Republic of the Philippines
DEPARTMENT OF TRANSPORTATION
AND
COMMUNICATIONS

JAPAN
INTERNATIONAL
COOPERATION
AGENCY

NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT

DRAWINGS

COMPONENT-3
Utility Works (U)

Subcomponent-3-1 Water Supply System (U1)
Subcomponent-3-2 Power Supply System (U2)
Subcomponent-3-3 Sewage Treatment System (U3)

August 2013

JICA DESIGN CONSULTANT JOINT VENTURE

JAPAN AIRPORT
CONSULTANTS,
INC.

NIPPON KOEI
CO., LTD.

NJS CONSULTANTS
CO., LTD.

DRAWING LIST

COMPONENT-3 UTILITY WORKS (U)
SUBCOMPONENT-3-1
(U1) WATER SUPPLY SYSTEM

SHEET No.	SHEET CONTENTS	SHEET No.	SHEET CONTENTS
U1-3110	**WATER SUPPLY**		
U1-3110-01	TYPICAL TRENCH DETAIL, CONCRETE THRUST BLOCKS, VERTICAL CONCRETE THRUST BLOCK, CONCRETE ANCHOR BLOCKS		
U1-3110-02	TYPICAL CULVERT CROSSING DETAIL, CONCRETE ENCASEMENT DETAIL OF BURIED GATE VALVE VALVE BOX & COVER		
U1-3110-03	DETAIL OF AIR VACUUM/AIR RELEASE VALVE ASSEMBLY, INSTALLATION DETAILS OF MAIN WATER METER,		
	BLOW-OFF VALVE INSTALLATION DETAIL		
U1-3130	**WATER SUPPLY AND DISTRIBUTION**		
U1-3130-01	DETAILS OF WATER TANK		
U1-3130-02	WATER DISTRIBUTION PUMP & EQUIPMENT LAYOUT		
U1-3130-03	DETAILS OF UNDERGROUND FIRE WATER STORAGE TANK		
U1-3150	**WATER DISTRIBUTION**		
U1-3150-01	COLD WATER LAYOUT		
U1-3150-02	FIRE HYDRANT PIPING LAYOUT		

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JAPAN AIRPORT CONSULTANTS, INC. | NIPPON KOEI CO., LTD. | NJS CONSULTANTS CO., LTD.

PREPARED BY:
VICTORIA P. ADECER
PROF: Sanitary Engineer | PTR. 2055781
REG. NO.: 0001927 | DATE: JAN 2013
T.I.N. 108-318-662 | PLACE: MANDALUYONG CITY

TADASHI AOI
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RECOMMENDNG APPROVAL:
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JULIANITO G. BUCAYAN, JR.
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PROJECT TITLE:
NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT

LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES

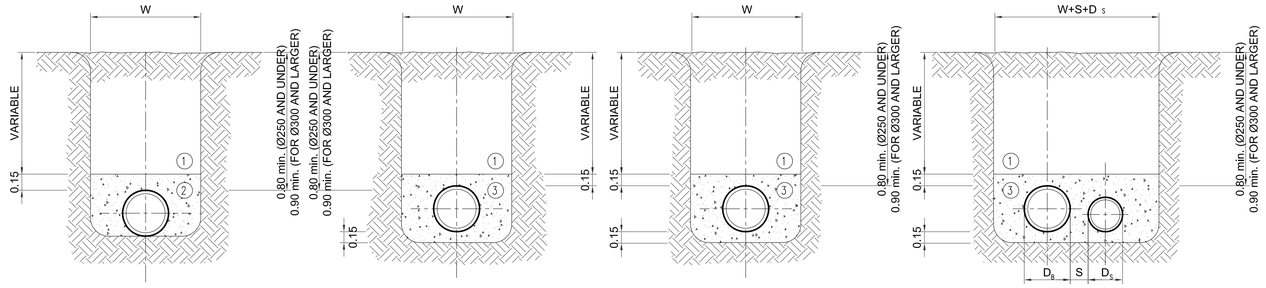
DATE	INDEX	AMENDMENTS	Prepared by	Checked by	Validated by
JUNE 2013				WIM	HC

SHEET CONTENTS:
COMPONENT-3 UTILITY WORKS (U)
SUBCOMPONENT-3-3
(U1) WATER SUPPLY SYSTEM

DRAWING LIST

SHEET NO: U1-LIST

DRAWING SCALE:



NORMAL INSTALLATION WHERE SAND BEDDING/ BACKFILL NOT REQUIRED

IN ROCK OR WHEN ORDERED BY ENGINEER

PVC INSTALLATION IN NON-GRANULAR SOIL AS DETERMINED BY ENGINEER

PVC INSTALLATION FOR TWO OR MORE PIPES

LEGEND:

1. COMPACTED SELECTED NATIVE MATERIAL BACKFILL (SEE SPECS.)
2. COMPACTED SELECTED NATIVE MATERIAL IN 0.15 LAYERS (SEE SPECS.)
3. APPROVED SAND BEDDING AND COMPACTED BACKFILL, HAND PLACED AND COMPACTED.

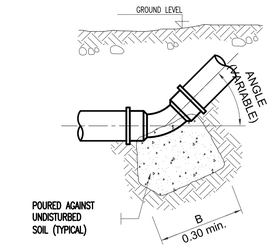
TABLE OF TRENCH DIMENSION (IN METERS)

PIPE DIAMETER							
mm	75 AND UNDER	100	150	200	250	300
in	3" AND UNDER	4"	6"	8"	10"	12"
MINIMUM "W"		0.20	0.40	0.45	0.50	0.55	0.60
MAXIMUM "W"		0.30	0.70	0.75	0.80	0.85	0.90

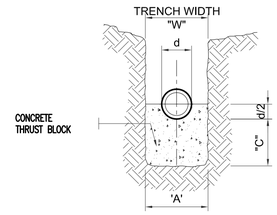
NOTES:

1. FOR MULTIPLE PIPES IN ONE TRENCH, USE TRENCH WIDTH OF BIGGEST PIPE PLUS SPACES SPECIFIED IN ROAD SECTIONS AND DIAMETERS OF SMALLER PIPES.
2. PAYMENT FOR ANY RESURFACING WILL BE BASED ON MAXIMUM TRENCH WIDTHS PER SIZE OF PIPE AS SHOWN ON TABLE OF TRENCH DIMENSION.

1 U1-3110-01 **TYPICAL TRENCH DETAIL** SCALE NTS



ELEVATION



BEARING AREA = A x B
SECTION

TABLE OF MINIMUM THRUST BLOCK DIMENSION FOR PIPE SIZES Ø75 TO Ø300

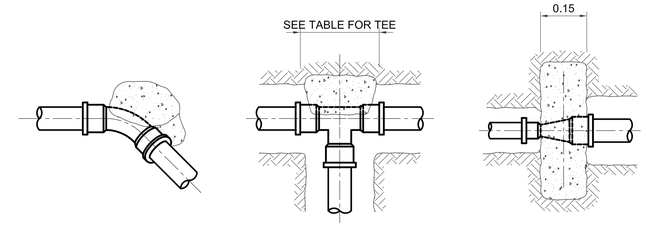
PIPE SIZE	"C"	THRUST BLOCK BEARING AREAS IN SQUARE METERS		
mm (in)	METERS	90° BEND	45° BEND	22 ½°BEND
ø75(3") & ø100(4")	0.25	0.14	0.12	+
ø150 (6")	0.25	0.31	0.17	0.12
ø200 (8")	0.25	0.54	0.30	0.15
ø250 (10")	0.25	0.85	0.46	0.24
ø300 (12")	0.30	1.23	0.66	0.34

+ THRUST BLOCK NOT REQUIRED

NOTES:

1. ABOVE AREAS ARE BASED ON AN ASSUMED SOIL BEARING PRESSURE 96 KPA (2000 psf)
2. REDUCE OR INCREASE AREAS PROPORTIONATELY TO SUIT ACTUAL FIELD CONDITIONS UPON APPROVAL OF ENGINEER
3. CONCRETE FOR THRUST BLOCK SHALL BE 13.8 MPA (2000 psi)
4. THRUST BLOCK NOT REQUIRED ON THE STEEL PIPELINES WITH WELDED OR FLANGED JOINTS OR ON SOLVENT WELDED PVC PIPE
5. WHERE PIPE CONNECTS TO A FITTING ON A STEEL PIPELINE, THE STEEL PIPELINE SHALL BE BLOCKED AS SHOWN HEREON
6. BEARING AREAS ARE BASED ON INTERNAL PRESSURE OF 106m (150 psi)

3 U1-3110-01 **VERTICAL CONCRETE THRUST BLOCKS** SCALE NTS



ISOMETRY OF THRUST BLOCK AREA

TEE

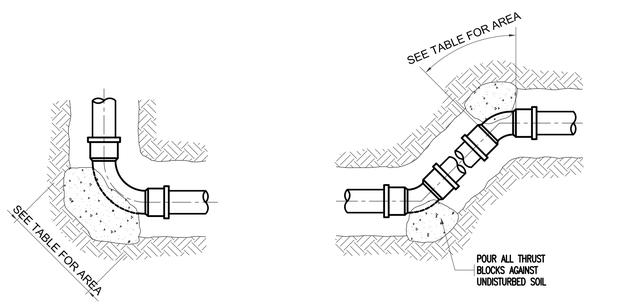
REDUCER

TABLE OF MINIMUM THRUST BLOCK BEARING AREAS IN SQUARE METERS FOR PIPE SIZES Ø75 TO Ø300

PIPE SIZE mm (in)	TEE AND DEAD END	90° BEND	45° BEND	22 ½° BEND
ø75 (3")	0.05	0.07	0.04	0.02
ø100 (4")	0.09	0.12	0.07	0.04
ø150 (6")	0.20	0.28	0.15	0.08
ø200 (8")	0.35	0.50	0.27	0.14
ø250 (10")	0.55	0.77	0.42	0.21
ø300 (12")	0.79	1.11	0.60	0.31

NOTES:

1. ABOVE AREAS ARE BASED ON AN ASSUMED SOIL BEARING PRESSURE OF 96 KPA (2000 psf)
2. REDUCE OR INCREASE AREA PROPORTIONATELY TO SUIT ACTUAL FIELD CONDITIONS UPON APPROVAL OF ENGINEER
3. CONCRETE FOR THRUST BLOCK SHALL BE 13.8 MPA (2000 psi)
4. ALL CONCRETE SHALL BE POURED TO AVOID INTERFERENCE WITH JOINTS
5. THRUST BLOCKS NOT REQUIRED ON STEEL PIPELINE WITH WELDED OR FLANGED JOINTS OR ON SOLVENT WELDED PVC PIPE
6. WHERE PIPE CONNECTS TO A FITTING IN A STEEL PIPELINE, THE STEEL PIPELINE SHALL BE BLOCKED AS SHOWN HEREON
7. BEARING AREAS ARE BASED ON INTERNAL PRESSURE OF 106m (150 psi)



90° ELBOW OR BEND

OFFSETS AND BEND

2 U1-3110-01 **HORIZONTAL CONCRETE THRUST BLOCKS** SCALE NTS

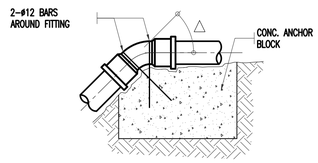


TABLE OF MINIMUM ANCHOR BLOCK VOLUMES IN CUBIC METERS FOR PIPE SIZE Ø75 TO Ø300

PIPE SIZE	PIPE DEFLECTION (△		
mm (in)	45°	22 ½°	11 ¼°
ø75 (3")	0.23	0.12	0.06
ø100 (4")	0.41	0.21	0.10
ø150 (6")	0.92	0.47	0.23
ø200 (8")	1.63	0.83	0.42
ø250 (10")	2.55	1.30	0.65
ø300 (12")	3.68	1.87	0.96

NOTES:

1. EMBED END OF BARS TO A MINIMUM OF 0.30 METERS INTO CONCRETE
2. CONCRETE FOR ANCHOR BLOCKS SHALL BE 13.8 MPA (2000 psi)
3. ANCHOR BLOCKS DIMENSIONS ARE BASED ON INTERNAL PRESSURE OF 106 M (150 psi)
4. THRUST BLOCKS NOT REQUIRED ON STEEL PIPELINES WITH WELDED OR FLANGED JOINTS OR ON SOLVENT WELDED PVC PIPE

4 U1-3110-01 **CONCRETE ANCHOR BLOCKS** SCALE NTS

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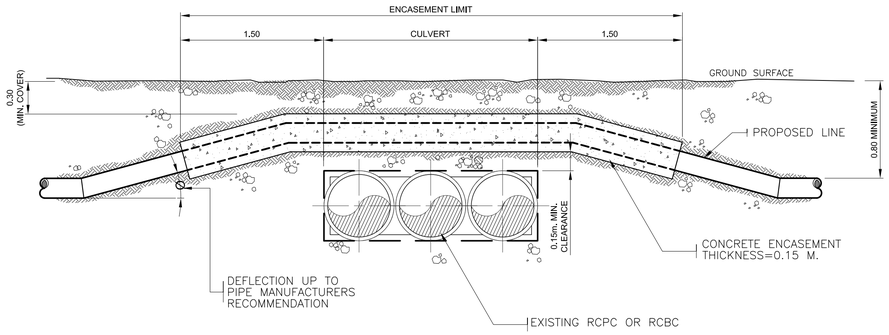
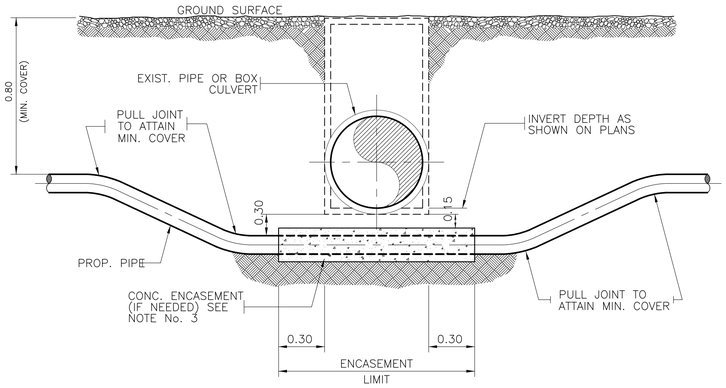
TYPICAL TRENCH DETAILS, HORIZONTAL CONCRETE THRUST BLOCKS, VERTICAL CONCRETE THRUST BLOCKS, CONCRETE ANCHOR BLOCKS

SHEET NO: U1-3110-01

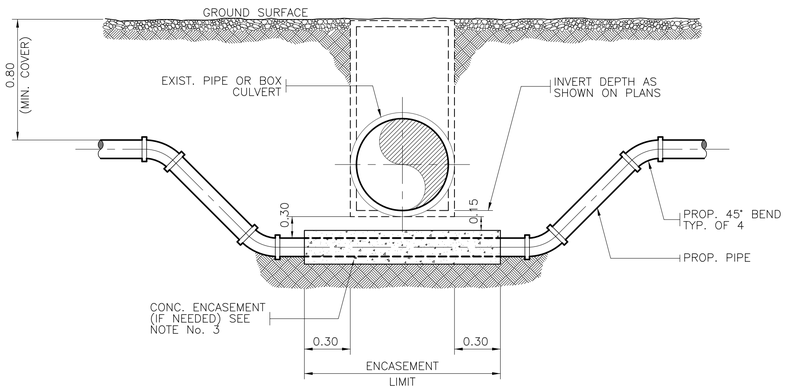
DRAWING SCALE: AS SHOWN



1. PIPE CROSS OVER CULVERT



3. PIPE CROSS UNDER CULVERT (W/ INVERT DEPTH <1.25M)



2. PIPE CROSS UNDER CULVERT (W/ INVERT DEPTH >1.25M)

1 U1-3110-02 **TYPICAL CULVERT CROSSING DETAIL**
SCALE NTS

NOTES:

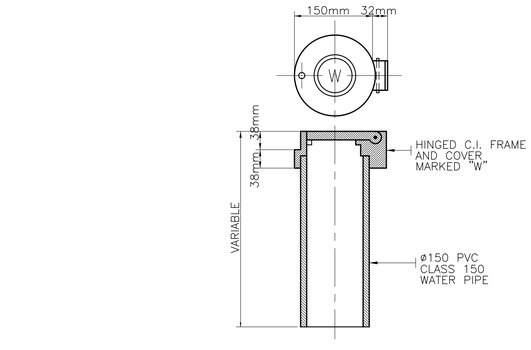
1. WHENEVER A PROPOSED PIPE ENCOUNTERS AN OBSTRUCTING CULVERT WITH CLEARANCE BETWEEN THE GROUND SURFACE AND THE TOP OF THE CULVERT OF AT LEAST 0.75M PLUS THE DIAMETER OF THE PROPOSED PIPE, SUCH PIPE SHALL BE DEFLECTED ABOVE THE CULVERT AS SHOWN IN TYPICAL DETAIL 1.

2. WHENEVER A PROPOSED PIPE ENCOUNTERS AN OBSTRUCTING CULVERT, SUCH PIPE SHALL BE DEFLECTED BELOW CULVERT AS SHOWN IN TYPICAL DETAIL 3 IF INVERT OF CULVERT DOES NOT EXCEED 1.25 M. BELOW GROUND SURFACE, OR AS SHOWN IN TYPICAL DETAIL 2 IF IT EXCEEDS 1.25 M.

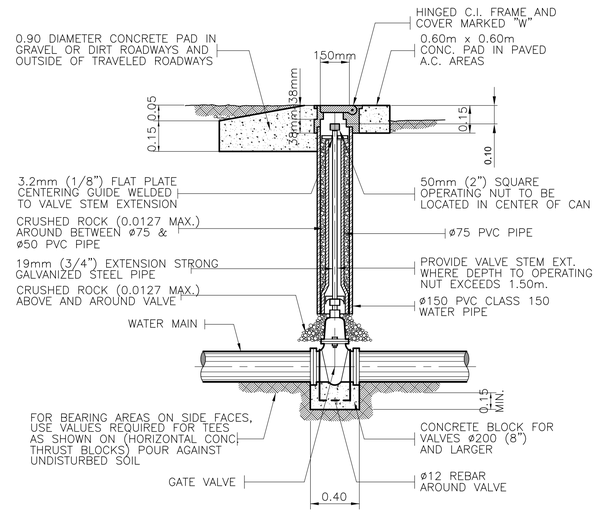
3. THE COST OF SUCH CULVERT CROSSING INCLUDES CONCRETE ENCASEMENT AND THE ESSENTIAL FITTINGS SHALL BE CONSIDERED AS INCLUDED IN THE CONTRACT UNIT PRICE FOR CORRESPONDING PIPE SIZE AND/OR MATERIAL. THE COST OF OVER EXCAVATION AS IN THE CASE OF DETAIL 2 SHALL BE PAID FOR IN ACCORDANCE WITH THE UNIT PRICE FOR OVER EXCAVATION.

4. IF FLEXIBLE OR RUBBER JOINTS OCCUR WITHIN THE LIMIT SHOWN AND/OR DEPTH OF PROPOSED PIPE FROM THE BOTTOM OF CULVERT IS LESS THAN 0.45 M., PROVIDE CONCRETE ENCASEMENT. THE COST OF CONCRETE ENCASEMENT SHALL BE PAID FOR IN ACCORDANCE WITH THE UNIT PRICE FOR CONCRETE ENCASEMENT.

2 U1-3110-02 **CONCRETE ENCASEMENT DETAIL**
SCALE NTS



4 U1-3110-02 **VALVE BOX AND COVER**
SCALE NTS



NOTES:

1. ALL DIMENSIONS IN METERS UNLESS OTHERWISE SHOWN.
2. VALVES SHALL HAVE MINIMUM COVER OF 0.30m. MEASURED TO THE TOP OF THE OPERATING NUT.
3. VALVES SHALL BE INSTALLED ON EXTENSION OF PROPERTY LINES EXCEPT WHERE OTHERWISE SHOWN OR SPECIFIED.
4. USE FLANGED END GATE VALVES ON STEEL AND PVC PIPELINE INSTALLATIONS.
5. CAST IRON OR STEEL COVER SHALL BE ADEQUATELY DESIGNED TO CARRY TRAFFIC LOADS.
6. CONCRETE BLOCK MAYBE OMITTED ON WELDED STEEL PIPELINES AT OPTION OF CONTRACTOR.

3 U1-3110-02 **INSTALLATION DETAIL OF BURIED GATE VALVE**
SCALE NTS

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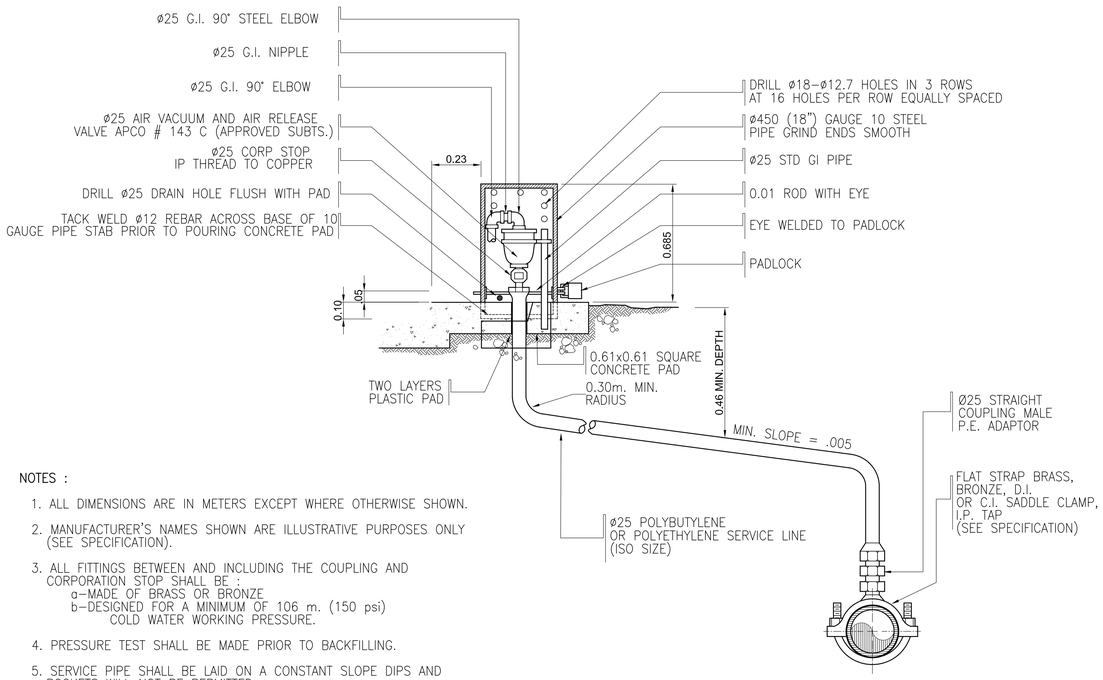
TYPICAL CULVERT CROSSING DETAIL, CONCRETE ENCASEMENT DETAIL, INSTALLATION DETAIL OF BURIED GATE VALVE, VALVE BOX AND COVER

SHEET NO: U1-3110-02

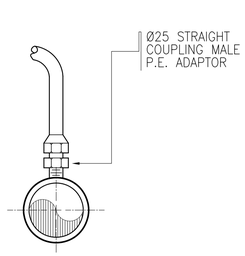
DRAWING SCALE: AS SHOWN



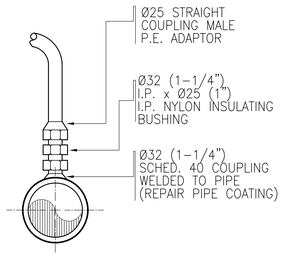
PVC PIPE

NOTES :

1. ALL DIMENSIONS ARE IN METERS EXCEPT WHERE OTHERWISE SHOWN.
2. MANUFACTURER'S NAMES SHOWN ARE ILLUSTRATIVE PURPOSES ONLY (SEE SPECIFICATION).
3. ALL FITTINGS BETWEEN AND INCLUDING THE COUPLING AND CORPORATION STOP SHALL BE :
   a–MADE OF BRASS OR BRONZE
   b–DESIGNED FOR A MINIMUM OF 106 m. (150 psi) COLD WATER WORKING PRESSURE.
4. PRESSURE TEST SHALL BE MADE PRIOR TO BACKFILLING.
5. SERVICE PIPE SHALL BE LAID ON A CONSTANT SLOPE DIPS AND POCKETS WILL NOT BE PERMITTED.
6. NOTATIONS :
   I.P.–IRON PIPE
   C.T.S.–COPPER TUBE SIZE
   C.S.–CORPORATION STOP
   COMP–COMPRESSION
7. WHERE NO CURBS OR GUTTERS EXIST, THE AIR VALVE SHALL BE INSTALLED WITHIN 1.50m. OF THE ROAD RIGHT–OF–WAY, OR AS DIRECTED BY ENGINEER, AND TWO BARRICADES SHALL BE INSTALLED SIMILAR TO STD. DRAWING.
8. THE AIR VACUUM AND AIR RELEASE ASSEMBLY ABOVE GROUND SHALL BE PAINTED IN ACCORDANCE WITH THE SPECS.
9. EQUIVALENT Ø25 ISO TUBING AND SERVICES FITTINGS WILL BE ALLOWED IN LIEU OF BRITISH UNITS SHOWN.
10. USE COPPER I.P. THREAD CORP. STOP IN LIEU OF COPPER TO I.P. THREAD CPLG. FOR WET TAP.
11. MINIMUM TUBING TRENCH WIDTH SHALL BE 0.15M. PAYMENT FOR ANY RESURFACING WILL BE BASED ON 0.20M. TRENCH WIDTH.



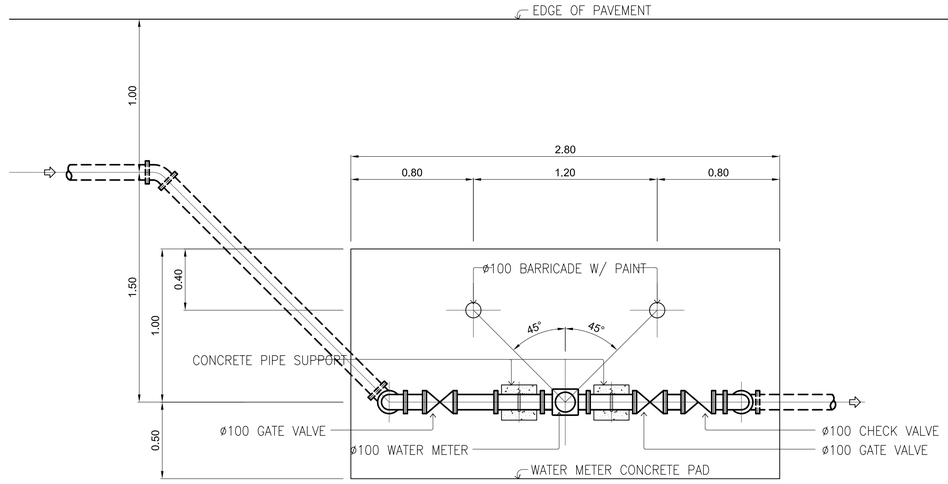
C.I. & D.I. PIPE



STEEL PIPE

1 U1–3110–03 — DETAIL OF AIR VACUUM/AIR RELEASE VALVE ASSEMBLY

SCALE: NOT TO SCALE



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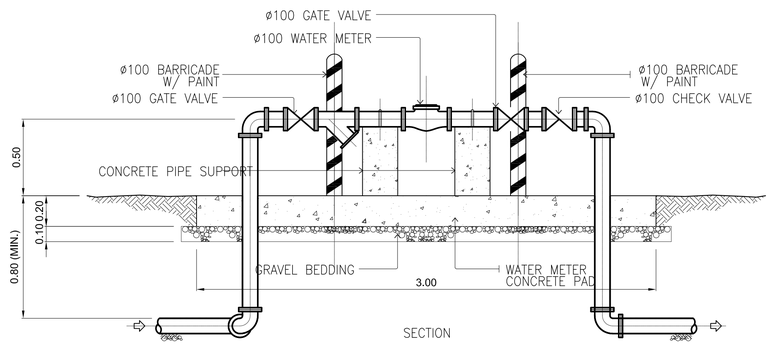
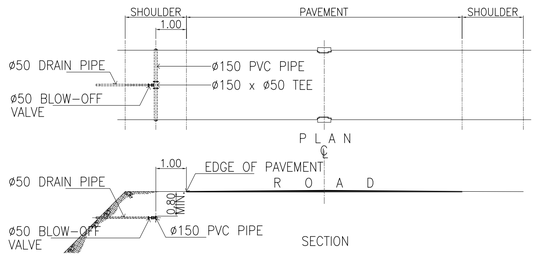


SECTION

2 U1–3110–03 — INSTALLATION DETAILS OF MAIN WATER METER

SCALE: 1:20 m.



P L A N

SECTION

3 U1–3110–03 — BLOW-OFF VALVE INSTALLATION DETAIL

SCALE: 1:50 m.

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DETAIL OF AIR VACUUM/AIR RELEASE VALVE ASSEMBLY, INSTALLATION DETAILS OF MAIN WATER METER, BLOW–OFF VALVE INSTALLATION DETAIL

SHEET NO: U1–3110–03

DRAWING SCALE: AS SHOWN

EQUIPMENT SCHEDULE

UNIT DESIGNATIONS	TYPE	CAPACITY (lps)	HEAD (psi)	POWER INPUT (kw)	ELECTRICAL CHARACTERISTICS		
					VOLTS	PHASE	HERTZ
FP 1	DIESEL–DRIVEN HORIZONTAL SPLIT–CASE FIRE PUMP	94.6	100		–	–	–
FP 2	ELECTRICAL–DRIVEN HORIZONTAL SPLIT–CASE FIRE PUMP	94.6	100	112.5	230	3	60
JP 1	ELECTRICAL–DRIVEN HORIZONTAL SPLIT–CASE JOCKEY PUMP	1.26	123	2.25	230	3	60
JP 2	ELECTRICAL–DRIVEN HORIZONTAL SPLIT–CASE JOCKEY PUMP	1.26	123	2.25	230	3	60

FUEL DAY TANK

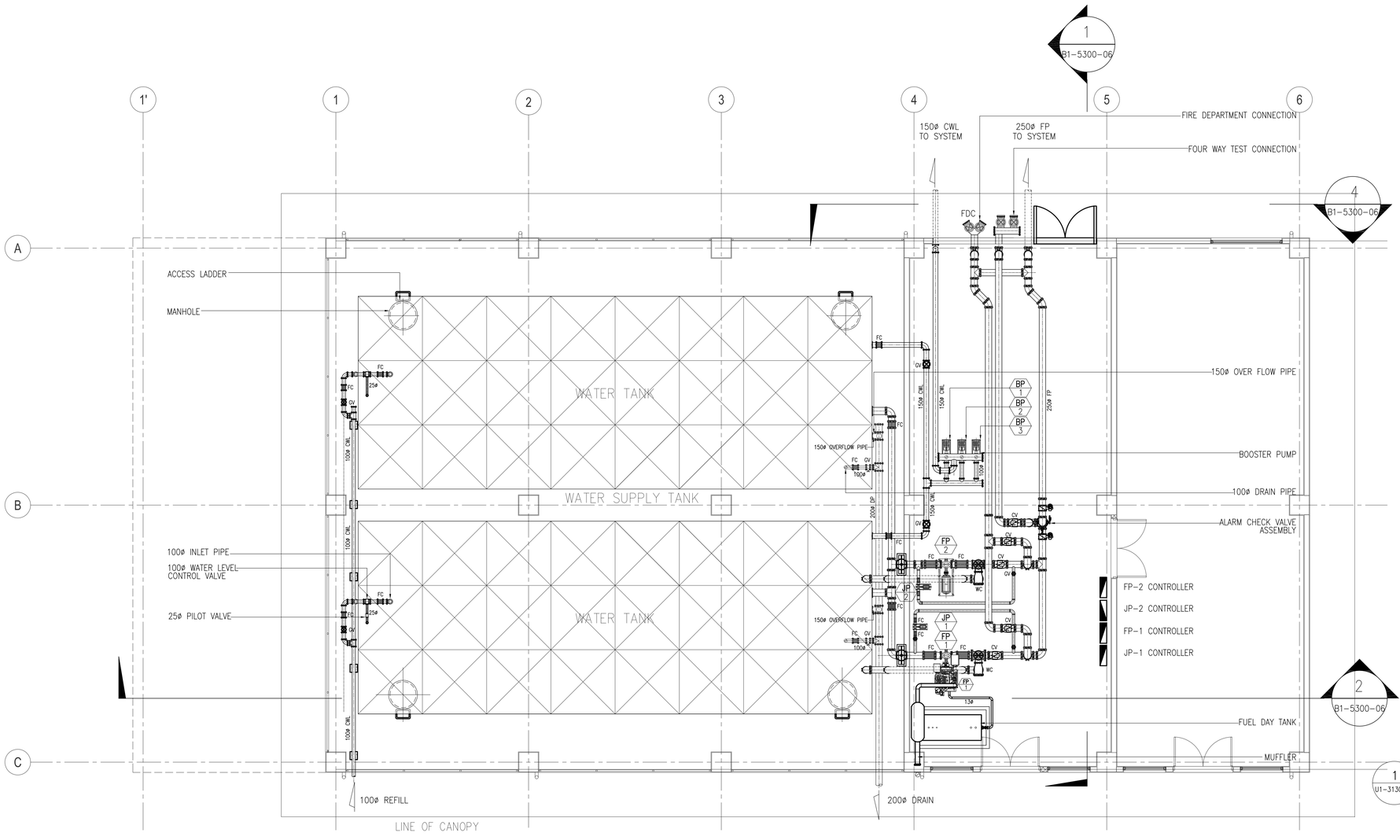
UNIT DESIGNATIONS	TYPE	CAPACITY (LITERS)	DURATION (MIN)	DIMENSION		REMARKS
				LENGTH	DIAMETER	
FDT 1	HORIZONTAL CYLINDRICAL TYPE FUEL DAY TANK	95	60	1100	600	BASED ON NFPA 30 FOR FIRE PUMP DRIVER

WATER SUPPLY PUMP

UNIT DESIGNATIONS	TYPE	CAPACITY (lps)	HEAD (psi)	POWER INPUT (kw)	ELECTRICAL CHARACTERISTICS			REMARKS
					VOLTS	PHASE	HERTZ	
BP 1	END SUCTION SPLIT–CASE HORIZONTAL CENTRIFUGAL PUMP	7.08	46.8	5.6	230	3	60	2 DUTY, 1 STAND–BY
BP 2	ELECTRICAL–DRIVEN HORIZONTAL SPLIT–CASE FIRE PUMP	7.08	46.8	5.6	230	3	60	
BP 3	ELECTRICAL–DRIVEN HORIZONTAL SPLIT–CASE JOCKEY PUMP	7.08	46.8	5.6	230	3	60	

NOTES :

1. GROOVED MECHANICAL COUPLING JOINTS FOR ALL FIRE PROTECTION PIPING (65mm AND ABOVE) SHALL CONSIST OF TWO DUCTILE IRON HOUSING SEGMENTS, PRESSURE RESPONSIVE EPDM GASKET, AND ZINC–ELECTROPLATED STEEL BOLTS AND NUTS.
   . RIGID COUPLINGS: HOUSINGS CAST WITH OFFSETTING, ANGLE–PATTERN BOLT PADS TO PROVIDE RIGIDITY.
   . FLEXIBLE COUPLINGS: USE IN LOACATIONS WHERE VIBRATION ATTENUATION AND STRESS RELIEF ARE REQUIRED.
2. CHECK VALVES
   . GROOVED END VALVES 65mm AND LARGER, SPRING–LOADED, WITH STAINLESS STEEL SPRING AND SHAFT AND DUCTILE IRON BODY.
3. BUTTERFLY VALVES
   . BUTTERFLY VALVES TO HAVE DUCTILE IRON GROOVED END BODY, STAINLESS STEEL STEM NICKEL COATED DUCTILE IRON DISC.
   . STEM SHALL BE OFFSET FROM THE DISC CENTERLINE TO PROVIDE FULL 360–DEGREE CIRCUMFERENTIAL SEATING.
4. PIPEWORK CONNECTIONS TO THE SUCTION AND DELIVERY OUTLETS OF PUMPS AND OTHER VIBRATING MACHINES COULD BE ISOLATED FROM SUCH SOURCES OF VIBRATION BY MEANS OF THREE FLEXIBLE MECHANICAL GROOVED COUPLINGS.



1 U1–3130–01 DETAILS OF WATER TANK

SCALE 1:75M

Republic of the Philippines DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

JAPAN INTERNATIONAL COOPERATION AGENCY

JICA DESIGN CONSULTANT JOINT VENTURE

JAPAN AIRPORT CONSULTANTS, INC. | NIPPON KOEI CO., LTD. | NJS CONSULTANTS CO., LTD.

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REG. NO.:	0001927	DATE:	JAN 2013
T.I.N.	108–316–662	PLACE:	MANDALUYONG CITY

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PROJECT TITLE:

NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT

LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES

DATE	INDEX	AMENDMENTS	Prepared by	Checked by	Validated by
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JUNE 2013				WIM	HC

SHEET CONTENTS:

COMPONENT–3: UTILITY WORKS
SUBCOMPONENT–3–1: WATER SUPPLY

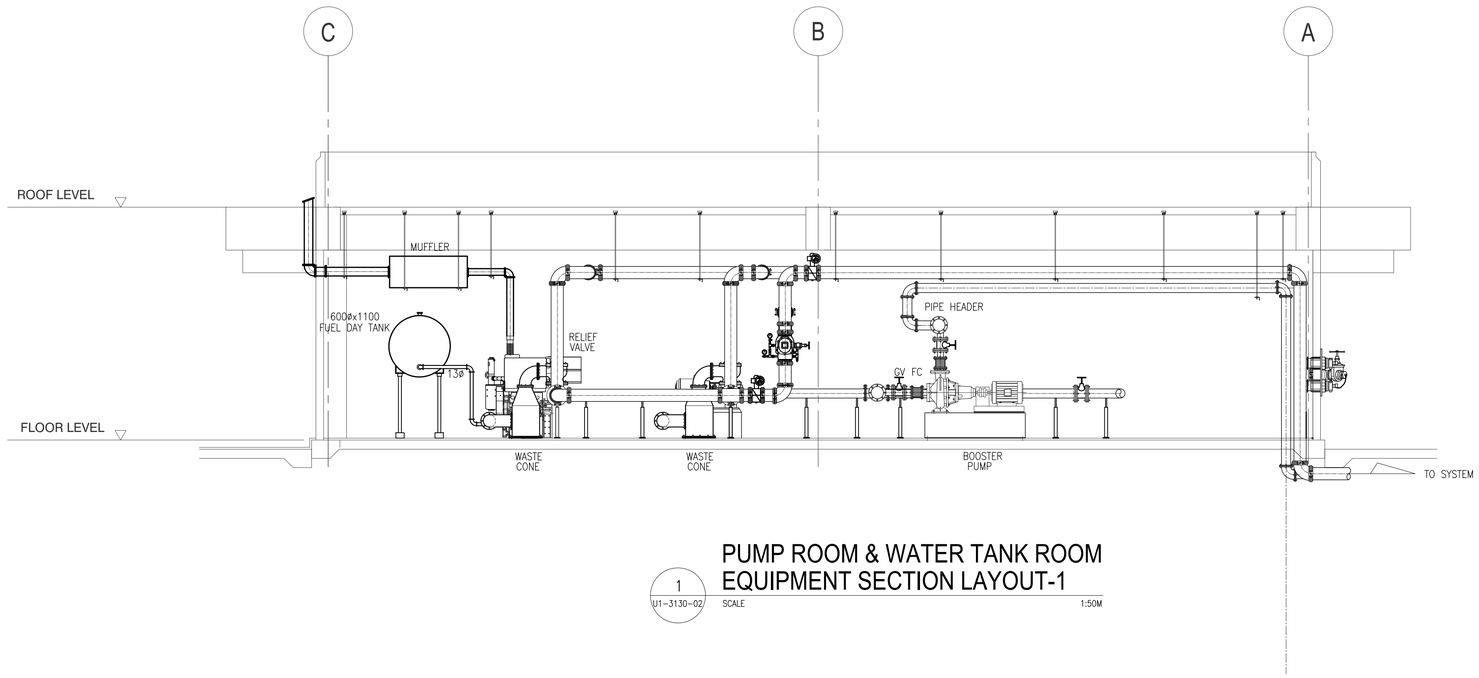
DETAILS OF WATER TANK

SHEET NO:

U1–3130–01

DRAWING SCALE:

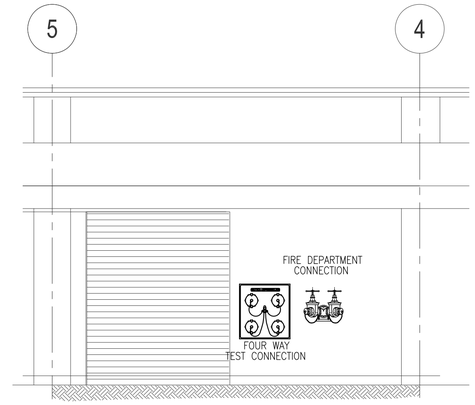
AS SHOWN



1 U1-3130-02

PUMP ROOM & WATER TANK ROOM EQUIPMENT SECTION LAYOUT-1

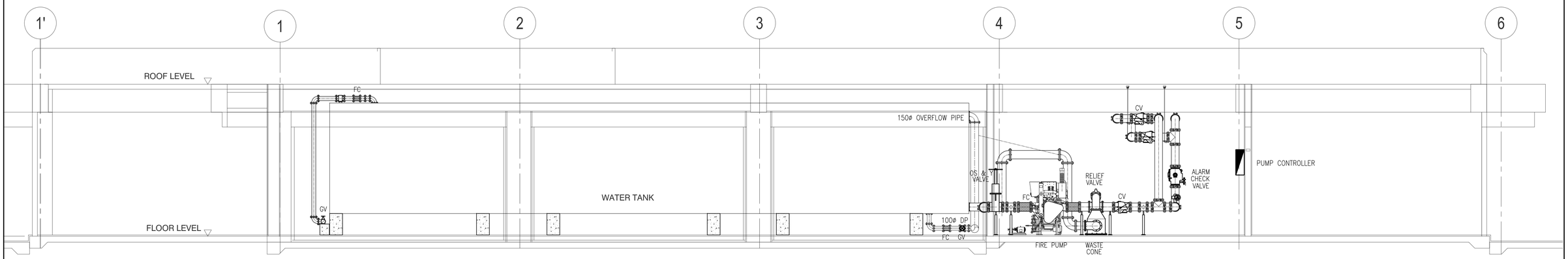
SCALE 1:50M



3 U1-3130-02

PUMP ROOM ELEVATION

SCALE 1:50M



2 U1-3130-02

PUMP ROOM & WATER TANK ROOM EQUIPMENT SECTION LAYOUT-2

SCALE 1:50M

Republic of the Philippines
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COMPONENT 3: UTILITY WORKS
SUBCOMPONENT-3-1: WATER SUPPLY SYSTEM
WATER DISTRIBUTION
PUMP AND EQUIPMENT LAYOUT

SHEET NO: U1-3130-02

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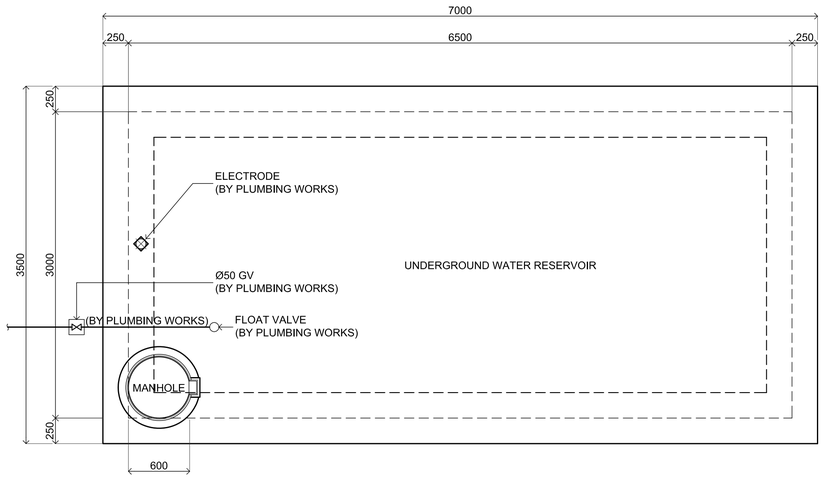
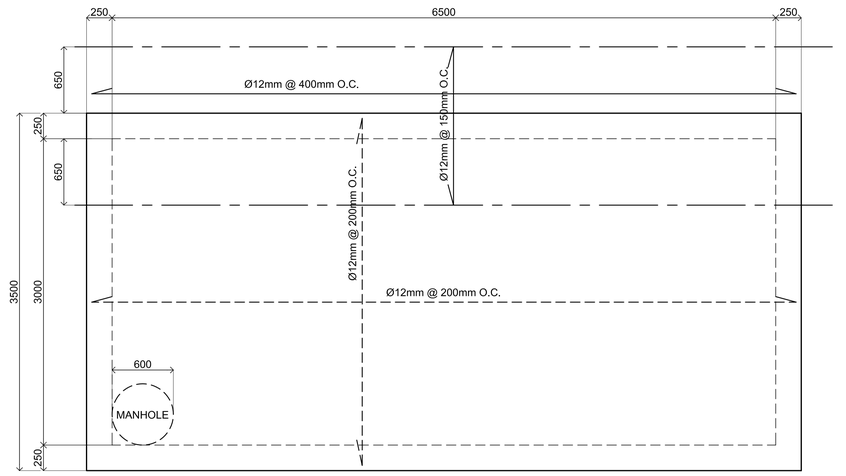
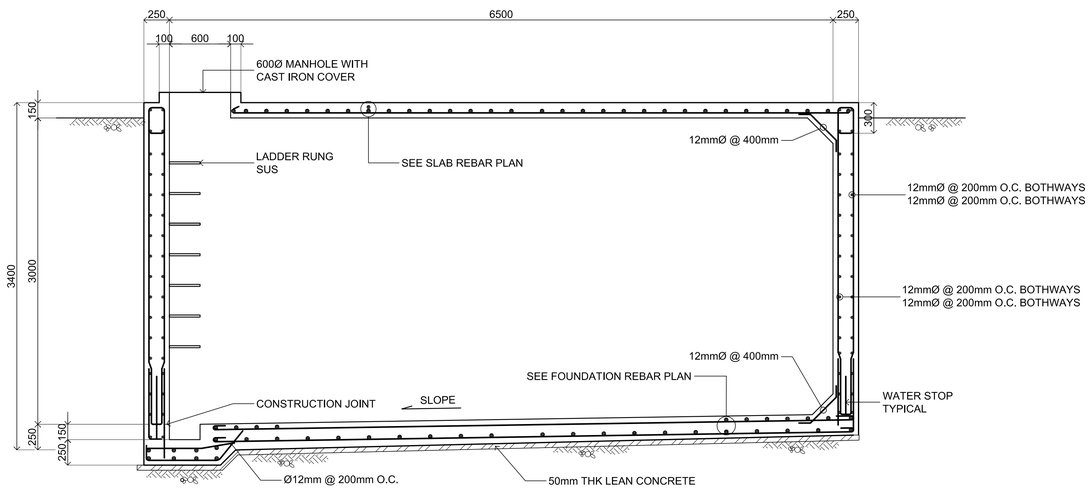


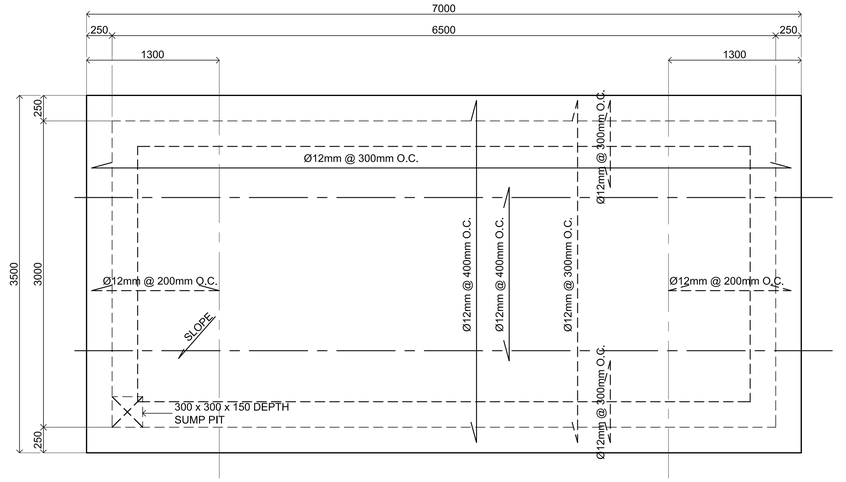
1 U1-3130-02 **PLAN** SCALE 1:30 m.



2 U1-3130-02 **SLAB REBAR PLAN** SCALE 1:30 m.



3 U1-3130-02 **SECTION** SCALE 1:30 m.



4 U1-3130-02 **FOUNDATION PLAN** SCALE 1:30 m.

UNDERGROUND FIRE WATER STORAGE TANK

SCALE AS SHOWN

Republic of the Philippines
DEPARTMENT OF TRANSPORTATION
AND
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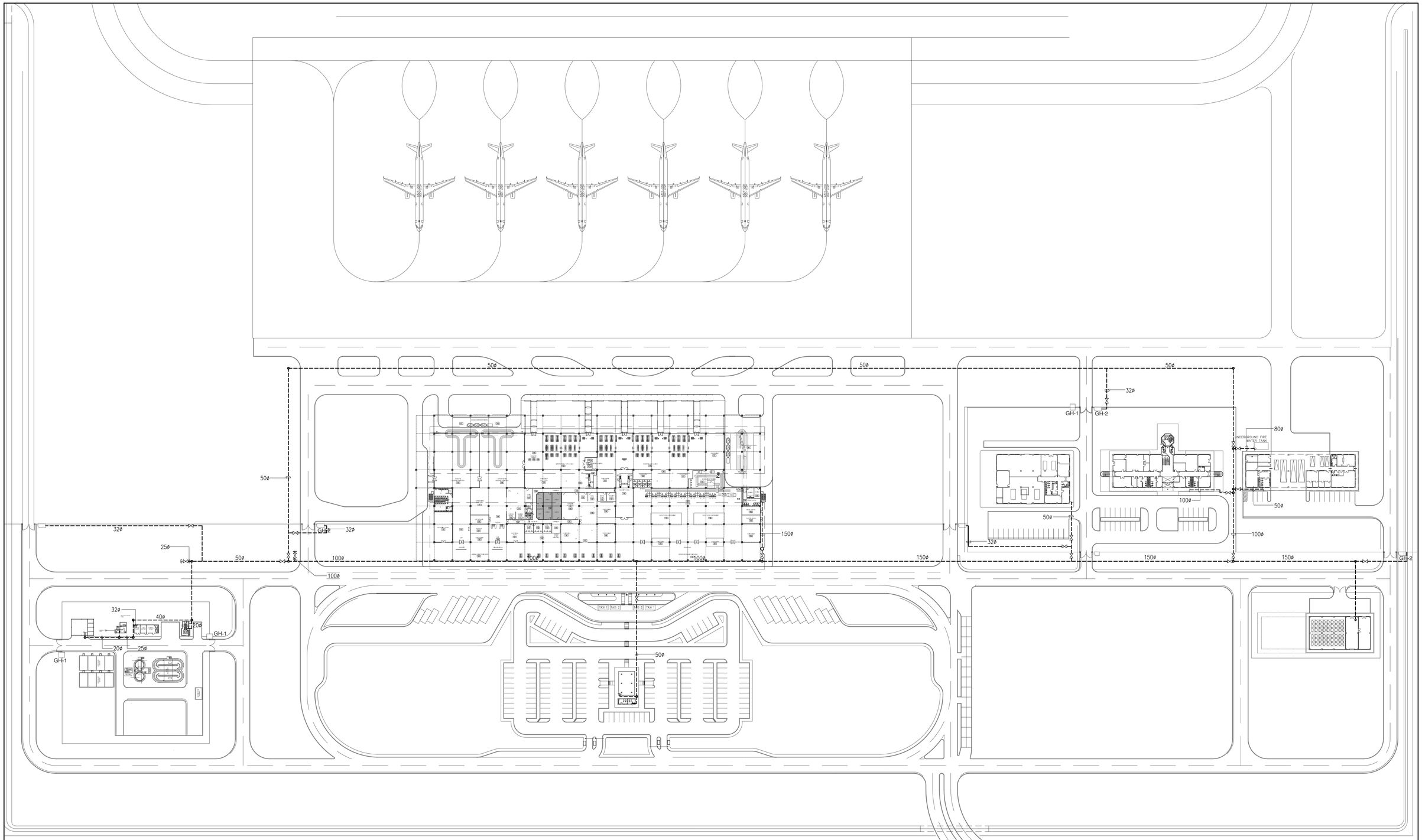
UTILITY WORKS
DIVISION 1: WATER SUPPLY AND DISTRIBUTION SYSTEM (WSD)

DETAILS OF UNDERGROUND FIRE WATER STORAGE TANK

SHEET NO: U1-3130-03

DRAWING SCALE: AS SHOWN



1 COLD WATER LAYOUT

U1-3150-01 SCALE 1:900M

Republic of the Philippines
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

JAPAN INTERNATIONAL COOPERATION AGENCY

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T.I.N. 108-318-662 | PLACE: MANDALUYONG CITY

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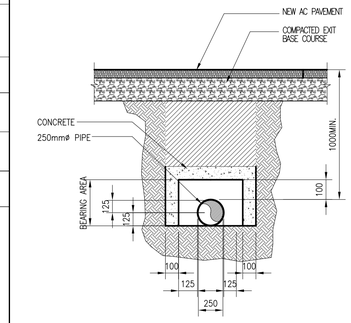
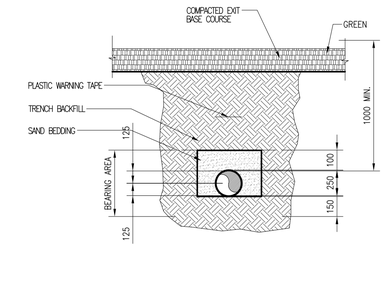
SUBCOMPONENT-3-1: WATER SUPPLY SYSTEM
WATER DISTRIBUTION
COLD WATER LAYOUT

SHEET NO: U1-3150-01

DRAWING SCALE: 1:900M.



DETAIL A-A



DETAIL B-B

1 U1-3150-02

FIRE HYDRANT PIPING LAYOUT

SCALE 1:900M

Republic of the Philippines DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS	JAPAN INTERNATIONAL COOPERATION AGENCY	PREPARED BY: RENATO A. ARRIOLA, PROF: MECHANICAL ENGINEER, PTR. 1725187, REG. NO.:2379, DATE: JANUARY 01, 2013, T.I.N. 150-563-379, PLACE: TAGUIG CITY	RECOMMENDNG APPROVAL: ILDEFONSO T. PATDU, JR., Assistant Secretary for Project Implementation, DOTC	APPROVED: JULIANITO G.-BUCAYAN, JR., Undersecretary for Project Implementation, DOTC	PROJECT TITLE: NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT	–	–	–	–	–	–	SHEET CONTENTS: COMPONENT 3: UTILITY WORKS, SUBCOMPONENT-3-1: WATER SUPPLY SYSTEM, WATER DISTRIBUTION, FIRE HYDRANT PIPING LAYOUT	SHEET NO: U1-3150-02
JICA DESIGN CONSULTANT JOINT VENTURE: JAPAN AIRPORT CONSULTANTS, INC.; NIPPON KOEI CO., LTD.; NJS CONSULTANTS CO., LTD.		TADASHI AOI, Team Leader			LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES	JUNE 2013				WIM	HC		DRAWING SCALE: 1:900M.
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DRAWING LIST

COMPONENT-3: UTILITY WORKS (U)

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U2-3210-02	LEGEND AND SYMBOLS1		
U2-3210-03	LEGEND AND SYMBOLS2		
U2-3210-04	13.2kV HVSG ONE-LINE DIAGRAM		
U2-3210-05	230V LVSGNE-PTB ONE-LINE DIAGRAM		
U2-3210-06	230V LVSGNE-CTO ONE-LINE DIAGRAM		
U2-3210-07	230V LVSGNE-PWH ONE-LINE DIAGRAM		
U2-3210-08	230V LVSGNE-AGL ONE-LINE DIAGRAM		
U2-3210-09	230V LVSGN-STP ONE-LINE DIAGRAM		
U2-3210-10	230V LVSG-Others SCHEDULE		
U2-3210-11	SUMMARY OF LOADS		
U2-3230-01	GENSET LAYOUT		
U2-3230-02	GENSET SECTION		
U2-3230-03	DAY TANK INSTALLATION DETAIL		
U2-3230-04	MAIN TANK INSTALLATION DETAIL		
U2-3250-01	Single Line Diaglam of Solar Power Generation System		
U2-3250-02	PV Module and ConnectionJuncion Boxes Layout		
U2-3250-03	Cables from PV modules to Power Conditioner		
U2-3270-01	LANDSIDE CONDUIT NETWORK		
U2-3270-02	CONCRETE PEDESTAL		
U2-3270-03	(PWH) ELEC. EQUIP. LAYOUT		
U2-3270-04	(PWH) CABLE TRENCH LAYOUT		
U2-3270-05	(CTO & FSM) CABLE TRENCH LAYOUT		
U2-3270-06	(WPH) CABLE TRENCH		
U2-3270-07	ELECTRICAL MANHOLE AND HANDHOLE DETAILS		
U2-3290-01	ROAD AND CAR PARK LIGHTS		
U2-3290-02	PANEL AND CONCRETE DUCT SCHEDULE		
U2-3290-03	ROAD LIGHT DETAILS		

Republic of the Philippines
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COMPONENT-3 UTILITY WORKS (U)
SUBCOMPONENT-3-2

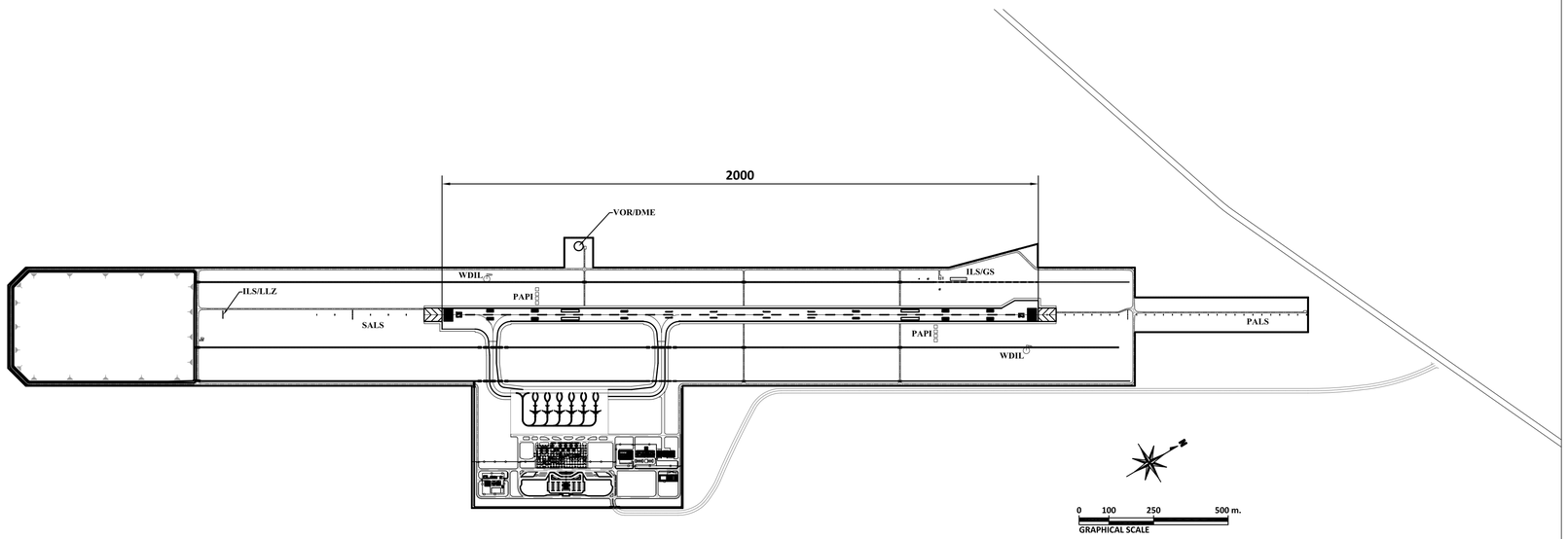
(U2) POWER SUPPLY SYSTEM
DRAWING LIST

SHEET NO:
U2-LIST

DRAWING SCALE:
AS SHOWN

GENERAL NOTES

1. ALL ELECTRICAL INSTALLATION HEREIN SHALL BE DONE IN ACCORDANCE WITH THE PROVISIONS OF THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE. THE RULES, REGULATIONS AND REQUIREMENTS OF THE LOCAL POWER COMPANY AND THE LAWS AND ORDINANCES OF THE LOCAL ENFORCING AUTHORITY.
2. ELECTRIC SERVICE SHALL BE 3ø, 3–WIRE, 13.2kV, 60HZ
3. THE CONTRACTOR SHALL VERIFY AND PROVISIONS OF THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE.
4. ALL CONDUCTORS SHALL BE COPPER, TYPE XLPE AND THNN 90°C, 600 VOLT INSULATION, MINIMUM SIZE SHALL BE 3.5mm², UNLESS OTHERWISE SPECIFIED.
5. ALL MATERIALS SHALL BE NEW AND OF THE APPROVED TYPE FOR THE LOCATION INTENDED.
6. ALL 20 AMPERE CIRCUIT HOMERUNS TO PANELBOARD, MORE THAN 30.0M(100ft) IN LENGTH SHALL BE 5.5mm², UNLESS OTHERWISE SPECIFIED.
7. STANDARD TYPE OF ACCESSORIES, SPLICING DEVICES, TERMINATION AND OTHER APPURTENANCES FOR THE ENTIRE ELECTRICAL INSTALLATIONS SHALL BE USED EVEN IF THESE ARE NOT INDICATED ON THE PLAN AND BILL OF QUANTITIES.
8. FOR ACTUAL LOCATION OF LIGHTING FIXTURES MOTORS AND OTHER ELECTRICAL EQUIPMENT SEE ARCHITECTURAL, MECHANICAL, FIRE PROTECTION AND SANITARY DRAWINGS.
9. ALL NON–CURRENT CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT, LIGHTING FIXTURE AND POWER OUTLET SHALL BE EFFECTIVELY GROUNDED.
10. CONDUITS AND OTHER WIRE ROUTING SHOWN ARE ONLY REPRESENTATION THE CONTRACTOR, SHALL SUBMIT SHOP DRAWINGS ON ALL PROPOSED ROUTING (SHOWN OR EVEN NOT SHOWN IN THE PLAN) AND INSTALLATION FOR APPROVAL.
11. BOXES SHALL BE MADE OF CODE GAGE STEEL WITH ZINC CHROMATE PROTECTION.
12. MOUNTING HEIGHTS FOR SWITCHES AND CONVENIENCE OUTLETS SHALL BE 1.37M AND 0.30M RESPECTIVELY, UNLESS OTHERWISE NOTED.
13. EXPOSED CONDUIT RUNS & CABLE TRAY SHALL BE INSTALLED PARALLEL TO OR PERPENDICULAR WITH THE BUILDING LINE AND SUPPORTED BY CONDUIT CLAMPS EVERY 1.5M.
14. PULLBOXES SHALL BE PROVIDED BY THE CONTRACTOR WHENEVER NECESSARY TO FACILITATE WIRE PULLING EVEN IF THESE ARE NOT INDICATED ON THE PLANS.
15. LAYOUT DIMENSION SHOWN IN DRAWINGS ARE APPROXIMATE ONLY AND INTENDED TO SERVE AS AN INSTALLATION GUIDE. DIMENSION MAY BE ADJUSTED AS REQUIRED TO MEET FIELD CONDITION. WHENEVER FIELD CONDITION OR EXIGENCIES OF CONSTRUCTION MAKE DEPARTURE FROM THE LAYOUT SHOWN, DETAIL OF SUCH DEPARTURE FROM PLAN AND REASON THEREOF SHALL BE SUBMITTED TO THE OWNER OR HIS DULY AUTHORIZED REPRESENTATIVE AND NO DEPARTURE SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE AUTHORITIES CONCERNED.
16. ELECTRICAL WORKS SHALL BE UNDER THE FULL SUPERVISION OF A DULY LICENSED AND PROFESSIONAL ELECTRICAL ENGINEER.



VICINITY PLAN
NOT TO SCALE

Republic of the Philippines
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

JAPAN INTERNATIONAL COOPERATION AGENCY

JICA DESIGN CONSULTANT JOINT VENTURE
JAPAN AIRPORT CONSULTANTS, INC.
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SHEET CONTENTS:
COMPONENT–3
UTILITY WORKS (U)
SUBCOMPONENT–3–2
(U2) Power Supply System
GENERAL NOTES & VICINITY PLAN

SHEET NO:
U2–3210–01

DRAWING SCALE:
AS SHOWN

POWER DISTRIBUTION

SYMBOLS	DESCRIPTION	REMARKS
A	AMMETER	
V	VOLTMETER	
W	WATT METER	
KWH	KILOWATT-HOUR METER	
PF	POWER-FACTOR METER	
F	FREQUENCY METER	
RH	RUNNING HOUR METER	
T	TIMER (24 HOURS)	
VH	VAR HOUR METER	
NGR	NEUTRAL GROUNDING RESISTOR	
	CAPACITOR BANK	
	DIESEL ENGINE GENERATOR	
	FRAME, TO GROUNDING	
	POWER TRANSFORMER (RATING AS INDICATED IN DRAWINGS)	
VS	VOLTMETER CHANGE OVER SWITCH	
AS	AMMETER CHANGE OVER SWITCH	
PT	POTENTIAL TRANSFORMER	
CT	CURRENT TRANSFORMER	
VT	POTENTIAL TRANSFORMER	
ZPD	GROUNDING (FAULT) PROTECTIVE RELAY SWITCHGEAR	
	DISCONNECTING SWITCH (MANUAL HANDLE OPERATED)	
VCB	VACUUM CIRCUIT BREAKER	
ACB	POWER CIRCUIT BREAKER	
MCCB	MOLDED CASE CIRCUIT BREAKER	
MC	ELECTROMAGNETIC CONTRACTOR	
VCCT	VACUUM MAGNETIC CONTRACTOR	
SR	SERIES REACTOR	
SC	STATIC CAPACITOR	
3-250mm²	3 CORES-250 SQUARE MILLIMETERS (CONDUCTOR)	
XLPE	600 VOLT CROSS-LINKED POLYETHYLENE INSULATED CABLE	
15KV XLPE	15000 VOLT CROSS-LINKED POLYETHYLENE INSULATED CABLE	
PF	POWER FUSE	
LBS	LOAD BREAK SWITCH	
	DISCONNECTING SWITCH (MANUAL HANDLE OPERATED)	
	DISCONNECTING SWITCH (MOTOR DRIVEN)	
LA	LIGHTNING ARRESTER	
SA	SURGE ARRESTER	
	MEANS DRAWING OUT TYPE	

POWER DISTRIBUTION

SYMBOLS	DESCRIPTION		REMARKS
27 R	AC UNDER VOLTAGE	RECEIVE	
27 E	RELAY	EMERGENCY	
51 R	AC OVER CURRENT RELAY	RECEIVE	
51 E		ENGINE GENERATOR	
51 C		CAPACITY	
51 F		FEEDER	
51 R		EMERGENCY GROUND	
51 S		SECONDARY	
51 G		GROUND	
51 N	AC OVER CURRENT RELAY	NEUTRAL	
51 EG	GROUND RELAY	EMERGENCY GROUND	
51 GN		EMERGENCY NEUTRAL	
59 E	AC OVER VOLTAGE RELAY	EMERGENCY GENERATOR	
84 E	AC VOLTAGE RELAY	EMERGENCY GENERATOR	
87 T	CURRENT DIFFERENTIAL RELAY	TRANSFORMER	
89R	DISCONNECTING SWITCH	RECEIVE	
67 S	DIRECTIONAL SHORT CIRCUIT RELAY		
59 R	OVER VOLTAGE RELAY	RECEIVE	
AQR	OVERCURRENT RELAY		
WHA	MEASUREMENT RELAY		
AT	CURRENT TRANDUCER FOR TELEMETERING		
VT	VOLTAGE TRANDUCER FOR TELEMETERING		
PFT	POWER-FACTOR TRANDUCER FOR TELEMETERING		
FT	FREQUENCY TRANDUCER FOR TELEMETERING		
T	TIMER (24 HOURS, FREQUENTLY)		
HPF	HIGH TENSION POWER FUSE		
EMH	ELECTRICAL MANHOLE		
EHH	ELECTRICAL HANDHOLE		
CH	CABLE TERMINATION HEAD		
	TEST TERMINAL (DRAWING OUT TYPE)		

AUXILIARY

SYMBOLS	DESCRIPTION	REMARKS
FACP	FIRE ALARM CONTROL PANEL	REFER TO NOTES
TEL	REMOTE TELEPHONE HANDSET	REFER TO NOTES
RAP	REMOTE ANNUNCIATOR PANEL	
FATC	FIRE ALARM TERMINAL CABINET	
SWS	SUPERVISORY WORK STATION	REFER TO NOTES
FZL	FIRE ZONE LOCATOR	
T	FIREMAN'S/MAINTENANCE TELEPHONE JACK	
F	FIREMAN ALARM MANUAL PULL STATION	
B	ALARM HORN STROBE	
B	ALARM BELL	
SD	PHOTOELECTRIC SMOKE DETECTOR	SURFACE TYPE
SD_A	PHOTOELECTRIC SMOKE DETECTOR	INSTALLED IN ABOVE CEILING OR VOID SPACE
SD_D	AIRCON DUCT PHOTOELECTRIC SMOKE DETECTOR	
SD_A	PHOTOELECTRIC SMOKE DETECTOR	WALL MOUNTED
HD_{FT}	FIXED TYPE PHOTOELECTRIC HEAT DETECTOR	
HD_R	RATE OF RISE PHOTOELECTRIC HEAT DETECTOR	
M D F	MAIN DISTRIBUTION FRAME	
PABX	PRIVATE ADDRESS BRANCH EXCHANGE	
IDF	INTERMEDIATE DISTRIBUTION FRAME	
DTC	DATA TERMINAL BOARD	FOR DATA ONLY
TTC	TELEPHONE TERMINAL BOARD	FOR TELEPHONE ONLY
TB	TERMINAL BOARD	MAY COMBINED WITH TELEPHONE, CCTV, CATV OR SYNCHRONIZING CLOCK, WITH PARTITION
	COMPUTER DATA LINE OUTLET WITH RJ45 DEVICE	WALL MOUNTED
	COMPUTER DATA LINE OUTLET WITH RJ45 DEVICE	FLOOR MOUNTED
	TELEPHONE OUTLET WITH RJ11 DEVICE	WALL MOUNTED
	TELEPHONE OUTLET WITH RJ11 DEVICE	FLOOR MOUNTED
	CAMERA WITH MOTORIZED CONTROL ZOOM LENS	INDOOR TYPE
	CAMERA WITH MOTORIZED CONTROL ZOOM LENS	OUTDOOR TYPE
ILSE	INLINE SLOPE EQUALIZER	
	AMPLIFIER FOR SIGNAL	
4W	4-WAY SPLITTER	
2W	2-WAY SPLITTER	
	TV UNIT OUTLET	
	MASTER CLOCK	
A	SINGLE FACED ANALOG SLAVE CLOCK	
D	SINGLE FACED DIGITAL SLAVE CLOCK	
	GPS ANTENNA/RECIEVER	
	SPEAKER WITH CEILING GRILL, 6W	WIDE DISPERSION TYPE (AT LEAST 120°)
A	SPLASHPROOF SPEAKER, 20W	
B	WALL MOUNTED SPEAKER, 30W	
C	WALL MOUNTED SPEAKER, 30W	
D	WALL MOUNTED BOX SPEAKER, 3W	
	PAGING HORN SPEAKER, 15W	
	ATTENUATOR, 0.5-30W	
M	DESK TOP MICROPHONE	

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JICA DESIGN CONSULTANT JOINT VENTURE

JAPAN AIRPORT CONSULTANTS, INC. | NIPPON KOEI CO., LTD. | NJS CONSULTANTS CO., LTD.

PREPARED BY:

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REG. NO.:	1927	DATE:	1-04-13
T.I.N.	119-747-900	PLACE:	MANILA

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PROJECT TITLE:

NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT

LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES

DATE	INDEX	AMENDMENTS	Prepared by	Checked by (WIM)	Validated by (HC)
JUNE 2013					

SHEET CONTENTS:

COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
LEGEND AND SYMBOLS1

SHEET NO:

U2-3210-02

DRAWING SCALE:

AS SHOWN

LIGHTING AND RECEPTACLE

SYMBOLS	DESCRIPTION	REMARKS
	1 x 36W FLUO. FIXTURE, LOOVER TYPE, SURFACE MTD.	NON–SHADED QUADRANT = NORMAL SUPPLY SHADED QUADRANT = NORMAL/EMERGENCY SUPPLY SEE LIGHTING DETAILS
	1 x 36W FLUO. FIXTURE, V–SHAPE TYPE, SURFACE MTD.	
	1 x 36W FLUO. FIXTURE, TROFFER TYPE RECESSED MTD. WITH LOUVER	
	1 x 36W FLUO. FIXTURE, VAPOR TIGHT, SURFACE MTD.	
	1 x 36W FLUO. FIXTURE, VAPOR TIGHT, WALL MTD.	
	2 x 36W FLUO. FIXTURE, LOOVER TYPE, SURFACE MTD.	
	2 x 36W FLUO. FIXTURE, V–SHAPE TYPE, SURFACE MTD.	
	2 x 36W FLUO. FIXTURE, TROFFER TYPE RECESSED MTD. WITH LOUVER	
/	1 x 18W FLUO. FIXTURE, LOOVER TYPE, RECESSED MTD.	
/	4 x 18W FLUO. FIXTURE, TROFFER TYPE RECESSED MTD. WITH LOUVER	
/	1 x 18W PLC, RECCESSED MOUNTED TYPE, DOWN LIGHT	
/	WALL LAMP W/ 1 x 18W CFL	
	1 x 18W PLC, RECCESSED MOUNTED TYPE, DOWN LIGHT (WEATHERPROOF TYPE)	
	1 x 18W CFL (WEATHERPROOF TYPE)	
WP	WALL LAMP W/ 1 x 18W CFL (WEATHERPROOF TYPE)	NORMAL SUPPLY, SEE LIGHTING DETAILS
MH	METAL HALIDE, WATTAGE AS INDICATED IN DRAWING	NORMAL SUPPLY, SEE LIGHTING DETAILS
/	EXIT SIGN LIGHT, SHADED QUADRANT INDICATES SIGN LETTER FACE CEILING / WALL MOUNTED	NORMAL/EMERGENCY SUPPLY, SEE LIGHTING DETAILS
	DUPLEX RECEPTACLE, 15A, 240V, PARALLEL BLADE GROUNDING SLOT	
	DUPLEX RECEPTACLE, 15A, 240V, PARALLEL BLADE GROUNDING SLOT (FLOOR MTD.)	
WP	DUPLEX RECEPTACLE, 15A, 240V, PARALLEL BLADE GROUNDING SLOT (WEATHERPROOF TYPE)	
	TWISTLOCK RECEPTACLE, 15A, 240V, PARALLEL BLADE GROUNDING SLOT	
HD	HANDDRYER OUTLET, SINGLE RECEPTACLE, 15A, 240V, PARALLEL BLADE GROUNDING SLOT (STAINLESS STEEL COVER)	
	ACU RECEPTACLE, 20A, 240V, 3W, SAME CONFIGURATION AS ACU PLUG, WITH PLATE	
	MANUAL DISCONNECT SWITCH SIZE AND RATING AS INDICATED IN DRAWING	
WH	WATER HEATER, MANUAL DISCONNECT SWITCH, SIZE AND RATING AS INDICATED IN DRAWING	
	JUNCTION BOX	
$\$_2$	LIGHT SWITCH, FLUSH TUMBLER , 1 WAY 1–GANG, 15A, 300V	
$\$_3/\$_4$	LIGHT SWITCH, FLUSH TUMBLER, 3WAY / 4WAY 1–GANG, 15A, 300V	
"a"	LETTER INDICATES FIXTURE OR DEVICE CONTROLLED BY SWITCH "a" OTHER LETTERS, SAME	
	RACEWAY CONCEALED IN CEILING OR WALL, NO HATCH MARK INDICATES 3 x 3.5mm² THHN WIRES (UNLESS OTHERWISE INDICATED) WITHIN INCLUDING GROUND. HATCH MARKS INDICATE NUMBER OF WIRES WITHIN INCLUDING GROUND	
	RACEWAY CONCEALED BELOW, FIN. FLR. "DITTO"	
	CIRCUIT HOMERUN	
	RISER UP OR RISER DOWN	
C	COUNTERPOISE	
G	GROUND WIRE	
CB	ENCLOSED CIRCUIT BRAKER, SIZE AND RATING AS INDICATED IN DRAWING	
"N"	PANELBOARD	NORMAL SUPPLY
"NE"	PANELBOARD	NORMAL/EMERGENCY SUPPLY

ABBREVATIONS

BOHECO	BOHOL ELECTRIC COOPERATIVE
HVSG	HIGH VOLTAGE SWITCH GEAR (13.2kV)
LVSG	LOW VOLTAGE SWITCH GEAR (460V / 230V)
GSG	GENERATOR SWITCH GEAR
CCR	CONSTANT CURRENT REGULATOR
CB	CIRCUIT BREAKER
DC	DIRECT CURRENT (DEVICE)
MCC	MOTOR CONTROL CENTER
ABN	AERODROME BEACON
E.I.	ELECTRICAL INTERLOCK
M.I.	MECHANICAL INTERLOCK
3ø 3W	THREE PHASE, THREE WIRE
1ø 2W	ONE PHASE, TWO WIRE
4P	FOUR POLES
3P	THREE POLES
2P	TWO POLES
V	VOLTAGE (VOLTS)
A	CURRENT (AMPERE/S)
kW	REAL POWER (KILO–WATT)
kVAR	REACTIVE POWER (REACTIVE KILO–VOLT AMPERE)
kVA	APPARENT POWER (KILO–VOLT AMPERE)
kAIC	KILO–AMPERE INTERUPTING CAPACITY
"N"	NORMAL SUPPLY
"NE"	NORMAL/EMERGENCY SUPPLY
VAC	VENTILLATION AND AIRCONDITIONING
PTB	PASSENGER TERMINAL BUILDING
CTB	CARGO TERMINAL BUILDING
FSM	FIRE STATION AND MAINTENANCE BUILDING
DRL	DRIVER'S LOUNGE
CPT	CAR PARK TOILET
GDH	GUARD HOUSE
TLB	TOLL BOOTH
WPH	WATER TANK AND PUMP HOUSE
PWH	POWER HOUSE
STP	SEWAGE TREATMENT PLANT
MRF	MATERIAL RECOVERY FACILITY
CTO	CONTROL TOWER, OPERATIONS AND ADMINISTRATION BUILDING
LLZ	LLZ BUILDING
GSB	GS BUILDING
VOR	VOR BUILDING
PNS	PHILIPPINE NATIONAL STANDARD
IEC	INTERNATIONAL ELECTROTECHNICAL COMMISION

METRIC - ENGLISH CONVERSION TABLE

WIRES AND CABLES			CONDUIT	
mmø SOLID	AWG	MCM	mmø	inø
1.25	NO. 16		15	1/2
1.6	NO. 14		20	3/4
2.0	NO. 12		25	1
2.6	NO. 10		32	1–1/4
mm² STRANDED			40	1–1/2
1.25	NO. 16		50	2
2	NO. 14		65	2–1/2
3.5	NO. 12		75	3
5.5	NO. 10		90	3–1/2
8	NO. 8		100	4
14	NO. 6			
22	NO. 4			
30	NO. 2			
38	NO. 1			
50	1/0			
60	2/0			
80	3/0			
100	4/0			
125		250		
150		300		
175		350		
200		400		
250		500		

NOTE: CONDUIT SIZES IN (mmø) ARE BASED ON INSIDE DIAMETER.

NEAREST EQUIVALENT PNS - IEC

PNS	IEC
mm² STRANDED	mm² STRANDED
3.5	2.5
5.5	4
8	6
14	10
22	16
30	25
38	35
50	50
80	70
100	95
125	120
150	150
200	185
250	240

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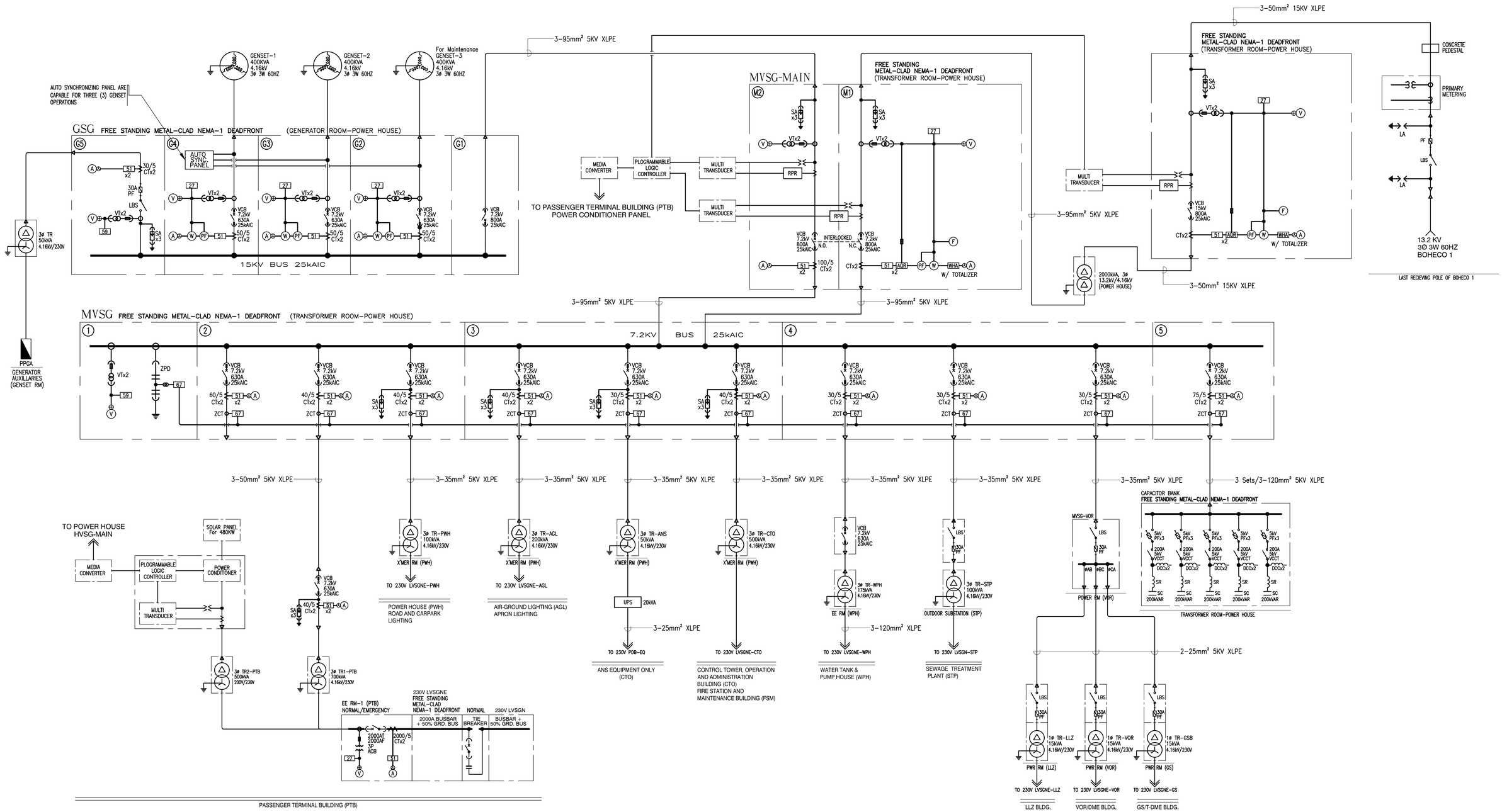
UTILITY WORKS (U)
SUBCOMPONENT–3–2
(U2) Power Supply System
LEGEND AND SYMBOLS2

SHEET NO: U2–3210–03

DRAWING SCALE: AS SHOWN



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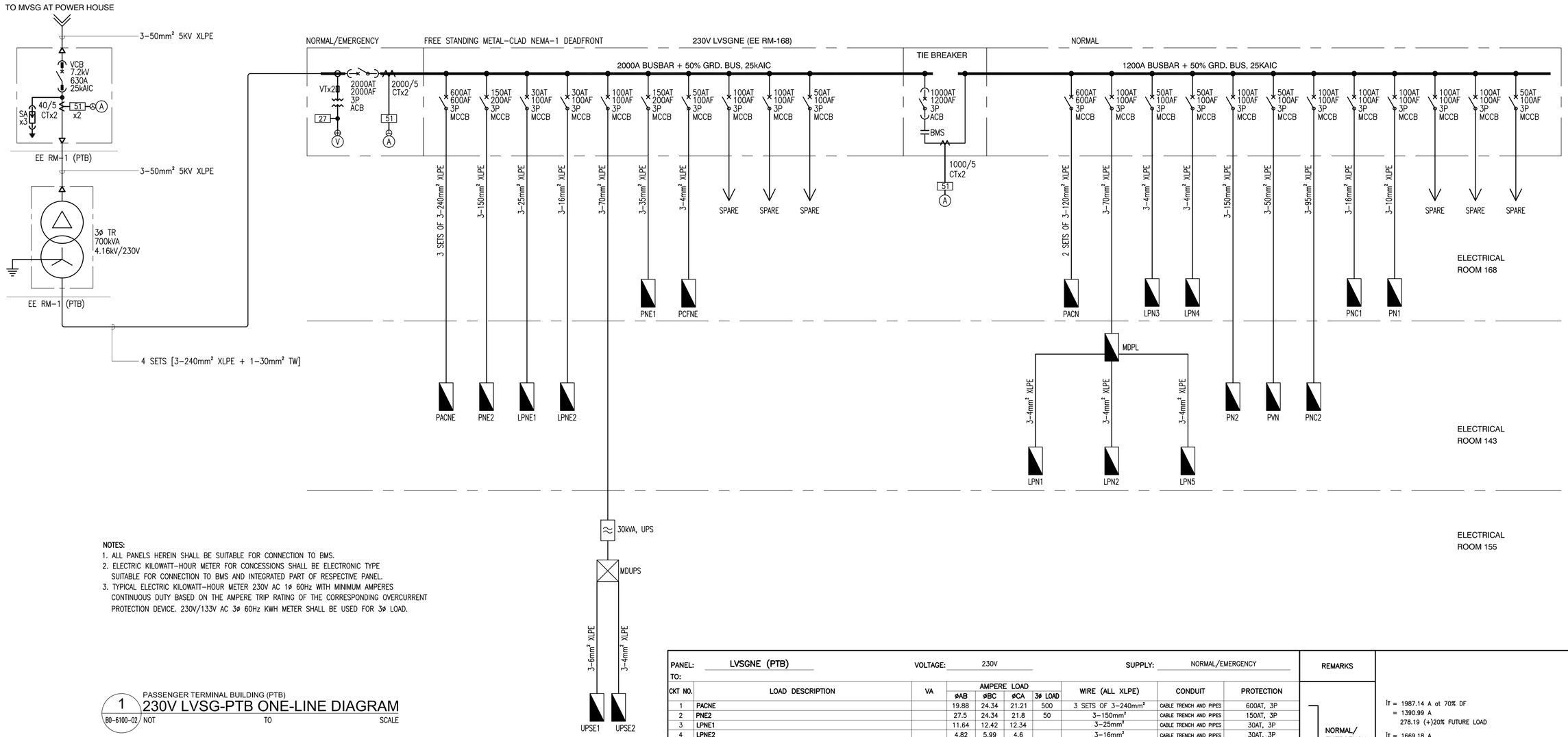
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
13.2kV HVSG ONE-LINE DIAGRAM

SHEET NO:

U2-3210-04

DRAWING SCALE:

AS SHOWN



NOTES:
1. ALL PANELS HEREIN SHALL BE SUITABLE FOR CONNECTION TO BMS.
2. ELECTRIC KILOWATT–HOUR METER FOR CONCESSIONS SHALL BE ELECTRONIC TYPE SUITABLE FOR CONNECTION TO BMS AND INTEGRATED PART OF RESPECTIVE PANEL.
3. TYPICAL ELECTRIC KILOWATT–HOUR METER 230V AC 1ø 60Hz WITH MINIMUM AMPERES CONTINUOUS DUTY BASED ON THE AMPERE TRIP RATING OF THE CORRESPONDING OVERCURRENT PROTECTION DEVICE. 230V/133V AC 3ø 60Hz KWH METER SHALL BE USED FOR 3ø LOAD.

1 — PASSENGER TERMINAL BUILDING (PTB)
B0–6100–02 NOT TO SCALE
230V LVSG-PTB ONE-LINE DIAGRAM

PANEL: LVSGNE (PTB) VOLTAGE: 230V SUPPLY: NORMAL/EMERGENCY
TO:

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD øAB	øBC	øCA	3ø LOAD	WIRE (ALL XLPE)	CONDUIT	PROTECTION	REMARKS
1	PACNE		19.88	24.34	21.21	500	3 SETS OF 3–240mm²	CABLE TRENCH AND PIPES	600AT, 3P	NORMAL/ EMERGENCY LOADS
2	PNE2		27.5	24.34	21.8	50	3–150mm²	CABLE TRENCH AND PIPES	150AT, 3P	
3	LPNE1		11.64	12.42	12.34		3–25mm²	CABLE TRENCH AND PIPES	30AT, 3P	
4	LPNE2		4.82	5.99	4.6		3–16mm²	CABLE TRENCH AND PIPES	30AT, 3P	
5	PNE1		29.69	30.88	34.19	60	3–35mm²	CABLE TRENCH AND PIPES	150AT, 3P	
6	PCFNE		11.41	16.3	14.67		3–4mm²	CABLE TRENCH AND PIPES	50AT, 3P	
7	UPSE1		33.19	33.19	33.88		3–6mm²	CABLE TRENCH AND PIPES	MDUPS 100AT, 2P	
8	UPSE2		3.69	3.36	4.11		3–4mm²	CABLE TRENCH AND PIPES		
		SUB–TOTAL	141.82	150.82	146.8	610				
9	PN1		36	31.5	34.5		3–10mm²	CABLE TRENCH AND PIPES	100AT, 3P	NORMAL LOADS
10	PN2		63	61.5	63		3–150mm²	CABLE TRENCH AND PIPES	100AT, 3P	
11	PACN		17.98	13.91	17.35	500	2 SETS OF 3–120mm²	CABLE TRENCH AND PIPES	600AT, 3P	
12	LPN1		13.17	9.01	11.33		3–4mm²	CABLE TRENCH AND PIPES	UNDER MDPL–100AT,3P	
13	LPN2		11.27	10.93	8.85		3–4mm²	CABLE TRENCH AND PIPES	UNDER MDPL–100AT,3P	
14	LPN3		12.32	15.08	13.74		3–4mm²	CABLE TRENCH AND PIPES	50AT, 3P	
15	LPN4		20.86	19.53	19.08		3–4mm²	CABLE TRENCH AND PIPES	50AT, 3P	
16	LPN5		7.39	7.86	6.82		3–4mm²	CABLE TRENCH AND PIPES	UNDER MDPL–100AT,3P	
17	PVN		5.85	5.0	5.0	25.29	3–50mm²	CABLE TRENCH AND PIPES	50AT, 3P	
18	PNC1		45	45	45		3–16mm²	CABLE TRENCH AND PIPES	100AT, 3P	
19	PNC2		45	45	45		3–95mm²	CABLE TRENCH AND PIPES	100AT, 3P	
		SUB–TOTAL	277.84	264.32	269.67	525.29				
		TOTAL	419.66	415.14	416.47	1135.29				

NOTE: A TIE BREAKER OF 1000AT,1200AF AT 230V

Ir = 419.66 X 1.732 + 1135.29 + 25%(500)
= 726.85 + 1135.29 + 125
= 1987.14A

Ir = 1987.14 A at 70% DF
= 1390.99 A
278.19 (+)20% FUTURE LOAD

Ir = 1669.18 A

TRANSFORMER CAPACITY:
kVA = 230 X 1669.18 X 1.732 / 1000
= 664.94 kVA 700 kVA

MAIN PROTECTION:
2000AT, 2000AF, 3P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE AT 4.16 kV
SECONDARY VOLTAGE AT 230 V

MAIN CABLE AT PRIMARY = 3–50mm² XLPE, 5kV
MAIN CABLE AT SECONDARY = 4 SETS OF 3–240mm² XLPE

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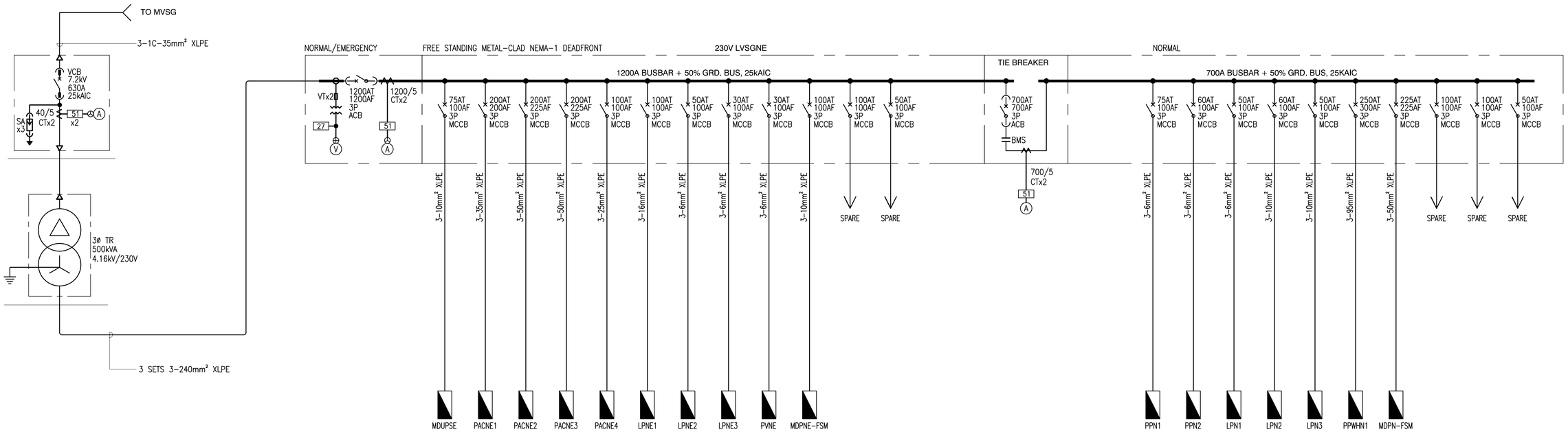
(U2) Power Supply System
230V LVSGNE–PTB ONE–LINE DIAGRAM

SHEET NO: U2–3210–05

DRAWING SCALE: AS SHOWN



NOTES:
1. ALL PANELS HEREIN SHALL BE SUITABLE FOR CONNECTION TO BMS.

1 (CTO)
. NOT TO SCALE
230V LVSGNE-CTO ONE-LINE DIAGRAM

PANEL: LVSGNE (CTO) VOLTAGE: 230V SUPPLY: NORMAL/EMERGENCY
TO:

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD øAB	øBC	øCA	3ø LOAD	CABLES (ALL XLPE)	CONDUIT	PROTECTION	REMARKS
1	MDUPSE		26.83	23.00	24.70		3–10mm²	CABLE PIT/PIPES	75AT, 100AF, 3P	NORMAL/ EMERGENCY LOADS
2	PACNE1		5.31	4.30	4.60	127.01	3–35mm²	CABLE PIT/PIPES	200AT, 200AF, 3P	
3	PACNE2		6.77	5.75	6.63	142	3–50mm²	CABLE PIT/PIPES	200AT, 225AF, 3P	
4	PACNE3		3.99	3.65	2.13	162.7	3–50mm²	CABLE PIT/PIPES	200AT, 225AF, 3P	
5	PACNE4		4.27	3.51	4.08	68.56	3–25mm²	CABLE PIT/PIPES	100AT, 100AF, 3P	
6	LPPNE1		21.41	19.24	18.83		3–16mm²	CABLE PIT/PIPES	100AT, 100AF, 3P	
7	LPPNE2		9.39	8.61	8.29		3–6mm²	CABLE PIT/PIPES	50AT, 100AF, 3P	
8	LPPNE3		4.70	3.07	4.52		3–6mm²	CABLE PIT/PIPES	30AT, 100AF, 3P	
9	PVNE		3.47	2.90	4.34	10.02	3–6mm²	CABLE PIT/PIPES	30AT, 100AF, 3P	
10	MDPNE–FSM		36.43	38.41	34.40		3–10mm²	CABLE PIT/PIPES	100AT, 100AF, 3P	
		SUB–TOTAL	122.57	112.44	112.52	510.29			TIE BREAKER 700AT, 700AF	
10	PPN1		21.31	21.89	23.20		3–6mm²	CABLE PIT/PIPES	75AT, 100AF, 3P	NORMAL LOADS
11	PPN2		21.65	21.80	16.18		3–6mm²	CABLE PIT/PIPES	60AT, 100AF, 3P	
12	LPN1		9.08	7.11	7.41		3–6mm²	CABLE PIT/PIPES	50AT, 100AF, 3P	
13	LPN2		8.43	10.72	9.27		3–10mm²	CABLE PIT/PIPES	60AT, 100AF, 3P	
14	LPPN3		20.49	20.14	18.93		3–6mm²	CABLE PIT/PIPES	50AT, 100AF, 3P	
15	PPWHN1		133.12	154.86	130.41	5.65	3–70mm²	CABLE PIT/PIPES	250AT, 300AF, 3P	
16	MDPN–FSM		108.13	107.01	109.09		3–50mm²	CABLE PIT/PIPES	225AT, 225AF, 3P	
		SUB–TOTAL	322.21	343.53	314.49	5.65				
		TOTAL	444.78	455.97	427.01	515.94				

IT = 448.55 X 1.732 + 515.94 + 25%(162.7)
= 776.88 + 515.94 + 40.67
= 1333.49 A

IT = 1346.35 X 70% DF
= 942.44 A
188.48 (+)20% FUTURE LOAD

IT = 1130.93 A

TRANSFORMER CAPACITY:
kVA = 1130.93 X 230 X 1.732
1000
= 450.51 kVA 500 kVA

MAIN PROTECTION:
1200AT, 1200AF, 3P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE at 4.16 kV
SECONDARY VOLTAGE at 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE at PRIMARY = 3–1C–35mm² XLPE, 5kV
MAIN CABLE at SECONDARY = 3 SETS OF 3–240mm² XLPE

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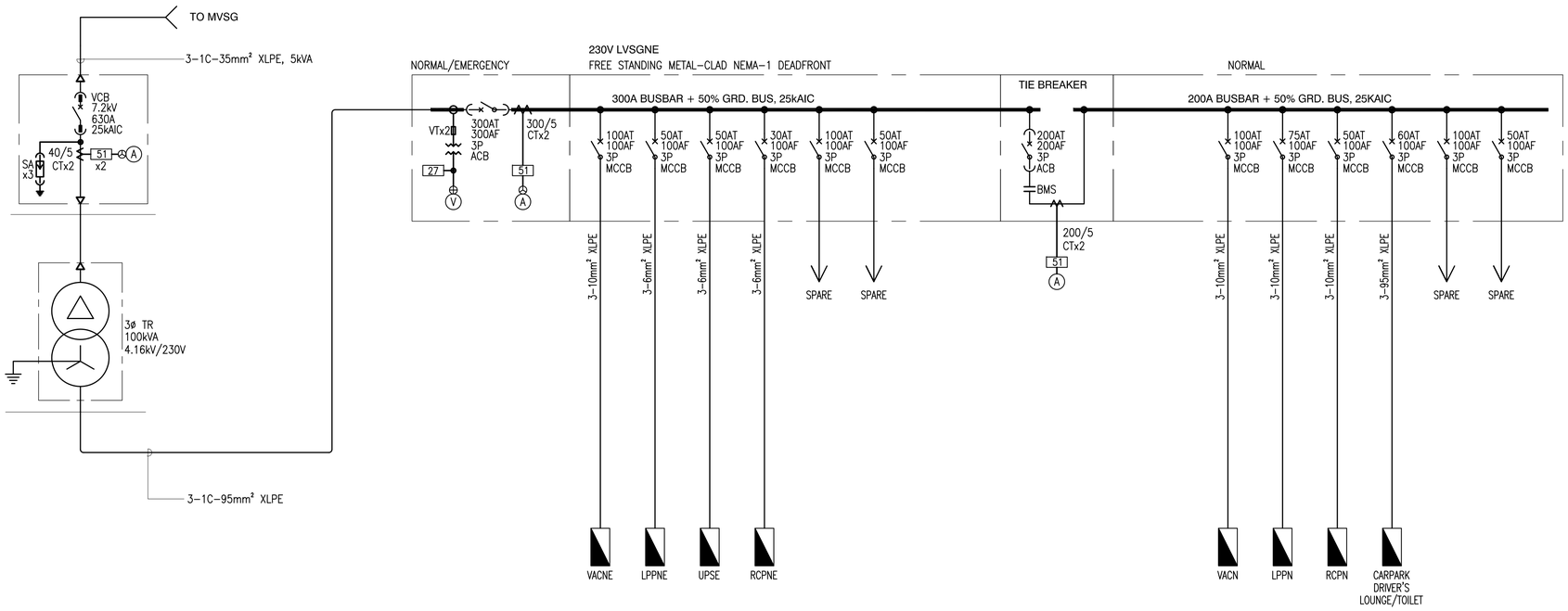
230V LVSGNE–CTO ONE–LINE DIAGRAM

SHEET NO: U2–3210–06

DRAWING SCALE: AS SHOWN



NOTES:
1. ALL PANELS HEREIN SHALL BE SUITABLE FOR CONNECTION TO BMS.

1 (PWH)
. NOT TO SCALE
230V LVSGNE-PWH ONE-LINE DIAGRAM

PANEL: LVSGNE (PWH) VOLTAGE: 230V SUPPLY: NORMAL/EMERGENCY
TO:

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD øAB	øBC	øCA	3ø LOAD	WIRE (ALL XLPE)	CONDUIT	PROTECTION
1	VACNE		33.56	36.93	36.17		3-10mm²	CABLE PIT/PVC	100AT, 100AF, 3P
2	LPPNE		15.26	13.74	14.96		3-6mm²	CABLE PIT/PVC	50AT, 100AF, 3P
3	UPSE (10kVA)		10.0	10.0	10.0		3-6mm²	CABLE PIT/PVC	50AT, 100AF, 3P
4	RCPNE		10.22	10.22	10.22		3-6mm²	CABLE PIT/PVC	30AT, 100AF, 3P
		SUB-TOTAL	69.04	70.89	71.35				
5	VACN		40.15	39.51	45.69		3-10mm²	CABLE PIT/PVC	100AT, 100AF, 3P
6	LPPN		25.63	25.17	27.26		3-10mm²	CABLE PIT/PVC	75AT, 100AF, 3P
7	RCPN		13.48	12.82	14.12		3-10mm²	CABLE PIT/PVC	50AT, 100AF, 3P
8	DRIVER'S LOUNGE (SOURCE IS PWA)		13.41	13.86	13.14		3-95mm²	CABLE PIT/PVC	60AT, 100AF, 3P
		SUB-TOTAL	92.67	91.36	100.48				
		TOTAL	161.71	162.25	171.83				

Ir = 171.83 X 1.732 = 297.60 A
= 208 at 70% DF
= 41 + 20% FUTURE LOAD
= 249.66 A

TRANSFORMER CAPACITY:
kVA = 249.66 X 230 X 1.732 / 1000
= 99.45 kVA 100 kVA

MAIN PROTECTION:
300AT, 300AF, 3P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE at 4.16 kV
SECONDARY VOLTAGE at 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE at PRIMARY, 4.16kV = 3-1C-35mm² XLPE, 5kV
MAIN CABLE at SECONDARY, 230V = 3-1C-95mm² XLPE

Republic of the Philippines
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JICA DESIGN CONSULTANT JOINT VENTURE
JAPAN AIRPORT CONSULTANTS, INC.
NIPPON KOEI CO., LTD.
NJS CONSULTANTS CO., LTD.

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REG. NO.: 1927 DATE: 1-04-13
T.I.N. 119-747-900 PLACE: MANILA
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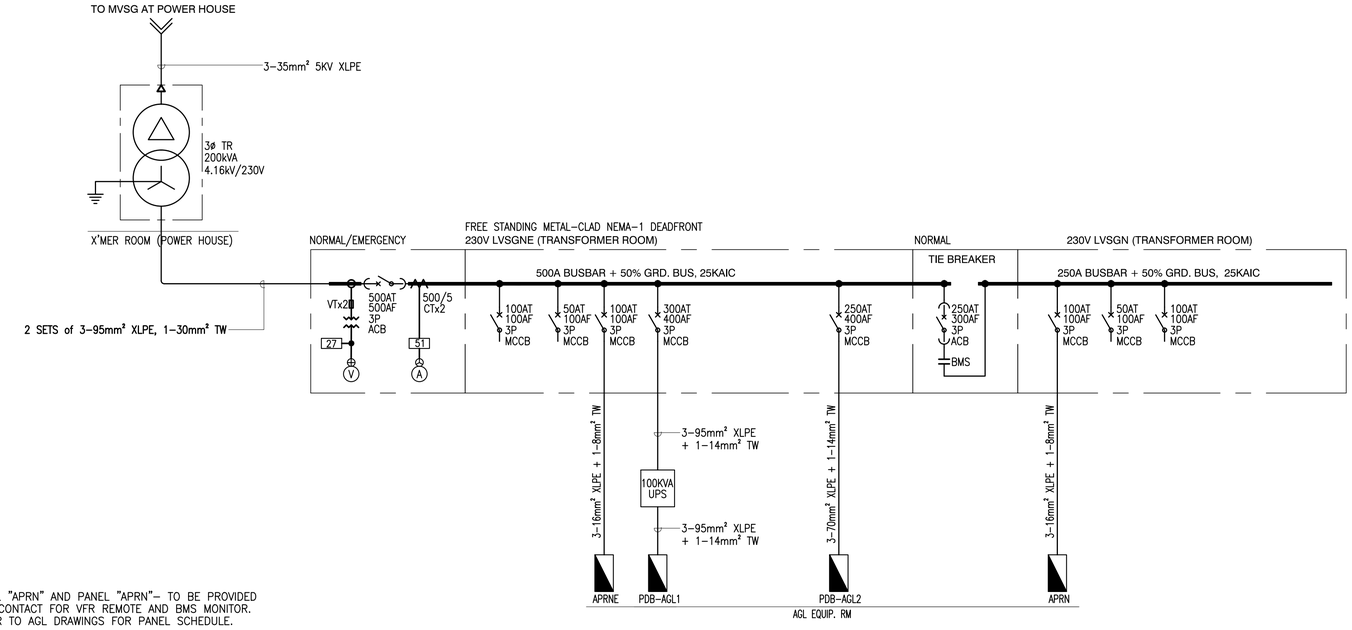
PROJECT TITLE:
NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT
LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES

DATE	INDEX	AMENDMENTS	Prepared by	Checked by	Validated by
JUNE 2013				WIM	HC

SHEET CONTENTS:
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
230V LVSGNE-PWH ONE-LINE DIAGRAM

SHEET NO: U2-3210-07

DRAWING SCALE: AS INDICATED



NOTE:
1. PANEL "APRN" AND PANEL "APRN"– TO BE PROVIDED WITH CONTACT FOR VFR REMOTE AND BMS MONITOR.
2. REFER TO AGL DRAWINGS FOR PANEL SCHEDULE.

1 AGL AND APRON LIGHTING
U2–3210–08 NOT TO SCALE

230V LVSG-AGL ONE-LINE DIAGRAM

PANEL: LVSGNE–AGL VOLTAGE: 230V SUPPLY: NORMAL/EMERGENCY
TO:

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD øAB	øBC	øCA	3ø LOAD	WIRE (ALL XLPE)	CONDUIT	PROTECTION
1	APRNE		10.76	10.76	3.59		3–10mm²	CABLE PIT/PVC	100AT, 100AF, 3P
2	PDB–AGL1		152.16	130.35	130.43		3–95mm²	CABLE PIT/PVC	50AT, 100AF, 3P
3	PDB–AGL2		14.64	130.43	43.48		3–70mm²	CABLE PIT/PVC	50AT, 100AF, 3P
							3–6mm²	CABLE PIT/PVC	30AT, 100AF, 3P
		SUB–TOTAL	177.56	271.54	177.5				
4	APRN		19.56	38.00	32.60		3–10mm²	CABLE PIT/PVC	100AT, 100AF, 3P
								CABLE PIT/PVC	75AT, 100AF, 3P
								CABLE PIT/PVC	50AT, 100AF, 3P
								CABLE PIT/PVC	60AT, 100AF, 3P
		SUB–TOTAL	19.56	38.00	32.60				
		TOTAL	197.12	309.54	210.10				

IT = 309.54 X 1.732 = 536.12 A
= 375 AT 70% DF
= 75 AT 20% FUTURE LOAD
= 450 A

TRANSFORMER CAPACITY:
kVA = 450 X 230 X 1.732 / 1000
= 179.262 kVA 200 kVA

MAIN PROTECTION:
500AT, 500AF, 3P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE AT 4.16 kV
SECONDARY VOLTAGE AT 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE AT PRIMARY, 4.16kV = 3–1C–35mm² XLPE, 5kV
MAIN CABLE AT SECONDARY, 230V = 2–3–1C–95mm² XLPE

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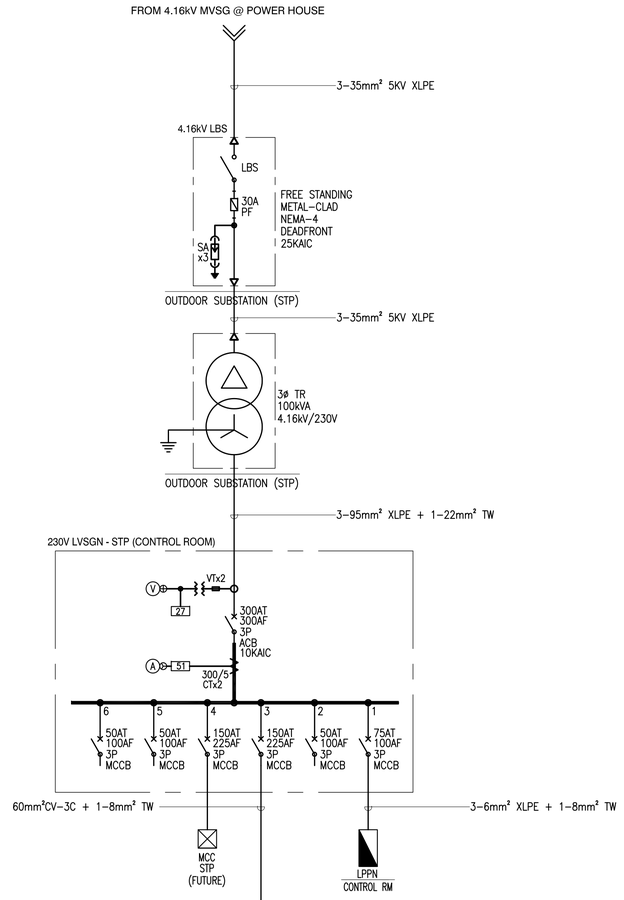
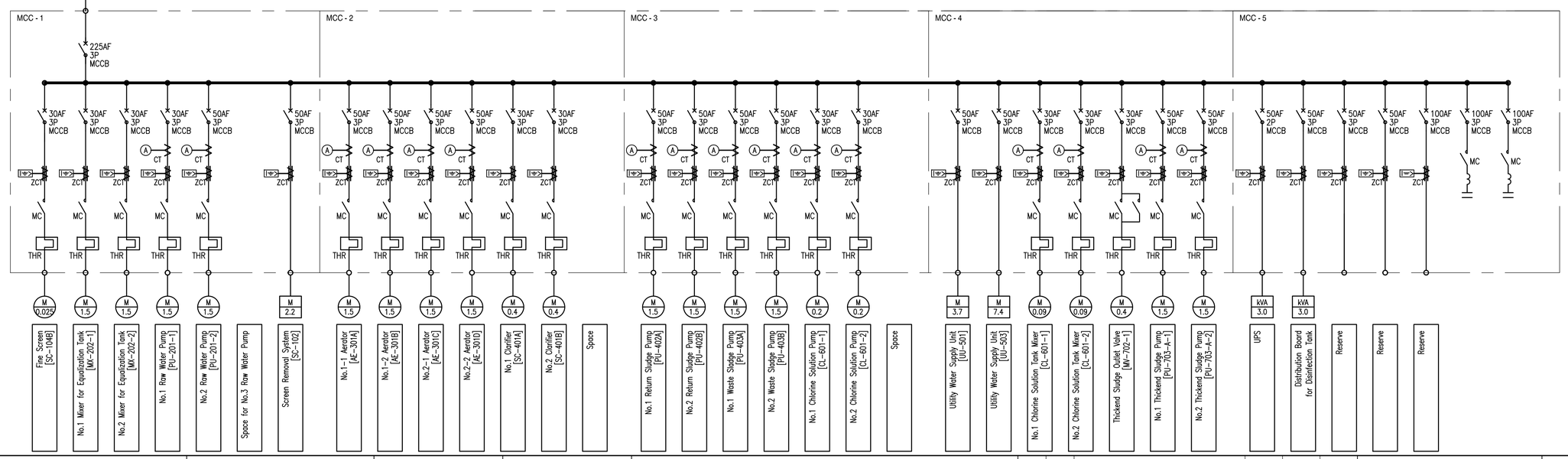
SUBCOMPONENT–3–2
(U2) Power Supply System
230V LVSGNE–AGL ONE–LINE DIAGRAM;

SHEET NO: U2–3210–08

DRAWING SCALE: AS SHOWN





PANEL: LVSGN–STP **VOLTAGE:** 230V **SUPPLY:** NORMAL

TO:

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD ØAB	ØBC	ØCA	3ø LOAD	WIRE (ALL XLPE)	CONDUIT	PROTECTION
1	LPPN–STP	11360	24.45	16.46	14.60		3–6mm² XLPE + 1–8mm² TW	CABLE PIT/PVC	75AT, 100AF, 3P
2	SPARE								50AT, 100AF, 3P
3	STP MCC	50638				127.09	60mm²CV–3C + 1–8mm² TW	CABLE PIT/PVC	150AT, 225AF, 3P
4	STP MCC FOR FUTURE								150AT, 225AF, 3P
5	SPARE								50AT, 100AF, 3P
6	SPARE								50AT, 100AF, 3P
		SUB–TOTAL	24.45	16.46	14.60	127.09			
		SUB–TOTAL							
		TOTAL	24.45	16.46	14.60	127.09			

I_T = 24.45 X 1.732 + 127.09 + 25%(67.78)
= 42.35 + 127.09 + 16.95
= 186.39 A

TRANSFORMER CAPACITY:

kVA = 186.39 X 230 X 1.732 / 1000

= 74.25 kVA → 100 kVA

MAIN PROTECTION:

300AT, 300AF, 3P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE AT 4.16 kV
SECONDARY VOLTAGE AT 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE AT PRIMARY, 4.16kV = 3–1C–35mm² XLPE, 5kV
MAIN CABLE AT SECONDARY, 230V = 3–1C–95mm² XLPE

SEWAGE TREATMENT PLANT (STP)

2 / U2–3210–07

LVSGN-STP ONE-LINE DIAGRAM

NOT TO SCALE

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COMPONENT–3
UTILITY WORKS (U)
SUBCOMPONENT–3–2
(U2) Power Supply System
LVSGN–STP ONE–LINE DIAGRAM

SHEET NO: U2–3210–09

DRAWING SCALE: AS SHOWN

MDP: **PPGA** VOLTAGE: 230V 3ø 3W SUPPLY: EMERGENCY ONLY

TO: TR-GA

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD				WIRE	CONDUIT	PROTECTION
			øAB	øBC	øCA	3ø LOAD			
1	2.238KW EF @ GENSET RM	2800	12.16				3-3.5mm² THHN	15mmØ	20AT, 100AF 2P CB
2	2.238KW EF @ GENSET RM	2800		12.16			3-3.5mm² THHN	15mmØ	20AT, 100AF 2P CB
3	2.238KW EF @ GENSET RM	2800			12.16		3-3.5mm² THHN	15mmØ	20AT, 100AF 2P CB
4	SPARE								20AT, 100AF 2P CB
5	SPARE								20AT, 100AF 2P CB
6	SPARE								20AT, 100AF 2P CB
7	SPARE								30AT, 100AF 2P CB
8	SPARE								30AT, 100AF 2P CB
9	SPARE								30AT, 100AF 2P CB
		8400	12.16	12.16	12.16				

IT = 12.16 x 1.732 = 21.06 A

SECONDARY FEEDER SIZE: 3-35mm² XLPE + 14mm² TW

SECONDARY MAIN PROTECTION: 175AT, 225AF 3P ACB, 10kAIC

TRANSFORMER SIZING:

TOTAL CONNECTED LOAD = 12.16 kVA

TRANSFORMER SIZE = 1 x 50kVA, 3ø 13.2kV/230V

TRANSFORMER CAPACITY:

kVA = 21.06 X 230 X 1.732 / 1000

= 8.4 kVA 15 kVA

MAIN PROTECTION:

175AT, 225AF, 3P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE AT 4.16 kV
SECONDARY VOLTAGE AT 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE AT PRIMARY, 4.16kV = 2-1C-25mm² XLPE, 5kV
MAIN CABLE AT SECONDARY, 230V = 2-1C-6mm² XLPE

MDP: **LVSGNE-LLZ** VOLTAGE: 230V 1ø 2W SUPPLY: NORMAL/EMERGENCY

TO: TR-LLZ

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD				WIRE	CONDUIT	PROTECTION
			øAB	øBC	øCA	3ø LOAD			
1	PANEL "PDB-LLZ"	3100	13.47				2-4mm² XLPE + 1-5.5mm² TW	20mmØ/CABLE TRAY	30AT, 50AF 3P MCCB
2	PANEL "LPPNE"	5851	25.44				2-4mm² XLPE + 1-5.5mm² TW	20mmØ/CABLE TRAY	50AT, 50AF 3P MCCB
		8951	47.13						

IT = 47.13 x 100% D.F. = 47.13 A

SECONDARY FEEDER SIZE: 2-6mm² XLPE + 1-8mm² TW

SECONDARY MAIN PROTECTION: 60AT, 100AF 2P MCCB, 120kAIC

TRANSFORMER SIZING:

TOTAL CONNECTED LOAD = 8.95 kVA

TRANSFORMER SIZE = 1 x 15kVA, 1ø 13.2kV/230V

TRANSFORMER CAPACITY:

kVA = 47.13 X 230 / 1000

= 10.84 kVA 15 kVA

MAIN PROTECTION:

60AT, 100AF, 2P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE AT 4.16 kV
SECONDARY VOLTAGE AT 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE AT PRIMARY, 4.16kV = 2-1C-25mm² XLPE, 5kV
MAIN CABLE AT SECONDARY, 230V = 2-1C-6mm² XLPE

MDP: **LVSGNE-VOR** VOLTAGE: 230V 1ø 2W SUPPLY: NORMAL/EMERGENCY

TO: TR-VOR

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD				WIRE	CONDUIT	PROTECTION
			øAB	øBC	øCA	3ø LOAD			
1	PANEL "PDB-VOR"	6000		26.09			2-4mm² XLPE + 1-5.5mm² TW	20mmØ/CABLE TRAY	50AT, 50AF 3P MCCB
2	PANEL "LPPNE"	7989		34.73			2-4mm² XLPE + 1-5.5mm² TW	25mmØ/CABLE TRAY	50AT, 50AF 3P MCCB
		13989		60.82					

IT = 60.82 x 100% D.F. = 60.82 A

SECONDARY FEEDER SIZE: 2-6mm² XLPE + 1-8mm² TW

SECONDARY MAIN PROTECTION: 75AT, 100AF 2P MCCB, 120kAIC

TRANSFORMER SIZING:

TOTAL CONNECTED LOAD = 13.90 kVA

TRANSFORMER SIZE = 1 x 15kVA, 1ø 13.2kV/230V

TRANSFORMER CAPACITY:

kVA = 60.82 X 230 / 1000

= 13.99 kVA 15 kVA

MAIN PROTECTION:

75AT, 100AF, 2P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE AT 4.16 kV
SECONDARY VOLTAGE AT 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE AT PRIMARY, 4.16kV = 2-1C-25mm² XLPE, 5kV
MAIN CABLE AT SECONDARY, 230V = 2-1C-6mm² XLPE

MDP: **LVSGNE-GS** VOLTAGE: 230V 1ø 2W SUPPLY: NORMAL/EMERGENCY

TO: TR-GS

CKT NO.	LOAD DESCRIPTION	KVA	AMPERE LOAD				WIRE	CONDUIT	PROTECTION
			øAB	øBC	øCA	3ø LOAD			
1	PANEL "PDB-GSB"	4647			20.19		2-4mm² XLPE + 1-5.5mm² TW	20mmØ/CABLE TRAY	30AT, 100AF 3P MCCB
2	PANEL "LPPNE"	5791			25.18		2-4mm² XLPE + 1-5.5mm² TW	20mmØ/CABLE TRAY	40AT, 100AF 3P MCCB
		5836			45.37				

IT = 45.37 x 100% D.F. = 45.37 A

SECONDARY FEEDER SIZE: 2-6mm² XLPE + 1-8mm² TW

SECONDARY MAIN PROTECTION: 60AT, 100AF 2P MCCB, 120kAIC

TRANSFORMER SIZING:

TOTAL CONNECTED LOAD = 12.61 kVA

TRANSFORMER SIZE = 1 x 15kVA, 1ø 13.2kV/230V

TRANSFORMER CAPACITY:

kVA = 45.37 X 230 / 1000

= 10.44 kVA 15 kVA

MAIN PROTECTION:

60AT, 100AF, 2P, 230V, 25KAIC, ACB

PRIMARY VOLTAGE AT 4.16 kV
SECONDARY VOLTAGE AT 230 V
CAST RESIN DRY TYPE, INDOOR

MAIN CABLE AT PRIMARY, 4.16kV = 2-1C-25mm² XLPE, 5kV
MAIN CABLE AT SECONDARY, 230V = 2-1C-6mm² XLPE

1 LVSG/PPGA SCHEDULE

U2-3210-10 NOT TO SCALE

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COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
LVSG-OTHERS SCHEDULE

SHEET NO: U2-3210-10

DRAWING SCALE: AS SHOWN

SUMMARY OF NORMAL LOADS

NO.	LOAD DESCRIPTION	LOAD KVA	
1	Passenger Terminal Building	678.29	
2	Power House	99.08	
3	Aeronautical Ground Lights	165.75	
4	Radio Navaids System	21.23	
5	Control Tower, Opearation & Admi Building and FRS	483.89	
6	Water Pump House	152.6	
7	Sewage Treatment Plant	55.95	
8	LLZ Building	8.95	
9	GS Building	10.44	
10	VOR Building	13.97	

TOTAL NORMAL CONNECTED LOAD = 1690.16 kVA

TOTAL DESIGN LOAD (COMMERCIALLY AVAILABLE LOAD) = 2000 kVA

PRIMARY FEEDER AND PROTECTION FOR NORMAL SOURCE:

I_T = 2000 KVA ÷ (13.2 x 1.732) = 87.48 A

PRIMARY FEEDER SIZE: 3–50mm² 15kV XLPE

PRIMARY MAIN PROTECTION: 800A 3P VCB, 31.5kAIC

SUMMARY OF GENSET LOADS

LOAD NO.	LOAD DESCRIPTION	LOAD KVA	EMERGENCY PERCENTAGE
1	Passenger Terminal Building	234.76	34.6 %
2	Power House	24.81	25.0 %
3	Aeronautical Ground Lights	145.64	87.9 %
4	Radio Navaids System	21.23	100 %
5	Control Tower, Opearation & Admi Building and FRS	193.15	39.9 %
6	Water Pump House	130.80	85.7 %
7	Sewage Treatment Plant	0.00	0.0 %
8	LLZ Building	8.95	100 %
9	GS Building	10.44	100 %
10	VOR Building	13.97	100 %

TOTAL EMERGENCY CONNECTED LOAD = 783.76 46.4 %

PRIMARY FEEDER AND PROTECTION FOR GENSET SOURCE:

I_T = 800 KVA ÷ (4.16 x 1.732) = 111.03 A

PRIMARY FEEDER SIZE: 3–95mm² 5kV XLPE

PRIMARY MAIN PROTECTION: 800A 3P VCB, 25kAIC

USE 2 x 625kVA, 13.2KV, 3ø–3W 60HZ GENSET

PRIMARY FEEDER AND PROTECTION FOR EACH GENSET:

I_T = 400 KVA ÷ (4.16 x 1.732) = 55.52 A

PRIMARY FEEDER SIZE: 3–35mm² 5kV XLPE

PRIMARY MAIN PROTECTION: 630A 3P VCB, 25kAIC

1 SUMMARY OF LOADS
U2-3210-11 NOT TO SCALE

NOTE:

1. AROUND 20% OF THE DESIGN LOAD REPRESENTS FUTURE LOADS.

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COMPONENT–3
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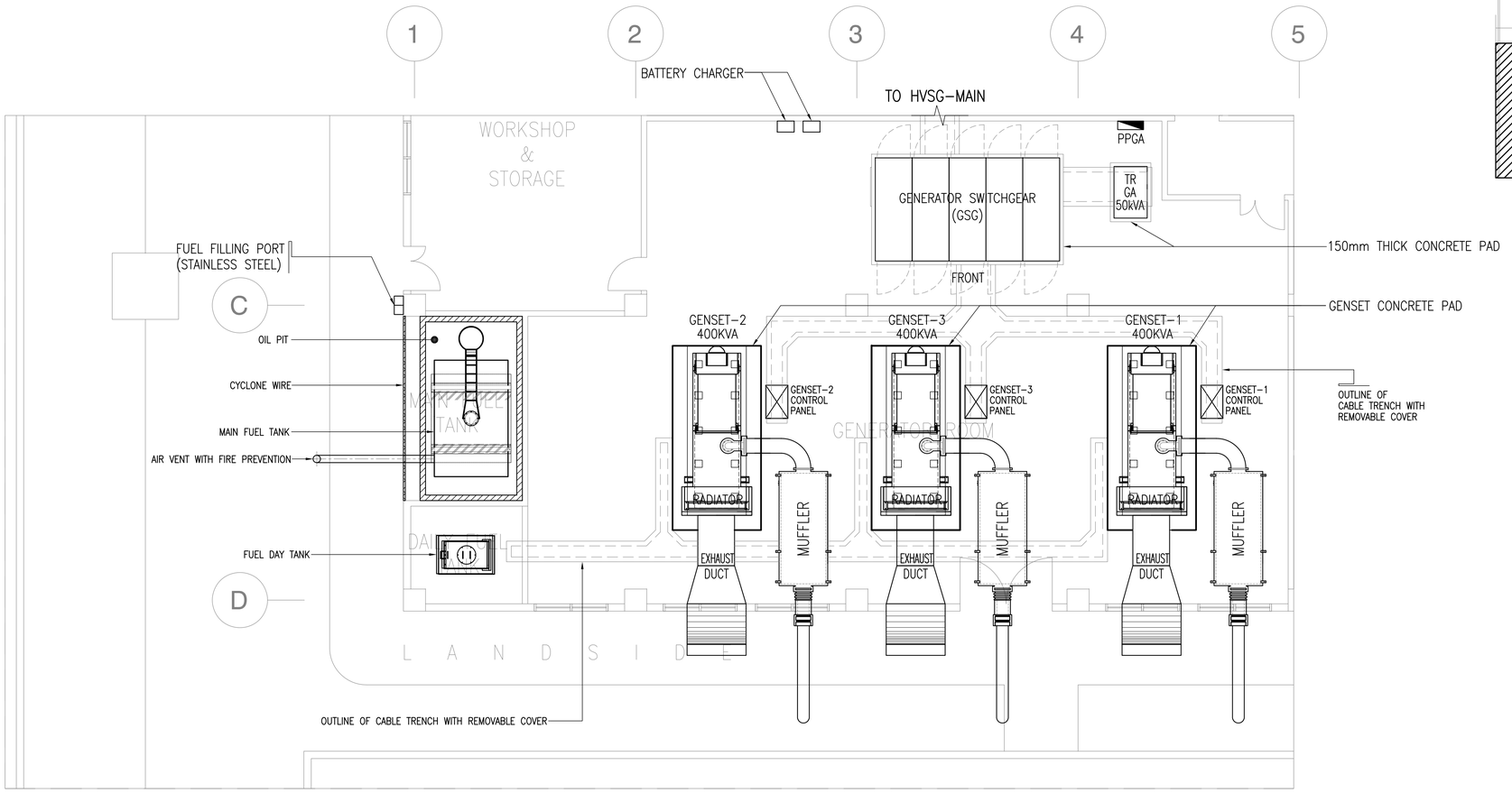
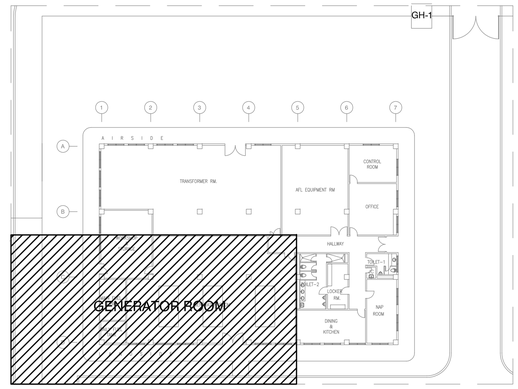
SUBCOMPONENT–3–2
(U2) Power Supply System
SUMMARY OF LOADS

SHEET NO: U2–3210–11

DRAWING SCALE: AS SHOWN





KEY PLAN
NOT TO SCALE

NOTE: SEE SHEET NO: U2–3230–02, U2–3230–3 & U2–3230–4 FOR SECTIONS AND DETAILS.

1 U2–3230–01 — POWER HOUSE (PWH)
GENERATOR ROOM LAYOUT PLAN
GRAPHIC SCALE 0 1 2 5m

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APPROVED:
JULIANITO G. BUCAYAN, JR.
Undersecretary
for Project Implementation, DOTC

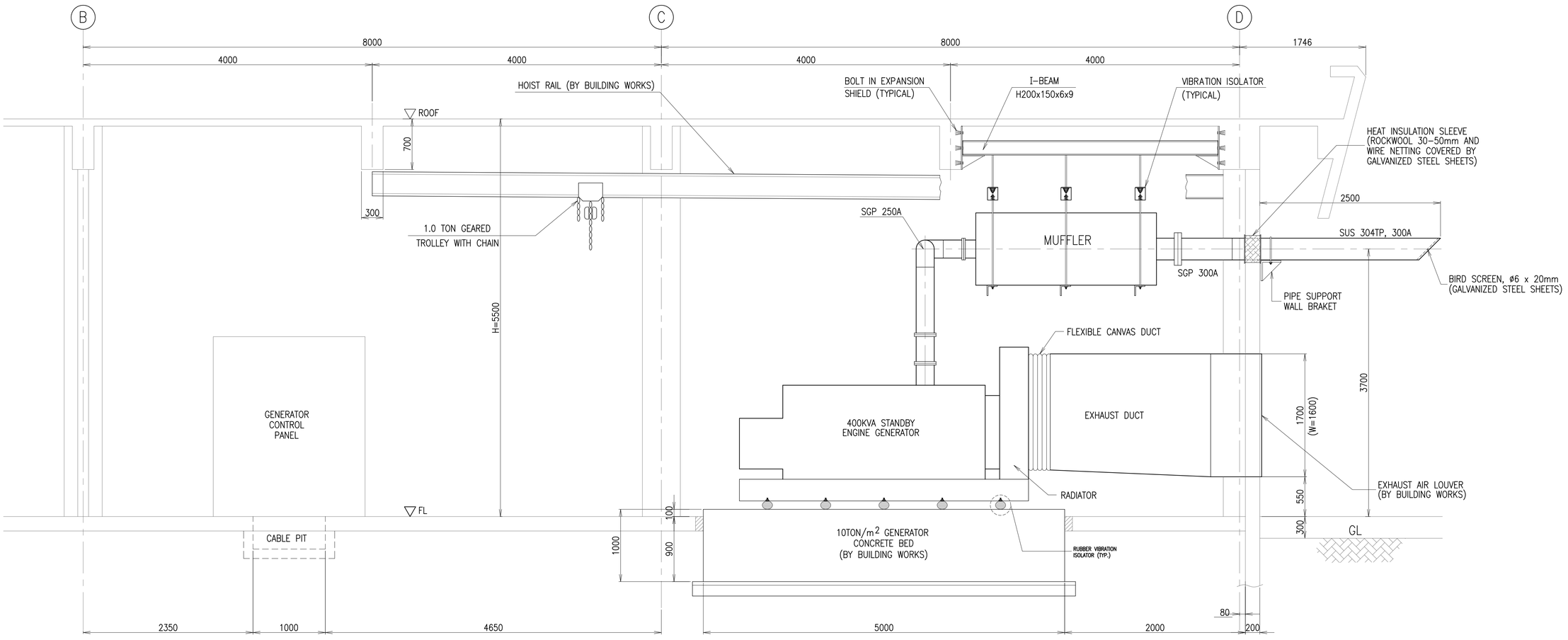
PROJECT TITLE:
NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT
LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES

DATE	INDEX	AMENDMENTS	Prepared by	Checked by	Validated by
JUNE 2013				WIM	HC

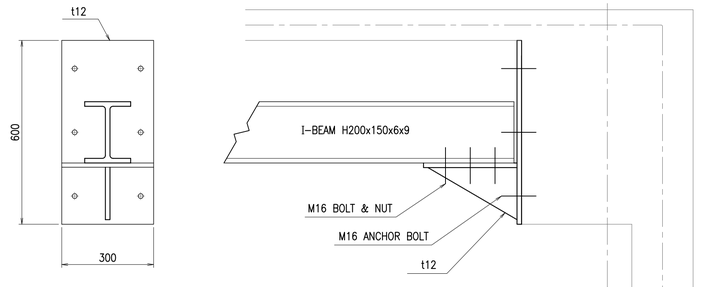
SHEET CONTENTS:
COMPONENT–3
UTILITY WORKS (U)
SUBCOMPONENT–3–2
(U2) Power Supply System
GENSET LAYOUT

SHEET NO: U2–3230–01

DRAWING SCALE: AS SHOWN

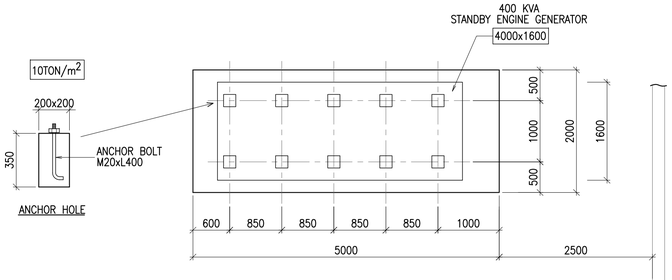


1 U2-3230-2 TYPICAL GENERATOR INSTALLATION (SECTION)
NOT TO SCALE

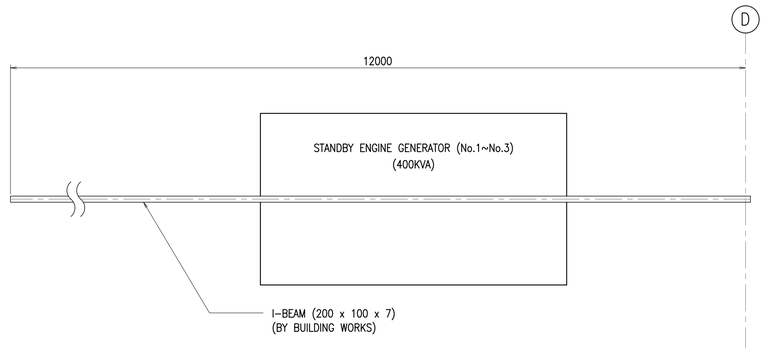


DETAIL "A"
NOT TO SCALE

MUFFLER	400KVA
DESIGNED WEIGHT	1200KG
SIZE, LENGTH (ASSUMPTION)	1000ø 2500



2 U2-3230-02 TYPICAL FOUNDATION BOLT PLAN
NOT TO SCALE



3 U2-3230-2 HOIST RAIL LAYOUT
NOT TO SCALE

Republic of the Philippines
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

JAPAN INTERNATIONAL COOPERATION AGENCY

JICA DESIGN CONSULTANT JOINT VENTURE

JAPAN AIRPORT CONSULTANTS, INC.
NIPPON KOEI CO., LTD.
NJS CONSULTANTS CO., LTD.

PREPARED BY:

TEODORO N. PAMATMAT
PROF: PROF. ELECTRICAL ENGINEER PTR. 1403773
REG. NO.: 1927 DATE: 1-04-13
T.I.N. 119-747-900 PLACE: MANILA

TADASHI AOI
Team Leader

RECOMMENDNG APPROVAL:

ILDEFONSO T. PATDU, JR.
Assistant Secretary
for Project Implementation, DOTC

APPROVED:

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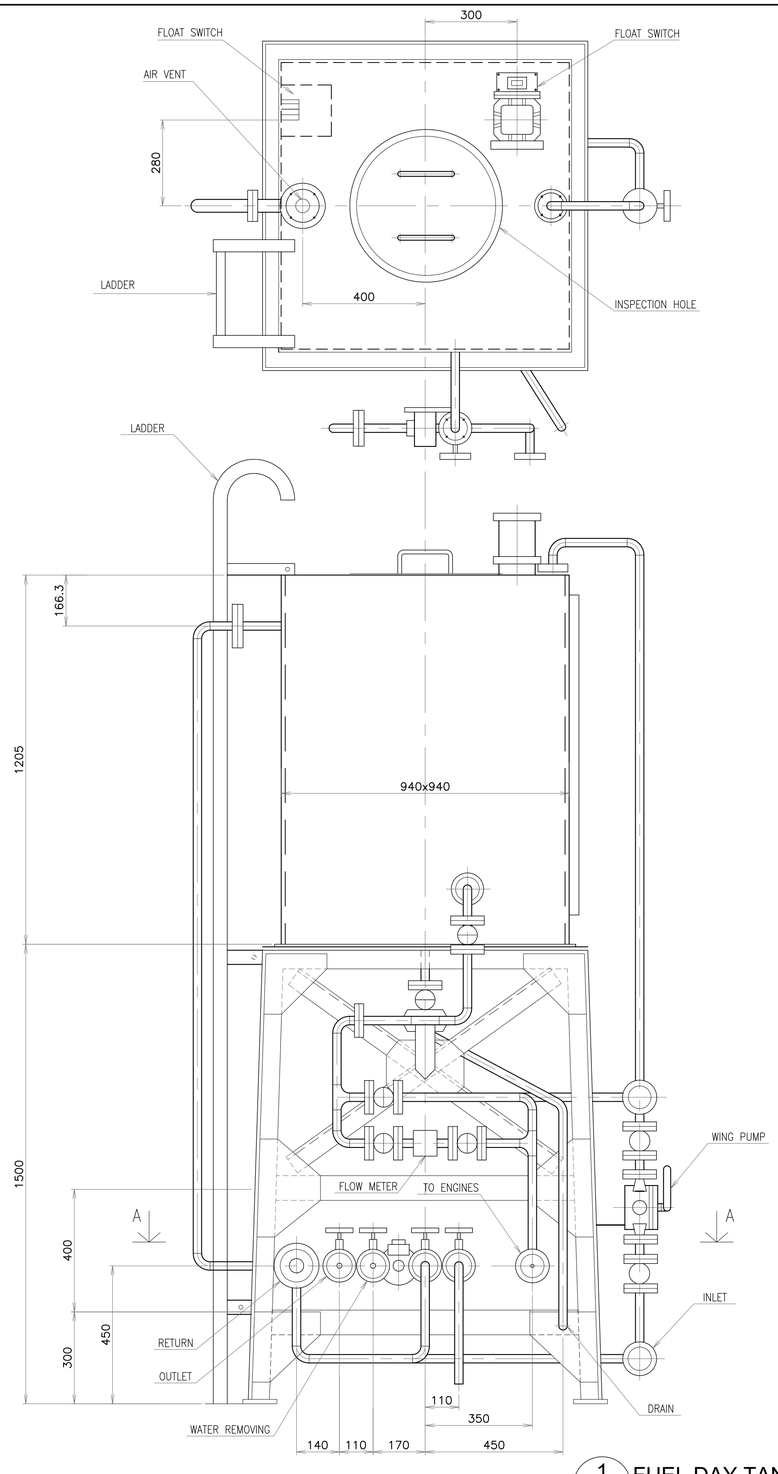
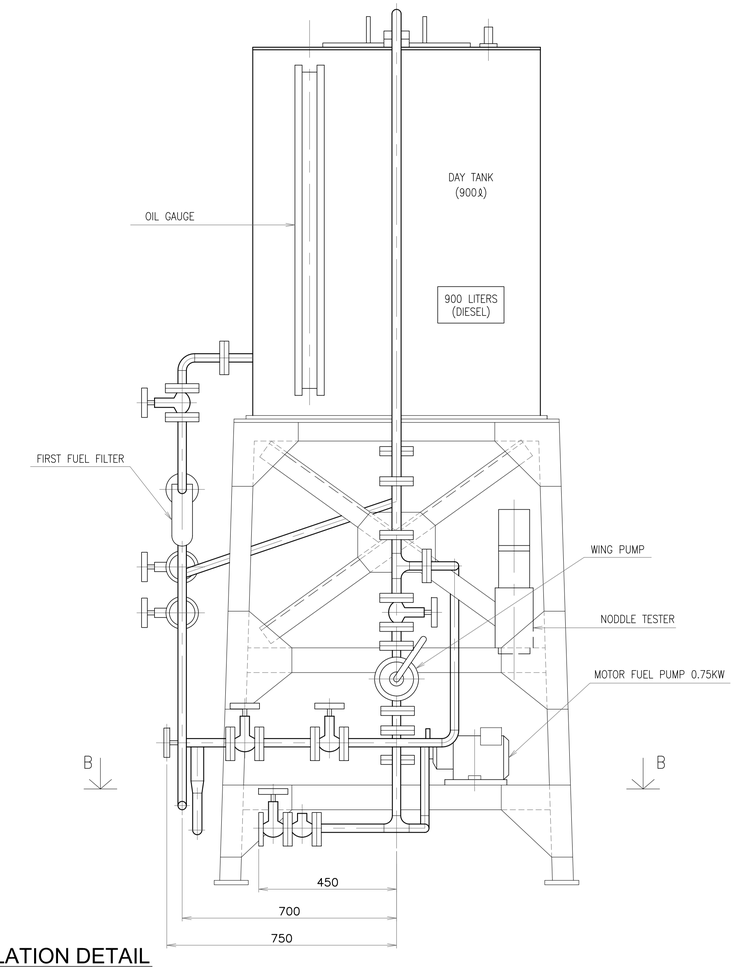
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
GENSET SECTION

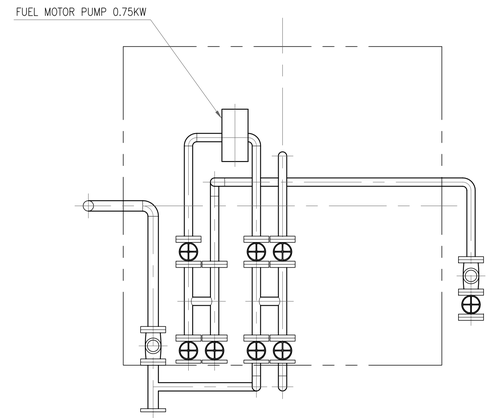
SHEET NO:
U2-3230-02

DRAWING SCALE:
AS SHOWN

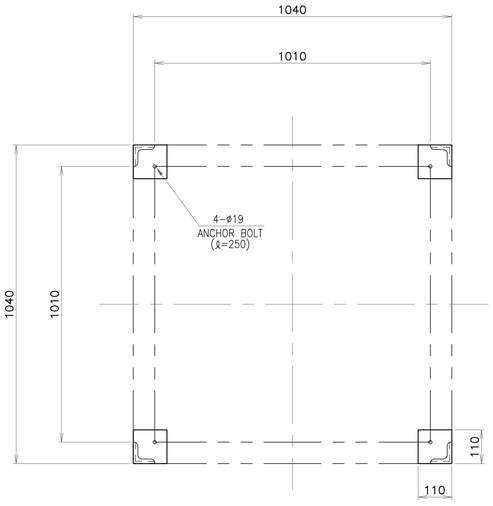


FLOAT SWITCHES		
A	PUMP RUNNING	APPROX. 285 ℓ
	PUMP STOP	APPROX. 825 ℓ
B	LOW LEVEL	APPROX. 255 ℓ
	HIGH LEVEL	APPROX. 855 ℓ





SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE

1 U2-3230-03 FUEL DAY TANK INSTALLATION DETAIL
NOT TO SCALE

Republic of the Philippines
DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

JAPAN INTERNATIONAL COOPERATION AGENCY

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NJS CONSULTANTS CO., LTD.

PREPARED BY:

TEODORO N. PAMATMAT

PROF:	PROF. ELECTRICAL ENGINEER	PTR.	1403773
REG. NO.:	1927	DATE:	1-04-13
T.I.N.	119-747-900	PLACE:	MANILA

TADASHI AOI
Team Leader

RECOMMENDNG APPROVAL:

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APPROVED:

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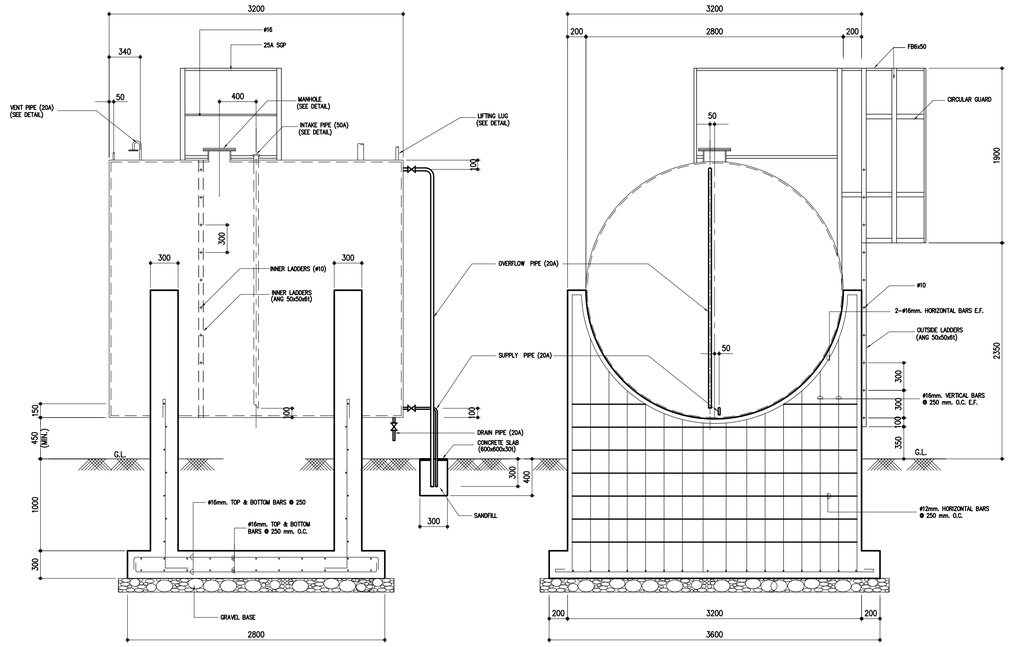
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
DAY TANK INSTALLATION DETAIL

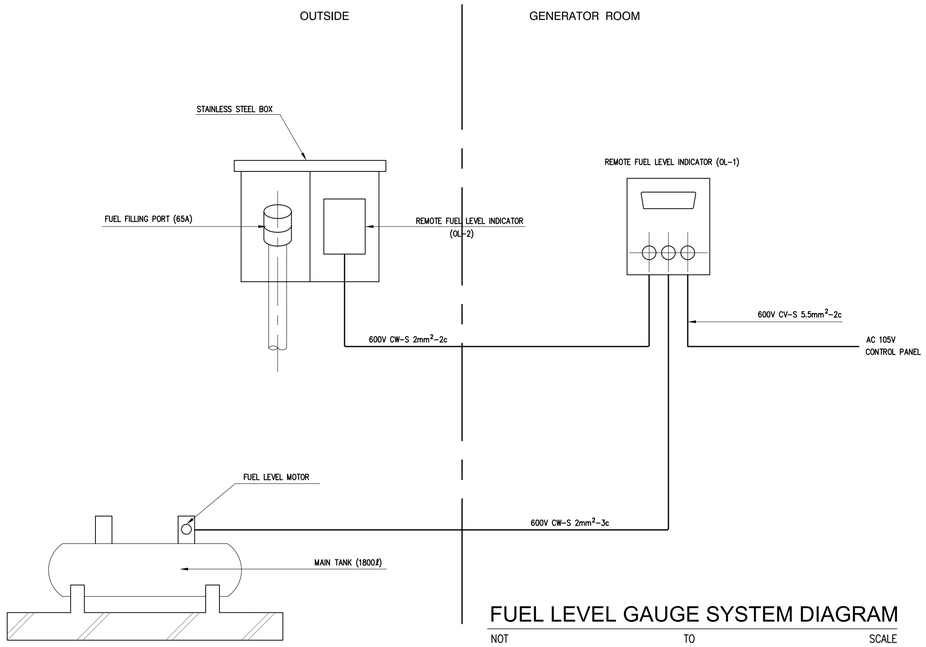
SHEET NO:
U2-3230-03

DRAWING SCALE:
AS SHOWN



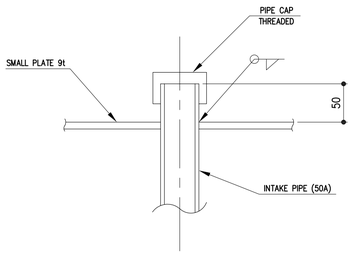
1 FUEL OIL TANK (1800/LITER CAPACITY)

U2-3230-04 NOT TO SCALE



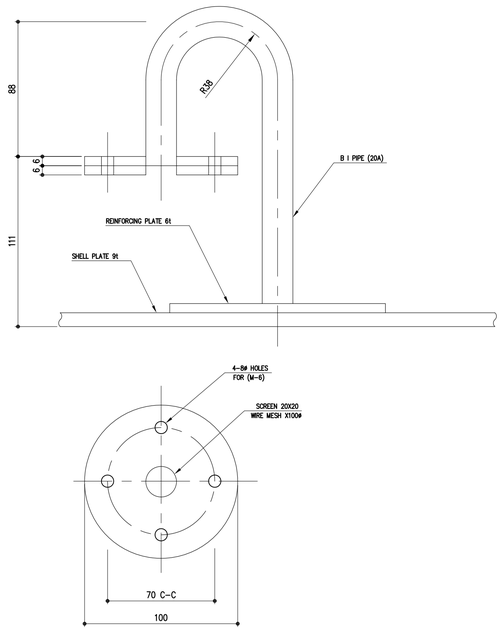
FUEL LEVEL GAUGE SYSTEM DIAGRAM

NOT TO SCALE



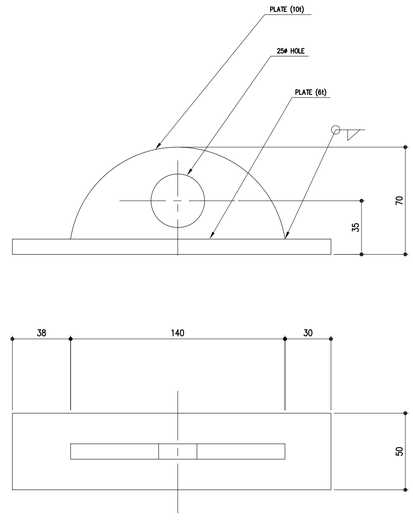
INTAKE PIPE DETAILS

NOT TO SCALE



VENT DETAILS

NOT TO SCALE



LIFTING LUG DETAILS

NOT TO SCALE

MANHOLES DETAILS

NOT TO SCALE

Republic of the Philippines DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS	JAPAN INTERNATIONAL COOPERATION AGENCY	PREPARED BY: TEODORO N. PAMATMAT PROF: PROF. ELECTRICAL ENGINEER PTR. 1403773 REG. NO.: 1927 DATE: 1-04-13 T.I.N. 119-747-900 PLACE: MANILA TADASHI AOI Team Leader	RECOMMENDNG APPROVAL: ILDEFONSO T. PATDU, JR. Assistant Secretary for Project Implementation, DOTC	APPROVED: JULIANITO G. BUCAYAN, JR. Undersecretary for Project Implementation, DOTC	PROJECT TITLE: NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES						SHEET CONTENTS: COMPONENT-3 UTILITY WORKS (U) SUBCOMPONENT-3-2 (U2) Power Supply System MAIN TANK INSTALLATION DETAIL	SHEET NO: U2-3230-04 DRAWING SCALE: AS SHOWN
JICA DESIGN CONSULTANT JOINT VENTURE JAC JAPAN AIRPORT CONSULTANTS, INC. · NIPPON KOEI CO., LTD. · NJS CONSULTANTS CO., LTD.						DATE	INDEX	AMENDMENTS	Prepared by	Checked by: WIM	Validated by: HC		
						JUNE 2013							

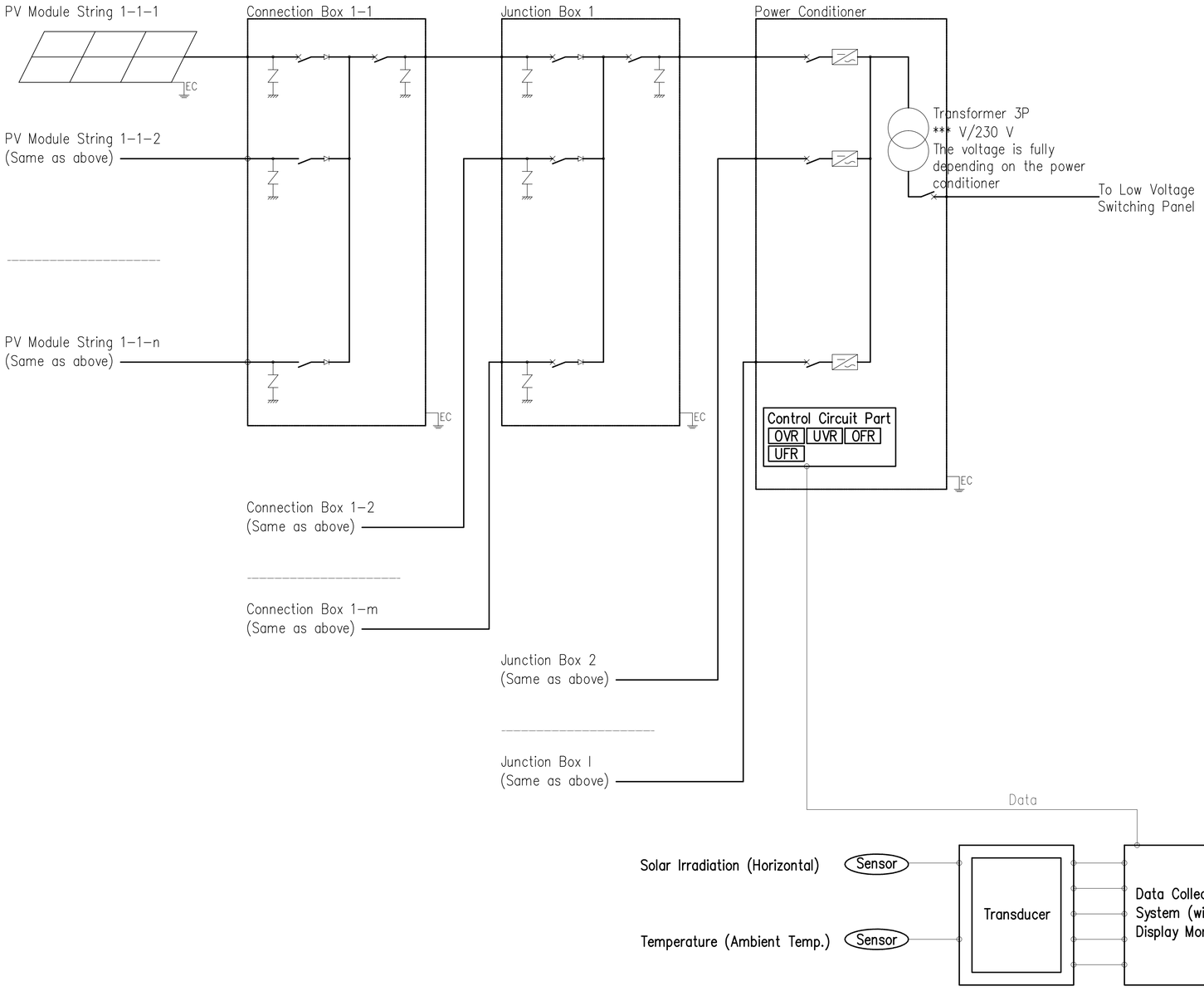
Total Capacity of PV Array:
480 kW or above

Parallel/Series numbers are fully depending on the product provided and system design by the contractor.

Nos. of Connection/Junction Box:
As required

The required numbers are fully depending on the numbers of input circuit of boxes and power conditioner and system design by the contractor.

Note:
Following equipments are assumed to prepare the drawing.
PV Module: 210 W (1,500 * 990 mm)
PV Array: 483.840 kW (2,304 modules in total, 18 modules/string, 128 strings)
Concoction Box: 22 nos. (6 circuits * 18 nos and 5 circuits * 4 nos)
Junction Box: 5 nos. (5 circuits * 2 nos and 4 circuits * 3 nos)
Power Conditioner (PV Inverter): 5 input circuits



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PROF: PROF. ELECTRICAL ENGINEER PTR. 1403773
REG. NO.: 1927 DATE: 1-04-13
T.I.N. 119-747-900 PLACE: MANILA

TADASHI AOI
Team Leader

RECOMMENDNG APPROVAL:

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COMPONENT–3
UTILITY WORKS (U)
SUBCOMPONENT–3–2
(U2) Power Supply System

Single Line Diaglam of Solar Power Generation System

SHEET NO:
U2–3250–01

DRAWING SCALE:
AS SHOWN

Relationship of PV Strings and Boxes

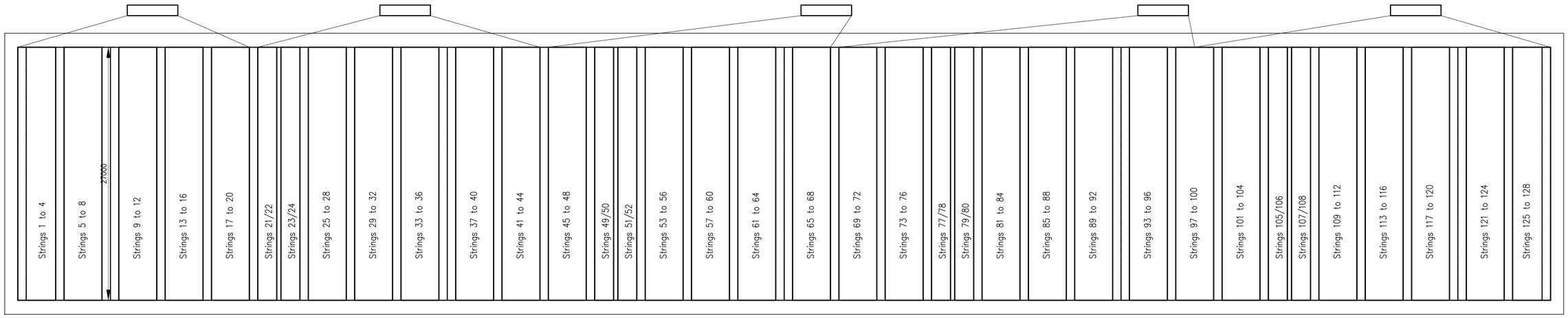
Solar Pad 1
One junction box and four connection boxes are installed.
[Power from Strings 1 to 20 (1-1-1 to 1-4-5)]
– Junction Box 1 (4 input circuits)
– Connection Box 1-1 to 1-4 (5 input circuits each)

Solar Pad 2
One junction box and four connection boxes are installed.
[Power from Strings 21 to 44 (2-1-1 to 2-4-6)]
– Junction Box 2 (4 input circuits)
– Connection Box 2-1 to 2-4 (6 input circuits each)

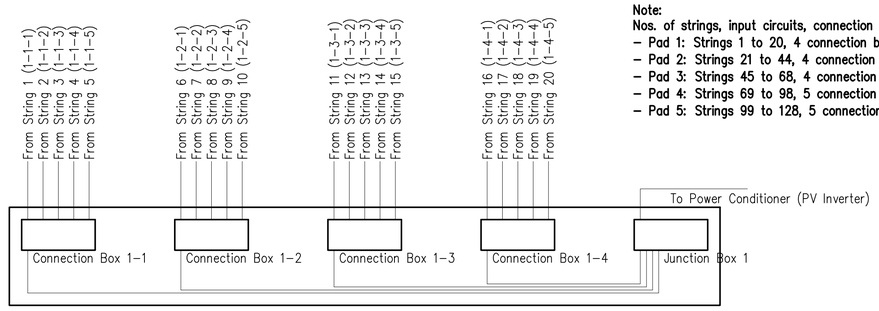
Solar Pad 3
One junction box and four connection boxes are installed.
[Power from Strings 45 to 68 (3-1-1 to 3-4-6)]
– Junction Box 3 (4 input circuits)
– Connection Box 3-1 to 3-4 (6 input circuits each)

Solar Pad 4
One junction box and five connection boxes are installed.
[Power from Strings 69 to 98 (4-1-1 to 4-5-6)]
– Junction Box 4 (5 input circuits)
– Connection Box 4-1 to 4-5 (6 input circuits each)

Solar Pad 5
One junction box and five connection boxes are installed.
[Power from Strings 99 to 128 (5-1-1 to 5-5-6)]
– Junction Box 5 (5 input circuits)
– Connection Box 5-1 to 5-5 (6 input circuits each)



Equipments and Circuits on Solar (Concrete) Pad



Note:
Nos. of strings, input circuits, connection boxes are depending on the pad.
– Pad 1: Strings 1 to 20, 4 connection boxes (5 input circuits each), junction box with 4 input circuits
– Pad 2: Strings 21 to 44, 4 connection boxes (6 input circuits each), junction box with 4 input circuits
– Pad 3: Strings 45 to 68, 4 connection boxes (6 input circuits each), junction box with 4 input circuits
– Pad 4: Strings 69 to 98, 5 connection boxes (6 input circuits each), junction box with 5 input circuits
– Pad 5: Strings 99 to 128, 5 connection boxes (6 input circuits each), junction box with 5 input circuits

Note:
Following equipments are assumed to prepare the drawings.
PV Module: 210 W (1,500 * 990 mm)
PV Array: 483.840 kW (2,304 modules in total, 18 modules/string, 128 strings)
Concoction Box: 22 nos. (6 circuits * 18 nos and 5 circuits * 4 nos)
Junction Box: 5 nos. (5 circuits * 2 nos and 4 circuits * 3 nos)
Power Conditioner (PV Inverter): 5 input circuits

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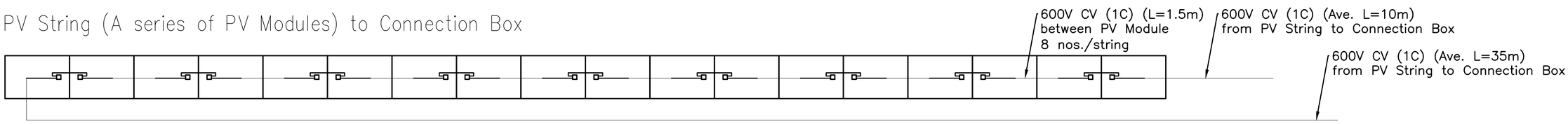
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
PV Module and Connection /Juncion Boxes Layout

SHEET NO:
U2-3250-02

DRAWING SCALE:
AS SHOWN

Cables from PV Modules to Power Conditioner

PV String (A series of PV Modules) to Connection Box



600V CV (1C) L=1.5m	8 nos./string * 128 strings = 1,024 nos.
600V CV (1C) L=10m (average)	1 nos./string * 128 strings = 128 nos.
600V CV (1C) L=35m (average)	1 nos./string * 128 strings = 128 nos.

Connection Box to Junction Box

600V CVD L=4.5m	1 nos./connection box * 5 boxes = 5 nos.
600V CVD L=6m	1 nos./connection box * 5 boxes = 5 nos.
600V CVD L=7.5m	1 nos./connection box * 4 boxes = 4 nos.
600V CVD L=9m	1 nos./connection box * 4 boxes = 4 nos.
600V CVD L=10.5m	1 nos./connection box * 4 boxes = 4 nos.

Junction Box to Power Conditioner (PV Inverter)

600V CVD L=30m	1 nos. (from Junction Box 5 to Power Conditioner)
600V CVD L=60m	1 nos. (from Junction Box 4 to Power Conditioner)
600V CVD L=100m	1 nos. (from Junction Box 3 to Power Conditioner)
600V CVD L=150m	1 nos. (from Junction Box 2 to Power Conditioner)
600V CVD L=180m	1 nos. (from Junction Box 1 to Power Conditioner)

Note:
Following equipments are assumed to prepare the drawings.
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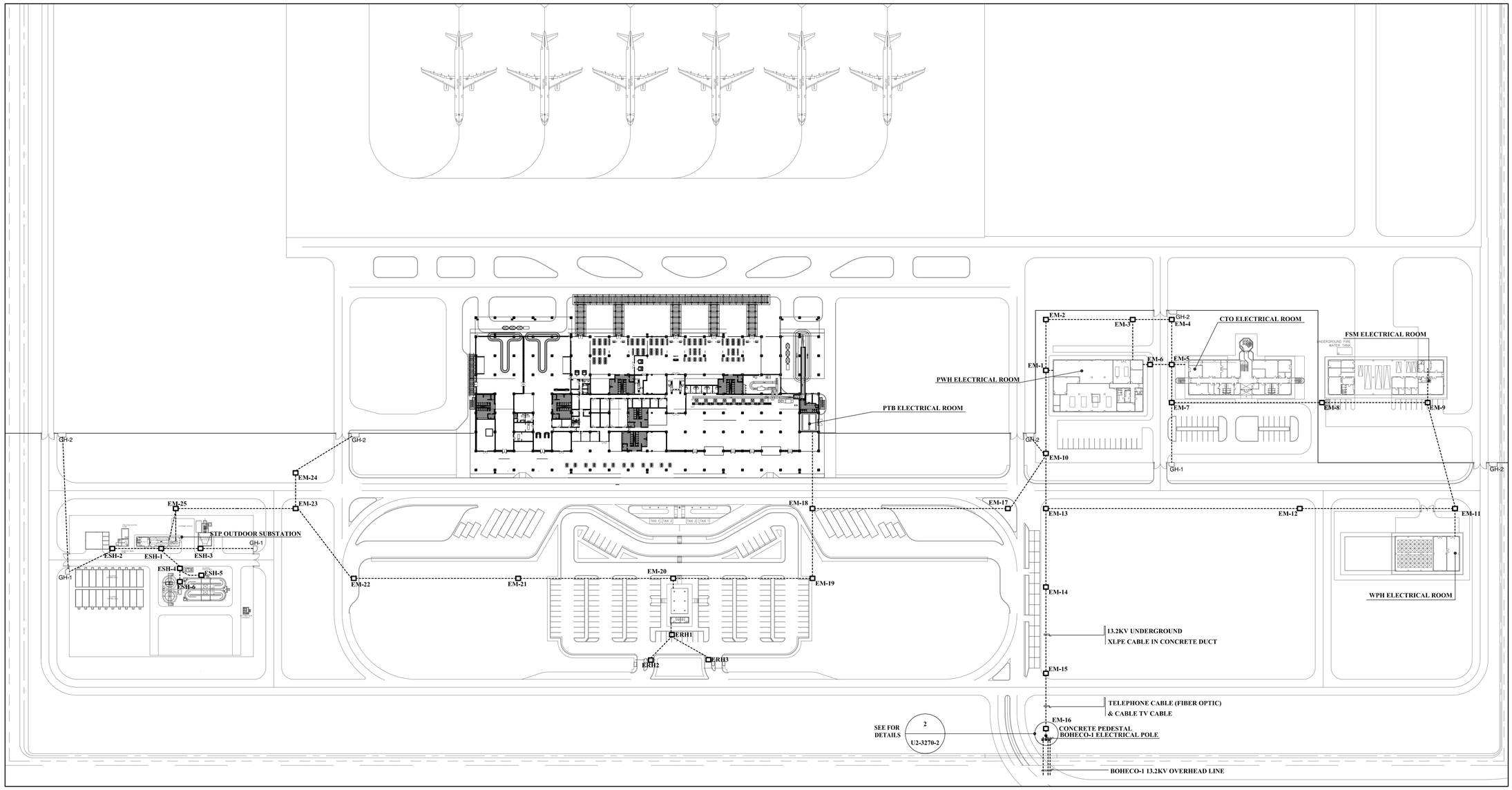
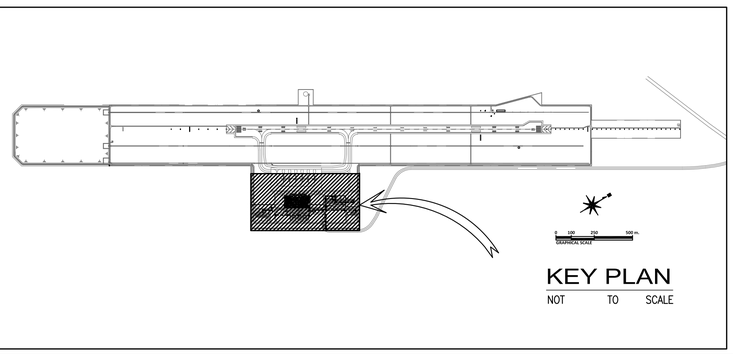
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
Cables from PV modules to Power Conditioner

SHEET NO: U2-3250-03

DRAWING SCALE: AS SHOWN





1 LANDSIDE POWER DISTRIBUTION NETWORK
U2-3270-01 GRAPHIC SCALE 0 10 20 50 100m

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COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
LANDSIDE CONDUIT NETWORK

SHEET NO:
U2-3270-01

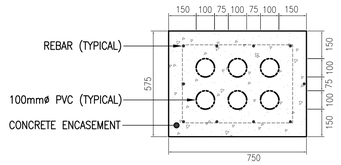
DRAWING SCALE:
AS SHOWN

CABLE AND PIPE SCHEDULE

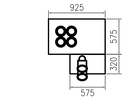
MANHOLE AND HANDHOLE	SIZE AND TYPE OF CABLE	NO. OF PIPE AND SIZE (PVC)	REMARKS
EM13 TO EM16	– 3–1C–50mm² XLPE, 15kV – TELEPHONE CABLE – CABLE TV	6–100mmØ	BOHECO AND SERVICE PROVIDER
EM13 TO EM10	– 3–1C–50mm² XLPE, 15kV – 3–1C–35mm² XLPE, 5kV – TELEPHONE CABLE – CABLE TV	6–100mmØ	SUPPLY TO PUMP HOUSE (PH)
EM10 TO EM1 POWER HOUSE	– 3–1C–50mm² XLPE, 15kV – 3–1C–50mm² XLPE, 5kV – 6–1C–35mm² XLPE, 5kV – LOW VOLTAGE CABLES – TELEPHONE CABLE – CABLE TV – OTHER AUXILLIARY CABLES	10–100mmØ	SUPPLY TO PTB, PUMP HOUSE, STP
EM13–EM12–EM11	– 3–1C–35mm² XLPE, 5kV – BMS CABLES	1–100mmØ 2–50mmØ	SUPPLY TO PH
EM10 TO EM17 AND EM17 TO EM18	– 3–1C–50mm² XLPE, 5kV – 3–1C–35mm² XLPE, 5kV – TELEPHONE CABLE – CABLE TV – LOW VOLTAGE DRIVER'S LOUNGE – OTHER AUXILLIARY CABLES	10–100mmØ	SUPPLY TO PTB STP, DRIVER'S LOUNGE
EM18 TO PTB	– 3–1C–50mm² XLPE, 5kV – TELEPHONE CABLE – CABLE TV – OTHER AUXILLIARY CABLES	6–100mmØ PVC	SUPPLY TO PTB
EM18 TO EM19, EM20 TO DRIVER'S LOUNGE	– 3–1C–35mm² XLPE, 5kV – LOW VOLTAGE CABLE – TELEPHONE CABLE – CABLE TV – OTHER AUXILLIARY CABLES	4–100mmØ PVC	SUPPLY TO STP DRIVER'S LOUNGE
EM20 TO EM21, 22, 23 24, 25, STP	– 3–1C–35mm² XLPE, 5kV – TELEPHONE CABLE – OTHER AUXILLIARY CABLES	4–100mmØ PVC	SUPPLY TO STP

CABLE AND PIPE SCHEDULE

MANHOLE AND HANDHOLE	SIZE AND TYPE OF CABLE	NO. OF PIPE AND SIZE (PVC)	REMARKS
PWH TO EM6 TO EM5	– LOW VOLTAGE CABLES – TELEPHONE CABLE – AUXILLIARY CABLES	6–100mmØ	SUPPLY TO CTO
EM5 TO CTO	– LOW VOLTAGE CABLES – TELEPHONE CABLE – AUXILLIARY CABLES	10–100mmØ	SUPPLY TO CTO
EM7 TO EM8, EM9	– LOW VOLTAGE CABLE – COMMUNICATION CABLES – AUXILLIARY CABLES	2–100mmØ 2–50mmØ	SUPPLY TO FSM
EM9 TO EM11	– COMMUNICATION CABLES	2–50mmØ	SUPPLY TO WPH
EM1 TO EM2	– COMMUNICATION CABLES AND AUXILLIARY CABLES	5–100mmØ	
EM2 TO EM3	– POWER, COMMUNICATION AND AUXILLIARY CABLES	10–100mmØ	
PWH TO EM3	– ALL POWER CABLES	12–100mmØ	
EM5 TO EM4	– ALL COMMUNICATION CABLES AND AUXILLIARY CABLES	5–100mmØ	
EM4 TO GH–2	– POWER CABLES AND TELEPHONE CABLES	2–50mmØ	SUPPLY TO GH
EM7 TO GH–1	– POWER CABLES AND TELEPHONE CABLES	2–50mmØ	SUPPLY TO GH
EM10 TO GH–2	– POWER CABLES AND TELEPHONE CABLES	2–50mmØ	SUPPLY TO GH
EM24 TO GH–2	– POWER CABLES AND TELEPHONE CABLES	2–50mmØ	SUPPLY TO GH
ESH TO GH–1 TO GH–2	– POWER CABLES AND TELEPHONE CABLES	2–50mmØ	SUPPLY TO GH
DRL TO ERH1	– POWER CABLES AND TELEPHONE CABLES	2–50mmØ	SUPPLY TO GH
ERH1 TO ERH2 ERH3	– POWER CABLES AND TELEPHONE CABLES	2–50mmØ	SUPPLY TO GH



A SECTION



TOP VIEW

NOTE:

1. POWER & TELECOM CABLE WILL BE SEPARATED PROPERLY INSIDE MANHOLE AS PER PEC.
2. MINIMUM DEPTH FROM FINISH GRADE LINE TO TOP SURFACE OF PIPE FOR ROAD CROSSING IS 1200mm.
3. MINIMUM DEPTH FROM FINISH GRADE LINE TO TOP SURFACE OF PIPES NON–ROAD IS 700mm.
4. SIZE OF PIPE INDICATED IS INSIDE DIAMETER.

LEGEND:

EM – ELECTRICAL MANHOLE

EH – ELECTRICAL HANDHOLE

SIDE ELEVATION

FRONT ELEVATION

1 UNDERGROUND CONCRETE DUCT CABLES AND SCHEDULE
U2–3270–02 NOT TO SCALE

2 CONCRETE PEDESTAL DETAIL
U2–3270–02 NOT TO SCALE

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JICA DESIGN CONSULTANT JOINT VENTURE

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PREPARED BY:

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PROF: PROF. ELECTRICAL ENGINEER PTR. 1403773
REG. NO.: 1927 DATE: 1–04–13
T.I.N. 119–747–900 PLACE: MANILA

TADASHI AOI
Team Leader

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(DOTC)

PROJECT TITLE:

NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT

LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES

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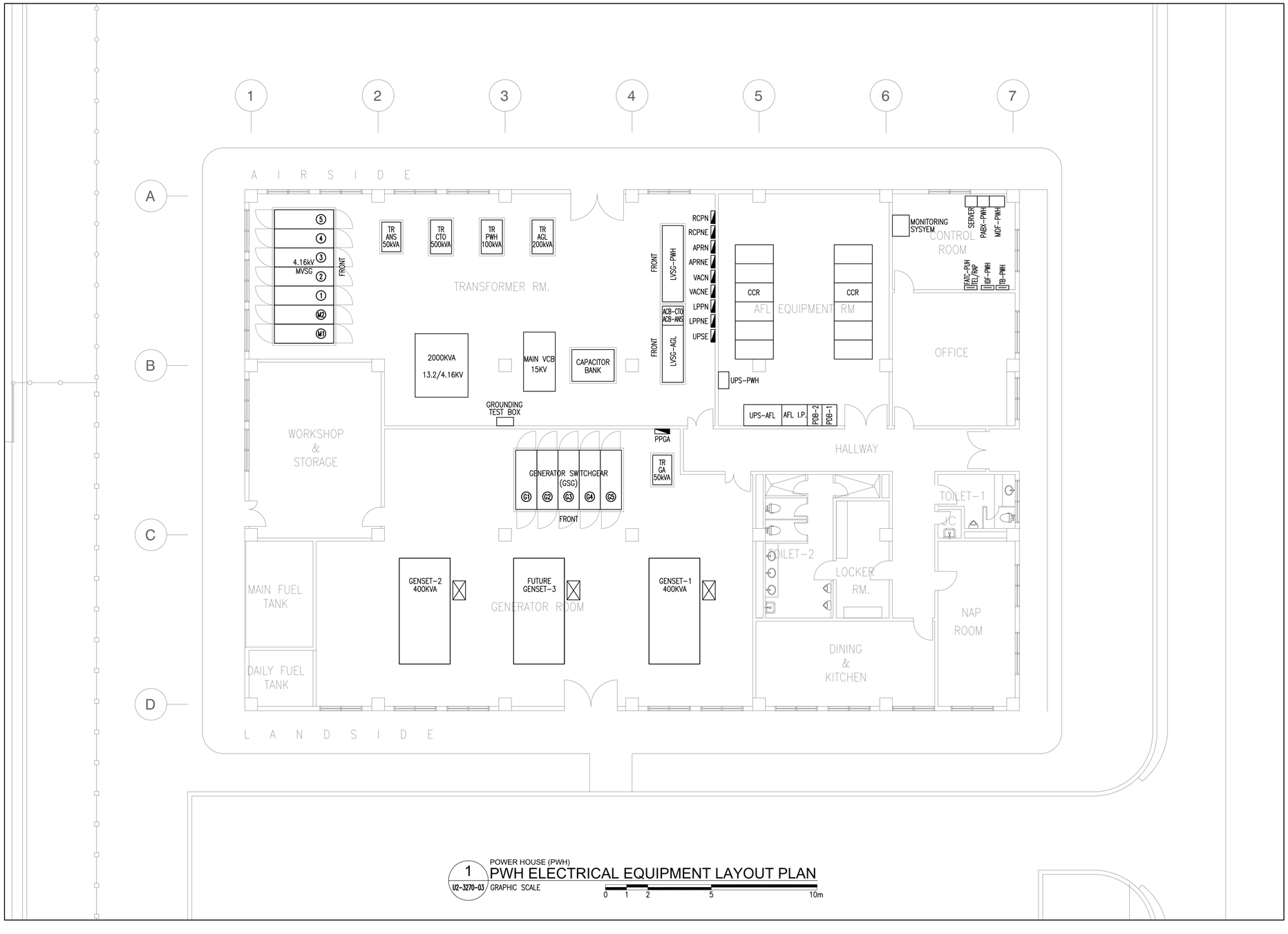
JUNE 2013				WIM	HC

SHEET CONTENTS:
COMPONENT–3
UTILITY WORKS (U)
SUBCOMPONENT–3–2
(U2) Power Supply System
CONCRETE PEDESTAL & CONDUIT SCHEDULE

SHEET NO: U2–3270–02

DRAWING SCALE: AS SHOWN



1 / U2-3270-03

POWER HOUSE (PWH)

PWH ELECTRICAL EQUIPMENT LAYOUT PLAN

GRAPHIC SCALE 0 1 2 5 10m

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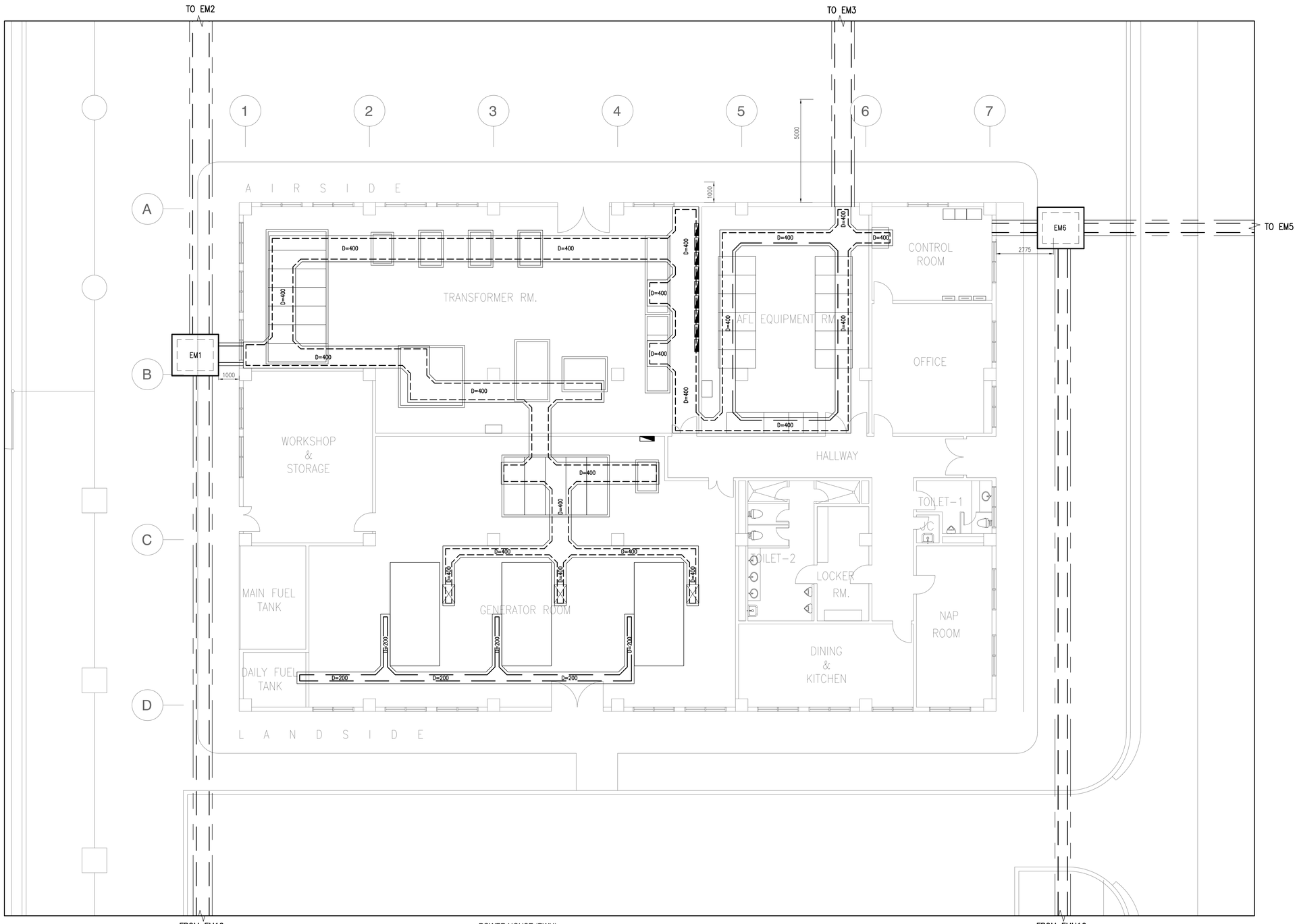
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
(PWH) ELECTRICAL EQUIPMENT ROOM LAYOUT

SHEET NO: U2-3270-03

DRAWING SCALE: AS SHOWN



POWER HOUSE (PWH)

(PWH) CABLE TRENCH LAYOUT PLAN

1 / U2-3270-04 GRAPHIC SCALE 0 1 2 5 10m

NOTE:

1. REFER TO SHEET NO. U2-3270-02 FOR MANHOLE AND HANDHOLE SCHEDULE.
2. REFER TO SHEET NO. U2-3270-07 FOR EMH & EHH DETAILS AND SECTION.

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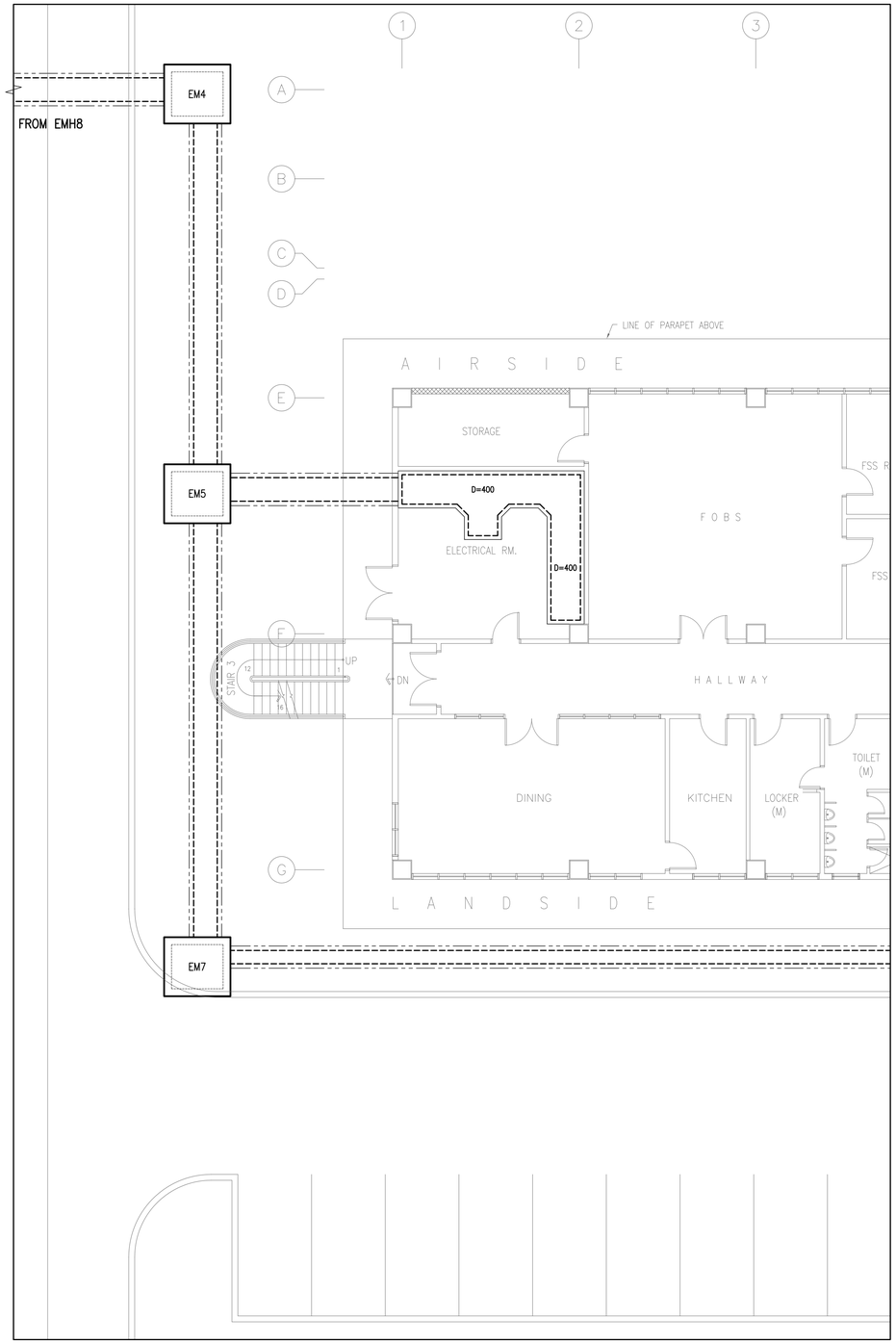
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
(PWH) CABLE TRENCH LAYOUT PLAN

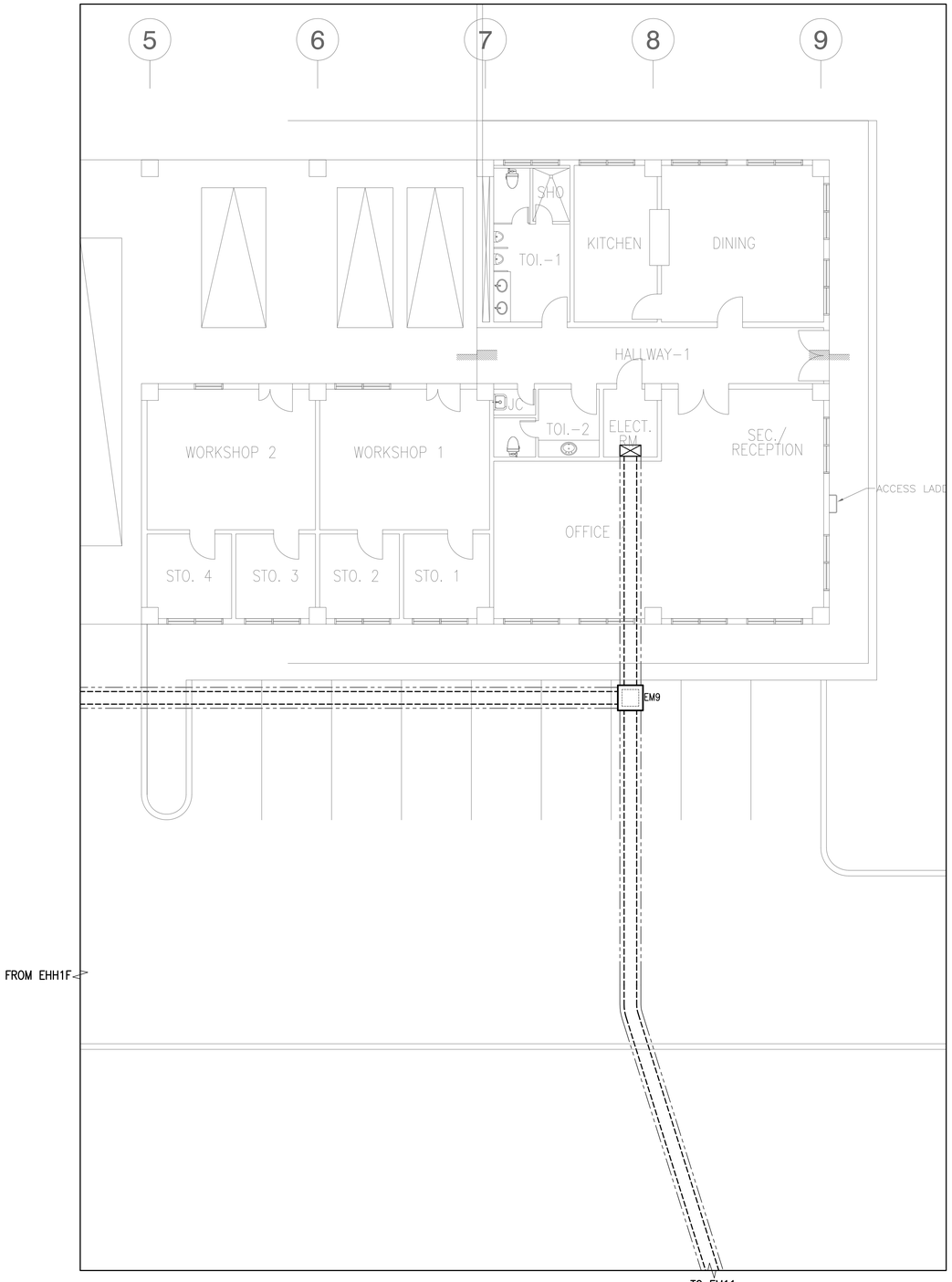
SHEET NO: U2-3270-04

DRAWING SCALE: AS SHOWN



1 CONTROL TOWER, OPERATIONS AND ADMINISTRATION BLDG. (CTO)
(CTO) CABLE TRENCH LAYOUT PLAN

U2-3270-05 GRAPHIC SCALE 0 1 2 5 10m



2 FIRE STATION AND MAINTENANCE BUILDING (FSM)
(FSM) CABLE TRENCH LAYOUT PLAN

U2-3270-05 GRAPHIC SCALE 0 1 2 5 10m

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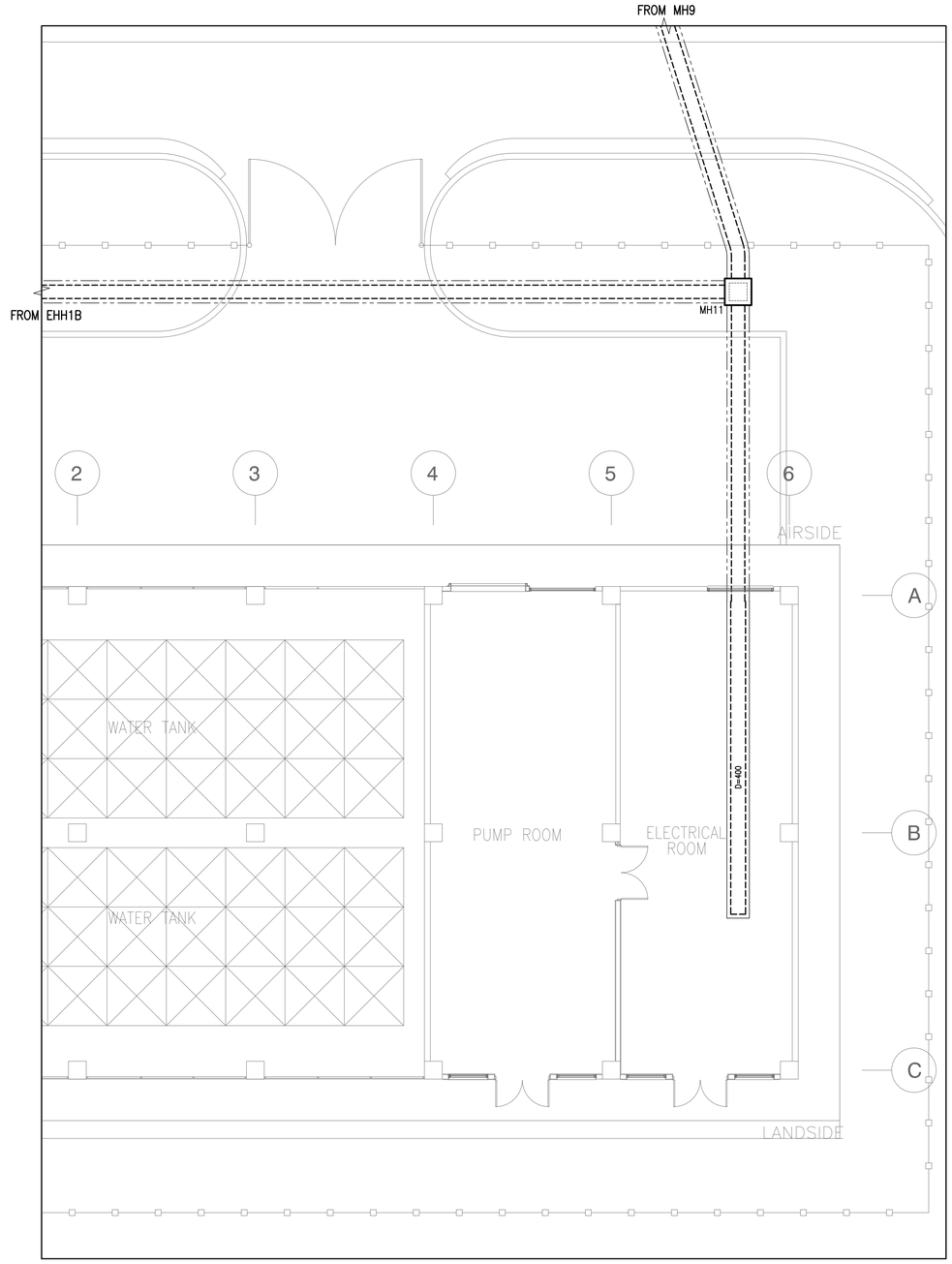
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
(CTO & FSM) CABLE TRENCH LAYOUT

SHEET NO:

U2-3270-05

DRAWING SCALE:

AS SHOWN



WATER TANK AND PUMP HOUSE (WPH)

1 (WPH) CABLE TRENCH LAYOUT PLAN

U2-3270-06 GRAPHIC SCALE 0 1 2 5 10m

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COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
(WPH) CABLE TRENCH LAYOUT PLAN

SHEET NO: U2-3270-06

DRAWING SCALE: AS SHOWN

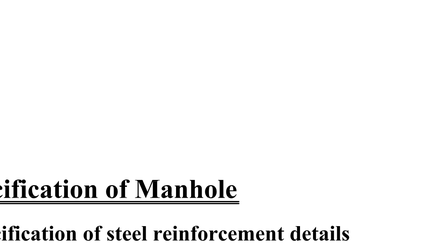
Specification of Manhole

Specification of steel reinforcement details

WALL	VERTICAL (INSIDE)	D13 - @ 300
	VERTICAL (OUTSIDE)	D13 - @ 300
	HORIZONTAL	D13 - @ 300 DOUBLE
TOP SLAB		D13 - @ 300 DOUBLE
BOTTOM SLAB		D13 - @ 300 DOUBLE

Schedule of materials

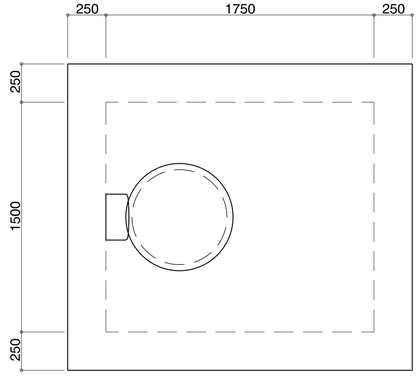
REINFORCEMENT (D13) SD295A	689.1 kg
CONCRETE (21N/mm2, S=15cm)	5.887 cubic m
FORM	34.848 square m
LEAN CONCRETE (18N/mm2, S=12cm)	0.270 cubic m
CRUSHED AGGREGATE	0.809 cubic m
HOOK BOLT FOR PULLING D16x700L	8 PCS
STEEL STEP	6 PCS
CABLE HANGER (300mm INTERVAL)	18 PCS
Manhole no. plate	1 PC



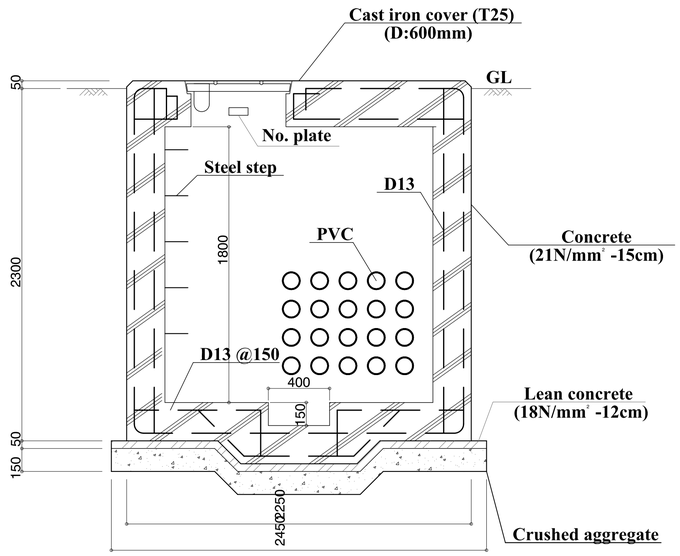
Typical installation of cable duct S=1:40

Note

1. The concrete encasement shall be provided under pavement



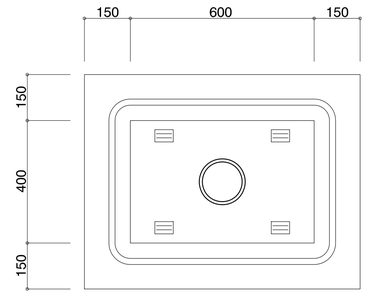
Top view for Manhole



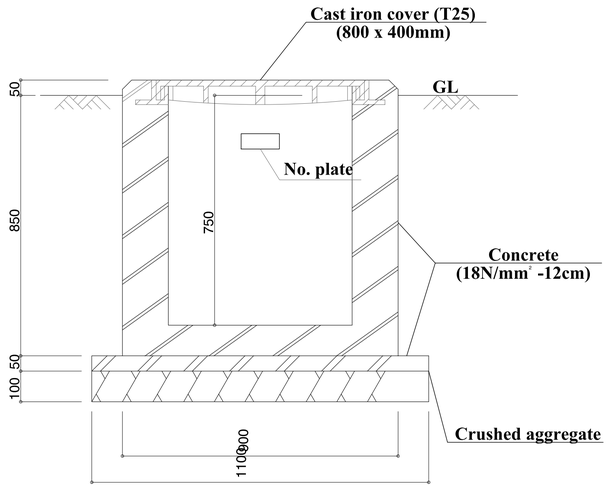
Detail of Manhole S=1:40

Note

1. Manhole shall be fabricated by Civil work.
2. Manhole shall be located on the cable duct for trunk line at land side



Top view for Handhole



Detail of Handhole S=1:20

Note

1. Handhole shall be fabricated by Civil work.
2. Handhole shall be located at land side

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COMPONENT-3
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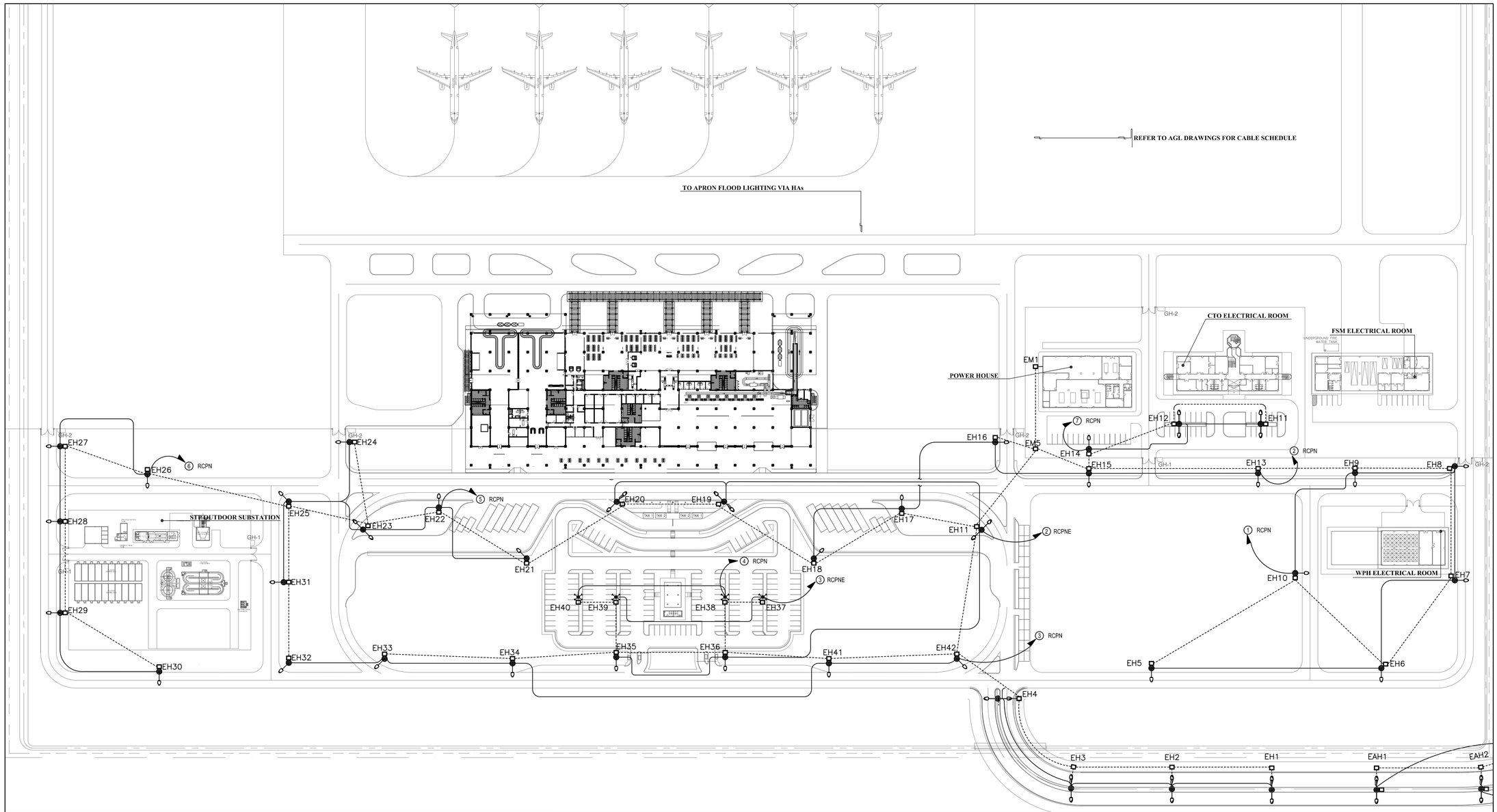
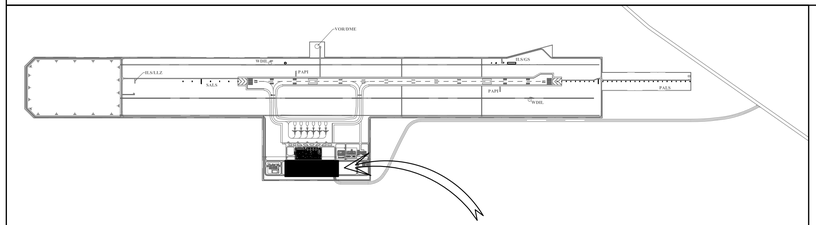
SUBCOMPONENT-3-2
(U2) Power Supply System
ELECTRICAL MANHOLE AND HANDHOLE DETAILS

SHEET NO: U2-3270-07

DRAWING SCALE: AS SHOWN





KEY PLAN
NOT TO SCALE

LEGEND	
	SINGLE ARM ROAD LIGHTING
	DOUBLE ARM ROAD LIGHTING
	CAR PARK LIGHTING

1 / U2-3270-01 ROAD AND CAR PARK LIGHTS
GRAPHIC SCALE 0 10 20 50 100m

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SUBCOMPONENT–3–2
(U2) Power Supply System
ROAD AND CAR PARK LIGHT

SHEET NO: U2–3290–01
DRAWING SCALE: AS SHOWN

MANHOLE AND HANDHOLE	PIPES SIZE AND QUANTITY
POWER HOUSE TO EM1 TO EM10 (ONLY FOR ROAD AND CARPARK LIGHTING)	8–50mmØ PVC
EM10 TO EHH15	3–50mmØ PVC
EM10 TO EHH11	8–50mmØ PVC
EM10 TO EHH16	1–50mmØ PVC
EHH11 TO EHH42	2–50mmØ PVC
EHH42 TO EHH4	1–50mmØ PVC

MANHOLE AND HANDHOLE	PIPES SIZE AND QUANTITY
EHH42 TO 41 TO 36 TO 35 TO 34 TO 33 TO 32	2–50mmØ PVC
EHH11 TO EHH17 TO EHH18	4–50mmØ PVC
EHH18 TO EHH19 TO EHH20	3–50mmØ PVC
EHH20 TO EHH21 TO EHH22 TO EHH23 TO EHH 25	2–50mmØ PVC
EHH23 TO EHH24	1–50mmØ PVC

MANHOLE AND HANDHOLE	PIPES SIZE AND QUANTITY
EHH25 TO 26 TO 27 TO 28 TO 29 TO EHH30	1–50mmØ PVC
EHH15 TO EHH14	1–50mmØ PVC
EHH14 TO 12 TO 11	1–50mmØ PVC
EHH15 TO EHH13 TO EHH9	2–50mmØ PVC
EHH9 TO EHH8 TO EHH7	1–50mmØ PVC
EHH9 TO EHH10 TO EHH5 TO EHH6	1–50mmØ PVC
EHH4 TO EHH3 TO EHH2 TO EHH1	1–50mmØ PVC

1 / U2–3290–02 CONCRETE DUCT SCHEDULE
NOT TO SCALE

PANEL: **ARLP1** VOLTAGE: 230V 1ø 2W SUPPLY: NORMAL DIRECT FROM BOHECO
TO: BOHECO POLE TYPE TRANSFORMER

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD ØAB	ØBC	ØCA	3ø LOAD	WIRE	PVC CONDUIT (IN DUCT)	PROTECTION
1	10 – 120W LED ROADLIGHT	1500	6.52				2–60mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
2	10 – 120W LED ROADLIGHT	1500		6.52			2–60mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
3	10 – 120W LED ROADLIGHT	1500			6.52		2–30mm² THHN 1–5.5mm² TW	45mmØ	20AT, 2P CB
4	10 – 120W LED ROADLIGHT	1500	6.52				2–60mm² THHN 1–5.5mm² TW	45mmØ	20AT, 2P CB
5	10 – 120W LED ROADLIGHT	1500		6.52			2–60mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
6	8 – 120W LED ROADLIGHT	1200			5.21		2–50mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
7	SPARE	1000	4.35						20AT, 2P CB
8	SPARE	1000		4.35					20AT, 2P CB
9	SPARE	1000			4.35				20AT, 2P CB
		11700	17.39	17.39	16.08				

IT = 17.39 x 1.732 = 30.12 A

MAIN PROTECTION: 50AT, 100AF, 230V, 3P, MCCB, 10KAIC
FEEDER SIZE: 3–10mm² XLPE

NOTE: ENCLOSURE SHALL BE NEMA 4X

PANEL: **ARLP2** VOLTAGE: 230V 3ø 3W SUPPLY: DIRECT FROM BOHECO
TO: BOHECO POLE TYPE TRANSFORMER

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD ØAB	ØBC	ØCA	3ø LOAD	WIRE	PVC CONDUIT (IN DUCT)	PROTECTION
1	10 – 120W LED ROADLIGHT	1500	6.52				2–60mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
2	10 – 120W LED ROADLIGHT	1500		6.52			2–60mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
3	10 – 120W LED ROADLIGHT	1500			6.52		2–30mm² THHN 1–5.5mm² TW	40mmØ	20AT, 2P CB
4	10 – 120W LED ROADLIGHT	1500	6.52				2–30mm² THHN 1–5.5mm² TW	40mmØ	20AT, 2P CB
5	8 – 120W LED ROADLIGHT	1200		5.21			2–50mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
6	10 – 120W LED ROADLIGHT	1500			6.52		2–50mm² THHN 1–8.0mm² TW	50mmØ	20AT, 2P CB
7	SPARE	1000	4.35						20AT, 2P CB
8	SPARE	1000		4.35					20AT, 2P CB
9	SPARE	1000			4.35				20AT, 2P CB
		11700	17.39	16.08	17.39				

IT = 17.39 X 1.732 = 30.12 A

MAIN PROTECTION: 50AT, 100AF, 230V, 3P, MCCB, 10KAIC
FEEDER SIZE: 3–10mm² XLPE

NOTE: ENCLOSURE SHALL BE NEMA 4X

PANEL: **RCPN** VOLTAGE: 230V 3ø 3W SUPPLY: NORMAL
TO: LVSGNE–PWH

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD ØAB	ØBC	ØCA	3ø LOAD	WIRE	PVC CONDUIT (IN DUCT)	PROTECTION
1	5 – 120W LED LAMP ROAD	750	3.26				2–14mm² THHN 1–5.5mm² TW	32mmØ	20AT, 2P CB
2	5 – 120W LED LAMP ROAD	750		3.26			2–14mm² THHN 1–5.5mm² TW	32mmØ	20AT, 2P CB
3	5 – 120W LED LAMP ROAD	750			3.26		2–22mm² THHN 1–5.5mm² TW	32mmØ	20AT, 2P CB
4	8 – 120W LED LAMP CAR PARK 1	1200	5.22				2–30mm² THHN 1–5.5mm² TW	50mmØ	20AT, 2P CB
5	7 – 120W LED LAMP ROAD	1050		4.56			2–30mm² THHN 1–5.5mm² TW	50mmØ	20AT, 2P CB
6	5 – 120W LED LAMP ROAD	750			3.26		2–38mm² THHN 1–5.5mm² TW	50mmØ	20AT, 2P CB
7	4 – 120W LED LAMP CARPARK 2 (PLOH AND CTO)	600			2.60		2–8.0mm² THHN 1–5.5mm² TW	25mmØ	20AT, 2P CB
8	SPARE	1150	5						20AT, 2P CB
9	SPARE	1150		5					20AT, 2P CB
10	SPARE	1150			5				20AT, 2P CB
		9300	13.48	12.82	14.12				

IT = 14.12 x 1.732 = 24.45 A

MAIN PROTECTION: 50AT, 100AF, 230V, 3P, MCCB, 10KAIC
FEEDER SIZE: 3–10mm² XLPE + 1–3.5mm² TW

PANEL: **RCPNE** VOLTAGE: 230V 3ø 3W SUPPLY: NORMAL/EMERGENCY
TO: LVSGNE–PWH

CKT NO.	LOAD DESCRIPTION	VA	AMPERE LOAD ØAB	ØBC	ØCA	3ø LOAD	WIRE	PVC CONDUIT (IN DUCT)	PROTECTION
1	8 – 120W LED LAMP AIRPORT ACCESS ROAD ENTRANCE	1200	5.22				2–30mm² THHN 1–5.5mm² TW	50mmØ	20AT, 2P CB
2	8 – 120W LED LAMP	1200		5.22			2–22mm² THHN 1–5.5mm² TW	32mmØ	20AT, 2P CB
3	8 – 120W LED LAMP CARPARK	1200			5.22		2–30mm² THHN 1–5.5mm² TW	50mmØ	20AT, 2P CB
4	SPARE	1150	5						20AT, 2P CB
5	SPARE	1150		5					20AT, 2P CB
6	SPARE	1150			5				20AT, 2P CB
		7050	10.22	10.22	10.22				

IT = 10.22 x 1.732 = 17.7 A

MAIN PROTECTION: 30AT, 100AF, 230V, 3P, MCCB, 10KAIC
FEEDER SIZE: 3–6mm² XLPE + 1–3.5mm² TW

1 / U2–3290–02 PANEL SCHEDULE
NOT TO SCALE

Republic of the Philippines DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

JAPAN INTERNATIONAL COOPERATION AGENCY

JICA DESIGN CONSULTANT JOINT VENTURE

JAC JAPAN AIRPORT CONSULTANTS, INC. · NIPPON KOEI CO., LTD. · NJS CONSULTANTS CO., LTD.

PREPARED BY:
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PROF: PROF. ELECTRICAL ENGINEER PTR. 1403773
REG. NO.: 1927 DATE: 1-04-13
T.I.N. 119-747-900 PLACE: MANILA
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Team Leader

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Assistant Secretary
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APPROVED:
JULIANITO G. BUCAYAN, JR.
Undersecretary
for Project Implementation, DOTC

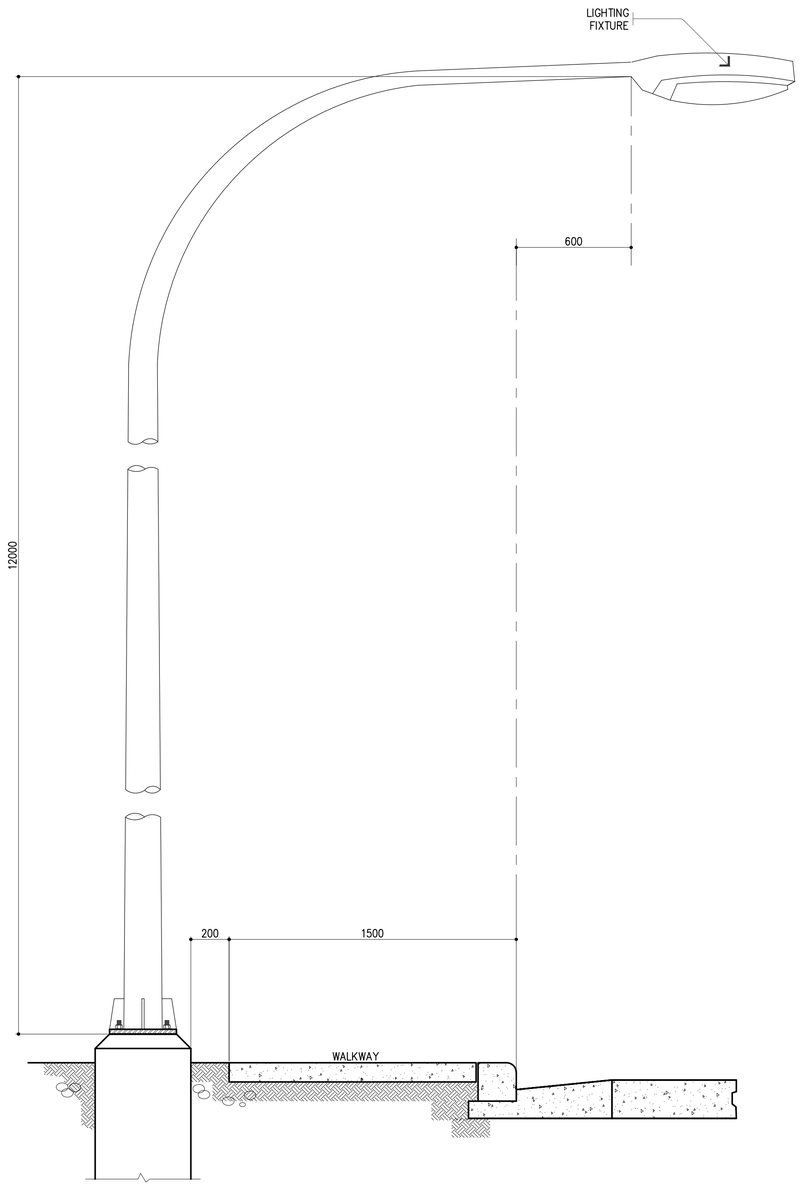
PROJECT TITLE:
NEW BOHOL AIRPORT CONSTRUCTION AND SUSTAINABLE ENVIRONMENT PROTECTION PROJECT
LOCATION: MUNICIPALITY OF PANGLAO, PROVINCE OF BOHOL, PHILIPPINES

DATE	INDEX	AMENDMENTS	Prepared by	Checked by	Validated by
JUNE 2013				WIM	HC

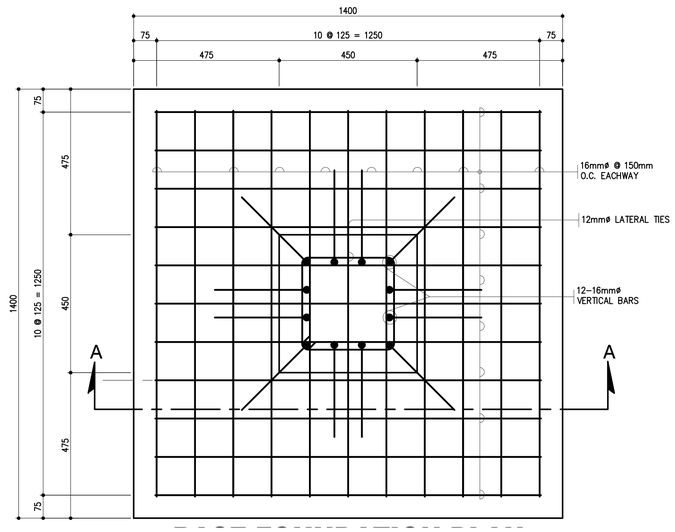
SHEET CONTENTS:
COMPONENT–3
UTILITY WORKS (U)
SUBCOMPONENT–3–2
(U2) Power Supply System
PANEL & CONCRETE DUCT SCHEDULE

SHEET NO: U2–3290–02

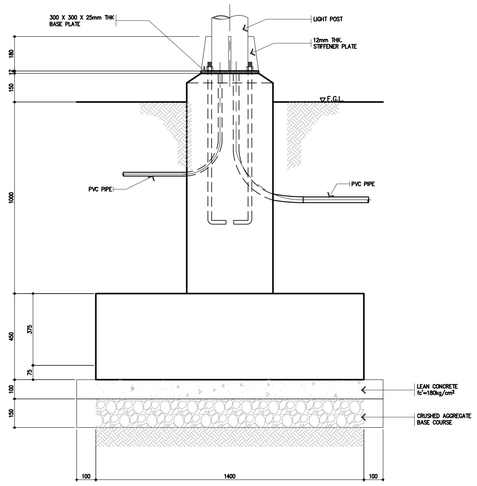
DRAWING SCALE: AS SHOWN



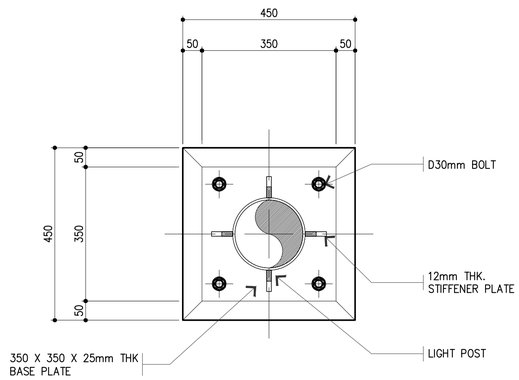
1 TYPICAL HIGH ROAD LIGHTING DETAIL
U2-3290-05 SCALE: AS SHOWN



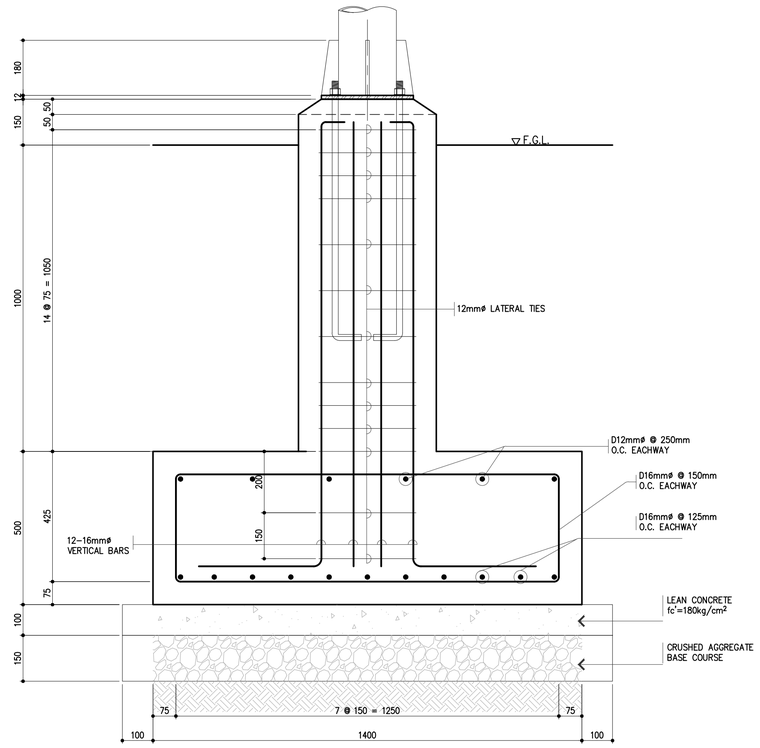
BASE FOUNDATION PLAN
SCALE: AS SHOWN



TYPICAL FOOTING ELEVATION
SCALE: AS SHOWN



TYPICAL PEDESTAL PLAN
SCALE: AS SHOWN



DETAIL OF REINFORCEMENT
SCALE: AS SHOWN

Note

1. The foundation shall be prepared for 12m & 15m Light Pole.

Republic of the Philippines
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SHEET CONTENTS:
COMPONENT-3
UTILITY WORKS (U)
SUBCOMPONENT-3-2
(U2) Power Supply System
ROAD LIGHTING DETAILS

SHEET NO: U2-3290-03

DRAWING SCALE: AS SHOWN