CONTRACT NO: JBALB/HQ/K004/2024 SARAWAK WATER SUPPLY GRID PROGRAM – STRESSED AREAS IMPROVEMENT OF WATER SUPPLY SYSTEM IN BETONG DIVISION PACKAGE 4-UPGRADING OF LUBAU WTP (RE-TENDER)

### Appendix D:

### **Standard Site Form for Mechanical & Electrical Work**

FORM M-GE-1	SECTIONAL PIPE PRESSURE TEST FORM
FORM M-GE-2	PIPE WELDED JOINT AIR TEST
FORM M-GE-3	PRE-COMMISSIONING OF PUMPS
	- INSTALLATION CHECK
	- CABLE INSULATION
FORM M-GE-4	TESTING AND COMMISSIONING OF OVERHEAD TRAVELING CRANE
FORM M-GE-5	TESTING AND COMMISSIONING OF DIESEL GENERATOR
FORM M-GE-6	TESTING AND COMMISSIONING OF PUMPS
	-FLYGT SUBMERSIBLE PUMP (MAS) CONTROLLER PROTECTION SETTING
FORM M-GE-7-1	TESTING AND COMMISSIONING OF PUMPS
	HORIZONTAL SPLIT CASING PUMP & MOTOR PROTECTION SETTING
FORM M-GE-7-2	TESTING AND COMMISSIONING OF AUXILLARY PUMPS
FORM M-GE-7-3	TESTING AND COMMISSIONING OF EC PUMPS
FORM M-GE-8	SURGE COMPRESSION SYSTEM TEST FORM
FORM M-GE-9	TESTING AND COMMISSIONING OF AIR COMPRESSOR
FORM M-GE-10	DIESEL GENERATOR OPERATION RECORD
FORM M-GE-11	RAW WATER PUMP OPERATION RECORD
FORM M-GE-12	TREATED WATER PUMP OPERATION RECORD
FORM M-GE-13	TOP ENTRY MIXER TEST FORM
FORM M-GE-14	METERING PUMP TEST FORM
FORM M-GE-15	AIR BLOWER TEST FORM
FORM M-GE-16	JAR TEST FORM
FORM M-GE-17	FILTER TEST FORM
FORM M-GE-18	FLOW METER TEST FORM
FORM M-GE-19	ELECTRIC ACTUATOR TEST FORM
FORM M-GE-20	FILTER VALVE/ PENSTOCK OPERATION TEST FORM

CONTRACT NO: JBALB/HQ/K004/2024 SARAWAK WATER SUPPLY GRID PROGRAM – STRESSED AREAS IMPROVEMENT OF WATER SUPPLY SYSTEM IN BETONG DIVISION PACKAGE 4-UPGRADING OF LUBAU WTP (RE-TENDER)

# Appendix D: Standard Site Form for Mechanical & Electrical Work

FORM E-LV-1	TESTING AND COMMISSIONING OF SWITCH BOARD
FORM E-LV-2	TESTING AND COMMISSIONING OF GENERATOR SETS
FORM E-LV-3	MAIN POWER CABLE INSULATION TEST
FORM E-LV-4	EARTH RESISTANCY TEST
FORM E-LV-5	DISTRIBUTION BOARD SUB-CIRCUIT TEST
FORM E-LV-6	AIR CONDITIONING UNIT TEST



GROUP ENGINEERS MALAYSIA SDN BHD								JABATAN BEKALAN AIR LUAR BANDAR SARAWAK
	_ <b>_</b>		 <u>s</u>	SECTIONAL P	IPE PRE	SSURE TE	ST FORM	FORM M-GE-1
Location:								
Instruments	Used :	_						,
Drawing No.	(if any)	:						
Working Pre	essure:					Psi / Bar		
Test Pressur			-			Psi / Bar		
Specified Du Pipe Length		зде:				-		
Item	Date / Time	Reading ( ) Units	Date/ Time	Reading ( ) Units	Du	ıration	Weather	Remarks
						·		
							<u></u>	
TEST RESUL	.Т :			ACCEPTED	l		REJECTED	
Comment:								
	Те	ested By:					Witnessed By:	Client Personnutative

Tested By:	Witnessed By:						
Contractor Representative	Consultant Representative	Client Representative					
Name:	Name:	Name:					
Date:	Date:	Date:					



PROJECT	TIT	LE
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FORM M-GE-6

## TESTING AND COMMISSIONING OF PUMPS SUBMERSIBLE PUMP (MAS) CONTROLLER PROTECTION SETTING

Pum	p No. / Location:		Equipment Tag No. :				
Seria	al No. :		Date : _				
PU	MP MAS PROTECTION			Pre-Set Value			
				Warning	Trip	Unit	
a)	Temperature Stator ph 1					°C	
b)	Temperature Stator ph 2					°C	
c)	Temperature Stator ph 3					°C	
d)	Temperature Main Bearing					°C	
e)	Leakage Stator Housing					mA	
f)	Leakage Junction Box					mA	
g)	Vibration					mm/s	
h)	Pump Current					Amp	
g)	Current Unbalance					%	
h)	Voltage Unbalance					%	
i)	Low Power					kW	
PU	MP OPERATION PROTECTION			Pre-Set	Value		
a)	Low Water Level in Suction Chamber	/ Reservoir				m	
b)	Discharge Main Pipe High Pressure S	top - Pressure Sensor				Bar	
c)	Discharge Header High Pressure Stop	o - Pressure switch				Bar	
Rem	arks :						
	Tested By:			essed By:			
	Contractor Representative	Consultant Representat	ive	Client R	epresentative		
Nam	e:	Name:		Name:			
Date	:	Date:		Date:			

MAIN CONTRACTOR:

GEM

GROUP ENGINEERS MALAYSIA

**SDN BHD** 

PROJECT TITLE:



FORM M-GE-7
- Sheet 1/2

## TESTING AND COMMISSIONING OF PUMPS HORIZONTAL SPLIT CASING PUMP & MOTOR PROTECTION SETTING

Pu	mp No. / Location :	Equipment Tag No. :						
Sei	ial No. :	Dat	te :					
Pι	IMP & MOTOR PROTECTION		Pre-Set Value					
a)	Low Water Level in Suction Reservoir					m		
b)	Valve Closed Interlock							
			W	arning	Trip	Unit		
c)	Motor Winding					°C		
d)	Motor NDE Bearing					°C		
e)	Motor DE Bearing					°C		
f)	Pump NDE Bearing					°C		
g)	Pump DE Bearing					mA		
h)	Heater connection							
i)	Pump Discharge Pressure Switch							
j)	Discharge Main Pipeline Pressure Senso	or						
Rei	marks :							
	Tested By:	W	Vitness	sed By:				
	Contractor Representative	Consultant Representative	)	Client Representative				
Naı	me:	Name:		Name:				
Dat	e:	Date:	I	Date:				



PROJECT TITLE:



Name: .....

Date :.....

FORM M-GE-7

- Sheet 2/2

## TESTING AND COMMISSIONING OF PUMPS HORIZONTAL SPLIT CASING PUMP & MOTOR PROTECTION SETTING

System:		Location	:				
n) Instruments Signal Output Scaling:							
		N	/linimum		Maximum		
System Level Sensor		(	) m	nA	( ) mA		
System Pressure Sensor		(	) m	nA	( ) mA		
* Data obtain from sensor name	e plate						
n) Instruments / Sensors Signal Record							
	Sensor Signal Output (Min)	Sensors F	Reading	Sensor Signal Output (Max)	Sensors Reading		
System Level Sensor	4 mA	( )	m	20 mA	( ) m		
System Pressure Sensor	4 mA	( )	Bar	20 mA	( ) Bar		
* Reding obtain from sensor na emarks :	L me plate or logged i	n to sensor's	s system	parameter			
Tested By:			Witnes	sed By:			
Contractor Representative	Consultant Representative			Client Representative			

Name: .....

Date : .....

MAIN CONTRACTOR:



Name: .....

**PROJECT TITLE:** 



Name: .....

Date : .....

FORM M-GE-7-2

- Sheet 1/1

### **TESTING AND COMMISSIONING OF AUXILLARY PUMPS**

Location : Equipment Tag No. :							
Туре	Type: Service:						
Brand : Model :							
Pow	er (kw) :		Capacity:				
	al No. :		Date :				
				Re	sult		
	PUMP & N	MOTOR PROTECTION		Pump 1	Pump 2		
a)	Low Water Level in Suction Char	nber - Operation Prohibit	ted (m)				
b)	High Water Level in Suction Char						
c)	Emergency Stop Function						
d)	Float Switch Function						
TES	T DESCRIPTION						
e)	Closed Valve Current (A)						
f)	Fully Open Valve Current (A)						
g)	Pressure (m)						
h)	Voltage (V)						
i)	Correct Rotation Check						
j)	j) Observed any abnormal vibration/ sound during operation?						
Rem	arks :						
	Tested By:		Witnessed By:				
	Contractor Representative	Consultant I	Representative		resentative		
		30					

Name: .....

Date : .....



FORM M-GE-8

#### SURGE SURPRESSION SYSTEM TEST FORM

A Air Compressor Functionality Test ( Unit _ of _ ) Equipment Information:  Manufacturer:	
Model:	
Motor S/N: Air Compressor Operation Test  i Manual Start/Stop	
Motor S/N: Air Compressor Operation Test  i Manual Start/Stop	
i Manual Start/Stop	
ii Auto Start/Stop by pres.sw. vii Overload Trip Set (A) iii Running Voltage (V) viii Tank Safety Air Valve functionality Test v Running Current (A) - Compressed air safety relief valve set at  B Surge Vessel Functionality Test i. Verification of Water Level Electrode cables connection correct.  Electrode designation Panel Terminal Correct Length (m) ii. Detected Water Levels Functioning Test  Status - Change of water level  HHWL HWL HWL HWL HWL HWL HWL HWL HWL H	
iii Running Voltage (V) viii Tank Safety Air Valve functionality Test v Running Current (A) - Compressed air safety relief valve set at  B Surge Vessel Functionality Test i. Verification of Water Level Electrode cables connection correct.  Electrode designation Panel Terminal Correct Length (m) ii. Detected Water Levels Functioning Test  Status - Change of water level  HHWL  HWL  NWL  LLWL  ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	
iii Running Voltage (V) viii Tank Safety Air Valve functionality Test  v Running Current (A) - Compressed air safety relief valve set at  B Surge Vessel Functionality Test  i. Verification of Water Level Electrode cables connection correct.  Electrode designation Panel Terminal Correct Length (m)  ii. Detected Water Levels Functioning Test  Status - Change of water level  HHWL  HWL  NWL  LWL  LLWL  ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	
V Running Current (A)  B Surge Vessel Functionality Test  i. Verification of Water Level Electrode cables connection correct.  Electrode designation Panel Terminal Correct Length (m)  ii. Detected Water Levels Functioning Test  Status  Change of water level  HHWL  HWL  NWL  LWL  LWL  LWL  LWL  LW	ヿ
i. Verification of Water Level Electrode cables connection correct.  Electrode designation Panel Terminal Correct Length (m)  ii. Detected Water Levels Functioning Test  Status Change of water level  HHWL  HWL  NWL  LUWL  LLWL  LLWL  ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	_
i. Verification of Water Level Electrode cables connection correct.  Electrode designation Panel Terminal Correct Length (m)  ii. Detected Water Levels Functioning Test  Status Change of water level  HHWL  HWL  NWL  LUWL  LLWL  LLWL  ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	
Panel Terminal Correct Length (m)  ii. Detected Water Levels Functioning Test  Status  Change of water level  HHWL  HWL  NWL  LWL  LLWL  ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	
Length (m)  ii. Detected Water Levels Functioning Test  Status Change of water level  HHWL  HWL  NWL  LLWL  LLWL  ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	
Status Change of water level  HHWL  HWL  NWL  LLWL  ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	
HHWL HWL NWL LWL LLWL ARV on (Open) ARV off (Closed) AC Start; Solenoid Valve Open	
HHWL HWL NWL LWL LLWL ARV on (Open) ARV off (Closed) AC Start; Solenoid Valve Open	
HWL         NWL           LWL         LUWL           LLWL         ARV on (Open)           ARV off (Closed)         AC Start; Solenoid Valve Open	
NWL           LWL           LLWL           ARV on (Open)           ARV off (Closed)           AC Start; Solenoid Valve Open	
LWL         ,         .	
LLWL         ARV on (Open)           ARV off (Closed)         AC Start; Solenoid Valve Open	
ARV on (Open)  ARV off (Closed)  AC Start; Solenoid Valve Open	
ARV off (Closed)  AC Start; Solenoid Valve Open	
AC Start; Solenoid Valve Open	
AC Stop; Solenoid Valve Close	
LLWL Alarm Cut off Signal Outpost	
HHWL Alarm Cut off signal Outpost	
Eq. Response Action (a/r)	
vi Interlock Signal to stop RWP operation Yes/No	
Comment:	
Tested By: Witnessed By:	
Contractor Representative Consultant Representative Client Representative	
Name:         Name:         Name:	
Date :         Date :         Date :	

MAIN CONTRACTOR:	PROJECT TITLE:	CLIENT:
GEM		JBALB SARAWAE
GROUP ENGINEERS MALAYSIA SDN BHD		JABATAN BEKALAN AIR LUAR BANDAR SARAWAK

GROU	JP ENGINEERS MALA	YSIA SDN BHD									JABATAN BI	EKALAN AIR LUA	AR BANDAR S	ARAWAK
				TREA	ATED WAT	TER PUMI	P OPERA	TION REC	<u>ORD</u>				FORM M-GE-12	
Total Pump	On Duty :						Pump/ mot	tor SN:			/			
Equipment	Tag No:				-		Date:							
Location:					-									
Pump Inforn	nation				-		Motor Inform	mation						
Make :					_		Motor Speed	1:			rpm			
Model:					<u>-</u>		Motor:				kW			
Duty Point:					-		Electrical ch	aracteristics:			A			
	Individual Pump		Inlet		Running	Voltage	Running	D.:	Bearing Ten	perature (°C)		Motor Winding	Vibration	(mm/s)
Time	Discharge Pressure	Main Discharge Header Pressure (m)	Tank/Channel Water Level (m)	Flow (m3/Hr)	Current	(Vac)	Speed	Pu Drive End	Mon Drive	Drive End	Non Drive	Temperature	Motor	Pump
	(m)		water Level (m)		(Amp)		(Rpm/Hz)	(DE)	End (NDE)	(DE)	End (NDE)	(°C)		-
_														
Comment :														
Tested By:									Witnessed E					
Contractor Representative						Consultant	Representati	ve			Cliei	nt Representative	9	
Name:				Name:				. Name:						
Date:				Date:				. Date :						

MAIN CONTRACTOR:	PROJECT TITLE:	CLIENT:
GEM		JEALE STANKS
GROUP ENGINEERS MALAYSIA SDN BHD		JABATAN BEKALAN AIR LUAR BANDAR SARAWAK

GROUP ENGINEERS MA									JAI		KALAN AIR LUAR
SDN BHD											R SARAWAK
		Т	OP EN	ITRY	MIXER T	TEST FO	RM				
Equipment Tag No.	:										FORM M-GE-13
Location	:										
1. Equipment Detail											
	MIXER							МО	TOR		
Manufacturer		MIXTEC			Manufact						
Model					Serial No						
SerialL No.					Voltage/ I						
Tank turnover					Power / C	Current		kW		Am	р
Superficial velocity				ļ	Speed						
2. Visual Inspection					YES	NO			Re	emark	
a) Mixer Frame mour	nting che	ck									
b) Mixer shaft alignm	ent chec	k									
c) Rotation check											
d) Cable entry & term	nination										
e) Emergency stop											
f) Local Start/Stop											
g) Operation protection	on										
h) Motor installed wit	h shed?	( if applicable	∍)								
3 Cable Insulation T	est										
Power Cable	!	R-Y	R-B		Y-B		R-E		Y-E		B-E
4. Operational Test					YES	NO			Re	emark	
Mixer Stator Method:		Variable Spe	eed Dr	ive		Do	OL			АТ	
a) Manual operation	test										
b) Auto operation tes	t										
c) Remote operation	test										
d) Emergency stop fu	ınctionali	ity test									
e) Low Water Level S	Start Prof	nibited Test									
f) Local Start/Stop											
g) Motor installed with	n Shed?	( if applicable	e)								
5. Operation Data		_									
Voltage (Vac)									ent (Amp)		
R-Y R-B Y-B						R		Υ	•		В
Regulated Speed (rp	m/Hz) :										
Remarks:											
Prepared By:							W	itnesse	d By:		
Contractor Representat	ive			(	Consultan	t Represen	tative		Clie	ent Repr	esentative

Name:.....

Date:....

Name:....

Date:....

Name:....

Date:....

MAIN CONTRACTOR:



PRO	IFCT	TITI	F



FORM M-GE-14

#### **METERING PUMP TEST FORM**

			IVIE	IEKII	NG PUWIP I	ESI FURIVI					
1. EQUIPMENT:				2. LOCATION							
3. EQUIPMENT DET	AIL										
3. EQUIPMENT DETAIL PUMP								MOTOR			
MANUFACTURER	PROMINENT				VOLTAGE	/ PH / Hz		415V/3ph/50Hz			
MODEL					POWER						
SERIAL No.					SERIAL No						
DESIGN CAPACITY					TYPE ENC	LOSURE		IP55			
4. VISUAL INSPECTI	ON:				YES	NO		Rei	mark		
a) Dosing skids frame	mounting che	ck									
b) Pipeline leakage ch	neck										
c) Cable entry & term	nation check										
d) Emergency stop											
e) Local Start/Stop											
f) Rotation check											
g)Pump suction tank	evel switch ins	tallation									
h) Motor c/w with forc	e cooling fan (i	f applicable)									
5. INSULATION RES	ISTANCE TES	Т									
PHASE TO EARTH		R to	E:	Y to E:				B to	E:		
6. CHEMICAL METE	RING PUMP R	UNNING DA	ATA								
CHEMICAL PUMP S	TROKE (%(		FLOW	RATE	E (L/MIN)		RUNNING CURREI (Amp)		VOL	TAGE (V)	
50											
40											
30											
20											
7. MANUAL START /	STOP FUNCT	IONALITY T	TEST		ACCEPTE	<b>)</b> :		FAI	LED :		
8. PUMP RUNNING (	CHECK			9. P	UMP ACCE	SSORIES S	ETTIN	NGS			
			BAC	K PRESSU	RE VALVE	SETT	ΓING (Bar):				
ABNORMAL NOISE	(Y/N) :			PRE	SSURE RE	LIEF VALV	E SE	TTING (Bar):			
SUCTION WITH STR	AINER (Y/N):			SAF	ETY RELIE	PIPE CON	NECT	ED (Y/N)			
Prep	ared By:						W	Vitnessed By:			

Prepared By:	Witnessed By:							
Contractor Representative	Consultant Representative	Client Representative						
•	•	•						
Name:	Name:	Name:						
Date:	Date:	Date:						
Date	Date	Date						

MAIN CONTRACTOR:
GEM
GROUP ENGINEERS MALAYSIA

SDN BHD

PROJECT TITLE:



FORM M-GE-20 - Sheet 1/1

		FILTER VALVE	PENSTOCK OPERATION	I TEST FORM			
Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check		
	FIV NO.1						
	FOV NO.1						
FILTER TANK NO.1	BWV NO.1						
	ASV NO.1						
	WOV NO.1						
Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check		
	FIV NO.2						
	FOV NO.2						
FILTER TANK NO.2	BWV NO.2						
	ASV NO.2						
	WOV NO.2						
Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check		
	FIV NO.3						
	FOV NO.3						
FILTER TANK NO.3	BWV NO.3						
	ASV NO.3						
	WOV NO.3						
	T		T	T	T		
Location	Valve/ Penstock Tag No.	Serial No.	Fully Open Function	Fully Close Operation	Water Tightness Check		
	FIV NO.4						
	FOV NO.4						
FILTER TANK NO.4	BWV NO.4						
	ASV NO.4						
	WOV NO.4						
Remarks :							
Contractor	Tested By: Representative	Consultan	t Representative	Witnessed By: Client Represe	ntative		
Contractor	<u> төргөзенкануе</u>	Consultant	. портезетануе	Onent Neprese	mau ve		
Date :		Date :	Date :				

MAIN CONTRACTOR:
GEM
GPOLID ENGINEEDS MALAYSIA

SDN BHD

PROJECT TITL	E:
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FORM E-LV-3

#### MAIN POWER CABLE INSULATION TEST

Location:			_								
Insulation Tester	<u>Detail</u>										
Model:			_		Cal. Certificate N	No:					
Serial No:			_		Voltage Inject :						
		To Point		Cable Detail			Results (Mega				
Item	From Point (Eq.Tag)	(Eq.Tag)	Core	Size (mm²)	Туре	Service	Ohm)	DATE TESTED			
R1-R2			0010	Oize (IIIII )	1,700						
R1-R3											
R1-Y1											
R1-Y2											
R1-Y3											
R1-B1											
R1-B2											
R1-B3											
R1-N1											
R1-N2											
R2-R3											
R2-Y1											
R2-Y2											
R2-Y3											
R2-B1											
R2-B2											
R2-B3											
R2-N1											
R2-N2											
R3-Y1											
R3-Y2											
R3-Y3						•					
R3-B1											
R3-B2											
R3-B3											
R3-N1											
R3-N2											
Y1-Y2											
Y1-Y3											
Y1-B1											
Y1-B2											
Y1-B3											
Tested Result :		ACCEPTE	ь Г		REJECTED						
			_								
Remarks :											
	Tested By:					Witnessed	Ву:				
С	ontractor Representative	!		Consultan	t Representativ	e	Client Rep	resentative			
Name:			Name:			Nam	ne:				
		·			·	·	Date :				

MAIN CONTRACTOR: PROJECT TITLE: CLIENT: С **GROUP ENGINEERS MALAYSIA** JABATAN BEKALAN AIR LUAR SDN BHD

FORM E-LV-5

**BANDAR SARAWAK** 

#### **DISTRIBUTION BOARD SUB-CIRCUIT TEST**

Location Building Panel T	<b>;</b> :							=	Panel R Name c	Rating of RCCB	: :				
	Test Result														
		Overc	urrent l	Devices	Co	ntinuity 1	Test	Insula			est for Cir	cuit (M.C	Ohms)		n RCCB
Circuit No.	No. of Outlet/points	Туре	Rating (A)	Breaking Capacity (KA	R1 + R2 (Ohms)	R2 (Ohms)	Ring Circuit	R-Y	Y-B	B-R	RYB-E/L-E	RYB-N/L-N	Ш- <u>'</u> Z	Time (	At 180
				_	_				·						
Inspection Remarks							ACCEP	TED				REJEC	TED		
	Te	sted By:							W	itnessed l	Ву:				

Tested By:	Witnessed By:							
Contractor Representative	Consultant Representative	Client Representative						
Name:	Name :	Name:						
Date:	Date:	Date:						