i.power solutions

CERTIFICATE OF:

(Please mark relevant check-box)

☒ **TESTING AND COMPLIANCE** (**Electrical installations**)
Issued in accordance with s159 of the *Electrical Safety Regulation 2002*

☐ **TESTING AND SAFETY** (**Electrical equipment**)
Issued in accordance with s15 of the *Electrical Safety Regulation 2002*

* Work performed for:

* Name MR (Title) PHIL (Given name/s) BAKER (Surname) (RE-PUMP AUSTRALIA P/L).

* Address 53 (Street) JIJAWS ST

SUMNER PARK (Suburb/town) QLD 4074 (Postcode)

* Electrical installation / equipment tested (detailed list of all work done):

INSTALLATION OF NEW MAIN SWITCHBOARD AND MODIFICATIONS TO EXISTING ELECTRICAL INSTALLATION IN ACCORDANCE WITH ELECTRICAL REQUIREMENTS OF QUU CONTRACT Nº C1101-052 AND RE-PUMP PURCHASE ORDER P10071.

QUU DRAWING SEQUENCE 4845/7-0256 SHEETS 000 TO 030 APPLY.

* Date of test 8 / 6 / 12 * Electrical contractor licence number 51689

Name on contractor licence JOHN CAMERON-SMITH.

Electrical contractor phone number 0429 195 663

For **electrical installations**, this certifies that the electrical installation, to the extent it is affected by the electrical work, has been tested to ensure that it is electrically safe and is in accordance with the requirements of the wiring rules and any other standard applying under the *Electrical Safety Regulation 2002* to the electrical installation.

For **electrical equipment**, this certifies that the electrical equipment, to the extent it is affected by the electrical work, is electrically safe.

Name SHANE HOSKING
Person who performed or person who is responsible for work

Signature [signature] Date 8 / 6 / 12

* **Indicates a mandatory field**

V2.02-2008

Hopkins Street SPS Upgrade

Control System FAT

Client

Queensland Urban Utilities

Document No

016505-TS-01-E-CONTROL SYSTEM FAT.DOCX

REVISION D

Site ID and Name	**SP** BTSP1
Test Date	21 /5/2012
Lend Lease Operative	PAUL MATTHEWS

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Lend Lease

Control Sheet

Prepared By:	**Johann Joubert**	**Date:**	**16/04/2012**
Checked By:	**Paul Matthews**	**Date:**	**18/04/2012**
Authorised For Issue By:	**Richard Behan-Howell**	**Date:**	**18/04/2012**

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6	
7	

Revision List

Rev	Date	Comment	Approved
A	18/04/2012	Issued for Review	Richard Behan-Howell
B	23/04/2012	Added Wet Well Calibration Test and other changes	
C	03/05/2012	Aligning FAT and SAT numbering	
D	16/05/2012	Updating FAT procedure	
E	21/05/2012	Adding detail to FAT procedure (Radtel sites)	

Abbreviations and Definitions

Abbreviation	Definition
ACMA	Australian Communications and Media Authority
ADSL	Asymmetric Digital Subscriber Line
CAL	Client Access Licence
CAT	Commissioning Acceptance Testing
CMI	Control Microsystems
CMF	Central Monitoring Facility
CPU	Central Processing Unit
CSV	Comma Separated Variable File
DMR	Digital Microwave Radio
DMZ	Demilitarized Zone
DOL	Direct On-Line
EP Rating	Environmental Priority Rating
ES	Engineering Station
FAT	Factory Acceptance Testing
GST	Goods and Service Tax
GUI	Graphical User Interface
HLZ	High Level Zone
HMI	Human Machine Interface
I&C	Instrumentation & Controls
IO	Inputs and Outputs
LL	Lend Lease Infrastructure Services
IS	Information Systems
ISaGRAF	ICS Triplex ISaGRAF is an IEC-61131-3 compliant software development application
ITP	Inspection and Test Plan
KFII	King Fisher Series II Protocol
km	Kilometre
KVM	Keyboard Video Mouse (Switch)
LAN	Local Area Network

LCD	Liquid Crystal Display
MTU	Master Telemetry Unit
OS	Operating System
PAT	Performance Acceptance Testing
PCS	Process Control System
PDD	Project Definition Document
PDF	Portable Document Format
PLC	Programmable Logic Controller
QA	Quality Assured
RF	Radio Frequency
RSSI	Received Signal Strength Indication
RTU	Remote Telemetry Unit
SAT	Site Acceptance Testing
SCADA	Supervisory Control and Data Acquisition
SOW	Scope of Works
SWR	Standing Wave Ratio
TIA	Totally Integrated Automation
UHF	Ultra High Frequency
W	Watt

Document Control

Prepared For:	Queensland Urban Utilities
Project Name:	SCADA Upgrade & Migration
Lend Lease Job Code:	15967
Contract Number:	BW.7013-0607
Document Type:	CONTROL SYSTEM SAT
File Name:	016505-TS-01-E-Control System FAT.docx
Revision:	E
Status:	Issued
Release Date:	16 May 2012
Prepared By:	Johann Joubert
	Control Systems Engineer
Reviewed By:	Paul Matthews
	Senior Control System Engineer
Lend Lease Approval By:	Richard Behan-Howell
	Engineering Section Lead

Table of Contents

Table of Figures

No table of figures entries found.

1 ATTACHED DOCUMENTS

1.1 Documents required for commisioning/attached

Item	Present
QUU provided MultiSmart Site specific MultiSmart Parameter list including Wet Well Level vs Volume Lookup Table	OK ☑
QUU provided Well diagram (probe hanging heights etc)	OK ☑

2 INITIAL TRIO RADIO COMMUNICATION SETUP

2.1 Trio Radio Communication to ClearSCADA

Task	Completed
Program Radio as per required repeater settings.	N/A OK ☐
Record installed radio serial number	N/A ------
When powered confirm radio in sync using LED indication.	N/A OK ☐
Save configuration to QUU SVN (SP???.cfg)	N/A OK ☐

3 MULTISMART INITIAL SETUP

3.1 MultiSmart Parameters

Task	Completed
Record MultiSmart - Password (from MultiTrode) - Serial No. (Menu: Info/More/Version Info)	YKjq1wq A121861
Check that selector switches are correctly set for Can Bus • Primary unit Can Baud = 7 and ID = 1 • Extension IO unit Can Baud = 7 and ID = 2 • CAN Bus termination switch: Unit 1 = OFF, Unit 2 = ON • CAN Bus cable: Unit 1 = CAN2, Unit 2 = CAN1	OK ☑
Check on MultiSmart and Radio • Serial 1 connected to Radio Port B • Serial 3 connected to Card Reader	OK ☑ OK ☑
Check timer settings: **2-Pump Sites** - Set Timer 1K7 to A with 5 second delay (= 0.5 sec) and 2K7 to B and 10 second delay. **3-Pump Sites** – Set BOTB on-delay timer to B and 10 seconds (delay for second pump to start) **All Sites** - Set delay-off timer BOT to a suitable (short) pump-down time for the test	✓ OK ☑ OK ☑
Ensure the FSP Backup Controller dip switch settings are correct. 1-Off, 2-Off, 3-On, 4-Off, 5-Off, 6-On, 7-Off, 8-On	OK ☑
Check that ISaGRAF is enabled (Menu: Settings/More/More/Software Modules/Enable-Disable Modules – check that ISaGraf is under Enabled Options)	OK ☑
Install standard 2 or 3 pump configuration supplied from Multitrode	✓
Check/Set the MultiSmart Clock Locale (Menu: Settings/More/More/Date-Time – Australia/Brisbane selected)	OK ☑
Enter MultiSmart communications to local SCADA – Slave 1: TCP/IP1, Add. 192.168.127.250 & Slave 2: Serial 1 & Disable	OK ☑
Ensure MultiSmart has the latest build version – namely 2.4.6 (Menu: Info/More/Version Information)	OK ☑

3.2 Power up board

Task	Complete
Check that the board powers up OK (Power Supplies and Switchboard Lights turn On)	OK ☑

3.3 Pump Emergency Control (Switch)

Task	Complete
With the MultiSmart turned OFF Ensure that the pumps start when the Emergency Pumping Run selector switch is turned to the ON/RUN position. Ensure that each pump continues to run for 30 seconds without faulting	Pump 1 OK ☑ Pump 2 OK ☑ ~~Pump 3 OK ☐~~
Ensure that the pumps stop when the Emergency Pumping Run selector switch is turned to the OFF position.	Pump 1 OK ☑ Pump 2 OK ☑ ~~Pump 3 OK ☐~~

3.4 Battery

Task	Completed
Check that the battery is connected and charging (i.e.24VDC across the terminals)	OK ☑
Check that the MultiSmart and radio system runs off the battery when the AC mains supply is isolated. (Remember to press the 'Reset' P/B on the 24VDC Power Supply unit). Check 2DI19 Changes State to on and that Powerbox RTU Power Fault is displayed on MultiSmart Screen. This may take some time delay from Powerbox unit.	OK ☑
Reconnect AC supply. Check alarm clears.	OK ☑
Disconnect Battery with breaker QD7. Check 2DI18 changes state to on that the Powerbox Battery Fault displayed. This may take some time delay from Powerbox unit.	OK ☑

3.5 Intruder Alarm

Task	Completed
Close all doors to panel, verify Intruder alarm is not present.	OK ☑
Open door to panel, verify Intruder alarm is present.	OK ☐

3.6 VSD/Soft Start ready to run

Task	Completed
Check VSD's/Soft Starts connected and commissioned by others already and pumps have been configured to run, also no comms errors are recorded.	OK ☑
Fault VSD 1. Check that Pump 1 Starter Fault displayed on MultSmart fault screen.	OK ☑
Rectify VSD 1 fault and check reset from MultiSmart alarm screen.	OK ☑
Fault VSD 2. Check that Pump 2 Starter Fault displayed on MultSmart fault screen.	OK ☑
Rectify VSD 2 fault and check reset from MultiSmart alarm screen.	OK ☑
Fault VSD 3. Check that Pump 3 Starter Fault displayed on MultSmart fault screen.	N/A OK ☐
Rectify VSD 3 fault and check reset from MultiSmart alarm screen.	N/A OK ☐
Turn off VSD 1 Isolator. Check that relay 1K5 drops out and Pump 1 Ctrl Power Not Available displayed on MultSmart fault screen. Turn Isolator back on and check fault clears.	OK ☑ 65 seconds
Turn off VSD 2 Isolator. Check that relay 1K5 drops out and Pump 2 Ctrl Power Not Available displayed on MultSmart fault screen. Turn Isolator back on and check fault clears.	OK ☑ 65 seconds
Turn off VSD 3 Isolator. Check that relay 1K5 drops out and Pump 3 Ctrl Power Not Available displayed on MultSmart fault screen. Turn Isolator back on and check fault clears.	N/A OK ☐

3.7 Moisture in Oil Sensor

Link Pump 1 Moisture in Oil Fault 1DI12. Check Pump 1 Moisture in Oil Fault Displayed on MultiSmart Fault Screen. Remove then Reset fault from MultiSmart Fault screen and check fault is no longer displayed.	OK ☑
Link Pump 2 Moisture in Oil Fault 2DI12. Check Pump 2 Moisture in Oil Fault Displayed on MultiSmart Fault Screen. Remove then Reset fault from MultiSmart Fault screen and check fault is no longer displayed.	OK ☑
Link Pump 3 Moisture in Oil Fault 3DI12. Check Pump 3 Moisture in Oil Fault Displayed on MultiSmart Fault Screen. Remove then Reset fault from MultiSmart Fault screen and check fault is no longer displayed.	OK ☐ N/A

3.8 Pressure Gauge Option U

The pressure gauge is for alarming/indication purposes only and does not affect the operation of the site.

With Pressure Gauge input disconnected MultiSmart reads Pressure Gauge Invalid Alarm.	OK ☑
Inject 4-20mA source at 4mA. Fault Clears	OK ☑
Inject 20mA. MultiSmart reads Pressure Gauge High alarm in Fault screen.	OK ☑
Inject 4mA. Start a Pump from Simulation of well level. MultiSmart reads Pressure Gauge Low alarm in Fault screen	OK ☑

3.9 Dry Well Sump Pump Option E

Before power up of Sump Pump Circuit MultiSmart indicates Dry Well Sump Pump Unavailable	OK ☑
Power circuit, Sump Pump no longer indicating unavailable	OK ☑
Simulate Low level probe by connecting XC408 to ground. Nothing Happens.	OK ☑
Simulate High level probe by connecting XC406 to ground. Sump pump runs. 4K1 pulls in.	OK ☑
Remove High level probe. Sump pump continues to run.	OK ☑
Remove Low level probe. Sump stops running.	OK ☑
Connect Low Level Probe. Sump pump can now be started and stopped from Start and Stop switches	OK ☑

3.10 Vent Fans

Turn on 5S1, contactor 5K1 Pulls in	OK ☑
Turn on 6S1, contactor 6K1 Pulls in	OK ☑

4 HYDROSTATIC AND WELL DEVICES

4.1 Hydrostatic wet well probe

Task	Completed
Record and enter QUU provided range into Hydrostatic, configure via HART communication. Save configuration file for record. (SP_ _ _.PW3)	Well Depth _ _ _ m 0% = _ _ _ _ 100% =_ _ _ _
Prior to connecting mA Source MultiSmart displaying Well 1 Primary Level AIN Under. Connect MA source to AI01	
Verify well level displayed on MultiSmart and SCADA.	OK ☐

4.2 SAFE-FSP Backup probe

Task	Completed
Ensure the FSP Backup Controller dip switch settings are correct. 1-Off, 2-Off, 3-On, 4-Off, 5-Off, 6-On, 7-Off, 8-On	OK ☑
Check wiring from terminal 'Level TX and Level Probes' to SAFE-FSP	OK ☑
Connect switches and activate Lo, Hi, AL & FS separately and check LEDs on SAFE-FSP	OK ☑

5 OTHER OPERATING MODES AND TESTS

5.1 High Level Pumping Mode

Task	Observation	Completed
Connect High Level Probe switch		
Initiate 'High Level' probe (10 sec delay). High Level Pumping mode is initiated.	A single pump is commanded to run.	OK ☑
	High Level Pumping Mode fault is displayed as well as High Level Pumping mode.	OK ☑
Remove the trigger for the probe	Pump pumps down for the High Level Pump Time of 60 sec.	OK ☑

5.2 Wet Well Calibration Test

The Wet Well Calibration Test is performed comparing the hydrostatic level value against the fixed single High Level Probe. The pumps are held out until the level reaches the High Level Probe.

Task	Observation	Completed
Set Start Time for test to proceed. Menu: Settings / Station Optimisation / Analog_Time Module / { highlight Time Based Triggers } / Configure / AnalogWatcher.TimeBased Trigger._5*	Pre-Conditions: • At least one pump available • Level below Duty Start	OK ☑
Once the activation time is reached.	ClearSCADA displays 'Test Active'	
Simulate level at approx. High Level Alarm Set Point and trigger High Level Probe.	Duty pump released to start	OK ☑
	Station returns to normal mode (pump holdout removed) when the level reaches Duty A Start SP or 10 minutes after High Probe was triggered.	
MS compares the information from the two level devices and if within 5% the test is passed.	Check on ClearSCADA under Well/Status for 'Calibration error' < 5%	OK ☑ Error: 0.2%

5.3 Secondary Control Circuit Test

Task	Observations	Completed
An automated test performed once per day within 1 hour of starting time. The High Level Probe alarm is suppressed	Pre-conditions: • All pumps in Auto, Available & Not De-commissioned. • Not in Maintenance Mode • No Electrode Test or Wet Well Calibration Test active • No SCCT Fault • No Wet Well High Probe or Surcharge Imminent Probe active	
Set time for Test to run (Menu: Settings/Station Optimisation/Analog_Time Module/{select Time assesed Triggers}/Configure/{select xxx/Edit)	Default time for test is 09:00:00	
Bring level up to > 80% of control range after time set above. NOTE ONE Pump ONLY, ELECTRICALLY INTERLOCKED	MultiSmart gives 'Test Active'	Tested OK ☑
	ETR (Electrode Test Relay) is energised.	Tested OK ☑
	Pump 1 starts 30 sec later and ~~Pump 2 starts 10 sec after that and run~~ together.	Tested OK ☑
	After 20 seconds relays 1K22 and 2K22 energise which stops both pumps.	Tested OK ☑
SCCT completed	Relays 1K22 and 2K22 de-energises after BOTA timer de-energises	Tested OK ☑

5.4 Electrode Test

Six hourly tests whereby the electrode is shorted to ground for 5 seconds and thereby activating the corresponding input on the RTU

Task	Observations	Completed
Bridge out High Level Probe Input in panel – for the test to pass		
Set time for Test to run (Menu: Settings/Station/ Optimisation/Analog_Time Module/{select Time Based Trigges}/Configure/{select xxx/Edit)	ETR energises for 5 sec. Bridge out High Level Probe at term. 902 & 903 with 3DI01 connected at 3DI-702 while ETR is energised for test to pass. Don't bridge out for test to fail.	Tested OK ☑
On completion of test HIGH PROBE DRY WELL FLOODED HIGH DRY WELL FLOODED TRIPPED	No probe failed fault should be displayed. 'Electrode Test Latched On' becomes active when ETR stays on too long.	Tested OK ☑

5.5 Battery System Test

Task	Observations	Completed
Test done weekly. To test the system and to get a 'failed' alarm, switch CB QD7 OFF and initiate a Battery test (Menu: Settings/More/Supply Protection/{select the relevant item}/Configure) Use the 'Test Now' option	• BST energises • MS should loose AC supply and shutdown. • BST de-energises and the MS will boot up. • Message sent to say the test has failed once MS is running	Tested OK ☑
	Alarms on SCADA - RTU/Status – Battery • **Fail (MultiSmart) – Active** (Tool-Tip 'Battery Test has failed') • **Fail (Power Supply) – Active** (Tool-Tip 'RTU DC Power Supply indicates battery has failed' (Poll required))	
To set time for Battery Test Start Time (Menu: Settings/More/Supply Protection/{select the relevant item}/Configure)		

5.6 SAFE-FSP Backup Operation Test

Task	Observation	Completed
All Sites - Ensure the FSP Backup Controller dip switch settings are correct. 1-Off, 2-Off, 3-On, 4-Off, 5-Off, 6-On, 7-Off, 8-On	None	OK ☑
2-Pump Sites - Set Timer 1K7 to A with 5 second delay (= 0.5 sec) and 2K7 to B and 10 second delay. **3-Pump Sites** – Set BOTB on-delay timer to B and 5 seconds (delay for second pump to start) **All Sites** - Set delay-off timer BOT to a suitable (short) pump-down time for the test.	None	OK ☑
Ensuring there is enough capacity in the well. Earth the 'Stop' (bottom) sensor.	None	OK ☑
Keeping the 'Stop' (bottom) sensor earthed and also earth the 'Start' (Middle) sensor. ONE PUMP ONLY.	**2-Pump Sites** - 1K7 activates. Pump 1 starts, 2K7 starts counting (delay on) & after 5 seconds pump 2 starts, MultiSmart indicates Emergency Pumping mode Active Alarm **3-Pump Sites** –pump starts controlled by UR1 (Back-Up Control programmable logic relay). 'Duty' pump starts and after a delay of 10 seconds, 'Standby' pump starts.	OK ☑
Release the 'Start' sensor.	Pumps both continue to run.	OK ☑
Release the 'Stop' sensor.	BOT starts counting down. Relay BOTA is energised for the duration. After the time set, both running pumps stop.	OK ☑
Earth the 'Alarm' (Top) sensor	MultiSmart indicates 'Surcharge Imminent Alarm'	OK ☑
Release the 'Alarm' sensor	Alarm is no longer ON in MultiSmart. Reset alarms & MultiSmart now healthy	OK ☑

6 MULTISMART MANUAL OPERATION

6.1 MultiSmart Manual Pump run operation

Verify communication to ClearSCADA.

Task	Observation	Completed
Switch all pumps to OFF on MS panel.	MultiSmart - All pumps on OFF ClearSCADA shows - OFF	OK ☑
Start Pump 1 - by selecting Manual (using P/B on MS panel).	Pump starts & runs. ClearSCADA shows - Semi Auto briefly	OK ☑
Stop Pump 1 - by selecting OFF on MS panel.	Pump stops.	OK ☑
Start Pump 2 - by selecting Manual (using P/B on MS panel).	Pump starts & runs. ClearSCADA shows - Semi Auto briefly	OK ☑
Stop Pump 2 - by selecting OFF on MS panel.	Pump stops.	OK ☑
Start Pump 3 - by selecting Manual (using P/B on MS panel).	Pump starts & runs. ClearSCADA shows - Semi Auto briefly	OK ☐ N/A
Stop Pump 3 - (Stop push button)	Pump stops.	N/A OK ☐
Switch all pumps back into Auto on MS Panel	MultiSmart - Available ClearSCADA shows - Auto.	OK ☑

6.2 MultiSmart Auto Operation

NOTE: - Use MultiSmart well level simulation to simulate the level for the following.

Task	Observation	Completed
Ensure all Pumps in Auto.	Check which pump is Duty Pump (next to start) and Start Setpoint on the MultiSmart ClearSCADA - All in Auto.	OK ☑ OK ☑
Normal Level Control by MS - Allow level in well to rise to Duty Start SP	Duty Pump starts - ClearSCADA - Duty Pump running	OK ☑
Monitor Well Level as it drops to Duty Stop SP	Duty Pump stops when Stop SP is reached. Check Duty change-over on MS. ClearSCADA - Pump stops, duty c/o.	OK ☑
Monitor the Well Level as it rises again to Duty Start SP.	New Duty Pump starts - ClearSCADA - Duty Pump running	OK ☑
Monitor the Well Level as it drops again to Duty Stop SP.	Pump stops when stop setpoint is reached. Check Duty change over again.	OK ☑
Repeat steps above if there is a 3rd pump.	Pump starts at duty level.	N/A OK ☐
Take level up to Standby Start level and once both pumps are running activate the Emergency Stop P/B	Next pump to run starts followed by the second pump. Both pumps stop when Emergency Stop P/B is activated.	N/A OK ☐
	Emergency Stop P/B Active Alarm on SCADA	OK ☑

6.3 Reflux Valves Option C

NOTE: - Use MultiSmart well level simulation to simulate the level for the following.

Task	Observation	Completed
Start Pump 1 with Reflux Valve 1 Open Input Off	After open time delay MultiSmart display Pump 1 Reflux Fail to Open Alarm and switches to run next pump	OK ☑ OK ☐
Pump 2 Starts with Reflux Valve 2 Open Input Off	After open time delay MultiSmart display Pump 2 Reflux Fail to Open Alarm and switches to run next pump	OK ☑
Pump 3 Starts with Reflux Valve 2 Open Input Off	After open time delay MultiSmart display Pump 3 Reflux Fail to Open Alarm and switches to run next Pump	OK ☑ N/A
Pump 1 Starts with Reflux Valve 1 Open Input On	Pump 1 runs continuously without fault	OK ☑
Pump 2 Starts with Reflux Valve 2 Open Input On	Pump 2 runs continuously without fault	OK ☑
Pump 3 Starts with Reflux Valve 2 Open Input On	Pump 3 runs continuously without fault	N/A OK ☐
Turn On Pump 1 Reflux Valve Input with Pumps off	Pump 1 Reflux Valve Fail to Close displayed on MultiSmart	OK ☑
Turn On Pump 2 Reflux Valve Input with Pumps off	Pump 2 Reflux Valve Fail to Close displayed on MultiSmart	OK ☑
Turn On Pump 3 Reflux Valve Input with Pumps off	Pump 3 Reflux Valve Fail to Close displayed on MultiSmart	N/A OK ☐

7 GENERATOR - NOT TESTED AT FAT

7.1 Standard Generator items (permanent or temporary)

Task	Observation	Completed
Check generator status is correct (on/off site). All other generator signals/operations will be tested to RTU by electrical installation contractor.	Generator displaying on/off site accordingly on SCADA.	OK ☑

8 SCADA ALARMS

8.1 Initating alarms to prove correct communication to ClearSCADA

Task	Observation	Completed
Cycle Mains power alarm check	Ensure that Mains Power OK alarm on ClearSCADA Station Status has received a Critical level alarm	OK ☑
RTU power supply alarm check	Remove AC power to RTU 24VDC Power Supply. Alarm found in RTU/Status – Supply 'Mains fail (Power Supply)' should come On in ClearSCADA. (MS input – 2DI 19)	OK ☑
Activate Surcharge imminent alarm, top probe on Safe FSP	Alarms – • 'Emergency Pumping – active' • 'Surcharge Imminent – active'	OK ☑
Activate High Level Alarm Probe	Alarms & Determined Level Faults – • 'High (probe) Active' • 'High active' • High Pumping Mode active	OK ☑
Pump 1 'Failed to Start' – • Open bayonet to 'Running' input – 1DI15 • Start pump in Manual	Alarms • 'Failed to Start – Active' and pump stops • Fault is Auto Reset	OK ☑
Pump 2 'Failed to Start' – • Open bayonet to 'Running' input – 2DI15 • Start pump in Manual	Alarms • 'Failed to Start – Active' and pump stops • Fault is Auto Reset	OK ☑
Pump 3 'Failed to Start' – • Open bayonet to 'Running' input – 3DI15 • Start pump in Manual	Alarms • 'Failed to Start – Active' and pump stops • Fault is Auto Reset	OK ☐ N/A
Confirm Well Level Indication	Confirm the well level displayed in the MultiSmart matches that displayed in the ClearSCADA	OK ☑
Test poll button from ClearSCADA. Record approx poll time	Verify that the time taken to poll/update site on ClearSCADA is acceptable (< 5-10 seconds)	OK ☑ _1_ Seconds

8.2 Swipe Card

Task	Completed
Swipe Card on panel, check for beep.	OK ☑
Verify that number has been carried to SCADA under Station, Status, Foldout, User Card	OK ☑

9 RADTEL SIGNALS

9.1 Test output signals to Radtel

Task	Observation	Completed
Make Pump 1 Unavailable *. Only tested with one of these faults during FAT. Also some sites have External Contactor which also makes unavailable. Test this individually	Unavailable signal output goes to Radtel output terminals Logic is HIGH for fail (high or low)	OK ☑ OK ☑
Make Pump 2 Unavailable *. Only tested with one of these faults during FAT. Also some sites have External Contactor which also makes unavailable. Test this individually	Unavailable signal output goes to Radtel terminals Logic is HIGH for fail (high or low)	OK ☑ OK ☑
Make Pump 3 Unavailable *. Only tested with one of these faults during FAT. Also some sites have External Contactor which also makes unavailable. Test this individually	Unavailable signal output goes to Radtel terminals Logic is ~~HIGH~~ for fail (high or low)	OK ☑ N/A OK ☑
Activate High Level alarm probe or from the Level High input threshold. Or backup circuit running, (derived through MultiSmart).	High Level probe output goes to Radtel output terminals Logic is HIGH for fail (high or low)	OK ☑
Pump 1 Running	Running Signal output goes to Radtel output terminals Logic is HIGH for fail (high or low)	OK ☑
Pump 2 Running	Running Signal output goes to Radtel output terminals Logic is HIGH for fail (high or low)	OK ☑
Pump 3 Running	Running Signal output goes to Radtel output terminals Logic is HIGH for fail (high or low)	OK ☑ N/A
Power failure (Phase fail relay)	Power failure output goes to Radtel output terminals Logic is HIGH for fail (high or low)	OK ☑
Surcharge Imminient	Surcharge Imminent output goes to Radtel output terminals Logic is HIGH for fail (high or low)	OK ☑

***See Multitrode provided documentation for MultiSmart Pump Unavailable faults**

10 SIGN OFF/NOTES

10.1 Record of setup/witness

Lend Lease Operative	Signature	Date
PAUL MATTHEWS	P. Matthews	22/05/2012

QUU	Signature	Date

10.2 Notes

3.4 Battery tested once per hour. Fails according to this...

3.6 Pump Ctrl power not available has 65 second delay...

4.1 Hydrostatic not yet programmed as already on site...

Pumps Electrically interlocked, one pump only.....

Modifications to be made to E-STOP circuit which need to be tested separately prior to install....

Hopkins St Upgrade

Control System SAT

Client

Queensland Urban Utilities

Document No

016505-TS-02-I-CONTROL SYSTEM SAT.DOCX

REVISION I

Site ID and Name	**Hopkins Street SPS**
Test Date	01/06/2012
Lend Lease Operative	Paul Matthews

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Lend Lease

Control Sheet

Prepared By:	**Paul Matthews**	**Date:**	**28/03/2012**
Checked By:	**Johann Joubert**	**Date:**	**28/03/2012**
Authorised For Issue By:	**Richard Behan-Howell**	**Date:**	**28/03/2012**

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Revision List

Rev	Date	Comment	Approved
A	08/03/2012	Issued for Review	Richard Behan-Howell
B	16/03/2012	Modified	
C	20/03/2012	Modified	
D	28/03/2012	Modified according to installation plan, ready for testing in factory	
E	28/03/2012	Added 2 and 3 backup pump control differences	
F	16/04/2012	Updated from last SAT	
G	27/04/2012	Additional SAT Tests added	
H	03/05/2012	Aligning FAT and SAT numbering	
I	05/06/2012	Adding Radtel Signals & other specific modifications	

Abbreviations and Definitions

Abbreviation	Definition
ACMA	Australian Communications and Media Authority
ADSL	Asymmetric Digital Subscriber Line
CAL	Client Access Licence
CAT	Commissioning Acceptance Testing
CMI	Control Microsystems
CMF	Central Monitoring Facility
CPU	Central Processing Unit
CSV	Comma Separated Variable File
DMR	Digital Microwave Radio
DMZ	Demilitarized Zone
DOL	Direct On-Line
EP Rating	Environmental Priority Rating
ES	Engineering Station
FAT	Factory Acceptance Testing
GST	Goods and Service Tax
GUI	Graphical User Interface
HLZ	High Level Zone
HMI	Human Machine Interface
I&C	Instrumentation & Controls
IO	Inputs and Outputs
LL	Lend Lease Infrastructure Services
IS	Information Systems
ISaGRAF	ICS Triplex ISaGRAF is an IEC-61131-3 compliant software development application
ITP	Inspection and Test Plan
KFII	King Fisher Series II Protocol
km	Kilometre
KVM	Keyboard Video Mouse (Switch)
LAN	Local Area Network

LCD	Liquid Crystal Display
MTU	Master Telemetry Unit
OS	Operating System
PAT	Performance Acceptance Testing
PCS	Process Control System
PDD	Project Definition Document
PDF	Portable Document Format
PLC	Programmable Logic Controller
QA	Quality Assured
RF	Radio Frequency
RSSI	Received Signal Strength Indication
RTU	Remote Telemetry Unit
SAT	Site Acceptance Testing
SCADA	Supervisory Control and Data Acquisition
SOW	Scope of Works
SWR	Standing Wave Ratio
TIA	Totally Integrated Automation
UHF	Ultra High Frequency
W	Watt

Document Control

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	Control System Engineer
Lend Lease Approval By:	Richard Behan-Howell
	Engineering Section Lead

Table of Contents

Table of Figures

No table of figures entries found.

1 ATTACHED DOCUMENTS

1.1 Documents required for commisioning/attached

Item	Present
QUU provided MultiSmart Site specific MultiSmart Parameter list	OK ☑
QUU provided Well diagram (probe hanging heights etc)	OK ☐

2 INITIAL TRIO RADIO COMMUNICATION SETUP

2.1 Trio Radio Communication to ClearSCADA N/A

Task	Completed
Program Radio as per required repeater settings. Record Repeater name.	OK ☐ _____ Repeater
Record installed radio serial number	_____
When powered confirm radio in sync using LED indication.	OK ☐
Perform Radio Commissioning report to be provided with this SAT document. Record RSSI and verify is similar to that recorded prior to new installation.	OK ☐ Rx Sig dBm = ___
Confirm in MultiSmart and on ClearSCADA that the site is connected through DNP3 communication. (Menu: Settings/More/Communications/Protocol Settings/(highlight DNP Slave)/Select Channel)	OK ☐
Record bearing that antenna has been set up to (by electrical installer). If available.	

2.2 3G Backup Communications to ClearSCADA N/A

Task	Completed
Agreed previously not to be installed at this time.	N/A

2.3 ClearSCADA Site Instance N/A

Task	Completed
Move old site to achieved location in project, take out of service. Install new ClearSCADA template in ClearSCADA in correct catchment.	OK ☐
Install embedded mimic of pumps on network map.	OK ☐
Set DNP3 address + other available parameters.	OK ☐

Test comms healthy to MultiSmart once power available.	N/A OK ☐

3 MULTISMART INITIAL SETUP

3.1 MultiSmart Parameters

Task	Completed
Record MultiSmart - Password (from MultiTrode) - Serial No. (Menu: Info/More/Version Info)	YKjq1wqY A1218611
Check that selector switches are correctly set for Can Bus • Primary unit Can Baud = 7 and ID = 1 • Extension IO unit Can Baud = 7 and ID = 2 • CAN Bus termination switch: Unit 1 = OFF, Unit 2 = ON • CAN Bus cable: Unit 1 = CAN2, Unit 2 = CAN1	OK ☑
Install standard 2 or 3 pump configuration supplied from Multitrode	
Check/Set the MultiSmart Clock. (Menu: Settings/More/More/Date-Time)	OK ☑
Enter site specific MultiSmart provided setup parameters as per Multitrode and QUU provided documentation. (From attachment 1)	OK ☑

3.2 Power up board

Task	Complete
Check that the board powers up OK (Power Supplies and Switchboard Lights turn On)	OK ☑

3.3 Pump Emergency Control (Switch)

Task	Complete
With the MultiSmart turned OFF Ensure that the pumps start when the Emergency Pumping Run selector switch is turned to the ON/RUN position. Ensure that each pump continues to run for 30 seconds without faulting	Pump 1 OK ☑ Pump 2 OK ☑ ~~Pump 3 OK ☐~~
Ensure that the pumps stop when the Emergency Pumping Run selector switch is turned to the OFF position.	Pump 1 OK ☑ Pump 2 OK ☑ ~~Pump 3 OK ☐~~

3.4 Battery

Task	Completed
Check that the battery is connected and charging (i.e.24VDC across the terminals)	OK ☑
Check that the MultiSmart and radio system runs off the battery when the mains supply is isolated. (Remember to press the 'Reset' P/B on the 24VDC Power Supply unit)	OK ☑

3.5 Intruder Alarm

Task	Completed
Close all doors to panel, verify Intruder alarm is not present.	OK ☑
Open door to panel, verify Intruder alarm is present.	OK ☑

3.6 VSD/Soft Start ready to run

Task	Completed
Check VSD's/Soft Starts connected and commissioned ~~by others~~ already and pumps have been configured to run, also no comms errors are recorded.	OK ☑

SEE NOTES FOR VSD SETTINGS

4 HYDROSTATIC AND WELL DEVICES

4.1 Hydrostatic wet well probe

Task	Completed
Record and enter QUU provided range into Hydrostatic, configure via HART communication. Save configuration file for record.	Well Depth 8.95 m 0% = 0 100% = 6231
Check that Hydrostatic is installed at QUU specified hanging distance. Also record previous hanging distance.	OK ☑ Hanging Distance 8.750 Previous Hanging Distance N/A
Verify well level displayed on MultiSmart and SCADA.	OK ☑

4.2 High level probe

Task	Completed
Check that High level probe is installed at QUU specified hanging distance.	OK ☑ Hanging Distance 6.569
Ensure all pumps are inhibited (or Off on MultiSmart panel). Allow well level to rise to High level probe (10sec delay before activating). Verify that the High Level probe alarm is displayed on MultiSmart and SCADA.	OK ☑ Probe activates at = 35 %
Check that High level probe pumping mode time has been entered to MultiSmart and record pump down time (supplied by QUU).	OK ☑ Time 60

4.3 SAFE-FSP Backup probe

Task	Completed
Ensure the FSP Backup Controller dip switch settings are correct. 1-Off, 2-Off, 3-On, 4-Off, 5-Off, 6-On, 7-Off, 8-On	OK ☑
Check wiring from terminal 'Level TX and Level Probes' to SAFE-FSP	OK ☑
Connect switches and activate Lo, Hi, AL & FS separately and check LEDs on SAFE-FSP	OK ☑

5 OTHER OPERATING MODES AND TESTS

5.1 High Level Pumping Mode

Task	Observation	Completed
Initiate 'High Level' probe (10 sec delay). High Level Pumping mode is initiated.	A single pump is commanded to run.	OK ☑
	High Level Pumping Mode fault is displayed as well as High Level Pumping mode.	OK ☑
Remove the trigger for the probe. [Check Parameters List: 7.2 High Level Pumping Mode Time (Menu: Info/More/IsaGRAF 5/Params – High Level Pumping Mode Time)]	Pump pumps down for the High Level Pump Time of 60 sec.	OK ☑

5.2 Wet Well Calibration Test

The Wet Well Calibration Test is performed comparing the hydrostatic level value against the fixed single High Level Probe. The pumps are held out until the level reaches the High Level Probe.

Task	Observation	Completed
Set Start Time for test to proceed. Menu: Settings / Station Optimisation / Analog_Time Module / { highlight Time Based Triggers } / Configure / AnalogWatcher.TimeBased Trigger._5*	Pre-Conditions: • At least one pump available • Level below Duty Start	OK ☑
Once the activation time is reached.	ClearSCADA displays 'Test Active'	✓
Allow level to rise at approx. High Level Alarm Set Point and check trigger % of High Level Probe Alarm.	Duty pump released to start	OK ☑
	Station returns to normal mode (pump holdout removed) when the level reaches Duty A Start SP or 10 minutes after High Probe was triggered.	
MS compares the information from the two level devices and if within 5% the test is passed.	Check on ClearSCADA under Well/Status for 'Calibration error' < 5%	-0.262 OK ☑ Error: [illegible] %

5.3 Secondary Control Circuit Test

Task	Observations	Completed
An automated test performed once per day within 1 hour of starting time. The High Level Probe alarm is suppressed	Pre-conditions: • All pumps in Auto, Available & Not De-commissioned. • Not in Maintenance Mode • No Electrode Test or Wet Well Calibration Test active • No SCCT Fault • No Wet Well High Probe or Surcharge Imminent Probe active	
Set time for Test to run (Menu: Settings/Station Optimisation/Analog_Time Module/{select Time assesed Triggers}/Configure/{select xxx/Edit)	Default time for test is 09:00:00	
Bring level up to > 80% of control range after time set above.	MultiSmart gives 'Test Active'	Tested OK ☑
	ETR (Electrode Test Relay) is energised.	Tested OK ☑
	Pump 1 starts 30 sec later and Pump 2 starts 5 sec after that and run together.	Tested OK ☑
	After 20 seconds relays 1K22 and 2K22 energise which stops both pumps.	Tested OK ☑
SCCT completed	Relays 1K22 and 2K22 de-energises after BOTA timer de-energises	Tested OK ☑

5.4 Electode Test

Six hourly tests whereby the electrode is shorted to ground for 5 seconds and thereby activating the corresponding input on the RTU

Task	Observations	Completed
Set time for Test to run (Menu: Settings/Station/ Optimisation/Analog_Time Module/{select Time Based Trigges}/Configure/{select xxx/Edit)	ETR energises for 5 sec (Also check input 3DI01)	Tested OK ☑
On completion of test	No probe failed fault should be displayed. 'Electrode Test Latched On' becomes active when ETR stays on too long.	Tested OK ☑

5.5 Battery System Test

Task	Observations	Completed
Test done weekly. To test the system and to get a 'failed' alarm, switch CB DQ7 OFF and initiate a Battery test	• BTR energises • MS should loose AC supply and shutdown. • BTR de-energises and the MS will boot up. • Message sent to say the test has failed once MS is running	Tested OK ☑
	Alarms on SCADA - RTU/Status – Battery • **Fail (MultiSmart) – Active** (Tool-Tip 'Battery Test has failed') • **Fail (Power Supply) – Active** (Tool-Tip 'RTU DC Power Supply indicates battery has failed' (Poll required))	
To set time for Battery Test Start Time (Menu: Settings/More/Supply Protection/{select the relevant item}/Configure) Use the 'Test Now' option		

5.6 SAFE-FSP Backup Operation Test

Ensure enough volume in well prior to testing so as not to run the pumps dry.

Task	Observation	Completed
All Sites - Ensure the FSP Backup Controller dip switch settings are correct. 1-Off, 2-Off, 3-On, 4-Off, 5-Off, 6-On, 7-Off, 8-On	None	OK ☑
2-Pump Sites - Set Timer 1K7 to A with 5 second delay (= 0.5 sec) and 2K7 to B and 5 second delay. **3-Pump Sites** – Set BOTB on-delay timer to B and 5 seconds (delay for second pump to start) **All Sites** - Set delay-off timer BOT to a suitable (short) pump-down time for the test.	None	OK ☑
Set all pumps to off on the MultiSmart front panel to prevent running via high probe or normal start stop levels if actually raising level.	Pumps off on MultiSmart	OK ☑
Ensuring there is enough capacity in the well. Earth the 'Stop' (bottom) sensor.	None	OK ☑
Keeping the 'Stop' (bottom) sensor earthed and also earth the 'Start' (Middle) sensor.	**2-Pump Sites** - 1K7 activates. Pump 1 starts, 2K7 starts counting (delay on) & after 5 seconds pump 2 starts, MultiSmart indicates Emergency Pumping mode Active Alarm **3-Pump Sites** –pump starts controlled by UR1 (Back-Up Control programmable logic relay). 'Duty' pump starts and after a delay of 5 seconds, 'Standby' pump starts.	OK ☑ 1pump only
Release the 'Start' sensor.	Pumps both continue to run.	OK ☑
Release the 'Stop' sensor.	BOT starts counting down. Relay BOTA is energised for the duration. After the time set, both running pumps stop.	OK ☐
Earth the 'Alarm' (Top) sensor	MultiSmart indicates 'Surcharge Imminent Alarm'	OK ☑
Release the 'Alarm' sensor	Alarm is no longer ON in MultiSmart. Reset alarms & MultiSmart now healthy	OK ☑
Check that 3-sensor probe has been hung by others at pre calculated value from level SPS diagram (given by QUU)	Probe installed in Well	OK ☑ Hanging Distance 3505 Prev. Hanging Distance N/A

2-Pump Sites - Set timer 2K7 for 5 seconds and set up BOT delay-off timer to suitable delay off minutes to pump well down to a level close to normal operational start level. (this value provided by QUU from previous installation - trying to prevent emptying the well during times of low inflow). [Check Parameters List: 7.1 Emergency Pumping Mode Time (Menu: Info/More/IsaGRAF 5/Params – Emergency Pumping Mode Time)] **3-Pump Sites -** Set BOTB on-delay timer to B and 5 seconds (delay for second pump to start). Set up BOT delay-off timer to suitable delay off minutes to pump well down to a level close to normal operations Test if SPS is active enough	If the SPS is active enough - check Backup system activates at correct level, 5 second delay between pump 1 and 2 starting and pumps down. Timer BOT time must not pump well dry. Verifying start level against calibrated hydrostatic. Stop level should be below normal operation Start Set-point.	Delay Off Seconds 300 Tested OK ☑ Unable to test to actual probe due to slow well (simulated) ☑

5.7 Insulation Resistance Test

Task	Observations	Completed
TEST PUMP 1 INSULATION	9,999 MΩ	✓
TEST PUMP 2 INSULATION	9,999 MΩ	✓

6 MULTISMART MANUAL OPERATION

6.1 MultiSmart Manual Pump run operation

Ensure enough volume in well prior to testing so as not to run the pumps dry. Verify communication to ClearSCADA.

Task	Observation	Completed
Switch all pumps to OFF on MS panel.	MultiSmart - All pumps on OFF ClearSCADA shows - OFF N/A	OK ☑
Start Pump 1 - by selecting Manual (using P/B on MS panel). Record Amps, kW and l/s. * [Check Parameters List: 11.3 Flow Alarms Pump1 Nominal Flow Rate – Enter value (Menu: Settings/More/Flow/Flow Alarms)]	Pump starts & runs. ClearSCADA shows - Semi Auto briefly	OK ☑ 48 Amps (62 on drive) 75 l/s
Stop Pump 1 - by selecting OFF on MS panel.	Pump stops.	OK ☑
Start Pump 2 - by selecting Manual (using P/B on MS panel). Record Amps, kW and l/s. * [Check Parameters List: 11.3 Flow Alarms Pump2 Nominal Flow Rate – Enter value (Menu: Settings/More/Flow/Flow Alarms)]	Pump starts & runs. ClearSCADA shows - Semi Auto briefly	OK ☑ 49 Amps (62 on drive) 75 l/s
Stop Pump 2 - by selecting OFF on MS panel.	Pump stops.	OK ☑
Start Pump 3 - by selecting Manual (using P/B on MS panel). Record Amps, kW and l/s. * [Check Parameters List: 11.3 Flow Alarms Pump2 Nominal Flow Rate – Enter value (Menu: Settings/More/Flow/Flow Alarms)]	Pump starts & runs. ClearSCADA shows - Semi Auto briefly	OK ☐ ___Amps N/A
Stop Pump 3 - (Stop push button)	Pump stops.	N/A OK ☐
Switch all pumps back into Auto on MS Panel	MultiSmart - Available ClearSCADA shows - Auto. N/A	OK ☑

6.2 MultiSmart Auto Operation

NOTE: - On an active site use hydrostatic well level to control the following test. On a non-active site use MultiSmart well level simulation to drive/simulate the following.

Task	Observation	Completed
Ensure all Pumps in Auto.	Check which pump is Duty Pump (next to start) and Start Setpoint on the MultiSmart ClearSCADA - All in Auto.	OK ☑ N/A OK ☐
Check Well Level	Check level in the well and compare with analog reading on MultiSmart (if using real level)	OK ☑
Normal Level Control by MS - Allow level in well to rise to Duty Start SP	Duty Pump starts - ClearSCADA - Duty Pump running	OK ☑
Monitor Well Level as it drops to Duty Stop SP	Duty Pump stops when Stop SP is reached. Check Duty change-over on MS. ClearSCADA - Pump stops, duty c/o.	OK ☑
Monitor the Well Level as it rises again to Duty Start SP.	New Duty Pump starts - ClearSCADA - Duty Pump running	OK ☑
Monitor the Well Level as it drops again to Duty Stop SP.	Pump stops when stop setpoint is reached. Check Duty change over again.	OK ☑
Repeat steps above if there is a 3rd pump.	Pump starts at duty level.	N/A OK ☐
Leave site running in Automatic.	Site running in auto.	OK ☑

7 GENERATOR

7.1 Standard Generator items (permanent or temporary)

Task	Observation	Completed
Check generator status is correct (on/off site). All other generator signals/operations will be tested to RTU by electrical installation contractor.	Generator displaying on/off site accordingly on SCADA.	OK ☐ N/A

8 SCADA COMMISSIONING CHECKS

8.1 Initiating alarms to prove communications to ClearSCADA (LOCAL PC ONLY)

Task	Observation	Completed
Cycle Mains power alarm check	Ensure that Mains Power OK alarm on ClearSCADA Station Status has received a Critical level alarm	OK ☑
RTU power supply alarm check	Remove AC power to RTU 24VDC Power Supply. Alarm found in RTU/Status – Supply 'Mains fail (Power Supply)' should come On in ClearSCADA. (MS input – 2DI 19)	OK ☑
Energex Mains Power alarm check	Turn OFF Supply Authority Metering Isolator (Or relay) Alarm found in Station/Status – 'Site Mains power fail'	OK ☑
Confirm starting and stopping of all pumps in manual (semi-auto) from SCADA (if sufficient level available otherwise run system with pumps disabled).	Pumps start and Stop. Pump 1 Pump 2 ~~Pump 3~~	OK ☑
Activate Safe-FSP bottom and middle probe (if sufficient level available otherwise run system with pumps disabled).	Confirm Emergency Pumping Mode on ClearSCADA Well Status has received a Critical level alarm	OK ☑
Activate Surcharge imminent alarm, top probe on Safe FSP	Confirm Surcharge Imminent on ClearSCADA Well Status has received a Critical level alarm	OK ☑
Activate High Level Alarm Probe	Confirm High (probe) on ClearSCADA Well Status has received a Critical level alarm	OK ☑
Fault Pump 1	Confirm Available on ClearSCADA Pump 1 Status has received a Critical level alarm	OK ☑
Fault Pump 2	Confirm Available on ClearSCADA Pump 2 Status has received a Critical level alarm	OK ☑
Fault Pump 3	Confirm Available on ClearSCADA Pump 3 Status has received a Critical level alarm	N/A OK ☐
Confirm Well Level	Confirm the well level displayed in the MultiSmart matches that displayed in the ClearSCADA	OK ☑
Test poll button from ClearSCADA. Record approx poll time	Verify that the time taken to poll/update site on ClearSCADA is acceptable (< 5-10 seconds)	OK ☑ 0.1 Seconds

8.2 Swipe Card

Task	Completed
Swipe Card on panel, check for beep.	OK ☑
Verify that number has been carried to SCADA under Station, Status, Foldout, User Card	OK ☑

8.3 Post Site ClearSCADA commissioning

Task	Observation	Completed
Request for Historian to point to new tags in new site	Historian connected to new site instance	OK ☐
Wet Well level and pump runs being received and trended	Pumps Cycling, well level according, trending	OK ☐
Pump current	Reading/trended	OK ☐
Confirm correct navigation to site thorough both menu system and via catchment map	Navigation correct	OK ☐
Check alarm and event history for the site on ClearSCADA to see if and anomalies have occurred.	Comments:	OK ☐

9 RADTEL SIGNALS

9.1 Test output signals to Radtel confirm received by Radtel Operator

Task	Observation	Completed
Make Pump 1 Unavailable *. Only tested with one of these faults during FAT. Also some sites have External Contactor which also makes unavailable. Test this individually	Unavailable signal output goes to Radtel Logic is _0_ _ for fail (high or low)	OK ☑ RADTEL (2)
Make Pump 2 Unavailable *. Only tested with one of these faults during FAT. Also some sites have External Contactor which also makes unavailable. Test this individually	Unavailable signal output goes to Radtel Logic is _0_ _ for fail (high or low)	OK ☑ RADTEL (4) OK ☐
Make Pump 3 Unavailable *. Only tested with one of these faults during FAT. Also some sites have External Contactor which also makes unavailable. Test this individually	Unavailable signal output goes to Radtel Logic is _ _ _ _ for fail (high or low) N/A	OK ☐ OK ☐
Activate High Level alarm probe or from the Level High input threshold. Or backup circuit running, (derived through MultiSmart).	High Level probe output goes to Radtel Logic is _0_ _ for fail (high or low)	OK ☑ RADTEL (6)
Pump 1 Running	Running Signal output goes to Radtel Logic is _1_ _ for ~~fail~~ RUN (high or low)	RADTEL (1) OK ☑
Pump 2 Running	Running Signal output goes to Radtel Logic is _1_ _ for ~~fail~~ RUN (high or low)	RADTEL (3) OK ☑
Pump 3 Running	Running Signal output goes to Radtel Logic is _ _ _ _ for fail (high or low)	OK ☐ N/A
Power failure (Phase fail relay)	Power failure output goes to Radtel Logic is _0_ _ for fail (high or low)	RADTEL (7) OK ☐
Surcharge Imminient	Surcharge Imminent output goes to Radtel Logic is _ _1_ _ for fail (high or low)	RADTEL (8) OK ☑
level	4-20mA split signal goes to Radtel Checked to mirror MultiSmart. 0-6231mm	OK ☑
Flowmeter	4-20mA split signal goes to Radtel only	OK ☑

***See Multitrode provided documentation for MultiSmart Pump Unavailable faults**

10 SIGN OFF/NOTES

10.1 Record of setup/witness

Lend Lease Operative	Signature	Date
PAUL MATTHEWS	P. Mathews	5/6/2012

QUU	Signature	Date

10.2 Notes

VSD (Changed) Parameters

1301 – 80%

1403 – Relay Output 3 Fault

1501 – AO1 Sel Excite PTC

1604 – Fault Reset Sel DI3

2002 – Max Speed 1480 rpm

2003 - Max Current 100A

2007 – 42Hz

2008 – 42Hz

2102 – Stop Function Ramp

2103 – DC magn time 0.1s

2202 – Acceleration time 15s

2203 – Decel time 10s

3501 – PTC

9802 – STD Modbus

9905 – 415V

9906 – 92A (Nominal Amps)

9908 – 1480 (Nominal RPM)

9909 – 50kW (Nominal Power)

- Well Washer option turned on, WWR operating but no washer connected. 29% start with 2 min run time and 30 seconds between runs.
- SCCT (Secondary control circuit test) disabled due to problems with the code currently not able to work with only one available pump. Seems to work for Pump 1 (odd days) but not pump 2 even days. Multitrode to investigate.

SP - SP Hopkins St Beaudesert

Probe type
Hydrostatic

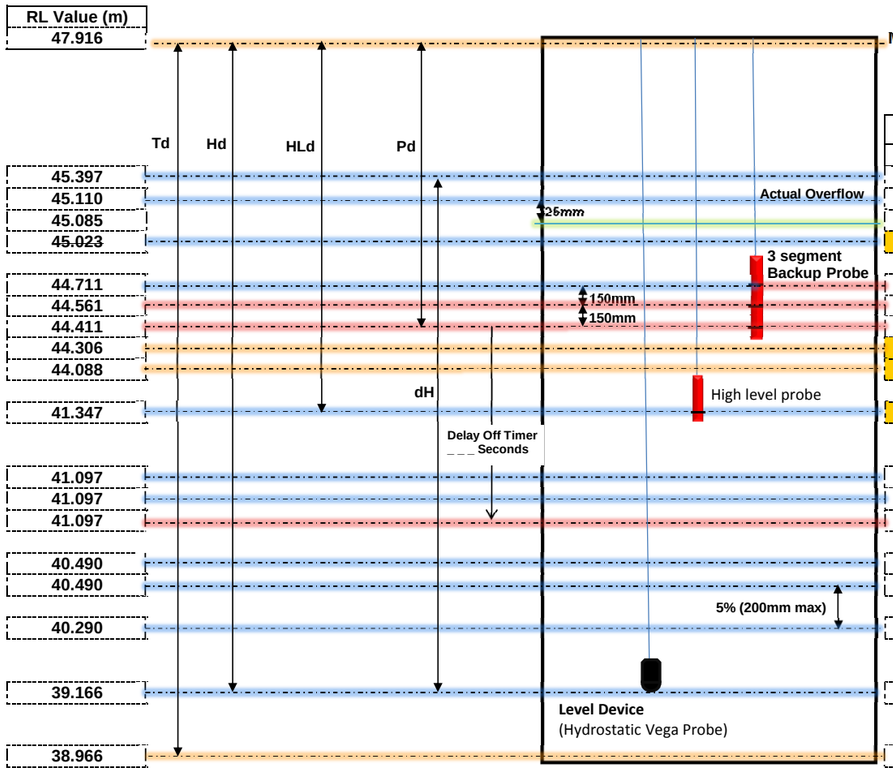
Note: Please refer to parameter list for Duty C Start and Stop (not contained on this sheet)

Hanging Distances (from RLt)	
Hydrostatic	
Hd (m)	8.750
3 Segment Backup Probe	
Pd (m)	3.505

High Level Probe	
HLd	6.569

Hydrostatic Analogue Range	
dH	6.231

Database Values	
Well RL Height (m)	47.916
Well Depth Td (m)	8.95
Actual Overflow RL (m)	45.11
DNP Address	0
MultiSmart PW	0
Serial No	0
Back-Up Timer setting	1 min



Measured from top of well lid concrete

WET WELL CONTROL VALUES

Hydro %	mm	Hydrostatic Action	Probe Action	Multismart Alarm(s)	
				Hydrostatic (Analogue)	Probe (Discrete)
100.00	6231				
95.40	5944				
95.00	5919	Well 1 Surcharge Occuring		Well 1 Surcharge Occurring	
~~94.00~~	~~5857~~			~~Well 1 Surcharge Occurring~~	
89.00	5545	Surcharge Imminent	Surcharge Imminent (Probe)	Probe Surcharge Imminent	Well 1 Surcharge Imminent
86.59	5395		Start Backup System	Emergency Backup System Active	
84.18	5245		Start Backup System Delay Off Timer		
82.50	5140	Inhibit Start			
79.00	4922	Inhibit Stop			
35.00	2181	Well 1 High Level	Well 1 High Level (Probe)	Well 1 High Level	Well 1 High Level (Probe)
31.00	1931	Duty B Start			
31.00	1931	Duty A Start			
31.00	1931		Stop Backup System (Approx)		
21.25	1324	Duty B Stop			
21.25	1324	Duty A Stop			
18.04	1124	Well 1 Low Level		Well 1 Low Level	
0.00	0				
-	-200	Bottom of Well		5.245	

Quu Asset No. + Description		Duty A Start (%)	Duty A Stop (%)	Duty B Start (%)	Duty B Stop (%)	Well RL Height (m)	Well Depth Td (m)	Actual Overflow RL (m)	DNP Address	Backup Timer Setting	MultiSmart Serial Number	MultiSmart Password		Level Control Device	High Level Alarm	Low Level Alarm	Surcharge Imminent	0-100% Length of Probe measurement	Well Cross Sectional Area (m2)	Volume Per %	Duty C Start (%)	Duty C Stop (%)	Inhibit Start Duty A (%)	Inhibit Start Duty B (%)	Inhibit Stop Duty A (%)	Inhibit Stop Duty B (%)	WWLCT Test Fault Threshold %
SP322 - SP322 HANLON ST (BUNDAMBA) 1		50	30	60	30	10.975	10	5.44	2059	5 min 30 sec				Hydrostatic	65	25	86	4463	33.06	1475.4678	100	99.9					
SP323 - SP323 VIDERONI ST (BUNDAMBA) 1		50	30	60	30	17.74	3.63	16.62	2054	1 min				Hydrostatic	71	19	91	2405	2.23	53.6315	100	99.9					
SP324 - SP324 OLD TOOWOOMBA RD (AMBERLEY) 1		50	20	60	20	21.54	2.94	21.54	1051	8 min				Hydrostatic	65	13	85	2858	1.75	50.015	100	99.9					
SP330 - SP330 CHALK ST (LEICHHARDT) 1		40	20	60	20	22.39	8.35	19.95	1053	2 min				Hydrostatic	65	14	89.7	5984	2.48	148.4032	100	99.9					
SP333 - SP333 ASHBURN RD (BUNDAMBA) 1		50	35	60	35	17.44	5.8	16.01	2056	30 sec				Hydrostatic	65	30	88	4358	10.53	458.8974	100	99.9	80.00	84.00	75.00	75.00	
SP334 - SP334 KENNETH ST (RIVERVIEW) 1		40	20	45	20	14.34	7.8	10.24	2053	3 min				Hydrostatic	65	15	85	3658	2.48	90.7184	100	99.9					
SP335 - SP335 SUTTON ST (CHURCHILL) 1		50	30	52	32	21.083	5.79	18.01	1055	2 min				Hydrostatic	64	22	83	2621	2.48	65.0008	100	99.9	70.00	76.90	62.00	62.00	5.00
SP336 - SP336 LOBB ST (CHURCHILL) 1		35	20	45	20	14.146	4.9	13.24	1052	2 min				Hydrostatic	59.5	15	87.2	3967	2.48	98.3816	100	99.9					
SP342 - SP342 MOGGILL FERRY RD (RIVERVIEW) 1		39	23	50	23	13.41	4.67	12.50	3050	3 min				Hydrostatic	65	14.9	86.7	3721	4.62	171.9102	100	99.9					
SP346 - SP346 MONASH RD (REDBANK) 1		50	25	60	25	11.64	5.085	9.20	2055	2 min				Hydrostatic	65	10	83	2547	2.48	63.1656	100	99.9					
SP350 - SP350 ROSEBERRY PDE (WOODEND) 1		50	25	60	25	16.24	15.2	6.00	1060	6 min				Hydrostatic	62	14	88.8	4984	15.9	792.456	100	99.9					
SP351 - SP351 TANTIVY ST (TIVOLI) 1		60	50	65	50	14.645	13.65	5.69	1059	2 min				Hydrostatic	65	16	89	4700	43.58	2048.26	100	99.9					
SP353 - SP353 TIGER ST (WEST IPSWICH) 1		50	35	60	35	16.527	8.75	12.86	1056	2 min				Hydrostatic	63	20	88.9	5111	7.35	375.6585	100	99.9					
SP354 - SP354 BOUNDARY ST (MOORES POCKET S) 2		50	25	52.54	27.54	13.54	6.9	10.60	1050	2 min	H1116908	dRwtFeUc		Hydrostatic	60.17	19.91	87.36	3932	2.48	97.5136	100	99.9	78.48	83.29	73.37	73.37	5.00
SP356 - SP356 BLACKALL ST (EAST IPSWICH) 1		50	20	60	20	16.53	4.72	14.43	1058	1 min 30 sec				Hydrostatic	65	13	83	2521	3.2	80.672	100	99.9					
SP357 - SP357 MT CROSBY RD (NORTH TIVOLI) 1		40	20	50	20	13.53	7.07	8.53	2052	2 min				Hydrostatic	70	10	80	1937	2.48	48.0376	100	99.9					
SP358 - SP358 SPORTSGROUND (TIVOLI) 1		50	40	60	40	16.36	3.75	15.31	2063	30 sec				Hydrostatic	70	13	83.5	2602	3.13	81.4426	100	99.9					
SP362 - SP362 MOORES POCKET RD (MOORES PCKT) 1		50	25	60	25	13.54	4.7	10.60	2050	4min				Hydrostatic	72	9	77	1616	2.48	40.0768	100	99.9					
SP364 - SP364 BOUNDARY ST (MOORES POCKET N) 1		50	32.9	65	32.9	13.53	7.07	8.53	2051	12 sec				Hydrostatic	58	12	70	1937	2.48	48.0376	100	99.9					
SP366 - SP366 WOODEND RD (WOODEND) 1		50	30	60	30	15.25	2.7	13.65	1054	1 min 30 sec				Hydrostatic	65	15	90	921	1.77	16.3017	100	99.9					
SP375 - SP375 OXFORD ST (NORTH BOOVAL) 1		17	7	22	10	16.416	6.93	15.40	3052	1.5min				Hydrostatic	56	5	90	5988	4.52	270.6576	100	99.9					
SP377 - SP377 BRISBANE TR (GOODNA) 1		28	13	29	14	12.9	14.4	6.05	3051	18min				Hydrostatic	65	20	90	4795	47.5	2277.625	100	99.9					
SP380 - SP380 BOGNUDA ST (BUNDAMBA) 1		55	20	58.63	23.63	16.59	8.93	10.50	2060	2 min	I1117016	n1q1PrCW		Hydrostatic	62.26	12.73	84.1	2753	12.55	345.5015	100	99.9	71.38	78.29	64.11	64.11	5.00
SP352 - SP352 CHERMSIDE RD (EAST IPSWICH) 1										1 min 15 sec				Hydrostatic							100	99.9					
SP374 - SP374 JUNCTION RD (KARALEE A) 2										5 min				Hydrostatic							100	99.9					
SP397 - SP397 Banks Creek Road 1	Radtel	35	25	40	25					18 min				Hydrostatic							100	99.9					
SP399 - SP399 Schmidt Road	Radtel	40	20	45	20					15 min				Hydrostatic							100	99.9					
SP467 - SP467 Lindemans Road	Radtel	43.3	13.3	53.3	13.3					12 min				Hydrostatic							100	99.9					
SP - SP Hopkins St Beaudesert	Radtel	31	21.25	31	21.25	47.92	8.95	45.11		1 min				Hydrostatic	35.00	4.3	89	5456		0	100	99.9	82.50	86.07	79.00	79.00	5.00
SP468 - SP468 Forrest Hill Fernvale Road	Radtel	50	20	55	20					15 min				Hydrostatic							100	99.9					

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INSPECTION AND TEST PLAN

BTSP1 Hopkins St. SPS Upgrade

Site Installation

16505-03-DT-ITP3000	
REVISION:	0.1
JOB No.	16505
CONTRACT:	QUU C1101-052
PURCHASE ORDER:	P10071
CLIENT	Re-Pump for QUU
CLIENT DOC. No.	N/A

CONTRACTOR	i.POWER SOLUTIONS
ITP DESCRIPTION	Site Acceptance Testing
COMPONENT	MCC Installation
ITEM/TAG No.	N/A

Suggested ITP Type Form Number Range: F3000 – F3999 — Electrical

Inspection Activity Classification:
E = Examine S = Surveillance W = Witness Point V = Verification H = Hold I = Inspection D = Document Approval

FORM NO. OR FORM NAME	PRIMARY INSPECTION AND TESTS FOR EACH OPERATION IN SEQUENCE OF MANUFACTURE/ INSTALLATION OR COMMISSIONING	APPLICABLE STANDARDS & ACCEPTANCE CRITERIA	SPECIFY INSPECTION RECORDS	ITP or Custom Checksheet Reference	Standalone or Reference Checksheets	i.POWER	VENDOR / SUBCONT	PRINCIPAL	INSTRUCTIONS AND REMARKS
	Cable Trenching								
	(item description)								
F3300			Cable Trenching	ITP-1237		S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	Concrete Test Sheet								
	(item description)								
F3400			Junction Box Inspection	ITP-1247		S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	Cable Support Systems								
F3500			Cable Support System	ITP-1231		S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	Low Voltage Cables Testing								
	(item description)								
F3600			Cable Installation Check Sheet - Control	ITP-1281		S			
F3601			Cable Installation Check Sheet - Power	ITP-1282		S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	Cable Testing								
	(item description)								
F3700			ELECTRIC MOTOR PRE-COMMISSIONING TEST	ITP-1255		S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	Cable Terminations								
	(item description)								
F3800			Field Device Check Sheet	ITP-1281		S			
						S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	Instrument Installations								
	(item description)								
F3900			VSD Checklist	ITP-1257		S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	Drive Testing								
	(item description)								
F3901			RCD Testing	ITP-1208		S			
		Approved Drawings BOM	Hit List		SF-1100	H			Internal Use Only - Not for Client Records
	(sub-section description)								
	(item description)								
F3902			Single Phase LV Cable	ITP-1229		S			
					SF-1100	H			

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INSPECTION AND TEST PLAN

BTSP1 Hopkins St. SPS Upgrade

Site Installation

16505-03-DT-ITP3000	
REVISION:	0.1
JOB No.	16505
CONTRACT:	QUU C1101-052
PURCHASE ORDER:	P10071
CLIENT	Re-Pump for QUU
CLIENT DOC. No.	N/A

CONTRACTOR	i.POWER SOLUTIONS
ITP DESCRIPTION	Site Acceptance Testing
COMPONENT	MCC Installation
ITEM/TAG No.	N/A

Suggested ITP Type Form Number Range: **Electrical**

F3000 – F3999

Inspection Activity Classification:
E = Examine S = Surveillance W = Witness Point V = Verification H = Hold I = Inspection D = Document Approval

FORM NO. OR FORM NAME	PRIMARY INSPECTION AND TESTS FOR EACH OPERATION IN SEQUENCE OF MANUFACTURE/ INSTALLATION OR COMMISSIONING	APPLICABLE STANDARDS & ACCEPTANCE CRITERIA	SPECIFY INSPECTION RECORDS	ITP or Custom Checksheet Reference	Standalone or Reference Checksheets	i.POWER	VENDOR / SUBCONT	PRINCIPAL	INSTRUCTIONS AND REMARKS

REVISION HISTORY

REVISION	Description				Date	Rev By	Checked	Approved		Comment
0.0	Initial Setup From iPSITPEngine				12/01/2012	J. Dalziel				
0.1	ITP Revision 0.1 checksheets generated by iPSITPEngine.				12/01/2012	J. Dalziel				

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St. SPS Upgrade		
ITP Description	Site Acceptance Testing		
Component	MCC Installation	**Item / Tag Number / Panel No**	TRENCHING.
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Technical Ref			
Technical Ref			

ITEM	DESCRIPTION	ACCEPT
1.1	Alignment	✓
1.2	Width	✓
1.3	Depth	✓
1.4	Backfill & Compacting	✓
1.5	Warning Tape	✓
1.6	Protective Slab	✓
1.7	Markers	✓
1.8	Surface Reinstatement	✓
1.9	Buried Cable Route Records / Drawings Updated	✓

Testing Officer Comments & Notes:

Tested By: (Conneq Authorised Person)		Witnessed By: (Client If applicable)	
(Name)	STUART HOLDING	(Name)	
(Sign)		(Sign)	
Date	2/4/12	Date	/ /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505		
Job Name	BTSP1 Hopkins St. SPS Upgrade	**Contract / PO Number**	QUU C1101-052 // P10071
ITP Description			
Component	MCC Installation	**Item / ~~Tag Number / Panel No~~**	INSTRUMENT + CONTROL JUNCTION BOX
Drawing Reference		**Client Document Number**	
Drawing Reference			
Technical Ref			
Technical Ref			

Item	DESCRIPTION	COMMENT	ACCEPT
1	Check for correct type and size		✓
1.1	Check for correct labelling and that clear designation sign is fitted.		✓
1.2	Check that the box is undamaged and securely mounted.		✓
1.3	Check position for access to terminals.		✓
1.4	Check all terminations are tight.		✓
1.5	Check all earths are connected.		✓
1.6	Check all equipment is installed as per General Arrangement Drawing.		✓
1.7	Check all terminations are as per Termination Drawing.		✓

Testing Officer Comments & Notes:

	Tested By: (IPS Testing Officer)		**Witnessed By: (Client if applicable)**
	(Name)	SIMON HOUSING	(Name)
	(Sign)		(Sign)
	Date	25/5/12	Date /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505		
Job Name	BTSP1 Hopkins St. SPS Upgrade	**Contract / PO Number**	QUU C1101-052 // P10071
ITP Description			
Component	MCC Installation	**Item / ~~Tag Number / Panel No~~**	PUMP No. 1 AUX CABLE
Drawing Reference		**Client Document Number**	JUNCTION BOX.
Drawing Reference			
Technical Ref			
Technical Ref			

Item	DESCRIPTION	COMMENT	ACCEPT
1	Check for correct type and size		✓
1.1	Check for correct labelling and that clear designation sign is fitted.		✓
1.2	Check that the box is undamaged and securely mounted.		✓
1.3	Check position for access to terminals.		✓
1.4	Check all terminations are tight.		✓
1.5	Check all earths are connected.		✓
1.6	Check all equipment is installed as per General Arrangement Drawing.		✓
1.7	Check all terminations are as per Termination Drawing.		✓

Testing Officer Comments & Notes:

Tested By: (IPS Testing Officer)	Witnessed By: (Client if applicable)
(Name) STANLEY HOPKINS	(Name)
(Sign)	(Sign)
Date 28/5/12	Date /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505		
Job Name	BTSP1 Hopkins St. SPS Upgrade	**Contract / PO Number**	QUU C1101-052 // P10071
ITP Description			
Component	MCC Installation	**Item / Tag Number / Panel No**	PUMP NO. 2 ANT CABLE
Drawing Reference		**Client Document Number**	JUNCTION BOX
Drawing Reference			
Technical Ref			
Technical Ref			

Item	DESCRIPTION	COMMENT	ACCEPT
1	Check for correct type and size		✓
1.1	Check for correct labelling and that clear designation sign is fitted.		✓
1.2	Check that the box is undamaged and securely mounted.		✓
1.3	Check position for access to terminals.		✓
1.4	Check all terminations are tight.		✓
1.5	Check all earths are connected.		✓
1.6	Check all equipment is installed as per General Arrangement Drawing.		✓
1.7	Check all terminations are as per Termination Drawing.		✓

Testing Officer Comments & Notes:

	Tested By: (IPS Testing Officer)	Witnessed By: (Client if applicable)
	(Name) [illegible]	(Name)
	(Sign)	(Sign)
	Date 28/5/12	Date /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505		
Job Name	BTSP1 Hopkins St. SPS Upgrade	**Contract / PO Number**	QUU C1101-052 // P10071
ITP Description			
Component	MCC Installation	**Item / Tag Number / Panel No**	WET WELL LEVELS
Drawing Reference		**Client Document Number**	JUNCTION BOX
Drawing Reference			
Technical Ref			
Technical Ref			

Item	DESCRIPTION	COMMENT	ACCEPT
1	Check for correct type and size		✓
1.1	Check for correct labelling and that clear designation sign is fitted.		✓
1.2	Check that the box is undamaged and securely mounted.		✓
1.3	Check position for access to terminals.		✓
1.4	Check all terminations are tight.		✓
1.5	Check all earths are connected.		✓
1.6	Check all equipment is installed as per General Arrangement Drawing.		✓
1.7	Check all terminations are as per Termination Drawing.		✓

Testing Officer Comments & Notes:

	Tested By: (IPS Testing Officer)	Witnessed By: (Client If applicable)
	(Name) Shaye Hopkins	(Name)
	(Sign)	(Sign)
	Date 25/5/12	Date /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St. SPS Upgrade		
ITP Description	Site Acceptance Testing		
Component	MCC Installation	**Item / Tag Number / Panel No**	CABLE TRAY
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Technical Ref			
Technical Ref			

Item	Description	Accept
1	CABLE LADDER	✓
1.1	Brackets	✓
1.2	Fishplates	✓
1.3	Cable Ladder Cover	NA
1.4	Earthing	✓
1.5	Painting	✓
1.6	Bushings	✓
1.7	Holding Down Clamps	✓

Testing Officer Comments & Notes:

Tested By: (IPS Testing Officer)		Witnessed By: (Client if applicable)	
(Name)	Tim Bar	(Name)	
(Sign)	TBar	(Sign)	
Date	8/6/12	Date	/ /

NOTE: Ensure relevant items or comments are recorded on the Hit List (Sf-1100)

ITP1281 - CABLE INSTALLATION CHECK SHEET - CONTROL

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St. SPS Upgrade		
ITP Description	Site Acceptance Testing		
Component	MCC Installation	**Item / Tag Number / Panel No**	
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Cable Schedule			
Technical Ref			

*** Do not energise equipment during this stage of checks. All equipment is to be correctly tagged and isolated. ***
Do not begin any testing until the surrounding area is safe to work and appropriate Job Safety Analysis' or equivalent have been consulted.

Cable checks: Each of the below tests are to be completed on the cables included in this test sheet.	
A	Cable glands appropriate size, with shrouds and lock nuts tight.
B	Cable installed correctly, supported and protected from damage.
C	Cable numbers fitted and correct as per cable schedule.
D	All terminations completed and tested as per the termination drawing.
E	Cable schedule and termination drawing updated when required.

Note:	Resistance test each earth conductor to earth (Maximum reading of 0.5Ω allowed).
	DO NOT INSULATION RESISTANCE TEST THE CONTROL CABLES!!

	Cable Check passes? (✓)					Ω Value?	Completed?	
Cable Number	**A**	**B**	**C**	**D**	**E**	**Earth Continuity**	**Yes (✓)**	**No (✓)**
I01	✓	✓	✓	✓	✓	.	✓	
I02	✓	✓	✓	✓	✓		✓	
I03	✓	✓	✓	✓	✓		✓	
I04	✓	✓	✓	✓	✓		✓	
I05	✓	✓	✓	✓	✓		✓	
I06	✓	✓	✓	✓	✓		✓	
I07	✓	✓	✓	✓	✓	—	✓	
I101	✓	✓	✓	✓	✓		✓	
I102	✓	✓	✓	✓	✓	—	✓	
I201	✓	✓	✓	✓	✓		✓	
I202	✓	✓	✓	✓	✓	—	✓	

Tests have been carried out in accordance with AS/NZS 3000:2007 and AS/NZS 3012

Authorised Person Comments & Notes:

Tested By: (Conneq Authorised Person)	**Witnessed By:** (Client if applicable)
(Name) Tim Bourne	(Name)
(Sign)	(Sign)
Date 8/6/12	Date / /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St. SPS Upgrade		
ITP Description	Site Acceptance Testing		
Component	MCC Installation	**Item / Tag Number / Panel No**	
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Cable Schedule			
Technical Ref			

*** Do not energise equipment during this stage of checks. All equipment is to be correctly tagged and isolated. ***
Do not begin any testing until the surrounding area is safe to work and appropriate Job Safety Analysis' or equivalent have been consulted.

Cable checks: Each of the below tests are to be completed on the cables included in this test sheet.	
A	Cable glands appropriate size, with shrouds and lock nuts tight.
B	Cable installed correctly, supported and protected from damage.
C	Cable numbers fitted and correct as per cable schedule.
D	All terminations completed and tested as per the termination drawing.
E	Cable schedule and termination drawing updated when required.

Note:	Insulation Resistance test the cables Core - Core and Core - Earth at 500V (Minimum reading of only 25M Ω allowed).
	Resistance test each earth conductor to earth (Maximum reading of 0.5Ω allowed).

	Cable Check passes? (✓)					Insulation Resistance Reading Recorded? (MΩ)							Ω Value?	Complete?	
Cable Number	A	B	C	D	E	R-B	R-W	B-W	R-E	W-E	B-E	Neutral	Earth Continuity	Yes (✓)	No (✓)
E01	✓	✓	✓	✓	✓	—	—	—	—	—	—	—	0.05	✓	
P01	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	>200	↑	✓	
P02	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	>200	0.05	✓	
P101	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.05	✓	
P102A	✓	✓	✓	✓	✓	>100	>100	>100	>200	>200	>200	—	0.05	✓	
P102B	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.05	✓	
P201	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.05	✓	
P202A	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.05	✓	
P202B	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.05	✓	
P401	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.05	✓	
P402	✓	✓	✓	✓	✓	—	—	—	>40	>40	>40	—	0.05	✓	
P501	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.1	✓	
P502	✓	✓	✓	✓	✓	—	—	—	>200	>200	>200	—	0.1	✓	
P601	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	—	0.1	✓	
P602	✓	✓	✓	✓	✓	—	—	—	>1MΩ	>1MΩ	>1MΩ	—	0.05	✓	
TEMP SUB-MAIN	✓	✓	✓	✓	✓	>200	>200	>200	>200	>200	>200	>200	0.05	✓	
3PH 20A Socket outlet	✓	✓	✓	✓	—	>200	>200	>200	>200	>200	>200	>200	0.05	✓	

Insulation Tester — Conneq iPower Solutions Equipment No 9901403

Multimeter — Conneq iPower Solutions Equipment No

Authorised Person Comments & Notes:

Tested By: (Conneq Authorised Person)	**Witnessed By: (Client If applicable)**
(Name) [illegible]	(Name)
(Sign)	(Sign)
Date 30 / 5 / 12	Date / /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St. SPS Upgrade		
ITP Description	Site Acceptance Testing		
Component	MCC Installation	**Item / Tag Number / Panel No**	
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Cable Schedule			
Technical Ref			

*** Do not energise equipment during this stage of checks. All equipment is to be correctly tagged and isolated. ***
Do not begin any testing until the surrounding area is safe to work and appropriate Job Safety Analysis' or equivalent have been consulted.

Cable checks: Each of the below tests are to be completed on the cables included in this test sheet.	
A	Cable glands appropriate size, with shrouds and lock nuts tight.
B	Cable installed correctly, supported and protected from damage.
C	Cable numbers fitted and correct as per cable schedule.
D	All terminations completed and tested as per the termination drawing.
E	Cable schedule and termination drawing updated when required.

Note:	Insulation Resistance test the cables Core - Core and Core - Earth at 500V (Minimum reading of only 25M Ω allowed).
	Resistance test each earth conductor to earth (Maximum reading of 0.5Ω allowed).

	Cable Check passes? (✓)					Insulation Resistance Reading Recorded? (MΩ)							Ω Value?	Complete?	
Cable Number	**A**	**B**	**C**	**D**	**E**	**R-B**	**R-W**	**B-W**	**R-E**	**W-E**	**B-E**	**Neutral**	**Earth Continuity**	**Yes (✓)**	**No (✓)**
RMP Gen Cables	✓	✓	N/A	N/A	N/A	50	7100	100	60	7200	70	70	0.05	✓	
LIGHTS (Room Wall)	✓	✓	✓	-		—	—	—	>200	—	—	>200	0.3	✓	
(CPO) RADIAL + FLOW POWER	✓	✓	✓	✓	-	—	—	—	>200	—	—	>200	0.1	✓	
General Power	✓	✓	✓	✓	-	—	—	—	>200	—	—	>200	0.1	✓	

Insulation Tester — Conneq iPower Solutions Equipment No 99 01403

Multimeter — Conneq iPower Solutions Equipment No

Authorised Person Comments & Notes:

Tested By: (Conneq Authorised Person)	**Witnessed By: (Client if applicable)**
(Name) Tim Bawman	(Name)
(Sign)	(Sign)
Date 6 / 6 / 12	Date / /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016509	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St. SPS Upgrade		
ITP Description	Site Acceptance Testing		
Component	MCC Installation	**Item / ~~Tag Number / Panel N~~**	PRIMARY WET WELL LEVEL SENSOR VEGAWELL 52
Drawing Reference		**Client Document Number**	
Drawing Reference			
Technical Ref			
Technical Ref			

ITEM	DESCRIPTION	COMMENT	ACCEPT
1.1	Check that device is correct type.		✓
1.2	Check that device is undamaged and securely mounted.		✓
1.3	Check device is labeled correctly.		✓
1.4	Check device operates correctly.		✓
1.5	Check device is installed in correct location.		✓
1.6	Check that device signal to control system is correct.		✓

Testing Officer Comments & Notes:

	Tested By: (Conneq Authorised P	Witnessed By: (Client if applicable)
(Name)	Tom Bourne	(Name)
(Sign)		(Sign)
Date	8 / 6 / 12	Date / /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016509	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St. SPS Upgrade		
ITP Description	Site Acceptance Testing		
Component	MCC Installation	**Item / ~~Tag Number / Panel N~~**	DELIVERY PRESSURE TRANSMITTER VEGABAR 52
Drawing Reference		**Client Document Number**	
Drawing Reference			
Technical Ref			
Technical Ref			

ITEM	DESCRIPTION	COMMENT	ACCEPT
1.1	Check that device is correct type.		✓
1.2	Check that device is undamaged and securely mounted.		✓
1.3	Check device is labeled correctly.		✓
1.4	Check device operates correctly.		✓
1.5	Check device is installed in correct location.		✓
1.6	Check that device signal to control system is correct.		✓

Testing Officer Comments & Notes:

Tested By: (Conneq Authorised P	**Witnessed By: (Client if applicable)**
(Name) Tim Brown	**(Name)**
(Sign)	**(Sign)**
Date 8 / 6 / 12	**Date** / /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

INSPECTION AND TEST PLAN

16505-02-DT-ITP0000

REVISION:	0.1
JOB No.	16505
CONTRACT:	QUU C1101-052
PURCHASE ORDER:	P10071
CLIENT	Re-Pump for QUU
CLIENT DOC. No.	N/A

CONTRACTOR	CONNEQ i.POWER SOLUTIONS
ITP DESCRIPTION	FAT
COMPONENT	Main Switchboard
ITEM/TAG No.	BTSP1-MCC

BTSP1 Hopkins St SPS Upgrade

Switchboard Manufacture

Suggested ITP Type Form Number Range: Select ITP Type Form No. Range

Inspection Activity Classification:
E = Examine S = Surveillance W = Witness Point V = Verification H = Hold I = Inspection D = Document Approval

FORM NO. OR FORM NAME	PRIMARY INSPECTION AND TESTS FOR EACH OPERATION IN SEQUENCE OF MANUFACTURE/ INSTALLATION OR COMMISSIONING	APPLICABLE STANDARDS & ACCEPTANCE CRITERIA	SPECIFY INSPECTION RECORDS	ITP or Quality Checksheet Reference	Standard or Reference Checksheet	CONNEQ i.POWER		VENDOR / SUBCONT		PRINCIPAL		INSTRUCTIONS AND REMARKS
	Sheetmetal Fabrication											
	(item description)											
F0100		Approved Drawings	Sheetmetal / Boiler Check Sheet	ITP-1214		H						
		Approved Drawings BOM	Hit List		SF-1100	H						Internal Use Only - Not for Client Records
	Finish Inspection											
	(item description)											
F0200		Approved Drawings Purchase Order BOM	Paint Finish Inspection	ITP-1278		H						
		Approved Drawings BOM	Hit List		SF-1100	H						Internal Use Only - Not for Client Records
	Testing & Final Inspection											
	(item description)											
F0404		i.Power Q.A. System,	RCD Test	ITP-1233		S						
F0409		i.Power QA System	GA Inspection Sheet		ITP-1216	S						
F0410		AS/NZS 3439.1	Auxiliary Circuits	ITP-1224		S						
F0412		i.Power QA System	Insulation And Continuity	ITP-1243		S						
F0416		i.Power Q.A. System	VSD settings and functionality	ITP-1257		S						
		i.Power Q.A. System,	Battery Charger/UPS	ITP-1296		S						
		Approved Drawings BOM	Hit List		SF-1100	H						Internal Use Only - Not for Client Records
			QUU Check list CA17A			H						Internal Use Only - Not for Client Records
	Release & Despatch											
		i.Power Q.A. System	Inspect and verify packaging is satisfactory and meets contract specifications.			H						
		i.Power Q.A. System	Ensure the SF-1008 Project Control form has been signed by the Job Owner for Despatch			H						
		i.Power Q.A. System	Ensure SF-102 Delivery Docket is complete and accurate and attached to the product to be despatched			H						

REVISION HISTORY

REVISION	Description	Date	Rev By	Checked	Approved	Comment
0.0	FAT	23/04/2012	Mick Nielsen			
0.1	ITP Revision 0.1 checksheets generated by iPSITPEngine.	23/04/2012	Mick Nielsen			

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St SPS Upgrade		
ITP Description	FAT		
Component	Main Switchboard	**Item / Tag Number / Panel No**	
Drawing Reference			
Drawing Reference		**Client Document Number**	N/A
Technical Ref			
Technical Ref			

Section 1	WIRING & CABLING	Checked By		
	Inspection Description	**Operator**	**L/Hand**	**Tester**
1	All power cable is correct current rating	✓		
2	All power cable is free of sharp bends (minimum bend radius is 6 x diameter of cable)	✓		
3	All power cable is phase coloured or marked with band of coloured heat shrink	✓		
4	All terminations are tight	✓		
5	All control wiring is the correct colour and size	✓		
6	Gland plates are earthed to suit cable size. (Refer to minimum earthing conductor chart)	✓		
7	All equipment is correctly earthed	✓		
8	All wiring access holes are bushed.	✓		
9	Test resistors are set to correct OHMs	N/A		

Section 2	GENERAL ITEMS	Checked By		
	Inspection Description	**Operator**	**L/Hand**	**Tester**
1	Switchboard is clean and free of loose objects	✓		
2	Paint colour as per general assembly	✓		
3	Paint finish is an acceptable quality	✓		
5	Door rubber is correctly secured	✓		
6	Correct Material & Thickness is used for gland plates – brass, aluminium, galvanised steel	✓		
7	All hinges are tight	✓		
8	Items To Be Sent List is complete, check with Project Officer.	✓		
9	Door escutcheons and cut-outs are correct	✓		
10	MEN link fitted and marked as per drawing (Main Board only)	✓		
11	Verify Req'd Labels are in place	✓		
12	Correct installation of CT's, special note for E/L Toroids.	✓		
13	Circuit Schedules are fitted to D.B chassis	✓		
14	Brass Nameplates fitted & Correct.	N/A		
15	Verify Minimum Creepage Distance	✓		
16	Verify Insulation & Fixings	✓		
17	Visually Confirm IP & Form Ratings has been achieved	✓		
18	Confirm components are as per BOM	✓		

Leading Hand (signing for section 1 & 2)	Date Comp 2/5/12	Print Name Navid Akbarian	Sign Name

Testing Officer Comments & Notes:

	Tested By: (IPS Testing Officer)	**Witnessed By: (Client if applicable)**
	(Name) N. Akbarian	(Name)
	(Sign)	(Sign)
	Date 2/5/12	Date / /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St SPS Upgrade		
ITP Description	FAT		
Component	Main Switchboard	**Item / Tag Number / Panel No**	
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Technical Ref			
Technical Ref			

Device Designation	Circuit Description	Type (I/II/III/IV)	CB Rating (A)	RCD Rating (mA)	½X Rated Trip (mS)	1X Rated Trip (mS)	5X Fast Trip (mS)	1X Rated 180° (mS)	Test Button Operation
Q12	LAP TOP GPO	III	10A	30mA		19ms			✓
Q13	Spare circuit	III	10A	30mA		19ms			✓
Q15	GEN ANC SUPPLY	III	10A	30mA		19ms			✓
Q11	3 phase GPO	III	20A	30mA		19ms			✓

Test acceptance criteria:
1. Type 2 RCD (<30mA) – trip time shall be less than 300 milli-seconds. (as per AS/NZS 3760).
2. Unless otherwise specified, devices shall be function tested only.

TEST EQUIPMENT

- RCD Test Set — i.PS Equip. No

Authorised Person Comments & Notes:

Tested By: (IPS Authorised Person)		**Witnessed By: (Client if applicable)**	
(Name)	D. Alabaster	(Name)	
(Sign)		(Sign)	
Date	21/5/12	Date	/ /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St SPS Upgrade		
ITP Description	FAT		
Component	Main Switchboard	**Item / Tag Number / Panel No**	
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Technical Ref			
Technical Ref			

CUSTOMER							
PLANT			**EQUIPMENT NO**				
MACHINE			**SERIAL NO**				
DATE	**CIRCUIT DESCRIPTION**	**INSULATION**	**CONTINUITY**	**CIRCUIT DESCRIPTION**	**INSULATION**	**CONTINUITY**
2/5/17	ISOLATOR to main switch	7100MΩ		Main Earth to VSD's		<0.1Ω
	Generator to main switch	72.2GΩ		Main earth to ground plate		<0.1Ω
	load side of main switch			Main earth to pans		<0.1Ω
	to line side of VSD's and DB	7300MΩ				
	DB main switch to					
	DB circuits	7180MΩ				
	Q10 circuit	72.2GΩ				
	Q11 circuit	72.2GΩ				
	Q12 circuit	71.6GΩ				
	Q14 circuit	70.7GΩ				
	Q15 circuit	>1.7GΩ				
	PUMP1 FAN CIRCUIT	72.2GΩ				
	PUMP2 FAN CIRCUIT	72.2GΩ				
	SUMP PUMP	72.2GΩ				
	DRY WELL	72.2GΩ				
	WET WELL	72.2GΩ				
	Continuity					
	Main Earthing to DB earth	<0.1Ω				
	Main earth to CC earth	<0.1Ω				
	Main earth to 3Φ GPO	<0.1Ω				
	Main earth to 1Φ GPO	<0.1Ω				
	Main earth to 1Φ GPO	<0.1Ω				
	Main earth to pans	<0.1Ω				
	Main earth to GEN PLUG	<0.1Ω				
	Main earth to ESCUTIONS	<0.1Ω				
	Main earth to doors	<0.2Ω				
	Main earth to meters	<0.1Ω				

Tests have been carried out in accordance with AS/NZS 3000:2007 and AS/NZS 3012

Authorised Person Comments & Notes:

Tested By: (IPS Authorised Person)		**Witnessed By: (Client if applicable)**	
(Name)	David Mulhaglon	(Name)	
(Sign)		(Sign)	
Date	2/5/17	Date	/ /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St SPS Upgrade		
ITP Description	FAT		
Component	Main Switchboard	**Item / Tag Number / Panel No**	
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Technical Ref			
Technical Ref			

CIRCUIT TESTS:
Tests to be carried out in respect to clause 8.3.1 AS/NZS 3439.1 - 2002

The total operation, control and indication of the auxiliary circuits is satisfactory as per the following Drawings.

DRAWING No	SHEET No	DRAWING REV	MARKED-UP	DRAWING No	SHEET No	DRAWING REV	MARKED-UP
4866/5/7-0256-000		Rev 1	☐	4866/5/7-0256	24	Rev 1	☐
4866/5/7-0256	1	Rev 1	☐	" "	25	Rev 1	☐
" "	2	Rev 1	☐	" "	26	Rev 1	☐
" "	3	Rev 1	☐	" "	27	Rev 1	☐
" "	4	Rev 1	☐	" "	28	Rev 1	☐
" "	5	Rev 1	☐	" "	29	Rev 1	☐
" "	6	Rev 1	☐	" "	30	Rev 1	☐
" "	7	Rev 1	☐			Rev	☐
" "	8	Rev 1	☐			Rev	☐
" "	9	Rev 1	☐			Rev	☐
" "	10	Rev 1	☐			Rev	☐
" "	11	Rev 1	☐			Rev	☐
" "	12	Rev 1	☐			Rev	☐
" "	13	Rev 1	☐			Rev	☐
" "	14	Rev 1	☐			Rev	☐
" "	15	Rev 1	☐			Rev	☐
" "	16	Rev 1	☐			Rev	☐
" "	17	Rev 1	☐			Rev	☐
" "	18	Rev 1	☐			Rev	☐
" "	19	Rev 1	☐			Rev	☐
" "	20	Rev 1	☐			Rev	☐
" "	21	Rev 1	☐			Rev	☐
" "	22	Rev 1	☐			Rev	☐
" "	23	Rev 1	☐			Rev	☐

TEST EQUIPMENT

- Current Injection Test Set — C i.PS Equip. No.
- Multimeter — C i.PS Equip. No.
- Current Clamp — C i.PS Equip. No.

Testing Officer Comments & Notes:

Tested By: (CIPS Testing Officer)		**Witnessed By: (Client if applicable)**	
(Name)	D. Alabaster	**(Name)**	
(Sign)		**(Sign)**	
Date	2 / 5 / 12	**Date**	/ /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF1100)

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St SPS Upgrade		
ITP Description	FAT		
Component	Main Switchboard	**Item / Tag Number / Panel No**	
Drawing Reference		**Client Document Number**	N/A
Drawing Reference			
Technical Ref			
Technical Ref			

VSD make and model:
VSD Power rating: 55 kW
VSD Voltage rating: 415 Volts

VSD TESTING		
TEST SEQUENCE DESCRIPTION	**RESULT**	**COMMENT**
Visual inspection of drive.	✓	
Verify all terminations into the drive.	✓	
Verify the polarity of the speed reference.	✓	To be verified AT FAT TEST
Check power cabling and ground.	✓	
Verify that supply voltage compatible with the supply voltage	✓	
Energise drive with no load.	✓	
Verify VSD inputs		To be verified AT FAT TEST
Verify motor starts correctly.		
Check cooling fans operate	✓	
Verify manual speed adjustment, i.e. drive ramps up and down,		To be verified AT FAT TEST
Correct communication cards fitted	✓	

Testing Officer Comments & Notes: testing to be completed at FAT TEST

Tested By: (Conneq Authorised Person)		**Witnessed By:** (Client if applicable)	
(Name)	David Akubuiro	(Name)	
(Sign)		(Sign)	
Date	2/5/12	Date	/ /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

ITP-1295 - BATTERY CHARGER / UPS TEST SHEET

Job No	0016505	**Contract / PO Number**	QUU C1101-052 // P10071
Job Name	BTSP1 Hopkins St SPS Upgrade	**Client Document Number**	N/A
ITP Description	FAT		
Component	Main Switchboard	**Item / Tag Number / Panel No**	
Drawing Reference			

Section 1	EQUIPMENT RECORDING (Place a √ / N/A in the blocks)				
Equipment Item	**Values**		**CHECKED BY**		
			Operator	**L/Hand**	**Tester**
Record main switching device rating	400A set at 200A	Amps			
Record No. Of battery packs	2 x 12V 38Ah				
Record Battery Charger / UPS Power Rating	POWERBOX 11A	VA			
Record Battery Charger / UPS Output voltage	24V	Volts			
Record Battery Charger / UPS Make & Model No.	POWERBOX PB 12080				
Record Power Cable rating	2.5	mm²			

Section 2	PANEL ASSEMBLY CHECKLIST (Place a √ / N/A in the blocks)			
GENERAL	**CHECKED BY**			
	Operator	**L/Hand**	**Tester**	
Check Panel is clean and free of loose objects	√			
All Drilled Holes Deburred including Label screw holes	√			
Rubber blanking gromets are fitted to all unused holes	√			
Check Panel for correct IP Rating	√			
Correct Gland plate material and size used	√			
Labels are fitted and correct	√			
Door Locks correct and hinges tight	√			
Shrouding fitted where applicable	√			
Paint colour correct and acceptable	√			
All wiring supports are suitable on doors and panels	√			
All doors requiring earth have earth studs fitted and are terminated correctly	√			
Door escutcheon and cutouts are correct	√			
Overall dimensions are correct	√			

Section 3	PANEL ASSEMBLY CHECKLIST (Place a √ / N/A in the blocks)			
WIRING & CABLING	**CHECKED BY**			
	Operator	**L/Hand**	**Tester**	
All Power Cable is Correct Current Rating	√			
All Power Cable is free of sharp Bends (Minimum Bend Radius is 6 x Dia of cable)	√			
All Power Cable is Coloured or Marked with a band of heat shrink	√			
All Power and Control Looms are neat	√			
All Terminations are Tight	√			
All control Wiring is correct colour and size	√			
All Wire Numbers are Fitted and correct	√			
All terminals are numbered	√			
Door Looms are secured at door and compartment	√			
All Equipment is correctly earthed	√			
All wiring access holes are bushed	√			

Section 4	FUNCTIONAL TESTING (Place a pass/N/A in the blocks)			
EQUIPMENT ITEMS		**CHECKED BY**		
		Operator	**L/Hand**	**Tester**
Output voltage correct (record voltage)	Volts			
Relay Output operation				
Alarms operation				
Bypass switch operates		N/A		
Auxiliary Devices Operation				

OPERATOR (signing off for sections 1,2 & 3)	Date Comp	Print Name	Sign Name
LEADING HAND (signing off for sections 1,2 & 3)	Date Comp	Print Name	Sign Name

TEST EQUIPMENT

- Multimeter i.PS Equip. No. _____

Testing Officer Comments & Notes:

	Tested By: (IPS Testing Officer)	**Witnessed By: (Client if applicable)**
	(Name) David Alexander	**(Name)**
	(Sign)	**(Sign)**
	Date 2/5/12	**Date** / /

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)

Job No	16505	Contract / PO Number	P10071 (RE-PUMP)
Job Name	BTSPi HOPKINS ST BEAUDESERT SEWAGE PUMPSTATION		
ITP Description	FAT		
Component	MAIN SWITCHBOARD/MCC	Item / Tag Number / Panel No	BTSPi - MCC
Drawing Reference	4864T7-0256 - 020 TO 025		
Drawing Reference	—	Client Document Number	QUU C1101-052
Technical Ref	QUU HOPKINS ST SPECIFICATION		
Technical Ref	—		

This inspection sheet is to be completed for all Custom switchboards and boiler work manufactured by i Power Solutions.
The inspecting officer will be one of the following and may be a combination of all:-

- Department Leading Hand
- Design Engineer
- Appropriate Department Manager

It is their responsibility to sign the form on completion of satisfactory inspection & attach to the switchgear in a protective sleeve.
The switchboard is to be fully assembled before any inspection will proceed.

SWITCHBOARD CONSTRUCTION

No	TO BE CHECKED PRIOR TO PAINTING	Inspection Result Pass (P), Fail (F), Not Applicable (N/A)
1	Overall finish, dimensions and gauge	P
2	Equipment mounting correct & supports sufficient	P
3	Corners fully welded	P
4	Cable entries correct	P
5	Gland plates correct, fitted and number stamped	P
6	All equipment cutouts correct	P
7	All studs for gear trays fitted	P
8	Panel wiring supports fitted and inter-tier wiring passages cut	P
9	Door hinge holes correct	P
10	Door latch cutouts correct	P
11	Busbar supports fitted and correct	N/A
12	All partitions fitted and straight	P
13	Earth bar mounts welded in place (STUDS)	P
14	Metal ducting and covers fitted	P
15	Lifting points fitted (PLINTH HOLES)	P
16	External weld ground off	P
17	Fixing holes and/or brackets fitted	P
18	Mounting holes for equipment drilled and tapped correct size	P
19	IP rating in accordance with drawing	P
20	Quantity correct	P
21	Check Explosion Vent Construction & Retention	N/A
OTHER CHECKS CARRIED OUT:		
22		
23		
24		
25		
26		

DOORS

No	TO BE CHECKED PRIOR TO PAINTING	Inspection Result Pass (P), Fail (F), Not Applicable (N/A)
1	Overall finish, dimensions, gauge and number stamped	P
2	Equipment cutouts correct	P
3	Viewing windows made and fitted	N/A
4	Door restraints fitted	P
5	Wiring supports fitted	P
6	Earth stud fitted	P
7	Hinging hardware correct	P
8	Latching hardware correct	P
9	IP rating in accordance with drawing	P
10	Quantity correct	P
OTHER CHECKS CARRIED OUT:		
11		
12		
13		
14		
15		

ESCUTCHEONS

No	TO BE CHECKED PRIOR TO PAINTING	Inspection Result Pass (P), Fail (F), Not Applicable (N/A)
1	Overall finish, dimensions, gauge and number stamped	P.
2	Cutouts correct and ground off	P
3	Hinging hardware correct	P
4	Latching hardware correct	P
5	Equipment wiring supports fitted	P
6	Earth stud fitted	P
7	Correct fit in cubicle	P.
8	Quantity correct	
OTHER CHECKS CARRIED OUT:		
9	VENTILATION COVERS AND LOUVRES	P.
10		
11		
12		
13		

GEAR TRAYS, etc

No	TO BE CHECKED PRIOR TO PAINTING	Inspection Result Pass (P), Fail (F), Not Applicable (N/A)
1	Overall finish, dimensions, gauge and number stamped	P
2	Mounting holes correct	P
3	Correct fit in cubicle	P
4	Quantity correct	P.
OTHER CHECKS CARRIED OUT:		
5		
6		
7		
8		
9		

Checked by	JOHN DALZIEL	Date:	7/03/2012.

Inspecting Officer Comments & Notes:

EXTRA WIRING LOOMS ON 3 DOORS REQUESTED.
16mm WIDE LIMIT SWITCHES TO BE SUBSTITUTED.
ALL STAINLESS HARDWARE ON FINAL ASSEMBLY.

	Inspected By:	Witnessed By: (Client if applicable)
(Name)	J DALZIEL	Ross Midgley. QUU.
(Sign)		R.O. Midgley.
Date	7/3/12.	7/3/12.

NOTE: Ensure relevant items or comments are recorded on the Hit List (SF-1100)