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BRISBANE CITY COUNCIL
BRISBANE WATER

SP306 – Coronation Drive Pump Station

Operation & Maintenance Manual
Contract No. BW30079-02/03

Volume No. 4

BRISBANE CITY COUNCIL
Brisbane Water
SP306 Coronation Drive Pump Station

BCC Contract No. BW30079-02/03

Coronation Drive Pump Station - SP306 Operation & Maintenance Manual
Table of Contents

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Coronation Drive Pump Station - SP306 Operation & Maintenance Manual
Table of Contents

Coronation Drive Pump Station - SP306 Operation & Maintenance Manual
Table of Contents

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Coronation Drive Pump Station - SP306 Operation & Maintenance Manual
Table of Contents

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Table of Contents

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BRISBANE WATER

Network Control Systems

FUNTIONAL SPECIFICATION

SP306 Coronation Drive

Sewage Pumping Station

Submersible 2 Pumps With VSD

(Wet Weather Station)

Document Signoff

Approval

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Manager Mechanical and Electrical Services *Engineering Design Services*	Rahim Janfade.	Concur		
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Manager *System Planning*	Peter Casey	Concur		
Project Manager	Andrew Bannink.	Approve		

Distribution

Name	Role	Section

Revision Control

Revision Number	Date	Amendment Details	Responsible Officer
Version 0.00	16/08/2005	Original Draft – Developed from Connell Wagner SP306 Revised Functional Spec	Alex Witthoft
Version 0.01	25/7/06	Updated approval sheet, removed flowmeter reference.	Gerard Anderson
Version 0.02	2/8/06	Updated approval sheet, Pump kW, picture details.	Gerard Anderson
Version 0.03	21/8/06	Updated confirmed sewer surcharge level and surcharge imminent level for SP306 (Noel Ralph). Station changed to Stop/Start at 50Hz (RM). Added Gravity Sewer alarm level diagram. Set High Level setpoint to 0.4M above TWL. Set pump inhibit limits to 200 and 400mm below Surcharge Imminent	Gerard Anderson
Version 1.00	14/3/2007	Site commissioned. Added level ranges.	Gerard Anderson
Version 1.01	27/4/2007	Added Bump Pumps Functionality ie run pumps every 3 days for 30 seconds to prevent seizing.	Gerard Anderson

Document Consultation

Please review the attached document and add your comments where necessary. To ensure that the process is kept within reasonable timeframes, it would be appreciated if you could return this document by the **Requested Return Date** listed below.

Project Sponsor:	Andy Moore	Officer Code: PM13BW	Location: T.C.B. Level 2
Author:	Alex Witthoft/ Gerard Anderson	Officer Code: CTAMP12/ E2SBW	Location: Cullen Ave
Document Administrator:	Gerard Anderson	Officer Code: E2SBW	Location: Cullen Ave

Version Number (1,2,3 etc)	Forwarded To: (Name / Officer Code)	Location (eg,TCB, Cullen Ave)	Date Sent	**Requested Return Date**	Date Returned	Comments Received (Y / N)	Comments Incorporated (Y / N)

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Table of Contents

Table of Figures

Table of Tables

Definitions

BWTS	Brisbane Water Telemetry System
RTU	Remote Telemetry Unit
SCADA	Supervisory Control And Data Acquisition
MAHD	Metres above Australia Height Datum

1 INTRODUCTION

This document contains the site specific details and describes the non standard functional requirements for control, monitoring and telemetry at sewage pump station SP306 at Coronation Drive, Toowong, opposite Patricks Lane. The functional requirements described in the document are in addition to the standard functionality detailed in "SPSV3 SEWAGE PUMPING STATION SUBMERSIBLE 3 PUMPS WITH VFD" [1].

The standard specification was written for a 3 pump station, of which only 2 pumps are allowed to run at any given time. The functionality for SP306 Coronation Drive is identical, except the third pump is removed. The pumps are interlocked so that only one pump can operate at a time. All site specific values are detailed in this document. The site specific details and the non standard functional requirements in this document were derived from the functional specification written by Connell Wagner "PATRICK LANE FUNCTIONAL SPECIFICATION" [2].

SP306 Coronation Drive sewage pump station is required to relieve the surcharging in the Coronation Drive gravity sewer. Under wet weather flow conditions, the gravity sewer is susceptible to surcharge and overflows to the environment. . SP306 Coronation Drive.is therefore wet weather sewage pump station only, incorporating two variable speed driven 65 kW submersible pumps operating in a one duty and one standby arrangement

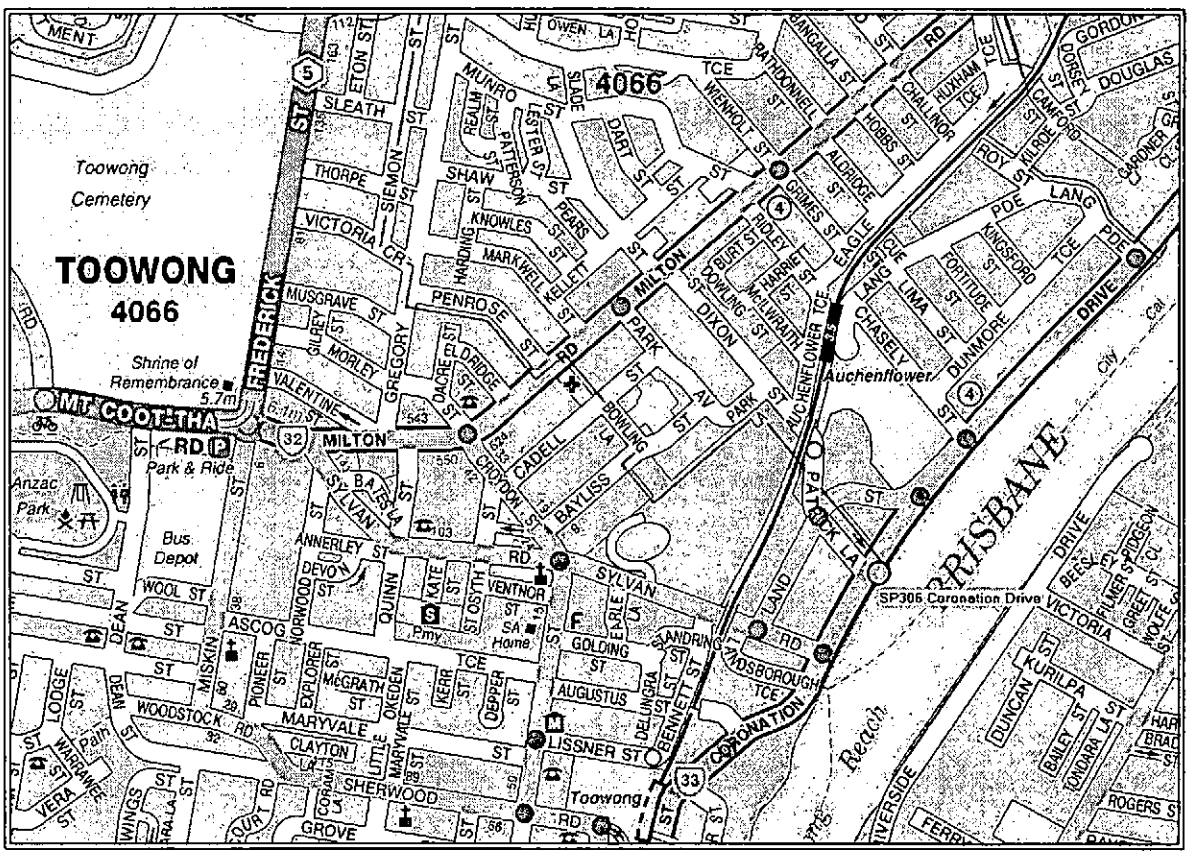


Figure 1: SP306 Location Map

1.1 General Process Description

SP306 Coronation Drive pump station will be connected to the gravity sewer via a short inlet. During wet weather events the sewage will flow into the well. This sewage will then be pumped into the rising main. This will continue until the level in the gravity sewer has receded, at which point the pumps shall stop under level control.

The sewage Pumping Station is of underground configuration operating in wet weather conditions only, with a wet well operating volume (under surcharge) of approximately 10 kl. The pump station will operate as a surcharge pump station, only allowing flows into the wet well during periods of surcharge in the adjacent gravity sewer. The wet well will be free to drain back into the gravity sewer at the end of the surcharge event. The pump station will have two submersible type sewage pumps installed in the Pump Well operating as duty/standby units. The pumps are interlocked so that only one pump can operate at a time. The station output with one pump operating at maximum speed will be approximately 150 l/sec.

This pump station will operate as a stop/start station only, there will be no PID control at this site. Pump speed will be limited to 50Hz, this is designed to pump down the Wet Well as quickly as possible.

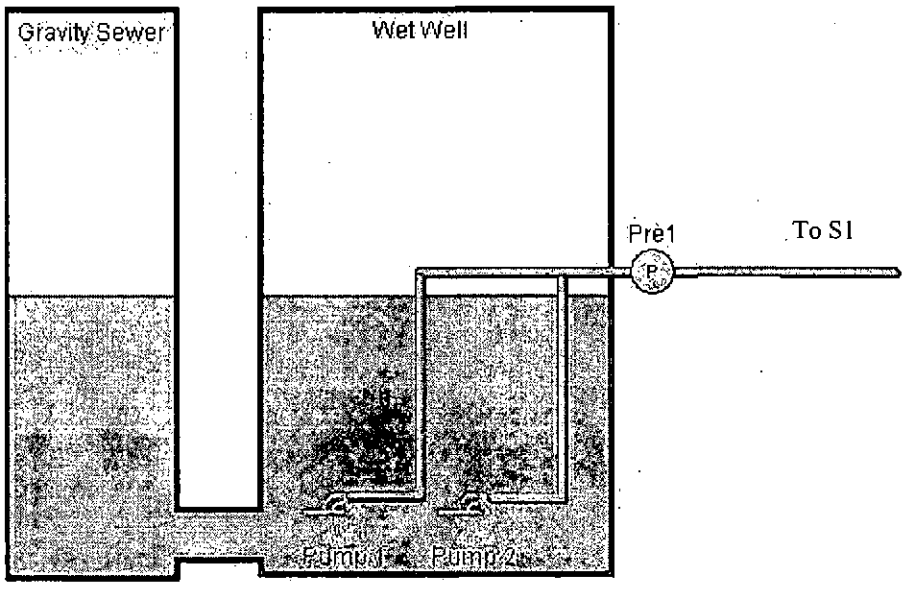


Figure 2: SP306 Process and Instrumentation Overview

2 EQUIPMENT INSTALLED

2.1 Standard Equipment

SP306 Coronation Drive pump station has the following standard equipment installed. The functionality for the control, monitoring and alarming for these items is fully described in the standard functional specification.

Pumps	Two Grundfoss submersible pumps with 65 kW four pole electric motors are installed in the wet well. Each pump is fitted with moisture probes in the oil chamber and thermistors in the stator windings.
Pump Starters	Two Danfoss Variable Frequency Drives (VFDs) are installed in the pump station switchboard. The VFDs will also provide soft starting functionality.
Level Sensors	One Vega hydrostatic level transmitter installed in the wet well. One Multitrode level probe (Surcharge imminent) installed in the wet well.
Pressure Transmitters	One Vega D84 pressure transmitters are installed on the discharge side of the pumps.

2.2 Non Standard Equipment

SP306 Coronation Drive pump station has the following non standard equipment installed. The functionality for the control, monitoring and telemetry for is described in the following sections as these items are NOT described in the standard specification. The pumps are interlocked so that only one pump can operate at a time.

Emergency Generator	The switchboard will have the facility for a generator to be connected. No generator will be installed on site.
Level Sensors	One Vega hydrostatic level transmitter installed in the gravity sewer One Multitrode level probe (Gravity Sewer High) installed in the gravity sewer
Reflux Limit Switches	Each pumps reflux valve has a reflux limit switch fitted. NB There is no flowmeter onsite.
Wet well washer solenoid	Well washer solenoid valve with flow switch installed in the wet well. Note that there is currently no water supply to the Wet well washer. The Wet Well washer will not be commissioned at this stage.

2.2.1 Emergency Generator

The emergency generator is designed to the standard functionality as described by "DIESEL STANDBY GENERATOR LOCAL CONTROL PANEL FUNCTIONAL DESCRIPTION". [3] The generator is supplied with the PLC fully configured and loaded with the standard program. The RTU (Logica MD3311) will programmed with the standard interface program that will provide the monitoring, control and telemetry to the BWTS master station.

2.2.2 Gravity Sewer Monitoring

The gravity sewer will also have monitoring in the form of a vega hydrostatic level transmitter as well as a gravity high multitrode electrode.

3 CONTROL PHILOSOPHY

The station will operate according to the control philosophy detailed in the standard functional specification (SPSV3). The initialisation block will be configured with the site specific set points listed in the tables in the next sections. Surcharge Occurring & Surcharge Imminent mAHD will be the same levels as the gravity main setup (confirmed with Noel Ralph). There is no physical surcharge pipe at SP306. Inlet level of pipe from gravity main to wet well is IL -3.790.

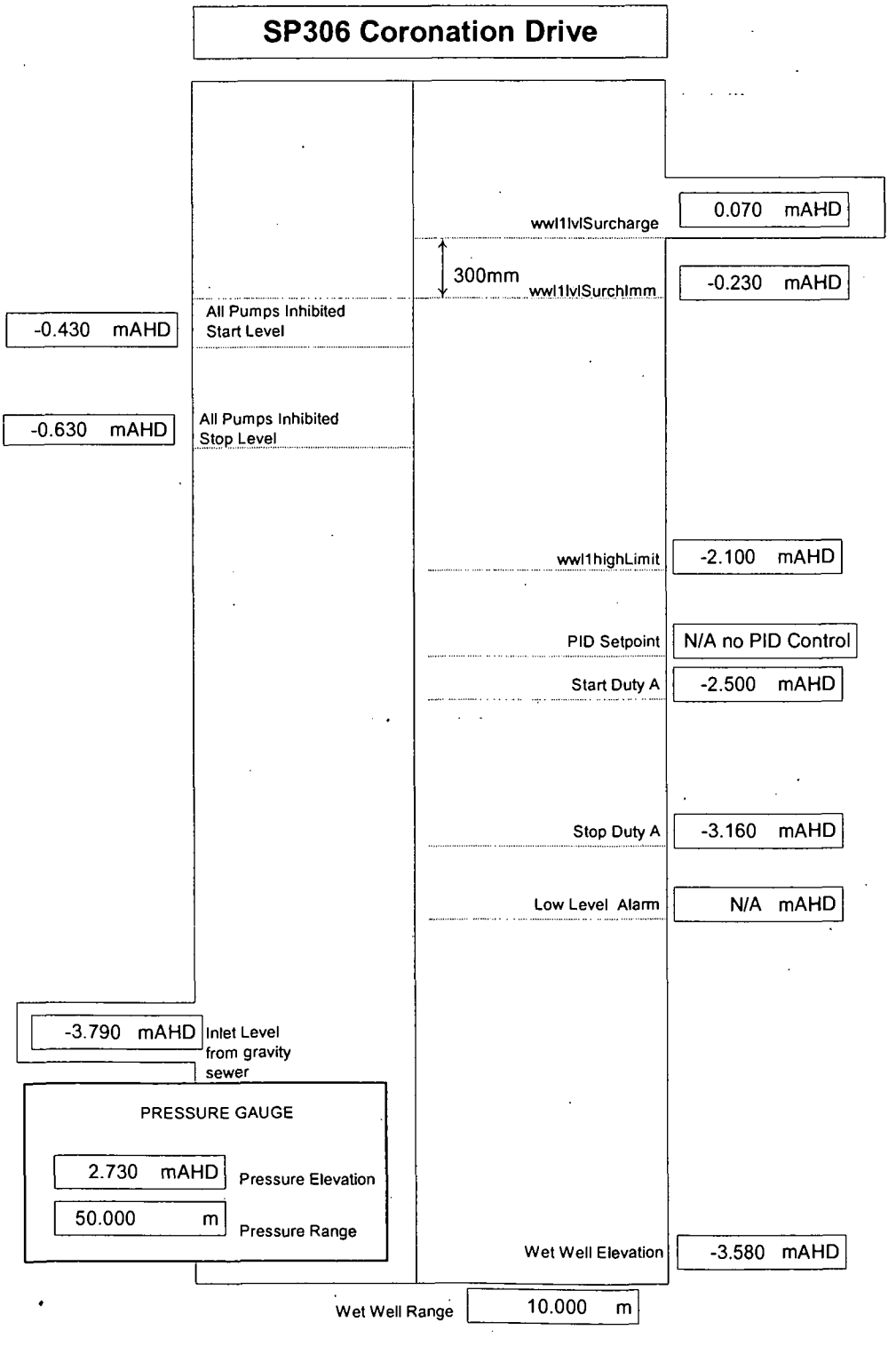


Figure 3: SP306 Station Level Set Points

3.1 Site Specific Values

Table 1: Site Specific Constants defined in the PLC

Tag Name	Description	Type	Value	Units
Sewerage Pumping Station				
Stn01grSurchPumpingTime	Surcharge pumping duration [3]	Integer	60	Sec
Delivery pressure				
Pre01txRange	Delivery pressure - Range	Real	5000	mmAHD/ 10
Pre01txZero	Delivery pressure – Elevation of the transducer	Real	273	mmAHD/ 10
Pump Blockage				
Stn01grPmpBlockFlowKneeSP	Flow blocked limit for flow/level PID control (knee)	Integer	N/A	l/s x 100
Stn01grPmpBlockSpeedKneeSP	VFD speed blocked limit for flow/level PID control (knee)	Integer	N/A	Hz x 100
Stn01grPmpBlockSpeedMinSP	VFD speed blocked limit for minimum flow PID control	Integer	N/A	Hz x 100
Wet well level				
Wwl01txRange	Wet well level range	Integer	10	mmAHD
Wwl01txSurchImmLevelSP	Wet well surcharge imminent level (300mm below Overflow #330 Coronation Drive "Oxleys on the River" Surcharge point of 0.070 MAHD)	Integer	-0.230	mmAHD
Wwl01grInhStartLevelSP	Wet well inhibit mode start level	Integer	-0.430	mmAHD
Wwl01grInhStopLevelSP	Wet well inhibit mode stop level	Integer	-0.630	mmAHD
Wwl01grRunatMaxLvlSP	Wet well run at maximum speed level	Integer	N/A	mmAHD
Wwl01txDtyBStartLevelSP	Wet well duty B pump start level	Integer	N/A	mmAHD
~~Wwl01txPIDLevelSP~~	~~Wet well PID set point~~	~~Integer~~	~~-2200~~	~~mmAHD~~
Wwl01txDtyAStartLevelSP	Wet well duty A pump start level	Integer	-2500	mmAHD
Wwl01txDtyAStopLevelSP	Wet well duty A pump stop level	Integer	-3160	mmAHD
Wwl01txDtyAStopLevelSP	Wet well duty A pump stop level	Integer	-3160	mmAHD
Wwl01txZero	Wet well empty level (4mA of Probe)	Integer	-3580	mmAHD
Variable Frequency Drive				
Stn01grMinSpeed	Variable Frequency Drive – Minimum Speed	Integer	5000	Hz x 100
Stn01grMaxSpeed	Variable Frequency Drive – Maximum Speed	Integer	5000	Hz x 100

Table 2: Site Specific Constants defined in the RTU

Tag Name	Description	Type	Value	Units
pre1almInhibitTm	Delivery pressure - Alarm inhibit timer	Integer	15	sec
wwl1surchLvlVol	Wet well volume at surcharge level	Real		kl
wwl1lvlSurcharge	Wet well surcharge occurring level	Real	0.070	mAHD
Pumps 1 & 2				
Pmp[x]almInhPwrTm	Pump [x] - Motor power alarm inhibit timer.	Integer	15	sec
pmp[x]almInhCrntTm	Pump [x] - Motor current alarm inhibit timer.	Integer	15	sec
pmp[x]currRange	Pump [x] - Motor current range	Real	120.0	Amps

Table 3: Site Specific Variable defined in the RTU

Wet well level				
wwl1highLimit	Wet well level - High alarm set point	Integer	-2.100	mmAHD
wwl1lowLimit	Wet well level - Low alarm set point	Integer	N/A	mmAHD
Delivery flow				
flw1highLimit	Delivery flow - High alarm set point	Integer	N/A	ml/s x 10
flw1lowLimit	Delivery flow - Low alarm set point	Integer	N/A	ml/s x 10
Delivery pressure				
pre1highLimit	Delivery pressure DN1370 – High alarm set point	Integer	Max	mmAHD
pre1lowLimit	Delivery pressure DN1370 – Low alarm set point	Integer	Min	mmAHD
Pumps 1 & 2				
pmp[x]currHiLimit	Pump [x] - Motor current high alarm set point [4]	Integer	130	Amps
pmp[x]currLoLimit	Pump [x] - Motor current low alarm set point [5]	Integer	130	Amps
pmp[x]powHiLimit	Pump [x] - Motor power high alarm set point	Integer		Watts
pmp[x]powLoLimit	Pump [x] - Motor power low alarm set point	Integer		Watts

Table 4: Wet Well Level vs Volume Data

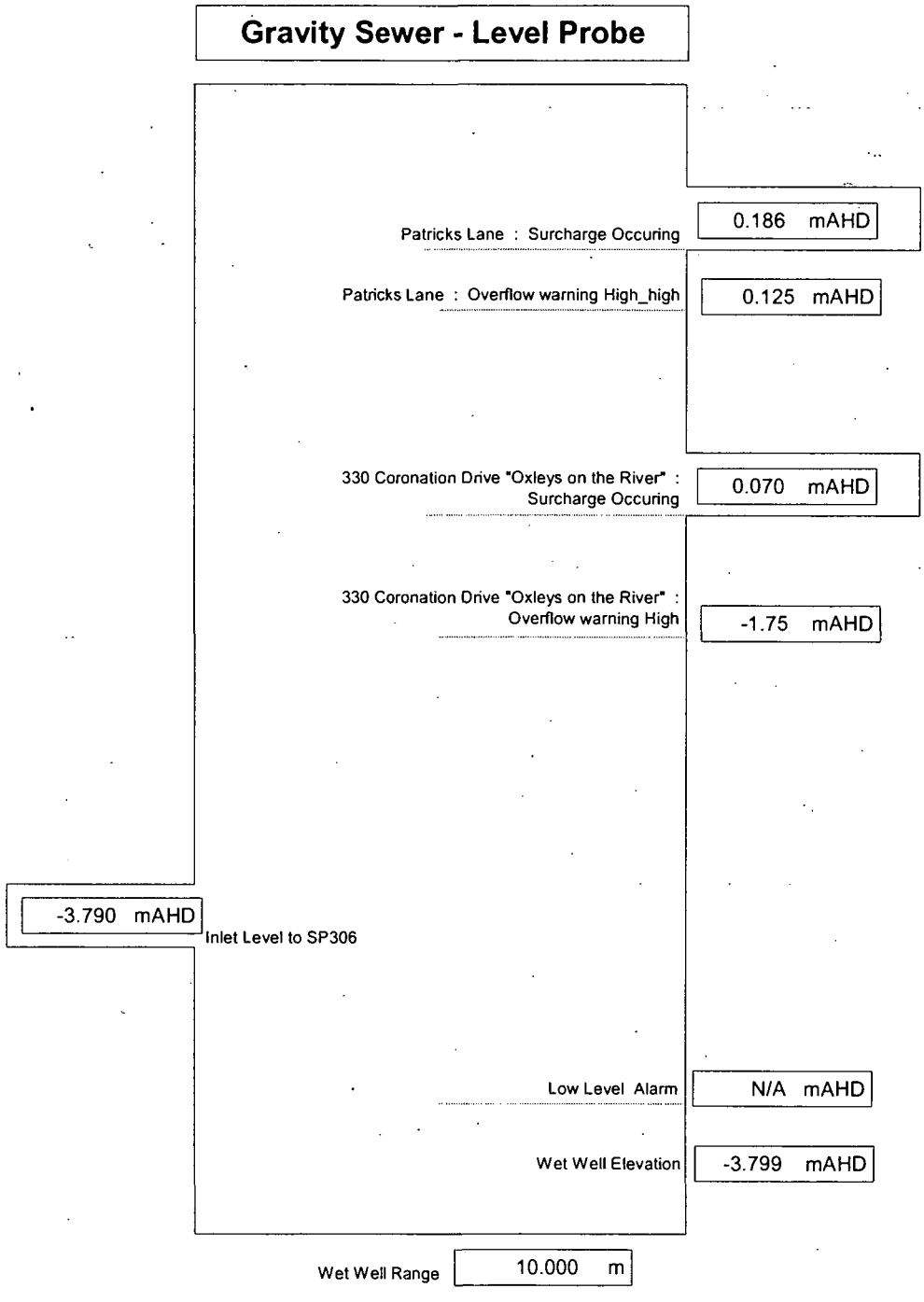
	Height (mAHD)	Volume m³	Remaining Storage m³	% Level	% Volume
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

3.2 Non Standard Monitoring and Alarms

3.2.1 Gravity Sewer Level

As the Vega probe takes a few seconds to initialise, all the wet well alarms except for invalid, are suppressed for 10 seconds upon RTU start up

Gravity Sewer	Invalid	1
Gravity Sewer	Patricks Lane Surcharge Occuring alarm	1
Gravity Sewer	Patricks Lane Overflow Warning High_high alarm	1
Gravity Sewer	330 Coronation Drive Oxleys on the River" Surcharge Occuring alarm	1
Gravity Sewer	330 Coronation Drive Oxleys on the River" Overflow Warning High alarm	1



Invalid

The signal is deemed invalid if it is :

Less than (4mA – dead band) or greater than (20mA + dead band) for 1 second.

Once the invalid alarm has been activated it can only be reset when the signal is both greater than 4mA and less than 20mA for 20 seconds. The time delays ensure that a signal is truly invalid before an alarm is set and that it is stable before it is reset. The dead band is calculated using the site invalid hysteresis value multiplied by the range.

If the gravity sewer level becomes invalid, the gravity sewer low and high alarm alarms are suppressed.

NOTE: As the wet well level is backed up by the battery – the site power does **not** suppress the invalid alarm.

Low Alarm

If the signal is valid and the start up delay has expired then the low alarm is activated if the signal is less than the low limit set point. It is deactivated if any of the above conditions become false or the signal is greater that the low limit set point plus the dead band. The dead band is calculated using the alarm hysteresis value multiplied by the range.

High Alarm

If the signal is valid and the start up delay has expired then the high alarm is activated if the signal is greater than the high limit set point. It is deactivated if any of the above conditions become false or the signal is less that the high limit set point minus the dead band. The dead band is calculated using the alarm hysteresis value multiplied by the range.

3.2.2 Bump Pumps Routine

Each sewer pump will be requested to run for 30 seconds every 3 days to prevent the pumps from seizing. The pumps will be run regardless of wet well level. The RTU will check if a pump has not run within 48 hours or if either pump is inhibited before initiating the bump pump routine.

3.3 Non Standard BWTS Picture

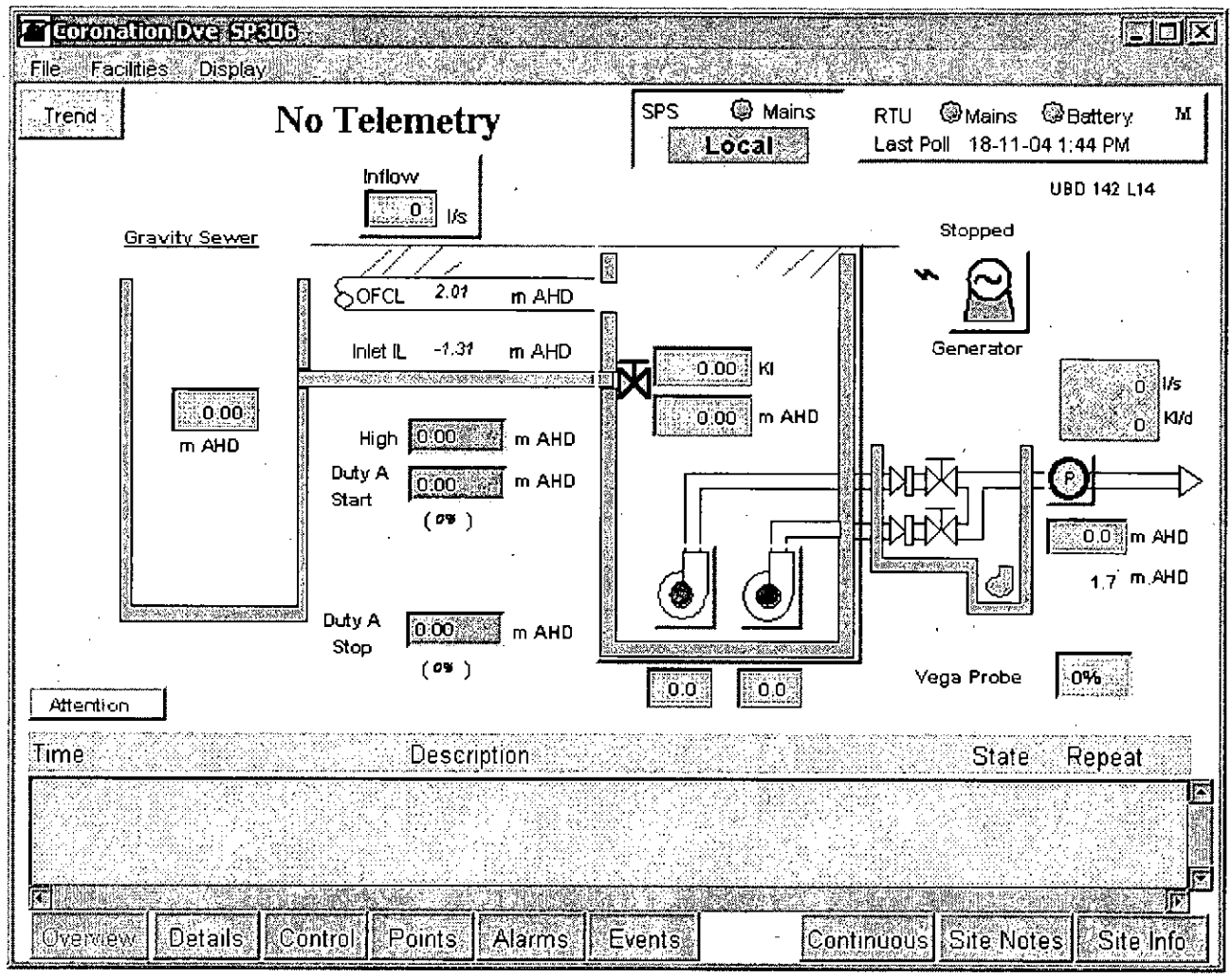


Figure 4 SP306 Details Page

3.4 Sewer Network Overview

The sewer network overview page will be updated to include the gravity sewer at Coronation drive pumping into the new S1 rising main at Coronation drive.

4 REFERENCES

1

TITLE	SPSV3 Sewage Pumping Station Submersible 3 Pumps With VFD – Functional Specification
DOCUMENT ID	003589
VERSION	0.30
AUTHOR	Alex Witthoft , Brisbane Water – Network Control Systems
DOCUMENT OWNER	Peter Sherriff, Brisbane Water – Network Control Systems

2

TITLE	Heroes Avenue Functional Specification
DOCUMENT ID	N/A
VERSION	N.A
AUTHOR	N.A
DOCUMENT OWNER	Cardino Davies Pty Ltd

3

TITLE	Diesel Standby Generator - Local Control Panel - Functional Description
DOCUMENT ID	N/A
VERSION	02
AUTHOR	SOUTH EAST POWER GENERATION
DOCUMENT OWNER	

Brisbane City

Brisbane Water

BRISBANE WATER

Network Control Systems

SITE ACCEPTANCE TEST (SAT)

TEST DOCUMENT (On Site)

SP306 Coronation Dr

Submersible 2 Sewage Pumping Station

Pumps With VSD and Sewer Level

Project & Commissioning Details

Date Commissioned	14/03/2007 + 27/4/07
Project Manager	Reg McGirr
Construction Manager	Bill Collie.
Electrical Inspector	
RTU Programmer	G. Anderson
Electricians	Andrew Graham

IDTS COMMISSIONING TEST SHEET

SP306 CORONATION DR

The purpose of these tests is to confirm that the new RTU is running and responding to inputs and sending data back to the IDTS master station.

- Notify Control Room that site is being commissioned - ph 340 78414
- Contact IDTS Test Room ph 3407 8477 to confirm receipt of alarms

Action	Observation	Result
Site in remote mode Switch on RTU power	Confirm that RTU ABNORMAL OPERATION alarm is received by IDTS Confirm that operator ajustable alarm setpoints are downloaded on RTU restart.	☑Yes ☑Yes
Cycle the Energex power	Confirm that Energex Power Alarm is received by IDTS and no other alarms [alarm suppression] are sent. Ensure that the Generator Starts and transfers before the site mains fail alarm activates	☑Yes
Switch off RTU mains power	Confirm that RTU MAINS FAIL alarm is received by IDTS.	☑Yes
Test operation of all pumps in REMOTE mode (Manual)	Each pump starts and stops when commanded by the IDTS picture controls	☑OK
Activate the probe itself to produce the surcharge imminent alarm.	Confirm that 2 pumps start 1 pump starts	☑Yes
	Confirm that SURCHARGE IMMINENT alarm is received by IDTS	☑Yes
Switch site to LOCAL and STOP pumps Wait until surcharge pumping timer expires (Record Time). Open Valve 1 via the push buttons.	Confirm that LOCAL mode alarm is received by IDTS	☑Yes
Test operation of all pumps in LOCAL mode.	Each pump starts and stops when commanded by the site pushbuttons.	☑OK
Site in Remote mode, RTU operating Test operation of the pump inhibit.	Apply pump inhibit to each pump and confirm that "station inhibit" is active	☑OK
Fault Pump 1 *Note: not every point that causes an availability alarm is tested, as this linkage is proved by SPSS2 standard code and FAT of switchboard*	Confirm Availability alarm is received by IDTS. Look at the points page and confirm the reason for the fault. Send a remote reset to clear the fault	☑OK ☑OK ☑OK
Fault Pump 2	Confirm Availability alarm is received by IDTS. Look at the points page and confirm the reason for the fault. Send a remte reset to clear the fault	☑OK ☑OK ☑OK
Trigger Wet Well Surcharge Occurring Alarm	Confirm alarm is received by IDTS	☑OK
Trigger Wet Well High alarm	Confirm alarm is received by IDTS	☑OK
Trigger Wet Well Invalid Alarm	Confirm alarm is received by IDTS	☑OK
Allow well to fill.	Observe that the duty pump starts and stops. Only need to test for 1 pump on a slow filling site.	☑Yes
	Confirm that IDTS is receiving the correct wet well level (%).	☑Yes
Pump start and stop values shown on the wet well label match the IDTS picture	Duty A start 11....% Duty A stop 4....%	

Site ~~FAT~~ SAT by (RTU Programmer)

Name: Gerard Anderson

Signature: .....

Date: 27/4/07

Pre-commissioning Test Sheet checked by NCS Project Officer

Name: .....

Signature: .....

Date: .....

Two Pump Submersible Sewerage Pump Station
SITE ACCEPTACE TEST

Brisbane Water - Network Control Systems

GRAVITY SEWER LEVEL

Action	Observation	Result
Calibrate the Sewer Level	Ensure the Level is the same in the Code as in IDTS	☑
IDTS Points	Level (mAHD)	☑
	Invalid	☑
	High + High High	☑
	Low	☑
	High Limit	☑
	Low Limit	☑
	High Limit Fbk ✓	☑
	Low Limit Fbk	☑
	Range Fbk	☑
	Zero Fbk	☑

GRAVITY SEWER LEVEL

Action	Observation	Result
Trigger the Electrode	Ensure the Sewer level high high alarm is activated	☑
IDTS Points	High High Alarm	☑
	Calibration Fault	
	Calibration Fault Reset	

Generator connected + running

RTU Indication

stn 1 Main CB Closed = No
stn 1 Mains Power = Yes
stn 1 gen Online = Yes
stn 1 energex Fail = Yes
gen 1 connected = Yes

Site FAT by (RTU Programmer)

Name: Gerard Anders

Signature: .....

Date: 27/4/07

Pre-commissioning Test Sheet checked by NCS Project Officer

Name: .....

Signature: .....

Date: .....

Brisbane City

Brisbane Water

BRISBANE WATER

Network Control Systems

FACTORY ACCEPTANCE TEST (FAT)

TEST DOCUMENT

SP306 Coronation Drive

Submersible 2 Sewage Pumping Station

Pumps With VSD,

1 Valves & Mobile Generator Capability

Project & Commissioning Details

Date Commissioned	
Project Manager	
Construction Manager	
Electrical Inspector	Peter Hague
RTU Programmer (NCS)	Alex Witthoft / Geoff Timms
Electricians	

FAT TEST (FOR ELECTRICAL INSPECTOR)

SP306 CORONATION DRIVE

This check list is to be performed before the official IDTS commissioning of the sewerage pump station.

CABINET

Task	Outcome
Check that locks are fitted on all doors and keyed correctly.	OK ☑
Check that the Power Supply, Radio and RTU have their lights visible	OK ☑
The heat shield are to be attached via welding NOT drilling throught the board.	OK ☑
Drawing Sheet pouch to be attached on the RTU cubicle door	OK ☐ Not be done
90mm gap above and below the RTU (to allow for cables from laptop to be plugged into the ports)	OK ☑
Gland plate in the PLC cubicle (cables such as aerial, phone line, surcharge imminent electrode).	OK ☑
Check that the limit switch works and turns off when the doors are closed.	OK ☐ Done for Cubicle S/w fault on Security
Check that Energex meter lock is fitted on the meter box.	OK ☐
Red Indicator Line on the Wet Well Indicator	OK ☑
Antenna Pole is Hinged	OK ☑
Caps on the lifting points – and adequatly sealed	OK ☑
No means of Gas Ingress	OK ☑
No 240VAC in the RTU section	OK ☑
Perform a physical inspection of the site and switchboard to determine if it is safe. Note any defect on the Defect notification sheet. Note any defects in switchboard.**(On Defect Sheet)**	OK ☑

POINT TO POINT

Task	Outcome
Using the Electrical Drawing do a thorough point to point on the control circuit to ensure that the local control of the pump operates indepandantly of the RTU (ie Part of the PLC) Wired to the RTU/PLC from beginning to end. (ie press the actual button and watch the I-O change in Isagraf / Versapro). The Drawings should be marked up with any changes to provide the AS BUILT markups (in conjuction with any modifications made during Site Acceptance Testing). (All circuits shoud be 'highlighted' as they are checked.	OK ☑

VARIABLE SPEED DRIVE

Task	Outcome
Check that the motor starter is programmed and able to start the each pump	Pmp1-OK☑ Pmp2-OK☑
Check that each VSD modbus connection active and that the Power and Current are being read correctly and are scalled correctly.	Pmp1-OK☐ Pmp2-OK☑

Site pre-commissioned by (Electrical Inspector)

Name: .....

Signature: .....

Date: .....

Pre-commissioning Test Sheet checked by NCS Project Officer

Name: .....

Signature: .....

Date: 27/5/16

FUNCTIONALITY TESTING OF VFD

The following test should be carried out once a full point to point test has been completed and the VFD drives have been completely configured.

NOTE: the VFD drive has 2 setups – local and remote – both of which are configurable. To ensure full functionality, the test below are often repeated for both local and remote mode.

Task	VFD 1	VFD 2
Local/Remote Mode Setup Selection:		
When the station local-remote selector switch is selected to		
1. Remote that setup 1 is active on both Drives	☑	☑
2. Local setup 2 is active on both Drives	☑	☑
Drive in Auto Mode:		
In both local and remote modes repeat the following:		
☐ Ensure that the Auto mode is active	☑	☑
*Press the **"Hand Start"** button on the keypad*		
☐ Ensure that the Auto mode feeback deactivates	☑	☑
*Press the **"Auto Start"** button on the keypad*		
☐ Ensure that the Auto mode is active	☑	☑
Run Command, Speed Control and Speed Feedback, Run at Maximum		
In Remote: – Setup 1 - DO FOR BOTH PUMPS SEPERATLY		
Command the pump to run via the digital output from the PLC.		
☐ Ensure that the VFD runs and the running signal is received from by the PLC.	☑	☑
☐ Ensure that the VFD speed is controlled by the PLC Analog output.	☑	☑
☐ Ensure that the speed of the pump from the VFD to the PLC is accurate.	☑	☑
☐ Ensure that the Maximum Speed is 50Hz (or whatever the current design max is).	☑	☑
Checking interlock is OFF		
Initiate Surcharge Pumping mode.		
☐ Ensure that **both** pump are commanded to run at maximum speed and that the run at max is active.	☑	☑
Stop Surcharge Pumping mode but activate duty A and then Duty B start commands		
☐ Ensure that the duty A and then the duty B pumps are commanded to run at the PID speed control and that the speed feedback is accurate.	☑	☑
Set the Drive to run in remote at minimum speed, then force the run at max output.		
☐ Ensure that the drive runs at maximum speed.	☑	☑
In Local: Setup 2 - DO FOR BOTH PUMPS SEPERATLY		
Command the pump to run via the start pushbutton (output from the PLC)		
☐ Ensure that the VFD runs and the running signal is received from by the PLC.	☑	☑
☐ Ensure that the VFD speed is controlled by the POT.	☑	☑
☐ Ensure that the Maximum Speed is 50Hz (or whatever the current design max is)	☑	☑
☐ Ensure that the speed of the pump from the VFD to the PLC is accurate.	☑	☑
Checking interlock is OFF - Try to start 2nd pump		
☐ Ensure that it gets commanded to run and does so	☑	☐
Set the Drive to run in local at minimum speed, then force the run at max output.		
☐ Ensure that the drive **DOES NOT** runs at maximum speed.	☑	☑
VFD Ready / Thermistor Fault / Reset:		
Repeat the following for both local and remote modes		
Trigger the thermistor fault. Used programmed fau Has no thermisters		
☐ Ensure that the VFD ready signal deactiveates (fault).	☑	☐
Re-enable the thermistor and ensure that the VFD is still not ready.		
Activate the reset output from the PLC.		
☐ Ensure that the VFD resets.	☑	☐

FAT TEST (RTU PROGRAMMER)

SP306 COROANTION DRIVE

RTU

Task	Outcome
Check that the RTU has the correct IP address set	IP Address 192.168.34.95 Subnet mask ....:....:....:....
Check that the RTU has the correct program code loaded	Code Name SP306_X7
Check CPU Firmware Version and Serial Number	Serial Number 1004.3441 Firmware Ver 1.0.4
Check that the .main file has been downloaded from the IDTS	OK ☐ No

POINT TO POINT

Task	Outcome
Using the Physical I-O Spreadsheeet check each individual physical I-O Wired to the RTU from beginning to end. ie press the actual button and watch the I-O change in Isagraf. Output lights and relays activate Inject 4-20mA into the Analog Inputs. The I-O spreadsheet should be ticked and signed by the test and attached to this FAT Test Document.	OK ☑

BATTERY

Task	Outcome
Check that the battery is connected and charging (i.e. 24V across the terminals).	OK ☑
Check that the RTU is running off battery when the mains supply is isolated	OK ☑

RADIO

Task	Outcome
Check that the correct radio type has been installed - high or low (transmit frequency)	High ☐ Low ☐
Check that radio is set on the correct frequency for the desired base station.	Tx MHz Rx MHz Base Station:

Site FAT by (RTU Programmer)

Name: ....

Signature: ....

Date: ....

Pre-commissioning Test Sheet checked by NCS Project Officer

Name: ....

Signature: .....

Date: 27/5/15

5.2 Pump Performance Testing

5.2.1 Purpose

The purpose of this test is to verify performances of the pumps are valid for the pump curves specified for the contract, and supplied by the manufacturer.

5.2.2 Scope

Grundfos will attend the test and verify all pumps satisfy the latest pump selection schedule/curve (dated 02/07/2004) and factory certifying documents. Copies of these documents are attached. Data taken from the tests would be used to draw up site pump curves.

All tests will be conducted in LOCAL mode to allow manual start/stop of the pumps, while hand start/stop of the VSDs would be required to run pumps at the desired speeds. The following data shall be recorded on the Pump Performance Testing Record to verify performance conforms to pump curves and specifications:

- Speed (in **Hz**)
- Current (in **A**)
- Power (in **kW**)
- Delivery (in **L/sec**)
- Pressure (in **m**)
- Well Level at operation (**% / mAHD**)

The pumps shall be tested and verified to the following points:

A 4 points tested at 50Hz on each pump

B 2 points tested at 40Hz on each pump

C 3 points tested at 32,5Hz on each pump

5.2.3 Procedures

A. 50Hz 4 points testing

1. Record wet well level.
2. Set discharge throttling valve fully open.
3. Start **Pump 1** and ramp to maximum speed **50Hz**.
4. With the discharge throttling valve fully open, record Q & H.
5. Close discharge throttling valve to a flow of **200L/s**, run for 10 minutes to let it settle, record readings.
6. Close discharge throttling valve to a flow of **100L/s**, run for 10 minutes to let it settle, record readings.
7. Close discharge throttling valve to a flow of **150L/s**, run for 10 minutes to let it settle, record readings.
8. Close discharge throttling valve to a flow of **50L/s**, run for 10 minutes to let it settle, record readings.
9. Shut down Pump 1 and repeat same process for Pump 2.

B. 40Hz 2 points testing

1. Record wet well level.
2. Set discharge throttling valve fully open.
3. With the discharge throttling valve fully open, record Q & H.
4. Start **Pump 1** and ramp to speed **40Hz**.
5. Close discharge throttling valve to a flow of **150L/s**, run for 10 minutes to let it settle, record readings.
6. Close discharge throttling valve to a flow of **100L/s**, run for 10 minutes to let it settle, record readings.
7. Shut down Pump 1 and repeat same process for Pump 2.

C. 32.5Hz 4 points testing

1. Record wet well level.
2. Set discharge throttling valve fully open.
3. With the discharge throttling valve fully open, record Q & H.

4. Start **Pump 1** and ramp to speed **32,5Hz**.
5. Close discharge throttling valve to a flow of **150L/s**, run for 10 minutes to let it settle, record readings.
6. Close discharge throttling valve to a flow of **100L/s**, run for 10 minutes to let it settle, record readings.
7. Close discharge throttling valve to a flow of **50L/s**, run for 10 minutes to let it settle, record readings.
8. Shut down Pump 1 and repeat same process for Pump 2.

< Pump Performance Testing Record Attachment >

< Pump Schedule/Curve and Factory Certifying Documents >

Brisbane Water

hps HVAC

SP306 Patrick Lane Sewage Pump Station Commissioning Plan

For Approval

REDIRECTION OF HEROES AVE SEWERAGE PUMP STATION, MECHANICAL & ELECTRICAL FITOUT & COMMISSIONING
CONTRACT: BW.30079-02/03
REF: 243-98-30082/2002/2003

BVQI ISO 9001 APPROVED COMPANY

Prepared by: William Wong

Last revision: 16/08/2005

HVAC/hps Queensland Pty Ltd
101 Cobalt Street, Carole Park Qld 4300
Ph: 3712.3400 Email: info@hvacqld.com
Fax: 3712.3444 Web: www.hvacqld.com

TABLE OF CONTENTS

1. VERSION CONTROL

Version	Date	Author	Details
1.0	01/08/05	William Wong	First draft
1.1	16/08/05	William Wong	For Approval

2. COMMISSIONING PLAN

2.1 Purpose

This plan details the description of methods and processes involved in site testing the Patrick Lane Pump Station portion of Contract BW.30079-02/03, including pre-commissioning and commissioning of the system resulting in the production of a Commissioning Inspection and Test Plan (ITP).

2.2 Scope

The scope of the project consists of the installation of a new switchboard and 2 submersible pumps along with associated pipework and control instrumentation.

The switchboard is tested separately in the workshop and then delivered to site to be installed by HVAC. The construction of the switchboard follows the process of sheet metal, minor bar works, power cable works, then electrical and control fit out.

Electrical installation follows the process of mains cabling, pumps cabling, and electrical and control cabling for field devices, as per cable schedule.

Mechanical installation follows the process of pumps installation, and associated pipework and valves installation, as per issued for construction drawings.

2.3 References

2.3.1 Specifications

- Commissioning attachment of Contract BW.30079-02/03 Redirection of Heroes Avenue Sewage Pump Station, Mechanical & Electrical Fitout & Commissioning
- Brisbane Water Patrick Lane Pump Station Functional Specification
- All associated Brisbane Water specifications supplied for the project

2.3.2 Drawings

- All electrical drawings as per specification supplied by Brisbane Water (Drawings no. 486/5/7-KJ006 to 486/5/7-KJ023)
- All civil and mechanical drawings as per specification supplied by Brisbane Water (Drawings no. 486/5/7-KJ002, 486/5/7-KJ003)
- All associated Brisbane Water standard drawings supplied for the project
- Switchboard sheet metal design drawings supplied by MPA Engineering (Drawings no. 7690-G20, 7690-G21, 7690-G22, 7690-G24)

2.3.3 Testing and Certifying Documents

- Switchboard Factory Acceptance Testing (FAT) document supplied by MPA Engineering
- Hydrostatic pressure test sheets and report
- Switchboard Pre-commissioning Site Acceptance Testing (SAT) document supplied by Common Logic
- Factory calibration certificates for level and pressure transmitters
- Variable speed drives programming parameter record
- Pumps pre-commissioning test sheets
- Switchboard functional test sheets
- Pump performance testing record
- Pump schedule/curve and factory certifying documents
- Brisbane Water Network Control Systems Pre-commissioning Acceptance Test Document
- Brisbane Water Network Control Systems Site Acceptance Test Document
- Defect Notice Template

2.3.4 Management Plans & Documents

- Site Environmental Management Plan
- Site Workplace Health & Safety Plan
- Project Quality Plan

2.4 Staff Responsibilities

Project Manager – Graham James, to prepare commissioning plan, ensure that ITPs are complete and pre-commissioning done prior to commissioning, coordinate commissioning activities, and to observe and verify as required.

Project Engineer – William Wong, to prepare commissioning plan, coordinate commissioning activities.

Mechanical Supervisor – Rene Bongers, to conduct mechanical pre-commissioning activities, and to assist in commissioning as required.

Commissioning Engineer – Grant Kerr, to commission pump station station as per contract specification 4.2.1.

Vega Australia Representative – Bradley Bailey, to calibrate and commission pressure transmitter, and to provide certification documents.

Grundfos Pumps – Andrew White, to certify correct pump installation, and observe and verify pump performances conform to specification.

Danfoss Australia – Nick Taylor, to assist in programming the VSDs, and observe and verify its correct operation.

BW Commissioning Representative – Reg McGirr, to witness commissioning activities, and to observe and verify as required, as per contract specification 4.2.2.

BW Networks Representative – Alex Witthoft, to program, operate and monitor the PLC and RTU to ensure proper operation of the pump station control system.

2.5 Procedures

2.5.1 Factory Acceptance Testing

The switchboard has been delivered to site and all FAT testings have been completed by MPA Engineering. Refer to Section 3. FACTORY ACCEPTANCE TESTING for testing procedures and completed test sheets.

2.5.2 Pre-Commissioning

All activities prior functional and pump performance tests are classed as "Pre-Commissioning". All mechanical and electrical installations by HVAC shall be tested. The following is a brief description of the activities involved:

1. **Hydrostatic Pressure Testing** – test for any leaks in the pumping system, ie. pipework, valves, pump seals, etc;
2. **Switchboard Pre-Commissioning SAT** – all tests prior to energising the switchboard and component test after energisation; test for insulation and resistance, earthing system, general wiring & inspection, point to point test of field wirings, component operational test after energisation;
3. **Variable Speed Drives Programming** – check and program parameters to ensure correct motor settings and correct communication between VSDs and control system, to meet functional specification;
4. **Pumps Pre-Commissioning Testing** – motor directional check, general inspection and checking of operation;
5. **Instrumentation Calibration and Commissioning** – on site calibration and commissioning of level and pressure transmitters;
6. **Brisbane Water Pre-Commissioning** – standard pre-commissioning acceptance testing conducted by Brisbane Water Network Control Systems, and may include I/O checks.

Refer to Section 4. PRE-COMMISSIONING for the procedures and test sheets for the above activities.

2.5.3 Commissioning

The following is a brief description of the activities that cover commissioning:

1. **Switchboard Functional Testing** – check functionality of the switchboard by testing every device to verify correct operation, all faults shall be simulated and indicated to the relevant PLC/RTU I/O point;
2. **Brisbane Water Site Acceptance Testing** – standard site acceptance testing conducted by Brisbane Water Network Control Systems to test pump station functionality;
3. **Pump Performance Testing** – verify pump performance by running pumps to various test points, and observe result matches pump curve;

Refer to Section 5. COMMISSIONING for the procedures and test sheets for the above activities.

2.6 Timeline

Below is an approximate order and duration of activities throughout commissioning.

COMMISSIONING ACTIVITIES	DATES
Factory Acceptance Testing	
• Switchboard FAT	*Completed (27/05/2005)*
Pre-Commissioning	
• Hydrostatic Pressure Testing	*22/08/2005*
• Switchboard Pre-Commissioning SAT	*18/08/2005*
• Variable Speed Drives Programming	*22/08/2005*
• Pumps Pre-Commissioning Testing	*TBA*
• Instrumentation Calibration and Commissioning	*23/08/2005*
• Brisbane Water Pre-Commissioning	*24/08/2005*
Commissioning	
• Switchboard Functional Testing	*TBA*
• Brisbane Water Site Acceptance Testing	*TBA*
• Pump Performance Testing	*TBA*
• Pump Draft Test Results Submission to BW	*TBA*

2.7 Commissioning Inspection and Test Plan

< Commissioning ITP Attachment >

REDIRECTION OF HEROES AVENUE SEWAGE PUMP STATION (HEROES AVENUE) INSPECTION AND TEST PLAN COMMISSIONING	BRISBANE WATER – CONTRACT BW.30079-02/03 HVAC/HPS QUEENSLAND PTY LTD DOCUMENT NO: 3251Q-HEROES-COMMISSION-01 REVISION DATE: 27/06/05

LEGEND	
INSPECTION ACTIVITY	**DEFINITIONS**
(I)	Visual Inspection
(A)	Action
(H) Hold Point	Work must not proceed until inspection activity has been carried out.
(T) Third Party	Outside agency nominated by client or end user involvement
(W) Witness Point	Work may proceed where inspection personnel are not available at the specified time.
(M) Monitor	Monitor on a random basis would be visual or dimensional or exam. of records, etc.
(S) Send	Send documents to purchaser for approval.
(E) Examine	Examine and endorse records for compliance to Quality Plan

ABBREVIATIONS	DEFINITIONS
WPS	Weld Procedure Specification
WPQR	Weld Procedure Qualification Record
NCR	Non Conformance Report
SC	Subcontractor
MDR	Manufacturers Data Report
JI	Job Instructions
POA	Purchase Order Attachments (eg. Form 06a for ductwork)

REFERENCE DOCUMENTS	
CODE	**DEFINITION**
C1	HVAC/HPS QLD Heroes Avenue Sewage Pump Station Commissioning Plan
C2	Brisbane Water Specification – Contract BW.30079-02/03
C3	Associated Brisbane Water Standard Specification
C4	Issued for Construction Drawings supplied for the project

ITP REVISION STATUS		
REVISION DATE	**SECTION NUMBERS REVISED**	**ISSUE STATUS**
01/08/2005	3 to 5.2	Approval

COMPANY PROCEDURES	
P-001	MANAGING OUR SYSTEM
P-002	ESTIMATING
P-003	LAUNCHING THE PROJECT
P-004	PROJECT IN PROGRESS
P-005	PROJECT WRAP UP
P-006	AFTER CARE
P-007	REPORTING
P-008	PROCESS CONTROL
P-010	TRAINING
P-012	AUDITING AND WORKPLACE INSPECTION
P-015	PLANT AND EQUIPMENT
P-016	PURCHASING
P-021	DESIGN PROCEDURE
P-028	DRAFTING STANDARDS
P-029	HANDLING STORAGE AND DELIVERY

REDIRECTION OF HEROES AVENUE SEWAGE PUMP STATION (HEROES AVENUE) INSPECTION AND TEST PLAN COMMISSIONING	BRISBANE WATER – CONTRACT BW30079-02/03 HVAC/HPS QUEENSLAND PTY LTD DOCUMENT NO: 3251Q-HEROES-COMMISSION-01 REVISION DATE: 27/06/05

SECT NO.	ACTIVITY	INSPECTION CRITERIA	ACCEPTANCE CRITERIA	CERTIFYING/ VERIFYING DOCUMENT	VERIFIED AND WITNESSED BY (INITIALED AND DATED)		COMMENTS
					HVAC/HPS QLD	BRISBANE WATER	
3.	Switchboard Factory Acceptance Testing	FAT Document	FAT completed and signed.	MPA Engineering FAT Inspection and Test Sheets	I	I	
4.1	Hydrostatic Pressure Testing	Hydrostatic Pressure Test Document	Testing completed and signed.	HVAC/HPS QLD Hydrostatic Pressure Test Sheets and Report (Form 15W, Form 90F)	A	H	
4.2	Switchboard Pre-Commissioning Site Acceptance Testing	SAT Document	SAT completed and signed.	SAT Inspection and Test Sheets	A	H	
4.3	Variable Speed Drives Programming	Record of programmed parameters	VSDs programmed and recorded.	VSDs Parameters Record	A	I	
4.4	Pumps Pre-Commissioning Testing	Pumps Pre-commissioning Test Document	Pumps pre-commissioning completed and test sheets signed.	HVAC/HPS QLD Pumps pre-commissioning test sheets (Form 46K)	A	I	
4.5	Level Transmitters Calibration and Commissioning	Calibration Certifying Document	Wet well and gravity sewer level transmitters calibrated on site.	Factory & Site Calibration Certifying Documents	I	H	
4.5	Pressure Transmitter Calibration and Commissioning	Calibration Certifying Document	Pressure transmitter calibrated and certified on site by manufacturer.	Vega Factory & Site Calibration Certifying Documents	A	H	
5.1	Switchboard Functional Testing	Functional Testing Document	Functional testing completed and test sheets signed.	HVAC/HPS QLD Functional Test Sheets	A	H	
5.2	Pump Performance Testing	Pump Performance Test Document	Pumps performed to client and manufacturer's specifications.	HVAC/HPS QLD Pump Performance Testing Records	A	H	

HVAC hps

COMMISSIONING SWITCHBOARD FUNCTIONAL TEST SHEET

	CONTRACT NO.	BW.30079-02/03	SW.BOARD NAME	SP306
	JOB NUMBER	3251Q	LOCATION	Patrick Lane / Coronation Drive, Toowong
	MANUFACTURER	MPA Engineering	DRAWING NUMBER	486/5/7-KJ006 to 486/5/7-KJ023
	CUSTOMER REF.	Brisbane Water	FED FROM	New 315A Pillar Box Supply

	DETAIL	OK	COMMENTS
	Pumps in Local		
1	Allow well to fill to a reasonable level (ie. above PID setpoint and below Start Duty 2) and check pumps start in local:		
2	Have station in REMOTE and pumps will start automatically according to well level		
3	Observe pressing all 2 pumps START pushbuttons have no effect		
4	Switch station to LOCAL and check all pumps stop operation		
5	Push pump 1 START pushbutton, and observe pump 1 operates		
6	Observe pump 1 speed can be adjusted via its potentiometer		
7	Push pump 1 STOP pushbutton, and observe pump 1 stops		
8	Push pump 2 START pushbutton, and observe pump 2 operates		
9	Observe pump 2 speed can be adjusted via its potentiometer		
10	Push pump 2 STOP pushbutton, and observe pump 2 stops		
11	At no time should 2 pumps operate simultaneously (auto interlock ???)		
	Pumps in Remote		
1	Switch station to REMOTE mode and check pumps start/stop to setpoints:		
	A. One pump starts when wet well level rises to START DUTY PUMP		
	B. Duty pump runs varibly to keep wet well level at PID SETPOINT		
	C. Duty A pump stops when wet well level drops to STOP DUTY PUMP		
2	When duty pump is running, simulate pump failure and observe standby pump activates and becomes duty pump, check its operation		
3	Check failed pump reset ok		
4	Simulate SURCHARGE IMMINENT ALARM and observe station operation:		
	A. Surcharge Imminent relay ON, alarm signalled to PLC		
	B. Duty pump run at maximum speed		
	Pumps Status		
1	Observe that lamp status indicates correct state of motors at all times		
2	Observe the hours run meters operate correctly on all pumps		
3	Observe cubicle fan operates and record their thermostat settings:		
	A. Pump 1 _____ degrees		
	B. Pump 2 _____ degrees		
4	Check and verify motor thermistors functionality on all pumps		
5	Check and verify motor moisture in oil sensor functionality on all pumps		
6	Check and verify reflux valve microswitches functionality on all pumps		
7	Check all MCC emergency stops functionality		

PRINT NAME	SIGNATURE	DATE	COMMENTS
INSPECTED BY			
APPROVED BY			SHEET 1

HVAC hps

	DETAIL	OK	COMMENTS
	Other I/Os		
	Check SITE ATTENTION ALARMS and associated RESET pushbutton are functional		
	Check surcharge imminent probe and alarm is operational		
	Check wet well wash solenoid is functional		
	Check pipe pressure transmitter analogue input into PLC		
	Check wet well level transmitter analogue input into RTU and PLC		
	Check gravity sewer level transmitter analogue input into RTU and PLC		
	Fail DC supply and check backup batteries supply to RTU and other DCs		
	Check RTU radio and comms back to BW Control Room are functional		

PRINT NAME	SIGNATURE	DATE	COMMENTS
INSPECTED BY			
APPROVED BY			SHEET 2

SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

Notes of Site Commissioning Work.
Monday/Tuesday/Wednesday 19/20 & 21 February 2007

Present:	Gordon Carr	(BW)
	Nicholas Siebel	(BW)
	Marty Vanyperen	(BW)
	Bill Collie	(BW)
	Harald Kemmetmuller	(BW)
	John Smith	(BW)
	Gerard Anderson	(BW)
	Alan Steward	(BW)
	Tony Deadman	(BW)
	Darryl Hayman	(BW)
	Gavin Smith	(BW)
	Reg McGirr	(BW)
	Justin White	(Appaway)
	Phil Williams	(Statewide)
	David Little	(Statewide)

The following is a brief overview of work carried out.

The following Commissioning was carried out according to:
Stage 1 System Integration Testing Procedure dated 07 February 07 Rev 3.0.

Monday 19/20 February 07 Time 08:30hrs

1) Toolbox Talk 08:30hrs.

2) Close isolation valve on the Indooroopilly rising main and open isolation valve on new rising main. New rising main filling.

3) Bleed air valve AV1 and AV 1/1.

4) Scour valve SC2/1 leaking sewage through manhole cover onto bikeway.
Location approximately 300meters from Patrick Lane pump station towards North Quay 2meters off bikeway.
Shut down pumps at SP103 and redirect sewage up the Indooroopilly rising main and start pumps.
Close new rising main knife gate valve at Patrick Lane pump station.
Open scour valve at Patrick Lane pump station and drain new main back to wetwell.
Arrange sucker truck to empty manhole.
Cause of leaking sewage scour valve not fully closed.
Open new rising main knife gate valve at Patrick Lane pump station.
Close scour valve at Patrick Lane pump station.
Shut down pumps at SP103 and close isolation valve on the Indooroopilly rising main and open. isolation valve on new rising main and restart pumps. New rising main filling.

5) Scour valve under Dunmore Bridge SC 3/1 leaking sewage through valve. Close valve.

6) Air valve AV 3/1 20meters after Lang Pde towards North Quay in the centre of Coronation drive sewage leaking through manhole.
Shut down pumps at SP103 and redirect sewage up the Indooroopilly rising main and start pumps.
Approximately 16:30hrs on Monday 19 February 07 all pump station personal off site to return at 21:00hrs.
Tool Box Talk 21:00hrs.
At 21:00hrs arrange sucker truck to empty manhole.
Cause of leaking sewage air valve not fully closed.
Shut down pumps at SP103 and close isolation valve on the Indooroopilly rising main and open isolation

SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

valve on new rising main and restart pumps. New rising main filling.
Bleed air valve AV1 and AV 1/1.

7) The time to fill the new rising main was excesses.
On further investigation we found the scour valve at MH 1/3 was open and scouring into the gravity main. Close scour valve.

8) **Approximately 02:30hrs on Tuesday 20 February 07 all pump station personal off site to return at 15:00hrs on Tuesday 20 February 07.**

9) All valving as per Check Lists 1/2 & 3 were checked for position opened/closed.

10) Approximately 04:00hrs on 20 February 07 we had sewage into the manhole at North Quay.

11) All air valving was checked for air.
All manhole pits were checked for leaking valving and pipework.
Air intake valving at point of rising main flows into gravity main was checked for leaks.

12) Odour levels at North Quay appear to be within acceptable levels. Ongoing monitoring of odour levels will be recorded. And the life cycle of Odour Scrubbers Activated Carbon to be monitored.

13) **Outstanding work:** Fine tuning of the PID parameters to occur, this will be conducted over the next couple of weeks (which could hopefully include a rain event!).
Final Odour report outstanding.

Attachments:

- Harald Kemmetmuller Performance Report
- Attendance Record 2pages.
- Trend 2pages.
- Schematic Operational Diagram 1page.
- Stage 1 System Integration Testing Procedure 10pages.
- ITP 1page.
- Check Lists 3pages.
- North Quay Odour Report 11pages.

G:\185 SEW_DRAIN\255 Des_Const\8890 Transport\S1 Luggage PT\SQSJ Redirect Heroes Ave (s1)\COMMISS\Reg McGirr SP103 Heroes\Integration Testing SP103 S1 Sewer\Commissioning Report New Rising Main\Site Work Minutes 19 and 20 February 07.doc

Reg McGirr - Fwd: Re: SP103 redirection of Heroes Avenue Sewage Pump Station into New Sewage Main

From: Reg McGirr
To: Barton, Michael; Karydas, Jim
Date: 07/03/2007 12:47
Subject: Fwd: Re: SP103 redirection of Heroes Avenue Sewage Pump Station into New Sewage Main
CC: Bannink, Andrew; Browne, Jeff; Cruden, Mark; Low, Stuart; Robson, Warner; Say, Jeff; Stanton, Neville; Sutherland-Macleod, Robert

Regards,
Reg McGirr
Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

>>> Harald Kemmetmuller 07/03/2007 10:32 >>>
The pump station duty specification was for 2 duty pumps to be capable of 360 L/s at 35.8 m while running at 50Hz. HVAC tendered pumps capable of meeting this duty at 48.5Hz.

The pump station performance exceeds the duty requirement. This is verified by SCADA trends showing the test carried out by the BW Networks Control System Engineer, Gerard Anderson, which show flow exceeding 365L/s.

Jim appears to be asking if the rising main hydraulic performance is what was predicted in the design? The answer to this is yes. I plotted a number of point on the theoretical system resistance curve, and found that they were within the normal operating envelope.

Jim also appears to be asking if we are sure that the pump is performing according to the design requirements and according to the suppliers undertakings. The answer to this question is also yes. Firstly as stated below, the pump performance has already been verified by the Senior Mechanical Design Engineer and by the Grundfos Engineer, William Wong. I have sited the test results for on site testing and confirm that the results matche the type performance for these pump types, claimed by the manufacturer.

All testing has been completed and all components of the system are performing according to all undertakings, by all parties. The asset acceptance process should proceed for all matters relating to flow performance.

Best Regards

Harald Kemmetmuller
Mechanical Engineer (em2psbw)
Projects Branch
Brisbane Water

Phone: 07 340 33418

Fax: 07 340 30205

>>> Reg McGirr 6/03/2007 11:34 am >>>
Harald,

Will talk to you regarding Jim comments below.

Regards,
Reg McGirr
Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

>>> Jim Karydas 06/03/2007 11:01 >>>
Reg,

You missed the point, the checks done by Henry Lai were checking the performance of the pumps at the station by recirculating the water.
What we need to verify that the flow calculations of the new rising main are correct and the pumps meet the head and flow requirements pumping through this rising main.
How do you know if the pumps are pumping too much or not enough through the new main.
This is the same procedure we go through when commissioning a donate asset.
We are supplied the test certificate from the pump manufacture, but at the end of the day what counts is the pumps meeting the design head and flow through the rising main.

Regards

Jim Karydas

>>> Reg McGirr 6/03/2007 8:57:44 am >>>
Jim,

Yes the pumps were checked for performance by Henri Lai and all OK. Refer to O&MM for test results.

Regards,
Reg McGirr
Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

>>> Jim Karydas 06/03/2007 8:14 >>>
Reg,

Before we accept the rising main, with heroes pumping into the new rising main have you checked the performance of the pumps to prove that they meet the design flow and head.

Jim Karydas

>>> Reg McGirr 5/03/2007 3:09:25 pm >>>
Jim,

The following information regarding the above subject.

Regards,
Reg McGirr
Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

>>> Michael Barton 05/03/2007 15:02 >>>

Reg

Could you resend this email addressed to Jim Karydas. Jim has responsibility for commissioning liasion with Project Branch.

Thanks

Michael Barton
Maintenance Planning Manager Networks
Brisbane Water
Telephone (07) 34078460
Mobile 0419 688 087
Fax 340 78470
michael.barton@brisbane.qld.gov.au

>>> Reg McGirr 5/03/2007 2:53 pm >>>

Michael,

Heroes Avenue Sewage Pump Station SP103 into New Sewage Main has been operational from 19 February 07.

The operation of Heroes Avenue Sewage Pump Station SP103 into New Sewage Main will fall under Networks/Operational (M&E) personal as of above date 05 March 07.

Should Networks operational personal require further training on the pumping station/system please contact Reg McGirr.

Regards,
Reg McGirr
Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

Subject: Commissioning Stage 1 System Integration Testing
SP103 Redirection of Heroes Avenue Sewage Pump Station
Site: Heroes Avenue Sewage Pump Station
19/20/21 February 2007 Time 08:30hrs/21:00hrs

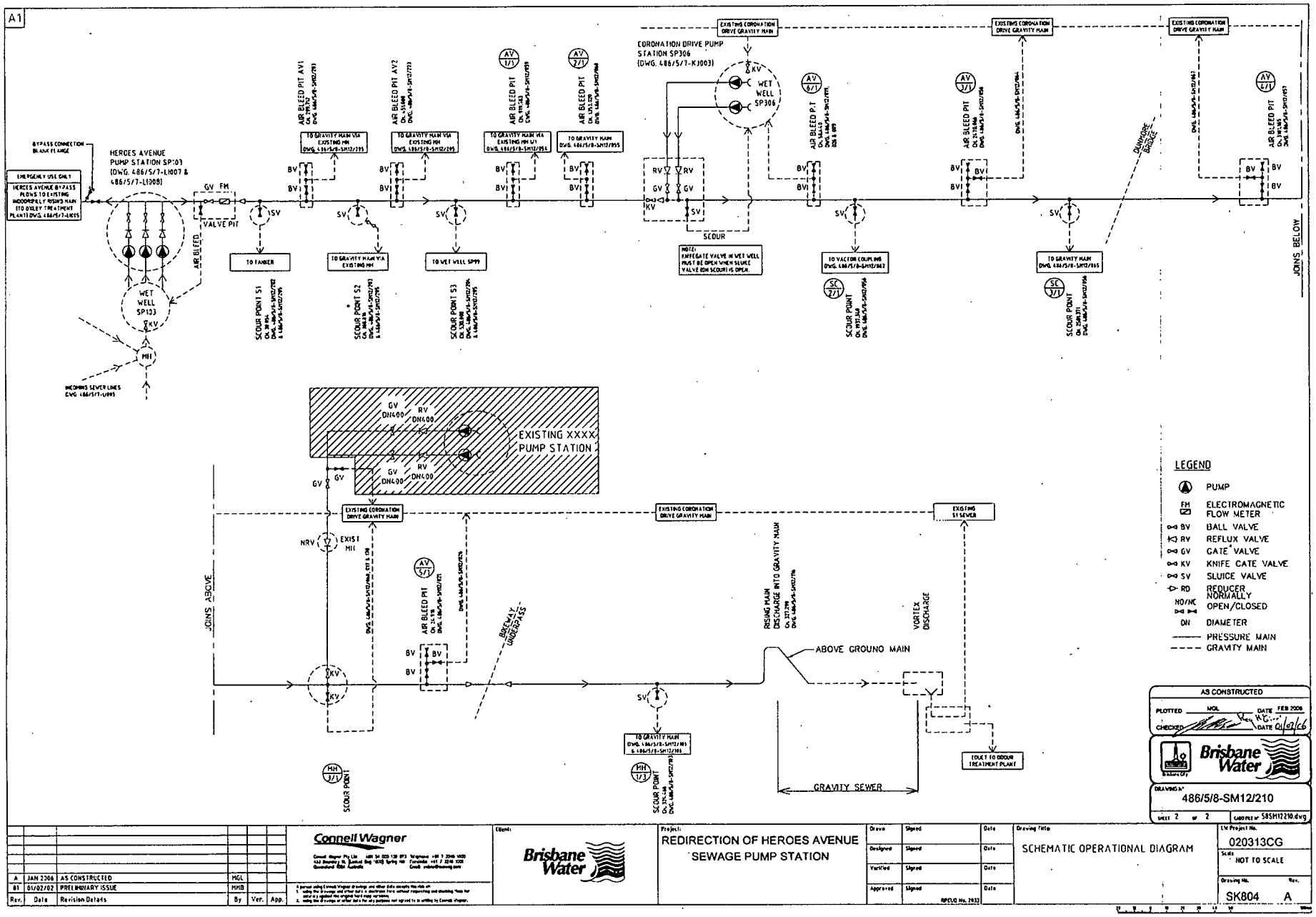
Attendance Record

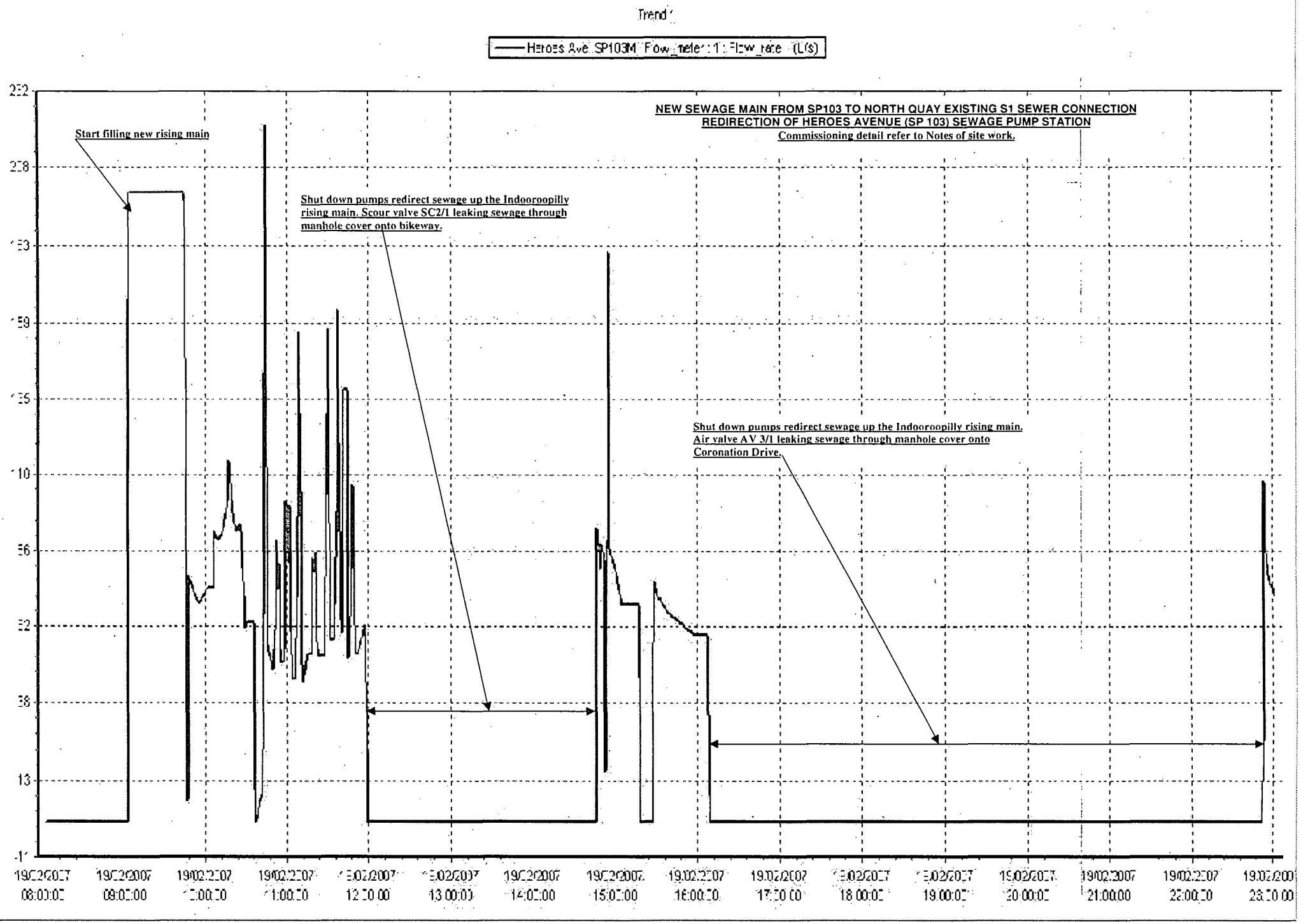
Print Name	Section	Date	Signature
JUSTIN WHITE	ZAPPAWAY	19-2-7	
GAVIN SMITH	BRISWATER	19.2.07	
DARRYL HARMAN	BRIS WATER	19.2.07	
PHIL WILLIAMS	STATEWIDE	19.2.07	
DAVID LITTLE	STATEWIDE	19.2.07	
Anthony Deeker	Brisbane Water	19-2-07	
Harald Kommetmüller	Projects	19-2-07	
GORDON CARR	BRISWATER	19/2/07	
Gerard Anderson	Brisbane Water	19/2/07	
Reg M'GIRR	BW Projects	19/2/07	
LL COLLIER	BW PROJECTS	19/02/07	

Subject: Commissioning Stage 1 System Integration Testing
SP103 Redirection of Heroes Avenue Sewage Pump Station
Site: Heroes Avenue Sewage Pump Station
19/20/21 February 2007 Time 08:30hrs/~~21:00hrs~~

Attendance Record

Print Name	Section	Date	Signature
Reg McGirr	Projects	19/02/07	[signature]
GORDON CARR	MH&Z	19/2/07	[signature]
NICHOLAS SIEBEL	PROJECTS	19/2/07	[signature]
MARQUAN YPEREN	0409 49577	19/2/07	[signature]
W Collie	PROJECTS	19/02/07	[signature]
Harald Kammetmüller	Projects	19/02/07	[signature]
John Smith	NETWORKS	19.2.07	[signature]
Gerard Andersen	Networks	19.02.07	[signature]
ALAN STEWARD	NETWORKS	19/02/07	[signature]


A1
HEROES AVENUE PUMP STATION SP103 (DWG. 486/S/7-LI007 & 486/S/7-LI008)
WET WELL SP103
CORONATION DRIVE PUMP STATION SP306 (DWG. 486/S/7-KJ003)
WET WELL SP306
EXISTING CORONATION DRIVE GRAVITY MAIN
TO TANKER
TO WET WELL SP99
TO VACTOR COUPLING
TO GRAVITY MAIN
SCOUR
VALVE PIT
AIR BLEED
JOINS BELOW
JOINS ABOVE
EXISTING XXXX PUMP STATION
EXISTING S1 SEWER
ABOVE GROUND MAIN
VORTEX DISCHARGE
GRAVITY SEWER
OUT TO ODOUR TREATMENT PLANT
LEGEND
PUMP
ELECTROMAGNETIC FLOW METER
BALL VALVE
REFLUX VALVE
GATE VALVE
KNIFE GATE VALVE
SLUICE VALVE
REDUCER
NORMALLY OPEN/CLOSED
DIAMETER
PRESSURE MAIN
GRAVITY MAIN
AS CONSTRUCTED
PLOTTED MGL DATE FEB 2006
CHECKED DATE 01/03/06
Brisbane Water
DRAWING No 486/5/8-SM12/210
SHEET 2 OF 2
Connell Wagner
Client: Brisbane Water
Project: REDIRECTION OF HEROES AVENUE SEWAGE PUMP STATION
Drawing Title: SCHEMATIC OPERATIONAL DIAGRAM
LW Project No. 020313CG
Scale NOT TO SCALE
Drawing No. SK804
Rev. A
A JAN 2006 AS CONSTRUCTED MGL
B1 01/02/02 PRELIMINARY ISSUE MHB


Trend
Heroes Ave SP103M Flow_rate : 1 : Flow_rate (L/s)
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION
Commissioning detail refer to Notes of site work.
Start filling new rising main
Shut down pumps redirect sewage up the Indooroopilly rising main. Scour valve SC2/1 leaking sewage through manhole cover onto bikeway.
Shut down pumps redirect sewage up the Indooroopilly rising main. Air valve A V 3/1 leaking sewage through manhole cover onto Coronation Drive.
13
08:00:00
09:00:00
12:00:00
13:00:00
14:00:00
15:00:00
16:00:00
18:00:00
19:00:00
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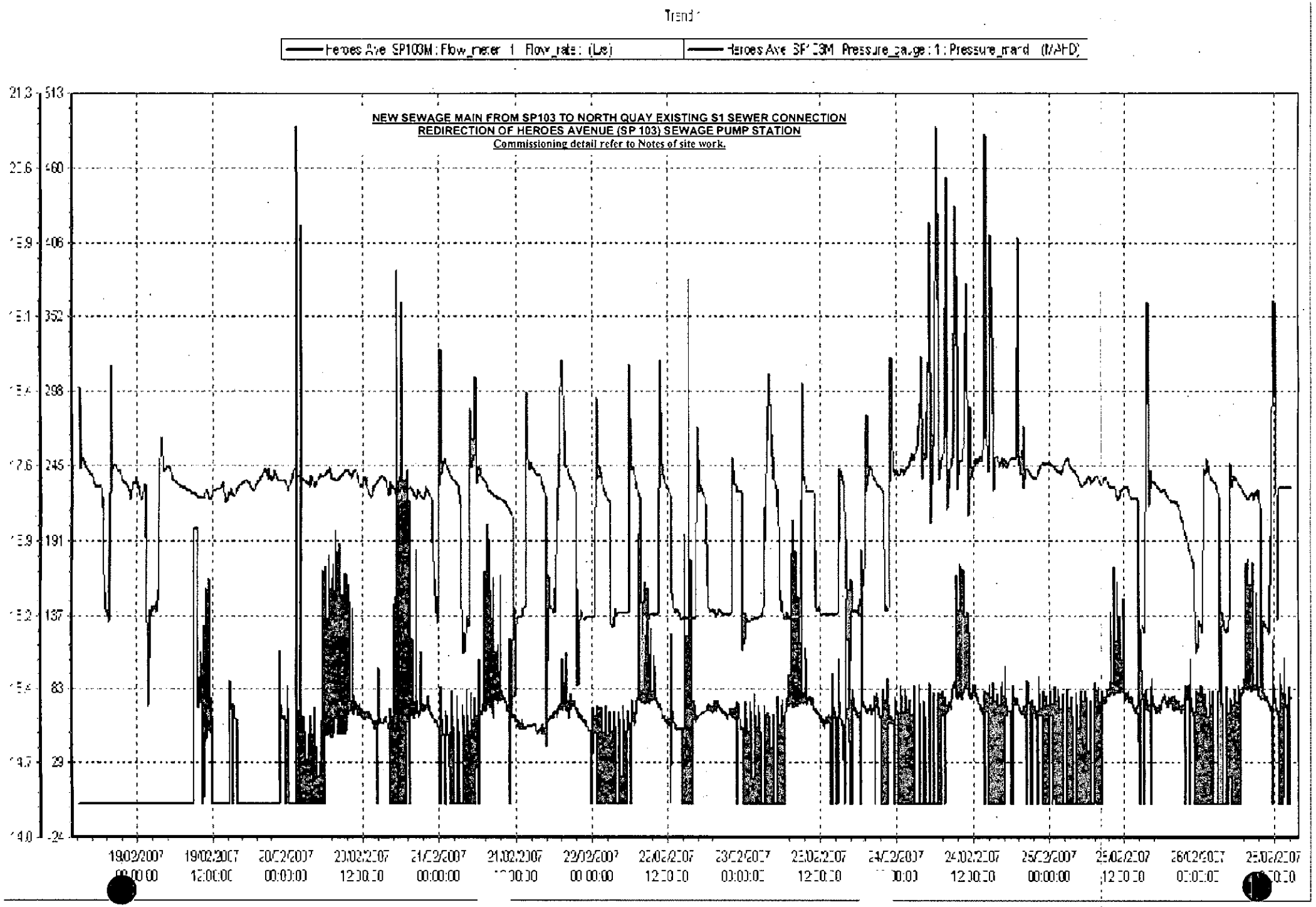
Trend
Heroes Ave SP103M : Flow_meter_1 : Flow_rate : (L/s)
Heroes Ave SP103M : Pressure_gauge : 1 : Pressure_mand (M AHD)
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION
Commissioning detail refer to Notes of site work.
513
460
406
352
298
245
191
137
83
29
-24
19/02/2007 00:00:00
19/02/2007 12:00:00
20/02/2007 00:00:00
20/02/2007 12:00:00
21/02/2007 00:00:00
22/02/2007 00:00:00
22/02/2007 12:00:00
23/02/2007 00:00:00
24/02/2007 12:00:00
25/02/2007 00:00:00
25/02/2007 12:00:00
26/02/2007 00:00:00

Dedicated to a better Brisbane

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE

NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION

REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

Document Approval

Name	Section	Signature
Andrew Bannink (Project Manager)	Projects (BW)	
Jeff Browne (W&S Operations)	Networks (BW)	
Peter Sherriff	Networks Control Systems (BW)	
Gerard Anderson	Networks Control Systems (BW)	
Sid Wain	Networks (BW)	
Harald Kennetmuller (Mechanical Engineer)	Projects (BW)	

07 February 2007

Rev 3.0

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STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

STAGE 2 Coronation Drive Pump Station SP306 (New Rising Main) to North Quay Existing S1 Sewer Connection.

STAGE 3 Cribb Street Connection for Existing XXXX Pump Station (New Rising Main) to North Quay Existing S1 Sewer Connection.

STAGE 4 Hockings Street Syphon Live Sewer Connection to Maintenance Holes EX. 1/4 & EX.2/4

TABLE OF CONTENTS

Section **Page**

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

1. Project/System Background

HEROES AVENUE SP103 PUMP STATION UPGRADE

1.1 The upgrade involves increasing the capacity of the pump station, minimising odour generation and redirection from the S2 catchment to the S1 catchment via new rising main along Coronation Drive to North Quay Existing S1 Sewer Connection.
To understand the layout of SP103 Heroes Avenue Pump Station and the new rising/gravity sewer mains into the S1 sewer main, refer to drawing numbers (486/5/8-SM12/209) (486/5/8-SM12/210) (486/5/7-LI005) (486/5/7-L1007) & 486/5/7-L1008.

1.2 It is intended to upgrade the existing Heroes Avenue wet well and install new pumps in the existing dry well and controls in the existing structure. The existing dry well pump station structure shall be retained to house the switchboard and the new pumps. The existing pumps and valves, switchboard, resistor banks and RTU cabinet shall be de-commissioned and removed to make way for the new equipment.

1.3 **Note: Heroes Avenue Pump Station SP103 upgrade is complete and was commissioned on 19 September 2005 using the Emergency Mode pumping to Oxley Creek via Indooroopilly Rising Main.**

1.4 Stage 2 Coronation Drive Pump Station SP306 will not be part of this commissioning procedure. **Note:** It is important that all valving at SP306 is set to the correct position, refer to Check List 3 Item No's 3.1/3.2/3.3.&3.4 Drg 486/5/8-SM12/061 & 486/5/7-KJ003. SP306 will only be commissioned when the new rising main has been in services for approximately 4 weeks.

1.5 Stage 3 Cribb Street connection (for existing XXXX pump station) will not be part of this commissioning procedure. **Note:** It is important that all valving at Cribb Street connection is set to the correct position, refer to Check List 3 Item No 3.5. Drg 486/5/8-SM12/068.

1.6 Stage 4 Hockings Street Syphon Live Sewer Connection to Maintenance Holes EX. 1/4 & EX.2/4 will not be part of this commissioning procedure.

2. Heroes Avenue Pump Station

2.1 SP103 is a sewage pump station incorporating three variable speed driven 122 kW dry mounted submersible pumps operating in a two duty and one standby arrangement. **Note: SP103 is set to EMERGENCY Mode, in this mode only one pump is allowed to run.** Refer to SP103 Functional Specification (Version 1.10 31/10/2005 Updated for As Built Site Variables) **Page 11 Section 3.2 Non Standard Control**

2.2 To understand the layout of Heroes Avenue PS, refer to drawings numbers (486/5/7-LI005) (486/5/7-L1007) & 486/5/7-L1008

2.3 To understand the control philosophy attached, refer to
SP103 Functional Specification (Version 1.10 31/10/2005 Updated for As Built Site Variables), **it is important you read and understand this document**.

2.4 **Before we can start filling the new rising main, we need to reinstall Gate Valve item No 36, refer to drg** 486/5/7-L1007. Installed on 10 January 2007 Reg McGirr.

- The valve is stored at Eaglefarm Pumping Station.

- Only when the Vortex Structure has been installed at the existing S1 sewer connection will the valve be installed.
- Networks (Steve Ellwood) will arrange installation (16 January 2007) of the valve.

3. Responsibility Codes

The Responsibility Codes used on the ITP and Inspection Check Lists are as follows:

Name	Code	Branch/Section	Required Dates
Gerard Anderson	GA	Networks Control Systems (BW)	
Sid Wain	SW	Networks (BW)	
Harald Kemmetmuller	HK	Mechanical Engineer (BW)	
Reg McGirr	RM	Commissioning Manager (BW)	
Jeff Browne	JB	Water & Sewerage Operations (BW)	
Alan Steward	AS	Networks (BW)	

4. Attachments:

- Inspection & Test Plan (ITP) No.: 001 Rev.2 REDIRECTION OF HEROES AVENUE SEWAGE PUMP STATION (SP 103). NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONECTION.
- Inspection Check List No 1 Rev 1. Rising Main Air Bleed Valving.
- Inspection Check List No 2 Rev 1. Rising Main Scour Valving.
- Inspection Check List No 3 Rev 1. Pump Station Valving.
- Pump Station/Rising Mains and Connections Drawing Register, including drawings.
- Functional Specification SP103 Heroes Avenue Sewage Pumping Station Version 1.10 31/10/2005 Updated for As Built Site Variables.

5. Inspection & Test Plan (ITP) & Inspection Check List above in item 4.

- To be signed before proceeding with system integration testing. ☑

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

6. Staff Responsibilities

Commissioning Manager	Reg McGirr	To provide direction as required and to insure that all ITPs and check sheets have been signed before proceeding with system integration testing
Senior Mechanical Engineer	John Blake	Backup Commissioning Manager to provide direction as required and to insure that all ITPs and check sheets have been signed before proceeding with system integration testing
Networks Control Systems	Gerard Anderson	Inform Control Room of work to be carried out refer section 8. Responsible for Monitoring SP103 (RTU/PLC) during the filling process. Also finetuning the system when we are pumping up the new rising main. To supply pumping Trends refer to section 8.3.
Electrical	Bill Collie	Ensure that all electrical equipment is ready for automatic/manual operation including flow-meter.
Field Commissioning Monitoring	Sid Wain/ Stan Sheeran	Ensure all valving is in the correct position (according to BW Tag Out Procedure) for manual/automatic operation. The above in accordance with Inspection Check Lists (1)/ (2) & (3). Traffic control procedures. And bleading of all Air Valves and carry out visual inspection of new sewage main.
Networks	Alan Steward	Odour equipment to be set-up to monitor the levels at North Quay Existing S1 Sewer. Operation of odour units at North Quay.
Mechanical Engineer	Harald Kemmetmuller	Control monitoring the operation of the pumping station/system. (Wet Well) (Pumps) (Flow) (Pressure) (Valve Position)

7. System Pre-commissioning Procedure Monday 10/11 April & 11 May 2006 Check all valving.

This section of work under item 7 will be completed well in advance of filling the rising main. This will give us time to carry out a detailed inspection of all valving listed in the following three (3) inspection checklists. Should we require work to be carried out or the updating of as-constructed drawings we will have time to complete.

7.1 Everyone involved in the Inspection Check Lists (1)/(2)&(3) to assemble at Heroes Avenue Pumping Station on Monday 10 April 2006 Time 7:30am. ☑

7.2 Workplace Health & Safety

- Tool Box talk (9am) before the start of inspection and recording of the Check Lists (1)/(2) &(3) to cover the following. ☑
- Everyone has a copy and understands the System Integration Testing Procedure/Documentation and Traffic Control Procedures. ☑
- In case of an emergency (during normal working hours) regarding the System Integration Testing:

First point of contact	**Reg McGirr :**	**Mobile Tel No. 0414576374**
Second point of contact	**Stan Sheeran :**	**Mobile Tel No. 0414299802**
Third point of contact	**Sid Wain :**	**Mobile Tel No. 0416159788**

Reg McGirr

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

- Confined Space Entry Permit will be the responsibility of Sid Wain.
  Note: No entry into a confined space without Authority Card. ☑

7.3 As Constructed Drawings

- Full set of marked-up As-Constructed rising main drawings. ☑

7.4 There will be the following inspection check lists to be signed and dated.

: Inspection Check List 1 Rising Main Air Bleed Valving. ☑

: Inspection Check List 2 Rising Main Scour Valving. ☑

: Inspection Check List 3 Pump Station Valving. ☑

7.5 Odour Monitoring/Date Collection & Odour Units operation/control at North Quay Existing S1 Sewer

It is important that we have a detailed record of the Odour levels at the different stages of the work/commissioning and under all operational conditions. The above information will determine if further Odour control measures are required.

Note: Before commissioning of the new sewage main the two (2) odour units to be running at maximum capacity 2 units running continually.
During the commissioning the odour levels at North Quay to be monitored/recorded continually 24hours for 7days to gain an overview of the odour levels.
The final operational philosophy of the odour units will be decided only when we have all odour data collection and final report from Alan Steward.

- Part 1 Odour data collection before Odour Unit at North Quay is up and running.
  Note: The gravity main feeding into the North Quay existing S1 sewer connection should not be flumed. ☑
- **Note:** The Odour unit is to be reinstated to the functional requirements as per the S1 operation and maintenance manual.
- Part 2 Odour data collection after Odour Unit at North Quay is up and running. **Note:** The gravity main feeding into the North Quay existing S1 sewer connection should not be flumed. ☑
- Part 3 Odour data collection after new main has been commissioned. **Note:** The gravity main feeding into the North Quay existing S1 sewer connection should not be flumed. ☐
- Note that during the commissioning of the new rising main into the S1 at North Quay, the operational philosophy of the odour unit could change. Should this occur, the relevant personnel within Brisbane Water will be consulted in regard to any operational changes. Any major changes will be considered external to the current Project Scope.

8. System Integration Testing – Day 1 Monday 19 February 2007 Time 08:30hrs.

- Everyone involved in the system integration testing to assemble at Heroes Avenue Pumping Station. ☑
- Workplace Health & Safety

Reg McGirr

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

Tool Box talk (08:30hrs) before the filling of the new rising main.

- Everyone has a copy and understands the System Integration Testing Procedure/Documentation and Traffic Control Procedures.

- In case of a emergency regarding the System Integration Testing:

First point of contact	**Reg McGirr :**	**Mobile Tel No. 0414576374**
Second point of contact	**Gerard Anderson:**	**Mobile Tel No. 0410536405**
Third point of contact	**Harald Kemmetmuller:**	**Mobile Tel No. 0410536405**
Forth point of contact	**Sid Wain :**	**Mobile Tel No. 0416159788**

- Confined Space Entry Permit will be the responsibility of Sid Wain.
  Note: No entry into a confined space without Authority Card.

- **At all times the control room must be contacted by phone and informed of what you are planing to do before you start the work.**

- **Note:** Air valve (AV1/1) on the corner of High St & Benson St will be bleed during the daytime.

- **Note:** All air valves excluding air valve (AV 1/1) will be bleed on the night of 19 & 20 February 2007 from 21:00hrs to 06:00am.

8.1 Redirection of Heroes Avenue (SP103) Sewage Pump Station.

- Change over from **S2 catchment** (Oxley Creek via Indooroopilly rising main) to **S1 catchment** via new rising main along Coronation Drive to North Quay existing S1 sewer connection.

- Before we start filling the new rising main all valving Air Bleed/Scour & Pump Stations valves to be checked for correct position (open/closed). There will be the following inspection check lists to be signed and dated.

  : Inspection Check List 1 Rising Main Air Bleed Valving.

  : Inspection Check List 2 Rising Main Scour Valving.

  : Inspection Check List 3 Pump Station Valving.

- Pump Station/Rising Mains and Connections Drawing Register..

- Check wet well level. Place all pumps in manual mode and pump wet well down to stop level.

- **Switch pump station (all 3 pumps) to manual mode** then stop pumps.

- Selector switch inside board to be switched **from Emergency mode to Normal mode.**

- Ensure the minium speed on the VFD is set to 28Hz and max speed to 50Hz. These speed settings to be set on pump No's 1 2 & 3 for normal operation. (Not Emergency mode).

- Pumps 2 & 3 to be locked out from running.

- Close isolation valve on the Indooroopilly rising Main (Check List 3 Item 3.1).

- Start pump No 1 in manual mode, the pump will ramp up to 28Hz.

Reg McGirr

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

- At the same time as pump 1 starts, slowly open the isolation valve (on the new rising main at Heroes Avenue (SP103) Sewage Pump Station (Check List 3 Item 3)) until the gauge pressure is indicating 105 Kpa. Corresponding to approximately a flow of 55 l/s. ☑

While the rising main is filling, the back pressure on the pump should be controlled by throttling the isolation valve, to ensure that the main is not filled to rapidly and the pump is not allowed to cavitate.

The expected flow range to maintain the level in the wet well is between 50 and 100l/s. The flow rates can be achieved by varying the pump speed between 28Hz and 30Hz & by gradually opening or closing the isolation valve.
It is recommended to operate the pump at minimum speed, if possible, while the main is filling and only increase the speed, if the level in the wet well is beginning to rise.

Once the main begins to fill and the flowmeter is flooded, the flowmeter should begin to provide an accurate indication of the flow rate.

The isolation valve should be progressively opened as the main fills, to maintain the required flow rate (to match inflow rate).

It will take approximately 4hours to fill the main at ADWF of 65l/s.

- Once the main is full and all air has been bleed from the main, all pumps are to be placed in automatic mode. ☑

8.2 Monitor the operation of the pump systems according to the Functional Specifications SP103 Version 1.10 30/10/2005.

- Monitor the wet well at SP103 and confirm that the duty pumps start at the start levels and stops at the stop level. ☑
- Monitor the operation of the pump systems according to the Functional Specifications SP103 Version 1.10 30/10/2005. ☑

8.3 Pumping trends of Heroes Avenue PS to be captured at the end of the day.

- Trends required of Wet Well Levels.
- Trends required of Delivery Pressure.
- Trends required of Pump Power, Speed and Running Signal.
- Trends required of Pump Flow. ☑

8.4 The pumping system will be left in the automatic position.

- Site Instruction will be left at SP103 (Control Room) so that if there is a failure on the new rising main we will revert back to Emergency Mode. ☑

8.5 The following procedure for changing from (Normal Mode) pumping to the S1 connection and changeover to (Emergency Mode) pumping to Oxley Creek via Indooroopilly rising main.

Procedure for changing from the S1 rising main (Normal Mode) to (Emergency Mode) pumping to Oxley Creek via Indooroopilly rising main.

a) All pumps set to manual mode. ☑

b) Pump wet well down to cut-out level. ☑

c) Place switchboard in Emergency Mode. ☑

Reg H'Girr

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONNECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

d) Close S1 rising main Gate Valve item No 36 refer to drg 486/5/7-L1007. ☑

e) Slowly open Indooroopilly Gate Valve on 470MSCL RL2.905 refer to drg 486/5/7-L1005. ☑

Note: The Indooroopilly Rising Main could be empty extreme caution when opening valve.

f) Switch all three pumps to auto mode. ☑

Procedure for changing from (Emergency Mode) pumping to Oxley Creek via Indooroopilly rising main **to the S1 rising main (Normal Mode).**

a) All pumps set to manual mode. ☑

b) Pump wet well down to cut-out level. ☑

c) Close Indooroopilly Gate Valve on 470MSCL RL2.905 refer to drg 486/5/7-L1005. ☑

d) Place switchboard in Normal Mode. ☑

e) Slowly open S1 rising main Gate Valve item No 36 refer to drg 486/5/7-L1007. ☑

f) Switch all three pumps to auto mode. ☑

9. System Integration Testing– Day 2 Tuesday 20 February 2007 Time 08:30hrs.

- Everyone involved in the system integration testing to assemble at Heroes Avenue Pumping Station. ☑
- Review of previous days work and work to be carried out. ☑
- **Note:** Air valve (AV1/1) on the corner of High St & Benson St will be bleed during the daytime. ☑
- **Note:** All air valves excluding air valve (AV 1/1) will be bleed on the night of 19 & 20 February 2007 from 21:00hrs to 06:00am. ☑

9.1 All items on Inspection Check Lists (1) (2) & (3) to be re-checked dated and signed. ☑
- Inspection & Test Plan No.: 001 Rev.0

9.2 The pumping system will be left in the automatic position.
- Site Instruction will be left at SP103 (Control Room) so that if there is a failure on the new rising main we will revert back to Emergency Mode. ☑

9.3 If required day three system testing.

Reg H Girr

10. Contingency Plan

- Be aware that the overarching contingency plan, should the odour be at unacceptable levels, is to redirect the flow back into the S2 system.

Brisbane Water

INSPECTION & TEST PLAN

PAGE: 1

CUSTOMER/PROJECT: Redirection of Heroes Avenue Sewage Pump Station SP103,
EQUIPMENT: System Integration Commissioning of New Sewage Main from SP103 to North Quay Existing S1 Sewer Conection

CONTRACT REF:

Date 14/03/06
ITP: 001 Rev. 2

ITEM NO: 1 Drawing No,s: 486/5/8-SM12/209 & 210 S/C:
COMPONENT: Mechanical/Electrical & New Sewage Main from SP103 to North Quay Existing S1 Sewer Conection System Integration Commissioning
MATERIAL:

KEY TO INSPECTION ACTIVITIES
H-Hold Point W- Witness S-Surveillance R-Review N-Notification DR-Document Reqd

NO	PROCESS DESCRIPTION/ACTIVITY	LOC	PROCEDURE	ACCEPTANCE STANDARD	Certifying Verifying Document	Inspection						
									BW			
						Key	Date	Sgn	Key	Date	Sgn	Code
1	Site Induction/Confined Space Training	E	Visual Inspection	BW	BW PROCEDURE Doc Id: 002728				DR/R			SW
2	Site commissioning of Heroes Avenue SP103 using Emergency Mode pumping to Oxley Creek via Indooroopilly rising main	E	Visual Inspection	Contract Document BW30079-02/02	BW System Integration Testing Procedure Emergency Mode				R/ DR	12/04/06		RM
3	Review Functional Specification SP103 Version 1.10 31/10/2005 Updated to As Built Site Variables	E	Visual Inspection	Contract Document BW30079-02/03	BW Functional Specification				R/ DR	19/2/07		RM/ GA
4	Review of As Constructed Drawings or Marked-up As Installed Drawings: Pump Station/Rising Mains and Connections Drawing Register	E	Visual Inspection	BW	BW Drawings				R/ DR	14/2/07		RM/ SW
5	Odour date collection (Part 1) at the S1 shaft connection before Odour unit is up and running.	E	Visual Inspection	BW	BW PROCEDURE				R/ DR			AS
6	Odour unit up and running.Odour date collection (Part 2) at the S1 shaft connection	E	Visual Inspection	BW	BW PROCEDURE				R/ DR			AS
7	Installation of Vortex Assembly at S1 Shaft Connection	E	Visual Inspection	BW	BW Drawings				R/ DR	04/01/07		RM
8	Review of Stage 1 System Integration Testing Procedure New Sewage Main From SP103 to North Quay Existing S1 Sewer Conection Redirection of Heroes Avenue SP103 Sewage Pump Station	E	Visual Inspection	BW	BW ITP & Check Sheets/Records Sheets/System Integration Testing Procedure				R/ DR	19/2/07		RM/ GA/ HK
9	Stage 1 System Integration Testing Procedure Item 2.4 has been completed. Reinstall Gate Valve Item 36 refer drg 486/5/7-L1007	E	Visual Inspection	BW	Stage 1 System Integration Testing Procedure				R/ DR	19/2/07		RM
10	Stage 1 System Integration Testing Procedure Item 7.4 has been completed.	E	Visual Inspection	BW	Stage 1 System Integration Testing Procedure. Check List 1 2 & 3.				R/ DR			SW
11	Clearance for use of new discharge sewage main	E	Visual Inspection	BW	BW PROCEDURE				R/ DR	19/2/07		RM/ SW
12	Odour data collection (Part 3) at the S1 shaft connection. After the new main has been commissioned.	E	Visual Inspection	BW	BW PROCEDURE				R/ DR			AS
13	Networks Operation Final Acceptance	E	Visual Inspection	Contract Document BW30079-02/03	BW PROCEDURE				R/ DR			JB

ORIGINAL ISSUE
PREPARED BY: Reg McGirr
APPROVED BY: Andrew Bannink

RELEASED BY: BW Projects

KEY TO LOCATION ACTIVITIES
A-BW S-Supplier C-Sub Contractor E-Site

BRISBANE WATER
T.C. Burnie Building 315 Brunswick St. Mall, Fortitude Valley, Brisbane Qld 4000

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

Inspection Check List 1 Rising Main Air Bleed Valving

Refer to Schematic Operational Diagram Drg No. 486/5/8-SM12/210

The following manual operated Air Bleed Valving to be inspected and checked for correct position open/closed.
Print name/signed and dated in the following check list.

Item No	Item Description	BW Drawing No.	Valve Position	Date Air Bleed	Date Checked	Code/Print Name	Sgn
1	AV1 in Josling St AV2 in Brisbane St To Gravity Main	AV1 &A V2 486/5/8-SM12/203 486/5/8-SM12/205	Closed		10-4-06 AV1 2-3-07 20-2-07	S.SHEERAN 40105 A.Deadman A.Deadman	
1.1	AV1/1 Corner of High & Benson St To Gravity Main	AV1/1 486/5/8-SM12/054 486/5/8-SM12/059	Closed		19-4-06 2-3-07 20-2-07	S.SHEERAN 40105 A.Deadman A.Deadman	
1.2	AV2/1 Just before Landsborough TCE on Coronation Drive To Gravity Main	AV2/1 486/5/8-SM12/055 486/5/8-SM12/060	Closed		10/5/06 2-3-07 20-2-07	S.SHEERAN 40105 A.Deadman A.Deadman	
1.3	AV6/1 58.440m from P/S1/1 Patrick Lane/ Coronation Drive (Note: Knifegate Valve Item 15 Drg No. Drg 486/5/7-KJ003 must be open when you bleed air) To Gravity Main	AV6/1 486/5/8-SM12/019 486/5/8-SM12/026 486/5/8-SM12/009	Closed		2-3-07 20-2-07	A.Deadman A.Deadman	
1.4	AV3/1 Just before Lang PDF on Coronation Drive To Gravity Main	AV3/1 486/5/8-SM12/056 486/5/8-SM12/064	Closed	chk mit	11/5/06 20-2-07	S.SHEERAN 40105 A.Deadman	
1.5	AV4/1 Just before Cribb St on Coronation Drive To Gravity Main	AV4/1 486/5/8-SM12/057 486/5/8-SM12/067	Closed		2-3-07 20-2-07	A.Deadman S.SHEERAN 40105 A.Deadman	
1.6	AV5/1 Just after Cribb St on Coronation Drive To Gravity Main	AV5/1 486/5/8-SM12/021 486/5/8-SM12/026	Closed		2-3-07 20-2-07	- No Air Valve + A.Deadman	
1.7							
1.8							

Issue Date: 15/3/06
Rev No: 1

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

Inspection Check List 2 Rising Main Scour Valving.

Refer to Schematic Operational Diagram Drg No. 486/5/8-SM12/210

The following manual operated Scour Valving to be inspected and checked for correct position open/closed.
Print name/signed and dated in the following check list.

Item No	Item Description	BW Drawing No.	Valve Position	Date Scoured	Date Checked	Code/Print Name	Sgn
2	Heroes Avenue Pump Station Car Park (S1 Sucker Truck)	S1 486/5/8-SM12/202 486/5/8-SM12/205	Closed		10/4/06 20-2-07.	S. SHEERAN 40105 A. Deadmen	
2.1	Herbert St (S2 To Gravity Main)	S2 486/5/8-SM12/203 486/5/8-SM12/205	Closed		20-2-07.	S. SHEERAN 40105 A. Deadmen	
2.2	Brisbane St (S3 To Wet Well SP99)	S3 486/5/8-SM12/204 486/5/8-SM12/205	Closed		9/7/07 20-2-07	S. SHEERAN 40105 A. Deadmen	
2.3	Patrick Lane/Coronation Drive SP306 (To Gravity Main via Wet Well) (**Note:** Knifegate Valve Item 15 Drg No. 486/5/7-KJ003 must be open when Scouring Main)	Scour Valve No.10 486/5/7-KJ003 486/5/8-SM12/061	Closed		10/4/06 2-3-07 20-2-07	S. SHEERAN A. Deadmen A. Deadmen	
2.4	Just before Chasely St/ Coronation Drive (SC2/1 To Vactor Coupling)	SC2/1 486/5/8-SM12/056 486/5/8-SM12/062	Closed		10/5/06 20-2-07	S. SHEERAN A. Deadmen	
2.5	Just after Lang PDE/ Coronation Drive (SC3/1 To Gravity Main)	SC3/1 486/5/8-SM12/056 486/5/8-SM12/065	Closed		11/5/06 20-2-07	S. SHEERAN A. Deadmen	
2.6	Cribb St/ Coronation Drive MH3/1 (To Gravity Main)	Scour Valve 486/5/8-SM12/057 486/5/8-SM12/068 486/5/8-SM12/017	Closed	Check M/H.	11/5/06 20-2-06	S. SHEERAN A. Deadmen	
2.7	Eagle Terrace MH1/3 (To Gravity Main)	Scour Valve 486/5/8-SM12/101 486/5/8-SM12/106	Closed		2-3-07 20-2-07.	A Deadmen A. Deadmen	
2.8							

Issue Date: 15/3/06
Rev No: 1

STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE
NEW SEWAGE MAIN FROM SP103 TO NORTH QUAY EXISTING S1 SEWER CONECTION
REDIRECTION OF HEROES AVENUE (SP 103) SEWAGE PUMP STATION

Inspection Check List 3 Pump Stations Valving & Piping.

Refer to Schematic Operational Diagram Drg No. 486/5/8-SM12/210

The following manual operated Valving to be inspected and checked for correct position open/closed.
Print name/signed and dated in the following check list.

Item No	Item Description	BW Drawing No.	Valve Position	Date Checked	Code/Print Name	Sgn
3	Heroes Avenue Pump Station SP103 (Item 36 will be closed. Only when we are filling the new rising main will the valve be opened) Item 36 Rising Main 375 NB Gate Valve.	Item 36 486/5/7-LI007 486/5/7-LI005	Closed/Open	10/4/06	S. SHEERAN 40105	VALVE NOT INSTALLED
3.1	Heroes Avenue (SP103) P/S Indooripilly rising main Isolation Valve	486/5/7-LI005	~~Closed~~ OPEN	10/4/06	S. SHEERAN 40105	
3.2	Patrick Lane/Coronation Drive SP306 Item 4 Rising Main DN600 Knife Gate Valve	Item 4 486/5/8-SM12/061	Open	2-3-07 10/4/06 20-2-07	A. Deedman S. SHEERAN 40105 A. Deedman	
3.3	Patrick Lane/Coronation Drive SP306 Item 6 & 7 DN300 Sluce Valve into Wet Well SP306	Item 6 & 7 486/5/8-SM12/061	Close	10/4/06 20-2-07	S. SHEERAN 40105 A. Deedman	
3.4	Patrick Lane/Coronation Drive SP306 Item 15 300NB Knife Gate Valve into Gravity Main	Item 15 486/5/7-KJ003	~~Open~~ ~~Closed~~ Open	10/4/06 20-2-07	S. SHEERAN 40105 A. Deedman A. Deedman	
3.5	Cribb St/Coronation Drive Item 3 DN 400 Knif Gate Valve to XXXX	Item 3 486/5/8-SM12/068	Closed	20-2-07	A. Deedman	
3.6	Just after Cribb St/Coronation Drive EX4/1	EX4/1 486/5/8-SM12/101 486/5/8-SM12/105	Piping to be checked for leaks	2-3-07 20-2-07	A. Deedman A. Deedman	
3.7	Eagle Terrace MH1/3	486/5/8-SM12/101 & 106	Piping to be checked for leaks	21-3-07 20-2-07	A. Deedman A. Deedman	
3.8						

Page 1 of 1

Issue Date: 15/3/06
Rev No: 1

From: Alan Steward
To: Barton, Michael; McGirr, Reg; Thompson, Bruce
Date: 15/03/2007 9:22:31
Subject: Heroes Ave Rising Main

Reg

I have attached the report concerning summarising the odour monitoring undertaken. I have limited the data to high level summation, I am unfortunately short of time at the moment. Please feel free to constructively criticize the document.

Kindest Regards
Alan Steward
PH 340 78416
Mobile 0438 684 231
alan.steward.brisbane.qld.gov.au

North Quay Odour Monitoring Plan

PROJECT

ODOUR MONITORING PLAN

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

Project Code: N/A

Maintenance Planning

Project Manager:

Andrew Bannick

Project Owner:

N/A

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

Purpose

To monitor Hydrogen Sulphide (H_2S) gas release from the North Quay discharge maintenance hole throughout the commissioning of the Heroes avenue pump station rising main. The purpose of this monitoring is to determine the new system configuration operates within acceptable odour levels.

Document Signoff

Approval

	NAME	ROLE	SIGNATURE	DATE
Project Manager	**Andrew Bannik**			
Operations	**Jeff Brown**			
Network Controls	**Peter Sherrif**			
Network Controls	**Gerard Anderson**			
Networks	**Sid Wain**			
Projects	**Harald Hekketmuller**			

Distribution

NAME	ROLE	SIGNATURE	DATE

Version History

Version	Author	Change	Date

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

Background

This document is an appendix to the "Systems Integration testing procedure" for the commissioning of the new Heroes Avenue pump station rising main. The procedure for monitoring Hydrogen Sulphide (H_2S) levels at North Quay discharge maintenance hole (MH235401) is given, outlining the minium emissions goals for this system to operate under. The management of H_2S emissions is critical to the continued operation of this new infrastructure, in the advent levels exceed the specified goals sewage will be redirected as per the emergency pumping mode to Oxley creek using Indooroopilly Road pumps station.

1. Monitoring Method

The method for monitoring must be identical to the previous two sampling periods to ensure consistency of results. The current procedure used for monitoring, challenging and spaning gas detectors should be utilised.

1.1. Monitoring Period

Monitoring will commence on the 12 February and continue until the 19 March 2007.

1.2. Locations

The gas detectors will be located as per schedule in Appendix A. The gas detectors in North Quay discharge maintenance hole are to be located with the preset positioning ropes at the top, middle and bottom of the shaft, with the bottom most logger being located approximately 30cm above the obvert of the S1 outlet.

1.3. Equipment

The Apptek "Odalog" units are to be used as per previous sampling and are referred to in this document as "Gas Detector". The units are to be hired for the duration of this sampling work and each unit is to be supplies with a calibration certificate.

2. Emission Goals

The criterion for success has been set at a level that will best serve the public in the vicinity of the discharge maintenance hole and the associated odour scrubbing facility. This criterion has been set with respect to the Environmental Protection Agency's Environmental Protection (AIR) Policy 1997. In the advent an issue arises beyond the criterion stated here, this policy should be used as a guide in consultation with Networks and Systems Planning branches.

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

2.1. Hydrogen Sulphide

	Indicators And Goals Relevant To The Aesthetic Enjoyment Of Places And Visual And Local Amenity		
Air Quality Indicators and Goals			
Air Quality Indicator	Micrograms per m3	Parts per Million (ppm)	Averaging Time
Hydrogen Sulphide	7	0.005	30 Minutes
Other Indicators and Goals			
Air Quality Indicator	Micrograms per m3	Parts per Million	Averaging Time
Hydrogen Sulphide	150	0.099	24 Hours
Stated goals per Schedule 1– Air Quality Indicators and Goals			

Table 1. Air Quality Criterion – Upper limits for Hydrogen Sulphide Emissions.

The air quality emission goals have been set at the levels in Table 1. on the premise that any emission above these stated levels may be detectable by people at the sensitive sites of the Commonwealth Law courts (20m from stack). the Inns of Court (20m from stack) or the Cycle path on the river bank (10m from stack).

2.2. Monitoring Projections

The sampler should give due consideration to the impact of any H_2S detected and make considered projections if any gas continues to be detected. An example is given below:

> *As per a point reading this would equate to a 0.1ppm reading within a window of thirty minutes. This would equate to a 30 minute average of 0.00333ppm and a single reading of 0.2 ppm equates to an average of 0.00668ppm, which is over the allowable 0.005.*

2.3. Odorous Compounds

Other odorous compounds are known to be associated with sewage and be present in sewer systems. At times these can be detected at vents stacks, discharge maintenance holes and pump stations. In the advent any odours other odour are detected emitting from North Quay discharge maintenance hole a full investigation should follow. Table 3 gives known examples of odorous compound associated with sewage:

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

Substance	Approximate odour thresholds (ppm)
Hydrogen sulphide	0.002
Styrene	0.07
Toluene	8
Ammonia	6
benzene	10
Ethylbenzene	0.5
Xylene (o)	5
Xylene (m)	0.4
Ethyl mercaptan	0.001
Methyl mercaptan	0.002
Dimethyl sulphide	0.002
Dimethyl disulphide	0.01
Skatole	0.001
Odour concentration	1 ou

Table 3. Typical Odorous compounds associated with sewage.

3. Monitoring Procedure

The telemetry system is to have the following alarms configured to the analogue signal received at SLP14.

1. Hydrogen Sulphide readings between 0 and 200ppm
2. Alarm at 5ppm
3. Alarm at 2mA or less (indication problem with equipment)

During the commissioning period sampling staff are to monitor the site during the period from 19 February 2007 through to the

3.1. Commissioning Schedule

- This H_2S monitoring is to continue from 19 February 2007 through to the 26 February 2007.

Pre – commissioning	11 January 2007	19 February 2007
Commissioning Part 1	19 February 2007	22 February 2007
Commissioning Part 2	22 February	26 February 2007
Post Commissioning	26 February 2007	26 March 2007

Table 2. Heroes Avenue pump station rising main H_2S monitoring schedule.

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

- Hydrogen Sulphide monitoring will continue at the North Quay scrubber vent stack (NQSVS) until such a time that the system is not emitting unacceptable levels of gas.

3.2. Pre-commission

- Hydrogen sulphide monitoring taken from NQSVS.
- See Heroes Avenue North Quay H_2S Report Stage II Revision II for further information on preliminary monitoring observations.
- The revised Preliminary data is to be presented to project manager on the 12 February 2007.
- All necessary monitoring equipment to be hired, calibration certificates supplied by the 12 February 2007.
- Site audit to be carried out on the 15 February 2007 to ensure no other odour issues are present that may confound the data. A low range gas detector set in "Instantaneous evaluation" mode to be utilised for this task.
- Informal testing of the Activated Carbon to be carried out on the 15 February 2007. In the advent the media indicates it is over 75 % exhausted a change of the media is to be scheduled immediately and completed by the 19 February 2007.
- Installation of the gas logger to the NQSVS utilising an analogue telemetry connection to Brisbane Water control room by 15 February 2007.
- Installation of a low range (in-line) gas detector to be installed to the scrubber outlet ducting (SDO) by the 15 February 2007. NB This should be a sealed system.

3.3. Commissioning Part 1

- Installation of monitoring equipment to site as per appendix A. on the 19 February 2007.
- A network sampler is to monitor the site constantly through Part 1 of the commissioning period. During this period 3 hourly observation (3am, 6am, 9am, 12pm & 3pm) of the monitoring equipment is to be recorded, staring at 12:00am, manually recording any gas level detected.
- The gas detectors and data loggers are to be gas challenged, zeroed, spanned and the data downloaded daily from 9am.
- **In the advent a positive readings are observed the sampler is to begin constantly monitoring the gas detectors located in the NQSVS and SDO. If the observations are trending towards a violation of the Air Quality Indicators or are greater than these contact Alan Steward on 0438 684 231 or 340 78416 to review the data and escalate the issue to the commissioning manager.**

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

- **In the advent a positive readings alarm is observed in the control room the controller is to notify the sampler on site. The sampler is to begin constantly monitoring the gas detectors located in the NQSVS and SDO. If the observations are trending towards a violation of the Air Quality Indicators or are greater than these contact Alan Steward on 0438 684 231 or 340 78416 to review the data and escalate the issue to the commissioning manager.**
- Hydrogen sulphide emissions outside the allowable criteria noted in section 2 should be responded in the following manner.

    1. Divert Heroes avenue pump station from (Normal Mode) pumping to the S1 connection and changeover to (Emergency Mode) pumping to Oxley Creek via Indooroopilly rising maim. See section 8.5 of "STAGE 1 SYSTEM INTEGRATION TESTING PROCEDURE".
    2. Test the scrubber media for level of useful life and report results to commissioning manager.

3.4. Commissioning Part 2

- Monitoring of the site is to continue from the control room as per part 1 from the 22 February.
- **In the advent a positive readings alarm is observed in the control room the controller is to notify the sampler the sampler on call (see appendix B). The sampler is to begin constantly monitoring the gas detectors located in the NQSVS and SDO. If the observations are trending towards a violation of the Air Quality Indicators or are greater than these contact Alan Steward on 0438 684 231 or 340 78416 to review the data and escalate the issue to the commissioning manager.**
- The gas detectors and data loggers are to be gas challenged, zeroed, spanned and the data downloaded daily from 9am.

3.5. Post Commissioning

- Ongoing site monitoring at the NQSVS and SDO is to continue as per appendix A from 26 February.
- All other gas detectors are to be decommissioned.
- The gas detectors and data loggers are to be gas challenged, zeroed, spanned and the data downloaded weekly on Tuesday.
- An audit of the activated carbon media is to be undertaken to determine its remaining useful life.

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

A. High Level Schedule

TASK	TASK DETAILS	TIME	DATE	RESOURCE

REDIRECTION OF HEROES AVENUE (SP103) SEWAGE PUMP STATION

ODOUR MONITORING PLAN

Appendix A.

No.	Site Location	Monitoring Period	Sensor Size	Logging Freq.	Description of Location
1	*North Quay Vent Stack*	***12 February to 19 March***	*1 to 200 ppm*	*1 minute*	*Top of Vent Stack – odotrack system recommended.*
2	*North Quay Scrubber Ducting*	*12 February to 19 March*	*0 to 2 ppm*	*10 Minutes*	*Scrubber Ducting at outlet to media containers.*
3	Brisbane Commonwealth Law Courts	19 February to 23 February	0 to 2 ppm	10 minutes	23 Tank St Brisbane Qld 4000
4	Brisbane Inns Of Court	19 February to 23 February	0 to 2 ppm	10 minutes	107 North Quay Brisbane Qld 4000
5	North Quay Vortex -	19 February to 23 February	1 to 200 ppm	1 minute	Top
6	North Quay Vortex -	19 February to 23 February	1 to 200 ppm	1 minute	Middle
7	North Quay Vortex -	19 February to 23 February	1 to 200 ppm	1 minute	Bottom - approximately 30 cm above the obvert of the S1 outlet
8	Turbot St S1 Mh	19 February to 23 February	1 to 200 ppm	1 minute	
9	Ann St and North Quay Main Sewer	19 February to 23 February	1 to 200 ppm	1 minute	

Appendix B.

Date	Time	Name	Phone
19 February		Geoff Bain	
20		John Smith	

STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

Notes of Site Commissioning Work. Wednesday 14 March 2007

Present:	Bill Collie	(BW)
	Gerard Anderson	(BW)
	Tony Deadman	(BW)
	Reg McGirr	(BW)

The following is a brief overview of work carried out.

The following Commissioning was carried out according to:
Stage 2 System Integration Testing Procedure dated 08 March 07 Rev 2.

Wednesday 14 March 07 Time 06:00hrs

1) Toolbox Talk 06:00hrs.

2) Close 300 NB Knife Gate Valve interconnection wet-well to gravity main.

3) Open Scour valve on new rising main to fill wet-well.

4) We attempted to start the pumps but they were tripping on motor over-current.
On further investigation we found because the pumps were standing for a long period of time there was a build up of rust between the Pump Impeller and wearing ring this caused the rotor to lock.
Pump No 1 freed itself after numerous attempted to start the pump.
Pump No2 started after we hit the suction area of the casing with a peace of wood.
To stop the above from occurring again we decided to add code to PLC to bump pumps once per day to prevent lockup.

5) All further work proceeded according to Stage 2 System Integration Testing Procedure dated 08 March 07 Rev 2.
Day two (2) testing was not required as we completed all testing except generator testing.

Outstanding work: Refer to Gerard Anderson e-mail dated 19/03/2007.

Attachments:

- Stage 2 System Integration Testing Procedure dated 08 March 07 Rev 2.
- Funtional Specification Version 1.00 14/3/2007.
- Pump Trends SP103.
- Pump Trends SP306.
- Gerard Anderson e-mail dated 19/03/2007 and attachements.
- Minutes of Commissioning meeting.

G:\185 SEW_DRAIN\255 Des_Const\8890 Transport\S1 Luggage PT\SQSJ Redirect Heroes Ave (s1)\COMMISS\Reg McGirr SP306 Coronation Drive\Site Commissioning Work Minutes Wedensday 14 March 07.doc

Reg McGirr - Re: Commissioning data for SP306 Coronation Drive - 14thMarch07

From: Reg McGirr
To: Anderson, Gerard; Collie, Bill
Date: 20/03/2007 14:51
Subject: Re: Commissioning data for SP306 Coronation Drive - 14thMarch07
CC: Sherriff, Peter

Gerard,

The following is confirming our telephone conversation today regarding Bump Pumps Once per day to prevent lockup.

After discussions with the pump supplier regarding pump lockup he recommended the following.

- **Each pump to be switched on for 30sec** every 7days. We will change from every 7days to **every 3days**.

Regards,
Reg McGirr
Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

>>> Gerard Anderson 19/03/2007 11:53 >>>
Reg,
Attached is an excel spreadsheet with pump comissioning data for SP306 Coronation Drive.
Also attached are trend files for the pump station operation on the commissioning day. The test with SP103 Heroes Ave running with 2 pumps full speed was performed at approximately 2.30PM in the afternoon (14/3/2007).
Also attached is the latest functional specification for SP306.
Outstanding testing to be performed at this site include :
- Generator testing to ensure generator can power the site and telemeter correctly back to Cullen Ave.
- VFD Run at Max testing : check digital output in PLC powers pumps when analog output is invalid
- Sewer level calibration fault code to be added for the gravity sewer probe against high level electrode.
- Sewer level high electrode hanging height to be determined- ie HiHi or High level
- Check % Wet Well indication onsite matches Cullen Ave graphic.
- Check mmAHDF elevation for Delivery Pressure probe.
- Add code to PLC to bump pumps once per day to prevent lockup.

Regards
Gerard Anderson
Brisbane Water
07 340 78410
0410 536 405

Dedicated to a better Brisbane

STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE

CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

Document Approval

Name	Section	Signature
Andrew Bannink (Project Manager)	Projects (BW)	
Jeff Browne (W&S Operations)	Networks (BW)	
Peter Sherriff	Networks Control Systems (BW)	
Gerard Anderson	Networks Control Systems (BW)	
Ron Wilson	Networks (BW)	
Harald Kennetmuller (Mechanical Engineer)	Projects (BW)	

08 March 2007

Rev 2

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STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

STAGE 2 Coronation Drive Pump Station SP306 (New Rising Main) to North Quay Existing S1 Sewer Connection.

STAGE 3 Cribb Street Connection for Existing XXXX Pump Station (New Rising Main) to North Quay Existing S1 Sewer Connection.

STAGE 4 Hockings Street Syphon Live Sewer Connection to Maintenance Holes EX. 1/4 & EX.2/4

TABLE OF CONTENTS

Section **Page**

STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

1. Project/System Background

HEROES AVENUE SP103 PUMP STATION UPGRADE

1.1 **Note: Heroes Avenue Pump Station SP103 upgrade is complete and was commissioned on 19 September 2005 using the Emergency Mode pumping to Oxley Creek via Indooroopilly Rising Main.**

1.2 **Note: Stage 1 Heroes Avenue Pump Station SP103 was commissioned on 19 February 2007 using the New Sewage Main from SP103 to North Quay Existing S1 Sewer Connection.**

1.3 Stage 3 Cribb Street connection (for existing XXXX pump station) will not be part of this commissioning procedure. **Note:** It is important that all valving at Cribb Street connection is set to the correct position, refer to Drg 486/5/8-SM12/068.

1.4 Stage 4 Hockings Street Syphon Live Sewer Connection to Maintenance Holes EX. 1/4 & EX.2/4 will not be part of this commissioning procedure.

2. Coronation Drive Pump Station SP306

2.1 SP306 Coronation Drive sewage pump station is required to relieve the surcharging in the Coronation Drive gravity sewer. Under wet weather flow conditions, the gravity sewer is susceptible to surcharge and overflows to the environment. SP306 Coronation Drive is therefore a wet weather sewage pump station only, incorporating two variable speed driven 65 kW submersible pumps operating in a one duty and one standby arrangement.

General Process Description

SP306 Coronation Drive pump station will be connected to the gravity sewer via a short inlet. During wet weather events the sewage will flow into the well. This sewage will then be pumped into the rising main. This will continue until the level in the gravity sewer has receded, at which point the pumps shall stop under level control.

The sewage Pumping Station is of underground configuration operating in wet weather conditions only, with a wet well operating volume (under surcharge) of approximately 10 kl. The pump station will operate as a surcharge pump station, only allowing flows into the wet well during periods of surcharge in the adjacent gravity sewer. The wet well will be free to drain back into the gravity sewer at the end of the surcharge event. The pump station will have two submersible type sewage pumps installed in the Pump Well operating as duty/standby units. The pumps are interlocked so that only one pump can operate at a time. The station output with one pump operating at maximum speed will be approximately 150 l/sec.

This pump station will operate, as a stop/start station only there will be no PID control at this site. Pump speed will be limited to 50Hz this is designed to pump down the Wet Well as quickly as possible.

2.2 To understand the layout of Coronation Drive PS, refer to drawing numbers (486/5/8-SM12/061) (486/5/7-KJ003) (486/5/8-SM12/009).

2.3 To understand the control philosophy attached, refer to SP306 Functional Specification Version 0.03 21/08/2006, **it is important you read and understand this document.**

STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE
CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

3. Responsibility Codes

The Responsibility Codes used on the ITP and Inspection Check Lists are as follows:

Name	Code	Branch/Section	Required Dates
Gerard Anderson	GA	Networks Control Systems (BW)	
Ron Wilson	RW	Networks (BW)	
Harald Kemmetmuller	HK	Mechanical Engineer (BW)	
Reg McGirr	RM	Commissioning Manager (BW)	
Jeff Browne	JB	Water & Sewerage Operations (BW)	

4. Attachments:

Inspection & Test Plan (ITP) No.: 306 Rev.0 STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION.

- Inspection Check List No 1 Rev 0 Pump Station Valving.
- SP306 Functional Specification Version 0.03 21/08/2006.

5. Inspection & Test Plan (ITP) & Inspection Check List above in item 4.

- To be signed before proceeding with system integration testing. ☐

6. Staff Responsibilities

Commissioning Manager	Reg McGirr	To provide direction as required and to insure that all ITPs and check sheets have been signed before proceeding with system integration testing
Senior Mechanical Engineer	John Blake	Backup Commissioning Manager to provide direction as required and to insure that all ITPs and check sheets have been signed before proceeding with system integration testing
Networks Control Systems	Gerard Anderson	Inform Control Room of work to be carried out. Responsible for Monitoring SP306 (RTU/PLC) during the commissioning process. Also finetuning the system when we are pumping into the new rising main. To supply pumping Trends refer to section 7.3.
Electrical	Bill Collie	Ensure that all electrical equipment is ready for automatic/manual operation.
Field Commissioning Monitoring	Ron Wilson	Ensure all valving is in the correct position (according to BW Tag Out Procedure) for manual/automatic operation. The above in accordance with Inspection Check List (1)
Mechanical Engineer	Harald Kemmetmuller	Control monitoring the operation of the pumping station/system. (Wet Well) (Pumps) (Pressure) (Valve Position)

STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

7. System Integration Testing – Day 1 Wedensday 14 March 2007 Time 06:00hrs.

- Everyone involved in the system integration testing to assemble at Coronation Drive Pumping Station. ☐
- Workplace Health & Safety
  Tool Box talk (06:00hrs) before commissioning. ☐
- Everyone has a copy and understands the System Integration Testing Procedure. ☐
- In case of a emergency regarding the System Integration Testing:

First point of contact	**Reg McGirr :**	**Mobile Tel No. 0414576374**
Second point of contact	**Gerard Anderson:**	**Mobile Tel No. 0410536405**
Third point of contact	**Harald Kemmetmuller:**	**Mobile Tel No. 0410536405**
Forth point of contact	**Ron Wilson :**	**Mobile Tel No. 0404083674**

- Confined Space Entry Permit will be the responsibility of Sid Wain.
  Note: No entry into a confined space without Authority Card. ☐
- **At all times the control room must be contacted by phone and informed of what you are planing to do before you start the work.** ☐

7.1 Commissioning of Coronation Drive (SP306) Sewage Pump Station.

- Before we start commissioning the new Pump Stations all valves to be checked for correct position (open/closed). There will be the following inspection check list to be signed and dated.

  : Inspection Check List 1 Pump Station Valving. ☐
- **Note:** For the commissioning process the 300 NB Knife Gate Valve will be closed. Refer to Drg No 486/5/7-KJ003 Item 15 Section A. ☐
- **Switch pump station (all 2 pumps) to manual mode.** ☐
- Ensure the minium speed on the VFD is set to 28Hz and max speed to 50Hz. ☐
- Fill wet well by opening DN150 Sluice Gate Valve. Refer to Drg No 486/5/8-SM12/061 Plan View Item 10. ☐
- Fill the wet well to just above Start Duty A pump and place the pump in auto mode. The pump should pump down to Stop Duty A pump. ☐
- Repeat the above step on Duty B pump. ☐
- With the pumps in manual mode fill the wet well to just above Surcharge Imminent, place the pumps in auto mode. One pump should pump down to Stop pump level. ☐
- Repeat the above step and the other pump should pump down to Stop pump level. ☐

STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE
CORONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

7.2 Monitor the operation of the pump systems according to the Functional Specifications SP306 Version 0.03 21/8/06.

- Monitor the wet well at SP306 and confirm that the duty pumps start at the start level and stops at the stop level. ☐
- Monitor the operation of the pump systems according to the Functional Specifications SP306 Version 0.03 21/08/06. ☐
- Check the operation of the Reflux Limit Switches. ☐

7.3 Pumping trends of Heroes Avenue PS SP103 and Coronation Drive PS SP306 to be captured at the end of the day.

- Trends required of Wet Well Levels.
- Trends required of Delivery Pressure. ☐
- Trends required of Pump Power, Speed and Running Signal.
- Trends required of Pump Flow.

7.4 The pumping system will be left in the automatic position.

- **Note:** The 300 NB Knife Gate Valve must be open. Refer to Drg No 486/5/7-KJ003 Item 15 Section A. ☐

8. System Integration Testing – Day 2 Thursday 15 March 2007 Time 06:00hrs

- Everyone involved in the system integration testing to assemble at Coronation Drive Pumping Station. ☐
- Workplace Health & Safety
  Tool Box talk (06:00hrs) before commissioning. ☐
- Everyone has a copy and understands the System Integration Testing Procedure. ☐
- In case of a emergency regarding the System Integration Testing:

First point of contact	**Reg McGirr :**	**Mobile Tel No. 0414576374**
Second point of contact	**Gerard Anderson:**	**Mobile Tel No. 0410536405**
Third point of contact	**Harald Kemmetmuller:**	**Mobile Tel No. 0410536405**
Forth point of contact	**Ron Wilson :**	**Mobile Tel No. 0404083674**

- Confined Space Entry Permit will be the responsibility of Sid Wain.
  Note: No entry into a confined space without Authority Card. ☐
- **At all times the control room must be contacted by phone and informed of what you are planing to do before you start the work.** ☐

8.1 System Control – Power Failure.

- **Simulate complete energex power failure by isolating main incoming switch.** ☐
- **Monitor the Generator cutin when energex main isolating switch is closed.** ☐

- **Open energex main isolating switch and monitor Generator cutout.** ☐

9. PWWF Testing of Heroes Avenue P/S SP103 and Coronation Drive P/S SP306 Pumping into the new rising main Simultaneous.

- Heroes Avenue P/S SP103. Pumps placed in manual mode and fill Wet Well level to just below surcharge level. ☐
- Coronation Drive P/S SP306. Pumps placed in manual mode and fill Wet Well level to just below surcharge level. ☐
- Heroes Avenue P/S SP103. Pumps placed in auto mode. Approximately 60sec later place Coronation Drive P/S SP306 in auto mode. ☐
- Pumping trends of Heroes Avenue P/S SP103 and Coronation Drive P/S SP306 to be captured
  - Trends required of Wet Well Levels.
  - Trends required of Delivery Pressure.
  - Trends required of Pump Power, Speed and Running Signal.
  - Trends required of Pump Flow.

  ☐

Note: To achieve meaningful test results the above trends to be captured after an actual Wet Weather event.

10. Contingency Plan

Shutdown complete pump station.

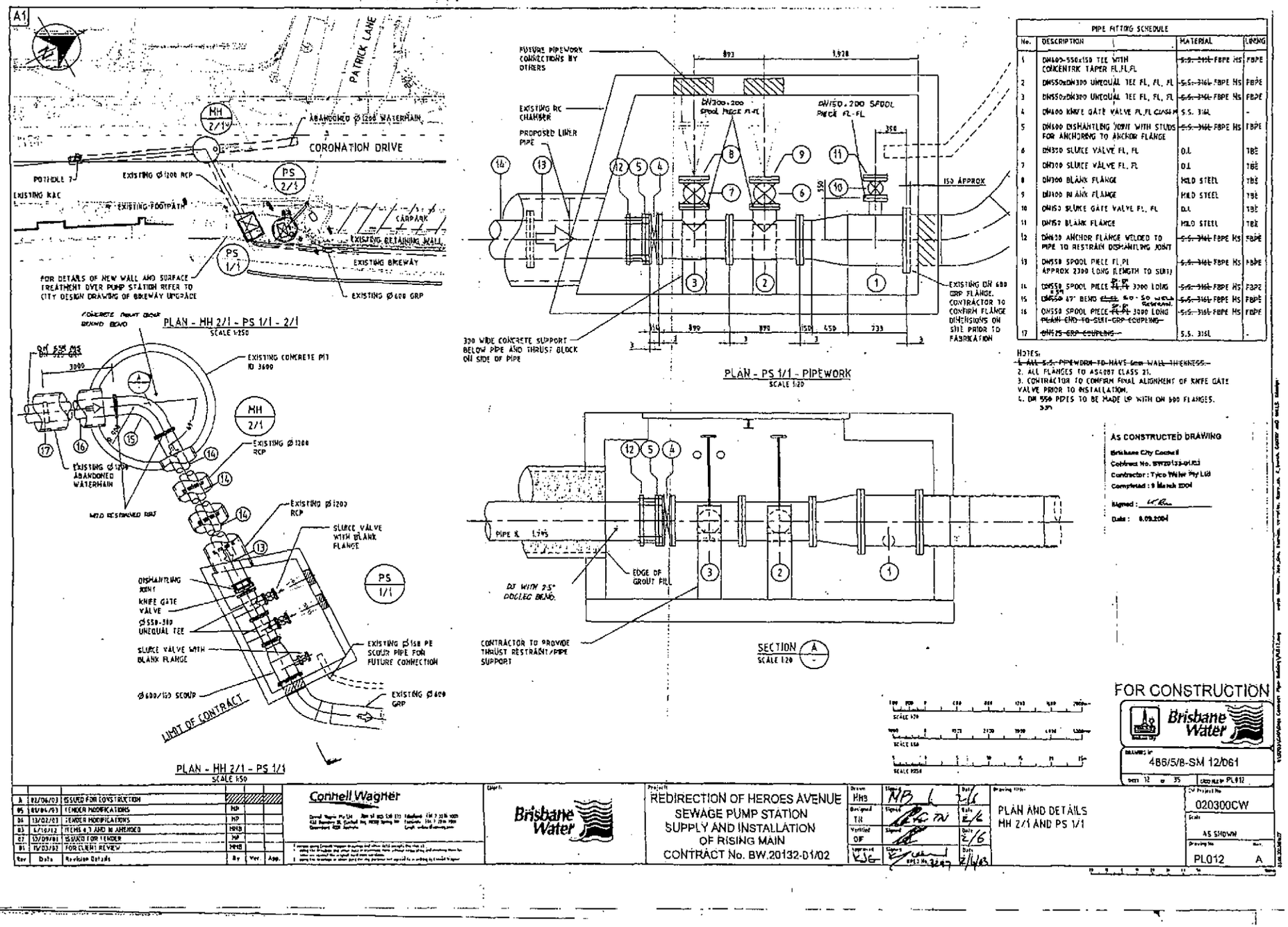
STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE
COTONATION DRIVE PUMP STATION SP306 (NEW RISING MAIN) TO NORTH QUAY EXISTING S1 SEWER CONNECTION

Inspection Check List 1 Pump Stations Valving & Piping.
Refer to Drg No,s. (486/5/8-SM12/061)(486/5/7-KJ003) (486/5/8-SM12/009

The following manual operated Valving to be inspected and checked for correct position open/closed.
Print name/signed and dated in the following check list.

Item No	Item Description	BW Drawing No.	Valve Position	Date Checked	Code/Print Name	Sgn
1	Patrick Lane/Coronation Drive SP306 Item 4 Rising Main DN600 Knife Gate Valve	Item 4 486/5/8-SM12/061	Closed/Open			
1.1	Patrick Lane/Coronation Drive SP306 Item 6 & 7 DN300 Sluce Valve into Wet Well SP306	Item 6 & 7 486/5/8-SM12/061	Open			
1.2	Patrick Lane/Coronation Drive SP306 Item 15 300NB Knife Gate Valve into Gravity Main	Item 15 486/5/7-KJ003	Open			
1.3	Patrick Lane/Coronation Drive SP306 Item 10 DN150 Sluce Gate Valve into Wet Well SP306	Item 15 486/5/8-SM12/061	Close			
1.4	Check Piping for leaks in Valve Chamber and Wet Well					
1.5						
1.6						
1.7						
1.8						

Issue Date: 05/3/07
Rev No: 0



PIPE FITTING SCHEDULE			
No.	DESCRIPTION	MATERIAL	LINING
1	DN600-550x150 TEE WITH CONCENTRIC TAPER FL,FL,FL	~~S.S. 316L~~ FBPE HS	FBPE
2	DN550xDN300 UNEQUAL TEE FL, FL, FL	~~S.S. 316L~~ FBPE HS	FBPE
3	DN550xDN300 UNEQUAL TEE FL, FL, FL	~~S.S. 316L~~ FBPE HS	FBPE
4	DN400 KNIFE GATE VALVE FL,FL CLASS H	S.S. 316L	-
5	DN600 DISMANTLING JOINT WITH STUDS FOR ANCHORING TO ANCHOR FLANGE	~~S.S. 316L~~ FBPE HS	FBPE
6	DN550 SLUICE VALVE FL, FL	D.I.	TBE
7	DN300 SLUICE VALVE FL, FL	D.I.	TBE
8	DN300 BLANK FLANGE	MILD STEEL	TBE
9	DN400 BLANK FLANGE	MILD STEEL	TBE
10	DN150 SLUICE GATE VALVE FL, FL	D.I.	TBE
11	DN150 BLANK FLANGE	MILD STEEL	TBE
12	DN630 ANCHOR FLANGE WELDED TO PIPE TO RESTRAIN DISMANTLING JOINT	~~S.S. 316L~~ FBPE HS	FBPE
13	DN550 SPOOL PIECE FL,PE APPROX 2300 LONG (LENGTH TO SUIT)	~~S.S. 316L~~ FBPE HS	FBPE
14	DN550 SPOOL PIECE ~~FL,PE~~ 3700 LONG	~~S.S. 316L~~ FBPE HS	FBPE
15	~~DN550 47° BENDS~~	~~S.S. 316L~~ FBPE HS	FBPE
16	DN550 SPOOL PIECE ~~FL,PE~~ 3000 LONG PLAIN END TO SUIT GRP COUPLING	~~S.S. 316L~~ FBPE HS	FBPE
17	~~DN525 GRP COUPLING~~	S.S. 316L	-

NOTES:
1. ~~ALL S.S. PIPEWORK TO HAVE 6mm WALL THICKNESS.~~
2. ALL FLANGES TO AS4087 CLASS 21.
3. CONTRACTOR TO CONFIRM FINAL ALIGNMENT OF KNIFE GATE VALVE PRIOR TO INSTALLATION.
4. DN 550 PIPES TO BE MADE UP WITH DN 600 FLANGES.

AS CONSTRUCTED DRAWING
Brisbane City Council
Contract No. BW20132-01/02
Contractor : Tyco Water Pty Ltd
Completed : 9 March 2004
Signed :
Date : 8.09.2004

FOR CONSTRUCTION

Brisbane Water

DRAWING No 486/5/8-SM 12/061
SHEET 12 OF 35 CAD FILE No PL012

Rev	Date	Revision Details	By	Ver.	App.
A	02/06/03	ISSUED FOR CONSTRUCTION			
05	06/06/03	TENDER MODIFICATIONS	MP		
04	13/02/03	TENDER MODIFICATIONS	MP		
03	6/10/02	ITEMS 6,7 AND 16 AMENDED	MHB		
02	27/09/01	ISSUED FOR TENDER	MP		
01	19/03/02	FOR CLIENT REVIEW	MHB		

Connell Wagner

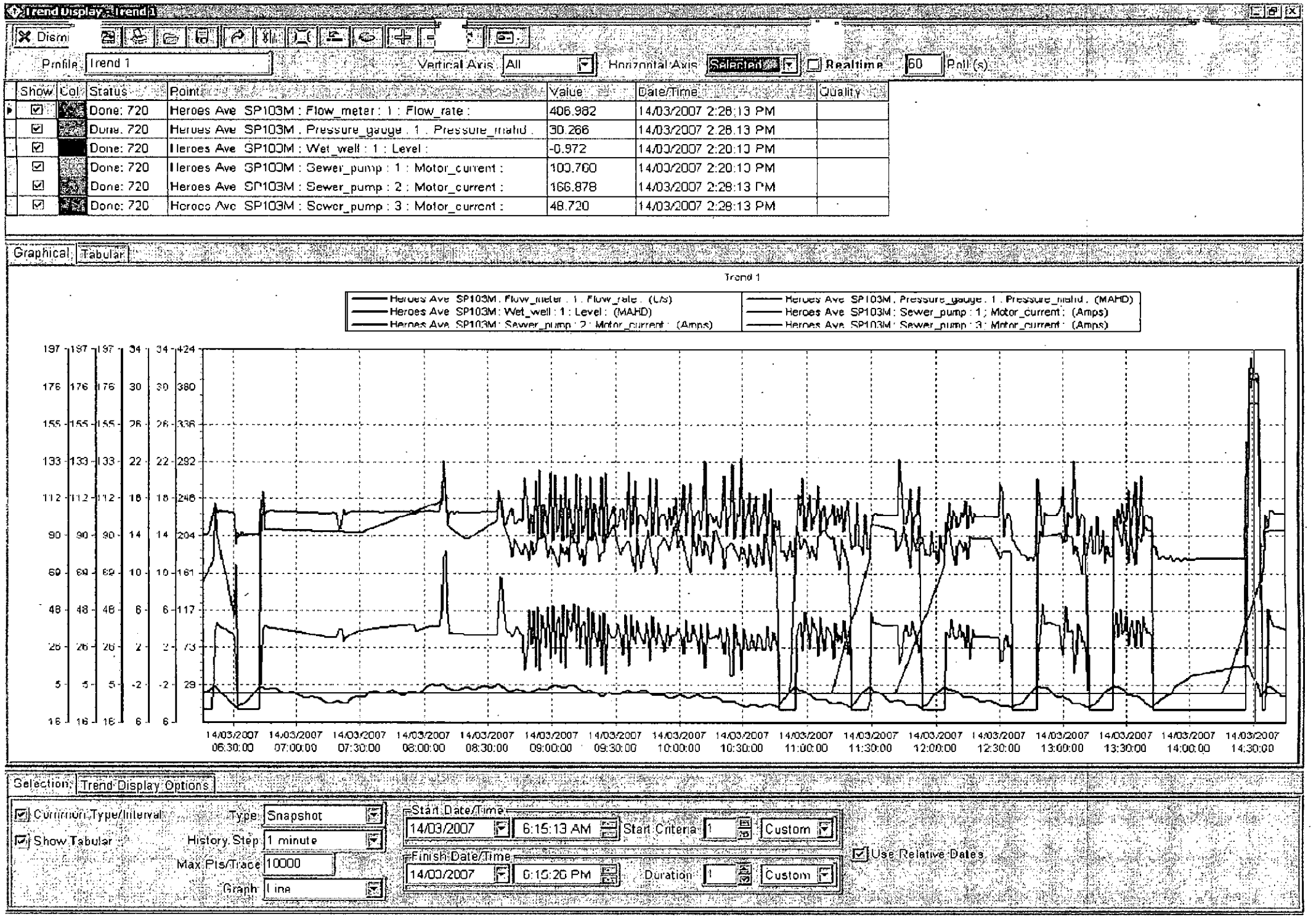
Brisbane Water

REDIRECTION OF HEROES AVENUE SEWAGE PUMP STATION SUPPLY AND INSTALLATION OF RISING MAIN CONTRACT No. BW.20132-01/02

Drawn MHB 7/6
Designed TR 2/6
Verified OF 2/6
Approved EJG 2/6/03

PLAN AND DETAILS HH 2/1 AND PS 1/1

CW Project No 020300CW
Scale AS SHOWN
Drawing No PL012 Rev A



Show	Col	Status	Point	Value	Date/Time	Quality
☑		Done: 720	Heroes Ave SP103M : Flow_meter : 1 : Flow_rate :	406.982	14/03/2007 2:28:13 PM	
☑		Done: 720	Heroes Ave SP103M : Pressure_gauge : 1 : Pressure_mahd :	30.266	14/03/2007 2:28:13 PM	
☑		Done: 720	Heroes Ave SP103M : Wet_well : 1 : Level :	-0.972	14/03/2007 2:20:13 PM	
☑		Done: 720	Heroes Ave SP103M : Sewer_pump : 1 : Motor_current :	100.760	14/03/2007 2:20:13 PM	
☑		Done: 720	Heroes Ave SP103M : Sewer_pump : 2 : Motor_current :	166.878	14/03/2007 2:28:13 PM	
☑		Done: 720	Heroes Ave SP103M : Sewer_pump : 3 : Motor_current :	48.720	14/03/2007 2:28:13 PM	

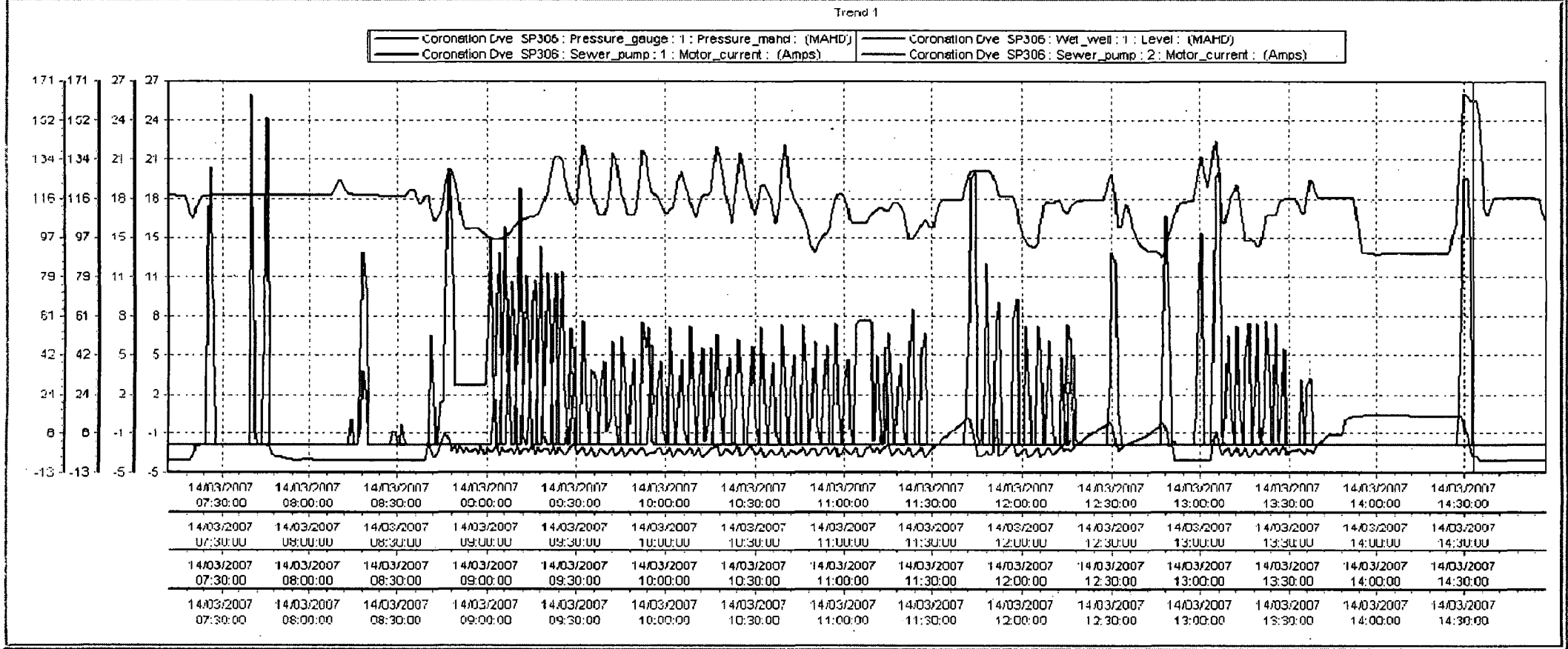
Trend Display - Trend 1

Dismiss

Profile: Trend 1 | Vertical Axis: All | Horizontal Axis: All | Realtime: 60 Poll (s)

Show	Col	Status	Point	Value	Date/Time	Quality
☑		Done: 720	Coronation Dve SP306 : Pressure_gauge : 1 : Pressure_mahd :	26.385	14/03/2007 2:30:13 PM	
☑		Done: 720	Coronation Dve SP306 : Wet_well : 1 : Level :	-1.108	14/03/2007 2:30:13 PM	
☑		Done: 720	Coronation Dve SP306 : Sewer_pump : 1 : Motor_current :	123.510	14/03/2007 2:29:13 PM	
☑		Done: 720	Coronation Dve SP306 : Sewer_pump : 2 : Motor_current :	0.000	14/03/2007 2:29:13 PM	

Graphical | Tabular



Selection | Trend Display Options

Common Type/Interval | Show Tabular

Type: Snapshot | History Step: 1 minute | Max Pts/Trace: 10000 | Graph: Line

Start Date/Time: 14/03/2007 6:15:13 AM | Start Criteria: 1 Custom

Finish Date/Time: 14/03/2007 6:15:20 PM | Duration: 1 Custom

Use Relative Dates

Reg McGirr - Commissioning data for SP306 Coronation Drive - 14thMarch07

From: Gerard Anderson
To: Collie, Bill; McGirr, Reg
Date: 19/03/2007 11:53
Subject: Commissioning data for SP306 Coronation Drive - 14thMarch07
CC: Sherriff, Peter

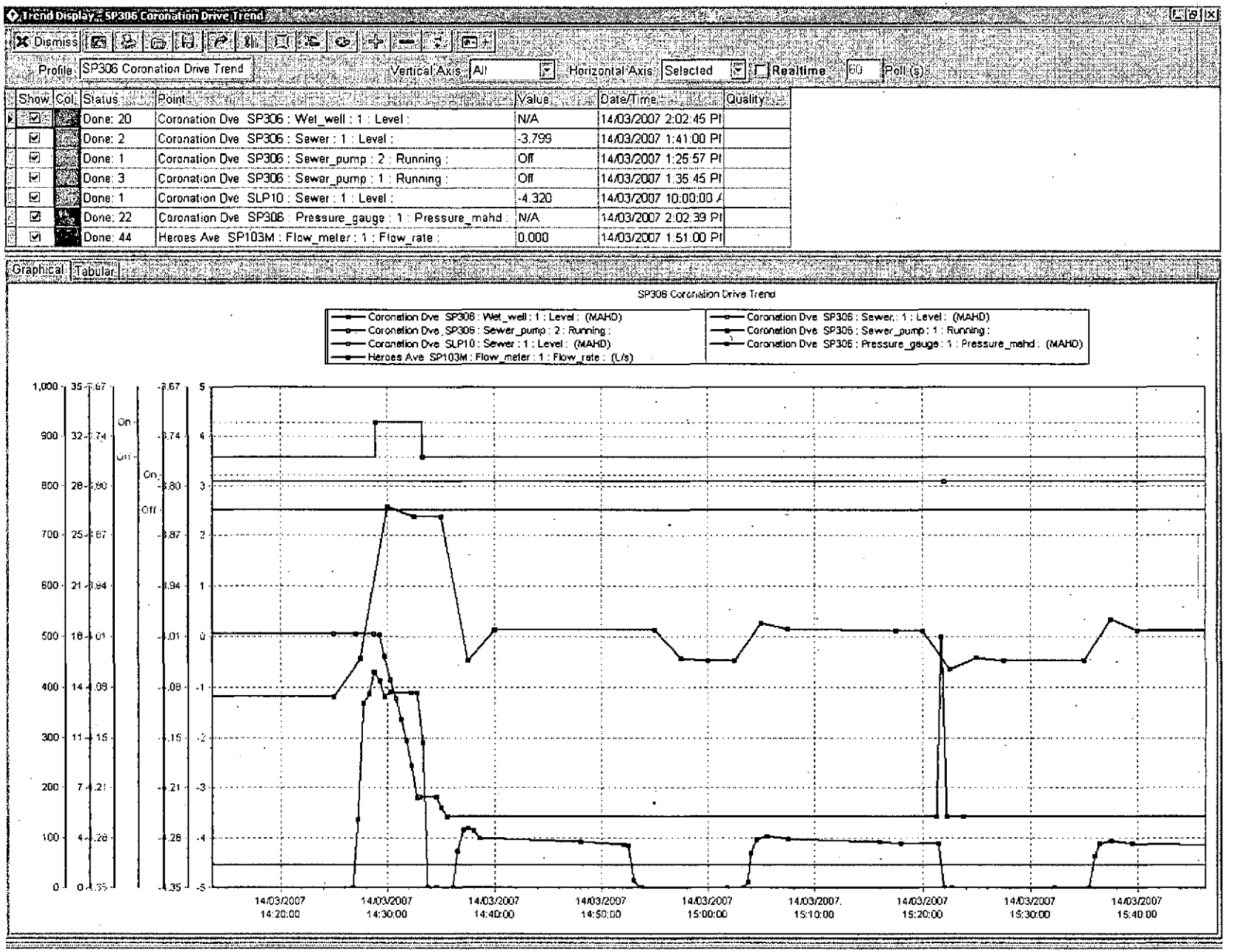
Reg,
Attached is an excel spreadsheet with pump comissioning data for SP306 Coronation Drive.
Also attached are trend files for the pump station operation on the commissioning day. The test with SP103 Heroes Ave running with 2 pumps full speed was performed at approximately 2.30PM in the afternoon (14/3/2007).
Also attached is the latest functional specification for SP306.
Outstanding testing to be performed at this site include :
- Generator testing to ensure generator can power the site and telemeter correctly back to Cullen Ave.
- VFD Run at Max testing : check digital output in PLC powers pumps when analog output is invalid
- Sewer level calibration fault code to be added for the gravity sewer probe against high level electrode.
- Sewer level high electrode hanging height to be determined- ie HiHi or High level
- Check % Wet Well indication onsite matches Cullen Ave graphic.
- Check mmAHDF elevation for Delivery Pressure probe.
- Add code to PLC to bump pumps once per day to prevent lockup.

Regards
Gerard Anderson
Brisbane Water
07 340 78410
0410 536 405

SP306 Coronation Drive commissioning

Full Load pump readings	Pump Amps	Pump kW	Delivery Pressure H_2O	Pressure kPa	Pressure MAHD
Pump 1	122.9	70.5	16550	183	21.49
Pump 2	128	72.68	16410	193	22.49

SP306 Coronation Drive Site Data with SP103 Heroes Ave running 2 pumps full speed.



Date/Time	Coronation Dve SP306 : Wet_well : 1 : Level :	Coronation Dve SP306 : Sewer : 1 : Level :	Coronation Dve SP306 : Sewer_pump : 2 : Running :	Coronation Dve SP306 : Sewer_pump : 1 : Running :	Coronation Dve SLP10 : Sewer : 1 : Level :	Coronation Dve SP306 : Pressure_gauge : 1 : Pressure_mahd :	Heroes Ave SP103M : Flow_meter : 1 : Flow_rate :
14/03/2007 10:00:00.000 AM					-4.320		
14/03/2007 1:25:57.000 PM			Off				
14/03/2007 1:35:45.000 PM				Off			
14/03/2007 1:41:00.000 PM		-3.799					
14/03/2007 1:51:00.000 PM							0.000
14/03/2007 2:12:00.000 PM	0.069						
14/03/2007 2:12:30.000 PM						13.350	
14/03/2007 2:25:00.000 PM	0.062					13.350	
14/03/2007 2:26:45.000 PM							0.000
14/03/2007 2:27:00.000 PM	0.062						
14/03/2007 2:27:15.000 PM							135.800
14/03/2007 2:27:30.000 PM						15.980	
14/03/2007 2:27:45.000 PM							369.700
14/03/2007 2:28:15.000 PM							388.500
14/03/2007 2:28:45.000 PM	0.061						430.300
14/03/2007 2:28:56.000 PM				On			
14/03/2007 2:29:15.000 PM	0.035						413.700
14/03/2007 2:29:45.000 PM	-0.395						381.300
14/03/2007 2:30:00.000 PM						26.560	
14/03/2007 2:30:15.000 PM	-0.846						391.500
14/03/2007 2:30:45.000 PM	-1.212						
14/03/2007 2:31:15.000 PM	-1.621						
14/03/2007 2:31:45.000 PM	-2.061						
14/03/2007 2:32:15.000 PM	-2.553						388.900
14/03/2007 2:32:30.000 PM						25.820	
14/03/2007 2:32:45.000 PM	-3.201						388.900
14/03/2007 2:33:00.000 PM	-3.184						
14/03/2007 2:33:15.000 PM				Off			290.300
14/03/2007 2:33:45.000 PM							0.000
14/03/2007 2:34:30.000 PM	-3.184						0.000
14/03/2007 2:35:00.000 PM	-3.394					25.820	
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14/03/2007 2:37:00.000 PM							116.900
14/03/2007 2:37:30.000 PM						15.890	120.400
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14/03/2007 3:05:00.000 PM						18.420	
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14/03/2007 3:07:30.000 PM						18.050	97.100
14/03/2007 3:16:00.000 PM							92.000
14/03/2007 3:17:30.000 PM						17.900	
14/03/2007 3:18:00.000 PM							88.000
14/03/2007 3:20:00.000 PM						17.900	
14/03/2007 3:21:15.000 PM	-3.580						
14/03/2007 3:21:30.000 PM							88.000
14/03/2007 3:21:45.000 PM	0.000						
14/03/2007 3:22:00.000 PM		-3.799					0.000
14/03/2007 3:22:15.000 PM	-3.580						
14/03/2007 3:22:30.000 PM						15.300	
14/03/2007 3:22:45.000 PM							0.000
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14/03/2007 3:36:30.000 PM							88.100
14/03/2007 3:37:30.000 PM						18.670	94.500
14/03/2007 3:39:30.000 PM							88.900
14/03/2007 3:40:00.000 PM						17.920	
14/03/2007 3:48:30.000 PM							84.700
14/03/2007 3:52:30.000 PM						17.920	
14/03/2007 5:29:00.000 PM		-3.799					
14/03/2007 5:30:45.000 PM	-3.580						
15/03/2007 9:59:45.000 AM					-4.320		
15/03/2007 10:00:00.000 AM			Off	Off			

Date/Time	Coronation Dve SP306 : Sewer_pump 1 : Motor_current :	Coronation Dve SP306 : Sewer_pump 1 : Motor_power :	Coronation Dve SP306 : Sewer_pump : 2 : Motor_current :	Coronation Dve SP306 : Sewer_pump : 2 : Motor_power :	Coronation Dve SP306 : Wet_well : 1 : Level :	Coronation Dve SP306 : Sewer_pump : 1 : Running :	Coronation Dve SP306 : Sewer_pump : 2 : Running :
14/03/2007 10:00:00.000 AM			0.000	0.000			Off
14/03/2007 10:09:28.000 AM						Off	
14/03/2007 10:14:45.000 AM					-2.503		
14/03/2007 10:15:00.000 AM	57.882	5.980					
14/03/2007 10:15:06.000 AM						On	
14/03/2007 10:15:15.000 AM		5.980					
14/03/2007 10:15:30.000 AM		71.500					
14/03/2007 10:15:45.000 AM		71.500			-2.657		
14/03/2007 10:16:00.000 AM	0.000	0.000	0.000				
14/03/2007 10:16:06.000 AM						Off	
14/03/2007 10:16:15.000 AM	0.000				-2.508		
14/03/2007 10:16:45.000 AM					-2.384		
14/03/2007 10:17:00.000 AM			58.530				
14/03/2007 10:17:15.000 AM				0.000	-2.384		
14/03/2007 10:17:26.000 AM							On
14/03/2007 10:17:30.000 AM				72.020			
14/03/2007 10:17:45.000 AM				70.200	-3.274		
14/03/2007 10:18:00.000 AM			28.242				
14/03/2007 10:18:15.000 AM					-3.215		
14/03/2007 10:18:30.000 AM				70.200			
14/03/2007 10:18:45.000 AM			0.000	0.000	-3.045		
14/03/2007 10:18:50.000 AM							Off
14/03/2007 10:19:15.000 AM	0.000				-2.888		
14/03/2007 10:19:45.000 AM			0.000		-2.713		
14/03/2007 10:20:15.000 AM					-2.553		
14/03/2007 10:20:30.000 AM					-2.443		
14/03/2007 10:20:45.000 AM			58.620	0.000			
14/03/2007 10:21:00.000 AM				70.540	-2.443		
14/03/2007 10:21:05.000 AM							On
14/03/2007 10:21:30.000 AM				70.540	-3.318		
14/03/2007 10:21:45.000 AM			21.498	4.540	-3.212		
14/03/2007 10:22:15.000 AM			0.000		-3.046		
14/03/2007 10:22:45.000 AM					-2.888		
14/03/2007 10:23:00.000 AM				4.540			
14/03/2007 10:23:07.000 AM							Off
14/03/2007 10:23:15.000 AM	0.000			0.000	-2.729		
14/03/2007 10:23:45.000 AM					-2.551		
14/03/2007 10:24:15.000 AM	51.462				-2.440		
14/03/2007 10:24:30.000 AM	57.252	0.000					
14/03/2007 10:24:42.000 AM						On	
14/03/2007 10:24:45.000 AM		48.480			-2.440		
14/03/2007 10:25:15.000 AM		48.480			-3.315		
14/03/2007 10:25:30.000 AM	24.732	1.220			-3.232		
14/03/2007 10:25:45.000 AM		0.000					
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14/03/2007 10:26:00.000 AM					-3.066		
14/03/2007 10:26:15.000 AM	0.000						
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14/03/2007 10:28:45.000 AM			58.968				
14/03/2007 10:29:00.000 AM					-2.326		
14/03/2007 10:29:15.000 AM				0.000			
14/03/2007 10:29:23.000 AM							On
14/03/2007 10:29:30.000 AM				70.552	-3.219		
14/03/2007 10:29:45.000 AM			32.472				
14/03/2007 10:30:00.000 AM				70.552	-3.214		
14/03/2007 10:30:18.000 AM							Off
14/03/2007 10:30:30.000 AM			0.000				
14/03/2007 10:31:15.000 AM	0.000						
14/03/2007 10:32:03.000 AM						On	
14/03/2007 10:39:15.000 AM		0.000					

BRISBANE WATER

Network Control Systems

FUNTIONAL SPECIFICATION

SP306 Coronation Drive

Sewage Pumping Station

Submersible 2 Pumps With VSD

(Wet Weather Station)

Document Signoff

Approval

	Name	Role	Signature	Date
Manager Mechanical and Electrical Services *Engineering Design Services*	Rahim Janfade.	Concur		
Manager *Water And Watewater Operations Manager*	Anu Atukorala	Concur		
Team Leader *Network Control Systems*	Peter Sherriff	Concur		
Manager *System Planning*	Peter Casey	Concur		
Project Manager	Andrew Bannink.	Approve		

Distribution

Name	Role	Section

Revision Control

Revision Number	Date	Amendment Details	Responsible Officer
Version 0.00	16/08/2005	Original Draft – Developed from Connell Wagner SP306 Revised Functional Spec	Alex Witthoft
Version 0.01	25/7/06	Updated approval sheet, removed flowmeter reference.	Gerard Anderson
Version 0.02	2/8/06	Updated approval sheet, Pump kW, picture details.	Gerard Anderson
Version 0.03	21/8/06	Updated confirmed sewer surcharge level and surcharge imminent level for SP306 (Noel Ralph). Station changed to Stop/Start at 50Hz (RM). Added Gravity Sewer alarm level diagram. Set High Level setpoint to 0.4M above TWL. Set pump inhibit limits to 200 and 400mm below Surcharge Imminent	Gerard Anderson
Version 1.00	14/3/2007	Site commissioned. Added level ranges.	Gerard Anderson

Document Consultation

Please review the attached document and add your comments where necessary. To ensure that the process is kept within reasonable timeframes, it would be appreciated if you could return this document by the **Requested Return Date** listed below.

Project Sponsor:	Andy Moore	Officer Code: PM13BW	Location: T.C.B. Level 2
Author:	Alex Witthoft/ Gerard Anderson	Officer Code: CTAMP12/ E2SBW	Location: Cullen Ave
Document Administrator:	Gerard Anderson	Officer Code: E2SBW	Location: Cullen Ave

Version Number (1,2,3 etc)	Forwarded To: (Name / Officer Code)	Location (eg,TCB, Cullen Ave)	Date Sent	**Requested Return Date**	Date Returned	Comments Received (Y / N)	Comments Incorporated (Y / N)

PLEASE RETURN THIS DOCUMENT TO THE ABOVE DOCUMENT ADMINISTRATOR

DO NOT SEND IT ANYWHERE ELSE!

Table of Contents

Table of Figures

Table of Tables

Definitions

BWTS	Brisbane Water Telemetry System
RTU	Remote Telemetry Unit
SCADA	Supervisory Control And Data Acquisition
MAHD	Metres above Australia Height Datum

1 INTRODUCTION

This document contains the site specific details and describes the non standard functional requirements for control, monitoring and telemetry at sewage pump station SP306 at Coronation Drive, Toowong, opposite Patricks Lane. The functional requirements described in the document are in addition to the standard functionality detailed in "SPSV3 SEWAGE PUMPING STATION SUBMERSIBLE 3 PUMPS WITH VFD" [1].

The standard specification was written for a 3 pump station, of which only 2 pumps are allowed to run at any given time. The functionality for SP306 Coronation Drive is identical, except the third pump is removed. The pumps are interlocked so that only one pump can operate at a time. All site specific values are detailed in this document. The site specific details and the non standard functional requirements in this document were derived from the functional specification written by Connell Wagner "PATRICK LANE FUNCTIONAL SPECIFICATION" [2].

SP306 Coronation Drive sewage pump station is required to relieve the surcharging in the Coronation Drive gravity sewer. Under wet weather flow conditions, the gravity sewer is susceptible to surcharge and overflows to the environment. . SP306 Coronation Drive is therefore wet weather sewage pump station only, incorporating two variable speed driven 65 kW submersible pumps operating in a one duty and one standby arrangement

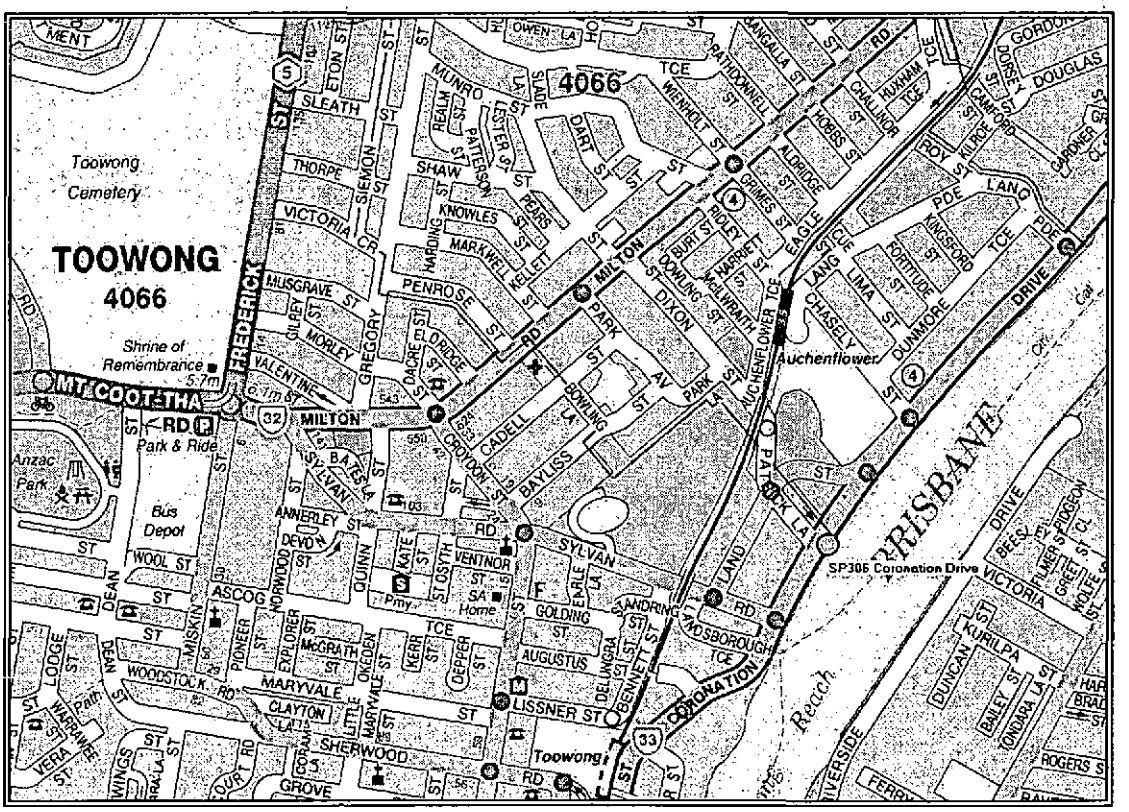


Figure 1: SP306 Location Map

1.1 General Process Description

SP306 Coronation Drive pump station will be connected to the gravity sewer via a short inlet. During wet weather events the sewage will flow into the well. This sewage will then be pumped into the rising main. This will continue until the level in the gravity sewer has receded, at which point the pumps shall stop under level control.

The sewage Pumping Station is of underground configuration operating in wet weather conditions only, with a wet well operating volume (under surcharge) of approximately 10 kl. The pump station will operate as a surcharge pump station, only allowing flows into the wet well during periods of surcharge in the adjacent gravity sewer. The wet well will be free to drain back into the gravity sewer at the end of the surcharge event. The pump station will have two submersible type sewage pumps installed in the Pump Well operating as duty/standby units. The pumps are interlocked so that only one pump can operate at a time. The station output with one pump operating at maximum speed will be approximately 150 l/sec.

This pump station will operate as a stop/start station only, there will be no PID control at this site. Pump speed will be limited to 50Hz, this is designed to pump down the Wet Well as quickly as possible.

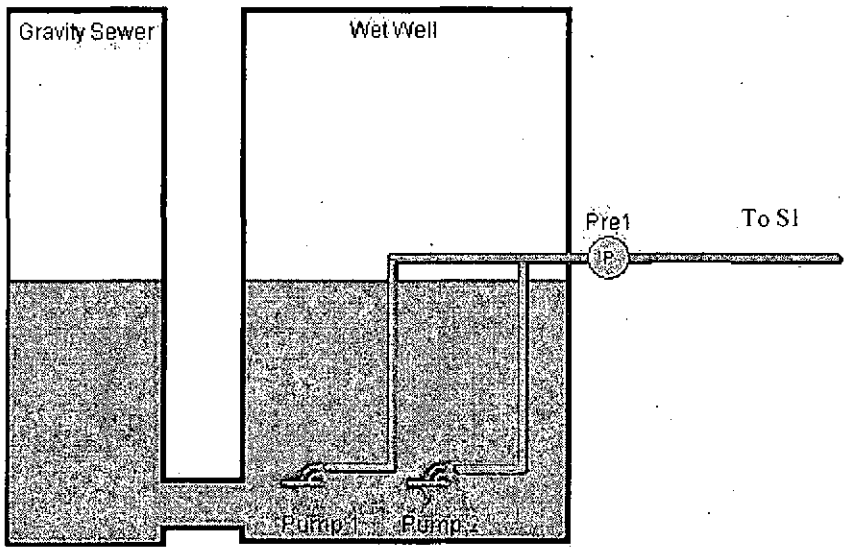


Figure 2: SP306 Process and Instrumentation Overview

2 EQUIPMENT INSTALLED

2.1 Standard Equipment

SP306 Coronation Drive pump station has the following standard equipment installed. The functionality for the control, monitoring and alarming for these items is fully described in the standard functional specification.

Pumps	Two Grundfoss submersible pumps with 65 kW four pole electric motors are installed in the wet well. Each pump is fitted with moisture probes in the oil chamber and thermistors in the stator windings.
Pump Starters	Two Danfoss Variable Frequency Drives (VFDs) are installed in the pump station switchboard. The VFDs will also provide soft starting functionality.
Level Sensors	One Vega hydrostatic level transmitter installed in the wet well. One Multitrode level probe (Surcharge imminent) installed in the wet well.
Pressure Transmitters	One Vega D84 pressure transmitters are installed on the discharge side of the pumps.

2.2 Non Standard Equipment

SP306 Coronation Drive pump station has the following non standard equipment installed. The functionality for the control, monitoring and telemetry for is described in the following sections as these items are NOT described in the standard specification. The pumps are interlocked so that only one pump can operate at a time.

Emergency Generator	The switchboard will have the facility for a generator to be connected. No generator will be installed on site.
Level Sensors	One Vega hydrostatic level transmitter installed in the gravity sewer One Multitrode level probe (Gravity Sewer High) installed in the gravity sewer
Reflux Limit Switches	Each pumps reflux valve has a reflux limit switch fitted. NB There is no flowmeter onsite.
Wet well washer solenoid	Well washer solenoid valve with flow switch installed in the wet well. Note that there is currently no water supply to the Wet well washer. The Wet Well washer will not be commissioned at this stage.

2.2.1 Emergency Generator

The emergency generator is designed to the standard functionality as described by "DIESEL STANDBY GENERATOR LOCAL CONTROL PANEL FUNCTIONAL DESCRIPTION". [3] The generator is supplied with the PLC fully configured and loaded with the standard program. The RTU (Logica MD3311) will programmed with the standard interface program that will provide the monitoring, control and telemetry to the BWTS master station.

2.2.2 Gravity Sewer Monitoring

The gravity sewer will also have monitoring in the form of a vega hydrostatic level transmitter as well as a gravity high multitrode electrode.

3 CONTROL PHILOSOPHY

The station will operate according to the control philosophy detailed in the standard functional specification (SPSV3). The initialisation block will be configured with the site specific set points listed in the tables in the next sections. Surcharge Occurring & Surcharge Imminent mAHD will be the same levels as the gravity main setup (confirmed with Noel Ralph). There is no physical surcharge pipe at SP306. Inlet level of pipe from gravity main to wet well is IL -3.790.

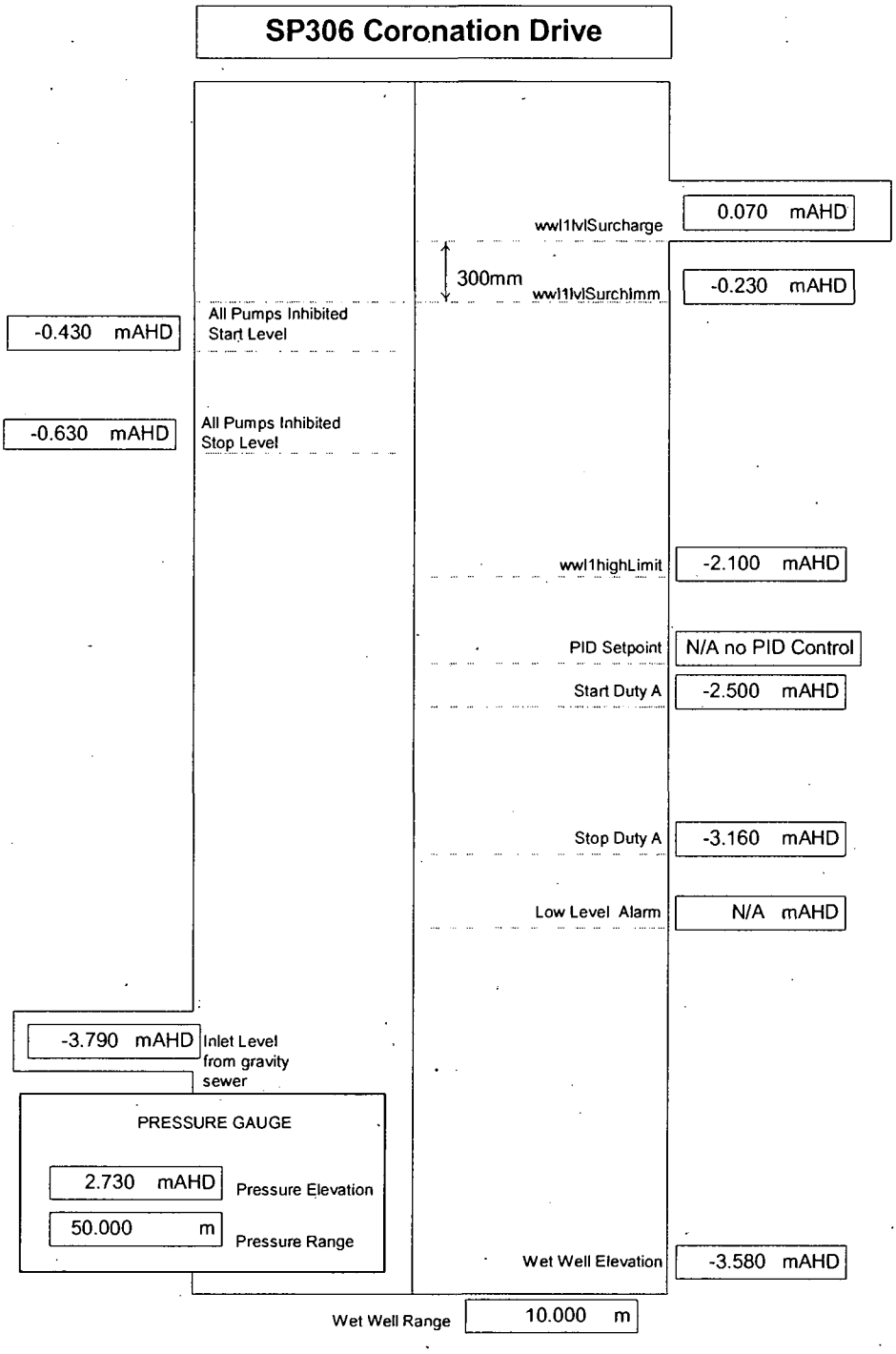


Figure 3: SP306 Station Level Set Points

SOME LEVELS MAY CHANGE ACCORDING TO COMMISSIONING FIGURES

3.1 Site Specific Values

Table 1: Site Specific Constants defined in the PLC

Tag Name	Description	Type	Value	Units
Sewerage Pumping Station				
Stn01grSurchPumpingTime	Surcharge pumping duration [3]	Integer	60	Sec
Delivery pressure				
Pre01txRange	Delivery pressure - Range	Real	5000	mmAHD/ 10
Pre01txZero	Delivery pressure – Elevation of the transducer	Real	273	mmAHD/ 10
Pump Blockage				
Stn01grPmpBlockFlowKneeSP	Flow blocked limit for flow/level PID control (knee)	Integer	N/A	l/s x 100
Stn01grPmpBlockSpeedKneeSP	VFD speed blocked limit for flow/level PID control (knee)	Integer	N/A	Hz x 100
Stn01grPmpBlockSpeedMinSP	VFD speed blocked limit for minimum flow PID control	Integer	N/A	Hz x 100
Wet well level				
Wwl01txRange	Wet well level range	Integer	10	mmAHD
Wwl01txSurchImmLevelSP	Wet well surcharge imminent level (300mm below Overflow #330 Coronation Drive "Oxleys on the River" Surcharge point of 0.070 MAHD)	Integer	-0.230	mmAHD
Wwl01grInhStartLevelSP	Wet well inhibit mode start level	Integer	-0.430	mmAHD
Wwl01grInhStopLevelSP	Wet well inhibit mode stop level	Integer	-0.630	mmAHD
Wwl01grRunatMaxLvlSP	Wet well run at maximum speed level	Integer	N/A	mmAHD
Wwl01txDtyBStartLevelSP	Wet well duty B pump start level	Integer	N/A	mmAHD
~~Wwl01txPIDLevelSP~~	~~Wet well PID set point~~	~~Integer~~	~~-2200~~	~~mmAHD~~
Wwl01txDtyAStartLevelSP	Wet well duty A pump start level	Integer	-2500	mmAHD
Wwl01txDtyAStopLevelSP	Wet well duty A pump stop level	Integer	-3160	mmAHD
Wwl01txDtyAStopLevelSP	Wet well duty A pump stop level	Integer	-3160	mmAHD
Wwl01txZero	Wet well empty level (4mA of Probe)	Integer	-3580	mmAHD
Variable Frequency Drive				
Stn01grMinSpeed	Variable Frequency Drive – Minimum Speed	Integer	5000	Hz x 100
Stn01grMaxSpeed	Variable Frequency Drive – Maximum Speed	Integer	5000	Hz x 100

Table 2: Site Specific Constants defined in the RTU

Tag Name	Description	Type	Value	Units
pre1almInhibitTm	Delivery pressure - Alarm inhibit timer	Integer	15	sec
wwl1surchLvlVol	Wet well volume at surcharge level	Real		kl
wwl1lvlSurcharge	Wet well surcharge occurring level	Real	0.070	mAHD
Pumps 1 & 2				
Pmp[x]almInhPwrTm	Pump [x] - Motor power alarm inhibit timer.	Integer	15	sec
pmp[x]almInhCrntTm	Pump [x] - Motor current alarm inhibit timer.	Integer	15	sec
pmp[x]currRange	Pump [x] - Motor current range	Real	120.0	Amps

Table 3: Site Specific Variable defined in the RTU

Wet well level				
wwl1highLimit	Wet well level - High alarm set point	Integer	-2.100	mmAHD
wwl1lowLimit	Wet well level - Low alarm set point	Integer	N/A	mmAHD
Delivery flow				
flw1highLimit	Delivery flow - High alarm set point	Integer	N/A	ml/s x 10
flw1lowLimit	Delivery flow - Low alarm set point	Integer	N/A	ml/s x 10
Delivery pressure				
pre1highLimit	Delivery pressure DN1370 – High alarm set point	Integer	Max	mmAHD
pre1lowLimit	Delivery pressure DN1370 – Low alarm set point	Integer	Min	mmAHD
Pumps 1 & 2				
pmp[x]currHiLimit	Pump [x] - Motor current high alarm set point [4]	Integer	130	Amps
pmp[x]currLoLimit	Pump [x] - Motor current low alarm set point [5]	Integer	130	Amps
pmp[x]powHiLimit	Pump [x] - Motor power high alarm set point	Integer		Watts
pmp[x]powLoLimit	Pump [x] - Motor power low alarm set point	Integer		Watts

Table 4: Wet Well Level vs Volume Data

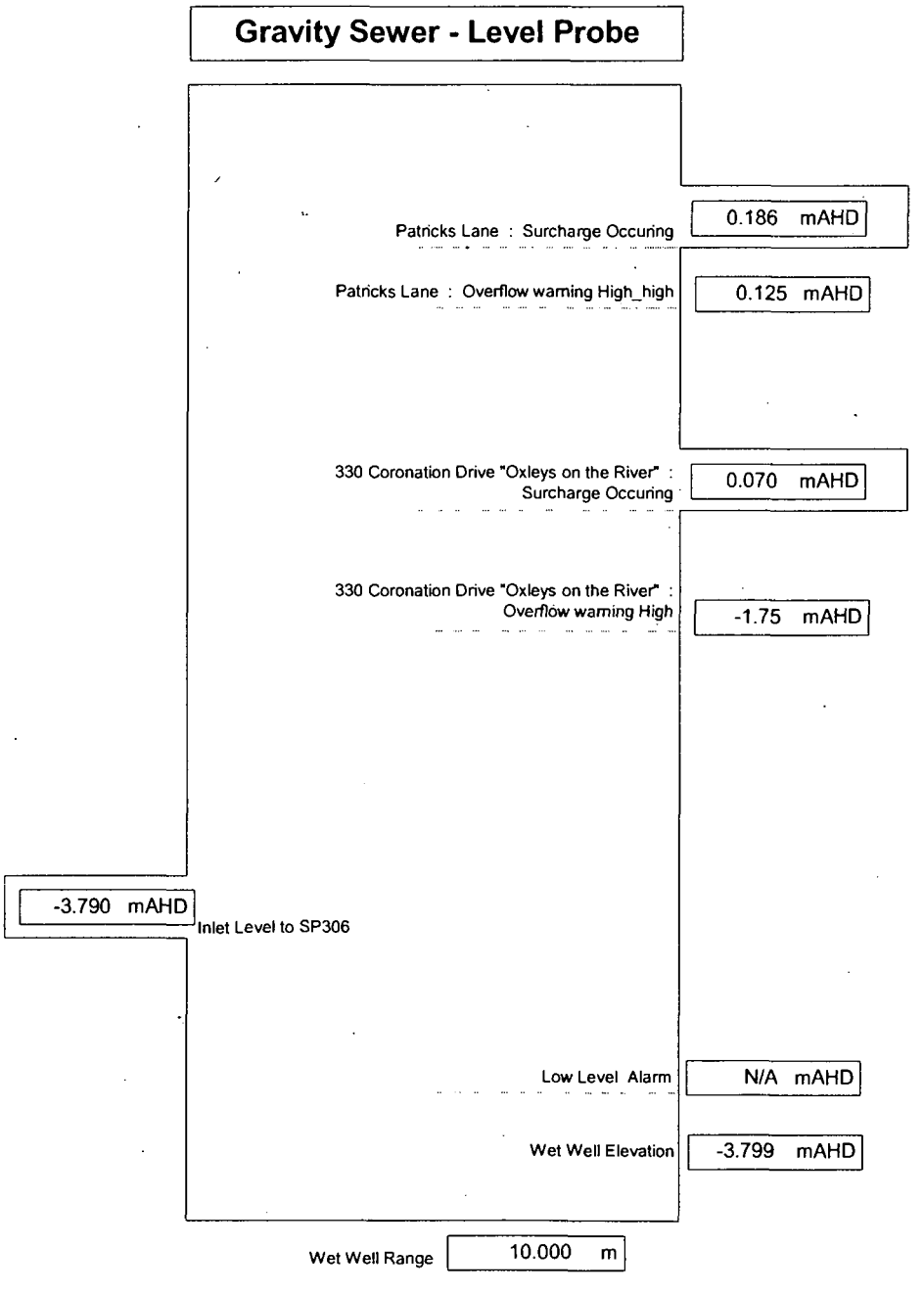
	Height (mAHD)	Volume m³	Remaining Storage m³	% Level	% Volume
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

3.2 Non Standard Monitoring and Alarms

3.2.1 Gravity Sewer Level

As the Vega probe takes a few seconds to initialise, all the wet well alarms except for invalid, are suppressed for 10 seconds upon RTU start up.

Gravity Sewer	Invalid	1
~~Gravity Sewer~~	~~Low_alarm~~	~~3~~
Gravity Sewer	Patricks Lane Surcharge Occuring alarm	1
Gravity Sewer	Patricks Lane Overflow Warning High_high alarm	1
Gravity Sewer	330 Coronation Drive Oxleys on the River" Surcharge Occuring alarm	1
Gravity Sewer	330 Coronation Drive Oxleys on the River" Overflow Warning High alarm	1



Invalid

The signal is deemed invalid if it is :

Less than (4mA – dead band) or greater than (20mA + dead band) for 1 second.

Once the invalid alarm has been activated it can only be reset when the signal is both greater than 4mA and less than 20mA for 20 seconds. The time delays ensure that a signal is truly invalid before an alarm is set and that it is stable before it is reset. The dead band is calculated using the site invalid hysteresis value multiplied by the range.

If the gravity sewer level becomes invalid, the gravity sewer low and high alarm alarms are suppressed.

NOTE: As the wet well level is backed up by the battery – the site power does **not** suppress the invalid alarm.

Low Alarm

If the signal is valid and the start up delay has expired then the low alarm is activated if the signal is less than the low limit set point. It is deactivated if any of the above conditions become false or the signal is greater that the low limit set point plus the dead band. The dead band is calculated using the alarm hysteresis value multiplied by the range.

High Alarm

If the signal is valid and the start up delay has expired then the high alarm is activated if the signal is greater than the high limit set point. It is deactivated if any of the above conditions become false or the signal is less that the high limit set point minus the dead band. The dead band is calculated using the alarm hysteresis value multiplied by the range.

3.3 Non Standard BWTS Picture

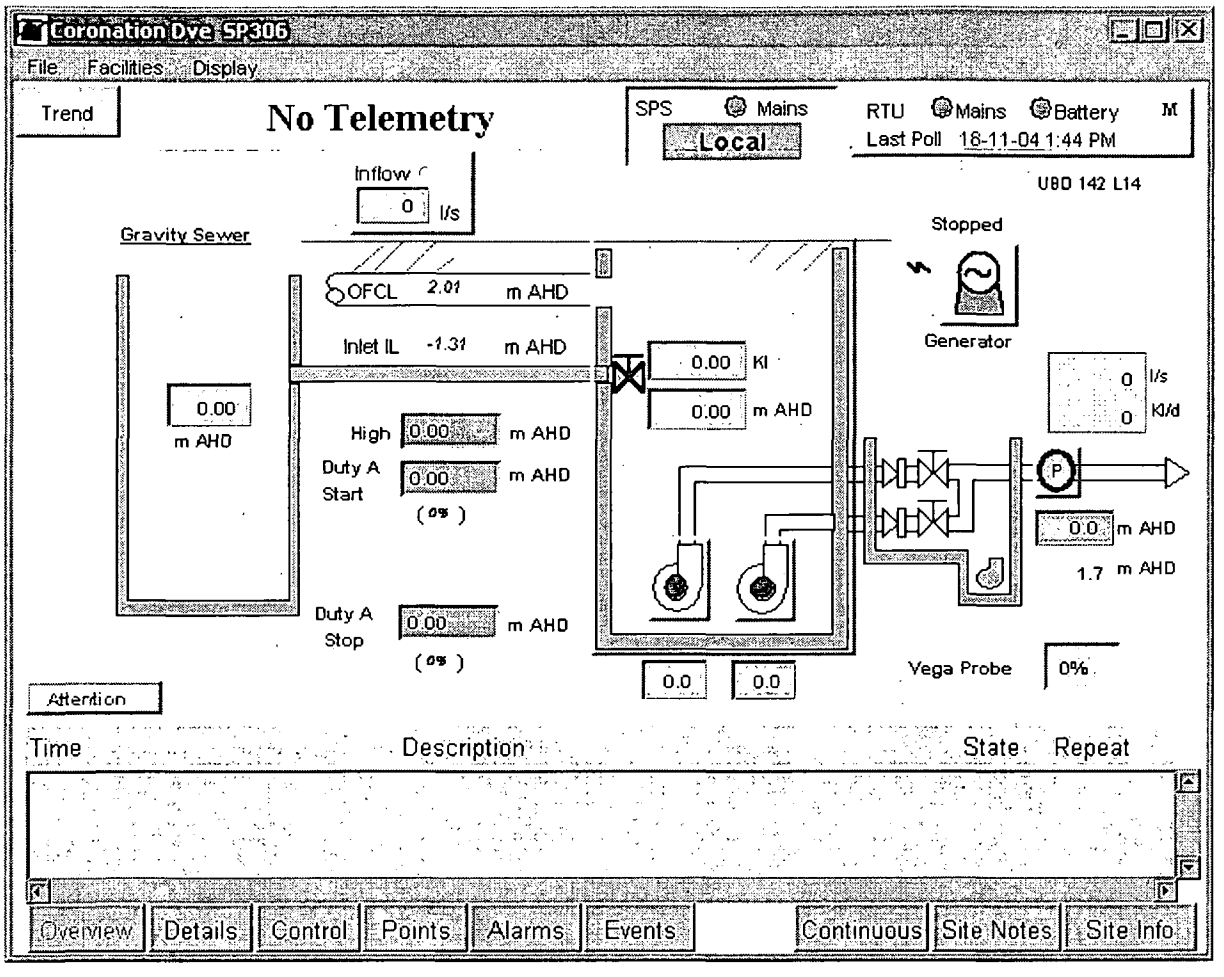


Figure 4 SP306 Details Page

3.4 Sewer Network Overview

The sewer network overview page will be updated to include the gravity sewer at Coronation drive pumping into the new S1 rising main at Coronation drive.

4 REFERENCES

1

TITLE	SPSV3 Sewage Pumping Station Submersible 3 Pumps With VFD – Functional Specification
DOCUMENT ID	003589
VERSION	0.30
AUTHOR	Alex Witthoft , Brisbane Water – Network Control Systems
DOCUMENT OWNER	Peter Sherriff, Brisbane Water – Network Control Systems

2

TITLE	Heroes Avenue Functional Specification
DOCUMENT ID	N/A
VERSION	N.A
AUTHOR	N.A
DOCUMENT OWNER	Cardino Davies Pty Ltd

3

TITLE	Diesel Standby Generator - Local Control Panel - Functional Description
DOCUMENT ID	N/A
VERSION	02
AUTHOR	SOUTH EAST POWER GENERATION
DOCUMENT OWNER	

STAGE 2 SYSTEM INTEGRATION TESTING PROCEDURE
CORONATION DRIVE PUMP STATION SP306 (New Rising Main) TO NORTH QUAY EXISTING S1 SEWER CONECTION
Minutes of Meeting. Place: BW-Projman Conference Room
Tuesday 06 March 2007 Time 09:00hrs to 10:00hrs

Agenda:

Review of Stage 2 System Integration Testing Procedure SP 306 Rev 1

Staff responsibilities.

All work completed for commissioning to proceed on 14/15 March 2007 Start Time 06:00am.

Present:	Ron Wilson	(BW)
	Neville Stanton	(BW)
	Jeff Browne	(BW)
	Gerard Anderson	(BW)
	Bill Collie	(BW)
	Reg McGirr	(BW)

The following is a brief overview of the meeting.

1) Stage 2 System Integration Testing Procedure 28 February 2007 Rev 1/Inspecion Check List 1 & Drawings were handed out to all present at meeting. Brief review of procedure.

2) Review of procedure/check list & drawings with Ron Wilson/ Neville Stanton.

3) Review of electrical pre-commissioning by Bill Collie.

- One of the pumps water in oil sensor faulty HVAC to investigate ASAP.
- Reflux Limit Switches to be checked before commissioning and final set-up at commissioning.
- Bill will arrange electrical leads for Generator connections into Coronation Drive switchboard.
- Bill has checked the size of Generator at Lytton Road pumping station and OK to use at Coronation Drive SP306 for switchboard/pump generator testing.

4) Review of RTU/PLC pre-commissioning Gerard Anderson.

- All OK.
- Gerard will arrange for Lytton Rd pumping station to be redirected (taken out of service) before we remove the generator to Coronation Drive pumping station.

5) Ron Wilson will arrange the following:

- The complete car parking area to be cordoned off for Generator and BW Commissioning personal only. From 13 March 07 to 16 March 07.
- Arrange for the generator at Lytton Rd to be removed and placed in the car parking area at Coronation Drive pumping station on 14 March 07 time 22:00hrs. Arrange traffic control if required.
- Inform the appropriate people (eg Local member/Residence) of commissioning and the car park will be cordoned off.
- Supply 2 confined space trained personal with all equipment for 2days of commissioning.

6) Reg McGirr to update Stage 2 System Integration Testing Procedure to reflect the following test.

- Heroes Avenue P/S SP103 Wet Well level to just below surcharge level and repeat the same at Coronation Drive P/S SP306.
- With the two pumping stations running at full capacity record pump trends at the two sites.
- The above tests will indicate if SP306 pumping into the new rising main has any influence on SP103. The same goes for SP103 pumping into the new rising main has any influence on SP306.
- The above tests will be carried out after the full commissioning has been completed.

Commissioning dates to be confirmed on Monday 12 March 07.

Stuart Cowhig - Fwd: Outstanding Commissioning of Stage 2 System Integration Testing Coronation Drive P/S SP306.

From: Reg McGirr
To: Cowhig, Stuart
Date: 9/05/2007 12:45:24 pm
Subject: Fwd: Outstanding Commissioning of Stage 2 System Integration Testing Coronation Drive P/S SP306.

Regards,
Reg McGirr
Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

>>> Reg McGirr 23/04/2007 13:30 >>>
To All,

All outstanding commissioning of SP306 will be carried out on Friday 27 April 07 Time 6am.

1) Gerard will arrange for Lytton Rd pumping station to be redirected (taken out of service on 26 April 07) before we remove the generator to Coronation Drive pumping station.

a) Generator testing switching in & out in the auto mode as per Stage 2 System Integration Procedure 08 March 2007 Rev 2 Item 8.1.

b) Testing the code/system for pumps to run for 30sec every three (3) days to prevent rotor lock.

c) All outstanding testing regarding switchboard control.

2) Bill will arrange electrical leads for Generator connections into Coronation Drive switchboard.

3) **Sid** will arrange the following:

a) The complete car parking area to be cordoned off for Generator and BW Commissioning personal only. From 26 April 07 to 27 April 07.

b) Arrange for the generator at Lytton Rd to be removed and placed in the car parking area at Coronation Drive pumping station on 26 April 07 time 22:00hrs. Arrange traffic control if required.

c) Inform the appropriate people (eg Local member/Residence) of commissioning and the car park will be cordoned off.

d) Supply 2 confined space trained personal with all equipment for 1day of commissioning.

e) Arrange for generator to be removed from Coronation Drive P/S SP306 and reinstalled/cables connected at Lytton Rd. Once the generator cables have been connected the control room to be contacted and the station to be put back on line.

Should you require further information please contact me.

Regards,
Reg McGirr

Commissioning Manager
Tel: 07 34033349
Mobile: 0414576374
E-mail: Reg.McGirr@brisbane.qld.gov.au

VOL 4 - SECT 3

hps HVAC

Methodology Statement on Procedure to carry out Patrick Lane Works

ISSUE: 01
DATE: 10/02/2005

REDIRECTION OF HEROES AVENUE SEWERAGE PUMP STATION, MECHANICAL & ELECTRICAL FITOUT AND COMMISSIONING
CONTRACT NO.: BW.30079-02/03

ISO 9001 APPROVED COMPANY

REVISION STATUS

Date	Description	Original	Review	Approval
10/02/2005	Issued for Approval	Garth Hamilton	Graham James	

1. OVERALL MANAGEMENT

The project manager will set up a "kick-off" meeting with Brisbane Water. All aspects of the works are to be discussed.

All work is to be carried out at "Patrick Lane" site on Coronation Drive Taringa.

Scheduling and planning of this aspect of the project is the single most important criteria if a successful outcome is to be achieved.

HVAC/hps planning engineer will work closely with the project team to monitor any design and construction issues that may arise.

2. METHOD STATEMENT

The works shall comprise the following principal activities plus all other activities necessary for the completion of the works as may be reasonably inferred from the Drawings and Specifications:

- Fitout existing wet well structure with all appurtenances and benching;
- Two new submersible sewage pumps;
- Power supply, controls and electrical works;
- New pipework, fittings, valves and actuator; and
- Surface works including stairs, general services, vent stack and fan pit.

3. CONSTRUCTION METHODOLOGY – DETAILED BREAKDOWN

1. Install Ladder in Existing Wet Well.
2. Excavate area between existing pipework chamber and existing wet well including excavation for electrical conduit installation. De-watering as required.
3. Install non-return valve and dismantling joint in existing valve chamber.
4. Install flanged mild steel fusion bonded PE lined and coated pressure pipework, fittings and supports between dismantling joint and existing wet well.
5. Continue 100mm Electrical conduit run from existing to RPZ housing and Limit switches in valve chamber.

6. Install PE induct ventilation pipework and fittings
7. Refill and compact excavated area.
8. Construct Induct / Fan pit.
9. Install in existing wet well, flanged mild steel fusion bonded PE lined and coated pressure pipework, fittings and supports
10. Install UPVC educt ventilation pipework and fittings
11. Install bar screens in manhole.
12. Construct benching in base of wet well.
13. Line wet well with protective coating
14. Install valve actuator and housing
15. Install well washer and water supply pipes and fittings
16. Install new submersible pumps
17. Construct concrete slab for switchboard
18. Electrical fit out
19. Construct concrete stairs
20. Connect rising main scour valve to PE discharge line within valve pit
21. Construction of Vent Pole
22. Construct new curbing and reinstate grassed area
23. Commission site

8. Completed Precommissioning and Commissioning Report

This section to be completed later.

9. As Constructed Drawings

Please refer to Appendix 30: As Built Drawings for the following drawings.

BW Drawing No.	CW / HVAC / MPA Drawing No.	Rev.	Drawing Title
486/5/7-KJ001	ME029	A	MH 2/1 PS 1/1 AND PS 2/1 CONTRACTOR LAYDOWN AND SITE ACCESS
486/5/7-KJ002	ME030	B	PUMP STATION PS 1/1 AND PS 2/1 GENERAL ARRANGEMENT
486/5/7-KJ003	ME031	A	PUMP STATION PS 1/1 AND PS 2/1 DETAILS
486/5/7-KJ004	ME032	A	PUMP STATION PS 1/1 AND PS 2/1 GSD, TED, TAC
486/5/7-KJ006	0203-E201	B	PATRICK LANE PS POWER DISTRIBUTION SCHEMATIC DIAGRAM
486/5/7-KJ007	0203-E202	B	PATRICK LANE PS PUMP 01 SCHEMATIC DIAGRAM
486/5/7-KJ008	0203-E203	B	PATRICK LANE PS PUMP 02 SCHEMATIC DIAGRAM
486/5/7-KJ009	0203-E204	B	PATRICK LANE PS MOTORISED VALVE SCHEMATIC DIAGRAM
486/5/7-KJ010	0203-E205	B	PATRICK LANE PS DC POWER SUPPLY SCHEMATIC DIAGRAM
486/5/7-KJ011	0203-E206	B	PATRICK LANE PS MITS RTU DIGITAL INPUT SHEET 1
486/5/7-KJ012	0203-E207	B	PATRICK LANE PS MITS RTU DIGITAL INPUT SHEET 2
486/5/7-KJ013	0203-E208	B	PATRICK LANE PS MITS RTU DIGITAL OUTPUT
486/5/7-KJ014	0203-E209	B	PATRICK LANE PS MITS RTU ANALOGUE INPUT
486/5/7-KJ015	0203-E210	B	PATRICK LANE PS PLC DIGITAL INPUTS SLOT 3
486/5/7-KJ016	0203-E211	B	PATRICK LANE PS PLC DIGITAL INPUTS SLOT 4
486/5/7-KJ017	0203-E212	B	PATRICK LANE PS PLC DIGITAL INPUTS SLOT 5
486/5/7-KJ018	0203-E213	B	PATRICK LANE PS PLC DIGITAL OUTPUTS SLOT 6
486/5/7-KJ019	0203-E214	B	PATRICK LANE PS PLC ANALOGUE INPUTS SLOT 7
486/5/7-KJ020	0203-E215	B	PATRICK LANE PS PLC ANALOGUE INPUTS SLOT 8
486/5/7-KJ021	0203-E216	B	PATRICK LANE PS PLC ANALOGUE OUTPUT SLOT 9
486/5/7-KJ022	0203-E217	B	PATRICK LANE PS CABLING BLOCK DIAGRAM
486/5/7-KJ023	0203-E218	B	PATRICK LANE PS CABLE SCHEDULE
486/5/7-KJ025	HVAC-	C	CORONATION DRIVE PUMP STATIONS PS 1/1 AND PS 2/1 PLAN
486/5/7-KJ026	HVAC-	C	CORONATION DRIVE PUMP STATIONS PS 1/1 AND PS 2/1 ELEVATION
486/5/7-KJ027	HVAC-	C	CORONATION DRIVE PUMP STATIONS PS 1/1 AND PS 2/1 PIPE FITTING DETAILS
486/5/7-KJ028	HVAC-SK-01	A	CORONATION DRIVE PUMP STATIONS PS 1/1 AND PS 2/1 PLAN OF FLANGE MODIFICATIONS

BW Drawing No.	CW / HVAC / MPA Drawing No.	Rev.	Drawing Title
	7690-G20	4	MPA PATRICK LANE SWITCHBOARD GENERAL ARRANGEMENT
	7690-G21	5	MPA PATRICK LANE SWITCHBOARD GENERAL ARRANGEMENT
	7690-G22	5	MPA PATRICK LANE SWITCHBOARD SECTIONAL VIEWS
	7690-G24	1	MPA PATRICK LANE SWITCHBOARD GENERAL ARRANGEMENT

10. List of Contract Variations and Plant Modifications

The contract variations for contract BW.30079-02/03 are as listed in the attached variation register.

HVAC NO.	DESCRIPTION	DATE SUBMITTED
1	Additional Bank Guarantees for Early Payment	21/07/2004
2	Upgrade of Motor Insulation from Class F to H on Pumps	21/07/2004
3A	Tender Vs 'Issued for Construction' Drawing Changes - Civil	15/10/2004
3B	Tender Vs 'Issued for Construction' Drawing Changes - Mechanical	
3C_1	Heroes Ave Tender Vs Construction Dwg. Changes - Electrical	15/10/2004
3C_2	Hockings Street Tender Vs Construction Dwg. Changes - Electrical	25/11/2004
3C_3	Patrick Lane Tender Vs Construction Dwg. Changes - Electrical	22/12/2004
4	Hockings St Electrical Supply & Streetlight Mains Relocation	09/08/2004
5	Remove Trees, garden bed & stairs Heroes Ave (PS-37)	25/08/2004
6A	Installation of Temporary Wet Well (Hallco's Work)	01/12/2004
6B	Installation of Temporary Wet Well (HVAC's Work)	01/12/2004
6B-1	Installation of TWW Additional Pipework and Cabling	09/02/2005
6B-2	Provision of Access Ladders and Platforms in Temporary Wet Well	04/02/2005
6B-3	Provision and Maintenance of Odour Control Equipment in Temporary Wet Well	04/02/2005
6C	Deletion of Grit Chamber	16/12/2004
6D	Contract Oncost and Contract Profit 10%and overhead 10%	11/01/2005
7	Transformer Culvert and Conduits	22/09/2004
7_Rev1	Transformer Drawing, Retaining wall, Concrete Pad, Safety Fence	27/10/2004
8	Harmonic Filter IP Upgrade	13/10/2004
9	Hockings St Streetlight Upgrade	14/10/2004
10A	EOT Claim #1	14/10/2004
10B	EOT Claim #2	14/10/2004
10C	EOT Claim #3	14/10/2004
11	EOT Claim 4B	21/03/2005
12	Temporary Wet Well Spoil	20/01/2005
13	Hockings Street Access Dates/ Deletion of Hockings St and XXXX	07/02/2005
14	Temporary Wet Well Roof	24/01/2005
15	Bypass Reducer	02/02/2005
16	Changes Patrick Lane Switchboard and/or Installation (PS-42)	18/08/2005
17	Practical Completion Dates	22/02/2005
18	EOT Claim #5	27/01/2005
19	EOT Claim #6	28/01/2005

HVAC NO.	DESCRIPTION	DATE SUBMITTED
20	Temporary Switchboard Additional \Works	09/02/2005
21	Additional requirements Temporary Wet Well -Pump Base Supports	18/02/2005
22	Additional requirements Temporary Wet Well - Vega Well Tx	18/02/2005
23	Additional requirements Temporary Switchboard - Provision of ATS (Automatic Transfer Switch)	18/02/2005
24	Modification to S1 Sewer Connection Line	04/03/2005
25	H2S Gas in S1 Connection Scouring Pit	04/03/2005
26	Supply and Installation of Gibault Joint	08/03/2005
27	Changes Patrick Lane Piping (PS-39)	08/03/2005
28	Delays due to rising main rupture	11/03/2005
29	Provision of New Service Pole	21/03/2005
30	EOT Claim #4	11/01/2005
31	EOT Claim #7	24/03/2005
32	Retention of overheads for grit chamber deletion	29/03/2005
33	Heroes Ave Pump Station New Lightings	09/05/2005
34	Wet Well Ladder	09/05/2005
35	Vactor Pipe	
36	EOT 8	28/04/2005
37	EOT 9	28/04/2005
38	Extra Works in Wet Well Platform Removal	03/05/2005
39	Extra Works in Wet Well Benching Removal	02/05/2005
40	Extra Works Dry Well Isolation	02/05/2005
41	Hockings Street Enclosure Changes	15/08/2005
42	Alarms - Withdrawn	
43	Supply & Installation of Self Closing Gates	01/06/2005
44	Repairs to Wet Well Structure	07/06/2005
45	Dry Well Platforms- Heroes Ave (PS-22)	07/06/2005
46	Supply and installation of disconnect boxes Heroes av	07/06/2005
47	Pressure Gauge Tapping Points	15/06/2005
48	Supply and Installation of Relays for Grundfos Pump Oil Sensors	22/06/2005
49	Sump Electrodes for Heroes Avenue	21/07/2005
50	400NB Gate Valve for Patrick Lane_(PS-9)	21/07/2005
51	EOT #12	30/06/2005
52		
53	Wet Well Washer Installation Heroes Avenue (PS-40)	30/09/2005
54	New Pressure Transmitter for Heroes Avenue(PS-07)	25/07/2005
55	Mounting Disconnect Boxes incl supply & install of 3 control disconnect boxes (PS-08)	27/07/2005
56	Cable Socks at Patrick Lane (PS-21)	28/06/2005
57	Construct and Supply Recirculation pipeline (PS-14)	25/07/2005
58	Removal of Switchboard Containing Asbestos (PS-17)	21/07/2005
59	Painting of Patrick Lane Vent pole (PS-20)	25/07/2005

HVAC NO.	DESCRIPTION	DATE SUBMITTED
60	By-pass Pumping System Settlement Adjustment	21/07/2005
61	EOT Settlement Adjustment	21/07/2005
62	Hockings St Takeout Settlement Adjustment	21/07/2005
63	After Hours Attendance of Bypass(PS-09)	21/07/2005
64	Extension of temporary Bypass Operation (PS-19)	22/07/2005
65	New Vent Fan GPO (PS-10)	25/07/2005
66	After Hours Attendance of Bypass 04/08/05 (PS-24)	05/08/2005
67	Supply and Installation of 100NB Gate Valve (PS-25)	08/08/2005
68	Induct Pit Patrick Lane (PS-41)	16/08/2005
69	Wet Well Covers Heroes Avenue (PS-28)	18/08/2005
70	Removal of Recirculation Pipeline and Reinstatement of Valve Pit (PS-31)	05/10/2005
71	Additional Pipe Supports in Dry Well (PS-38)	05/10/2005
72	Chains for Patrick Lane Pumps (PS-27)	18/08/2005
73	Switch Board Modifications (Indooroopilly pumping hardware interlock (PS-46))	25/10/2005
74	Valve Lockouts (Heroes Ave & Patrick Lane) (PS-44)	25/10/2005
75	Ladder for Valve Pit - Heroes Avenue (PS-43)	25/10/2005
76	Preparations For Indooroopilly commissioning incl Barrel Unions & Nipples for Vega Pressure gauges (PS-45)	25/10/2005
77	Remove Overflow plate - Heroes Ave (PS-34)	21/09/2005
78	Additional Drafting & Surveying (PS-36)	21/09/2005
79	Patrick Lane Temporary Fencing (PS-35)	22/09/2005
80	Extra Works CPS- Patrick Lane (PS-30)	31/10/2005
81	Extra Works CPS-Heroes Ave (PS-47)	24/11/2005
82	Valve Testing Heroes Avenue (PS-48)	31/10/2005
83	Loosen Pump Flanges For Inspection - Heroes Ave (PS-49)	31/10/2005
84	Indooroopilly Emergency Pumping Commissioning (PS-32)	30/09/2005
85	Heroes Kick rail & Mesh (PS-50)	31/10/2005
86	Washdown & Sump Pump Pipework (PS-51)	31/10/2005
87	Supply of Flexible Connectors for Hocking St (PS-29)	31/08/2005
88	Supply of Multitrode Probes for Hocking St (PS-33)	31/08/2005
89	Additional Site Surveys (PS-52)	24/10/2005
90	Fencing Hire October (PS-53)	31/10/2005
91	Heroes Ave Valve Backfilling (PS-54)	10/11/2005
92	Heroes Ave Transformer Landscaping (PS-55)	24/11/2005

11.5 Sample Site Management Plan

PUMPSTATION REFURBISHMENT
HERO'S AVENUE
and
PATRICK'S LANE
BRISBANE QLD 4000

HVAC
BRISBANE QLD

SITE MANAGEMENT PLAN

To be read in conjunction with:

Workplace Health & Safety Policy
Confined Space Entry Procedure
Hazardous Substance Management Procedure

CORROSION PROTECTION SERVICES PTY LTD
P O BOX 1094
HERVEY BAY QLD 4655
PHONE: 07 4194 0400
FAX: 07 4194 0500
MOBILE: 0407 940 409

Corrosion Protection Services
CPS Sewerage Lining System

DISTRIBUTION REGISTER

ISSUE: 1

COPY NO.	DATE OF ISSUE	REGISTERED HOLDER
1	03/03/05	Corrosion Protection Services
2	03/03/05	HVAC (Graeme James)
3		

DATE: .....

Corrosion Protection Services
CPS Sewerage Lining System

Project Details: Pumpstation Resurfacing
City of Brisbane Qld

Work to be Performed: Resurfacing of Wastewater Pumpstation – Hero's Avenue, Brisbane.
Resurfacing of Wastewater Pumpstation – Patricks's Lane, Brisbane.

BACKGROUND AND EXTENT OF WORK

Rehabilitation and resurfacing of Pumpstations using the CPS System and KL11 applied to all internal surfaces at a thickness of 5mm.

SYSTEM CONSTRAINTS

- Clearly defined work areas, normal access for pedestrians.
- To be aware of access to private houses.
- Endeavour to keep traffic flow uninterrupted.
- Site is left clean & environmentally friendly

SAFE WORK PLAN / PROCEDURE FOR
ENTRY INTO CONDUITS / CONFINED SPACES

The persons referred to below shall have the following responsibilities with regard to the implementation of this site plan for the project/works.

Site Manager

Kel Attkins/ Stephen Attkins are the people responsible for ensuring that the operations of the system in which the works / project is to be carried out and is able to be operated in a manner so as to ensure the safety of those persons engaged in the performance of that specific work / project. The Site Managers must provide a situation where the safe work plan is able to be implemented and the system safely recommissioned.

The Site Manager is also responsible for the supervision of the confined space entry and to ensure that all persons entering the confined space are accredited / trained, and that all persons entering the confined space are captured on the entry form. A Site Foreman will be nominated for all major projects, prior to work commencing.

Site Manager – Kel Attkins Mobile: 0407 940 409
Stephen Attkins Mobile: 0408 728 156

Corrosion Protection Services
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Site Personnel

Is the person(s) responsible for carrying out the project / works. They will be required to follow specific instructions from the Site Manager during this specific works / project until the work / project is completed.

Site Personnel – Kane Dennis

SITE SAFETY RULES

- ALL VISITORS MUST REPORT TO SITE MANAGER IMMEDIATELY UPON ARRIVAL AT SITE. THE SITE MANAGER SHALL ENSURE ALL VISITORS ARE WEARING APPROPRIATE SAFETY GEAR AND THAT THEY ARE AWARE OF THE SITE SAFETY RULES BEFORE MOVING ON SITE.
- ALL SITE PERSONNEL MUST WEAR SAFETY FOOTWEAR AND VESTS WHEN ON SITE. WHILE IN CONFINED SPACES, PROTECTIVE HOODS TOGETHER WITH EAR & EYE PROTECTION MUST BE WORN.
- ALL PERSONNEL MUST UNDERGO SITE INDUCTION PRIOR TO COMMENCEMENT OF WORK AT SITE AND BE AWARE OF INCIDENT MANAGEMENT PROCEDURE.
- PERSONNEL ENGAGED IN CONFINED SPACE WORK MUST CARRY THEIR CURRENT CONFINED SPACE TRAINING TICKET WHEN AT SITE.
- ALL PERSONNEL SHALL ENSURE SAFETY OF PUBLIC NEAR TO WORK SITE. USE SIGNS AND BARRICADES AS APPROPRIATE.
- ANY RESIDENTS AFFECTED MUST BE NOTIFIED PRIOR TO ENTRY INTO THEIR PROPERTY.
- ALL WORK AREAS MUST BE MADE SAFE PRIOR TO LEAVING SITE.
- ALL VISITORS MUST REPORT TO SITE MANAGER BEFORE LEAVING TO ENSURE SAFE EXIT.

CONTACT SITE MANAGER,
KEL ATTKINS
IF YOU REQUIRE FURTHER INFORMATION.

Corrosion Protection Services
CPS Sewerage Lining System

IN THE EVENT OF AN ACCIDENT OR EMERGENCY:

1. IMMEDIATE CONTACT SHALL BE MADE WITH THE SITE MANAGER.
2. THE SITE MANAGER SHALL APPROVE AND OVERSEE THE MATTER AND ENSURE THE NECESSARY PROCEDURES ARE INSTIGATED.
3. PROCEDURES FOLLOWED AS PER OUR WH&S POLICY.

CORROSION PROTECTION SERVICES PTY LTD

WORKCOVER POLICY NO: FW 025159018

AMP GENERAL INSURANCE LTD - POLICY NO: 4 Y048839P
Including Public Liability $20,000,000
Product Liability $10,000,000
All work vehicles are covered by full comprehensive insurance.

1. GENERAL SITE SAFETY REQUIREMENTS

The following safety requirements shall be complied with at all times when on site:

1.1 Safety Helmets

Safety helmets shall be worn by all site personnel and associated visitors where necessary on site.

1.2 Footwear

Steel capped boots must be worn at all times.

1.3 Protective Equipment

Protective equipment, including eye and ear protection shall be worn where necessary. Air feed hoods are worn when confined space work is carried out.

1.4 Alcohol

The consumption of alcohol on site, or elsewhere, any time during working hours is prohibited.

1.5 Confined Space Entry

Confined space entry shall be done when required under the Confined space entry permit and checklist records. The entry will follow the procedure in confined space procedure. A copy of the confined space entry permit is attached. All open manholes or access points shall be barricaded during the works and securely covered when the work team is not present. Working signs will be placed in strategic positions as per WH&S requirements.

Responsible Manager for confined space entry would be our Site Manager, Kel Attkins who will be on site full time.

1.6 Accidents

Accidents shall be reported immediately to the Site Manager. Any employee who is off for more than seven (7) days along with any dangerous occurrence, will warrant a report to be lodged with WorkCover Authority of Qld.

1.7 First Aid

All persons requiring first aid treatment are to contact the first aid officer who will administer the treatment and record the accident in a report record book, the person's name and nature of the accident. First Aid Officer – Mr Kel Attkins.

1.8 Fire Prevention

Fire extinguishers shall be kept on site and accessible with all site personnel aware of their placement and fully instructed in their usage.

1.9 Work Areas / Housekeeping

Work areas will be kept clean and tidy from rubbish and other safety hazards.
Rubbish will be cleaned up on completion of the day's / project's work.

1.10 Parking of Vehicles

Where possible work vehicles will be parked off the road. When vehicles are parked on streets to access the work site, the working area will be marked using traffic cones. The appropriate traffic warning signs shall be placed prior to commencement of work. A safety vest will be worn when working on or near the roadways. All traffic control devices for works on roads would conform to AS 1742.3 – 1985.

1.11 Material Handling

All materials are clearly labelled.
Materials are stored as per State and Technical Safety Data Legislation.
Minimal amounts are stored on site.
Bulk materials are stored at our Hervey Bay Depot and delivered overnight as required.

1.12 Site Amenities

Site amenities will be provided on site, or central locations to site work.

2. FIRST AID / FIRE / EMERGENCY PROCEDURES

If an accident / emergency happens on site, notify the Site Manager – Kel Attkins with the following details:

- Location of Accident / Emergency
- Type of Injury / Emergency
- Severity of Injury / Emergency
- Will the authorities (ie ambulance) be required
- The Site Manager shall approve and oversee the matter and ensure the necessary procedures are instigated.

Giving such details as:

- Time of Injury
- Location
- Cause
- Extent
- Action Taken

Corrosion Protection Services
CPS Sewerage Lining System

CONTACT NAME AND TELEPHONE NUMBERS

Kel Attkins Mobile: 0407 940 409

Ambulance Phone: 000

In the event of a major accident/incident, Managerial / Office personnel shall, as soon as possible, contact:

WorkCover 4122 3122
HVAC
- Mr Graeme James 0403 607 032

All verbal contact will be confirmed in writing as soon as possible after the event.

3. RISK ASSESSMENT

1.1 Confined Space Entry

Potential Risks

- Contaminated Gas Inhalation inside manholes
- Sudden surge of flow

Safeguards

- Gas detectors are used before and during entry to Pumpstation to monitor the contaminants in the confined space.
- The person entering the pumpstation wears a safety harness attached to a Rescue Master during the work period.
- Airs feed hoods are worn by workers in confined spaces, limiting contaminated gas inhalation.
- Continual mechanical ventilation of manhole.

3.2 Lining Process

Potential Risks

- Risks in Confined Space Entry
- Equipment Failure

Safeguards

- All personnel to be trained and accredited with their Confined Space Entry Certificate.
- All personnel evacuated if necessary, until equipment is restored to a safe working level.
- Standby equipment available

2. INSPECTION AND TESTING

2.1 Plant and Equipment

Plant and equipment used in the project are inspected and maintenance work is carried out at regular intervals.

2.2 Lining Process

It is the responsibility of the Site Manager to follow the procedures and checklists given below:

- Pumpstation Relining start
- Pumpstation relining in Process
- Pumpstation Relining finish
- Pumpstation Inspection
- Confined Spaces Entry checklist
- Traffic Control checklist (if applicable)
- Storage Handling & Packaging checklist
- Daily Site Record

3. TRAINING

3.1 Site Induction

The following particulars outline requirements and standard procedure for the Induction Briefing. All employees would be inducted prior to commencement of work at the project.

- Project Layout
- Tools and equipment – used for lining
- Site Traffic Control – (if applicable)
- Location of First Aid and Safety Officer
- Location of Work Areas
- Reporting
- Certification and Licensing
- Safety Requirements
- Lifting Techniques
- NO Alcohol or Drugs allowed at any time
- Housekeeping
- Hazardous Substances
- Handling of Materials

3.2 Confined Space Entry

All personnel involved in confined space entry would be trained to required specifications.

4. HAZARDOUS SUBSTANCES – REFER MANAGEMENT PROCEDURE

The material used in this project would be:
KL11 Seal System
KL11 Trowelable System
KL11 Top Coat System
MEKP
Acetone

Suppliers of all hazardous substances will be required to provide MSDS for all items supplied. All personnel involved in handling would be suitably trained operators as per Hazardous Substances, Usage and Handling documentation.

- Protective clothing shall be worn by the operator during handling of the chemicals.
- Material Safety Data sheets would be kept on site for reference.

4.1 Register and Inventories

A register or inventory shall be kept on site to provide a central listing of all chemicals in the project.

Registers and inventories will be kept in the same location as MSDS's and be accessible to operations.

4.2 Labels

All containers of substances supplied to be used or handled in the workplace will be labelled to allow people to use the substances safely.

4.3 Control

Control of hazardous substances will be achieved through progressive application of the following hierarchy of control measures:

- Isolation of the process to control the emission of hazardous substances
- Engineering control, including local exhaust ventilation for vapour, gases or particulate, to control or minimise hazardous substances or processes
- Adoption of safe work practices, including changes to work methods which minimise exposure to hazardous substances

4.4 Employee's Duties

- All employees working with or near hazardous substances will maintain safe work practices so that their health and safety, and the health and safety of those around them, is maintained.
- Employees will use the control measures provided to minimise the risk of exposure to hazardous substances.
- Personal protective equipment will be used when required. It should be kept clean and maintained in an appropriate manner.
- Defects discovered in any control measures including personal protective equipment will be reported promptly to the Site Manager.

4.5 Records

Employee records are kept at Head Office at Point Vernon.
Records will include inventories of hazardous substances, results of workplace monitoring and employee health surveillance.

Corrosion Protection Services
CPS Sewerage Lining System

ON SITE RISK MANAGEMENT AND SAFE WORK PROCEDURE

WHAT CAN GO WRONG	HOW IT WILL BE MANAGED
Confined Space Category: Confined space category could change due to flow atmospheric conditions	Gas testing to monitor the work atmosphere. If applicable, use of bypass plugs. Air feed hoods worn.
Isolation of Work Site: Flow in Pumpstation could alter	Situation regularly monitored. Evacuation if necessary until Flow is at an acceptable level.
Pre-Entry Inspection: Access Chamber isolated Site established Vehicles parked correctly	Site has been clearly barricaded to isolate access chamber. Appropriate signage put out as per requirements.
Access: Access will be required to pumpstation	Confined Space personnel to remain at access points at all times.
Methods of Work: Ventilation of carrier Equipment Failure	Maintain natural ventilation and Mechanical Ventilation Standby equipment available.
Suitable Workers: Untrained or unsuitable workers involved in confined space work.	All persons entering the confined space will have undertaken and are currently certified to work in confined spaces
Rescue Precautions: Noxious gases entering system while working	All personnel entering the access chamber will have harnesses on them. Evacuate if necessary, then establish cause and rectify. Air feed hood worn.
Atmospheric Monitoring: A change in atmospheric conditions	Constant monitoring of atmosphere with a gas monitor during entry into confined space
Traffic and Public Access:	Follow CI 808 – Safe working on or near roadways and footpaths. Ensure workplace is properly barricaded.
Hazardous or Explosive Gas Dangers:	Continual ventilation of pumpstation until a safe working environment is created.
Contents / Hazard: Syringes etc.	Initial inspection and clean
Personal Injury risks:	Protective clothing worn. Air tools are provided to help prevent any serious personal injury. Personnel are fully trained and experienced in pump station rehabilitation works.
Electric Isolation: The risk of electrical shock or electrocution at work site	Pre-works investigation, appropriate shielding or isolation. Air tools only, used on site

VOL 4 - SECT 4

HVAC hps

HYDROSTATIC / PNEUMATIC PRESSURE TEST REPORT

PROJECT: Redirection of Heroes Avenue Sewage Pump Station	**PROJECT NO.:** 3251Q
CLIENT: Brisbane Water	**TEST DATE:** 16-8-05
LOCATION/AREA: SP306 - Patrick Lane Pump Station	

TEST SECTION DATA		TEST SECTION I.D
LOCATION	CORONATION DRIVE/ PATRICK LANE	
TEST MEDIUM	WATER	FROM PUMP BASES IN WET WELL TO SPADES BETWEEN CHEQUE VALVES & GATE VALVES
VOLUME	≈ 2000 LITRES	
HIGHPOINT	AS PER SKETCH	
LOW POINT	AS PER SKETCH	
GAUGE POINT	AS PER SKETCH	

PRESSURE RATING OF EQUIPMENT IN TEST SECTION		
ITEM	TAG NO.	RATING M.A.O.P. KPa
PUMP 1		450 KPA
PUMP 2		450 KPA

TEST EQUIPMENT DATA				
DESCRIPTION	MAKE	SERIAL NO	CALIBRATED BY	DATE
PRESSURE GAUGE	WIKA		ACS	10-8-05
PRESSURE RECORDED	—			
AMB.TEMP. RECORDER	—			
AMB. THERMOMETER	DIGI TEMP			

PRESSURISING DATA		
TIME	PRESSURE KPa	AMB TEMP °C
16:17	~~885~~ 860 KPA	21°C
16:49	860 KPA	21°C
17:19	860KPA	20°C

STRENGTH TEST DATA		
TIME	PRESSURE KPa	AMB TEMP °C

LEAK TEST DATA		
TIME	PRESSURE KPa	AMB TEMP °C

Supervisor report: NO VISIBLE LEAKS DETECTED

TESTED BY: (NAME & SIGNATURE)	WITNESSED BY: (NAME & SIGNATURE)
RENE BURGERS	M. HERITAGE

AUSTRALIAN CALIBRATING SERVICES (A'SIA) PTY. LTD.
A.B.N. 31 629 153 738

126 Oxford Street, Collingwood
P.O. Box 1174, Collingwood, Vic. 3066, Australia
Phone: +61 3 9417 5688, Fax: +61 3 9417 1578

File No: Q.AC/635-E-2
Issue Date: 12 Aug 2005

CALIBRATION REPORT
AN INDUSTRIAL PRESSURE GAUGE

FOR: HVAC CONSTRUCTIONS
101 COBALT STREET
CAROLE PARK
QLD 4300

LOCATION: ACS Brisbane

TEST DATE: 10 August 2005

EQUIPMENT DETAILS:

Gauge Details			
Maker:	WIKA		
Model:	1600 x 20 kPa		
Serial Number:	69911	Capacity:	1600 kPa
Plant Number:	Nil	Resolution:	20 kPa

TEST DETAILS: Australian Standard AS1349:1986
"Bourdon Tube Pressure and Vacuum Gauges"
Section 4. Performance and Testing

- The pressure gauge was calibrated in a vertical position with increasing and decreasing pressure. The case of the pressure gauge was lightly tapped before each reading.
- The pressure medium was mineral oil.
- The Ambient Temperature during calibration was 20 °C
- Reference Equipment: Q.AC/1000-3F
- Uncertainty Confidence Level = 95%: Coverage Factor k = 2

COMMENTS: Prior to taking final readings, the pressure gauge was repaired and adjusted.

PERFORMANCE TABLE:

Applied Pressure (kPa)	*As Found (kPa)*	*Increasing (kPa)*		*Decreasing (kPa)*		*Uncertainty (kPa)*
		Reading	*Correction*	*Reading*	*Correction*	
400		400	0.0	400	0.0	±3.3
800		800	0.0	800	0.0	±3.3
1200		1,195	+5.0	1,195	+5.0	±3.3
1600		1,595	+5.0	1,595	+5.0	±3.3

OVERLOAD TEST: The overload test was not performed.

CONCLUSION: The pressure gauge complied with the specification requirements

RECOMMENDED DATE OF NEXT CALIBRATION: 10 August 2006 (1 Year)

Signed .....
A. TIEDEMANN
Approved Signatory
AUSTRALIAN CALIBRATING SERVICES (A'SIA) PTY LIMITED

NATA
ACCREDITATION

NATA Accredited Laboratory Number 1239
The tests, calibrations or measurements covered by this document have been performed in accordance with NATA requirements, which include the requirements of ISO/IEC 17025, and are traceable to national standards of measurement.

HVAC

PIPING CHECKLIST – PRE HYDRO

hps

Project: Redirection of Heroes Avenue Sewage Pump Station	Inspected By: RENE BONGERS	SITE: Patrick Lane
Line No./Test Pack No.:	Area: SP306 – Patrick Lane Pump Station	
Equipment Description: WASTE WATER ROMAN STATION		

Item No.	Item Description	Checked by HVAC/HPS	
		Initial	Date
1.	Installed to P&ID	RB	26-8-05
2.	Materials correct	RB	
3.	Supports/Guides/Anchors correct	NA	
4.	Spring hangers blocked/ removed	NA	
5.	Temporary supports installed	NA	
6.	Checked for external damage	RB	
7.	NDT complete and satisfactory	RB	
8.	PWHT complete and satisfactory	NA	
9.	Control valves removed		
10.	Check valves/ internals removed (refer to register)		
11.	Expansion joints removed and/or restrained		
12.	Orifice plates removed YES/NO		
13.	Instrument process piping disconnected		
14.	Pre-testing flushing	RB	
15.	In-line strainers installed (refer to register)	NA	
16.	Blanks and spades installed	RB	
17.	Vents open for filling	RB	
18.	Test medium	WATER	
19.	Welds and fittings wrapped for underground service	NA	
20.	Holiday test satisfactory	RB	
21.	Trench backfilled and compacted	RB	

Comments

CHECKED BY: (NAME) RENE BONGERS	
APPROVED BY: (HVAC Representative) Date: 26-8-05	APPROVED BY: (Client's Representative) Date:

PIPING CHECKLIST – POST HYDRO

HVAC

Project : Redirection of Heroes Avenue Sewage Pump Station	Inspected By: Rose Bowers	SITE: Patrick Lane
Line No./Test Pack No.:	Area: SP306 – Patrick Lane Pump Station	
Equipment Description: Waste Water Pumping Station		

Item No.	Item Description	Checked by HVAC/HPS	
		Initial	Date
1.	Test satisfactory completed		
2.	Flushing satisfactory completed		
3.	In-line strainers reinstated (refer to register)		
4.	Test blanks and spades removed		
5.	Temporary supports removed		
6.	Expansion joint restraints removed, joints installed		
7.	Control valves installed		
8.	Check valves/ internals reinstated (refer to register)		
9.	Orifice plates installed		
10.	Spring hangers unblocked and set and/or installed		
11.	Replacement gaskets installed		
12.	Vent/ Drain couplings plugged/ welded		
13.	Instrument process piping re-connected		
14.	Instrument installed		
15.	Steam tracing installed		
16.	Insulation complete		
17.	Painting and/or identification complete		
18.	Re-instated to P&ID		

Comments

CHECKED BY: (NAME)	
APPROVED BY : (HVAC Representative) Date:	APPROVED BY: (Client's Representative) Date:

COMMON LOGIC Pty Ltd
Specialist Electrical Contractors

Site Acceptance Tests

Subject: Switchboard Pre-Commissioning SAT for Patrick Lane Pump Station	Sheet: 5 Of: 13	Section 3

Page Revision No: 0 Date: 29/07/05 Manual Issue No: 0 Date: 29/07/05

3.0 INSULATION RESISTANCE/ HIGH POT TEST

3.1 Insulation Resistance Test

Insulation resistance of whole or part of an installation must be a minimum of 1 Meg/ohm (AS/NZS 3000:2000)

- ☐ Insulation test conducted on all internal circuits
- ☐ Insulation test conducted on all busbar
- ☐ Insulation test conducted on all motors
- ☐ Insulation test conducted on L&P circuits

- → All Selector Switches, Isolators and CB's are in the off position
- → Surge Diverter Disconnected
- → Remove MEN LINK before insulation test
- → All electronic equipment susceptible to high voltage damage to be isolated.

3.2 Low Voltage Switchboards Insulation Test

MEGGAR VOLTAGE 500 VOLTS
INSTRUMENT DETAILS SK-300J SIEMENS

Switchboard and mains.

ACROSS	RESULT (M.OHM)	High Pot
Join Red, White & Blue Phases and Neutral, Test to Earth	200	
Red Phase to White, Blue & N	200	
White Phase to Red, Blue and N	200	
Blue Phase to Red, White & N	200	
N to Red, White & Blue	200	

Sewage Pumps

ACROSS	PUMP 1 RESULT (M.OHM)	PUMP 2 RESULT (M.OHM)
Red Phase to White, Blue & E	U1 - 600 U2 - 500	U1 - 800 U2 - 700
White Phase to Red, Blue and E	V1 - 600 V2 - 500	V1 - 700 V2 - 750
Blue Phase to Red, White & E	W1 - 620 W2 - 400	W1 - 700 W2 - 750
	1000V	1000V

W. WONG 21/07/2005

Test Carried out by... R. BURKE Signed... R Burke Date.. 21/07/05

Test witnessed by..... W. WONG Signed W Wong Date.. 21/07/05

Authorised By:

Prüfzertifikat

für Druckmessumformer

Test certificate for pressure transmitters

VEGA

Core Dru
Gravity Sens

VEGA bestätigt, dass die zur Qualitätsprüfung des Erzeugnisses eingesetzten Messmittel gültig kalibriert und auf nationale Normale der Physikalischen Technischen Bundesanstalt (PTB) rückführbar sind.
VEGA confirms that all instruments used to assure the quality of our products are calibrated and traceable to national standards of PTB (Physikalischen Technischen Bundesanstalt)

VEGA Grieshaber KG, Am Hohenstein 113, 77761 Schiltach, Tel. 0 78 36/50-0, Fax. 0 78 36/50 201

Druckmessumformer / Pressure transmitter:	WELL72	**Kundennummer** Customer ID	44741
Messbereich / Meassuring range:	0 bis/to 1 bar rel. 0 bis/to 100 kPa rel.	**Auftragsnummer** Order number	1156693
Seriennummer / Series no.:	14028316		
Ausgang / Output:	4 ... 20mA, HART	**Auftragsposition** Order position	2
Zulassungen / Approvals:	OHNE		

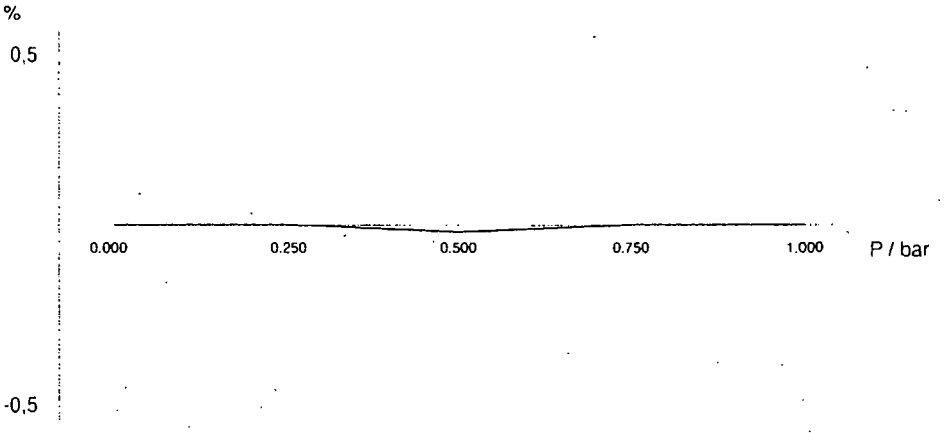
Kennwerte / Characteristics: 0,000 bis/to 1,000 bar rel.

4,007 bis/to 19,999 mA

Kennliniencharakteristik / Output characteristics:

max. zul. Abweichung bezogen auf Messbereich: < 0,25 %
/ Dev. in linearity rel. to measuring range

Ref.-Druck / Ref. pressure [bar]:	0,000	0,250	0,500	0,750	1,000
Soll-Ausgang / Ideal output [mA]:	4,007	8,006	12,003	15,999	19,999
Ist-Ausgang / Real output [mA]:	4,007	8,005	11,999	15,999	19,999
Abweichung / Accuracy [%]:	0,00	0,00	-0,02	0,00	0,00



Temperatureinfluss
/ Temperature influence:

Temperaturfehler bei 0 bar rel.
/ Temperature accuracy at 0 bar rel.

:ogen auf den Messbereich / Related to the measuring range

Bezugstemperatur 20 °C / Ref. temperature 20 °C

Temperatur [°C] Temperature	0	20	60	100
Ist-Ausgang [mA] Real output	4,003	4,007	3,997	3,999
Abweichung [%] Accuracy	-0,03	0,00	-0,06	-0,05

Datum / Date: 09.08.2004 **Unterschrift** / Signature:

Prüfzertifikat

für Druckmessumformer

Test certificate for pressure transmitters

VEGA

Patrick Lane
WELL

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VEGA Grieshaber KG, Am Hohenstein 113, 77761 Schiltach, Tel. 0 78 36/50-0, Fax. 0 78 36/50 201

Druckmessumformer / Pressure transmitter:	WELL72	**Kundennummer** Customer ID	44741
Messbereich / Meassuring range:	0 bis/to 1 bar rel. 0 bis/to 100 kPa rel.	**Auftragsnummer** Order number	1156693
Seriennummer / Series no.:	14028319		
Ausgang / Output:	4 ... 20mA, HART	**Auftragsposition** Order position	2
Zulassungen / Approvals:	OHNE		

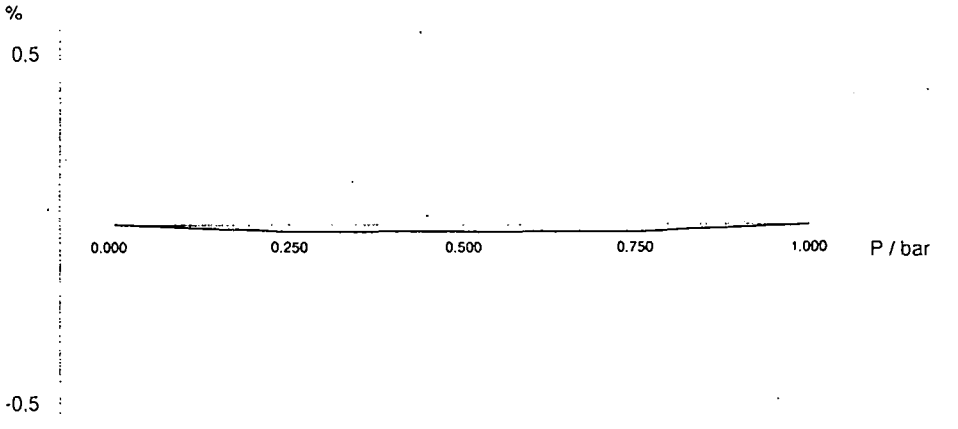
Kennwerte / Characteristics: 0,000 bis/to 1,000 bar rel.

4,003 bis/to 19,998 mA

Kennliniencharakteristik / Output characteristics:

max. zul. Abweichung bezogen auf Messbereich: < 0,25 %
/ Dev. in linearity rel. to measuring range

Ref.-Druck / Ref. pressure [bar]:	0,000	0,250	0,500	0,750	1,000
Soll-Ausgang / Ideal output [mA]:	4,003	8,002	12,000	15,997	19,998
Ist-Ausgang / Real output [mA]:	4,003	7,999	11,996	15,993	19,998
Abweichung / Accuracy [%]:	0,00	-0,02	-0,02	-0,02	0,00



Temperatureinfluss
/ Temperature influence:

Temperaturfehler bei 0 bar rel.
/ Temperature accuracy at 0 bar rel.

Bezogen auf den Messbereich / Related to the measuring range

Bezugstemperatur 20 °C / Ref. temperature 20 °C

Temperatur [°C] Temperature	0	20	60	100
Ist-Ausgang [mA] Real output	3,993	4,003	3.996	3.993
Abweichung [%] Accuracy	-0,06	0.00	-0,05	-0,06

Datum / Date: 09.08.2004 **Unterschrift** / Signature:

Prüfzertifikat

für Druckmessumformer

Test certificate for pressure transmitters

VEGA

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VEGA Grieshaber KG, Am Hohenstein 113, 77761 Schiltach, Tel. 0 78 36/50-0, Fax. 0 78 36/50 201

Druckmessumformer / Pressure transmitter:	BAR64	**Kundennummer** Customer ID	44741
Messbereich / Meassuring range:	-1 bis/to 5,0bar rel. -100 bis/to 500 kPa rel.	**Auftragsnummer** Order number	1207381
Seriennummer / Series no.:	14315134		
Ausgang / Output:	4 ... 20mA, HART	**Auftragsposition** Order position	1
Zulassungen / Approvals:	OHNE		

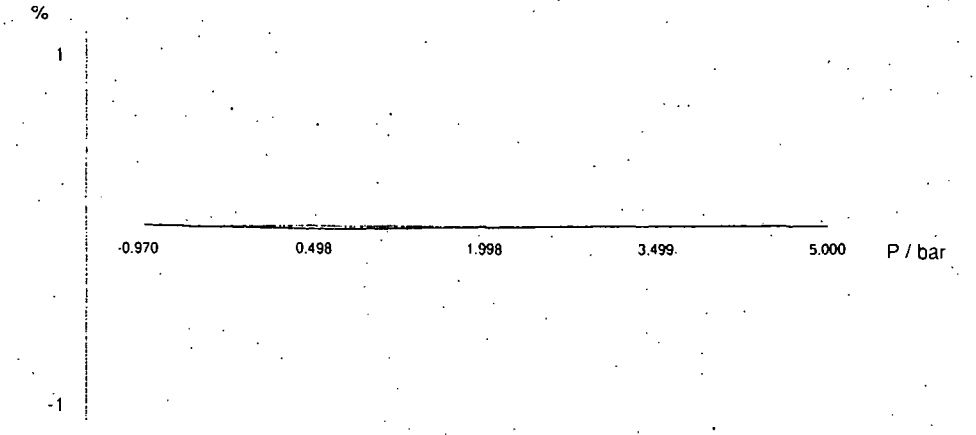
Kennwerte / Characteristics: -0,970 bis/to 5,000 bar rel.

0,51 bis/to 100,01 %

Kennliniencharakteristik / Output characteristics:

max. zul. Abweichung bezogen auf Messbereich: < 0.08 %
/ Dev. in linearity rel. to measuring range

Ref.-Druck / Ref. pressure [bar]:	-0,970	0,498	1,998	3,499	5,000
Soll-Ausgang / Ideal output [%]:	0,51	24,98	49,98	74,98	100.01
Ist-Ausgang / Real output [%]:	0.51	24,96	49,97	74,98	100.01
Abweichung / Accuracy [%]:	0,00	-0,02	-0,01	0,00	0.00



Temperatureinfluss
/ Temperature influence:

Temperaturfehler bei 0 bar rel.
/ Temperature accuracy at 0 bar rel.

Bezogen auf den Messbereich / Related to the measuring range

Bezugstemperatur 20 °C / Ref. temperature 20 °C

Temperatur [°C] Temperature	0	20	60	100
Ist-Ausgang [%] Real output	16,85	16,83	16.85	16.82
Abweichung [%] Accuracy	0,02	0.00	0.02	-0.01

Datum / Date: 10.06.2005 **Unterschrift** / Signature:

AUSTRALIAN CALIBRATING SERVICES (A'SIA) PTY. LTD.
A.B.N. 33 823 153 736

126 Oxford Street, Collingwood
P.O. Box 1174, Collingwood, Vic. 3066, Australia
Phone: +61 3 9417 5688, Fax: +61 3 9417 1578

File No: Q.AC/635-E-2
Issue Date: 12 Aug 2005

CALIBRATION REPORT
AN INDUSTRIAL PRESSURE GAUGE

FOR: HVAC CONSTRUCTIONS
101 COBALT STREET
CAROLE PARK
QLD 4300

LOCATION: ACS Brisbane

TEST DATE: 10 August 2005

EQUIPMENT DETAILS:

Gauge Details			
Maker:	WIKA		
Model:	1600 x 20 kPa		
Serial Number:	69911	Capacity:	1600 kPa
Plant Number:	Nil	Resolution:	20 kPa

TEST DETAILS: Australian Standard AS1349:1986
"Bourdon Tube Pressure and Vacuum Gauges"
Section 4. Performance and Testing

- The pressure gauge was calibrated in a vertical position with increasing and decreasing pressure. The case of the pressure gauge was lightly tapped before each reading.
- The pressure medium was mineral oil.
- The Ambient Temperature during calibration was 20 °C
- Reference Equipment: Q.AC/1000-3F
- Uncertainty Confidence Level = 95%: Coverage Factor k = 2

COMMENTS: Prior to taking final readings, the pressure gauge was repaired and adjusted.

PERFORMANCE TABLE:

Applied Pressure (kPa)	*As Found (kPa)*	*Increasing (kPa)*		*Decreasing (kPa)*		*Uncertainty (kPa)*
		Reading	*Correction*	*Reading*	*Correction*	
400		400	0.0	400	0.0	±3.3
800		800	0.0	800	0.0	±3.3
1200		1,195	+5.0	1,195	+5.0	±3.3
1600		1,595	+5.0	1,595	+5.0	±3.3

OVERLOAD TEST: The overload test was not performed.

CONCLUSION: The pressure gauge complied with the specification requirements

RECOMMENDED DATE OF NEXT CALIBRATION: 10 August 2006 (1 Year)

Signed .....
A. TIEDEMANN
Approved Signatory
AUSTRALIAN CALIBRATING SERVICES (A'SIA) PTY LIMITED

NATA Accredited Laboratory Number 1239
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Signed A Tiedemann
A. TIEDEMANN
Approved Signatory
AUSTRALIAN CALIBRATING SERVICES (A'SIA) PTY LIMITED

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