HEAT EXCHANGERS

HANDOVER PACKAGE

Oxley WRP

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John Holland

OXLEY WRP – HEAT EXCHANGERS – HANDOVER PACKAGE

Revision List

Draft/tender issues of this document shall be identified as Revision A, B, C, etc. Upon initial issue (generally Contract Award) this shall be changed to a sequential number commencing at Revision 0

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Date	Rev	Details	Sect.	Page	Auth. (Initial)
21st May 2012	A	Preliminary Draft	All	All	JB
11 JULY 2012	B	FOR ISSUE	ALL	ALL	MG

Approval

Name		Signature	Date
JHG	Tate Brammer		11/7/12
JHG	Mason Grieco		11/7/12

Distribution List

Name		Hard Copy	Soft Copy	Signature	Date
QUU	Paul Fisher	1	1		
JHG	Mason Grieco	1	1		11/7/12

Contents

1. Design Documents

1.1. Updated Functional Description

Oxley WRP	
Functional Specification	**Customer: Queensland Urban Utilities**

Oxley Creek Water Reclamation Plant
Sludge Temperature Maintenance & Storage
(Heat Exchangers)
Functional Specification

W:\PROJ\QLD\NR-Proj\Oxley WWTP\NEW FILING SYSTEM\COMMISSIONING\Functional Specification\Updated Heat Exchangers Functional Description.doc			Author: John Edwards	
Rev	**Description**	**By**	**Approved**	**Date**
C	Updated	DJS		28/09/05
D	Updated – Post Software FAT	JE		30/01/06
E	Updated – Added Sludge and Updated Inlet Works	DP		05/04/07
F	Updated – Changes to Struvite	DP		01/06/07

Printed: 02/06/12

Oxley WRP	
Functional Specification	**Customer: Queensland Urban Utilities**

1.1. Sludge Temperature Maintenance & Storage

Hydrolysed sludge from the Flash Tank is pumped by the duty/duty/standby Digester Feed Pumps 01, 02 & 03, part of the Thermal Hydrolysis Unit (THU), to the parallel duty/duty Post Thermal Hydrolysis Heat Exchangers 01 & 02, HX-626-01/02 then on to the 4 number digesters.

The digester feed pumps speeds are controlled via a PID control loop to maintain a combined sludge flow rate set point. This combined flow is divided between the online/available heat exchangers by an operator adjustable digester feed pump ratio set point in the CAMBI PLC. Pumping occurs when the level in the flash tank is above a low fill level.

The Heat Exchangers, tube in tube, will be controlled by the plant control system. On each Heat Exchanger (HX) there is modulating valve on the service water outlet line. This valve operates via a PID control loop to maintain a sludge outlet temperature set point.

In Pulper Feed Mode 1, Hot sludge from thermal hydrolysis is pumped out at between 80-100^{o}C and is cooled in the main sludge heat exchanger to between 40-50^{o}C. The sludge digesters operate at 35-37^{o}C. As such the existing heat exchanger arrangement on each digester will be modified to cool the sludge as required.

In Pulper Feed Mode 2, Sludge is fed directly to the Digesters. In this case, the existing heat exchanger arrangement on the digesters will be modified to heat the sludge to the required temperature.

During the transition between Pulper Feed Modes, there may be a requirement for Pulper Feed Mode 2, but to have the Digesters in a cooling mode. As a result, the operation of Digester Temperature control will be operator selectable via SCADA.

1.1.1. Equipment List

1.1.1.1. Post Thermal Hydrolysis Sludge Cooling and Distribution

Tag	Equipment	Range	Type	Make & Model	Comment
TT-626-01	Heat Exchanger 1 Service Water Return Temperature Transmitter				
TT-626-02	Heat Exchanger 2 Service Water Return Temperature Transmitter				
TT-626-04	Heat Exchanger 1 Sludge Output Temperature Transmitter				

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TT-626-06	Heat Exchanger 2 Sludge Output Temperature Transmitter				
FCV-626-04	Heat Exchanger 1 Cooling Water Control Valve				
FCV-626-06	Heat Exchanger 2 Cooling Water Control Valve				
HV-626-11	Thermal Hydrolysis Heat Exch. 1 Inlet Valve				
HV-626-25	Thermal Hydrolysis Heat Exch. 2 Inlet Valve				
FIT-626-05	Digesters Sludge Flow Transmitter				
FCV- 626-90	Heat Exchanger 1 Service Water Auto Flush Inlet valve				
FCV-626-14	Heat Exchanger 1 Automatic Flush Drain Valve				
FCV-626-13	Heat Exchanger 1 Sludge Outlet Automatic Valve				
FCV- 626-94	Heat Exchanger 2 Service Water Auto Flush Inlet valve				
FCV-626-24	Heat Exchanger 2 Automatic Flush Drain Valve				
FCV-626-23	Heat Exchanger 2 Sludge Outlet Automatic Valve				

1.1.1.2. Process instrumentation

1.1.1.2.1. Post Thermal Hydrolysis Heat Exchanger Temperature ***Transmitters: TT-626-01/02/04/06***

These temperature transmitters measure sludge temperature and drainage service water temperature of the two post thermal hydrolysis heat exchangers. These devices operate as Standard Process Analogues, and shall be controlled as outlined in the functional standards. The process value of this device is filtered and is scaled from 0 to 100ºC.

1.1.1.2.2. Digesters Sludge Flow Transmitter: FIT-626-05

This flow transmitter measures the amount of sludge being fed into the four digesters. This device operates as a Standard Flowmeter, and shall be controlled as outlined in the functional standards. The process value of this device is filtered and scaled from 0 to 10 L/s.

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1.1.1.2.3. Thermal Hydrolysis Heat Exchanger Inlet Valves: HV-626-11/21

The two post thermal hydrolysis heat exchangers are equipped with hand valves that have position feedback switches. These devices operate as Standard Process Digital Inputs, and shall be controlled as outlined in the functional standards.

1.1.1.3. Controlled Equipment

1.1.1.3.1. Post Thermal Hydrolysis Heat Exchanger Cooling Water Control Valves: FCV-626-04/06

These flow control valves control the amount of cooling water used by the two heat exchangers. These devices operate as Standard Modulating Control Valves, and are controlled as outlined in the functional standards.

1.1.1.1.1. Heat Exchanger 1 and 2 Service Water Flush Inlet Valves: FCV-626-90/94

These valves control the inlet service water for the automatic flush on the sludge side of the heat exchangers. These devices operate as Standard Control Valves, and are controlled as outlined in the functional standards.

1.1.1.1.2. Heat Exchanger 1 and 2 Automatic Flush Drain Valves: FCV-626-14/24

These valves control the drainage for the automatic service water flush on the sludge side of the heat exchangers. These devices operate as Standard Control Valves, and are controlled as outlined in the functional standards.

1.1.1.1.3. Heat Exchanger 1 and 2 Sludge Outlet Automatic Valves: FCV-626-13/23

These valves control the sludge outlet from the heat exchangers. These devices operate as Standard Control Valves, and are controlled as outlined in the functional standards.

1.1.2. Automatic Control

1.1.2.1. Post Thermal Hydrolysis Sludge Cooling

Service water for cooling is supplied to each online/availabe heat exchanger. There are two heat exchangers which require a number of permissive. For Heat Exchanger 01A (HX-626-01A) the following permissives must be confirmed for the unit to be available:

- Inlet Hand Valve in Open Position – ZSO-626-611
- Temperature Transmitter on cooling water outlet available – TT-626-01
- Temperature Transmitter on Sludge outlet available – TT-626-04
- Flow control valve on discharge of sludge is available – FCV-626-13
- Dilution water valve are available– FCV-626-90 and FCV-626-14
- Flow control valve on cooling water discharge (FCV-626-04) available

NB: The same permissives are also required for Heat Exchanger 02A with the associated equipment.

A heat exchanger can be set online and offline by the operator. A heat exchanger will only be able to be put online if the above permissives are confirmed.

This flow is controlled on the down stream side of the service water flow from the HX via a control valve FCV62604 and FCV62606. Note that FCV62604 and FCV62606 should be slow closing to prevent water hammer. The valve position is controlled to maintain a temperature set point in the 'cooled' sludge line. That is:

- TIC62604 controls FCV62604 via a PID control loop and
- TIC62606 control FCV62606 via a PID control loop.

Three interlocks will be sent to the Thermal Hydrolysis PLC to prevent hydrolysed sludge being pumped from the flash tanks.

Tag	Type	Purpose
dcFeedPump1IL	Boolean	PU401 Interlock
dcFeedPump2IL	Boolean	PU402 Interlock
dcFeedPump3IL	Boolean	PU403 Interlock

These interlocks will be set high to prevent the pumps from operating. The interlocks will operate on any of the following conditions:

- The associated heat exchanger inlet hand valve is not confirmed open, HV-626-11 for PU401 or PU402 (if pumping to HX-626-01A), HV-626-21 for PU403 or PU402 (if pumping to HX-626-02A) OR
- Any of the associated heat exchangers sludge or service water temperature high levels are reached OR
- None of the digester inlet control valves are open

May need to add min, max speed and flows for controller on Digester feed pumps now that capacity has been doubled. TB

1.1.1.2. Post Thermal Hydrolysis Sludge Cooling – Automatic Flush

When feed to a heat exchanger is stopped and the heat exchanger is taken offline an automatic flush will be completed for an operator adjustable duration. The sequence will operate as follows:

1. Confirm Associated digester feed pump has stopped (PU-625-401, PU-625-402 or PU-625-403) and associated digester feed pump discharge valves are in closed postion (FCV-625-423/433/434/435).
2. Wait 5 seconds and Close associated Heat Exchanger sludge discharge valve (FCV-626-13 or FCV-626-23).
3. When Close feedback position has been confirmed on associated heat exchanger sludge discharge valve, Open the associated Heat Exchanger Automatic Flush Drainage Valve (FCV-626-14 or FCV-626-24).
4. When Open feedback position has been confirmed on associated Automatic Flush Drainage Valve, Open the associated Heat Exchanger Service Water Flush Inlet Valve (FCV-626-90 or FCV-626-94).
5. Run flush for operator adjustable Heat Exchanger Flush Timer.
6. When Timer has expired, Close Heat Exchanger X Service Water Flush Inlet Valve (FCV-626-90 or 94).
7. When Closed feedback has been confirmed, wait 20 seconds and then close Heat Exchanger X Automatic Flush Drainage Valve (FCV-626-14 or 24).

This flush can also be triggered manual by the operator if the associated equipment including heat exchanger and pump are confirmed offline.

1.1.2.2. Post Thermal Hydrolysis Sludge Distribution

The system shall be set such that the flow reading used for digester feed control can be either:

- Mode 1, Digester Inlet: The value from FIT62605
- Mode 2, Heat Exchanger Inlet: The sum of the values from FIT-625-410, FIT-625-409 and FIT-625-408 (THU PLC). Only utilising flowmeters associated with pumps selected for duty.

In the event that FIT62605 faults, and digester feed is mode 1, then operation should continue using mode 2. These flows will be sent from the THU PLC to the sludge PLC.

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Tag	Type	Purpose
dsFIT409Avail	Boolean	FIT409 Available status
dsFIT408Avail	Boolean	FIT408 Available status
dsFIT410Avail	Boolean	FIT410 Available status
asFIT409Flow	REAL	FIT409 Flow
asFIT408Flow	REAL	FIT408 Flow
asFIT410Flow	REAL	FIT410 Flow

In this system there is a flow setpoint for each digester:

- Digester 1 Feed Interval Flow Set point (m3).
- Digester 2 Feed Interval Flow Set point (m3).
- Digester 3 Feed Interval Flow Set point (m3).
- Digester 4 Feed Interval Flow Set point (m3).

Under normal circumstances these values should be equal. They should also be set such that the period between switching between digesters is reasonable (e.g. 10 minutes approx).

In mode 1 the sequence is as follows:

1. Digester 1 Feed Control Valve FCV62613 is open (confirmed by ZO62613)
2. Digester Feed pumps are running
3. FIQ62605 starts an interim totaliser
4. When the interim totaliser reaches the Digester 1 Feed Interval Flow Set point,
5. Digester 3 Feed Control Valve FCV62615 opens, when this is confirmed by ZO62615
6. Then Digester 1 Feed Control Valve FCV62613 closes (confirmed by ZC62613), when this is confirmed then
7. FIQ62605 starts a new interim totaliser
8. When the totaliser reaches the Digester 3 Feed Interval Flow Set point,
9. Digester 2 Feed Control Valve FCV62614 opens, when this is confirmed by ZO62614
10. Then Digester 3 Feed Control Valve FCV62615 closes (confirmed by ZC62615), when this is confirmed then
11. FIQ62605 starts a new interim totaliser
12. When the totaliser reaches the Digester 2 Feed Interval Flow Set point (m3).
13. Digester 4 Feed Control Valve FCV62616 opens, when this is confirmed by ZO62616
14. Then Digester 2 Feed Control Valve FCV62613 closes (confirmed by ZC62613), when this is confirmed then
15. FIQ62605 starts a new interim totaliser
16. When the totaliser reaches the Digester 4 Feed Interval Flow Set point,
17. Digester 1 Feed Control Valve FCV62613 opens, when this is confirmed by ZO62613
18. Then Digester 4 Feed Control Valve FCV62616 closes (confirmed by ZC62616), when this is confirmed then the sequence recommences.

If any of the digesters are unavailable the sequence skips to the next digester.

For mode 2, the sequence operates in the same manner. The only difference being that FIT-625-401/402 will be used to totalize flow to the digesters.

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1.1.3. Setpoints

Setpoint Description	Default Value	Security Level
TT-626-01 High	-	Operator
TT-626-01 Low		
TT-626-02 High		
TT-626-02 Low		
TT-626-04 High		
TT-626-04 Low		
TT-626-06 High		
TT-626-06 Low		
Heat Exchanger 1 Temperature Set Point		
Heat Exchanger 2 Temperature Set Point		
Digester Feed Pump Mode		
Digester Feed Flow Mode		
Digester 1 Feed Interval Flow Set Point		
Digester 2 Feed Interval Flow Set Point		
Digester 3 Feed Interval Flow Set Point		
Digester 4 Feed Interval Flow Set Point		

1.1.4. Process Alarms and Interlocks

1.1.4.1. Post Thermal Hydrolysis Heat Exchanger Drainage Temperature Alarms

Tag	Equipment	Action
TT-626-01	Heat Exchanger 2 Outlet Temperature Transmitter	Raise Alarm
TT-626-02	Heat Exchanger 1 Outlet Temperature Transmitter	Raise Alarm

Alarms will be raised on Invalid, High and High High conditions. The High High condition will also interlock the corresponding hydrolysed sludge feed pump PU401/402. These are Priority 6 Alarms.

1.1.4.2. Post Thermal Hydrolysis Heat Exchanger Drainage Temperature Alarms

Tag	Equipment	Action
TT-626-04	Heat Exchanger 1 Sludge Output Temperature Transmitter	See Below
TT-626-06	Heat Exchanger 2 Sludge Output Temperature Transmitter	See Below

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Alarms will be raised on Invalid, Low, High and High High conditions. The High High condition will also interlock the corresponding hydrolysed sludge feed pump PU401/402. These are Priority 6 Alarms.

1.1.4.3. Post Thermal Hydrolysis Heat Exchanger Control Valves

Tag	Equipment	Action
FCV-626-04	Heat Exchanger 1 Cooling Water Control Valve	Raise Alarm
FCV-626-06	Heat Exchanger 2 Cooling Water Control Valve	Raise Alarm
FCV- 626-90	Heat Exchanger 1 Service Water Auto Flush Inlet valve	Raise Alarm
FCV-626-14	Heat Exchanger 1 Automatic Flush Drain Valve	Raise Alarm
FCV-626-13	Heat Exchanger 1 Sludge Outlet Automatic Valve	Raise Alarm
FCV- 626-94	Heat Exchanger 2 Service Water Auto Flush Inlet valve	Raise Alarm
FCV-626-24	Heat Exchanger 2 Automatic Flush Drain Valve	Raise Alarm
FCV-626-23	Heat Exchanger 2 Sludge Outlet Automatic Valve	Raise Alarm

These alarms will be generated when the valve fails to position. These are Priority 6 Alarms.

1.1.4.4. DWAS Flow Indicator

Tag	Equipment	Action
FIT-626-05	Digesters DWAS Flow Transmitter	Raise Alarm.

This alarm will be generated when the flow becomes high or invalid. These are Priority 6 Alarms.

1.2. P&ID

R7D185
INSTRUMENT AIR
HV-626-40

INSTRUMENT AIR
DN25
HV-626-61
NOTE 2.
HEAT EXCHANGER 1A
COOLING WATER
CONTROL VALVE
FCV 62604
PRV-626-01
DN20
100x75
HV-626-19
75x150
585-150-SS-SW
R7D194
DRAINAGE
TE 62601
TT 62601
TI 62601
EXISTING
NEW
75x150
583-100-SS-SW
DN25
HV-626-29

SERVICE WATER
DN50
NRV-626-91
INSTRUMENT AIR
DN6
HV-626-67
ZO 62690
ZC 62690
FCV 62690
ZSO 62690
ZSC 62690
FCV-626-90
100x150
PP
150x100
EXISTING
NEW
R7D176
HYDROLYSED SLUDGE
FROM THERMAL HYDROLYSIS
ZC 62611
ZO 62611
ZSC 62611
ZSO 62611
FLUSH POINT
DN50
HV-626-12
LOCKABLE
HV-626-11
LOCKABLE
247-100-SS-HS
NOTE 1
100x76
DN50
FLUSH POINT
HV-626-18
LOCKABLE
NOTE 1
NOTE 3, 4.
HX-626-01A
POST THERMAL HYDROLYSIS
HEAT EXCHANGER 01A
TIC 62604
H
L
TT 62604
TE 62604
TI 62603
ZSC 62613
ZC 62613
ZSO 62613
ZO 62613
FCV 62613
DN6
HV-626-63
INSTRUMENT AIR
HV-626-15
EXISTING
NEW
100x150
253-150-SS-HS
R7D178
HYDROLYSED SLUDGE TO DIGESTERS
76x100
251-100-SS-HS
NOTE 1
FCV-626-13
DRAIN
100x150
BLANK
DN25
HV-626-33
SAMPLING POINT

R7D184
DIGESTER SLUDGE RECYCLE
254-150-DICL-DS
(FUTURE IF REQUIRED)
PI 62690
20x40
HV-626-31
DN40
HV-626-30
CHLORINE
TABLET DOSER
HV-626-32
50x40
NEW
EXISTING
DN50
HV-626-10
LOCKABLE
580-150-SS-SW
NEW
EXISTING
HV-626-20
LOCKABLE
150x100
HV-626-16
LOCKABLE
581-100-SS-SW
DN50
HV-626-17
LOCKABLE
R7D198
HIGH PRESSURE SERVICE WATER
150x100
PRV-626-03
NOTE 5
100x150
NRV-626-01
DN6
HV-626-65
INSTRUMENT AIR
FCV-626-14
DN50
FCV 62614
ZSO 62614
ZSC 62614
ZO 62614
ZC 62614

INSTRUMENT AIR
DN25
HV-626-62
NOTE 2.
HEAT EXCHANGER 2A
COOLING WATER
CONTROL VALVE
FCV 62606
PRV-626-02
DN20
100x75
584-75-SS-SW
TE 62602
TT 62602
TI 62602
EXISTING
NEW
DN25

SERVICE WATER
DN50
NRV-626-95
INSTRUMENT AIR
DN6
HV-626-68
ZC 62694
ZO 62694
FCV 62694
ZSC 62694
ZSO 62694
FCV-626-94
ZC 62621
ZO 62621
ZSC 62621
ZSO 62621
FLUSH POINT
DN50
HV-626-22
LOCKABLE
PP
R7D176
HYDROLYSED SLUDGE
FROM THERMAL HYDROLYSIS
HV-626-21
LOCKABLE
248-100-SS-HS
NOTE 1
100x76
DN50
FLUSH POINT
HV-626-28
LOCKABLE
NOTE 1
NOTE 3, 4.
HX-626-02A
POST THERMAL HYDROLYSIS
HEAT EXCHANGER 02A
R7D184
DIGESTER SLUDGE RECYCLE
255-150-DICL-DS
(FUTURE IF REQUIRED)
76x100
252-100-SS-HS
NOTE 1
TIC 62605
H
L
TT 62605
TE 62605
TI 62605
ZC 62623
ZSC 62623
ZO 62623
ZSO 62623
FCV 62623
DN6
HV-626-64
INSTRUMENT AIR
FCV-626-23
INSTRUMENT AIR
DN6
HV-626-66
FCV-626-24
DN50
FCV 62624
ZSO 62624
ZO 62624
ZC 62624
ZSC 62624
582-100-SS-SW
HV-626-26
LOCKABLE
NOTE 1
DN50
HV-626-27
LOCKABLE
R7D194
DRAINAGE

NOTES:
1. REMOVABLE SPOOL TO ALLOW PHYSICAL CLEANING OF EXCHANGER IF REQUIRED.
2. MUST BE SLOW CLOSING VALVES, ACTUATORS TO PREVENT WATER HAMMER. REQUIRED VALVE DIAMETER TBC.
3. FLANGES ON HEAT EXCHANGERS ARE TO ANSI 150
4. ALL GASKETS ON SLUDGE LINES TO BE GRAPHITE SPIRAL WOUND 316 SS
5. ADJUST PRV SETPOINT AS NECESSARY TO ENSURE SUFFICIENT FLOW AT PEAK DEMAND

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE: 8/4/12
NAME of SIGNATORY: MIKE McCOY
RPEQ No. or LICENCE: 10696
COMPANY NAME: BETTER TECHNICAL OPTIONS
START DATE: 11.11.11 FINISH DATE: 1.06.12

Better Technical Options Ltd
environmental solutions

NAME	SIGNATURE	DATE

QUEENSLAND URBAN UTILITIES DELEGATE
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND UrbanUtilities

No.	DATE	AMENDMENT	DRAFTED	DESIGNED	RPEQ NO.	APPROVED
K	23.05.12	AS BUILT	LS	JW	-	JW
J2	20.01.12	FOR CONSTRUCTION	LS	JW	-	JW
J1	14.12.11	PRELIMINARY DRAWING	LS	JW	-	JW

FUNDING
DESIGN W.O. No. -
CONSTRUCTION W.O. No.
FUNDED BY Q.U.U. (✓) EXTERNAL ( )

DRAFTED JB - 19.01.12
DRAFTING CHECK
CAD FILE
Q.U.U. FILE No.

JEFF WHITTY - 20.01.12
DESIGN R.P.E.Q. No. DATE
MIKE MCCOY 10696 20.01.12
DESIGN CHECK R.P.E.Q. No. DATE

APPROVED BY SIGNATURE DATE
CONSTRUCTION MANAGER SIGNATURE DATE

ASSET/PROJECT
OXLEY CK WRP
HEAT EXCHANGER UPGRADE

DRAWING TITLE
P&ID
DIGESTER FEED
HEAT EXCHANGERS

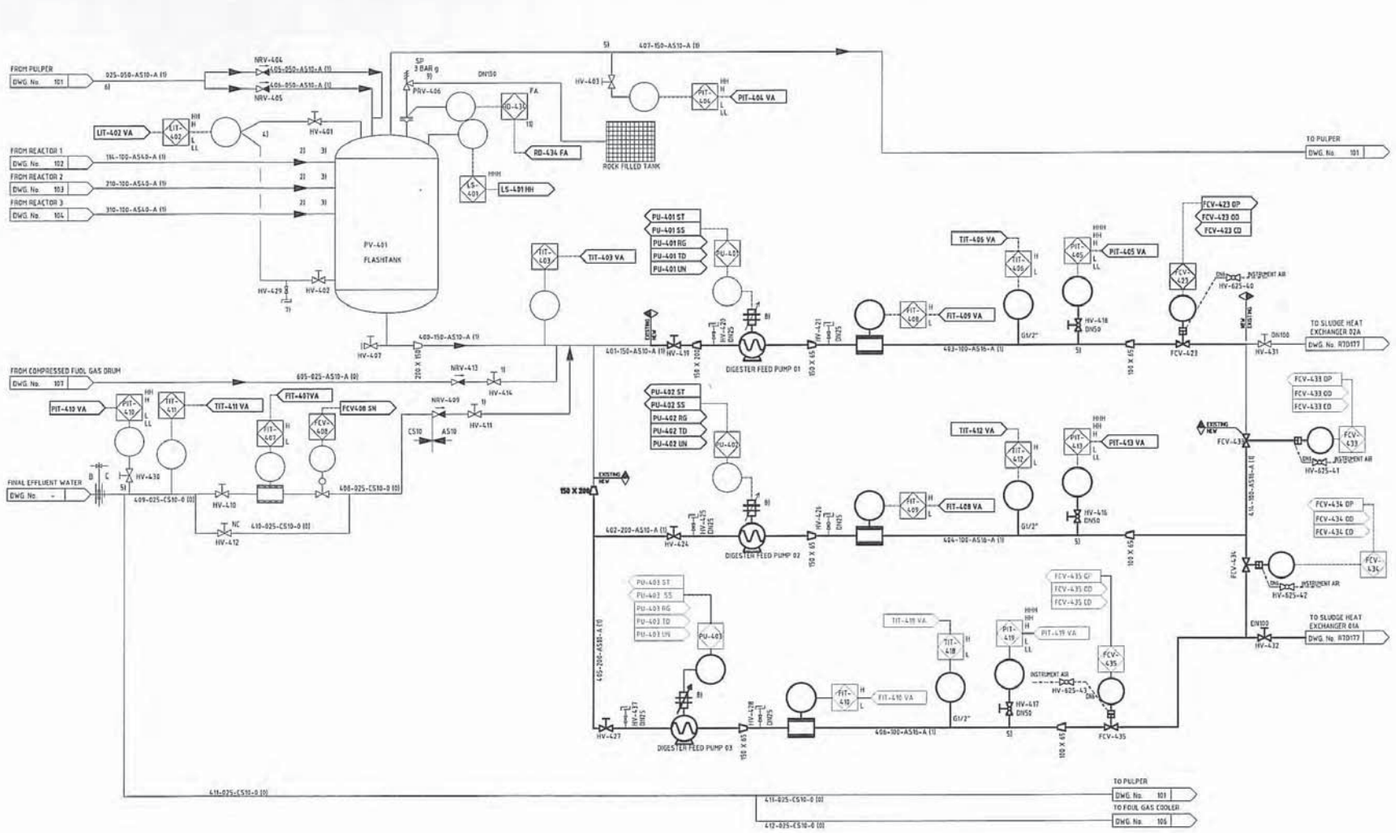
SHEET No. 1 OF 1
QUEENSLAND URBAN UTILITIES DRAWING No. 486/5/5 R7D177
AMEND K

EQUIPMENT TAG No.	PV-401
	FLASHTANK
	3,3/3,12
	26

EQUIPMENT TAG No.	PU-401 / PU-402 / PU-403
EQUIPMENT NAME	DIGESTER FEED PUMP 01 / 02 / 03
CAPACITY (m3/h)	24
DIFF. PRESSURE (bar)	12
DISCH. PRESSURE (barg)	3
POWER INSTALLED (kW)	18.5

NOTES

1) VALVES CLOSE TO SLUDGE PIPE
2) INLET FROM REACTORS TO BE ABOVE MAX LEVEL
3) 5 X DIA BENDS
4) TO BE INSTALLED WITH FLUSHING POINT
5) 3 MM SADDLE REINFORCEMENT ON MAIN PIPE
6) NO POCKETS
7) FLUSHING UNIT, SEE DOC. NO. 999-STD-002, REV. D02, ATT C17
8) MOTOR EQUIPPED WITH THERMISTOR
9) BATTERY LIMIT ON PRESSURE SAFTETY VALVE DISCHARGE FLANGE
10) SEQUENCE NUMBER IN TAG NUMBER TO BE PREFIXED BY 625
11) RD-434 SET AT 2.7 BARG



AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: ..... DATE: 13/06/12
NAME of SIGNATORY: MIKE McCOY
RPEQ No. or LICENCE: 10696
COMPANY NAME: BETTER TECHNICAL OPTIONS
START DATE: 13.11.11 FINISH DATE: 1.06.12

Better Technical Options Ltd
environmental solutions

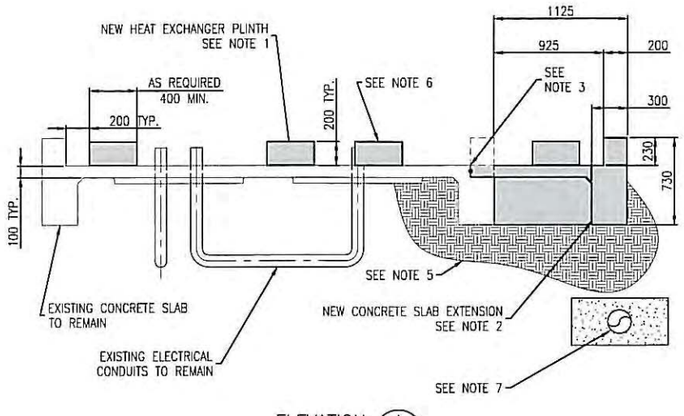
NAME SIGNATURE DATE
QUEENSLAND URBAN UTILITIES DELEGATE
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND UrbanUtilities

1.3. General Arrangement Drawings

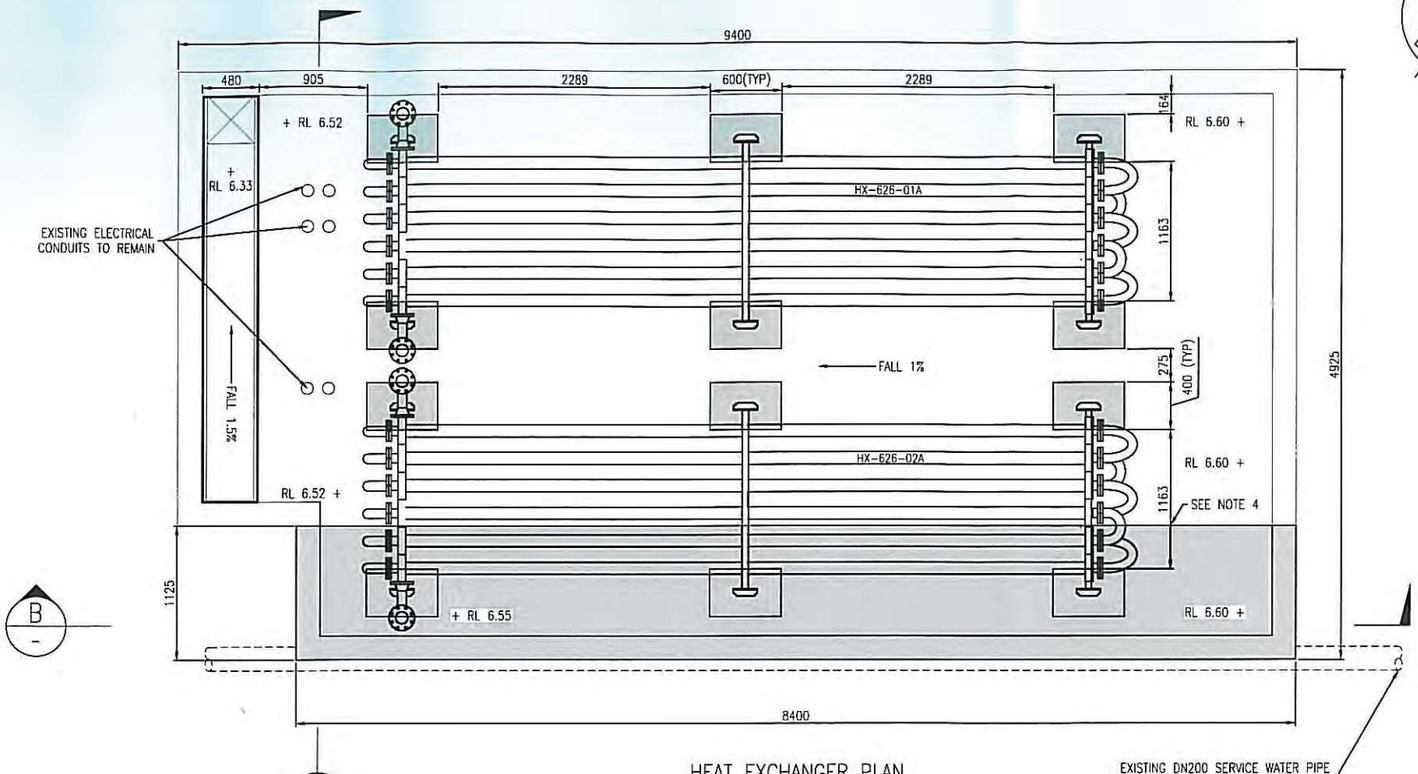
NOTE:

1. PLINTH DETAIL TO BE AS PER DWG: R7Q095.
2. NEW SLAB DETAIL TO BE AS PER DWG: R7Q095.
3. SAWCUT ALONG CONSTRUCTION JOINT (EXISTING FOUNDATION AND BUND WALL) FOR SEALED JOINT. SAWCUT DEPTH = 100mm. APPLY SIKAFLEX TANK SEALANT IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION.
4. COATING TO BE EPIGEN CHEMPROOF 4029FC WITH SURFACE PREP & PRIMER AS RECOMMENDED BY COATING MANUFACTURER.
5. SOIL PREPARATION: 100mm SLAB REINFORCED WITH 1 LAYER SL81 MESH GENERALLY, CAST ON VAPOUR BARRIER AND DAMP PROOF MEMBRANE 'AS 2870' LAPPED AND TAPED ON 50mm COMPACTED HARDFILL.
6. SAWCUT AND BREAKOUT EXISTING PLINTHS AND BUND WALLS DOWN TO SLAB LEVEL. REINFORCING BARS TO BE CUT BELOW SLAB LEVEL TO AVOID DAMAGE TO NEW SLAB MEMBRANE. COAT ENDS OF BARS WITH GALVANISED PRIMER. REPAIR SLAB DAMAGE WITH NON-SHRINK HIGH-STRENGTH POURABLE REPAIR GROUT.
7. EXISTING UNDERGROUND SERVICE WATER PIPE LOCATION AND DEPTH TO BE CONFIRMED PRIOR TO CONSTRUCTION AND CONCRETE ENCASED AS PER DETAIL ON DWG: R7Q095.
8. SEE TERALBA DIMPLEFLOW MODEL 62T 76 102 6000 MAN.

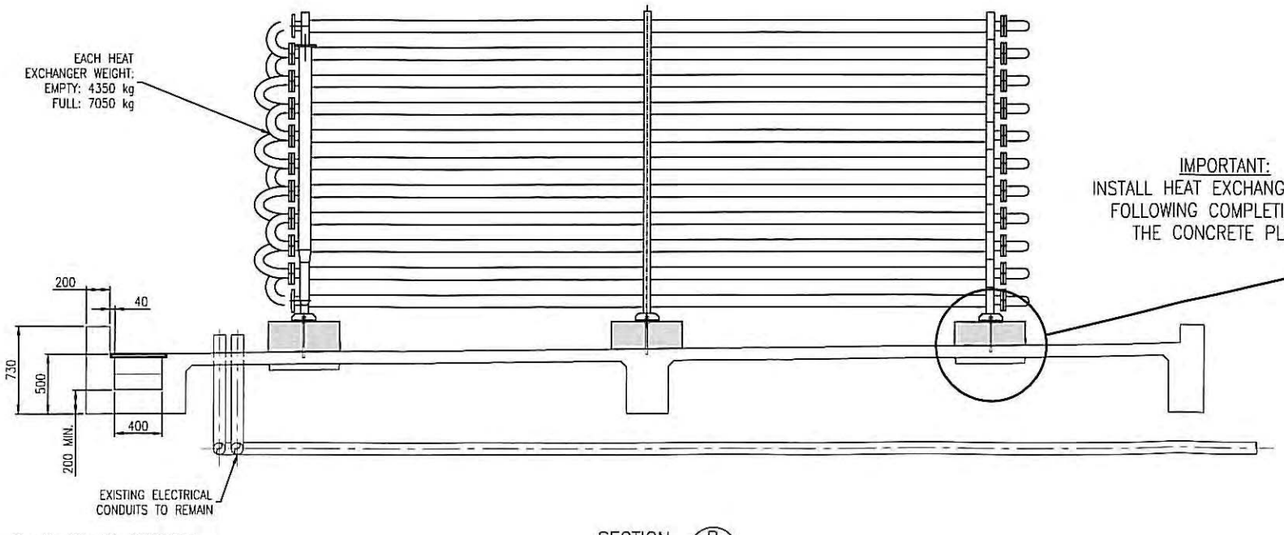


ELEVATION A
SCALE 1:25

(EXISTNG PIPEWORK NOT SHOWN FOR CLARITY)



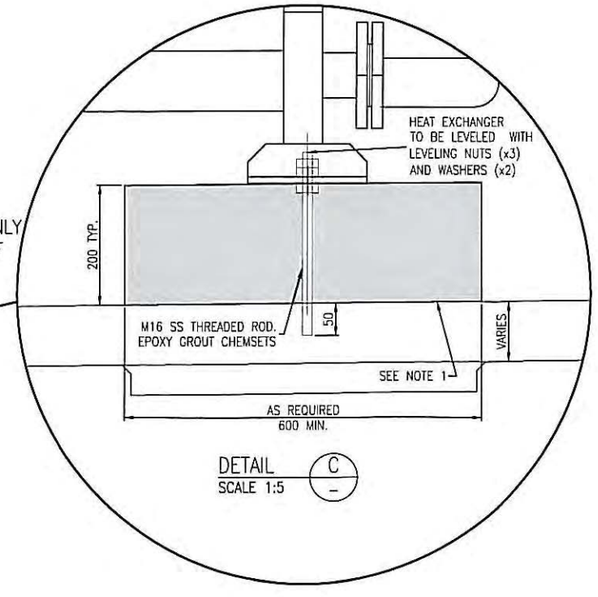
HEAT EXCHANGER PLAN
SCALE 1:25



SECTION B
SCALE 1:25

SCALE 1:25 AT A1 SHEET FULL SIZE

IMPORTANT:
INSTALL HEAT EXCHANGER ONLY FOLLOWING COMPLETION OF THE CONCRETE PLINTH



DETAIL C
SCALE 1:5

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE: 5/6/12

NAME of SIGNATORY: MIKE McCOY
RPEQ No. or LICENCE: 10696
COMPANY NAME: BETTER TECHNICAL OPTIONS
START DATE: 11.11.11 FINISH DATE: 1.06.12

Better Technical Options Ltd
environmental solutions

NAME SIGNATURE DATE

QUEENSLAND URBAN UTILITIES DELEGATE
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND UrbanUtilities

No.	DATE	AMENDMENT	DRAFTED	DESIGNED	RPEQ NO.	APPROVED
G	31.05.12	AS BUILT	LS	JW	-	JW
F4	13.02.12	FOR CONSTRUCTION - WITH DIMS	LS	JW	-	JW
F3	19.01.12	FOR CONSTRUCTION	JB	JW	-	JW

FUNDING: DESIGN W.O. No. . | CONSTRUCTION W.O. No. | FUNDED BY Q.U.U. (✓) EXTERNAL ( )

DRAFTED	JB - 14.12.11	JEFF WHITTY - 20.01.12	
DRAFTING CHECK		DESIGN R.P.E.Q. No. DATE	APPROVED BY SIGNATURE DATE
CAD FILE		MIKE MCCOY 10696 20.01.12	
Q.U.U. FILE No.		DESIGN CHECK R.P.E.Q. No. DATE	CONSTRUCTION MANAGER SIGNATURE DATE

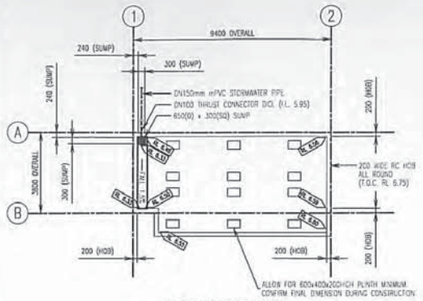
ASSET/PROJECT: OXLEY CK WRP HEAT EXCHANGER UPGRADE

DRAWING TITLE: HEAT EXCHANGER CONCRETE SLAB & PLINTH DETAILS

SHEET No. 1 OF 1

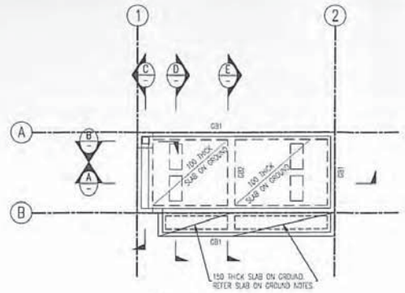
QUEENSLAND URBAN UTILITIES DRAWING No. 486/5/5-R7Q040

AMEND. G



SLAB LAYOUT PLAN

SCALE 1:100



SLAB ON GROUND PLAN

SCALE 1:100

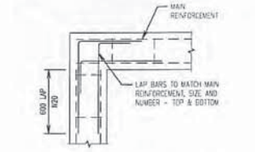
NOTES

- REFER TO DRAWING 0001 FOR GENERAL NOTES
- ALL CONCRETE STRENGTH TO BE N32

SLAB ON GROUND NOTES

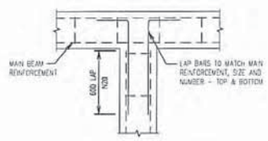
- 100 OR 150 THICK SLAB REINFORCED WITH 1 LAYER SL81 MESH GENERALLY, CAST ON 'FORTECON STANDARD' LAPPED AND TAPED ON 50mm CRUSHER DUST UNO
- COVER – 40 TOP COVER TO REINFORCEMENT

BEAM SCHEDULE		
MARK	SIZE	REMARKS
GB1	500 WIN(D) x 350(W)	SLAB BEAM
GB2	500 WIN(D) x 350(W)	SLAB BEAM



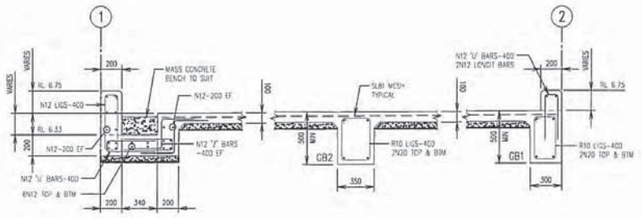
TYP. FOOTING BEAM CORNER JUNCTION

SCALE 1:20



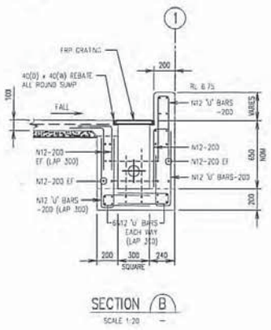
TYP. FOOTING BEAM 'T' JUNCTION

SCALE 1:20



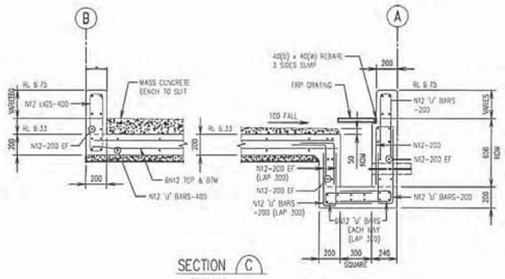
SECTION (A)

SCALE 1:20



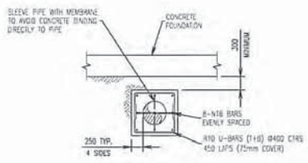
SECTION (B)

SCALE 1:20



SECTION (C)

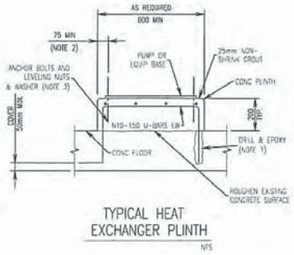
SCALE 1:20



PIPE ENCASEMENT DETAIL

NTS

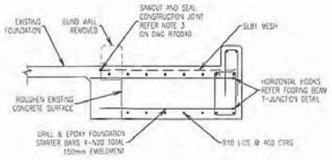
NOTE:
ALL PIPING AND CONDUITS BELOW SLABS ON EARTH TO BE ENCASED BY CONTRACTOR UNLESS NOTED OTHERWISE



TYPICAL HEAT EXCHANGER PLINTH

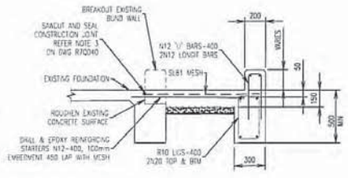
NTS

NOTE:
1. DRILL PILOT HOLES AT EACH LOCATION TO DETERMINE SLAB DEPTH. WHERE SLAB IS 200mm THICK OR LESS, USE DOWELS EMBEDDED TO WITHIN 50mm OF BOTTOM OF SLAB, MINIMUM EMBEDMENT DEPTH 75mm.
2. USE BASEPLATE TEMPLATE FOR HEAT EXCHANGER TO POSITION REINFORCING BARS TO MINIMISE THE RISK OF CLASHES DURING DRILLING OF ANCHOR BOLTS.
3. SIZE PLINTH TO ENSURE ANCHOR BOLTS DRILLED INSIDE REINFORCING CAGE.



SECTION (E)

SCALE 1:20



SECTION (D)

SCALE 1:20

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE: 5/12/12

NAME of SIGNATORY: MIKE McCOY

RPEQ No. or LICENCE: 10696

COMPANY NAME: BETTER TECHNICAL OPTIONS

START DATE: 11.11.11 FINISH DATE: 1.05.12

Better Technical Options Ltd
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NAME SIGNATURE DATE

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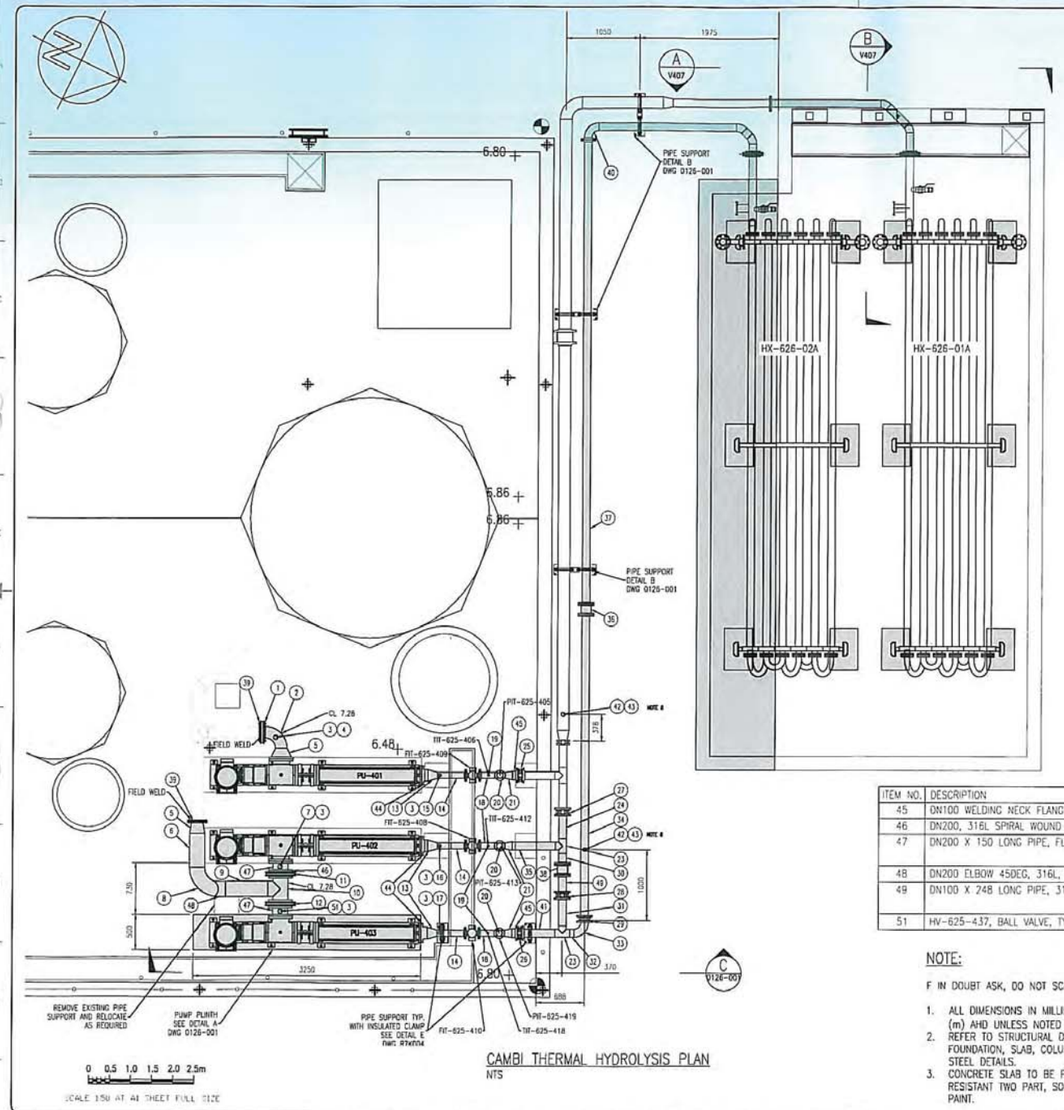
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND Urban Utilities



CAMBI THERMAL HYDROLYSIS PLAN
NTS

ITEM NO.	DESCRIPTION	NO. OFF	COMMENTS
1	HV-625-419, KNIFE GATE VALVE	1	See Valve Schedule
2	DN150 ELBOW 90DEG, 316 SS, FL X WLD	1	BS_EN 1092-1, PN16, FLAT FACE
3	DN25 NIPPLE T.O.E. X 75MM	5	See Spec Section 3.2
4	HV-625-420, BALL VALVE, TYPE B CAMLOCK	1	See Valve Schedule
5	DN150 X DN200 RDC, 316L SS, FL X WLD	2	BS-EN 1092-1, PN16, FLAT FACE
6	DN200 X 480 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
7	HV-625-425, BALL VALVE, TYPE B CAMLOCK	1	See Valve Schedule
8	DN200, SR ELBOW 90 DEG, 316L SS, WLD X WLD	1	See Spec Section 3.2
9	DN200 X 655 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2 – CUT TO SUIT
10	DN200 X DN200 TEE, 316L SS, FL X FL X WLD	1	BS_EN 1092-1, PN10, FLAT FACE
11	HV-625-424, KNIFE GATE VALVE	1	See Valve Schedule
12	HV-625-427, KNIFE GATE VALVE	1	See Valve Schedule
13	DN150 X DN65 RDC, 316L SS, WLD X WLD	3	See Spec Section 3.2
14	DN65 X 398 LONG PIPE, 316L SS, WLD X FL	3	BS_EN 1092-1, PN40, RAISED FACE
15	HV-625-421, BALL VALVE, TYPE B CAMLOCK	1	See Valve Schedule
16	HV-625-426, BALL VALVE, TYPE B CAMLOCK	1	See Valve Schedule
17	HV-625-428, BALL VALVE, TYPE B CAMLOCK	1	See Valve Schedule
18	DN65 X 213 LONG PIPE, 316L SS, FL X WLD	3	BS_EN 1092-1, PN40, RAISED FACE
19	NIPPLE, G1/2-INCH T.O.E. X 50MM	3	See Spec Section 3.2
20	DN65 X DN50 TEE, 316L SS, WLD X WLD X FL	3	BS_EN 1092-1, PN40, RAISED FACE
21	DN65 X DN100 RDC, 316L SS, WLD X WLD	3	See Spec Section 3.2
23	DN100 TEE, 316L SS, WLD X WLD	2	See Spec Section 3.2
24	DN100 X 342 LONG PIPE, 316L SS, WLD X FL	1	BS4504, PN16, RAISED FACE - CUT TO SUIT
25	HV-625-423, KNIFE GATE VALVE	1	See Valve Schedule
26	HV-625-435, KNIFE GATE VALVE	1	See Valve Schedule
27	HV-625-433, KNIFE GATE VALVE	1	See Valve Schedule
28	HV-625-434, KNIFE GATE VALVE	1	See Valve Schedule
29	HV-625-432, KNIFE GATE VALVE	1	See Valve Schedule
30	DN100 X 150 LONG PIPE, 316L SS, WLD X FL	1	AS2129, TABLE D, FLAT FACE
31	DN100 X 400 LONG PIPE, 316L SS, WLD X FL	1	BS4504, PN16, RAISED FACE
32	DN100 X 61 LONG PIPE, 316L SS, WLD X FL	1	See Spec Section 3.2 - CUT TO SUIT
33	DN100 ELBOW 90 DEG, 316L SS, WLD X FL	1	AS2129, TABLE E, FLAT FACE
34	DN100 X 4288 LONG PIPE, 316 SS, FL X FL	1	AS2129, TABLE E, FLAT FACE X AS4087, FIG B7, FLAT FACE
35	DN100 X 635 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
36	EXPANSION JOINT WITH CONTROL RODS	1	Spec Section 3.5, AS2129, TABLE D, FLAT FACE
37	DN100 X 6265 LONG PIPE, 316 SS, FL X FL	1	AS4087, FIG B7, FLAT FACE - CUT TO SUIT
38	EXPANSION JOINT	1	Spec Section 3.5, AS2129, TABLE D, FLAT FACE
39	DN150 SLIP-ON FLANGE	2	BS_EN 1092-1, PN16, FLAT FACE
40	DN100 ELBOW 90 DEG, 316L SS, WLD X FL	1	AS4087, FIG B7, FLAT FACE
41	DN100 X 525 LONG PIPE, 316L, WLD X FL	1	BS4504, PN16, RAISED FACE
42	DN50 NIPPLE T.O.E X 75mm	1	See Spec Section 3.2
43	FCV-625-90, FCV-625-94 GATE VALVE	2	See Valve Schedule
44	DN150 WELDING NECK FLANGE	3	BS_EN 1092, PN16, FLAT FACE

ITEM NO.	DESCRIPTION	NO. OFF	COMMENTS
45	DN100 WELDING NECK FLANGE	3	BS4504, PN16, FLAT FACE
46	DN200, 316L SPIRAL WOUND GASKET	6	KLINGER CRIR 316L-316L-FG-316L
47	DN200 X 150 LONG PIPE, FL X FL	2	BS-EN 1092-1, PN16, FLAT FACE X BS-EN 1092-1, PN10, RAISED FACE
48	DN200 ELBOW 45DEG, 316L, WLD X WLD	1	See Spec Section 3.2
49	DN100 X 248 LONG PIPE, 316L FL X FL	1	AS2129, TABLE D, FLAT FACE X BS4504, PN16, RAISED FACE
51	HV-625-437, BALL VALVE, TYPE B CAMLOCK	1	See Valve Schedule

NOTE:

F IN DOUBT ASK, DO NOT SCALE.

1. ALL DIMENSIONS IN MILLIMETERS, ALL LEVELS IN (m) AHD UNLESS NOTED OTHERWISE.
2. REFER TO STRUCTURAL DRAWINGS FOR FOUNDATION, SLAB, COLUMNS AND STRUCTURAL STEEL DETAILS.
3. CONCRETE SLAB TO BE PAINTED WITH AN ACID RESISTANT TWO PART, SOLVENT BASED EPOXY PAINT.
4. FOR DETAILS OF HEAT EXCHANGER REFER DRAWING No. R7Q040.
5. DIGESTER FEED PUMP DIMENSIONS TO BE CONFIRMED BY CONTRACTOR.
6. FOR DETAILS OF HEAT EXCHANGER PIPE & FITTINGS SEE DRAWING NO. R7V406 & R7V407.
7. ALL ELBOWS ARE LONG RADIUS. ALL REDUCERS ARE CONCENTRIC.
8. SERVICE WATER PIPE NOT SHOWN

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE: 5/6/12

NAME of SIGNATORY: MIKE McCOY

RPEQ No. or LICENCE: 10696

COMPANY NAME: BETTER TECHNICAL OPTIONS

START DATE: 11.11.11 FINISH DATE: 1.06.12

Better Technical Options Ltd
environmental solutions

NAME	SIGNATURE	DATE

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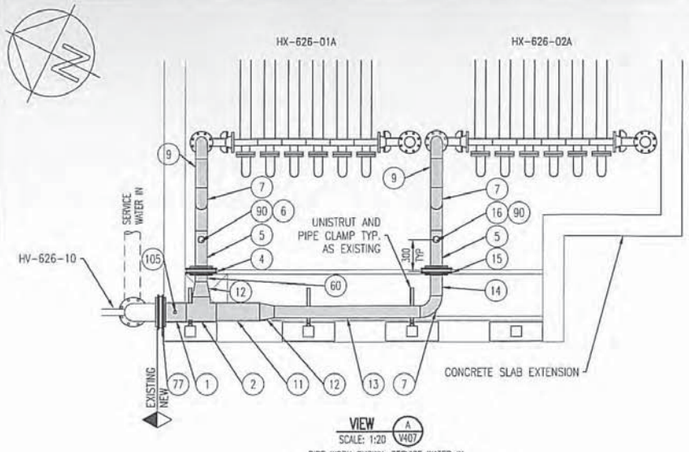
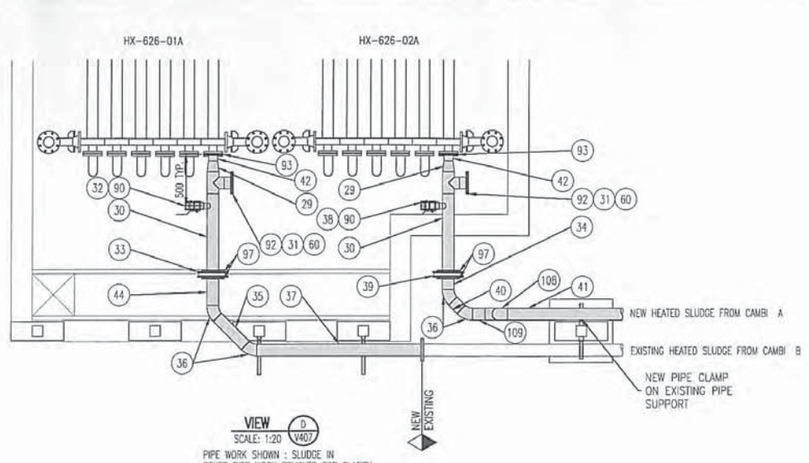
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND UrbanUtilities



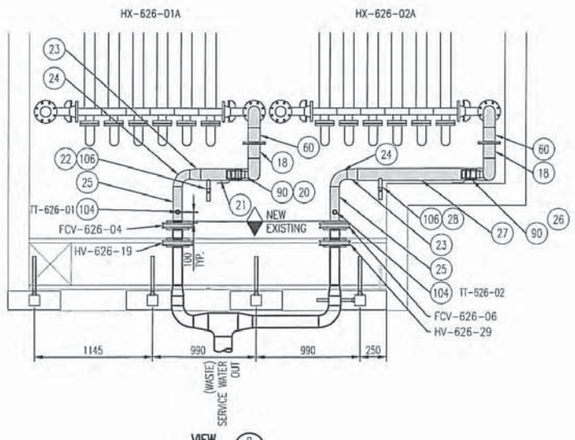
VIEW A SCALE: 1:20 V407

PIPE WORK SHOWN: SERVICE WATER IN
OTHER PIPE WORK REMOVED FOR CLARITY
CHLORINE TABLET DOSER NOT SHOWN FOR CLARITY



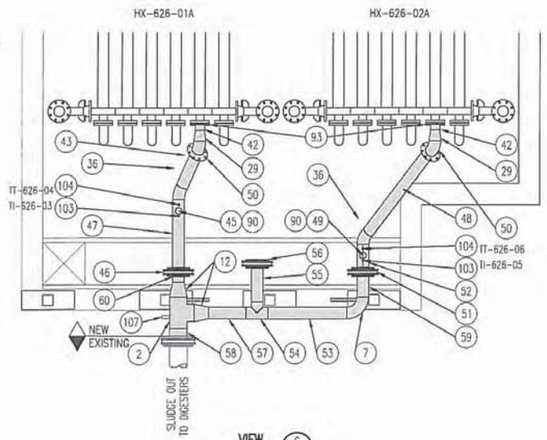
VIEW D SCALE: 1:20 V407

PIPE WORK SHOWN : SLUDGE IN
OTHER PIPE WORK REMOVED FOR CLARITY



VIEW B SCALE: 1:20 V407

PIPE WORK SHOWN : (WASTE) SERVICE WATER OUT
OTHER PIPE WORK REMOVED FOR CLARITY



VIEW C SCALE: 1:20 V407

PIPE WORK SHOWN : SLUDGE OUT
OTHER PIPE WORK REMOVED FOR CLARITY

NOTE:

1. DN25 COMPRESSED INSTRUMENT AIR TO BE FIELD ROUTED.
2. PROVIDE DN20 THREADED SOCKETS FOR TEMPERATURE PROBES.
3. PIPE AND VALVE LOCATIONS BASED ON EXISTING AS-CONSTRUCTED DRAWINGS.
4. PIPE AND FITTING TO BE ALIGNED AND TACK WELDED ON-SITE TO ENSURE PROPER ALIGNMENT.

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE: 5/6/12
NAME of SIGNATORY: MIKE McCOY
RPEQ No. or LICENCE: 10696
COMPANY NAME: BETTER TECHNICAL OPTIONS
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environmental solutions

NAME SIGNATURE DATE
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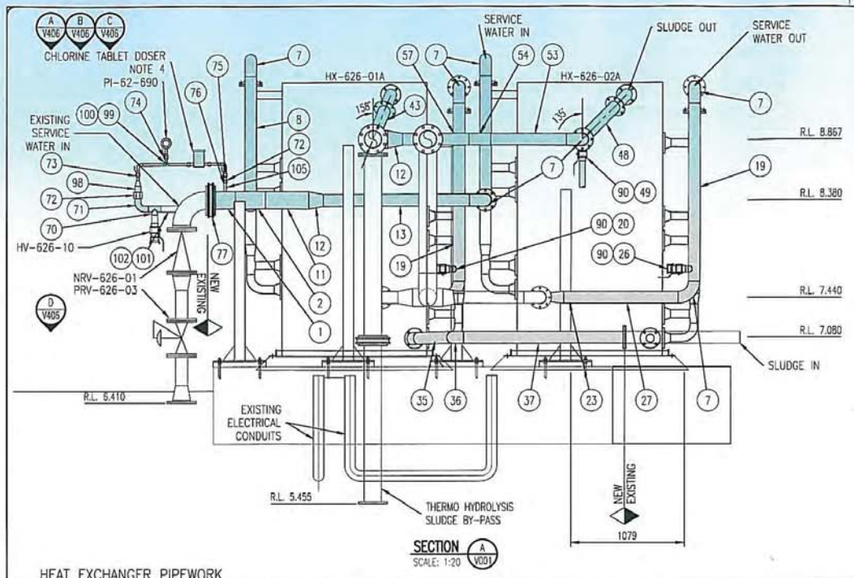
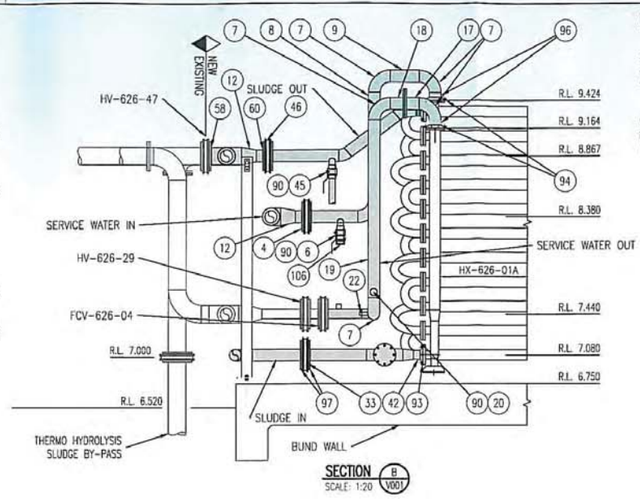
QUEENSLAND UrbanUtilities

0 20 40 60 80 100cm
SCALE 1:20 AT A1 SHEET FULL SIZE





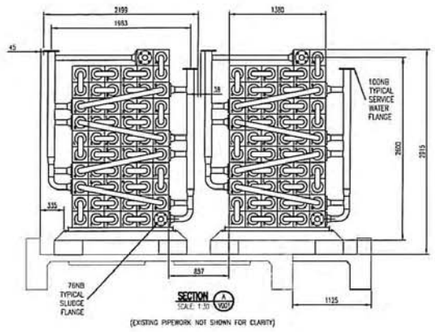
NOTE:
1. SMALL DIAMETER PVC PIPE & FITTINGS NOT ITEMISED ON SCHEDULE
2. ALL ELBOWS ARE LONG RADIUS
3. ALL REDUCERS ARE CONCENTRIC
4. ACTUAL ARRANGEMENT OF CHLORINE TABLET DOSER DIFFERS TO INSTALLATION

WLD = WELDED
FL = FLANGED
TOE = THREADED ONE END

HEAT EXCHANGER PIPEWORK

ITEM NO.	DESCRIPTION	NO. OFF	COMMENTS
1	DN150 x 212 LONG PIPE, 316L SS, WLD X FL	1	AS2129 TABLE E, FLAT FACE
2	DN150 X DN150 TEE, 316L SS, WLD X WLD X WLD	2	See Spec Section 3.2
4	HV-626-16, BUTTERFLY VALVE	1	See Valve Schedule
5	DN100 X 340 LONG PIPE, 316L SS, FL X WLD	2	AS4087, FIG B7, FLAT FACE
6	HV-626-17, BALL VALVE WITH TYPE B, 316 SS CAMLOCK	1	See Valve Schedule
7	DN100 ELBOW 90 DEG, 316L SS, WLD X WLD	12	See Spec Section 3.2
8	DN100 X 1022 LONG PIPE, 316L SS, WLD X WLD	2	See Spec Section 3.2
9	DN100 X 275 LONG PIPE, 316L SS, WLD X WLD	2	See Spec Section 3.2
11	DN150 X 410 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
12	DN150 X DN100 RDC, 316L SS, WLD X WLD	4	See Spec Section 3.2
13	DN100 X 1393 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
14	DN100 X 208 LONG PIPE, 316L SS, WLD X FL	1	AS4087, FIG B7, FLAT FACE
15	HV-626-26, BUTTERFLY VALVE	1	See Valve Schedule
16	HV-626-27, BALL VALVE WITH TYPE B, 316 SS CAMLOCK	1	See Valve Schedule
17	DN100 X 145 LONG PIPE, 316L SS, FL X WLD	2	AS4087, FIG B7, FLAT FACE
18	DN100 X 145 LONG PIPE, 316L SS, FL X WLD	2	AS4087, FIG B7, FLAT FACE
19	DN100 X 1575 LONG PIPE, 316L SS, WLD X WLD	2	See Spec Section 3.2
20	HV-626-18, BALL VALVE WITH TYPE B, 316 SS CAMLOCK	1	See Valve Schedule
21	DN100 X 361 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
22	PRV-626-01, PRESSURE RELIEF VALVE	1	See Valve Schedule
23	DN100 X DN75 RDC, 316L SS, WLD X WLD	2	See Spec Section 3.2
24	DN75 ELBOW 90 DEG, 316L SS, WLD X WLD	2	See Spec Section 3.2
25	DN75 X 335 LONG PIPE, 316L SS, WLD X FL	2	AS2129 TABLE E, FLAT FACE
26	HV-626-28, BALL VALVE WITH TYPE B, 316 SS CAMLOCK	1	See Valve Schedule
27	DN100 X 1099 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
28	PRV-626-02, PRESSURE RELIEF VALVE	1	See Valve Schedule
29	DN76 X DN100 RDC, 316L SS, FL X WLD	4	See Spec Section 3.2
30	DN100 X 732 LONG PIPE, 316L SS, WLD X FL	2	AS2129 TABLE E, FLAT FACE
31	DN100 TEE, 316L SS, WLD X WLD	2	See Spec Section 3.2
32	HV-626-12, BALL VALVE WITH TYPE B, 316 SS CAMLOCK	1	See Valve Schedule
33	HV-626-11, KNIFE GATE VALVE	1	See Valve Schedule
34	DN100 X 60 LONG PIPE, 316L SS, FL X WLD	1	AS2129 TABLE E, FLAT FACE
35	DN100 X 377 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
36	DN100 ELBOW 45 DEG, 316L SS, WLD X WLD	6	See Spec Section 3.2
37	DN100 X 1790 LONG PIPE, 316L SS, WLD X FL	1	AS2129, TABLE E, FLAT FACE
38	HV-626-22, BALL VALVE WITH TYPE B, 316 SS CAMLOCK	1	See Valve Schedule

ITEM NO.	DESCRIPTION	NO. OFF	COMMENTS
39	HV-626-21, KNIFE GATE VALVE	1	See Valve Schedule
40	DN100 X 111 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
41	DN100 X 1380 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
42	DN76 LAP JOINT STUB END, SHORT PATTERN	4	See Spec Section 3.2
43	DN100 X 487 LONG PIPE, 316L SS, WLD X FL	1	AS4087, FIG B7, FLAT FACE
44	DN100 X 210 LONG PIPE, 316L SS, WLD X FL	1	AS2129, TABLE E, FLAT FACE
45	FCV-626-14, BALL VALVE	1	See Valve Schedule
46	FCV-626-13, KNIFE GATE VALVE	1	See Valve Schedule
47	DN100 X 645 LONG PIPE, 316L SS, FL X WLD	1	AS4087, FIG B7, FLAT FACE
48	DN100 X 1055 LONG PIPE, 316L SS, FL X WLD	1	AS4087, FIG B7, FLAT FACE
49	FCV-626-24, BALL VALVE	1	See Valve Schedule
50	DN100, ELBOW 45 DEG, 316L SS, FL X BLD	2	AS4087, FIG B7, FLAT FACE
51	FCV-626-23, KNIFE GATE VALVE	1	See Valve Schedule
52	DN100 X 235 LONG PIPE, 316L SS, FL X WLD	1	AS4087, FIG B7, FLAT FACE
53	DN100 X 640 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
54	DN100 X DN100 TEE, 316L SS, WLD X WLD X WLD	1	See Spec Section 3.2
55	DN100 X 332 LONG PIPE, 316L SS, WLD X FL	1	AS4087, FIG B7, FLAT FACE
56	HV-626-15, KNIFE GATE VALVE	1	See Valve Schedule
57	DN100 X 365 LONG PIPE, 316L SS, WLD X WLD	1	See Spec Section 3.2
58	DN150 WELDING NECK FLANGE	1	AS2129 TABLE E, FLAT FACE
59	DN100 X 217 LONG PIPE, 316L SS, FL X WLD	1	AS4087, FIG B7, FLAT FACE
60	DN100 WELDING NECK FLANGE	6	AS4087, FIG B7, FLAT FACE
70	DN50 X DN50 TEE, 316 SS, THD X THD	1	See Spec Section 3.2
71	DN50 ELBOW 90DEG, PVC SOC X SOC	4	See Spec Section 3.2
72	DN50, 316 SS X PVC TRANSITION, THD X SOCKET	2	GEORG FISCHER 878-02055
73	HV-626-30 DN40 PVC BALL VALVE	1	See Valve Schedule
74	HV-626-31 DN20 316 SS BALL VALVE	1	See Valve Schedule
75	HV-626-32 DN40 316 SS BALL VALVE	1	See Valve Schedule
77	HV-626-29 BUTTERFLY VALVE	8	See Valve Schedule
90	DN50 NIPPLE T.O.E. X 100MM	2	See Spec Section 3.2
92	DN100 BLIND FLANGE, 316 SS	4	AS4087, FIG B7, FLAT FACE
93	DN76, ANSI 150 LAP JOINT FLANGE, RAISED FACE	4	
94	DN100, ANSI 150 LAP JOINT FLANGE, RAISED FACE	4	
96	DN100 LAP JOINT STUB END, SHORT PATTERN	4	See Spec Section 3.2
97	DN100, 316 SS, SPIRAL WOUND GASKET	1	Klinger CRIR 316L/316L/FG/316L
98	DN50 X DN40 REDUCING BUSH, 316L SS	1	
99	DN40 X DN20 REDUCING BUSH, PVC	1	
100	¾ X 1 SS REDUCING BUSH		



(EXISTING PIPEWORK NOT SHOWN FOR CLARITY)

ITEM NO.	DESCRIPTION	NO. OFF	COMMENTS
101	DN50 316SS NIPPLE	2	
102	DN50 316SS SOCKET	1	
103	1/2" BSP SOCKET	2	
104	3/4" NPT NIPPLE TOE X 75mm	4	
105	DN40 NIPPLE TOE X 75mm	1	
106	3/4" BSP SOCKET	2	
107	DN25 NIPPLE TOE X 75mm	1	
108	DN100 ELBOW 45DEG, 316L SS, WLD X WLD	2	
109	DN100 X 120 LONG PIPE, 316L SS, WLD X WLD	1	

0 20 40 60 80 100cm
SCALE 1:20 AT A1 SHEET FULL SIZE

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE: 5/6/12
NAME of SIGNATORY: MIKE McCOY
RPEQ No. or LICENCE: 10696
COMPANY NAME: BETTER TECHNICAL OPTIONS
START DATE: 11.11.11 FINISH DATE: 1.06.12

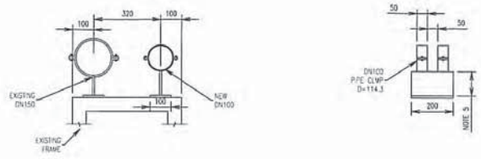
Better Technical Options Ltd
environmental solutions

NAME	SIGNATURE	DATE

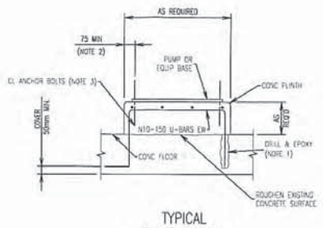
QUEENSLAND URBAN UTILITIES DELEGATE (AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND UrbanUtilities

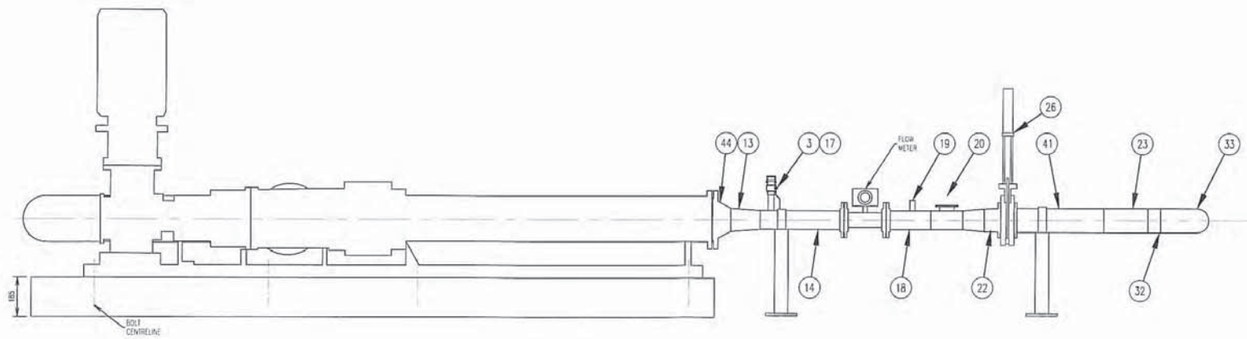
NOTE:
1. DRILL PILOT HOLES AT EACH LOCATION TO DETERMINE SLAB DEPTH. WHERE SLAB IS 200mm THICK OR LESS, USE DOWELS EMBEDDED TO WITHIN 50mm OF BOTTOM OF SLAB, MINIMUM EMBEDMENT DEPTH 75mm.
2. USE EQUIPMENT BASEPLATE TEMPLATE TO POSITION REINFORCING BARS TO MINIMISE THE RISK OF CLASHES DURING DRILLING OF ANCHOR BOLTS.
3. SIZE PLINTH TO ENSURE ANCHOR BOLTS DRILLED INSIDE REINFORCING CAGE.
4. ALL MATERIALS TO BE 10mm FLAT BAR, GALVANISED.
5. HEIGHT TO BE FIELD CONFIRMED.



TYPICAL PIPE SUPPORT
DETAIL (B) SCALE NTS R7V001



TYPICAL PUMP PLINTH
DETAIL (A) SCALE NTS R7V001



SIDE ELEVATION
DIGESTER FEED PUMPS
SECTION (C) SCALE 1:10 R7V001

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: [signature] DATE: 5/6/12
NAME of SIGNATORY: MIKE McCOY
RPEQ No. or LICENCE: 10696
COMPANY NAME: BETTER TECHNICAL OPTIONS
START DATE: 11.11.11 FINISH DATE: 1.06.12

Better Technical Options Ltd
environmental solutions

NAME SIGNATURE DATE

QUEENSLAND URBAN UTILITIES DELEGATE
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND Urban Utilities

1.4. Electrical Drawings

PLC CUBICLE

RACK 2 SLOT 3
16 POINT
DIGITAL OUTPUT MODULE
6ES7322-1HH01-0AA0

1L+	1	(1)
Q8.0	2	(2)
Q8.1	3	(3)
Q8.2	4	(4)
Q8.3	5	(5)
Q8.4	6	(6)
Q8.5	7	(7)
Q8.6	8	(8)
Q8.7	9	(9)
L+	10	(10)
2L+	11	(11)
Q9.0	12	(12)
Q9.1	13	(13)
Q9.2	14	(14)
Q9.3	15	(15)
Q9.4	16	(16)
Q9.5	17	(17)
Q9.6	18	(18)
Q9.7	19	(19)
M	20	(20)

SIEMENS PART No.
6ES7922-3BF00-0AB0
20 WAY
CONNECTOR+WIRES
(5M)

RACK 2 SLOT 3
MARSHALLING
TERMINALS

(1)	1	P23B
(2)	2	Q8.0 SPARE
(3)	3	Q8.1 SPARE
(4)	4	Q8.2 SPARE
(5)	5	Q8.3 SPARE
(6)	6	Q8.4 (4)
(7)	7	Q8.5 SPARE
(8)	8	Q8.6 SPARE
(9)	9	Q8.7 (4)
(10)	10	P23A
(11)	11	P23C
(12)	12	Q9.0
(13)	13	Q9.1
(14)	14	Q9.2
(15)	15	Q9.3
(16)	16	Q9.4
(17)	17	Q9.5
(18)	18	Q9.6 SPARE
(19)	19	Q9.7 SPARE
(20)	20	N23A
N23A	21 500mA	N23B-01
N23B	22 500mA	N23B-02
	23 500mA	
	24 500mA	
	25 500mA	
	26 500mA	N23B-05 (5)
	27 500mA	N23B-06
	28 500mA	
	29 500mA	N23B-08 (5)
N23C	500mA	N23C-01
	500mA	N23C-02
	500mA	N23C-03
	500mA	N23C-04
	500mA	N23C-05
	500mA	N23C-06

TO REMOTE I/O 24VDC
POWER SUPPLY No.2
DRG. 486/5/5-R7Y612

P23A (Q202)
P23B (Q203)
P23C (Q204)
FROM WAS DEWATERING MCC
24VDC POWER SUPPLY No.2
DRG. 486/5/5-R7Y612

FCV-64206-C01 — PART B REFER DRG. R7Y680 — JB-642-06 — FCV-64206-C03 — Q8.4 OPEN — N23B-05 — FCV-64206 CENTRIFUGE No.3 STRUVITE SLURRY VALVE (KEYSTONE F791)

FCV-64204-C01 — PART B REFER DRG. R7Y680 — JB-642-04 — FCV-64204-C03 — Q8.7 OPEN — N23B-08 — FCV-64204 CENTRIFUGE No.3 CENTRATE VALVE (KEYSTONE F791)

JB-646-A	N23C-01	Q9.0	OPEN	FCV-626-13	
JB-646-A	N23C-02	Q9.1	OPEN	FCV-626-14	
JB-646-A	N23C-03	Q9.2	OPEN	FCV-626-23	
JB-646-A	N23C-04	Q9.3	OPEN	FCV-626-24	
JB-646-B	N23C-05	Q9.4	OPEN	FCV-626-90	
JB-646-B	N23C-06	Q9.5	OPEN	FCV-626-94	

NOTES

1. OMRON G2R-1-SND/24VDC RELAY WITH INBUILT FLYWHEELING DIODE. (AC3 RATING: 5A 30VDC COS 0.4)
2. RELECO C4-A40DX-24VDC RELAY WITH INBUILT FLYWHEELING DIODE.
3. SOLENOID CONNECTOR PLUG TOP - MOULDED TYPE WITH INBUILT FLYWHEEL DIODE, REVERSE POLARITY PROTECTION DIODE, INDICATOR LED

2 | 2 | Q8.1 | 2
- WIRE No.
- TERMINAL No.
- CORE OR PAIR No.

I0.1
- POINT NUMBER
- CARD NUMBER OF CARD TYPE
- INPUT/OUTPUT

P07A-01
- POINT NUMBER
- GROUP
- RACK & SLOT NUMBER
- +VE POWER

AS CONSTRUCTED

REV	DATE	AMENDMENT	DRAWN	APPROVED
E	17.11.06	VALVES DELETED / AS CONSTRUCTED	JM	JOHN CAVE
D	10.05.06	AS CONSTRUCTED	DF	JOHN CAVE
C	14.11.05	AS MANUFACTURED	JRM	
B	29.09.05	ISSUED FOR CONSTRUCTION	JRM	
F	3.06.12	ADDED FCV-626	DD	ND

POWER ELECTRIC Switchboards PTY LTD
ACN 052 204118
Manufacturers of Engineered Switchboards for Mining, Industrial & Commercial Projects
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International Telephone: 0061-7-3274 3922 Facsimile: 0061-7-3274 3929
Email: sales@powerelectric.com.au
P.O. Box 6176 Fairfield Gardens, Brisbane, Queensland, 4103, Australia

richard flanagan AND COMPANY
Electrical Engineers and Contractors
A.C.N. 010 738 511
Box 6117 Gold Coast Mail Centre Bundall Qld 9726
15 Olympic Circuit Southport Qld 4215
Ph 07 5564 0466
Fax 07 5564 0262
Email: rflanagan@richardflanagan.com.au

brisbane water
enviro alliance

PROJECT: OXLEY CREEK WWTP NUTRIENT REMOVAL UPGRADE STAGE 5

TITLE: WAS DEWATERING MCC RACK 2 SLOT 3 DO MODULE TERMINATION DIAGRAM

SCALE: A.H. DATUM

DRAWING N°: 486/5/5-R7Y689

AMEND.: F

SHEETS: OF

Plotted: (17/11/06 08:1) Saved: (17/11/06 08:10) File: 55R7Y689E.DWG

PLC CUBICLE

RACK 1 SLOT 5
MARSHALLING
TERMINALS

FROM WAS DEWATERING MCC
24VDC POWER SUPPLY No.1 Q121
DRG. 486/5/5-R7Y611

P15A

1	200mA	P15A-1
2	200mA	P15A-2
3	200mA	P15A-3
4	200mA	P15A-4
5	200mA	P15A-5
6	200mA	P15A-6
7	200mA	
8	200mA	
9	200mA	
10	200mA	

RACK 1 SLOT 5
32 POINT
DIGITAL INPUT MODULE
6ES7321-1BL00-0AA0

N/C	1	11	I32.0
I32.0	2	12	I32.1 SPARE
I32.1	3	13	I32.2
I32.2	4	14	I32.3
I32.3	5	15	I32.4
I32.4	6	16	I32.5
I32.5	7	17	I32.6
I32.6	8	18	I32.7
I32.7	9	19	I33.0
N/C	10	20	I33.1
N/C	11	21	I33.2
I33.0	12	22	I33.3
I33.1	13	23	I33.4
I33.2	14	24	I33.5
I33.3	15	25	I33.6 SPARE
I33.4	16	26	I33.7 SPARE
I33.5	17	27	
I33.6	18	28	
I33.7	19		
M	20		

(2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20)

N15A

CONTINUED ON
DRAWING No. R7Y682

CONTINUED ON
DRAWING No. R7Y682

FROM WAS DEWATERING MCC
24VDC POWER SUPPLY No.1
DRG. 486/5/5-R7Y611

JB-626-A	P15A-1	I32.2	ZSC
		I32.3	ZSO
			FCV-626-13
JB-626-A	P15A-2	I32.4	ZSC
		I32.5	ZSO
			FCV-626-14
JB-626-A	P15A-3	I32.6	ZSC
		I32.7	ZSO
			FCV-626-23
JB-626-A	P15A-4	I33.0	ZSC
		I33.1	ZSO
			FCV-626-24
JB-626-B	P15A-5	I33.2	ZSC
		PISA-5	ZSO
		I33.3	
			FCV-626-90
JB-626-B	PISA-6	I33.4	ZSC
		PISA-6	ZSO
		I33.5	
			FCV-626-94

2 | 2 | I33.1 | 2
- WIRE No.
- TERMINAL No.
- CORE OR PAIR No.

I32.1
- POINT NUMBER
- CARD NUMBER OF CARD TYPE
- INPUT/OUTPUT

P13A-01
- POINT NUMBER
- GROUP
- RACK & SLOT NUMBER
- +VE POWER

AS CONSTRUCTED

Plotted: (17/11/06 11:12) Saved: (17/11/06 11:12) File: 55R7Y681E.DWG

2. Quality Assurance

2.1. Inspection & Test Plans, Handover Register & Completion List

INSPECTION AND TEST PLAN			Document Title	HEAT EXCHANGERS (INCL DIGESTER FEED PUMP STATION)		John Holland
ITP No:	8453-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Revision:	A	Project Number:	8543			
Date of Issue:	01.06.12	Approved by:				

Item No.	Activity Details	Reference Procedure	Verifying Document of Report incl check sheet number.	Verify or Test by					Remarks/Records			
				JHG			QUU					
				Key	Resp.	Sign/Date	Key	Sign/Date				
1.01	Ensure Civil Installation Check Sheets are complete		Refer to handover register.			JB 11/6						
2.01	Mechanical Pump & Heat Exchangers Installation Check Sheets are complete (PU-625-401, PU-625-402, PU-625-403, HX-626-01, HX-626-02)		Refer to handover register.			JTB 11/6				PUMP	CURVES	TO
			Refer to handover register.			JTB 11/6				BE	COMPLETED	
			Refer to handover register.			JTB 11/6				ON	SLUDGE.	
			Refer to handover register.			JB 12/6						
			Refer to handover register.			JB 12/6						
2.02	Mechanical Valve Installation Check sheets are complete		Refer to handover register.			JB 11/6						
2.03	Mechanical Instrument Installation Check sheets are complete		Refer to handover register.			JB 11/6						
2.04	Mechanical Pipework Installation Check sheets are complete		Refer to handover register.			JB 11/6						
3.01	Electrical Check Sheets Complete	Refer to reference Electrical.	Refer to handover register.			JB 11/6						
4.01	Energisation of equipment	Refer to engergisation procedure.	Refer to handover register.			JB 11/6						
5.01	Control System FAT complete		Insert commissioning ITP reference.			JB 11/6			CONTROL SYSTEM FAT ON DIGESTER FEED PS NOT AVAILABLE DUE TO CAMBI PLC CODE HAVING NO TEST MODE.			

INSPECTION AND TEST PLAN			Document Title	HEAT EXCHANGERS (INCL DIGESTER FEED PUMP STATION)		John Holland
ITP No:	8453-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Revision:	A	Project Number:	8543			
Date of Issue:	01.06.12	Approved by:				

Item No.	Activity Details	Reference Procedure	Verifying Document of Report incl check sheet number.	Verify or Test by					Remarks/Records			
				JHG			QUU					
				Key	Resp.	Sign/Date	Key	Sign/Date				
6.01	HANDOVER from Construction to Commissioning Certificates Complete		Refer to handover register.			JB 11/6						
7.01	Pre-commissioning Checks Complete		Insert commissioning ITP reference.			JB 11/6						
8.01	Control System SAT complete		Insert commissioning ITP reference.			JTB 11/6						

FINAL APPROVAL FOR CLOSE OUT OF ITP			
	NAME	SIGNATURE	DATE
JH	TATE BRAMMER	JTB	11/6/12

Heat Exchanger/Digester Feed Pump Station Mech/Elec and Energisation Register

Date: 07/03/2012

Rev: A

		TAG			MECHANICAL			ELECTRICAL			ENERGISATION				
Item	P&ID	Prefix	Number	Description	Mech Complete Sign off	LOT. No.	Date	Elec Complete Sign off	Doc. No.	Date	Equipment Energised	Doc. No.	Date	Handover to Commissioning	Date
1	R7W105	PU	625-401	Digester feed pump 01	8543-M-HX-001	JB	11/6	8543-E-HX-001		11/6		NA	NA		11/6/12
2	R7W105	PU	625-402	Digester feed pump 02	8543-M-HX-002	JB	11/6	"		11/6	"	"	"	"	"
3	R7W105	PU	625-403	Digester feed pump 03	8543-M-HX-003	JB	11/6	"		11/6	"	"	"	"	"
4	R7W105	FCV	625-423	Pneumatic ON/OFF valve after digester feed pump 1	9543-M-HX-100	JB	11/6	"		11/6	"	"	"	"	"
5	R7W105	FCV	625-435	Pneumatic ON/OFF valve after digester feed pump 3	8543-M-HX-101	JB	11/6	"		11/6	"	"	"	"	"
6	R7W105	FCV	625-433	Pneumatic ON/OFF distribution valve for pump 2 to HX 1	8543-M-HX-102	JB	11/6	"		11/6	"	"	"	"	"
7	R7W105	FCV	625-434	Pneumatic ON/OFF distribution valve for pump 2 to HX 2	8543-M-HX-103	JB	11/6	"		11/6	"	"	"	"	"
8	R7W105	FIT	625-409	Flow transmitter after digester feed pump 1	8543-M-HX-200	JB	11/6	"		11/6	"	"	"	"	"
9	R7W105	FIT	625-408	Flow transmitter after digester feed pump 2	8543-M-HX-201	JB	11/6	"		11/6	"	"	"	"	"
10	R7W105	FIT	625-410	Flow transmitter after digester feed pump 3	8543-M-HX-202	JB	11/6	"		11/6	"	"	"	"	"
11	R7W105	PIT	625-405	Pressure transmitter after digester feed pump 1	8543-M-HX-203	JB	11/6	"		11/6	"	"	"	"	"
12	R7W105	PIT	625-413	Pressure transmitter after digester feed pump 2	8543-M-HX-204	JB	11/6	"		11/6	"	"	"	"	"
13	R7W105	PIT	625-419	Pressure transmitter after digester feed pump 3	8543-M-HX-205	JB	11/6	"		11/6	"	"	"	"	"
14	R7W105	TIT	625-406	Temperature transmitter after digester feed pump 1	8543-M-HX-206	JB	11/6	"		11/6	"	"	"	"	"
15	R7W105	TIT	625-412	Temperature transmitter after digester feed pump 2	8543-M-HX-207	JB	11/6	"		11/6	"	"	"	"	"
16	R7W105	TIT	625-418	Temperature transmitter after digester feed pump 3	8543-M-HX-208	JB	11/6	"		11/6	"	"	"	"	"
17	R7W105	HV	625-419	ON/OFF valve before digester feed pump 1	8543-M-HX-300	JB	"	NA	NA	NA	NA	NA	NA	"	"
18	R7W105	HV	625-424	ON/OFF valve before digester feed pump 2	8543-M-HX-301	JB	"	"	—	—	—	—	—	"	"
19	R7W105	HV	625-427	ON/OFF valve before digester feed pump 3	8543-M-HX-302	JB	"	"	—	—	—	—	—	"	"
20	R7W105	HV	625-416	Instrument valve on PIT-625413	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
21	R7W105	HV	625-418	Instrument valve on PIT-625405	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
22	R7W105	HV	625-417	Instrument valve on PIT-625419	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
23	R7W105	HV	625-420	Flushing and sampling point	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
24	R7W105	HV	625-421	Flushing and sampling point	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
25	R7W105	HV	625-425	Flushing and sampling point	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
26	R7W105	HV	625-426	Flushing and sampling point	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
27	R7W105	HV	625-437	Flushing and sampling point	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
28	R7W105	HV	625-428	Flushing and sampling point	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
29	R7W105	HV	625-429	Flushing valve on level transmitter	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"
30	R7W105	HV	625-431	ON/OFF valve after digester feed pump	8543-M-HX-303	JB	"	"	—	—	—	—	—	"	"
31	R7W105	HV	625-432	ON/OFF valve after digester feed pump	8543-M-HX-304	JB	"	"	—	—	—	—	—	"	"
32	R7W105	HV	625-436	Flushing and sampling point	8543-M-HX-500	JB	"	"	—	—	—	—	—	"	"

Heat Exchanger/Digester Feed Pump Station Mech/Elec and Energisation Register

Date: 07/03/2012

Rev: A

		TAG			MECHANICAL			ELECTRICAL			ENERGISATION				
Item	P&ID	Prefix	Number	Description	Mech Complete Sign off	LOT. No.	Date	Elec Complete Sign off	Doc. No.	Date	Equipment Energised	Doc. No.	Date	Handover to Commissioning	Date
33	R7D177	HX	626-01	Post TH Heat Exchanger 1	8543-M-HX-004	JB	11/6	8543-E-HX-001		11/6	JB	N/A	11/6/12	JB	11/6/12
34	R7D177	HX	626-02	Post TH Heat Exchanger 2	8543-M-HX-005	JB	11/6	"		11/6	"	"	"	"	"
35	R7D177	FCV	626-04	THSC H-Exch 1 SW to Drain FCV	8543-M-HX-104	JB	11/6	"		11/6	"	"	"	"	"
36	R7D177	FCV	626-06	THSC H-Exch 2 SW to Drain FCV	8543-M-HX-105	JB	11/6	"		11/6	"	"	"	"	"
37	R7D177	FCV	626-13	THSC H-Exch 1 Sludge Out Isol.	8543-M-HX-501	JB	11/6	"		11/6	"	"	"	"	"
38	R7D177	FCV	626-23	THSC H-Exch 2 Sludge Out Isol.	8543-M-HX-309	JB	11/6	"		11/6	"	"	"	"	"
39	R7D177	FCV	626-90	THSC H-Exch 1 SW Flush Inlet FCV	8543-M-HX-104	JB	11/6	"		11/6	"	"	"	"	"
40	R7D177	FCV	626-94	THSC H-Exch 2 SW Flush Inlet FCV	8543-M-HX-105	JB	11/6	"		11/6	"	"	"	"	"
41	R7D177	FCV	626-14	THSC H-Exch 1 SW Flush Outlet FCV	8543-M-HX-501	JB	11/6	"		11/6	"	"	"	"	"
42	R7D177	FCV	626-24	THSC H-Exch 2 SW Flush Outlet FCV	8543-M-HX-309	JB	11/6	"		11/6	"	"	"	"	"
37	R7D177	TT	626-01	Heat Exchanger 1 SW Outlet Temperature	8543-M-HX-209	JB	11/6	"		11/6	"	"	"	"	"
38	R7D177	TT	626-02	Heat Exchanger 2 SW Outlet Temperature	8543-M-HX-210	JB	11/6	"		11/6	"	"	"	"	"
39	R7D177	TT	626-04	Heat Exchanger 1 Sludge Output Temperature	8543-M-HX-211	JB	11/6	"		11/6	"	"	"	"	"
40	R7D177	TT	626-06	Heat Exchanger 2 Sludge Output Temperature	8543-M-HX-212	JB	11/6	"		11/6	"	"	"	"	"
41	R7D177	HV	626-10	THSC H-Exch 1 & 2 Cl dosing line flush/bleed point	8543-M-HX-501	JB	11/6	N/A			"	"	"	"	"
42	R7D177	HV	626-11	THSC H-Exch 1 Sludge In Isol.	8543-M-HX-305	JB	"	8543-E-HX-001		11/6	"	"	"	"	"
43	R7D177	HV	626-12	THSC H-Exch 1 Sludge In Flush	8543-M-HX-501	JB	"	N/A	N/A	N/A	"	"	"	"	"
46	R7D177	HV	626-15	THSC H-Exch 1 Sludge Out Drain Valve 1	8543-M-HX-501	JB	"	"	"	"	"	"	"	"	"
47	R7D177	HV	626-16	THSC H-Exch 1 SW In Isol.	8543-M-HX-306	JB	"	"	"	"	"	"	"	"	"
48	R7D177	HV	626-17	THSC H-Exch 1 SW In Flush	8543-M-HX-501	JB	"	"	"	"	"	"	"	"	"
49	R7D177	HV	626-18	THSC H-Exch 1 SW Out Flush	8543-M-HX-501	JB	"	"	"	"	"	"	"	"	"
50	R7D177	HV	626-19	THSC H-Exch 1 SW Out Isol.	8543-M-HX-501	JB	"	"	"	"	"	"	"	"	"
51	R7D177	HV	626-20	THSC H-Exch Cl dosing bypass valve	8543-M-HX-307	JB	"	"	"	"	"	"	"	"	"
52	R7D177	HV	626-21	THSC H-Exch 2 Sludge In Isol.	8543-M-HX-308	JB	"	8543-E-HX-001		11/6	"	"	"	"	"
53	R7D177	HV	626-22	THSC H-Exch 2 Sludge In Flush	8543-M-HX-501	JB	"	N/A	N/A	N/A	"	"	"	"	"
56	R7D177	HV	626-26	THSC H-Exch 2 SW In Isol.	8543-M-HX-310	JB	"	"	"	"	"	"	"	"	"
57	R7D177	HV	626-27	THSC H-Exch 2 SW In Flush	8543-M-HX-501	JB	"	"	"	"	"	"	"	"	"
58	R7D177	HV	626-28	THSC H-Exch 2 SW Out Flush	8543-M-HX-501	JB	"	"	"	"	"	"	"	"	"
59	R7D177	HV	626-29	THSC H-Exch 2 SW Out Isol.	8543-M-HX-501	JB	"	"	"	"	"	"	"	"	"
60	R7D177	HV	626-30	THSC H-Exch 1 & 2 Cl dosing feed valve	8543-M-HX-502	JB	"	"	"	"	"	"	"	"	"
61	R7D177	HV	626-31	THSC H-Exch 1 & 2 Cl dosing pressure gauge isolation valve	8543-M-HX-502	JB	"	"	"	"	"	"	"	"	"
62	R7D177	HV	626-32	THSC H-Exch 1 & 2 Cl dosing dispenser discharge valve	8543-M-HX-502	JB	"	"	"	"	"	"	"	"	"
65	R7D177	PRV	626-01	THSC H-Exch 1 CW Out PRV	8543-M-HX-400	JB	"	"	"	"	"	"	"	"	"
66	R7D177	PRV	626-02	THSC H-Exch 2 CW Out PRV	8543-M-HX-401	JB	"	"	"	"	"	"	"	"	"
67	R7D177	TI	626-03	Heat Exchanger 1 Sludge Output temp gauge	8543-M-HX-700	JB	"	"	"	"	"	"	"	"	"
68	R7D177	TI	626-05	Heat Exchanger 2 Sludge Output temp gauge	8543-M-HX-700	JB	"	"	"	"	"	"	"	"	"
69	R7D177	PI	626-90	Heat Exchanger 1 & 2 Chlorine dosing pressure gauge	8543-M-HX-700	JB	"	"	"	"	"	"	"	"	"

2.2. Checksheets

2.2.1. Civil Checksheets

STRUCTURAL CONCRETE			AREA:	HEAT EXCHANGER		John Holland
ITP ref. No:	8543-010	Project:	HEATE EXCHANGER UPGRADE	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
LOT No.	8543-C-HX-001	Project Number:	8543			
Date of Issue:	06.02.12					
EQUIPMENT DESCRIPTION:		Heat Exchanger Extension Slab and Footings				

Item No.	Activity Details	Reference Document	Acceptance Criteria	Verify or Test by							Remarks/Records
				S/C		JH			QUU		
				Key	Sign/Date	Key	Resp.	Sign/Date	Key	Sign/Date	
1.00	**Start-up checks**	-	-								
1.01	Check drawings are latest revisions	Drawings	Visual Inspection			W	PE	MG			
1.02	Lot identification and set out	Drawings	Surveyor's set-out			W	FM				
1.03	Review approved TRAs and ensure appropriate safety measures are in place	TRA				H	FM				**HOLD POINT**
1.04	Check environmental protection measures	SEP	Visual Inspection			H	FM				**HOLD POINT**
2.00	**Construction**	-	-								
2.01	Check formwork/False work DESIGN	AS3610	Design Engineer Approved			W	PE	MG			Edge form, no design reqd
2.02	Check as-built of base/binding layer	Survey Set-out Drawing	+0mm to -10mm			W	FM	MG			
2.03	Check erection of formwork and falsework, check dimensions and stability	JHG-2-002-3	Inspect foundation for falsework. Compliance with Designers Drawings & standards as applicable AS1509, AS3610. Toe bracing checked			H	PE	MG			**HOLD POINT** 200mm High Edge forms inspected
2.04	Check location and preparation of construction and expansion joints	Drawings				H	PE	MG			

STRUCTURAL CONCRETE			AREA:	HEAT EXCHANGER		John Holland
ITP ref. No:	8543-010	Project:	HEATE EXCHANGER UPGRADE	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
LOT No.	8543-C-HX-001	Project Number:	8543			
Date of Issue:	06.02.12					
EQUIPMENT DESCRIPTION:	Heat Exchanger Extension Slab and Footings					

Item No.	Activity Details	Reference Document	Acceptance Criteria	Verify or Test by							Remarks/Records
				S/C		JH			QUU		
				Key	Sign/Date	Key	Resp.	Sign/Date	Key	Sign/Date	
2.05	Reinforcement installation, check line and length	Drawings	As per designed drawings support and tying, cover to be maintained during pour. Crushing of chairs prevented. Inspection completed			H	PE	MG			HOLD POINT
2.06	Check cast-in items and clock-out alignments and levels	Drawings	As per designed drawings. Visual check			H	PE	NA			HOLD POINT No Cast Ins
2.07	Concrete Placement, check mix and signoff that correct mix is being delivered	Drawings	N32			H	PE	MG			HOLD POINT - Attach batch records
2.08	On-site concrete testing is performed as required	AS3600/Spec Cl.7.3.3	Check concrete conforms to design requirements (grade, temp, slump)			W	FM				Attach test records
2.09	Finishing concrete	Drawings C1351Rev0, C1352Rev0, C1353Rev0 SpecCl7.2.16	Levels as per spec (+10mm to -0mm) Acceptable finish quality			W	FM				
2.1	Check curing application and time is adequate	Spec Cl.7.2.18				W	FM				
2.11	Stripping of formwork	AS3600-1994 Section 7	24 hours after pour			W	FM				

STRUCTURAL CONCRETE			AREA:	HEAT EXCHANGER		John Holland
ITP ref. No:	8543-010	Project:	HEATE EXCHANGER UPGRADE	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
LOT No.	8543-C-HX-001	Project Number:	8543			
Date of Issue:	06.02.12					
EQUIPMENT DESCRIPTION:	Heat Exchanger Extension Slab and Footings					

Item No.	Activity Details	Reference Document	Acceptance Criteria	Verify or Test by							Remarks/Records
				S/C		JH			QUU		
				Key	Sign/Date	Key	Resp.	Sign/Date	Key	Sign/Date	
2.12	Check as-built survey against design tolerences	Surveyor's sketch Spec Cl.7.2.16	Levels as per spec (+10mm to -0mm) Acceptable finish quality			W	PE	MG			
2.13	Installation of Joint Sealant	Drawings	Manufacturers specifications			W	PE	MG			
2.14	Verify concrete test results	Spec Cl.7.23.3	32MPa compressive strength			W	PE	MG			
3.00	**Installation Complete**										
3.01	Final inspection		QA records complete ITP stages signed off NCRs dispositioned			H	PE	MG			**HOLD POINT - All items completed and all relevant documentation attached**

APPROVAL				
	NAME		SIGNATURE	DATE
S/C				
JH	MASON GRIEGO			11/6/12

NEILSEN'S CONCRETE PTY LTD
ABN 28 055 131 283

NEILSEN'S TECHNICAL SERVICES LABORATORY
39 MICA STREET, CAROLE PARK QLD 4300
PHONE: (07) 3723 8704
FACSIMILE: (07) 3271 2620

Reference No.

CONCRETE • SAND SOIL • GRAVEL

CONCRETE TEST RECORD

CLIENT: John Holland

PROJECT ADDRESS: 240 Donaldson, Rd Rocklea

JOB No.: LAB No.: C

DATE & DAY SAMPLED: Thurs 9.2.12

SUPPLIER: Neilsens PLANT: Limeston

TESTING OFFICER: CD No. 14

TIME ARRIVAL: 9am TIME DEPART:

WEATHER: FINE

Mix Code	Location of Concrete	Slump (Initial)
F'c		Slump (Additive)
Spec. Slump		Concrete Temp.
Truck No.		Ambient Temp.
Time Batched	Delivery Docket No.	Sampling Method
Time sampled	Load / Progressive	Compaction

Mix Code	Location of Concrete	Slump (Initial)	Compaction
32/80	Heat exchange slab	80	
32/80		33	
490		32	
0612	5046 / 509	7.2.1	
0945	3.8 / 38	1.7.3	

SPECIMEN No.	MOULD NUMBER	DATE FOR TESTING	AGE	AIR CURED (Y / N)	CHARGE REQUEST / QC	TEST TYPE (C / FS)	REMARKS
A	101		7		R	C	
B	224		28		/	/	
C	256		28		/	/	

Sampling Method: AS 1012.1, 7.2.1 - Uninterupted discharge, 7.2.2 - Consistence test only, 7.2.3 - Slow discharge, 7.2.4 - Terminated discharge, 7.3 - Sampling from non-agitator units, 7.4 - From specified locations.

Compaction Method: AS1012.8, 1.7.3 - Rodding 1.7.4 - Vibration, 1.7.5 - Ramming

Pick-up & Start Standard Moist Curing			Initial Curing Hours		Delayed Curing (Temperature & Reason)	
Date	Time	By			Max.	Min.

NOTE: Concrete tested in accordance with AS1012.1, AS1012.8, AS1012.13, AS1012.3

Customer's Signature

Tested By CD

NATA National Association of Testing Authorities Australia Accredited Laboratory Accred No. 14293

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Concrete Test Record Rev. 8 June 2011

Neilsen's Technical Services Laboratory
39 Mica St, Carole Park QLD 4300
Phone: (07) 3723 8705
Fax: (07) 3271 2620

Concrete Test Report [AS]

Report No: CON:W12-00308
Issue No: 1
This report replaces all previous issues of report no 'CON:W12-00308'.

Client: JOHN HOLLAND CONSTRUCTIONS
PO BOX 556
FORTITUDE VALLEY QLD 4006

Project: 240 DONALDSON RD
ROCKLEA

This document is issued in accordance with NATA's accreditation requirements.

NATA Accredited Laboratory Number: 14293

Approved Signatory: Garry Baldwinson

Date of Issue: 12/03/2012

COMPRESSIVE STRENGTH OF CONCRETE CYLINDERS

Details of Sampled Concrete — Concrete Specimens and Results

Date & Time Batched / Load / Prog. Load	Truck No / Time Sampled	Plant Name / Docket No / Product Code	Grade(MPa) / Agg(mm) / Slump(mm) Design	Air (%) / Compact (mm) Measured	Specimen Ident.	Dimensions (mm) Avg. Diameter	Dimensions (mm) Height	Density (kg/m³)	Curing Initial (hrs)	Curing Std (days)	Type of Cap	Date of Test	Age (days)	Strength (MPa)	Marks / Fail Mode	Location & Remarks
09/02/12	490	Windsor	N32		CA195\A	99.9	199	2480	26	6	S	16/02/12	7	22.0	N	Sampling AS 1012.1 Cl 6b
08:42	09:45	5046509	20		CA195\B	100.2	200	2480		27	S	08/03/12	28	36.0	N	HEAT EXCHANGE SLAB
3.8/3.8		N32280	80	80	CA195\C	100.0	199	2500		27	S	08/03/12	28	38.0	N	Concrete Temp. (°C): 33

Notes

1. Sampling in accordance with AS 1012.1
2. Slump Test in accordance with AS 1012.3.1
3. Compaction by rodding, in accordance with AS 1012.8.1 Clause 7.3
4. Initial Curing in accordance with AS 1012.8.1 Clause 9.2.2
5. Standard Curing in accordance with AS 1012.8.1 Clause 9.3(a)
6. Capping R - Rubber, S - Sulphur, G - Ground, D - Double Cap Sulphur
7. Compressive Strength in accordance with AS 1012.9
8. Density in accordance with AS 1012.12.1
9. Moisture Condition SSD in accordance with AS 1012.12.1, unless otherwise stated

Remarks

FailureMode: N = NORMAL

STRUCTURAL CONCRETE			AREA:	HEAT EXCHANGER		John Holland
ITP ref. No:	8543-010	Project:	HEATE EXCHANGER UPGRADE	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
LOT No.	8543-C-HX-002	Project Number:	8543			
Date of Issue:	17.02.12					
EQUIPMENT DESCRIPTION:		Heat Exchanger Plinths and Digester Feed Pump Plinth				

Item No.	Activity Details	Reference Document	Acceptance Criteria	Verify or Test by							Remarks/Records
				S/C		JH			QUU		
				Key	Sign/Date	Key	Resp.	Sign/Date	Key	Sign/Date	
1.00	**Start-up checks**	-	-								
1.01	Check drawings are latest revisions	Drawings	Visual Inspection			W	PE	MG			
1.02	Lot identification and set out	Drawings	Surveyor's set-out			W	FM				
1.03	Review approved TRAs and ensure appropriate safety measures are in place	TRA				H	FM				**HOLD POINT**
1.04	Check environmental protection measures	SEP	Visual Inspection			H	FM				**HOLD POINT**
2.00	**Construction**	-	-								
2.01	Check formwork/False work DESIGN	AS3610	Design Engineer Approved			W	PE	MG			
2.02	Check as-built of base/binding layer	Survey Set-out Drawing	+0mm to -10mm			W	FM				
2.03	Check erection of formwork and falsework, check dimensions and stability	JHG-2-002-3	Inspect foundation for falsework. Compliance with Designers Drawings & standards as applicable AS1509, AS3610. Toe bracing checked			H	PE	MG			**HOLD POINT**
2.04	Check location and preparation of construction and expansion joints	Drawings				H	PE	MG			

STRUCTURAL CONCRETE			AREA:	HEAT EXCHANGER		John Holland
ITP ref. No:	8543-010	Project:	HEATE EXCHANGER UPGRADE	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
LOT No.	8543-C-HX-002	Project Number:	8543			
Date of Issue:	17.02.12					
EQUIPMENT DESCRIPTION:	Heat Exchanger Plinths and Digester Feed Pump Plinth					

Item No.	Activity Details	Reference Document	Acceptance Criteria	Verify or Test by							Remarks/Records
				S/C		JH			QUU		
				Key	Sign/Date	Key	Resp.	Sign/Date	Key	Sign/Date	
2.05	Reinforcement installation, check line and length	Drawings	As per designed drawings support and tying, cover to be maintained during pour. Crushing of chairs prevented. Inspection completed			H	PE	MG			**HOLD POINT**
2.06	Check cast-in items and clock-out alignments and levels	Drawings	As per designed drawings. Visual check			H	PE	MG			**HOLD POINT**
2.07	Concrete Placement, check mix and signoff that correct mix is being delivered	Drawings	N32			H	PE	MG			**HOLD POINT - Attach batch records**
2.08	On-site concrete testing is performed as required	AS3600/Spec Cl.7.3.3	Check concrete conforms to design requirements (grade, temp, slump)			W	FM				**Attach test records**
2.09	Finishing concrete	Drawings C1351Rev0, C1352Rev0, C1353Rev0 SpecCl7.2.16	Levels as per spec (+10mm to -0mm) Acceptable finish quality			W	FM				
2.1	Check curing application and time is adequate	Spec Cl.7.2.18				W	FM				
2.11	Stripping of formwork	AS3600-1994 Section 7	24 hours after pour			W	FM				

STRUCTURAL CONCRETE			AREA:	HEAT EXCHANGER		John Holland
ITP ref. No:	8543-010	Project:	HEATE EXCHANGER UPGRADE	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
LOT No.	8543-C-HX-002	Project Number:	8543			
Date of Issue:	17.02.12					
EQUIPMENT DESCRIPTION:	Heat Exchanger Plinths and Digester Feed Pump Plinth					

Item No.	Activity Details	Reference Document	Acceptance Criteria	Verify or Test by							Remarks/Records
				S/C		JH			QUU		
				Key	Sign/Date	Key	Resp.	Sign/Date	Key	Sign/Date	
2.12	Check as-built survey against design tolerences	Surveyor's sketch Spec Cl.7.2.16	Levels as per spec (+10mm to -0mm) Acceptable finish quality			W	PE	MG			
2.13	Installation of Joint Sealant	Drawings	Manufacturers specifications			W	PE	MG			
2.14	Verify concrete test results	Spec Cl.7.23.3	32MPa compressive strength			W	PE	MG			
3.00	**Installation Complete**										
3.01	Final inspection		QA records complete ITP stages signed off NCRs dispositioned			H	PE	MG			**HOLD POINT - All items completed and all relevant documentation attached**

APPROVAL				
	NAME		SIGNATURE	DATE
S/C				
JH	MARK GRIECO			11/6/12

NEILSEN'S CONCRETE PTY LTD
ABN 28 055 131 283

NEILSEN'S
"The Independent Alternative"

NEILSEN'S TECHNICAL SERVICES LABORATORY
39 MICA STREET, CAROLE PARK QLD 4300
PHONE: (07) 3723 8704
FACSIMILE: (07) 3271 2620

Reference No.

CONCRETE • SOIL • GRAVEL

CONCRETE TEST RECORD

CLIENT: JOHN HOLLAND

PROJECT ADDRESS: 240 DONALDSON ROCKLEA

WEATHER: FINE.

JOB No.: LAB No.: C

DATE & DAY SAMPLED: 21.2.12.A

SUPPLIER: NEILSENS. PLANT: CAROL PARK

TESTING OFFICER: PAUL V No. 13.

TIME ARRIVAL: TIME DEPART:

Mix Code	Location of Concrete	Slump (Initial)
F'c		Slump (Additive)
Spec. Slump		Concrete Temp.
Truck No.		Ambient Temp.
Time Batched	Delivery Docket No.	Sampling Method
Time sampled	Load / Progressive	Compaction

PRODUCTION ASSESSMENT

SPECIMEN No.	MOULD NUMBER	DATE FOR TESTING	AGE	AIR CURED (Y / N)	CHARGE REQUEST / QC	TEST TYPE (C / FS)	REMARKS
0720	HEAT X CHANGER	70	A	90		7	-	R	C	
N3/20	NIB WALL	-	B	95		28	-			
80	4.	33	C	236.		28	-			
531.	PLINTHS.	33								
1104	402481.	7.2.1.								
1200	2.8 / 2.8.	1.7.2								

ENTERED

Sampling Method: AS 1012.1, 7.2.1 - Uninterupted discharge, 7.2.2 - Consistence test only, 7.2.3 - Slow discharge, 7.2.4 - Terminated discharge, 7.3 - Sampling from non-agitator units, 7.4 - From specified locations.

Compaction Method: AS1012.8, 1.7.3 - Rodding 1.7.4 - Vibration, 1.7.5 - Ramming

Pick-up & Start Standard Moist Curing				Delayed Curing (Temperature & Reason)		
Date	Time	By	Initial Curing Hours	Max.	Min.	

NOTE: Concrete tested in accordance with AS1012.1, AS1012.8, AS1012.13, AS1012.3

Customer's Signature

Tested By PAUL V

NATA
National Association of Testing Authorities Australia
Accredited Laboratory
Accred No. 14293

benchmark IN QUALITY ISO 9001

Concrete Test Record Rev. 8 June 2011

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Neilsen's Technical Services Laboratory
39 Mica St, Carole Park QLD 4300
Phone: (07) 3723 8705
Fax: (07) 3271 2620

Concrete Test Report [AS]

Report No: CON:W12-00450
Issue No: 1
This report replaces all previous issues of report no 'CON:W12-00450'.

Client: JOHN HOLLAND CONSTRUCTIONS
PO BOX 556
FORTITUDE VALLEY QLD 4006

Project: 240 DONALDSON RD
ROCKLEA

This document is issued in accordance with NATA's accreditation requirements.

NATA Accredited Laboratory Number: 14293

Approved Signatory: Garry Baldwinson

Date of Issue: 20/03/2012

COMPRESSIVE STRENGTH OF CONCRETE CYLINDERS

Details of Sampled Concrete — Concrete Specimens and Results

Date & Time Batched / Load / Prog. Load	Truck No / Time Sampled	Plant Name / Docket No / Product Code	Grade(MPa) / Agg(mm) / Slump(mm) Design	Air (%) / Compact (mm) Measured	Specimen Ident.	Dimensions (mm) Avg. Diameter	Height	Density (kg/m³)	Curing Initial (hrs)	Curing Std (days)	Type of Cap	Date of Test	Age (days)	Strength (MPa)	Marks	Fail Mode	Location & Remarks
21/02/12	531	Carole Park	N32		CA307\A	100.0	198	2480	23	6	S	28/02/12	7	26.0		N	Sampling AS 1012.1 Cl 6b
11:04	12:00	4029801	20		CA307\B	100.1	200	2480		27	S	20/03/12	28	44.0		N	HEAT EXCHANGER NIB
2.8/2.8		N32280	80	70	CA307\C	100.0	201	2500		27	S	20/03/12	28	44.5		N	WALL & PLINTHS Concrete Temp. (°C): 33

Notes

1. Sampling in accordance with AS 1012.1
2. Slump Test in accordance with AS 1012.3.1
3. Compaction by rodding, in accordance with AS 1012.8.1 Clause 7.3
4. Initial Curing in accordance with AS 1012.8.1 Clause 9.2.2
5. Standard Curing in accordance with AS 1012.8.1 Clause 9.3(a)
6. Capping R - Rubber, S - Sulphur, G - Ground, D - Double Cap Sulphur
7. Compressive Strength in accordance with AS 1012.9
8. Density in accordance with AS 1012.12.1
9. Moisture Condition SSD in accordance with AS 1012.12.1, unless otherwise stated

Remarks

FailureMode: N = NORMAL

2.2.2. Mechanical/Pre-commissioning Checksheets

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

STAINLESS STEEL PIPEWORK INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION/HEAT EXCHANGER		John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager
Checksheet No.:	8543-M-HX-500	Project Number:	8543		
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP STATION TO HEAT EXCHANGER PIPEWORK			
PIPE ID:		TO:	HEAT EXCHANGERS.	FROM:	DIGESTER FEED PS.

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Pipework issued as per specification					H	PE	JB 31/5	
2.00	**Pipework installation incl Stainless Steel (316)**								
2.01	Correct installation of joints	Manufacturer's Instruction				S			
2.02	Pipe and flange alignment correct (Square, grade, horizontal)	NA				S			
2.03	Ensure bolts are all tightened correctly as per torque procedure.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.04	Correct gaskets installed (spiral wound or 3mm insertion rubber as applicable)	NA				S			
2.05	Check installation of pipe supports (Site to confirm centrelines)	Drawing				S			
2.06	Instruments installed as per P&ID including pressure indicators etc.	486/5/5-R7W105				S	PE		
2.07	Ensure that all valves are consistent with P&ID and equipment schedule.	486/5/5-R7W105				H	PE	JB 11/6	
2.08	Ensure all instrumentation is installed and consistent with the P&ID and equipment schedule.	486/5/5-R7W105				H	PE	JB 11/6	
2.09	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6	
3.00	**Installation of Expansion joints**								

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

PIPE ID:		TO:		FROM:	

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
3.01	Apply lubricant to the expansion joints before installation	Recommended lubricants are graphite solution or water or glycerine				S			
3.02	Install bolts from the arch end (so that bolt heads are adjacent to the arch) to insure that bolts do not interfere with the arch during periods of compression	NA				S			
3.03	Tighten all bolts gradually and equally by alternating around the flange and monitor the flange bulge slightly.	NA				S			
3.00	**Pre-commissioning**								
3.01	Ensure all stainless steel pipework completed by qualified welder and all welds have been inspected					S			
3.02	Pipework pressure test completed - record pressure test sheet reference number and attach.					H	PE		
3.02	Check bolt tightness of expanion joints at least one week after going on-stream and periodically thereafter.					H	PE		
3.03	Check for damage and leave area tidy and clean for next discipline.					W	PE	DB 11/6	
3.04	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL

	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Form: 8531 – HTR - 003	**HYDRO STATIC TESTING RECORD**	John Holland
Revision: 0	**316 Stainless Steel** **Oxley Flood Recovery**	Page 1 of 1

Australian Standard Referenced:	AS 2566.2:2002 App M4	Line No:	[illegible]
Line Description:	New Discharge on Digester Feed Pump Station		
Line Material:	316 Stainless Steel	Line Size:	DN100
Hydro Test Medium:	Potable Water		
Hydro test Equipment:	Bucket pump, calibrated gauges,		

Pipe Test Pressure (KPa):		600KPA
Hold Test for 2hours Record Pressure at 15 minute intervals 15 minutes Pressure 605 Kpa 30 minute Pressure 605 Kpa 45 Minute Pressure 605 Kpa 1 Hour Pressure 605 Kpa 1 Hour 15 Minute Pressure 605 Kpa 1 Hour 30 Minute Pressure 605 Kpa 1 Hour 45 Minute Pressure 605 Kpa 2 Hour Pressure 605 Kpa		
Allowable Make-up Water Quantity ($Q \leq 0.14LDH$)(L/hr)		0.13 L/hr
Measured Make-up Water Quantity (L/hr)		NIL
Ambient Temperature:	Start of Test	9:18 am
	Completion of Test	11:25 am
Water Temperature:		
Hydro Test Complies:		Yes
If Hydro Test Fails Attach Sketch of Repaired Section:		
Test Water Dumped (location):		House drain

Pipeline is ☑ **fit for service** ☐ **not fit for service**

Subcontractor's Representative	Name:	ANDY ELSE
	Signature:	[signature]
	Date:	19-05-12
JHG Engineer:	Name:	
	Signature:	
	Date:	
Client's Representative	Name:	
	Signature:	
	Date:	

Form: 8543-500-002	**HYDRO STATIC TESTING RECORD**	John Holland
Revision: 0	**316 Stainless Steel** **Oxley Flood Recovery**	Page 1 of 1

Australian Standard Referenced:	AS 2566.2:2002 App M4	Line No:	251, 252, 253-150-SS-145
Line Description:	Sludge Discharge of Heat Exchanger 1		
Line Material:	316 Stainless Steel	Line Size:	DN100
Hydro Test Medium:	Potable Water		
Hydro test Equipment:	Bucket pump, calibrated gauges,		

Pipe Test Pressure (KPa):		600KPA
Hold Test for 2hours Record Pressure at 15 minute intervals 15 minutes Pressure 600 Kpa 30 minute Pressure 600 Kpa 45 Minute Pressure 600Kpa 1 Hour Pressure 600Kpa 1 Hour 15 Minute Pressure 600 Kpa 1 Hour 30 Minute Pressure 600 Kpa 1 Hour 45 Minute Pressure 600Kpa 2 Hour Pressure 600 Kpa		
Allowable Make-up Water Quantity ($Q \leq 0.14LDH$)(L/hr)		0.13 L/hr
Measured Make-up Water Quantity (L/hr)		NiL
Ambient Temperature:	Start of Test	10.05 am
	Completion of Test	12.15 pm
Water Temperature:		
Hydro Test Complies:		yes
If Hydro Test Fails Attach Sketch of Repaired Section:		
Test Water Dumped (location):		House drain

Pipeline is ☑ **fit for service** ☐ **not fit for service**

Subcontractor's Representative	Name:	JHG Andy Else
	Signature:	
	Date:	21-05-12
JHG Engineer:	Name:	
	Signature:	
	Date:	
Client's Representative	Name:	
	Signature:	
	Date:	

Form: 8543-500-003	**HYDRO STATIC TESTING RECORD**	John Holland
Revision: 0	**316 Stainless Steel** **Oxley Flood Recovery**	Page 1 of 1

Australian Standard Referenced:	AS 2566.2:2002 App M4	Line No:	251, 252, 253-150 S/S-HS
Line Description:	Sludge Discharge of Heat Exchanger 2		
Line Material:	316 Stainless Steel	Line Size:	DN100
Hydro Test Medium:	Potable Water		
Hydro test Equipment:	Bucket pump, calibrated gauges,		

Pipe Test Pressure (KPa):		600 KPA
Hold Test for 2hours Record Pressure at 15 minute intervals 15 minutes Pressure 600 Kpa 30 minute Pressure 600 Kpa 45 Minute Pressure 600 Kpa 1 Hour Pressure 600 Kpa 1 Hour 15 Minute Pressure 600 Kpa 1 Hour 30 Minute Pressure 600 Kpa 1 Hour 45 Minute Pressure 600 Kpa 2 Hour Pressure 600 Kpa		
Allowable Make-up Water Quantity (Q ≤ 0.14LDH)(L/hr)		0.13 L/hr
Measured Make-up Water Quantity (L/hr)		NIL
Ambient Temperature:	Start of Test	1005 am
	Completion of Test	12:15 pm
Water Temperature:		
Hydro Test Complies:		yes
If Hydro Test Fails Attach Sketch of Repaired Section:		
Test Water Dumped (location):		House drain

Pipeline is ☑ **fit for service** ☐ **not fit for service**

Subcontractor's Representative	Name:	Andy Else
	Signature:	
	Date:	21-05-12
JHG Engineer:	Name:	
	Signature:	
	Date:	
Client's Representative	Name:	
	Signature:	
	Date:	

Form: 8531 – HTR - 003	**HYDRO STATIC TESTING RECORD**	John Holland
Revision: 0	**316 Stainless Steel** **Oxley Flood Recovery**	Page 1 of 1

551-100-S/S

Australian Standard Referenced:	AS 2566.2:2002 App M4	Line No:	580-150-S/S 552-100-S/S
Line Description:	Service Water to Heat Exchanger 1		
Line Material:	316 Stainless Steel	Line Size:	DN100
Hydro Test Medium:	Potable Water		
Hydro test Equipment:	Bucket pump, calibrated gauges,		

Pipe Test Pressure (KPa):		1065 KPA
Hold Test for 2hours Record Pressure at 15 minute intervals 15 minutes Pressure …….. 30 minute Pressure…… 45 Minute Pressure…….. 1 Hour Pressure …… 1 Hour 15 Minute Pressure …… 1 Hour 30 Minute Pressure …….. 1 Hour 45 Minute Pressure …… 2 Hour Pressure ……		
Allowable Make-up Water Quantity ($Q \leq 0.14LDH$)(L/hr)		0.13 L/hr
Measured Make-up Water Quantity (L/hr)		
Ambient Temperature:	Start of Test	* Note 1065 KPa test
	Completion of Test	No visible external leaks
Water Temperature:		Knife gate internal leakage
Hydro Test Complies:		No Room to spade
If Hydro Test Fails Attach Sketch of Repaired Section:		
Test Water Dumped (location):		House drain

Pipeline is ☑ **fit for service** ☐ **not fit for service**

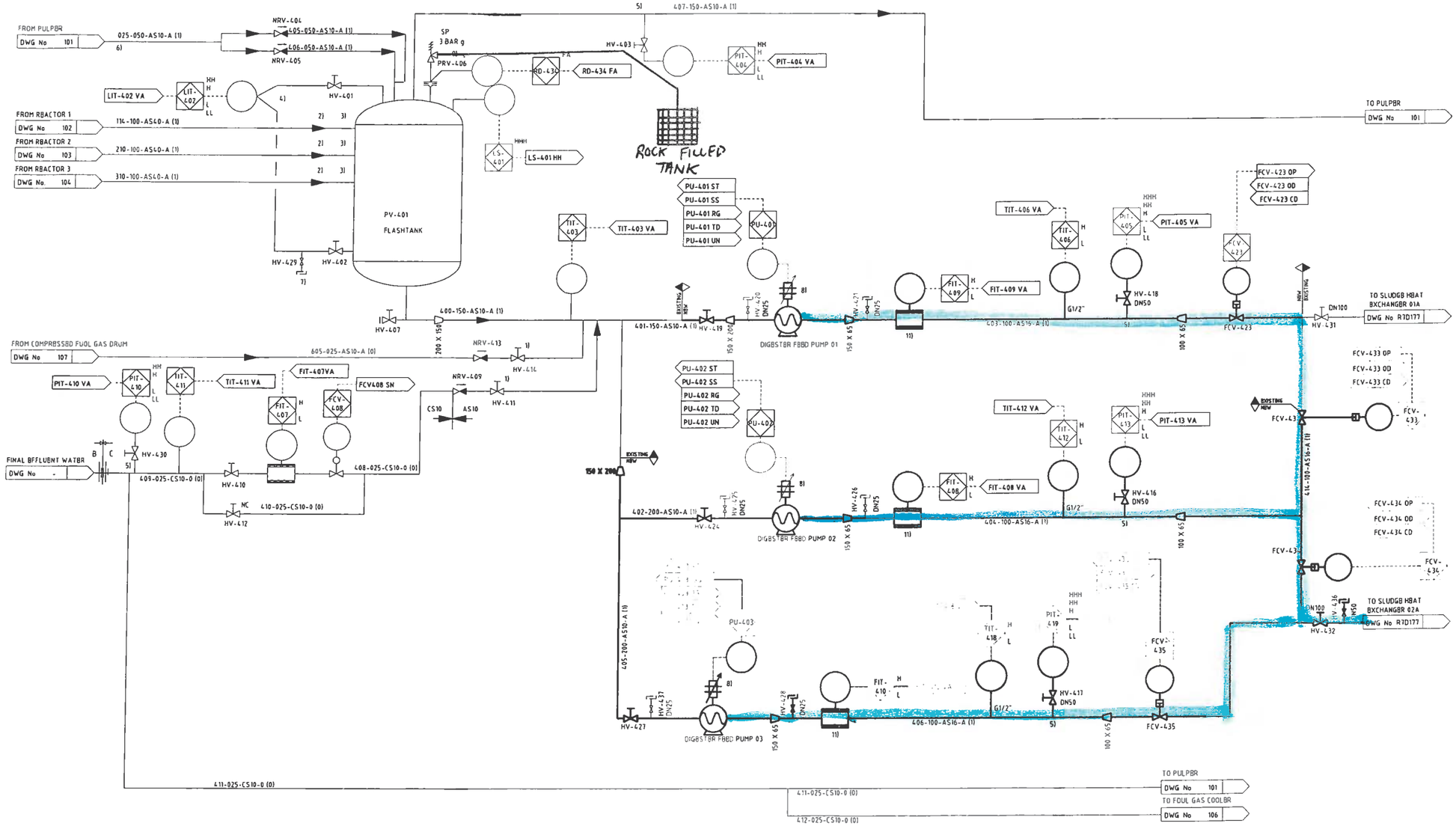
Subcontractor's Representative	Name:	Andy Else
	Signature:	
	Date:	21-05-12
JHG Engineer:	Name:	
	Signature:	
	Date:	
Client's Representative	Name:	
	Signature:	
	Date:	

EQUIPMENT TAG No	PU-401
	FLASHTANK
	3,3/3,12
	26

EQUIPMENT TAG No	PU-401 / PU-402 / PU-403
EQUIPMENT NAME	DIGESTER FEED PUMP 01 / 02 / 03
CAPACITY (m3/h)	24
DIFF PRESSURE (bar)	12
DISCH PRESSURE (barg)	3
POWER INSTALLED (kW)	18.5

NOTES

1) VALVES CLOSE TO SLUDGE PIPE
2) INLET FROM REACTORS TO BE ABOVE MAX LEVEL
3) 5 X DIA BENDS
4) TO BE INSTALLED WITH FLUSHING POINT
5) 3 MM SADDLE REINFORCEMENT ON MAIN PIPE
6) NO POCKETS
7) FLUSHING UNIT, SEE DOC NO 999-STD-002, REV D02, ATT C17
8) MOTOR EQUIPPED WITH THERMISTOR
9) BATTERY LIMIT ON PRESSURE SAFETY VALVE DISCHARGE FLANGE
10) SEQUENCE NUMBER IN TAG NUMBER TO BE PREFIXED BY 625



AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE:

NAME of SIGNATORY:

RPEQ No. or LICENCE:

COMPANY NAME:

START DATE: FINISH DATE:

Better Technical Options Ltd
environmental solutions

NAME	SIGNATURE	DATE

QUEENSLAND URBAN UTILITIES DELEGATE
(AUTHORISED FOR 12 MONTHS FROM DATE SHOWN)

QUEENSLAND UrbanUtilities

No.	DATE	AMENDMENT	DRAFTED	DESIGNED	RPEQ NO.	APPROVED
F3	20.01.12	FOR CONSTRUCTION	LS	JW	-	JW
F2	13.01.12	PRELIMINARY DRAWING - FOR REVIEW	LS	JW	-	JW
F1	14.12.11	PRELIMINARY DRAWING	LS	JW	-	JW

FUNDING
DESIGN W.O. No.
CONSTRUCTION W.O. No.
FUNDED BY Q.U.U. (✓) EXTERNAL ( )

DRAFTED JB - 13.01.12
DRAFTING CHECK
CAD FILE
Q.U.U. FILE No.

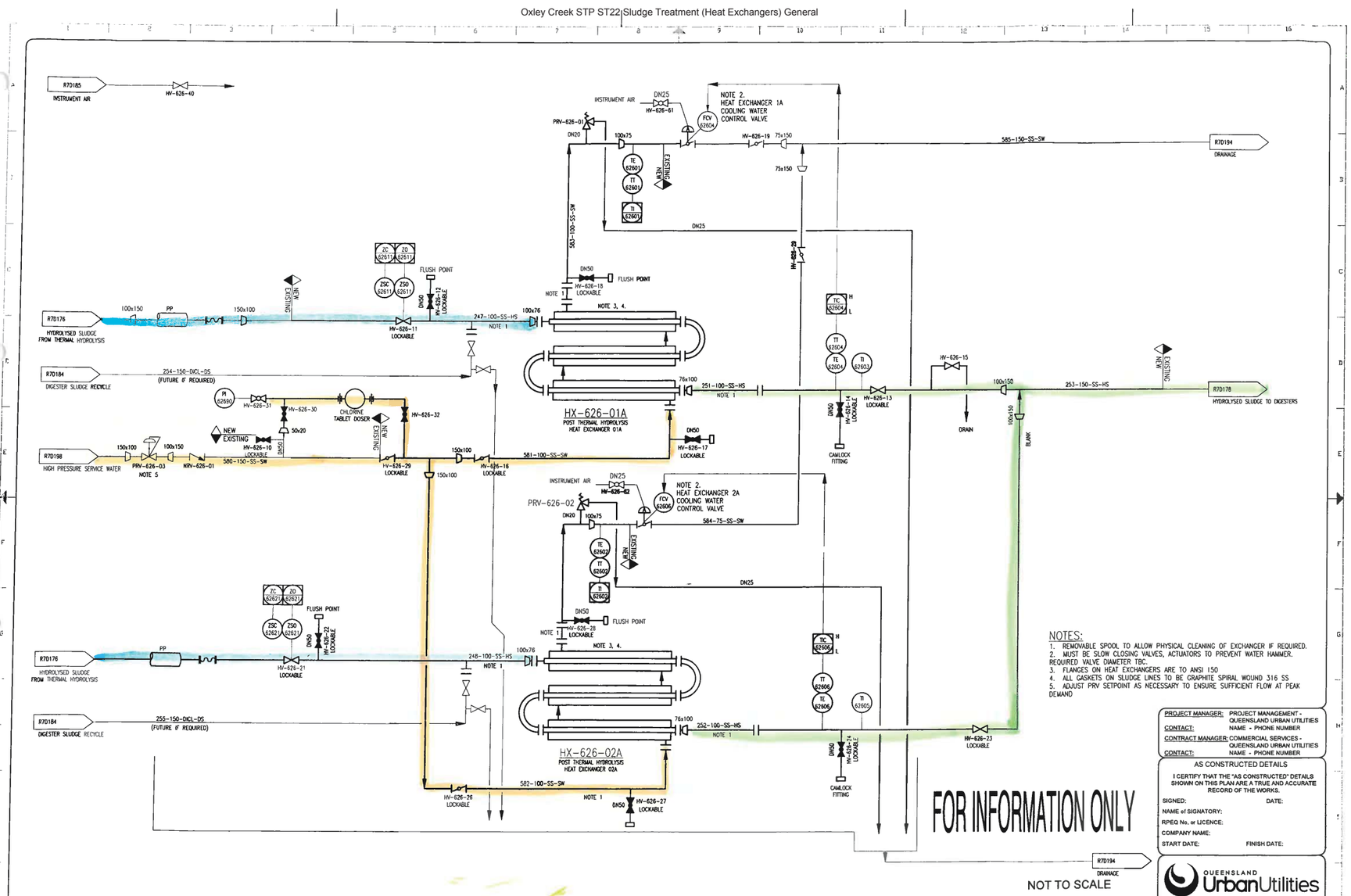
JEFF WHITTY	-	20.01.12	
DESIGN	R.P.E.Q. No.	DATE	
MIKE MCCOY	10696	20.01.12	
DESIGN CHECK	R.P.E.Q. No.	DATE	

APPROVED BY	SIGNATURE	DATE
CONSTRUCTION MANAGER	SIGNATURE	DATE

ASSET/PROJECT
OXLEY CK WRP
HEAT EXCHANGER UPGRADE

DRAWING TITLE
P&ID
DIGESTER FEED PUMPS

SHEET No. 1 OF 1
QUEENSLAND URBAN UTILITIES DRAWING No. AMEND.
486/5/5 R7W105 F3



NOTES:
1. REMOVABLE SPOOL TO ALLOW PHYSICAL CLEANING OF EXCHANGER IF REQUIRED.
2. MUST BE SLOW CLOSING VALVES, ACTUATORS TO PREVENT WATER HAMMER. REQUIRED VALVE DIAMETER TBC.
3. FLANGES ON HEAT EXCHANGERS ARE TO ANSI 150
4. ALL GASKETS ON SLUDGE LINES TO BE GRAPHITE SPIRAL WOUND 316 SS
5. ADJUST PRV SETPOINT AS NECESSARY TO ENSURE SUFFICIENT FLOW AT PEAK DEMAND

FOR INFORMATION ONLY

NOT TO SCALE

PROJECT MANAGER:	PROJECT MANAGEMENT - QUEENSLAND URBAN UTILITIES
CONTACT:	NAME - PHONE NUMBER
CONTRACT MANAGER:	COMMERCIAL SERVICES - QUEENSLAND URBAN UTILITIES
CONTACT:	NAME - PHONE NUMBER

AS CONSTRUCTED DETAILS

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE A TRUE AND ACCURATE RECORD OF THE WORKS.

SIGNED: DATE:
NAME of SIGNATORY:
RPEQ No. or LICENCE:
COMPANY NAME:
START DATE: FINISH DATE:

QUEENSLAND UrbanUtilities

	FUNDING	DRAFTED	JB - 19.01.12	JEFF WHITTY - 20.01.12		ASSET/PROJECT	DRAWING TITLE P&ID
							SHEET No. 1 OF 1

Revision: A
Approved By: Tate Brammer

Date of ue: 13.02.12

PVC PIPEWORK INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS		
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	John Holland
Checksheet No.:	8543-M-HX-501	Project Number:	8543			
EQUIPMENT DESCRIPTION:		HEAT EXCHANGERS PVC PIPEWORK				
PIPE ID:	CHLORING DISENSER	TO:		FROM:		

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Pipework issued as per specification					H	PE	JB 31/5	
2.00	**Pipework installation incl PVC**								
2.01	Correct installation of joints	Manufacturer's Instruction				S			
2.02	Pipe and flange alignment correct (Square, grade, horizontal)	NA				S			
2.03	Correct gaskets installed (3mm insertion rubber)	NA				S			
2.04	Correct torquing of bolts					S			
2.05	Ensure PVC is installed as per manufacturer's recommendations. Confirm PVC glue, primer and thread sealant are suitable for application	WeldOn P70(Primer), 724(Glue) and Spears Blue 75 Liquid thread sealant				S			
2.06	Check installation of pipe supports (Site to confirm centrelines)	Drawing				S			
2.07	Instruments installed as per P&ID including pressure indicators etc.	486/5/5-R7D177				S	PE		
2.08	Ensure that all valves are consistent with P&ID and equipment schedule.	486/5/5-R7D177				H	PE	JB 11/6	
2.09	Ensure all instrumentation is installed and consistent with the P&ID and equipment schedule.	486/5/5-R7D177				H	PE	JB 11/6	
2.10	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

PIPE ID:		TO:					FROM:			
Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by							Remarks/Records
			S/C			JH				
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date		
2.11	Pipework pressure/service test completed - record pressure test sheet reference number and attach.					H	PE			
2.12	Check for damage and leave area tidy and clean for next discipline.					W	PE	JB 5/6/12		
3.04	**MECH INSTALLATION COMPLETE**	NA				H	PE			

APPROVAL

	NAME	SIGNATURE	DATE
JH	JANE BEECHEY	Jane Beechey	11/6/12
JH			

Revi. . A
Approved By: Tate Brammer

Date of Issue: 2.12

PUMP INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-001	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 1				Tag Number:	PU-625-401

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Set out and Levels are correct to drawing.					S	SV		
2.00	**Pump Storage**								
2.01	Pump delivered as specified					H	PE	JB 31/5	
2.02	Clean and free of debris					S			
2.03	Visual inspect pump and ensure there is no damage. Record notes.					W			
3.00	**Record nameplate data:**								
3.01	Pump - Record any variances to below Manufacturer: Mono Pumps Pump type: Compact EZ Strip Range Model No.: CAMB1-DIG-LH-SF Record Serial No.: C559554 101					W	PE	JB 31/5	
3.02	Motor Type: WEG W22 Record Serial No.: Phase: 3 Frequency: 50Hz Protection: IP55 Power: 18.5kW Voltage: 380V Current: 36.3A cos φ: 0.85 Revs: 1460/min					W	PE	JB 31/5	
4.00	**Pump Installation**								
4.01	Anchors as per manufacturers requirements					W	PE/SV	JB 31/5	
4.02	Confirm gasket type (3mm insertion spiral wound gasket)	NA				S			

Revision: A
Approved By: Tate Brammer

PUMP INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-001	Project Number:	8543				
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 1					Tag Number:	PU-625-401

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.03	Pipework aligned correctly	NA				S			
4.04	Base grouted	NA				S			(pour plinths Correct height)
4.05	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 339Nm for 12 bolts and 203 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S	SV		
4.06	Check all nuts, bolts, securing flanges and base mounting fixtures are tightened	NA				S			
4.07	Check oil levels and top up if required. Recommended oil: *KLUBER SYNTHESO D460 EP OIL or MOBIL GEAR OIL SHC 320*	Mono Pump O&M: EZ Strip Range. MPA600				W	SV	JB 31/5	
4.08	Check alignment of pump and gearbox.	Mono Pump O&M: EZ Strip Range. MPA601				W			
4.09	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 1/6	
	MECH INSTALLATION COMPLETE								
5.00	**Pump Pre-com Mech**								
5.01	Remove gearbox breathers if required.					W			
5.02	Verify that pump is energised. Check energisation register for specific area.	Insert engerisation procedure number.				H	PE	JB 1/6	
5.03	Ensure pump is filled with liquid and check rotation of pumps (Anti-clockwise gives inlet at drive end)					W	PE	JB 1/6	
5.04	Test all pump interlocks and ensure the pump starts and stops accordingly.					W	PE	JB 1/6	
5.05	Run test of pump at different speeds and record flowrate, current, voltage and power from VSD and instruments. Plot results against manufacturers curve.					W	PE	TO BE COMPLETED ON SLUDGE.	

Revis A
Approved By: Tate Brammer

Date of Issue: 1 .12

PUMP INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-001	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 1				Tag Number:	PU-625-401

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
5.06	Check for damage to pump and leave area tidy and clean for next discipline.					W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	TATE BRAMMER		11/6/12

Revis A
Approved By: Tate Brammer

Date of Issue: 2.12

PUMP INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-002	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 2				Tag Number:	PU-625-402

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Set out and Levels are correct to drawing.					S	[signature]		
2.00	**Pump Storage**								
2.01	Pump delivered as specified					H	PE	JB 31/5	
2.02	Clean and free of debris					S	[signature]		
2.03	Visual inspect pump and ensure there is no damage. Record notes.					W	[signature]		
3.00	**Record nameplate data:**								
3.01	Pump - Record any variances to below Manufacturer: Mono Pumps Pump type: Compact EZ Strip Range Model No.: CAMBI - DIG-RH-SF Record Serial No.: C559552 101					W	PE	JB 31/5	
3.02	Motor Type: WEG W22 Record Serial No.: Phase: 3 Frequency: 50Hz Protection: IP55 Power: 18.5kW Voltage: 380V Current: 36.3A cos φ: 0.85 Revs: 1460/min					W	PE	JB 31/5	
4.00	**Pump Installation**								
4.01	Anchors as per manufacturers requirements					W	PE/SV	JB 31/5	
4.02	Confirm gasket type (3mm insertion spiral wound gasket)	NA				S	[signature]		

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

PUMP INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-002	Project Number:	8543				
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 2					Tag Number:	PU-625-402

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.03	Pipework aligned correctly	NA				S	SV		
4.04	Base grouted	NA				S	SV		
4.05	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 339Nm for 12 bolts and 203 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S	SV		
4.06	Check all nuts, bolts, securing flanges and base mounting fixtures are tightened	NA				S	SV		
4.07	Check oil levels and top up if required. Recommended oil: *KLUBER SYNTHESO D460 EP OIL or MOBIL GEAR OIL SHC 320*	Mono Pump O&M: EZ Strip Range. MPA600				W	SV	JB 31/5	
4.08	Check alignment of pump and gearbox.	Mono Pump O&M: EZ Strip Range. MPA601				W	SV		
4.09	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 11/6	
	MECH INSTALLATION COMPLETE								
5.00	**Pump Pre-com Mech**								
5.01	Remove gearbox breathers if required.					W	SV		
5.02	Verify that pump is energised. Check energisation register for specific area.	Insert engerisation procedure number.				H	PE	JB 1/6	
5.03	Ensure pump is filled with liquid and check rotation of pumps (Anti-clockwise gives inlet at drive end)					W	PE	JB 1/6	
5.04	Test all pump interlocks and ensure the pump starts and stops accordingly.					W	PE	JB 1/6	
5.05	Run test of pump at different speeds and record flowrate, current, voltage and power from VSD and instruments. Plot results against manufacturers curve.					W	PE	TO BE COMPLETED ON SLUDGE.	

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Date of Issue: 1 .12

PUMP INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	John Holland
Checksheet No.:	8543-M-HX-002	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 2				Tag Number:	PU-625-402

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
5.06	Check for damage to pump and leave area tidy and clean for next discipline.					W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	TATE BRAMMER		11/6/12

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Date of Issue: 2.12

PUMP INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-003	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 3				Tag Number:	PU-625-403

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Set out and Levels are correct to drawing.					S			
2.00	**Pump Storage**								
2.01	Pump delivered as specified					H	PE	JB 31/5	
2.02	Clean and free of debris					S			
2.03	Visual inspect pump and ensure there is no damage. Record notes.					W			
3.00	**Record nameplate data:**								
3.01	Pump - Record any variances to below Manufacturer: Mono Pumps Pump type: Compact EZ Strip Range Model No.: CAMBI-DIG-ZH-SF Record Serial No.: C559554 102					W	PE	JB 31/5	
3.02	Motor Type: WEG W22 Record Serial No.: Phase: 3 Frequency: 50 HZ Protection: IP55 Power: 18.5 kW Voltage: 380 V Current: 36.3 A cos φ: 0.85 Revs: 1460/min					W	PE	JB 31/5	
4.00	**Pump Installation**								
4.01	Anchors as per manufacturers requirements					W			
4.02	Confirm gasket type (3mm insertion spiral wound gasket)	NA				S			

PUMP INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-003	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 3				Tag Number:	PU-625-403

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.03	Pipework aligned correctly	NA				S			
4.04	Base grouted	NA				S			
4.05	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 339Nm for 12 bolts and 203 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S	SV		
4.06	Check all nuts, bolts, securing flanges and base mounting fixtures are tightened	NA				S			
4.07	Check oil levels and top up if required. Recommended oil: *KLUBER SYNTHESO D460 EP OIL or MOBIL GEAR OIL SHC 320*	Mono Pump O&M: EZ Strip Range. MPA600				W		JB 31/5	
4.08	Check alignment of pump and gearbox.	Mono Pump O&M: EZ Strip Range. MPA601				W			
4.09	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 11/6	
	MECH INSTALLATION COMPLETE								
5.00	**Pump Pre-com Mech**								
5.01	Remove gearbox breathers if required.					W			O.K
5.02	Verify that pump is energised. Check energisation register for specific area.	Insert engerisation procedure number.				H	PE	JB 1/6	
5.03	Ensure pump is filled with liquid and check rotation of pumps (Anti-clockwise gives inlet at drive end)					W	PE	JB 1/6	
5.04	Test all pump interlocks and ensure the pump starts and stops accordingly.					W	PE	JB 12/6	
5.05	Run test of pump at different speeds and record flowrate, current, voltage and power from VSD and instruments. Plot results against manufacturers curve.					W	PE	TO BE COMPLETED ON SLUDGE	

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PUMP INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-003	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 3				Tag Number:	PU-625-403

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
5.06	Check for damage to pump and leave area tidy and clean for next discipline.					W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	TATE BRAMMER		11/6/12

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Date of Issue: 2.12

HEAT EXCHANGER INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-004	Project Number:	8543			
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 1				Tag Number:	HX-626-01A

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Set out and Levels are correct to drawing.					S			
1.02	Heat exchanger delivered as specified					H	PE	JB 31/5	
1.03	Clean and free of debris					S			
1.04	Visual inspect heat exchanger tubes and ensure there is no damage. Record notes.					W			
2.00	**Record nameplate data:**								
2.01	Heat exchanger - Record any variances to below Manufacturer: Teralba Industries Model No.: Record Serial No.: Temperature Range: Pressure Range:					W	PE	JB 31/5	
3.00	**Heat Exchanger Installation**								
3.01	Anchors as per manufacturers requirements					W			
3.02	Confirm gasket type (3mm insertion spiral wound)	NA				S			
3.03	Pipework aligned correctly	NA				S			
3.04	Base grouted	NA				S	SV		poured platters to height
3.05	Check all nuts, bolts, securing flanges and base mounting fixtures are tightened.	NA				S			
3.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Bolt Load Tables and torquing sequence.				S			
3.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 11/6	
	MECH INSTALLATION COMPLETE								

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HEAT EXCHANGER INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-004	Project Number:	8543			
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 1				Tag Number:	HX-626-01A

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
5.00	**Heat Exchanger Pre-com Mech**								
5.01	Complete pressure test on heat exchanger and ensure testing sheets are completed and attached	Teralba quality assurance report				W	SV/PE	JB 31/5	Carried out at Teralba Industries workshop
5.02	Scour service water line for several minutes to ensure that no debris enters the cooling jacket.					H	PE	JB 12/6	
5.03	Check for damage to pump and leave area tidy and clean for next discipline.					W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	12/6/12

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HEAT EXCHANGER INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV-Surveyor, PE – Project Engineer Sup-Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-005	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 2				Tag Number:	HX-626-02A

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Set out and Levels are correct to drawing.					S			
1.02	Heat exchanger delivered as specified					H	PE	JB 31/5	
1.03	Clean and free of debris					S			
1.04	Visual inspect heat exchanger tubes and ensure there is no damage. Record notes.					W			
2.00	**Record nameplate data:**								
2.01	Heat exchanger - Record any variances to below Manufacturer: Teralba Industries Model No.: Record Serial No.: Temperature Range: Pressure Range:					W	PE	JB 31/5	
3.00	**Heat Exchanger Installation**								
3.01	Anchors as per manufacturers requirements					W			
3.02	Confirm gasket type (3mm insertion spiral wound)	NA				S			
3.03	Pipework aligned correctly	NA				S			
3.04	Base grouted	NA				S			poured plinths to height
3.05	Check all nuts, bolts, securing flanges and base mounting fixtures are tightened.	NA				S			
3.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
3.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 11/6	
	MECH INSTALLATION COMPLETE								
5.00	**Heat Exchanger Pre-com Mech**								

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HEAT EXCHANGER INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Hest Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-005	Project Number:	8543			
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 2				Tag Number:	HX-626-02A

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
5.01	Complete pressure test on heat exchanger and ensure testing sheets are completed and attached	Teralba quality assurance report				W	SV/PE	JB 3/5	Carried out at Teralba Industries workshop
5.02	Disconnect service water line and scour service water line for several minutes to ensure that no debris enters the cooling jacket.					H	PE		
5.03	Check for damage to heat exchanger and leave area tidy and clean for next discipline.					W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	12/6/12

AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager
Checksheet No.:	8543-M-HX-100	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 1 Outlet Valve			Tag Number:		FCV-625-423

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Aeon Kempster Model: KV7 Lugged Knife gate Valve DN: 100mm Valve Class: GA21-A With Air Actuator and Limit Switch Box					W	PE	JB 31/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10-16)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	Aeon KV7 Installation Manual				S	PE	JB 11/6	
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
3.01	**Actuator Installation**								
3.03	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.04	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/12	
3.05	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6	
3.05	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 11/6	

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Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Disconnect compressed air line. Energise compressed air and flush line. Adjust regulator to correct pressure **(Verify Max Compressed air Allowed).** Reconnect airline to valve.	NA				H	PE	JB 11/6	
4.02	Energise valve electrically following energisation procedure.	NA						JB 11/6	
4.02	Stroke the valve with air manually and ensure actuator is operating normally. Adjust stroke and speed if required.	NA				W	PE	JB 11/6	
4.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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Date of Issue: 2.12

AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-101	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 3 Outlet Valve				Tag Number:	FCV-625-435

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Aeon Kempster Model: KV7 Lugged Knife gate Valve DN: 100mm Valve Class: GA21-A With Air Actuator and Limit Switch Box					W	PE	JB 3/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10-16)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	Aeon KV7 Installation Manual				S	PE	JB 11/6	
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
3.01	**Actuator Installation**								
3.03	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.04	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/12	
3.05	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6	
3.05	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 11/6	

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Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Disconnect compressed air line. Energise compressed air and flush line. Adjust regulator to correct pressure **(Verify Max Compressed air Allowed).** Reconnect airline to valve.	NA				H	PE	JB 11/6	
4.02	Energise valve electrically following energisation procedure.	NA						JB 11/6	
4.02	Stroke the valve with air manually and ensure actuator is operating normally. Adjust stroke and speed if required.	NA				W	PE	JB 11/6	
4.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-102	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 2 DISTRIBUTION VALVE TO HX 2			Tag Number:		FCV-625-433

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Aeon Kempster Model: KV7 Lugged Knife gate Valve DN: 100mm Valve Class: GA21-A With Air Actuator and Limit Switch Box					W	PE	JB 31/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10-16)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	Aeon KV7 Installation Manual				S	PE	JB 11/6	
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
3.01	**Actuator Installation**								
3.03	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.04	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/17	
3.05	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6	
3.05	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 11/6	

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Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Disconnect compressed air line. Energise compressed air and flush line. Adjust regulator to correct pressure **(Verify Max Compressed air Allowed).** Reconnect airline to valve.	NA				H	PE	JB 11/6	
4.02	Energise valve electrically following energisation procedure.	NA						JB 11/6	
4.02	Stroke the valve with air manually and ensure actuator is operating normally. Adjust stroke and speed if required.	NA				W	PE	JB 11/6	
4.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-103	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 2 DISTRIBUTION VALVE TO HX2				Tag Number:	FCV-625-434

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Aeon Kempster Model: KV7 Lugged Knife gate Valve DN: 100mm Valve Class: GA21-A With Air Actuator and Limit Switch Box					W	PE	JB 3/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10-16)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	Aeon KV7 Installation Manual				S	PE	JB 11/6	
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
3.01	**Actuator Installation**								
3.03	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.04	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/12	
3.05	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6	
3.05	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 11/6	

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Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Disconnect compressed air line. Energise compressed air and flush line. Adjust regulator to correct pressure **(Verify Max Compressed air Allowed).** Reconnect airline to valve.	NA				H	PE	JB 11/6	
4.02	Energise valve electrically following energisation procedure.	NA						JB 11/6	
4.02	Stroke the valve with air manually and ensure actuator is operating normally. Adjust stroke and speed if required.	NA				W	PE	JB 11/6	
4.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Revis A
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Date of Issue: 1 2.12

AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager
Checksheet No.:	8543-M-HX-104	Project Number:	8543			
EQUIPMENT DESCRIPTION:		Heat Exchanger 1 Service Water Drain FCV			Tag Number:	FCV-626-04

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C			JH			Remarks/Records
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: RTK Valve Model: PV6211 DN: 75mm Valve Class: GL01-A Positioner: Siemens Sipart PS2	NA				W	PE	JB 5/6/17	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm gasket type **(3mm insertion rubber)**	NA				S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	RTK Manual for PV6211				S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.	NA				S			
2.05	Ensure bolts are well lubricated before torquing up.	NA				S			
2.03	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.	NA				S			
3	**Actuator Installation**								
3.01	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.02	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/17	
3.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W177				W	PE	JB 11/16	
3.04	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 5/6/17	
4.00	**Pre-commissioning**								
4.01	Energise compressed air and adjust regulator to correct pressure **(Verify max pressure on actuator)**	NA				H	PE	JB 5/6/17	

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Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.02	Energise valve electrically following energisation procedure.	NA				W	PE	JB 5/6/12	
4.03	Run auto setup for sipart positioners and record settings and attach to this checksheet.	Siemens Sipart PS2 PA Manual				W	PE	JB 5/6/12	
4.04	Stroke the valve manually and ensure gearbox operating normally. Adjust stroke and speed if required.	NA				W	PE	JB 5/6/12	
4.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 5/6/12	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Revis A
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Date of Issue: 2.12

AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-105	Project Number:	8543			
EQUIPMENT DESCRIPTION:	Heat Exchanger 2 Service Water Drain FCV				Tag Number:	FCV-626-06

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: RTK Valve Model: PV6211 DN: 75mm Valve Class: GL01-A Positioner: Siemens Sipart PS2	NA				W	PE	JB 3/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm gasket type **(3mm insertion rubber)**	NA				S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	RTK Manual for PV6211				S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.	NA				S			
2.05	Ensure bolts are well lubricated before torquing up.	NA				S			
2.03	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.	NA				S			
3	**Actuator Installation**								
3.01	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.02	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/12	
3.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W177				W	PE	JB 11/6	
3.04	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 5/6/12	
4.00	**Pre-commissioning**								
4.01	Energise compressed air and adjust regulator to correct pressure **(Verify max pressure on actuator)**	NA				H	PE	JB 5/6/12	

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Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.02	Energise valve electrically following energisation procedure.	NA				W	PE	JB 5/6/12	
4.03	Run auto setup for sipart positioners and record settings and attach to this checksheet.	Siemens Sipart PS2 PA Manual				W	PE	JB 5/6/12	
4.04	Stroke the valve manually and ensure gearbox operating normally. Adjust stroke and speed if required.	NA				W	PE	JB5/6/12	
4.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 5/6/12	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Revis A
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Date of Issue: 1 .12

AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-106	Project Number:	8543			
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 1 SLUDGE DISCHARGE VALVE				Tag Number:	FCV-626-13

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Tyco - Keystone Model: VLV KGV F55 DN: 100mm With Air Actuator and Limit Switch Box					W	PE	JB 31/5	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10-16)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	Tyco Keystone O&M manual				S	PE	JB 5/6/12	
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
3.01	**Actuator Installation**								
3.03	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.04	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/12	
3.05	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
3.05	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 5/6/12	
4.00	**Pre-commissioning**								

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Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.01	Disconnect compressed air line. Energise compressed air and flush line. Adjust regulator to correct pressure **(Verify Max Compressed air Allowed).** Reconnect airline to valve.	NA				H	PE	JB 5/6/12	
4.02	Energise valve electrically following energisation procedure.	NA						JB 5/6/12	
4.03	Stroke the valve with air manually and ensure actuator is operating normally. Adjust stroke and speed if required.	NA				W	PE	JB 5/6/12	
4.04	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 5/6/12	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	John Holland
Checksheet No.:	8543-M-HX-108	Project Number:	8543				
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 1 SW FLUSH INLET VALVE					Tag Number:	FCV-626-90

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record nameplate data - record any variances to below**								
	Actuator Type: Air actuator DN50					W	PE	JB 5/6/12	
	Serial No.:								
1.02	Valve issued as per specification/ purchase order					W	PE	JB 5/6/12	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm alignment and install valve making sure valve is securely tightened.					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Check manual handles have correct access and no restriction for operation					S	PE	JB 5/6/12	
3.01	**Actuator Installation**								
3.01	If installing the actuator separately ensure valve is secure before fitting the actuator.					S			
3.02	Fit the actuator to valve as per vendor recommendations.					S			
3.03	Verify silences/speed adjustments are installed.					S	SV/PE	NA	
3.04	Flush compressed airline.					S	SV/PE	JB 5/6/12	
3.05	Connect compressed air. Verify compressed air is within manufacturers recommendations. (**5.6 bar to 10bar**).					S	SV/PE	JB 5/6/12	
3.06	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
3.07	Ensure Limit Switches are installed and ready for wiring.					S	SV	JB 5/6/12	
	MECH INSTALLATION COMPLETE								

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Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Energise compressed air and check for leaks.					S	SV/PE	JB 5/6/12	
4.02	Stroke the valve manually and ensure gearbox operating normally. Adjust stroke and speed if required.					W	PE	JB 11/6	
4.05	Check for damage and leave area tidy and clean for next discipline.					W	PE	JB 11/6	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Revi: : A
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AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-109	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 2 SW FLUSH INLET VALVE				Tag Number:	FCV-626-94

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
	Actuator Type: Air actuator DN50					W	PE	JB 5/6/12	
	Serial No.:								
1.02	Valve issued as per specification/ purchase order					W	PE	JB 5/6/12	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm alignment and install valve making sure valve is securely tightened.					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Check manual handles have correct access and no restriction for operation					S	PE	JB 5/6/12	
3.01	**Actuator Installation**								
3.01	If installing the actuator separately ensure valve is secure before fitting the actuator.					S			
3.02	Fit the actuator to valve as per vendor recommendations.					S			
3.03	Verify silences/speed adjustments are installed.					S	SV/PE	N/A	
3.04	Flush compressed airline.					S	SV/PE	JB 5/6/12	
3.05	Connect compressed air. Verify compressed air is within manufacturers recommendations. (**5.6 bar to 10bar**).					S	SV/PE	JB 5/6/12	
3.06	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 1/6	
3.07	Ensure Limit Switches are installed and ready for wiring.					S	SV/PE	JB 5/6/12	
	MECH INSTALLATION COMPLETE								

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Approved By: Tate Brammer

Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Energise compressed air and check for leaks.					S	SV/PE	JB 5/6/12	
4.02	Stroke the valve manually and ensure gearbox operating normally. Adjust stroke and speed if required.					W	PE	JB 5/6/12	
4.05	Check for damage and leave area tidy and clean for next discipline.					W	PE	JB 5/6/12	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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Date of Issue: 2.12

AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-110	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 1 SW FLUSH DISCHARGE VALVE				Tag Number:	FCV-626-14

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record nameplate data - record any variances to below**								
	Actuator Type: Air actuator DN50					W	PE	JB 5/6/17	
	Serial No.:								
1.02	Valve issued as per specification/ purchase order					W	PE		
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm alignment and install valve making sure valve is securely tightened.					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Check manual handles have correct access and no restriction for operation					S	PE	JB 5/6/17	
3.01	**Actuator installation**								
3.01	If installing the actuator separately ensure valve is secure before fitting the actuator.					S			
3.02	Fit the actuator to valve as per vendor recommendations.					S			
3.03	Verify silences/speed adjustments are installed.					S	SV/PE	NA	
3.04	Flush compressed airline.					S	SV/PE	JB 5/6/17	
3.05	Connect compressed air. Verify compressed air is within manufacturers recommendations. (**5.6 bar to 10bar**).					S	SV/PE	JB 5/6/17	
3.06	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 5/6/17	
3.07	Ensure Limit Switches are installed and ready for wiring.					S	SV/PE	JB 5/6/17	
	MECH INSTALLATION COMPLETE								

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Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Energise compressed air and check for leaks.					S	SV/PE	JB 5/6/12	
4.02	Stroke the valve manually and ensure gearbox operating normally. Adjust stroke and speed if required.					W	PE	JB 5/6/12	
4.05	Check for damage and leave area tidy and clean for next discipline.					W	PE	JB 5/6/12	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Revis : A
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Date of Issue: 2.12

AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-111	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 2 SW FLUSH DISCHARGE VALVE				Tag Number:	FCV-626-24

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
	Actuator Type: Air actuator DN50					W	PE	JB 5/6/12	
	Serial No.:								
1.02	Valve issued as per specification/ purchase order					W	PE	JB 5/6/12	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm alignment and install valve making sure valve is securely tightened.					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Check manual handles have correct access and no restriction for operation					S	PE	JB 5/6/12	
3.01	**Actuator installation**								
3.01	If installing the actuator separately ensure valve is secure before fitting the actuator.					S			
3.02	Fit the actuator to valve as per vendor recommendations.					S			
3.03	Verify silences/speed adjustments are installed.					S	SV/PE	N/A	
3.04	Flush compressed airline.					S	SV/PE	JB 5/6/12	
3.05	Connect compressed air. Verify compressed air is within manufacturers recommendations. (**5.6 bar to 10bar**).					S	SV/PE	JB 5/6/12	
3.06	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 5/6/12	
3.07	Ensure Limit Switches are installed and ready for wiring.					S	SV/PE	JB 5/6/12	
	MECH INSTALLATION COMPLETE								

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Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.00	**Pre-commissioning**								
4.01	Energise compressed air and check for leaks.					S	SV/PE	JB 5/6/12	
4.02	Stroke the valve manually and ensure gearbox operating normally. Adjust stroke and speed if required.					W	PE	JB 5/6/12	
4.05	Check for damage and leave area tidy and clean for next discipline.					W	PE	JB 5/6/12	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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AIR ACTUATED VALVE >DN50 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV-Surveyor, PE – Project Engineer Sup-Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-107	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 2 SLUDGE DISCHARGE VALVE				Tag Number:	FCV-626-23

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Tyco - Keystone Model: VLV KGV F55 DN: 100mm With Air Actuator and Limit Switch Box					W	PE	JB 5/6/17	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10-16)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	Tyco Keystone O&M manual				S	PE	JB 5/6/17	
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
3.01	**Actuator installation**								
3.03	Verify silences/speed adjustments are installed.	NA				S	SV/PE	NA	
3.04	Connect compressed air and ensure isolated. Do not pressurise until pre-commissioning.	NA				S	SV/PE	JB 5/6/17	
3.05	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 1/1/6	
3.05	**MECH INSTALLATION COMPLETE**	NA				H	SV/PE	JB 5/6/17	
4.00	**Pre-commissioning**								

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Approved By: Tate Brammer

Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
4.01	Disconnect compressed air line. Energise compressed air and flush line. Adjust regulator to correct pressure **(Verify Max Compressed air Allowed).** Reconnect airline to valve.	NA				H	PE	JB 5/6/12	
4.02	Energise valve electrically following energisation procedure.	NA						JB 5/6/12	
4.02	Stroke the valve with air manually and ensure actuator is operating normally. Adjust stroke and speed if required.	NA				W	PE	JB 5/6/12	
4.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 5/6/12	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Revision: A
Approved By: Tate Brammer

Date c ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-200	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 1 FLOWMETER				Tag Number:	FIT-625-409

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
	Manufacturer: Endress & Hauser								
	Model: Promag P								
	Order Code: 50P65-EA1A1AA0KFAH								
	Serial No.: EC01292.0000								
1.01	k-FACTOR:					W	PE	JB 3/5	
	Size: DN65								
	Pressure rating: PN40								
	Temperature rating:								
	Protection: IP67								
1.02	Instrument issued as per specifications/ purchase order					W	PE	JB 3/5	
2.00	**Instrument installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Install the instrument upstream from fittings i.e. valves, tees, elbows etc. and ensure the correct inlet and outlet run is maintained as follows: ***Inlet run: ≥ 5xDN and Outlet run: ≥ 2xDN***	E&H Manual for Magflow Meter.				S			
2.03	Confirm flange alignment and install instrument making sure of correct bolting sequence and torques (20-44Nm).	NA				S			
2.04	Ensure bolts are well lubricated before torquing up.					S			
2.05	Install instruments with correct gaskets. **(3mm spiral wound gaskets)**	NA				S			

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 43 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **from E&H O&M manual**				S			
2.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 31/5	
2.08	Roll up and fasten the cable ready for electrical installation	NA				S			
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	
MECH INSTALLATION COMPLETE									

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

Revision: A
Approved By: Tate Brammer

Date c ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-201	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 2 FLOWMETER				Tag Number:	FIT-625-408

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser Model: Promag P Order Code: 50P65-EA1A1AA0KFAH Serial No.: EC012820000 k-FACTOR: Size: DN65 Pressure rating: PN40 Temperature rating: Protection: IP67					W	PE	JB 31/5	
1.02	Instrument issued as per specifications/ purchase order					W	PE	JB 31/5	
2.00	**Instrument Installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Install the instrument upstream from fittings i.e. valves, tees, elbows etc. and ensure the correct inlet and outlet run is maintained as follows: ***Inlet run: ≥ 5xDN and Outlet run: ≥ 2xDN***	E&H Manual for Magflow Meter.				S	SV/PE		
2.03	Confirm flange alignment and install instrument making sure of correct bolting sequence and torques (20-44Nm).	NA				S			
2.04	Ensure bolts are well lubricated before torquing up.					S			
2.05	Install instruments with correct gaskets. **(3mm spiral wound gaskets)**	NA				S			

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 43 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **from E&H O&M manual**				S	SV		
2.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	3B31/5	
2.08	Roll up and fasten the cable ready for electrical installation	NA				S			
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	3B 31/5	
MECH INSTALLATION COMPLETE									

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

Revision: A
Approved By: Tate Brammer

Date c ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-202	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 3 FLOWMETER				Tag Number:	FIT-625-410

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
	Manufacturer: Endress & Hauser								
	Model: Promag P								
	Order Code: 50P65-EA1A1AA0KFAH								
	Serial No.: F3012320000								
1.01	k-FACTOR:					W	PE	JB 3/5	
	Size: DN65								
	Pressure rating: PN40								
	Temperature rating:								
	Protection: IP67								
1.02	Instrument issued as per specifications/ purchase order					W	PE	JB 3/5	
2.00	**Instrument installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Install the instrument upstream from fittings i.e. valves, tees, elbows etc. and ensure the correct inlet and outlet run is maintained as follows: ***Inlet run: ≥ 5xDN and Outlet run: ≥ 2xDN***	E&H Manual for Magflow Meter.				S			
2.03	Confirm flange alignment and install instrument making sure of correct bolting sequence and torques (20-44Nm).	NA				S			
2.04	Ensure bolts are well lubricated before torquing up.					S			
2.05	Install instruments with correct gaskets. **(3mm spiral wound gaskets)**	NA				S			

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 43 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **from E&H O&M manual**				S	SV		
2.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 31/5	
2.08	Roll up and fasten the cable ready for electrical installation	NA				S			
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	
MECH INSTALLATION COMPLETE									

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

Revision: A
Approved By: Tate Brammer

Date Issue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-203	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 1 PRESSURE TRANSMITTER				Tag Number:	PIT-625-405

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser Model: Cerabar M Order Code: PMC51-V-JU2/0 Serial No.: ECQ8821128 Size: DN50 Pressure rating: PN40 Process Connection: DN50 PN10-40 B1, 316L flange EN1092-1					W	PE	JB 31/5	
1.02	Instrument issued as per specifications/ purchase order					W	PE	JB 31/5	
2.00	**Instrument installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm flange alignment and install instrument making sure of correct bolting sequence.	NA				S			
2.03	Ensure bolts are well lubricated before torquing up.					S			
2.04	Install instruments with correct gaskets. **(3mm spiral wound gaskets)**	NA				S			
2.05	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 160 Nm for 4 bolts**) Mark all bolts with an 'X' after	Refer to Flange Tightenging Procedure				S			
2.06	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 31/5	
2.07	Roll up and fasten the cable ready for electrical installation	NA				S			

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
2.08	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	31/5	
MECH INSTALLATION COMPLETE									

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

Revision: A
Approved By: Tate Brammer

Date c sue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-204	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 2 PRESSURE TRANSMITTER				Tag Number:	PIT-625-413

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser Model: Cerabar M Order Code: PMC51-V-JU2/0 Serial No.: ECO 921128 Size: DN50 Pressure rating: PN40 Process Connection: DN50 PN10-40 B1, 316L flange EN1092-1					W	PE	JB 31/5	
1.02	Instrument issued as per specifications/ purchase order					W	PE	JB 31/5	
2.00	**Instrument installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm flange alignment and install instrument making sure of correct bolting sequence.	NA				S			
2.03	Ensure bolts are well lubricated before torquing up.					S			
2.04	Install instruments with correct gaskets. **(3mm spiral wound gaskets)**	NA				S			
2.05	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 160 Nm for 4 bolts**) Mark all bolts with an 'X' after	Refer to Flange Tightenging Procedure				S			
2.06	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 31/5	
2.07	Roll up and fasten the cable ready for electrical installation	NA				S			

Revision: A
Approved By: Tate Brammer

Date of Issue: 13.02.12

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
2.08	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	
MECH INSTALLATION COMPLETE									

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

Revision: A
Approved By: Tate Brammer

Date issue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-205	Project Number:	8543				
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 3 PRESSURE TRANSMITTER					Tag Number:	PIT-625-419

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser Model: Cerabar M Order Code: PMC51-V-JU2/0 Serial No.: F3O02A21128 Size: DN50 Pressure rating: PN40 Process Connection: DN50 PN10-40 B1, 316L flange EN1092-1					W	PE	JB 31/5	
1.02	Instrument issued as per specifications/ purchase order					W	PE	JB 31/5	
2.00	**Instrument installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm flange alignment and install instrument making sure of correct bolting sequence.	NA				S			
2.03	Ensure bolts are well lubricated before torquing up.					S			
2.04	Install instruments with correct gaskets. **(3mm spiral wound gaskets)**	NA				S			
2.05	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 160 Nm for 4 bolts**) Mark all bolts with an 'X' after	Refer to Flange Tightenging Procedure				S			
2.06	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D185				W	PE	JB 31/5	
2.07	Roll up and fasten the cable ready for electrical installation	NA				S			

Revision: A
Approved By: Tate Brammer

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
2.08	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	28 31/5	
MECH INSTALLATION COMPLETE									

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

Revision: A
Approved By: Tate Brammer

Date o. ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-206	Project Number:	8543				
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 1 TEMPERATURE TRANSMITTER					Tag Number:	TIT-625-406

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser	E&H O&M Manual				W	PE	JB 31/5	
	Model: TR10-AMA1CASJB3000								SN: EC0247 14152
1.02	Instrument issued as per specifications/ purchase order - **verify instrument is not damaged.**					W	PE	JB 31/5	
2.00	**Instrument Installation**								
2.01	Connect TIT to measuring location using high temperature thread paste (PTFE) or yellow gas line teflon tape.	NA				S	SV		
2.02	Ensure bolts are cleaned and well lubricated before torquing.	NA				S	SV		
2.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 31/5	
2.04	Roll up and fasten the cable ready for electrical installation	NA				S	SV		
2.05	Check for damage and leave area tidy and clean for next discipline.	NA				W	SV		
2.06	**MECH INSTALLATION COMPLETE**	NA				H	SV		

APPROVAL			
	NAME	SIGNATURE	DATE
JH	Jane Beecher	JANE BEECHER	31/5/12

Revision: A
Approved By: Tate Brammer

Date o. ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-207	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 2 TEMPERATURE TRANSMITTER				Tag Number:	TIT-625-412

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser	E&H O&M Manual				W	PE	JB 31/5	
	Model: TR10-AMA1CASJB3000								SN: EC024914152
1.02	Instrument issued as per specifications/ purchase order - **verify instrument is not damaged.**					W	PE	JB 31/5	
2.00	**Instrument installation**								
2.01	Connect TIT to measuring location using high temperature thread paste (PTFE) or yellow gas line teflon tape.	NA				S			
2.02	Ensure bolts are cleaned and well lubricated before torquing.	NA				S			
2.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 31/5	
2.04	Roll up and fasten the cable ready for electrical installation	NA				S			
2.05	Check for damage and leave area tidy and clean for next discipline.	NA				W			
2.06	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	31/5/12

Revision: A
Approved By: Tate Brammer

Date o. ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-208	Project Number:	8543				
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 3 TEMPERATURE TRANSMITTER					Tag Number:	TIT-625-418

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser	E&H O&M Manual				W	PE	JB 31/5	
	Model: TR10-AMA1CASJB3000								SN: F3042B 14152
1.02	Instrument issued as per specifications/ purchase order - **verify instrument is not damaged.**					W	PE	JB31/5	
2.00	**Instrument Installation**								
2.01	Connect TIT to measuring location using high temperature thread paste (PTFE) or yellow gas line teflon tape.	NA				S			
2.02	Ensure bolts are cleaned and well lubricated before torquing.	NA				S			
2.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 31/5	
2.04	Roll up and fasten the cable ready for electrical installation	NA				S			
2.05	Check for damage and leave area tidy and clean for next discipline.	NA				W			
2.06	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	31/5/12

Revision: A
Approved By: Tate Brammer

Date o. sue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-209	Project Number:	8543			
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 1 SERVICE WATER DRAIN TEMPERATURE TRANSMITTER			Tag Number:		TT-626-01

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser Model: TR10-AHB1CESFBC000	E&H O&M Manual				W	PE	JB 31/5	SN: EC026114152
1.02	Instrument issued as per specifications/ purchase order - **verify instrument is not damaged.**					W	PE	JB 31/5	
2.00	**Instrument installation**								
2.01	Connect TIT to measuring location using high temperature thread paste (PTFE) or yellow gas line teflon tape.	NA				S			
2.02	Ensure bolts are cleaned and well lubricated before torquing.	NA				S			
2.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 31/5	
2.04	Roll up and fasten the cable ready for electrical installation	NA				S			
2.05	Check for damage and leave area tidy and clean for next discipline.	NA				W			
2.06	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	31/5/12

Revision: A
Approved By: Tate Brammer

Date o ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-210	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 2 SERVICE WATER DRAIN TEMPERATURE TRANSMITTER				Tag Number:	TT-626-02

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser Model: TR10-AHB1CESFBC000	E&H O&M Manual				W	PE	JB 31/5	SN: EC0262141 52
1.02	Instrument issued as per specifications/ purchase order - **verify instrument is not damaged.**					W	PE	JB 31/5	
2.00	**Instrument installation**								
2.01	Connect TIT to measuring location using high temperature thread paste (PTFE) or yellow gas line teflon tape.	NA				S			
2.02	Ensure bolts are cleaned and well lubricated before torquing.	NA				S			
2.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 31/5	
2.04	Roll up and fasten the cable ready for electrical installation	NA				S			
2.05	Check for damage and leave area tidy and clean for next discipline.	NA				W			
2.06	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	31/5/12

Revision: A
Approved By: Tate Brammer

Date o ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-211	Project Number:	8543				
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 1 SLUDGE OUTLET TEMPERATURE TRANSMITTER					Tag Number:	TT-626-04

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser	E&H O&M Manual				W	PE	JB 5/6/12	
	Model: TR10-AHB1CESFBC000								SN: EC026314152
1.02	Instrument issued as per specifications/ purchase order - **verify instrument is not damaged.**					W	PE	JB 5/6/12	
2.00	**Instrument installation**								
2.01	Connect TIT to measuring location using high temperature thread paste (PTFE) or yellow gas line teflon tape.	NA				S			
2.02	Ensure bolts are cleaned and well lubricated before torquing.	NA				S			
2.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
2.04	Roll up and fasten the cable ready for electrical installation	NA				S			
2.05	Check for damage and leave area tidy and clean for next discipline.	NA				W			
2.06	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

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Date o ue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-212	Project Number:	8543				
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 2 SLUDGE OUTLET TEMPERATURE TRANSMITTER					Tag Number:	TT-626-06

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record nameplate data - record any variances to below**								
1.01	Manufacturer: Endress & Hauser	E&H O&M Manual				W	PE	JB 5/6/12	
	Model: TR10-AHB1CESFBC000								SN: EC026414152
1.02	Instrument issued as per specifications/ purchase order - **verify instrument is not damaged.**					W	PE	JB 5/6/12	
2.00	**Instrument installation**								
2.01	Connect TIT to measuring location using high temperature thread paste (PTFE) or yellow gas line teflon tape.	NA				S	SW		
2.02	Ensure bolts are cleaned and well lubricated before torquing.	NA				S			
2.03	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 5/6/12	
2.04	Roll up and fasten the cable ready for electrical installation	NA				S			
2.05	Check for damage and leave area tidy and clean for next discipline.	NA				W			
2.06	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	5/6/12

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Date c ue: 13.02.12

MANUAL VALVE >DN80 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager
Checksheet No.:	8543-M-HX-300	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 1 INLET ISOLATION VALVE			Tag Number:		HV-625-419

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by S/C Key	S/C Resp.	S/C Sign/Date	JH Key	JH Resp.	JH Sign/Date	Remarks/Records
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Erhard Model: ERUK1 - Lugged Knife Gate Valve DN: 150mm Material: SS/CI Valve Class: GA21-H					W	PE	JB 31/5	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN150 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 203 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Stroke the valve manually, ensure valve opens and closes easily.	NA				W	PE	JB 31/5	
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	

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2.1	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6	
2.11	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	**SIGNATURE**	**DATE**
JH	JANE BEECHER	Jane Beecher	11/6/12

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Date c ue: 13.02.12

MANUAL VALVE >DN80 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager
Checksheet No.:	8543-M-HX-301	Project Number:	8543			
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP 2 INLET ISOLATION VALVE			Tag Number:	HV-625-424

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Erhard					W	PE	JB 31/5	
	Model: ERUK1 - Lugged Knife Gate Valve								
	DN: 200mm								
	Material: SS/CI								
	Valve Class: GA21-H								
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN200 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 258 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Stroke the valve manually, ensure valve opens and closes easily.	NA				W	PE	JB 31/5	
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	

2.1	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6		
2.11	**MECH INSTALLATION COMPLETE**	NA				H				

APPROVAL			
	NAME	**SIGNATURE**	**DATE**
JH	JANE BEECHER	Jane Beecher	11/6/12

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Date o ue: 13.02.12

MANUAL VALVE >DN80 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-302	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP 3 INLET ISOLATION VALVE			Tag Number:	HV-625-427	

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: Erhard					W	PE	JB 31/5	
	Model: ERUK1 - Lugged Knife Gate Valve								
	DN: 200mm								
	Material: SS/CI								
	Valve Class: GA21-H								
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN200 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 258 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Stroke the valve manually, ensure valve opens and closes easily.	NA				W	PE	JB 31/5	
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	

2.1	Equipment lables are in place and consistent with P&ID.	486/5/5-R7W105				W	PE	JB 11/6	
2.11	**MECH INSTALLATION COMPLETE**	NA				H	SV		

APPROVAL			
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JH	JANE BEECHER	Jane Beecher	11/6/12

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MANUAL VALVE >DN80 INSTALLATION CHECK SHEET			AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-303	Project Number:	8543				
EQUIPMENT DESCRIPTION:		DIGESTER FEED PUMP STATION DISCHARGE TO HX 2 VALVE				Tag Number:	HV-625-431

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: (Existing) Model: Lugged Knife Gate Valve DN: 100mm Material: SS/CI					W	PE	JB 31/5	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Stroke the valve manually, ensure valve opens and closes easily.	NA				W	PE	JB 31/5	
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	

2.1	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
2.11	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	**SIGNATURE**	**DATE**
JH	JANE BEECHER	Jane Beecher	11/6/12

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MANUAL VALVE >DN80 INSTALLATION CHECK SHEET		AREA:	DIGESTER FEED PUMP STATION			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-304	Project Number:	8543			
EQUIPMENT DESCRIPTION:	DIGESTER FEED PUMP STATION DISCHARGE TO HX 1 VALVE				Tag Number:	HV-625-432

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: (Existing) Model: Lugged Knife Gate Valve DN: 100mm Material: SS/CI					W	PE	JB 31/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Stroke the valve manually, ensure valve opens and closes easily.	NA				W	PE	JB 31/5	
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	

2.1	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
2.11	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	**SIGNATURE**	**DATE**
JH	JANE BEECHER	Jane Beecher	11/6/12

Revision: A
Approved By: Tate Brammer

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MANUAL VALVE >DN80 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-305	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 1 SLUDGE INLET ISOLATION VALVE				Tag Number:	HV-626-11

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: (Existing) Model: Lugged Knife Gate Valve DN: 100mm Material: SS/CI					W	PE	JB 31/5	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Check installation of limit switches and adjust accordingly to ensure that the valve flag is in contact with each proximity switch	NA				S	PE	JB 31/5	
2.09	Stroke the valve manually, ensure valve opens and closes easily. Check limits switches.	NA				W	PE	JB 31/5	

2.10	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	
2.11	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 1/6	
2.12	**MECH INSTALLATION COMPLETE**	NA				H			
3.00	**Pre-commissioning**								
3.01	Energise valve limits electrically following energisation procedure.	NA						JB 5/6/12	
3.02	Stroke the valve manually and ensure limit switches are communicating correctly	NA				W	PE	JB 5/6/12	
3.03	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 5/6/12	

APPROVAL			
	NAME	**SIGNATURE**	**DATE**
JH	JANE BEECHER	Jane Beecher	11/6/12

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Date c ue: 13.02.12

MANUAL VALVE >DN80 INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-306	Project Number:	8543			
EQUIPMENT DESCRIPTION:	HEAT EXCHANGER 1 SERVICE WATER INLET ISOLATION VALVE				Tag Number:	HV-626-16

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Valve issued as per specification/ purchase order					W	PE	JB 31/5	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm gasket type **(3mm insertion rubber)**	NA				S			
2.03	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.	NA				S			
2.04	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	NA				S			
2.05	Check manual handles (if applicable) have correct access and no restriction for operation	NA				S	PE		
2.06	Stroke valve manually.	NA				S			
2.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
2.08	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	
3.06	Ensure Limit Switches are installed and ready for wiring. **(IF REQUIRED)**	NA				S			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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Date o ue: 13.02.12

MANUAL VALVE >DN80 INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-307	Project Number:	8543			
EQUIPMENT DESCRIPTION:	HEAT EXCHANGERS CHLORINE DOSING BYPASS VALVE				Tag Number:	HV-626-20

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Valve issued as per specification/ purchase order					W	PE	JB 31/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm gasket type **(3mm insertion rubber)**	NA				S			
2.03	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.	NA				S			
2.04	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	NA				S			
2.05	Check manual handles (if applicable) have correct access and no restriction for operation	NA				S	PE		
2.06	Stroke valve manually.	NA				S			
2.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
2.08	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	
3.06	Ensure Limit Switches are installed and ready for wiring. **(IF REQUIRED)**	NA				S			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

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MANUAL VALVE >DN80 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	John Holland
Checksheet No.:	8543-M-HX-308	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 2 SLUDGE INLET ISOLATION VALVE				Tag Number:	HV-626-21

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: (Existing) Model: Lugged Knife Gate Valve DN: 100mm Material: SS/CI					W	PE	JB 31/5	
2.00	**Valve Installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Check installation of limit switches and adjust accordingly to ensure that the valve flag is in contact with each proximity switch	NA				S	PE	JB 5/6/12	
2.09	Stroke the valve manually, ensure valve opens and closes easily. Check limits switches.	NA				W	PE	JB 5/6/12	

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2.10	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 3/5	
2.11	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
2.12	**MECH INSTALLATION COMPLETE**	NA				H			
3.00	**Pre-commissioning**								
3.01	Energise valve limits electrically following energisation procedure.	NA						JB 5/6/12	
3.02	Stroke the valve manually and ensure limit switches are communicating correctly	NA				W	PE	JB 5/6/12	
3.03	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 5/6/12	

APPROVAL			
	NAME	**SIGNATURE**	**DATE**
JH	JANE BEECHER	Jane Beecher	11/6/12

Revision: A
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Date o ue: 13.02.12

MANUAL VALVE >DN80 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	8543-M-HX-309	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGER 2 SERVICE WATER INLET ISOLATION VALVE				Tag Number:	HV-626-26

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.01	Valve issued as per specification/ purchase order					W	PE	JB 31/5	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris	NA				S			
2.02	Confirm gasket type **(3mm insertion rubber)**	NA				S			
2.03	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.	NA				S			
2.04	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.	NA				S			
2.05	Check manual handles (if applicable) have correct access and no restriction for operation	NA				S	PE		
2.06	Stroke valve manually.	NA				S			
2.07	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 1/6	
2.08	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	
3.06	Ensure Limit Switches are installed and ready for wiring. **(IF REQUIRED)**	NA				S			

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12

Revision: A
Approved By: Nate Brammer

Date of Issue: 13.02.12

MANUAL VALVE >DN80 INSTALLATION CHECK SHEET			AREA:	HEAT EXCHANGERS			John Holland
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Flood Recovery	Inspection Key: W - Witness, H - Hold, S - Surveillance		Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager	
Checksheet No.:	**8543-M-HX-310**	Project Number:	8543				
EQUIPMENT DESCRIPTION:		HEAT EXCHANGERS SLUDGE OUTLET DRAIN VALVE				Tag Number:	HV-626-15

Item No.	Activity Details	REFERENCE DOCUMENT/ DRAWINGS	Verify or Test by						Remarks/Records
			S/C			JH			
			Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	
1.00	**Record Actuator nameplate data - record any variances to below**								
1.01	Manufacturer: (Existing) Model: Lugged Knife Gate Valve DN: 100mm Material: SS/CI					W	PE	JB 31/5	
2.00	**Valve installation**								
2.01	Check internal pipework and clear any debris					S			
2.02	Confirm gasket type **(SS316 spiral wound gasket rating DN100 PN10)**					S			
2.03	Check installation direction of valves and ensure it is as per vendor manual or arrow on valve body.					S			
2.04	Confirm flange alignment and install valve making sure of correct bolting sequence and torques.					S			
2.05	Ensure bolts are well lubricated before torquing up.					S			
2.06	Ensure bolts are torqued up as per spiral wound gasket methodology and torque rating (**Approx Torque per bolt 176 Nm for 8 bolts**) Mark all bolts with an 'X' after torquing completed.	Refer to Flange Tightenging Procedure **JHG-OXL-037.**				S			
2.07	Check manual handles have correct access and no restriction for operation	NA				S	PE	JB 31/5	
2.08	Stroke the valve manually, ensure valve opens and closes easily.	NA				W	PE	JB 5/6/12	
2.09	Check for damage and leave area tidy and clean for next discipline.	NA				W	PE	JB 31/5	

2.1	Equipment lables are in place and consistent with P&ID.	486/5/5-R7D177				W	PE	JB 11/6	
2.11	**MECH INSTALLATION COMPLETE**	NA				H			

APPROVAL			
	NAME	**SIGNATURE**	**DATE**
JH	JANE BEECHER	Jane Beecher	11/6/12

Revision: A
Approved By: Tate Brammer

Date issue: 13.02.12

INSTRUMENT INSTALLATION CHECK SHEET		AREA:	HEAT EXCHANGERS		
ITP ref. No:	8543-001-HX	Project:	Oxley WRP Heat Exchanger Upgrade	Inspection Key: W - Witness, H - Hold, S - Surveillance	Responsibility Key: SV- Supervisor, SV- Surveyor, PE – Project Engineer Sup- Superintendent PM- Project Manager
Checksheet No.:	8543-M-HX-700	Project Number:	8543		
EQUIPMENT DESCRIPTION:		INSTRUMENT INSTALLATION CHECK SHEET			

Tag Number	Description	Manufacturer	Model	Serial No.	Installed as per O&M	Set point	Additional Parameters Set & Attached	Test Operation	Remarks/Records
TI-62603	Heat Exchanger 1 Sludge Discharge Temperature Indicator	TEL-TRU	BC-350R	NA	✓	NA	NA	✓	
TI-62605	Heat Exchanger 2 Sludge Discharge Temperature Indicator	TEL-TRU	BC-350R	NA	✓	NA	NA	✓	
PI-62690	Heat Exchanger Chlorine dosing line pressure indicator	WIKA	NA	NA	✓	NA	NA	✓	

APPROVAL			
	NAME	SIGNATURE	DATE
JH	JANE BEECHER	Jane Beecher	11/6/12.

2.2.3. Electrical Checksheets

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OXLEY WWTP

FLOOD RECOVERY ZONE 3

Heat Exchanger

Electrical Installation Test Sheet

THE ENGINEERS, THE IDEAS, THE SOLUTIONS www.mpaeng.com.au

HEAD OFFICE	Unit 3/ 22-24 Strathwyn St Brendale Qld 4500	Tel: 07 3881 0722	Fax: 07 3881 0723
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TOWNSVILLE	14 Chaimberlane Crt Kirwan Qld 4817	Tel: 07 4723 6882	Fax: 07 4723 6585
SYDNEY	8 Charles St St Marys NSW 2760	Tel: 02 9623 7066	Fax: 02 9623 7166
MELBOURNE	Unit 10/64 Oakover Rd Preston Vic 3072	Tel: 03 9480 8006	Fax: 07 9416 8591

QLD Electrical Contractor Licence No 10423

Document Control

Identification	Project Name	CAMBI HEAT EXCHANGE UPGRADE	
	Job No.	19216 & 19323	
	Document Title	Heat Exchanger Electrical Installation Test Sheet	
	Associated Documents		
	Document Number		
	Client Reference		
	Path\File Name		
Authority	Written by	M.G	Control Systems Engineer
	Authorised by	D.D	Project Manager
	Client Authorisation		
Ownership	Copyright	Copyright © MPA Engineering Pty Ltd. ABN 77 011 069 533	
	Intellectual Property	MPA Engineering Pty Ltd asserts ownership of the intellectual property contained herein, and claims copyright and authorship. MPA Engineering Pty Ltd has and retains all rights of ownership and use of the material herein in its on-going business.	

Revision History

Rev	Date	By	Remarks	Checked
00	17 April 2012	MG	First Issue	

Contents

4. Tests Summary

ELECTRICAL FITOUT	N/A	Pass	Comments
6mm SDI (Minimum)fitted to line side of control fuses for high fault level takeoffs	✓		
Check surge arrestor line side cabling size	✓		
Check cable size with cable schedule		✓	
Check cable size with rating of CB	✓		
All control wiring ferruled as required		✓	
All control wiring numbers and colours as per drawings		✓	
Wiring looms to doors incorporates suitable slack	✓		
All terminal numbers fitted		✓	
Terminals randomly checked for tightness		✓	
Check contactors, O/L's and CB's are correct for particular operation	✓		
Check fuses for continuity		✓	
Check fuses for correct current rating		✓	
All indicators correct colour and voltage	✓		
All pushbuttons correct colour	✓		
Labels correct sizes, colours and wording			
All labels secured with screws			
All internal equipment labelled			
Ammeters and CT's correct range	✓		
CT test block fitted	✓		
Voltmeters correct range	✓		
Bolts fitted to incoming terminations	✓		
Phase separators and shrouds provided	✓		
Fit fuse cartridges		✓	
Sample check tightness of connections		✓	
All protective covers in place	✓		
All duct lid fitted		✓	
All pole fillers fitted	✓		
Lighting operation correct	✓		
Door limit switches operational	✓		
All doors are earthed		✓	
All escutcheons are earthed		✓	
C.T secondary's earthed	✓		
All transformer secondaries are earthed	✓		
All power supplies 0 Volts are earthed	✓		
Check correct screen connections of analog and VSD cable	✓		
Adjust O/L settings to motor current or minimum	✓		
Adjust timers to correct values	✓		
Adjust CB settings	✓		
Adjust RCD settings	✓		
Point to point wiring check completed		✓	

INSULATION RESISTANCE TESTS							
Before performing the insulation resistance tests, disconnect or isolate the MEN link, RCD earths and neutrals, surge arrestors and any equipment that could be damaged by the tests. Carry out the tests with the test instrument on the 1000 Volt range.							
INCOMERS INSULATION RESISTANCE TESTS – PASS CRITERIA IS > 1 MΩ							
Red – White		MΩ	White - Blue		MΩ	Red - Blue	MΩ
Red – Neutral	NA	MΩ	White - Neutral	NA	MΩ	Blue - Neutral	NA MΩ
Red – Earth		MΩ	White - Earth		MΩ	Blue - Earth	MΩ
Neutral – Earth		MΩ					
DISTRIBUTION INSULATION RESISTANCE TESTS – PASS CRITERIA IS > 1 MΩ							
Red – White		MΩ	White - Blue		MΩ	Red - Blue	MΩ
Red – Neutral	NA	MΩ	White - Neutral	NA	MΩ	Blue - Neutral	NA MΩ
Red – Earth		MΩ	White - Earth		MΩ	Blue - Earth	MΩ
Neutral – Earth		MΩ					
N/A:	**Pass:**		**Init:**			**Date:**	
Reconnect all equipment isolated for the insulation tests							

5. Test Completion Acceptance

NAME	COMPANY	LIC/REG NO	SIGNATURE	DATE
J. JORDAAN	MPA	PGE233425		05/06/2012.

6. APPENDIXES

AREA	CABLE ID	CABLE RUN FROM	CABLE RUN TO	CABLE TEST DATE	RED/WHITE	RED/BLUE	WHITE/BLUE	RED/EARTH	WHITE/EARTH	BLUE/EARTH	CONTROL CABLE MULTI-CORE	ANALOG CABLE	TEST SUMMARY	COMMENT
HEAT	FCU626 11-CO1	SLUDGE PLC	JB626 -11	4/6/12							✓			
Exchanger														
	FCU 62621-CO1	"	JB 626-21	4/6/12							✓			
NEW	FCU 62631-CO1	"	JB 626-31	4/6/12							✓			
NEW	FCU 62641-CO1	"	JB 626-41	4/6/12							✓			

Cable Schedule

mpa Engineering Pty Ltd

Project: John Holland Oxley Zone 3 Cable Testing
JOB NO: 19216 - CAMBI

CABLE IDENTIFIER				PHASE TESTING	TEST CABLES TO EARTH									
					ELECTRICAL CHECKS									
AREA	CABLE ID	CABLE RUN FROM	CABLE RUN TO	CABLE TEST DATE	RED/WHITE	RED/BLUE	WHITE/BLUE	RED/EARTH	WHITE/EARTH	BLUE/EARTH	CONTROL CABLE MULTI-CORE	ANALOG CABLE	TEST SUMMARY	COMMENT
Sludge Room	MCC-023-01 -P01/P02/P03	MCC-021-01	MCC-023-01	11/5/12	1000MΩ	1000MΩ	1000MΩ	1000MΩ	1000MΩ	1000MΩ			✓	
		MS	Busbar	"	"	"	"	"	"	"			✓	
		CO-625801 +VA1 THP	compressor	"	"	"	"	"	"	"			✓	
		CO-625802	"	"	"	"	"	"	"	"			✓	
		PU-625001	circ. pump 1	"	∞	∞	∞	∞	∞	∞			✓	
		PU-625001 MCB	VSD	"	"	"	"	"	"	"			✓	
		O-Q3+VA1	surge protection	"	"	"	"	"	"	"			✓	
		O-Q3+VA1	power meter	"	"	"	"	"	"	"			✓	
		PU-625002	circ. pump 2	"	"	"	"	"	"	"			✓	
		PU-625003	reactor feed pump 1	"	"	"	"	"	"	"			✓	
		PU-625004	reactor feed pump 2	"	"	"	"	"	"	"			✓	
		PU-625401	digester feed pump 1										✓	
		PU-625402	digester feed pump 2										✓	
		PU-625601	ejector 1 water pump										✓	
		PU-625602	ejektor 2 water pump										✓	
		O+UA6	anti cond. element										✓	
		PU-625403	digester feed pump 3										✓	

J. JORDAAN 11/5/2012

2.2.4. FAT Checksheets

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OXLEY WRP

FLOOD RECOVERY ZONE 3

Factory Acceptance Test – PLC & SCADA

Heat Exchanger Modification

THE ENGINEERS, THE IDEAS, THE SOLUTIONS www.mpaeng.com.au

HEAD OFFICE	Unit 3/ 22-24 Strathwyn St Brendale Qld 4500	Tel: 07 3881 0722	Fax: 07 3881 0723 Breakdown Service: 0411 221 446
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MELBOURNE	Unit 10/64 Oakover Rd Preston Vic 3072	Tel: 03 9480 8006	Fax: 07 9416 8591

Document Control			
Identification	Document Title	Factory Acceptance Test- PLC & SCADA	
	Document Subtitle	Oxley WRP Zone3 - Heat Exchanger Modification Control System FAT	
	Document Number	MPA-19323-FAT	
	Client Reference		
	Path\File Name		
Authority	Written by	M Garrosi	Control Systems Engineer
	Authorised by		
	Client Authorisation		
Ownership	Copyright	Copyright © MPA Engineering Pty Ltd. ABN 77 011 069 533	
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Revision History				
Rev	Date	By	Remarks	Checked
0.0	26 May 2012	MG		

CONTENTS

1. INTRODUCTION

1.1 General

The tests described below are designed to test the control and indication of the PLC & SCADA (control system). As the test will be done with simulation, and also on the switchboard, all the conditions could not be achieved. Problems may arise while conducting the tests as described; which may necessitate conducting of further tests not described herein. Any subsequent tests or notes should be documented in the space provided.

Any abnormalities with the operation of function of any of the equipment being tested shall be noted, even if not specifically covered by the test procedure. All devices shall be checked thoroughly for correct installation. Any items that may warrant attention must be noted in the space provided on each item's test plan.

1.2 Objectives

The Objective of this document is to provide a structured and detailed methodology to allow the Testing Officer to fully and methodically test the functionality of the Oxley WRP – Sludge PLC – Heat Exchanger Units. In addition this document is used to record all the results that are observed during the execution of this protocol. Completion of these test sequences verifies the basic unit functionality of each inspected device as well as the higher level automation that ties together the devices as a collective as detailed.

1.3 Scope

The scope of this document is the testing of device standard operational/status aspects in the PLC/SCADA. Higher level automation of each plant module as required for the process control including process set-points and alarms will be tested on site and appropriate SAT document will be provided.

1.4 Reference Table

Name	Details
Oxley WRP FDS	Functional Description

1.5 Defect Notice

Non-conforming items should be rectified immediately if possible. If the defect is not the responsibility of the tester, then a defect notice should be provided to the appropriate person(s). A defect notice template is supplied in the next section.

A copy of the defect report shall be given to the manufacturer, supplier or subcontractor and they shall take corrective action in time for the date of re-inspection or advise in writing that the defect report is disputed and include the reason(s).

1.6 Defect Notice Template

PROJECT: Oxley WRP Flood Recovery Zone 3				
INSPECTION LOCATION:				
INSPECTOR:				
Sect. No.	Insp. No.	Date	Defect Description	Corrected Date & Signature
RECOMMENDATIONS:				
RE-INSPECTION DATE:				

2. TEST SUMMARY

2.1 Test Method Description

The following sections describe the method of testing the system. The tests procedures are described in a numerically logical order, but do not necessarily have to be performed in this order, and several testing points can be combined and conducted at the same time.

Prior to conducting the test, it's very important to check all Electrical and Mechanical test sheet(s) and/or check list(s) that should indicate the readiness of all installed equipment. (In case the test are for installed equipment)

During the test, it's a common practice to start looking for ways that the code could be improved, and for areas that could be a source of potential problems; in order to optimize the operation – as such cannot be achieved to fullest at design and programming stages.

2.2 I/O Test:

Devices should be activated/driven to give the corresponding I/O's. When it's not possible, it should be simulated. Either way, the PLC corresponding I/O should be noted for correct configuration, tagging and description.

Alarm and fault digital statuses are fail-safe wherever applicable. Hence, input should be ON to indicate healthy status. Analogue scaling values (minimum and maximum) should be logged in the PLC and recorded here.

2.2.3 Digital Inputs:

Address	Symbol	Description	Test	comment
I32.2	SLG01ZSC62613diClosed	Valve Closed		
I32.3	SLG01ZSC62613diOpened	Valve Opened		
I32.4	SLG01ZSC62614diClosed	Valve Closed		
I32.5	SLG01ZSC62614diOpened	Valve Opened		
I32.6	SLG01ZSC62623diClosed	Valve Closed		
I32.7	SLG01ZSC62623diOpened	Valve Opened		
I33.0	SLG01ZSC62624diClosed	Valve Closed		
I33.1	SLG01ZSC62624diOpened	Valve Opened		
I33.2	SLG01ZSC62690diClosed	Valve Closed		
I33.3	SLG01ZSC62690diOpened	Valve Opened		
I33.4	SLG01ZSC62694diClosed	Valve Closed		
I33.5	SLG01ZSC62694diOpened	Valve Opened		

2.2.4 Digital Outputs:

Address	Symbol	Description	Test	comment
Q9.0	SLG01FCV62613doOpen	Open Valve		
Q9.1	SLG01FCV62614doOpen	Open Valve		
Q9.2	SLG01FCV62623doOpen	Open Valve		
Q9.3	SLG01FCV62624doOpen	Open Valve		
Q9.4	SLG01FCV62690doOpen	Open Valve		
Q9.5	SLG01FCV62694doOpen	Open Valve		

2.3 Heat Exchanger 1 Sludge Outlet Auto Valve FCV-626-13

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable				
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened				
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed				
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time				
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time				
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time				
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time				Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.4 Heat Exchanger 1 Auto Flush Drain Valve FCV-626-14

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable				
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened				
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed				
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time				
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time				
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time				
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time				Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.5 Heat Exchanger 1 Service Water Auto Flush Inlet Valve FCV-626-90

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable				
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened				
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed				
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time				
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time				
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time				
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time				Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.6 Heat Exchanger 2 Sludge Outlet Auto Valve FCV-626-23

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable				
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened				
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed				
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time				
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time				
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time				
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time				Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.7 Heat Exchanger 2 Auto Flush Drain Valve FCV-626-24

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable				
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened				
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed				
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time				
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time				
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time				
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time				Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.8 Heat Exchanger 2 Service Water Auto Flush Inlet Valve FCV-626-94

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable				
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened				
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed				
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time				
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time				
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time				
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time				Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.9 Automatic Control

The purpose of this section is to verify that correct function is given by all equipment in accordance with the control philosophy. It involves testing/running the equipment in Automatic Mode.

2.9.1 Heat Exchanger 1 Normal Operation

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62613 FCV62614 FCV62690 FCV62604 - The Inlet Hand Valve set to Open - The associated Instruments are available: TT62601 TT62604 - The Auto Flush Valves in closed position	-	Heat Exchanger Available				
2	Heat Exchanger Available	- Set Heat Exchanger Online	- Heat Exchanger Online - Sludge Outlet Valve Shall be opened				
3	Heat Exchanger is Online	- Set Heat Exchanger Offline	- Sludge Outlet Valve Shall be Closed				
4	Heat Exchanger is Online	Simulate one of following items: - FCV62613 in Manual or Faulty - FCV62614 in Manual or Faulty - FCV62690 in Manual or Faulty - FCV62604 in Manual or Faulty - The Inlet Hand Valve set to closed - TT62601 Faulty - TT62604 Faulty - FCV62614 Open - FCV62690 Open	- Heat Exchanger Offline - Heat Exchanger Unavailable				

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
5	- Heat Exchanger Unavailable	-Set Heat Exchanger Online	- Heat Exchanger Offline				
6	- Heat Exchanger Online - TT62601 not in High Level - TT62604 not in High Level - At least one of the digester inlet control valves is open - FCV62613 is open	-	- Digester feed pump 1 Interlock is healthy - Digester feed pump 2 Interlock is healthy				
7	- Digester feed pump 1 Interlock is healthy - Digester feed pump 2 Interlock is healthy	Simulate one of following items: - Heat Exchanger Offline - TT62601 High Level Alarm - TT62604 High Level Alarm - Close all the digester inlet control valves - Close FCV62613	- Digester feed pump 1 Interlock is not healthy - Digester feed pump 2 Interlock is not healthy				
8	- Heat Exchanger Online - Feed Pump 1 or 2 Interlock is Healthy - Pump 1 or 2 is Running	- Simulate the Sludge Outlet Temperature (Process Variable) higher than Setpoint	- Heat Exchanger Cooling Water Flow Control Valve Shall attempt to touch the setpoint				
9							
10							
11							
12							
13							
14							
15							

Note:

2.9.2 Heat Exchanger 2 Normal Operation

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62623 FCV62624 FCV62694 FCV62606 - The Inlet Hand Valve set to Open - The associated Instruments are available: TT62602 TT62606 - The Auto Flush Valves in closed position	-	Heat Exchanger Available				
2	Heat Exchanger Available	- Set Heat Exchanger Online	- Heat Exchanger Online - Sludge Outlet Valve Shall be opened				
3	Heat Exchanger is Online	- Set Heat Exchanger Offline	- Sludge Outlet Valve Shall be Closed				
4	Heat Exchanger is Online	Simulate one of following items: - FCV62623 in Manual or Faulty - FCV62624 in Manual or Faulty - FCV62694 in Manual or Faulty - FCV62606 in Manual or Faulty - The Inlet Hand Valve set to closed - TT62602 Faulty - TT62606 Faulty - FCV62624 Open - FCV62694 Open	- Heat Exchanger Offline - Heat Exchanger Unavailable				
5	- Heat Exchanger Unavailable	-Set Heat Exchanger Online	- Heat Exchanger Offline				
6	- Heat Exchanger Online - TT62602 not in High Level - TT62606 not in High Level - At least one of the digester inlet control valves is open - FCV62623 is open	-	- Digester feed pump 2 Interlock is healthy - Digester feed pump 3 Interlock is healthy				

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
7	- Digester feed pump 2 Interlock is healthy - Digester feed pump 3 Interlock is healthy	Simulate one of following items: - Heat Exchanger Offline - TT62602 High Level Alarm - TT62606 High Level Alarm - Close all the digester inlet control valves - Close FCV62623	- Digester feed pump 2 Interlock is not healthy - Digester feed pump 3 Interlock is not healthy				
8	- Heat Exchanger Online - Feed Pump 2 or 3 Interlock is Healthy - Pump 2 or 3 is Running	- Simulate the Sludge Outlet Temperature (Process Variable) higher than Setpoint	- Heat Exchanger Cooling Water Flow Control Valve Shall attempt to touch the setpoint				
9							
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14							
15							
Note:							

2.9.3 Heat Exchanger 1 Flush Control

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62613 FCV62614 FCV62690 FCV62604 - Heat Exchanger Offline	-	Heat Exchanger Flush Available				
2	- Heat Exchanger Flush Available	- Set Heat Exchanger Flush to Manual Mode - Set Flush Time Setpoint to 1 Min - Start Flush Sequence Manually	- Flush Sequence Starts and goes to step 1				
3	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2				
4	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3				
5	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4				
6	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5				
7	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6				
8	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7				
9	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8				
10	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed				
11	- Heat Exchanger Online - Heat Exchanger Flush Available - Heat Exchanger Flush On Remote/Auto Mode	- Set the Heat Exchanger to Offline Mode	- Flush Sequence Starts and goes to step 1				

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
12	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2				
13	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3				
14	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4				
15	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5				
16	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6				
17	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7				
18	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8				
19	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed				
20							
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26							

Note:

2.9.4 Heat Exchanger 2 Flush Control

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62613 FCV62614 FCV62690 FCV62604 - Heat Exchanger Offline	-	Heat Exchanger Flush Available				
2	- Heat Exchanger Flush Available	- Set Heat Exchanger Flush to Manual Mode - Set Flush Time Setpoint to 1 Min - Start Flush Sequence Manually	- Flush Sequence Starts and goes to step 1				
3	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2				
4	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3				
5	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4				
6	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5				
7	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6				
8	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7				
9	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8				
10	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed				
11	- Heat Exchanger Online - Heat Exchanger Flush Available - Heat Exchanger Flush On Remote/Auto Mode	- Set the Heat Exchanger to Offline Mode	- Flush Sequence Starts and goes to step 1				

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
12	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2				
13	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3				
14	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4				
15	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5				
16	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6				
17	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7				
18	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8				
19	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed				
20							
21							
22							
23							
24							
25							
26							

Note:

2.9.5 SCADA Alarms

No.	Description	SCADA Tag	PLC Check	SCADA Check	Client Check	Comment
1	Heat Exchanger 1 Sludge Outlet Auto Valve Fail to Close	ST022HYD01FCV62613dsF2Close				
2	Heat Exchanger 1 Sludge Outlet Auto Valve Fail to Open	ST022HYD01FCV62613dsF2Open				
3	Heat Exchanger 1 Auto Flush Drain Valve Fail to Close	ST022HYD01FCV62614dsF2Close				
4	Heat Exchanger 1 Auto Flush Drain Valve Fail to Open	ST022HYD01FCV62614dsF2Open				
5	Heat Exchanger 2 Sludge Outlet Auto Valve Fail to Close	ST022HYD01FCV62623dsF2Close				
6	Heat Exchanger 2 Sludge Outlet Auto Valve Fail to Open	ST022HYD01FCV62623dsF2Open				
7	Heat Exchanger 2 Auto Flush Drain Valve Fail to Close	ST022HYD01FCV62624dsF2Close				
8	Heat Exchanger 2 Auto Flush Drain Valve Fail to Open	ST022HYD01FCV62624dsF2Open				
9	Heat Exchanger 1 SW Auto Flush Inlet Valve Fail to Close	ST022HYD01FCV62690dsF2Close				
10	Heat Exchanger 1 SW Auto Flush Inlet Valve Fail to Open	ST022HYD01FCV62690dsF2Open				
11	Heat Exchanger 2 SW Auto Flush Inlet Valve Fail to Close	ST022HYD01FCV62694dsF2Close				
12	Heat Exchanger 2 SW Auto Flush Inlet Valve Fail to Open	ST022HYD01FCV62694dsF2Open				
13						
14						
15						

Note:

2.9.6 SCADA Trends

No.	Description	SCADA Tag	PLC Check	SCADA Check	Client Check	Comment
1						
2						
3						
4						
5						

Note:

3. TEST COMPLETION ACCEPTANCE

NAME	POSITION	COMPANY	SIGNATURE	DATE

mpa **Engineering Pty Ltd**

Specialists in Machine Plant Automation

OXLEY WRP

FLOOD RECOVERY ZONE 3

Factory Acceptance Test – PLC & SCADA

Heat Exchanger Modification

THE ENGINEERS, THE IDEAS, THE SOLUTIONS www.mpaeng.com.au

HEAD OFFICE 221 446	Unit 3/ 22-24 Strathwyn St Brendale Qld 4500	Tel: 07 3881 0722	Fax: 07 3881 0723 Breakdown Service: 0411
IPSWICH	117 Toongarra Rd Ipswich Qld 4305	Tel: 07 3813 7100	Fax: 07 3813 7199
TOWNSVILLE	14 Chaimberlane Crt Kirwan Qld 4817	Tel: 07 4723 6882	Fax: 07 4723 6585
SYDNEY	8 Charles St St Marys NSW 2760	Tel: 02 9623 7066	Fax: 02 9623 7166
MELBOURNE	Unit 10/64 Oakover Rd Preston Vic 3072	Tel: 03 9480 8006	Fax: 07 9416 8591

Document Control			
Identification	Document Title	Factory Acceptance Test- PLC & SCADA	
	Document Subtitle	Oxley WRP Zone3 - Heat Exchanger Modification Control System FAT	
	Document Number	MPA-19323-FAT	
	Client Reference		
	Path\File Name		
Authority	Written by	M Garrosi	Control Systems Engineer
	Authorised by		
	Client Authorisation		
Ownership	Copyright	Copyright © MPA Engineering Pty Ltd. ABN 77 011 069 533	
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Revision History

Rev	Date	By	Remarks	Checked
0.0	26 May 2012	MG		

CONTENTS

1. INTRODUCTION

1.1 General

The tests described below are designed to test the control and indication of the PLC & SCADA (control system). As the test will be done with simulation, and also on the switchboard, all the conditions could not be achieved. Problems may arise while conducting the tests as described; which may necessitate conducting of further tests not described herein. Any subsequent tests or notes should be documented in the space provided.

Any abnormalities with the operation of function of any of the equipment being tested shall be noted, even if not specifically covered by the test procedure. All devices shall be checked thoroughly for correct installation. Any items that may warrant attention must be noted in the space provided on each item's test plan.

1.2 Objectives

The Objective of this document is to provide a structured and detailed methodology to allow the Testing Officer to fully and methodically test the functionality of the Oxley WRP – Sludge PLC – Heat Exchanger Units. In addition this document is used to record all the results that are observed during the execution of this protocol. Completion of these test sequences verifies the basic unit functionality of each inspected device as well as the higher level automation that ties together the devices as a collective as detailed.

1.3 Scope

The scope of this document is the testing of device standard operational/status aspects in the PLC/SCADA. Higher level automation of each plant module as required for the process control including process set-points and alarms will be tested on site and appropriate SAT document will be provided.

1.4 Reference Table

Name	Details
Oxley WRP FDS	Functional Description

1.5 Defect Notice

Non-conforming items should be rectified immediately if possible. If the defect is not the responsibility of the tester, then a defect notice should be provided to the appropriate person(s). A defect notice template is supplied in the next section.

A copy of the defect report shall be given to the manufacturer, supplier or subcontractor and they shall take corrective action in time for the date of re-inspection or advise in writing that the defect report is disputed and include the reason(s).

1.6 Defect Notice Template

PROJECT: Oxley WRP Flood Recovery Zone 3

INSPECTION LOCATION:

INSPECTOR:

Sect. No.	Insp. No.	Date	Defect Description	Corrected Date & Signature
		30/5/12	TT62604 + TT62606 @ HIGH HIGH ALARM ACTIVIATES DIG. FEED PUMP INTERLOCK.	
		30/5/12	GRAPHIC COMMON BOX TO INCLUDE PUMP 3.	
		30/5/12	FLUSH CYCLE TIME EXCEEDED ALARM FLUSHING TIME SP + SET PERIOD.	

RECOMMENDATIONS:

RE-INSPECTION DATE:

2. TEST SUMMARY

2.1 Test Method Description

The following sections describe the method of testing the system. The tests procedures are described in a numerically logical order, but do not necessarily have to be performed in this order, and several testing points can be combined and conducted at the same time.

Prior to conducting the test, it's very important to check all Electrical and Mechanical test sheet(s) and/or check list(s) that should indicate the readiness of all installed equipment. (In case the test are for installed equipment)

During the test, it's a common practice to start looking for ways that the code could be improved, and for areas that could be a source of potential problems; in order to optimize the operation – as such cannot be achieved to fullest at design and programming stages.

2.2 I/O Test:

Devices should be activated/driven to give the corresponding I/O's. When it's not possible, it should be simulated. Either way, the PLC corresponding I/O should be noted for correct configuration, tagging and description.

Alarm and fault digital statuses are fail-safe wherever applicable. Hence, input should be ON to indicate healthy status. Analogue scaling values (minimum and maximum) should be logged in the PLC and recorded here.

2.2.3 Digital Inputs:

Address	Symbol	Description	Test	comment
I32.2	SLG01ZSC62613diClosed	Valve Closed		
I32.3	SLG01ZSC62613diOpened	Valve Opened		
I32.4	SLG01ZSC62614diClosed	Valve Closed		
I32.5	SLG01ZSC62614diOpened	Valve Opened		
I32.6	SLG01ZSC62623diClosed	Valve Closed		
I32.7	SLG01ZSC62623diOpened	Valve Opened		
I33.0	SLG01ZSC62624diClosed	Valve Closed		
I33.1	SLG01ZSC62624diOpened	Valve Opened		
I33.2	SLG01ZSC62690diClosed	Valve Closed		
I33.3	SLG01ZSC62690diOpened	Valve Opened		
I33.4	SLG01ZSC62694diClosed	Valve Closed		
I33.5	SLG01ZSC62694diOpened	Valve Opened		

2.2.4 Digital Outputs:

Address	Symbol	Description	Test	comment
Q9.0	SLG01FCV62613doOpen	Open Valve		
Q9.1	SLG01FCV62614doOpen	Open Valve		
Q9.2	SLG01FCV62623doOpen	Open Valve		
Q9.3	SLG01FCV62624doOpen	Open Valve		
Q9.4	SLG01FCV62690doOpen	Open Valve		
Q9.5	SLG01FCV62694doOpen	Open Valve		

2.3 Heat Exchanger 1 Sludge Outlet Auto Valve FCV-626-13

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable	✓	✓		
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened	✓	✓		
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed	✓	✓		
* 4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time	✓	✓		
* 5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time	✓	✓		
* 6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		
* 7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.4 Heat Exchanger 1 Auto Flush Drain Valve FCV-626-14

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable	✓	✓		
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened	✓	✓		
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed	✓	✓		
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time	✓	✓		
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time	✓	✓		
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		Valve Control Standard Function needs to be modified
8							
9							
10							

Note: VALVE LIMIT FAULT RESULTS IN UNDEFINED STATUS. (OVERWRITING TEXTS)

2.5 Heat Exchanger 1 Service Water Auto Flush Inlet Valve FCV-626-90

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable	✓	✓		
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened	✓	✓		
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed	✓	✓		
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time	✓	✓		
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time	✓	✓		
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.6 Heat Exchanger 2 Sludge Outlet Auto Valve FCV-626-23

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable	✓	✓		
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened	✓	✓		
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed	✓	✓		
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time	✓	✓		
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time	✓	✓		
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.7 Heat Exchanger 2 Auto Flush Drain Valve FCV-626-24

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable	✓	✓		
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened	✓	✓		
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed	✓	✓		
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time	✓	✓		
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time	✓	✓		
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.8 Heat Exchanger 2 Service Water Auto Flush Inlet Valve FCV-626-94

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	Device Available	Simulate a Fault	Device Unavailable	✓	✓		
2	In Remote Manual Mode, No Fault Condition	Manual Open Command	Valve Opened	✓	✓		
3	In Remote Manual Mode, No Fault Condition	Manual Close Command	Valve Closed	✓	✓		
4	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Open Command Open Feedback Inactive	Failed to Open Alarm after delay time	✓	✓		
5	In Remote Manual Mode, No Fault Condition Set fail 2 Open Timer (10s)	Manual Close Command Close Feedback Inactive	Failed to Close Alarm after delay time	✓	✓		
6	No Fault Condition	Simulate Both Open and Close feedbacks inactive	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		
7	No Fault Condition	Simulate Both Open and Close feedbacks active	Fail to close or Fail to open Alarm shall raise after Delay time	✓	✓		Valve Control Standard Function needs to be modified
8							
9							
10							

Note:

2.9 Automatic Control

The purpose of this section is to verify that correct function is given by all equipment in accordance with the control philosophy. It involves testing/running the equipment in Automatic Mode.

2.9.1 Heat Exchanger 1 Normal Operation

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62613 FCV62614 FCV62690 FCV62604 - The Inlet Hand Valve set to Open - The associated Instruments are available: TT62601 TT62604 - The Auto Flush Valves in closed position	-	Heat Exchanger Available	✓	✓		
2	Heat Exchanger Available	- Set Heat Exchanger Online	- Heat Exchanger Online - Sludge Outlet Valve Shall be opened	✓	✓		
3	Heat Exchanger is Online	- Set Heat Exchanger Offline	- Sludge Outlet Valve Shall be Closed	✓	✓		
4	Heat Exchanger is Online	Simulate one of following items: - FCV62613 in Manual or Faulty ✓ - FCV62614 in Manual or Faulty ✓ - FCV62690 in Manual or Faulty ✓ - FCV62604 in Manual or Faulty ✓ - The Inlet Hand Valve set to closed ✓ - TT62601 Faulty ✓ - TT62604 Faulty ✓ - FCV62614 Open ✓ - FCV62690 Open ✓	- Heat Exchanger Offline - Heat Exchanger Unavailable	✓	✓		

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
5	- Heat Exchanger Unavailable	-Set Heat Exchanger Online	- Heat Exchanger Offline	✓	✓		
6	- Heat Exchanger Online - TT62601 not in High Level - TT62604 not in High Level - At least one of the digester inlet control valves is open - FCV62613 is open	-	- Digester feed pump 1 Interlock is healthy - Digester feed pump 2 Interlock is healthy	✓	✓		
* 7	- Digester feed pump 1 Interlock is healthy - Digester feed pump 2 Interlock is healthy	Simulate one of following items: - Heat Exchanger Offline - TT62601 High Level Alarm - TT62604 High Level Alarm - Close all the digester inlet control valves - Close FCV62613	- Digester feed pump 1 Interlock is not healthy - Digester feed pump 2 Interlock is not healthy	✓	✓		TT62604 HIGH HIGH TO ACTIVATE PUMP INTERLOCK. JB 30/5/12
8	- Heat Exchanger Online - Feed Pump 1 or 2 Interlock is Healthy - Pump 1 or 2 is Running	- Simulate the Sludge Outlet Temperature (Process Variable) higher than Setpoint	- Heat Exchanger Cooling Water Flow Control Valve Shall attempt to touch the setpoint	✓	✓		
9							
10							
11							
12							
13							
14							
15							

Note:

2.9.2 Heat Exchanger 2 Normal Operation

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62623 FCV62624 FCV62694 FCV62606 - The Inlet Hand Valve set to Open - The associated Instruments are available: TT62602 TT62606 - The Auto Flush Valves in closed position	-	Heat Exchanger Available	✓	✓		
2	Heat Exchanger Available	- Set Heat Exchanger Online	- Heat Exchanger Online - Sludge Outlet Valve Shall be opened	✓	✓		
3	Heat Exchanger is Online	- Set Heat Exchanger Offline	- Sludge Outlet Valve Shall be Closed	✓	✓		
4	Heat Exchanger is Online	Simulate one of following items: - FCV62623 in Manual or Faulty - FCV62624 in Manual or Faulty - FCV62694 in Manual or Faulty - FCV62606 in Manual or Faulty - The Inlet Hand Valve set to closed - TT62602 Faulty - TT62606 Faulty - FCV62624 Open - FCV62694 Open	- Heat Exchanger Offline - Heat Exchanger Unavailable	✓	✓		
5	- Heat Exchanger Unavailable	-Set Heat Exchanger Online	- Heat Exchanger Offline	✓	✓		
6	- Heat Exchanger Online - TT62602 not in High Level - TT62606 not in High Level - At least one of the digester inlet control valves is open - FCV62623 is open	-	- Digester feed pump 2 Interlock is healthy - Digester feed pump 3 Interlock is healthy	✓	✓		

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
7	- Digester feed pump 2 Interlock is healthy - Digester feed pump 3 Interlock is healthy	Simulate one of following items: - Heat Exchanger Offline - TT62602 High Level Alarm - TT62606 High Level Alarm - Close all the digester inlet control valves - Close FCV62623	- Digester feed pump 2 Interlock is not healthy - Digester feed pump 3 Interlock is not healthy	✓	✓		SAME AS SECT 2.9.1 LINE ITEM 7. JB 30/5/12
8	- Heat Exchanger Online - Feed Pump 2 or 3 Interlock is Healthy - Pump 2 or 3 is Running	- Simulate the Sludge Outlet Temperature (Process Variable) higher than Setpoint	- Heat Exchanger Cooling Water Flow Control Valve Shall attempt to touch the setpoint	✓	✓		
9							
10							
11							
12							
13							
14							
15							

Note:

2.9.3 Heat Exchanger 1 Flush Control

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62613 FCV62614 FCV62690 FCV62604 - Heat Exchanger Offline	-	Heat Exchanger Flush Available	✓	✓		
2	- Heat Exchanger Flush Available	- Set Heat Exchanger Flush to Manual Mode - Set Flush Time Setpoint to 1 Min - Start Flush Sequence Manually	- Flush Sequence Starts and goes to step 1	✓	✓		
3	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2	✓	✓		
4	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3	✓	✓		
5	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4	✓	✓		
6	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5	✓	✓		
7	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6	✓	✓		
8	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7	✓	✓		
9	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8	✓	✓		
10	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed	✓	✓		
11	- Heat Exchanger Online - Heat Exchanger Flush Available - Heat Exchanger Flush On Remote/Auto Mode	- Set the Heat Exchanger to Offline Mode	- Flush Sequence Starts and goes to step 1	✓	✓		

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
12	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2	✓	✓		
13	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3	✓	✓		
14	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4	✓	✓		
15	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5	✓	✓		
16	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6	✓	✓		
17	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7	✓	✓		
18	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8	✓	✓		
19	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed	✓	✓		
20							
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23							
24							
25							
26							

Note:

2.9.4 Heat Exchanger 2 Flush Control

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
1	- All associated devices are available in Remote Auto: FCV62613 FCV62614 FCV62690 FCV62604 - Heat Exchanger Offline	-	Heat Exchanger Flush Available	✓	✓		
2	- Heat Exchanger Flush Available	- Set Heat Exchanger Flush to Manual Mode - Set Flush Time Setpoint to 1 Min - Start Flush Sequence Manually	- Flush Sequence Starts and goes to step 1	✓	✓		
3	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2	✓	✓		
4	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3	✓	✓		
5	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4	✓	✓		
6	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5	✓	✓		
7	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6	✓	✓		
8	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7	✓	✓		
9	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8	✓	✓		
10	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed	✓	✓		
11	- Heat Exchanger Online - Heat Exchanger Flush Available - Heat Exchanger Flush On Remote/Auto Mode	- Set the Heat Exchanger to Offline Mode	- Flush Sequence Starts and goes to step 1	✓	✓		

No.	Pre-condition	Action	Response	PLC Check	SCADA Check	Client Check	Comment
12	- Flush Sequence in Step 1	Simulate Digester Pump Permissive: - Digester Feed Pump 1 not Running - Digester Feed Pump 2 not Running - FCV62523 is Closed - FCV62533 is Closed	- Flush Sequence goes to Step 2	✓	✓		
13	- Flush Sequence in Step 2	- Sim Digester Outlet Valve Closed	- Flush Sequence goes to Step 3	✓	✓		
14	- Flush Sequence in Step 3	- Sim Flush Drain Valve Opened	- Flush Sequence goes to Step 4	✓	✓		
15	- Flush Sequence goes to Step 4	- Sim Flush Inlet Valve Opened	- Flush Sequence goes to Step 5	✓	✓		
16	- Flush Sequence goes to Step 5	- Wait for 1 Min (Flush Time Setpoint)	- Flush Sequence goes to Step 6	✓	✓		
17	- Flush Sequence goes to Step 6	- Sim Flush Inlet Valve Closed	- Flush Sequence goes to Step 7	✓	✓		
18	- Flush Sequence goes to Step 7	- Sim Flush Drain Valve Closed	- Flush Sequence goes to Step 8	✓	✓		
19	- Flush Sequence goes to Step 8	-	- Flush Sequence Completed	✓	✓		
20							
21							
22							
23							
24							
25							
26							

Note:

2.9.5 SCADA Alarms

No.	Description	SCADA Tag	PLC Check	SCADA Check	Client Check	Comment
1	Heat Exchanger 1 Sludge Outlet Auto Valve Fail to Close	ST022HYD01FCV62613dsF2Close	✓	✓		
2	Heat Exchanger 1 Sludge Outlet Auto Valve Fail to Open	ST022HYD01FCV62613dsF2Open	✓	✓		
3	Heat Exchanger 1 Auto Flush Drain Valve Fail to Close	ST022HYD01FCV62614dsF2Close	✓	✓		
4	Heat Exchanger 1 Auto Flush Drain Valve Fail to Open	ST022HYD01FCV62614dsF2Open	✓	✓		
5	Heat Exchanger 2 Sludge Outlet Auto Valve Fail to Close	ST022HYD01FCV62623dsF2Close	✓	✓		
6	Heat Exchanger 2 Sludge Outlet Auto Valve Fail to Open	ST022HYD01FCV62623dsF2Open	✓	✓		
7	Heat Exchanger 2 Auto Flush Drain Valve Fail to Close	ST022HYD01FCV62624dsF2Close	✓	✓		
8	Heat Exchanger 2 Auto Flush Drain Valve Fail to Open	ST022HYD01FCV62624dsF2Open	✓	✓		
9	Heat Exchanger 1 SW Auto Flush Inlet Valve Fail to Close	ST022HYD01FCV62690dsF2Close	✓	✓		
10	Heat Exchanger 1 SW Auto Flush Inlet Valve Fail to Open	ST022HYD01FCV62690dsF2Open	✓	✓		
11	Heat Exchanger 2 SW Auto Flush Inlet Valve Fail to Close	ST022HYD01FCV62694dsF2Close	✓	✓		
12	Heat Exchanger 2 SW Auto Flush Inlet Valve Fail to Open	ST022HYD01FCV62694dsF2Open	✓	✓		
13						
14						
15						

Note:

* TO INCLUDE AUTOFLUSH SEQUENCE TIME EXCEEDED ALARM. JB 30/5/12.

2.9.6 SCADA Trends

No.	Description	SCADA Tag	PLC Check	SCADA Check	Client Check	Comment
1						
2						
3						
4						
5						

Note:

3. TEST COMPLETION ACCEPTANCE

NAME	POSITION	COMPANY	SIGNATURE	DATE
JANE BEECHER	COMMISSIONING ENGINEER	JHG	Jane Beecher	30/5/12
SCOTT ADAMS	CONTROL SYSTEMS	QUU		31-5-12

2.2.5. SAT Checksheets

WWTP Oxley Creek, Brisbane, Australia

ALARM, TRIP AND SETTINGS LIST
Doc.no.1035-PRG-003, rev.D04
Thermal hydrolysis plant

P&ID	Loop number	Description	Type	Adjustable range	Set point	Unit	Action	SAT Date/sign.
General	N/A	Time delay for pump discharge alarms	Timer	0-60	10	sec.	Delays monitoring on pump discharges after starting pump.	24/10/13
General	N/A	Time delay for rupture disk alarm	Timer	No	8	hours	allows THP operation for 8 hours after reset of rupture disk alarm. Not possible to reset during count down.	23/10/13
486/5/5-R7W101	LS-625002	Level switch in pulper	High high	N/A	N/A		Stop pulper feed system, close dilution water system, stop flashing from reactors, stop reactor blowdown, stop circulation pumps, stop THP, stop foul gas system.	23/10/13
	LIT-625001	Level transmitter in pulper	High	50-100	65	%	Close dilution water system, prevent flashing from reactor and reactor blowdown.	24/10/13
			High fill	50-100	60	%	Stop pulper feed.	
			Set point	25-75	50	%	Control set point for speed of pulper feed.	
			Low fill	0-50	40	%	Prevent start of reactor fill.	BA 13/10
			Low	0-50	30	%	Stop reactor fill, prevent flashing from reactors and reactor blowdown.	BA 13/10
			Low low	0-50	20	%	Stop circulation pumps and pulper feed, stop flashing from reactors and reactor blowdown, stop circulation pumps, close dilution water control valve.	24/10/13
	PIT-625006	Pulper pressure	High high	0-3	3	barg	Stop THP.	20/10/13
			High	0-3	2	barg	High pressure. Stop foul gas compressor, start standby.	24/10 AM
			Set point	0-2	0.1	barg	Control set point for foul gas ejector water pump.	BA 13/10
			Low	-0.2-0	-0.05	barg	Low pressure.	24/10/13
			Low low	-0.2-0	-0.1	barg	Stop reactor feed pump and foul gas compressors, vacuum in pulper. DO NOT start standby equipment. Stop THP.	20/10/13
	PIT-625008 PIT-625009	Circulation pump 01 discharge pressure Circulation pump 02 discharge pressure	High high	0-10	4	barg	Stop duty and start standby circulation pump.	23/10/13
			High	0-8	3	barg	High pressure.	17/10 AM
			Set point	0-5	2	barg	~~Control set point for speed of circulation pumps or~~ the flow of dilution water.	25/10/13
			Low	0-5	1	barg	Low pressure.	23/10/13
			Low low	0-5	0.5	barg	Stop duty and start standby circulation pump.	23/10/13
	PIT-625007	Reactor feed pumps discharge pressure	High high high	0-20	13	barg	Shut down pump without delay. Start standby pump. NOT	23/10/13
			High high	0-15	10	barg	Shut down pump. Start standby pump.	23/10/13
			High	0-15	5	barg	High pressure.	23/10/13
			Low	0-5	1	barg	Low pressure.	23/10/13
			Low low	0-5	0.5	barg	Shut down pump. Start standby pump.	23/10/13
	FIT-625005	Dilution water upstream pulper circulation pumps	High	0-10	7	m3/h	High flow alarm only when flow is required.	25/10/13
			Low	0-10	0.2	m3/h	Low flow alarm only when flow is required.	17/10/13

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Thermal hydrolysis plant

P&ID	Loop number	Description	Type	Adjustable range	Set point	Unit	Action	SAT Date/sign.
			Zero	0-1	0.1	m3/h	Zero flow when flow is required, start standby circulation pump.	17/10
			Not zero	0-1	0.1	m3/h	Flow not zero alarm only when flow is not required (leaking valve).	25/10
			Reverse	-1-0	-0.1	m3/h	Stop circulation system. Start standby.	25/10
			Mode	See below	Pressure	Var.	Type of dilution water control.	25/10
			Position	0-100	0	%	Set point when position controlled.	25/10
			Flow	0-10	0	m3/h	Set point when flow controlled.	25/10
			Pressure	0-5	2	barg	Set point when pressure controlled.	25/10
	TIT-625003 TIT-625004	Circulation pump 01 discharge temperature Circulation pump 02 discharge temperature	High	0-150	110	°C	Prevent/stop flashing from reactors, continue flashing when condition has cleared. Prevent blowdown, but continue blowdown if high temperature is reached during blowdown time.	25/10
	FCV-625019 FCV-625020	Reactor feed pump 01 discharge valve Reactor feed pump 02 discharge valve	Not opened	0-60	30	sec.	Valve failed to open within the set time. Make equipment unavailable.	25/10
			Not closed	0-60	30	sec.	Valve failed to close within the set time. Make equipment unavailable.	25/10
	FCV-625008	Dilution water control valve	Opening time	0-600	60	sec.	Dilution water control valve opening time (0-100%)	25/10
			Closing time	0-600	60	sec.	Dilution water control valve closing time (0-100%)	25/10
	FCV-625031 FCV-625032	Seal water	Timer	0-60	10	sec.	Delayed start of circulation pumps after start of seal water.	24/10
	PU-625001 PU-625002	Circulation pump 01 Circulation pump 02	Set speed	0-100	100	%	Sets pump speed.	BSA 11/10
	PU-625003 PU-625004	Reactor feed pump 01 Reactor feed pump 02	Set speed	0-100	100	%	Sets reactor feed pump speed.	BSA 12/10
	RD-625036	Rupture disk on pulper	Fault	N/A	N/A		Makes pulper unavailable.	AM 20/10
	Time monitoring	Reactor sludge filling time	Timer	15-30	20	min.	Long filling time.	BSA 11/10
486/5/5-R7W102 to 486/5/5-R7W104	PIT-625105	Steam pressure from boiler	Low low	4-8	5	barg	Close steam filling valves until pressure is above low. Then resume operation.	BSA 13/10
		Steam pressure from boiler	Low	6-10	6	barg	Prevent opening of steam filling valves.	24/10
		Pressure difference between main steam pressure and reactor pressure.	Low	0-2	0.5	barg	Close relevant steam injection valve. Resume operation when pressure is above pressure difference + deadband (below).	12/10
		Dead band on pressure difference	Set	0-2	0.5	barg		24/10
	PIT-625101 ✓ PIT-625201 ✓ PIT-625301 ✓	Reactor pressure	High high	10-15	11	barg	Close steam filling valve, make reactor unavailable.	15/10
			High	5-15	10	barg	High pressure.	15/10
			Retention pressure	4-8	6	barg	Control set point for steam filling valves.	12/10

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P&ID	Loop number	Description	Type	Adjustable range	Set point	Unit	Action	SAT Date/sign.
			Flash pressure	1-4	2	barg	Set point for closing flashing valves.	
			Low	3-8	5	barg	Only during retention time, alarm low pressure if pressure is below set point.	
			Low low	-1-0	-0.1	barg	Stop emptying reactor (close blowdown valve), reset reactor cycle. Make reactor unavailable.	
			Increase	0-60	20	min.	Long steam filling time, blocked steam injection system.	
			Decrease	0-60	25	min.	Long pressure reduction time, blocked flash steam system.	
			% of pressure start timer	75-100	95	%	Set % point of required hydrolysis pressure, i.e. retention time starts.	
	LS-625102 LS-625202 LS-625302	Reactor level	High high	N/A	N/A		Stop reactor filling (both sludge and steam), make reactor unavailable.	
	LS-625103 LS-625203 LS-625303	Reactor level	High fill	N/A	N/A		Stop reactor sludge filling, no alarm. Proceede to next cycle step if allowed by the control system.	
	FCV-625101 FCV-625201 FCV-625301	Reactor sludge filling valve	Not opened	0-60	30	sec.	Valve failed to open within the set time. Make reactor unavailable.	
			Not closed	0-60	30	sec.	Valve failed to close within the set time. Make reactor unavailable.	
	FCV-625102 FCV-625202 FCV-625302	Reactor steam filling valves	Not closed	0-60	30	sec.	Valve failed to close. Make reactor unavailable.	
			Max open	0-100	80	%	Maximum open position on valve.	
			Min open	0-100	20	%	Minimum open position on valve.	
			Opening time	0-600	60	sec.	0-100% opening time	
			Closing time	0-600	10	sec.	0-100% closing time	
	FCV-625104 FCV-625204 FCV-625304	Reactor flash steam valves	Not closed	0-60	30	sec.	Valve failed to close. Make reactor unavailable.	
			Max open	0-100	80	%	Maximum open position on valve.	
			Min open	0-100	20	%	Minimum open position on valve.	
			Opening time	0-600	60	sec.	0-100% opening time	
			Closing time	0-600	10	sec.	0-100% closing time	
	FCV-625103 FCV-625203 FCV-625303	Reactor blowdown valve	Not opened	0-60	30	sec.	Valve failed to open within the set time. Close valve and make reactor unavailable.	
			Not closed	0-60	30	sec.	Valve failed to close within the set time. Make reactor unavailable.	

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P&ID	Loop number	Description	Type	Adjustable range	Set point	Unit	Action	SAT Date/sign.
			Blowdown time	0-10	5	min.	Time for blowdown valve to remain open during emptying of reactor.	13/10/13
	FCV-625102 FCV-625202 FCV-625302	Reactor steam filling valves during shot of steam	Opening time	0-600	0	sec.	0-100% opening time	12/10
			Closing time	0-600	0	sec.	0-100% closing time	12/10
			Open time	0-600	0	sec.	The opening time during shot of steam before blowdown	13/10
			Open position	0-100	0	%	The opening % during shot of steam before blowdown	12/10
	PIT-625101 PIT-625201 PIT-625301	Reactor pressure increase after shot of steam	Increase	0-1	0,3	barg	Repeat flashdown if pressure has increased set value above flashdown pressure.	12/10
	RD-625118 RD-625214 RD-625314	Rupture disk on reactor	Fault	N/A	N/A		Makes reactor unavailable.	20/10 20/10 20/10
	Time monitoring	Retention time	Timer	15-45	30	min.	Reactor retention timer.	13/10
		Delay to start a new cycle	Timer	0-100	0	min.	Time delay between between the end of a cycle (confirmed closed blowdown valve) and a start of a new cycle.	13/10/13
486/5/5-R7W105	LS-625401	Level switch in flashtank	High high high	N/A	N/A		High high high level (level switch), close all blowdown valves, close dilution water system, foul gas condensate and stop water flow from compressed foul gas drum. Stop digester feed pumps.	24/10/13
	LIT-625402	Level transmitter in flashtank	High high	50-100	80	%	High high level, stop digester feed pumps.	24/10/13
			High	50-100	65	%	High level, prevent opening of blowdown valves, close dilution water system, foul gas condensate and stop water flow from compressed foul gas drum.	13/10/13
			High fill	25-75	50	%	Prevent start of new reactor cycle.	13/10/13
			Low fill	0-50	40	%	Prevent start of digester feed pumps.	13/10/13
			Low	0-50	20	%	Stop digester feed pumps. Restart when above low fill level.	13/10/13
			Low low	0-50	10	%	Stop digester feed pumps.	13/10/13
	PIT-625404	Flashtank pressure	High high	0-3	2.5	barg	Close blowdown valves, stop THP.	20/10/13
			High	0-3	2	barg	High pressure.	20/10/13
			Low low	-0.2-0	-0.1	barg	Vacuum in flashtank, stop digester feed pumps. Make flashtank unavailable.	20/10/13
		Time delay for high pressure	Timer	0-30	10	min.	Warning of blockage of flash steam line (high pressure).	26/10/13
	PIT-625405 PIT-625413	Digester feed pumps discharge pressure	High high high	0-20	12	barg	Shut down digester feed system without delay. Start standby system.	24/10/13
			High high	0-15	10	barg	Shut down digester feed system. Start standby system.	24/10/13
			High	0-15	5	barg	High pressure.	24/10/13

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Thermal hydrolysis plant

P&ID	Loop number	Description	Type	Adjustable range	Set point	Unit	Action	SAT Date/sign.
			Low	0-5	1	barg	Low pressure.	24/10/13
			Low low	0-5	0.5	barg	Shut down pump. Start standby system.	24/10/13
	PIT-625410	Final effluent water pressure	High high	0-10	8	barg	Suspend THP until pressure is below high.	26/10/13
			High	0-8	7	barg	High pressure, prevent start of THP.	26/10/13
			Low	0-5	5	barg	Low pressure, prevent start of THP.	26/10/13
			Low low	0-5	4	barg	Suspend THP until pressure is above low.	26/10/13
	FIT-625407	Dilution water upstream digester feed pumps	High	0-10	0.5	m3/h	High flow alarm only when flow is higher than required.	24/10/13
			Low	0-10	0.5	m3/h	Low flow alarm only when flow is lower than required.	24/10/13
			Zero	0-1	0.1	m3/h	Zero flow when flow is required, stop associated digester feed pump system and start standby.	26/10/13
			Not zero	0-1	0.1	m3/h	Flow not zero alarm only when flow is not required (leaking valve).	26/10/13
			Reverse	-1-0	-0.1	m3/h	Stop digester feed system. Start standby.	26/10/13
			Mode	See below	% of flow	Var.	Type of dilution water control.	24/10/13
			Position	0-100	0	%	Set point when position controlled.	24/10/13
			Flow	0-30	0	m3/h	Set point when flow controlled.	24/10/13
			% of flow	0-100	20	%	Set point when % of flow controlled. Flow is calculated from the total flow on the discharge of the digester feed pumps	24/10/13
	FIT-625408 FIT-625409	Sludge flow after digester feed pumps	High	5-15	10	m3/h	High flow.	24/10/13
			Mode	See below	Flow	Var.	Type of sludge flow control.	24/10/13
			Flow	0-30	5	m3/h	Set point when flow controlled.	24/10/13
			Pump speed	0-100	0	%	Set point when pump speed controlled.	24/10/13
			Low	0-5	1	m3/h	Low flow.	24/10/13
			Discrepancy	0-1	0.5	m3/h	Alarm if there is a deviation between the sludge flow to the digesters and the rate of fall in the flashtank level.	
			Reverse	-1-0	-0.1	m3/h	Negative flow of sludge, stop digester feed pump and cooler, start standby system. If system is already stopped and the associated digested recycled sludge control valve is open, close the digested sludge control valve. Make system unavailable. Reverse flow is registered by a digital contact on the flowmeter.	24/10/13
			Zero	0-1	0.1	m3/h	Stop associated digester feed pump system, start standby system.	24/10/13
			Deviation	0-1	0.5	m3/h	If the flow from the digester feed pump is lower than the set point, a low sludge flow warning is displayed.	24/10/13
	TIT-625403	Sludge temperature downstream flashtank		N/A	N/A		Temperature monitoring.	12/10/13
	TIT-625406	Sludge temperature to coolers	High	0-100	95	°C	High temperature.	21/6/13

FIT625408/409 Not Zero Alarm 24/6/13

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ALARM, TRIP AND SETTINGS LIST
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P&ID	Loop number	Description	Type	Adjustable range	Set point	Unit	Action	SAT Date/sign.
	TIT-625412		Low	0-100	70	°C	Low temperature.	12/10/13
	FCV-625408	Dilution water control valves	Opening time	0-600	60	sec.	Dilution water control valve opening time (0-100%)	25/10/13
			Closing time	0-600	60	sec.	Dilution water control valve closing time (0-100%)	25/10/13
	FCV-625423 FCV-625428	Digester feed pump discharge valves	Not opened	0-60	30	sec.	Valve failed to open within the set time.	25/10 AM
			Not closed	0-60	30	sec.	Valve failed to close within the set time. Stop digester feed, do not promote standby system.	25/10 AM
	RD-625118	Rupture disk on flashtank	Fault	N/A	N/A		Makes flashtank unavailable.	20/10 AM
486/5/5-R7W106	TIT-625501	Temperature downstream foul gas cooler	High	0-50	40	°C	High temperature.	16/10 AM
			Mode	See below	Temperature	Var.	Type of cooling water control.	26/10/13
			Position	0-100	0	%	Set point on valve when position controlled.	26/10/13
			Temperature	0-50	35	°C	Set point when temperature controlled.	12/10/13
	TIT-625502	Temperature downstream foul gas cooler		N/A	N/A		Temperature monitoring.	12/10/13
	FCV-625503	Cooling water control valve	Opening time	0-600	60	sec.	Cooling water control valve opening time (0-100%)	26/10/13
			Closing time	0-600	60	sec.	Cooling water control valve closing time (0-100%)	26/10/13
486/5/5-R7W107	LS-625601	Level swith in compressed foul gas drum	Low low	N/A	N/A		Stop foul gas ejectors, stop THP.	16/10 06 AM
	LIT-625602	Level in compressed foul gas drum	High high	50-100	70	%	Stop foul gas ejectors, stop THP.	16/10 AM
			High	50-100	60	%	High level.	16/10 AM
			Set point	0-100	50	%	Set point for water in and out valves.	13/10/13
			Low	0-70	40	%	Low level.	16/10 AM
			Low low	0-70	40	%	Stop foul gas ejectors, stop THP.	16/10 AM
			Dead band	0-10	5	%	Dead band for adding and removing water.	13/10/13
	PIT-625603	Pressure in compressed foul gas drum	High high	0-10	4	barg	High high pressure, stop THP.	16/10 AM
			High	0-10	3	barg	High pressure, close V-625618.	16/10 AM
			Set point	0-5	2	barg	Set pressure for compressed foul gas drum, controls foul gas flow from drum using control valve V-625618.	16/10 AM
			Low	0-10	0	barg	Low pressure, close V-625618.	16/10 AM
			Low low	-0.2-0	-0.1	barg	Low low pressure (vacuum), stop THP.	16/10 - AM
	FIT-625605	Flow of industrial water from compressed foul gas drum	High	0-10	7	m3/h	High flow alarm only when flow is required.	16/10 AM
			Low	0-10	0.2	m3/h	Low flow alarm only when flow is required.	26/10/13
			Zero	0-1	0.1	m3/h	Zero flow when flow is required, start standby pump set.	26/10/13
			Not zero	0-1	0.1	m3/h	Flow not zero alarm only when flow is not required (leaking valve).	26/10/13
			Reverse	-1-0	-0.1	m3/h	Stop duty ejector system. Start standby.	26/10/13
			Mode	See below	Pressure	Var.	Type of ~~dilution~~ water control.	
			Position	0-100	0	%	Set point when position controlled.	

WWTP Oxley Creek, Brisbane, Australia

ALARM, TRIP AND SETTINGS LIST
Doc.no.1035-PRG-003, rev.D04
Thermal hydrolysis plant

P&ID	Loop number	Description	Type	Adjustable range	Set point	Unit	Action	SAT Date/sign.
			Flow	0-10	0	m3/h	Set point when flow controlled.	
		LEVEL	~~Pressure~~	0-10	2	~~barg~~%	Set point when ~~pressure~~ controlled. flow	16/10/13
	TIT-625604	Temperature in compressed foul gas drum	High high	50	0-100	°C	Stop foul gas ejectors, stop THP.	16/10
			High	45	0-100	°C	High temperature.	16/10
			Set point	20-60	40	°C	Set point for water in valves.	12/10/13
			Dead band	0-20	5	°C	Dead band for adding and removing water.	N/A
	PU-625601 PU-625602	Foul gas ejector water pumps	Speed	0-100	100	%	Set speed of foul gas ejector water pumps.	13/10
			Dead band	0-1	0.1	barg	Dead band for starting and stopping foul gas ejector water pumps.	26/10/13
			Mode	See below	Pressure	Var.	Type of foul gas ejector control. Pressure set point is taken from PIT-625006, pulper pressure.	12/10
			Pressure	N/A	N/A		Pressure set point is taken from PIT-625006, pulper pressure. Ejector pump speed is controlled to achieve pressure.	12/10/13
			On/off	N/A	N/A		Pressure set point is taken from PIT-625006, pulper pressure. Ejector pumps start and stop based on pressure and dead band.	12/10
	FVC-625621	Water to compressed foul gas drum control valve	Opening time	0-600	60	sec.	Water control valve opening time (0-100%)	13/10
			Closing time	0-600	60	sec.	Water control valve closing time (0-100%)	13/10
	FCV-625612 FCV-625613	Water from compressed foul gas drum control valve	Opening time	0-600	60	sec.	Water control valve opening time (0-100%)	13/10
			Closing time	0-600	60	sec.	Water control valve closing time (0-100%)	13/10
	FCV-625618	Foul gas from compressed foul gas drum control valve	Opening time	0-600	60	sec.	Foul gas control valve opening time (0-100%)	13/10
			Closing time	0-600	60	sec.	Foul gas control valve closing time (0-100%)	13/10
486/5/5-R7W108	PIT-625701	Compressed air pressure	High high	5-15	8	barg	Suspend THP until pressure below high.	26/10/13
			High	5-15	7	barg	Prevent start of THP.	26/10/13
			Low	0-10	5	barg	Prevent start of THP.	26/10/13
			Low low	0-10	4	barg	Suspend THP until pressure above low.	26/10/13