HOARE LEA

EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

Mechanical and Electrical Engineering Specification

VOLUME 4 OF 4 – APPENDICIES

REF: 0308416
REV: T1 (TENDER ISSUE)
DATE: JUNE 2022

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EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

MECHANICAL AND ELECTRICAL ENGINEERING SPECIFICATION

ISSUE STATUS

Rev.	Description	Prepared by	Reviewed by	Authorised by	Date
T1	Tender Issue	SH	AL	SF	June 2022

Reference: 0308005
Date: January 2019

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EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

MECHANICAL AND ELECTRICAL ENGINEERING SPECIFICATION

MASTER INDEX

VOLUME 4

HOARE LEA

EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

MECHANICAL AND ELECTRICAL ENGINEERING SPECIFICATION

APPENDIX A EQUIPMENT SCHEDULES

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Schedule.

Pumps.

PROJECT NAME
Eden Geothermal Heat Network MEP
HL PROJECT NUMBER
0308416
DOCUMENT IDENTIFICATION
0308416-HLEA-ZZ-ZZ-SH-M-000000
SYSTEM
LTHW District Heating
CLASSIFICATION
Pr_65_53_86

REVISION HISTORY

Revision	Status	Date	Prepared by	Reviewed by	Authorised by	Comments
P01	S1	08.04.22	AL	SF	SF	

INFORMATION REQUIRED

For every equipment entry in the schedule, confirm that each of the design parameters has been met by the final selection. In addition, provide details of the following parameters for each piece of equipment:

Electrical

Rotating speed (rpm)
Starting current (A)
Starting current duration (S)
Active power running (kW)
Running current (A)
Active power rated / Motor size (kW)
Motor efficiency at duty point (%)
Full load current (A)
Absorbed power / shaft power (kW)

Construction

Connection size (mm)
Operating mass (kg)

NOTES

1. All pumps are to comply with specification section Y20.
2. The final selection system pressure drops are to be calculated by the installer, according to the actual layout and components used, prior to ordering the pumps. The values entered in this schedule are for tender value purposes only.
3. The pump must be selected to meet the capability duty but with peak efficiency at the design duty.
4. Assignment of roles on this schedule is to indicate how the total flow rate for the system they serve is intended to be split between the pumps. All pumps indicated as 'assist' or 'standby' will be cycled through in normal operation to act as the 'duty' pump.
5. Show test and working pressures on the nameplate.
6. Provide test certificates.

Acoustics

L_W at capability duty at (dB):
63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz

PROJECT NAME	SYSTEM
Eden Geothermal Heat Network MEP	LTHW District Heating
HL PROJECT NUMBER	**CLASSIFICATION**
0308416	Pr_65_53_86

GROUP DESIGN PARAMETERS				
The project contains different types of pump. Each type operates with different design parameters. These types are detailed below, with reference in the main schedule just made to the type name.				
GENERAL				
Type reference		Type A		
Quantity of pumps		3		
Configuration		Single-head		
Shaft orientation		Horizontal		
Pump type		End-suction		
Pump stages		Single stage		
Pumping method		Axial		
Sealing		Glanded		

ELECTRICAL	Units			
Voltage	V	400		
Motor rotating speed	rpm	2900		
Motor to be inverter driven		Yes		
Inverter mounting location		Stand-alone unit mounted remotely		
Motor type		EC/DC permanent magnet		
Motor efficiency class		IE3		
Minimum efficiency index		>= 0.6		
Energy efficiency index		N/A		
Motor starting method		Inverter		
Ingress protection rating		IP55		

CONTROL				
Power-on control operation		via BMS - see control system schedule		
Inverter integral control mode		Variable Volume / Constant Pressure Control, Maintaining Min Differencial Pressure at each load PHEX as sensed by local DP Sensors		
Minimum set point commissioning point		Minimum flow rate required by pump		
Set point influence from BMS		Yes		
Direct connected control sensor type		See control system schedule		

GENERAL				
Type reference		Type A		
Control wiring interface type		via IP comms interface		
Inverter comms interface type		via IP		

CONSTRUCTION	Units			
Casing material		Cast iron		
Impellar material		Bronze		
Shaft material		Stainless steel		
Primary shaft seal material				
Secondary shaft seal material		EPDM		
Drive coupling type		Direct		
Pipe connection type		Flanged		
Height	mm	430		
Width	mm	344		
Length	mm	1053.5		

ACCESSORIES				
AV mountings		Yes		
Inertia base		Yes		
Flexible connections		Yes		
Drain plug		Yes		
Notes				

PROJECT NAME	SYSTEM
Eden Geothermal Heat Network MEP	LTHW District Heating

HL PROJECT NUMBER	CLASSIFICATION
0308416	Pr_65_53_86

GENERAL				DUTY										
Unit ref.	Location	Type reference	System	Duty sharing assignment (Note 4)	Fluid type	Fluid temperature (°C)	Fluid density (kg/m^3)	Pressure rating (PN)	System design flow rate (l/s)	System design resistance (kPa)	Pump flow rate capability duty (l/s)	Pump pressure capability duty (kPa)	Minimum pump turn-down duty (%)	Minimum overall efficiency at design duty (%) (Note 3)
P1A	Packaged Plantroom	Type A	LTHW District Heating	Duty	LTHW (Water)	85	971.8	16	20	892.4	21	983.9		
P1B	Packaged Plantroom	Type A	LTHW District Heating	Duty	LTHW (Water)	85	971.8	16	20	892.4	21	983.9		
P1C	Packaged Plantroom	Type A	LTHW District Heating	Standby	LTHW (Water)	85	971.8	16	20	892.4	21	983.9		

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PRESSURISATION UNIT SCHEDULE

SCHEDULE REF	SCH	0	Y20_2	PU	1			
PROJECT	0308416				No. 1			
SYSTEM	LTHW District Heating			UNIT REF	PU 1			

CONSTRUCTION	LOCATION	**Packaged Plantroom**			
	PURPOSE	**Pressure control of LTHW Heating Circuit**			
	OPERATION AND CONTROL	**Fill / Spill**			
	PUMP TYPE	**Manufacturer to confirm**			
	PUMP CASING	**Manufacturer to confirm**			
	PUMP IMPELLERS	**Manufacturer to confirm**			
	PUMP SHAFT	**Manufacturer to confirm**			
	MANIFOLDS	**Manufacturer to confirm**			
	PUMP ARRANGEMENT	**Duty Standby**			
	FLUID	**LTHW Water**			
	VESSEL WORKING PRESSURE RATING	**8.8**	bar (gauge)	minimum	
	VESSEL TEMPERATURE RATING	**60**	°C	minimum	
	MINIMUM EXPANSION VESSEL(S) VOLUME (See note 4)	**2640**	litres to	**3168**	litres approx
DUTY	COLD FILL PRESSURE	**1.0**	bar (gauge)		
	NORMAL WORKING PRESSURE (at operating temperature)	**7.30**	bar (gauge) at System Low Point, circa **3.5** Bar at Well Head		
	MAX WORKING PRESSURE (Equipment limit & SV setting)	**8.0**			
	SYSTEM WATER CONTENT (See note 4)	**50000.0**	litres to	**60,000**	litres approx
	ENERGY INPUT TO SYSTEM (Total heating output)	**3760**	kW		
	SYSTEM HEIGHT ABOVE AND BELOW P.U. SET	**5**	m (ABOVE)	**45.0**	m (BELOW)
	SYSTEM OPERATING TEMPERATURES	**85.0**	°C FLOW	**60.0**	°C RETURN
	SYSTEM TEMPERATURE LIMITS	**85.0**	°C MIN	**60.0**	°C MAX
ELECTRICAL	PHASE & FREQUENCY	**Single**	phase	**50**	Hz
	VOLTAGE	**230**	V		
ACCESSORIES	ISOLATING VALVES ON PUMP INLET AND OUTLET	**Yes**			
	STRAINERS ON PUMP SUCTION(S)	**Yes**			
	CHECK VALVES ON PUMP OUTLET(S)	**Yes**			
	CONTROL PANEL (STEEL WITH HINGED DOOR)	**Yes**	As Per Specialist Control Panel		
	VESSEL FEET	**Yes**			
	COMMON ALARM TO BMS	**Yes**			
	AUDIBLE ALARM	**Yes**			
	BREAK TANK with type AF air gap	**Yes**			
	HIGH/LOW PRESSURE ALARM INDICATION	**Yes**			
	MAKE-UP WATER METER WITH OUTPUT TO BMS	**Yes**			
	SAFETY VALVE	**Yes**			
	PRESSURE GAUGES	**Yes**			
	TEST BUTTON FOR TESTING PUMP(S) OPERATION	**Yes**	(NOT TEST/OFF/AUTO SWITCH)		
	LOCKSHIELD VALVE ON CONNECTION TO SYSTEM	**Yes**			

NOTES

1. TEST CERTIFICATES TO BE PROVIDED
2. NAMEPLATES TO SHOW TEST AND WORKING PRESSURES
3. UNIT TO COMPLY WITH HSE INDG 436 AND PRESSURE SYSTEMS SAFETY REGULATIONS
4. INSTALLER TO CONFIRM SYSTEM WATER VOLUME BASED ON SELECTED EQUIPMENT & INSTALLATION DRAWINGS PRIOR TO ORDERING
5. WIRING TO COMPLY WITH BS 7671
6. PROVIDE ALL NECESSARY INTERCONNECTING PIPEWORK, CHECK VALVES, ETC
7. UNIT CONTROLLER SHALL PROVIDE ALTERNATING PUMP STARTING (WHERE 2 PUMPS SPECIFIED); PUMP START FREQUENCY / LEAK DETECTION ALARM TO INDICATE LEAK IF ABOVE MAX STARTS PER HOUR; HIGH / LOW PRESSURE ALARMS ARRANGED FOR MANUAL RESTART; COMMON ALARM TO SHUT DOWN SYSTEM IF IT EXCEEDS PRESSURE LIMITS; AND PROVIDE INDICATION OF TRANSDUCER OR LEAD FAULT
8. DESIGN SELECTION IS BASED UPON - Reflex - Variomat Range (ALTERNATIVES MUST BE EQUAL & ACCEPTED)

ISSUE/REVISION	P1							
DATE	13.04.2022							
PREPARED BY	AL							
REVIEWED BY	SF							
AUTHORISED BY	SF							

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PLATE HEAT EXCHANGER SCHEDULE

SCHEDULE REF	SCH	0	Y22	HX	01 A/B			
PROJECT	0308416				Qty. 2no			
SYSTEM	LTHW District Heating			UNIT REF	HX 01 A/B			

CONSTRUCTION	PLATES	**Stainless Steel**		
	FRAME AND END PLATES	**TBC**		
	GASKETS	**TBC**		(to have 150°C, 20 Bar Capability)
	FINISH	**TBC**		
	PRIMARY FLUID	**Water**		(Note: possible Saline / CO_2 present)
	SECONDARY FLUID	**Water**		
DUTY (PRIMARY)	HEAT TRANSFER CAPACITY	**3760.0**	kW	
	FLOW RATE	**35.96**	kg/s	
	FLUID TEMP FLOW (INLET)	**86**	°C	
	FLUID TEMP RETURN (OUTLET)	**61**	°C	
	MAX FLUID PRESSURE DROP	**20**	kPa	
	SPECIFIC HEAT CAPACITY	**4.182**	kJ/kg K	
	FOULING FACTOR	**0.044**	m^2°C/W	(Allowance for unkown water quality)
DUTY (SECONDARY)	HEAT TRANSFER CAPACITY	**3760**	kW	
	FLOW RATE	**35.96**	kg/s	
	FLUID TEMP FLOW (OUTLET)	**85**	°C	
	FLUID TEMP RETURN (INLET)	**60**	°C	
	MAX FLUID PRESSURE DROP	**20**	kPa	
	SPECIFIC HEAT CAPACITY	**4.182**	kJ/kg K	
	FOULING FACTOR	**0.018**	m^2°C/W	
PRESSURE	PRIMARY WORKING	**10.0**	bar (gauge)	
	PRIMARY TEST	**20.0**	bar (gauge)	
	SECONDARY WORKING	**10.0**	bar (gauge)	
	SECONDARY TEST	**13.0**	bar (gauge)	
CONNECTIONS	PRIMARY FLOW AND RETURN	**150**	mm	
	SECONDARY FLOW AND RETURN	**150**	mm	
MAXIMUM DIMENSIONS	LENGTH	**TBC**	mm	
	WIDTH	**TBC**	mm	
	HEIGHT	**TBC**	mm	
ACCESSORIES (PRIMARY & SECONDARY)	ALTITUDE GAUGE AND COCK - FLOW	**Yes**		
	ALTITUDE GAUGE AND COCK - RETURN	**Yes**		
	TEMPERATURE GAUGE - FLOW	**Yes**		
	TEMPERATURE GAUGE - RETURN	**Yes**		
	SAFETY VALVE	**Yes**	**20.0** bar (gauge)	
	REMOVABLE INSULATED JACKET TO PHE	**Yes**		
	CONDENSATION DRIP TRAY	**No**		

NOTES
1. TEST CERTIFICATES TO BE PROVIDED
2. NAMEPLATES TO SHOW TEST AND WORKING PRESSURES
3. DESIGN SELECTION IS BASED UPON - Alfa Laval (ALTERNATIVES MUST BE EQUAL & ACCEPTED)

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ISSUE/REVISION	P1							
DATE	13.04.2022							
PREPARED BY	AL							
REVIEWED BY	SF							
AUTHORISED BY	SF							

SCHEDULE OF BMS POINTS										HOARE LEA
PROJECT	**Eden Geothermal**					No	0308311			
SYSTEM	Controls					UNIT REF	BMS Points			
						LV Power			**Cable Type**	
Description	**Ref**	**AI**	**AO**	**DI**	**DO**	**Power (volts)**	**Running Load (kW)**	**Fuse/Circuit Breaker (amps)**	**Cable Type**	**Notes**
Existing controls maintained. Outlined below is the new points list, all existing to be maintained.										
Low Temperature Hot Water Water Service										
EGL / BESTEC WELL HEAD SYSTEMS CONTROL PANEL	CP1			✓	✓			Control Specialists Spec	Control Specialists Spec	Send information from wellhead to BMS
P1A - Pump	P1A				✓	TBC	TBC	Control Specialists Spec		Inverter control by BMS to pumps (Constant speed operation)
P1B - Pump	P1B				✓	TBC	TBC	Control Specialists Spec		Inverter control by BMS to pumps (Constant speed operation)
P1C - Pump	P1C				✓	TBC	TBC	Control Specialists Spec		Inverter control by BMS to pumps (Constant speed operation)
Temperature sensor - From well head - Flow	T1	✓							Control Specialists Spec	
Temperature sensor - From well head - Return	T2	✓							Control Specialists Spec	
Temperature sensor - Return from PHEX 01	T3	✓							Control Specialists Spec	
Temperature sensor - Flow to PHEX 01	T4	✓							Control Specialists Spec	
Temperature sensor - Return from PHEX 02	T5	✓							Control Specialists Spec	
Temperature sensor - Flow to PHEX 02	T6	✓							Control Specialists Spec	
Temperature sensor - Flow to PHEX 03 serving Greenhouses	T7	✓							Control Specialists Spec	
Temperature sensor - Return from PHEX 03 serving Greenhouses	T8	✓							Control Specialists Spec	
Temperature sensor - Flow to PHEX 04 serving Biome Energy Centre	T9	✓							Control Specialists Spec	
Temperature sensor - Return from PHEX 04 serving Biome Energy Centre	T10	✓							Control Specialists Spec	
DP1 Strainer	DP1	✓		✓					Control Specialists Spec	To monitor flow through from PHEX 01
DP2 Strainer	DP2	✓		✓					Control Specialists Spec	To monitor flow through from PHEX 02
Down Hole Pump	P1				✓	TBC	50kW	Control Specialists Spec		
Flow Monitor	Q (MID)				✓				Control Specialists Spec	Monitoring flowrate from wellhead
Metering & General Alarms & Misc										

1. Cable sizes and types are indicative only and are to be confirmed by controls manufacturer prior to installation.
2. Issued for design purposes only refer to M&E contractors working drawings for installation details.
3. Final connections to sensors via conduit box with fixed connectors and flex outlet
4. Final plant electrical loads to be confirmed by the mechanical installer
5. Plant LV power supplies to terminate with IP65 rotary isolator with final connection via flex CONDUIT

ISSUE/REVISION	P01						
DATE	24.05.2022						
SIGNED	SH						
CHECKED	AL						

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EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

MECHANICAL AND ELECTRICAL ENGINEERING SPECIFICATION

APPENDIX B DRAWING ISSUE SHEET

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Drawing issue sheet.

Issuing office/group

Plymouth

Project name

EDEN GEOTHERMAL HEAT MAIN MEP DESIGN

Project number

03/08416

Project identifier

Not Applicable

Drawing series

MECHANICAL, ELECTRICAL AND PUBLIC HEALTH

DAY	04
MONTH	07
YEAR	22

STATUS (SUITABILITY) CODE	S0=WIP, S1=Coordination, S2=Information, S3=Review, S4=Stage Approval, S6=PIM Authorisation, S7=AIM Authorisation, Ax=Published (Contractual) authorised and accepted, Bx=Published (Contractual) partial sign-off (with comments), CR=Published (for AIM acceptance) as constructed record drawing
	S2

INITIALS OF DRAWING ISSUER	AL

PURPOSE OF ISSUE	P=Preliminary, T=Tender, C=Contractual, I=Information, R=Request
	T

DISTRIBUTION		COPIES Copy types: E=Email, P=Paper Copy, CD=CD, F=Hoare Lea Fileshare, X=Extranet
Eden Geothermal	Steve Mabbott	F

Drawing reference								Drawing title	Scale	Size	Revision
Project	Originator	Volume/ System	Level/ Location	Type	Role	Number					In the from P01 where P = Preliminary, C = Contractual, and 01 = Primary revision number.
0308416	HLEA	XX	XX	DR	M	100	001	Greenhouse Plantroom Layout	1:50	A1	T1
0308416	HLEA	XX	XX	DR	M	560	001	Site Plan	NTS	A0	T1
0308416	HLEA	XX	XX	DR	M	600	003	Biome Energy Centre Layout	1:50	A1	T1
0308416	HLEA	XX	XX	SM	M	600	001	Mechanical Schematic	NTS	A0	T1
								Leave this row blank			

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EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

MECHANICAL AND ELECTRICAL ENGINEERING SPECIFICATION

APPENDIX C TENDER SUMMARIES

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EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

MECHANICAL AND ELECTRICAL ENGINEERING SPECIFICATION

HL PROJECT NO. E/03/08416

ELECTRICAL ENGINEERING SYSTEMS STANDARD TENDER SUMMARY SHEET

FLUCTUATING PRICE TENDER - ~~YES~~/NO
FIRM PRICE TENDER - YES/~~NO~~
ALL ELEMENTAL COSTS SHALL BE INCLUSIVE OF 2.5% CASH DISCOUNT - ~~YES~~/NO

The Tenderer shall allow in his Tender for complying with all the requirements of the Tender Documents as stated in the Invitation to Tender.

Any works contained in the Tender Documents that cannot be identified using the following Elemental Headings are to be included and described separately.

£/p

Allow for complying with the following Elements as defined on the tender drawings and within the Particular Material and Installation Clauses.

1. INCOMING SERVICE (V11 part, V12 part). Connection to supply authority main. Service from connection to supply authority switch. As applicable. _____

2. HIGH VOLTAGE MAINS AND SWITCHGEAR (V11 part). Connection from supply authority's switch to main switches including any cabling. Main switches, fuses and cubicles (or busbar). Cables, supports (eg cable trays), busbar trunking. Transformers. As applicable. _____

3. LOW VOLTAGE MAINS AND SWITCHGEAR (V12 part). Connection from supply authority's switch to main switches (or busbar) including any cabling. Main switches, fuses and cubicles (or busbar), cables, supports (eg cable trays), busbar trunking. As applicable. _____

4. SUB-MAINS AND DISTRIBUTION BOARDS (V20 part). Cables, busbars, trunking, conduit, supports (eg cable trays) from main switches to distribution boards. Fuses, circuit breakers, conduit and trunking. As applicable. _____

5. DISTRIBUTION TO MECHANICAL SYSTEMS (V20 part). Cables, wiring, conduit, trunking, supports between distribution boards, switches, control panels, outstations, motor control centres, sensors, actuators, motors, peripherals. Switches, starters, isolators. As applicable. _____

6. GENERAL LIGHTING (V21). Wires, conduit, trunking, busbar trunking, supports, capping in final circuits. Light fittings (ie luminaires). Switches, accessories. As applicable. _____

7. GENERAL POWER (V22). Wires, conduit, trunking, busbar trunking, supports, _____

Where the tenderer submits a price for the provision of any work package listed above, the tenderer confirms that the price submitted is fully inclusive and compliant with all requirements within the tender documentation.

Name of Company: ……

Carried forward: _____

ELECTRICAL STANDARD TENDER SUMMARY SHEET (Continued) £/p

Brought forward: _____

capping in final circuits. Socket outlets and accessories. Fixed equipment served. As applicable. _____

_____

8. EMERGENCY LIGHTING (V40 part). Batteries, emergency generators, auto changeover equipment, distribution boards, switchgear, controls. Wires, conduit, trunking, supports, cappings from batteries to light fittings. Light fittings. As applicable. _____

_____

9. EXTERNAL LIGHTING (V41 part). Wires, conduit, trunking, supports. Light fittings. Controls, switches and accessories. As applicable. _____

10. DATA TRANSMISSION (W15 or W30). Modems, multiplexes, batteries, cables and wiring, data bus system. Conduit and trunking, support components. Data terminals. As applicable. _____

11. SECURITY/ ACCESS CONTROL (W40 part, W41 part, W42, W43 and W44). Distribution boards, batteries, switchgear, cables and wiring, conduit and trunking, computer control equipment, detection equipment, alarm equipment, surveillance equipment and Software. As applicable. _____

12. FIRE DETECTION AND ALARM (W50). Distribution boards, batteries, switchgear cables and wiring, conduit and trunking. Detection equipment, alarm equipment. Accessories. As applicable. _____

_____

13. EARTHING AND BONDING (W51). Screening systems, earth mat systems, cables, conductor tapes, earthing busbars. Clamps, rods. As applicable. _____

_____

_____

14 METERING, MONITORING & MANAGEMENT SYSTEMS (W66) Metering Equipment, Communication Network, Software, Security _____

_____

15. OTHER ELEMENTS. _____

16. TEST AND COMMISSION (Y81). Testing equipment, commissioning system and fuel for testing and commissioning. Recording data, test certificates, provision of O&M manuals and as-fitted drawings. As applicable. _____

_____

17. PRELIMINARIES (A). Allow for complying with the following: Standard Preliminary Clauses, Standard Technical Clauses, Schedule for Daywork Rates _____

Where the tenderer submits a price for the provision of any work package listed above, the tenderer confirms that the price submitted is fully inclusive and compliant with all requirements within the tender documentation.

Name of Company: ……

Carried forward:.....

ELECTRICAL STANDARD TENDER SUMMARY SHEET (Continued) £/p

Brought forward: _____

Appendix. _____

TOTAL ELECTRICAL ENGINEERING SYSTEMS £ _____

Signed: .....…… Date: .....

For and on behalf of: .....……

Where the tenderer wishes to offer alternative provisions to those of a compliant tender, the tenderer shall list the alternatives below, stating the saving being offered. The tenderer acknowledges that the client is under no obligation to accept any alternative and that the submitted tender is fully compliant with the tender documentation.

Where the tenderer submits a price for the provision of any work package listed above, the tenderer confirms that the price submitted is fully inclusive and compliant with all requirements within the tender documentation.

Name of Company: ……

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EDEN GEOTHERMAL HEAT NETWORK MEP DESIGN

MECHANICAL AND ELECTRICAL ENGINEERING SPECIFICATION

MECHANICAL ENGINEERING SYSTEMS STANDARD TENDER SUMMARY SHEET

HL PROJECT NO. M/03/08416

FLUCTUATING PRICE TENDER - ~~YES~~/NO
FIRM PRICE TENDER - YES/~~NO~~
ALL ELEMENTAL COSTS SHALL BE INCLUSIVE OF 2.5% CASH DISCOUNT - ~~YES~~/NO

The Tenderer shall allow in his Tender for complying with all the requirements of the Tender Documents as stated in the Invitation to Tender.

Any works contained in the Tender Documents that cannot be identified using the following Elemental Headings are to be included and described separately.

£/p

Allow for complying with the following Elements as defined on the tender drawings and within the Particular Material and Installation Clauses.

1. SANITARY SYSTEMS (R11, R12, R14). Pipework, fittings, labelling, supports, gutters, gulleys. As applicable. _____

2. COLD WATER (S10). Connection to supply authority's main. Storage tanks or vessels, supports, equipment insulation, gauges, mountings, Pipelines, pumps, meters, valves, insulation, trace heating to points of use (eg sanitary fittings, fountains, water features, and water heating and cooling sources). As applicable. _____

3. HEATING (T31). F&E tanks, pressurisation units, heat exchangers, equipment insulation, inertia bases, fire protection/alarm equipment. Pipelines, valves, pumps, supports, pipework expansion equipment, flexible connections, strainers, water treatment, external finishes, labelling straps, associated packaged controls. As applicable. _____

4. CONTROLS/ BUILDING MANAGEMENT SYSTEMS (W60). Panel lights, control switches, mimic display equipment, digital display equipment, supervisors, control valves, actuators, terminations, monitoring equipment, monitors, projectors, printers, contactors, starters, identification, transducers, outstations, supports, enclosures. Software engineering, controls commissioning. As applicable.

5 METERING, MONITORING AND MANAGEMENTS SYSTEMS (W66) Meter Workstation/ Headend, Metering Devices (Water Flow, Heat, Gas), Wiring and System Security. _____

7. OTHER ELEMENTS

Where the tenderer submits a price for the provision of any work package listed above, the tenderer confirms that the price submitted is fully inclusive and compliant with all requirements within the tender documentation.

Name of Company: ……

Carried forward: _____

MECHANICAL STANDARD TENDER SUMMARY SHEET (Continued) £/p

Brought forward: _____

8. TEST AND COMMISSION (Y51). Tests for cleanliness, pressure, vacuum, air leakage. Setting to work, system balancing, recording test data. Commissioning, operation proving, control interlocks and sequencing. Recording data, test certificates, provision of O&M manuals and as fitted drawings. Fuel for testing and commissioning. As applicable. _____
9. PRELIMINARIES (A). Allow for complying with the following: Standard Preliminary Clauses, Standard Technical Clauses, Schedule for Daywork Rates Appendix. _____

TOTAL MECHANICAL ENGINEERING SYSTEMS £ _____

Signed: .....…… Date: .....

For and on behalf of: .....……

Where the tenderer wishes to offer alternative provisions to those of a compliant tender, the tenderer shall list the alternatives below, stating the saving being offered. The tenderer acknowledges that the client is under no obligation to accept any alternative and that the submitted tender is fully compliant with the tender documentation.

Where the tenderer submits a price for the provision of any work package listed above, the tenderer confirms that the price submitted is fully inclusive and compliant with all requirements within the tender documentation.

Name of Company: ……

Carried forward:.....

MECHANICAL STANDARD TENDER SUMMARY SHEET (Continued) £/p

Brought forward:

Where the tenderer submits a price for the provision of any work package listed above, the tenderer confirms that the price submitted is fully inclusive and compliant with all requirements within the tender documentation.

Name of Company: ……