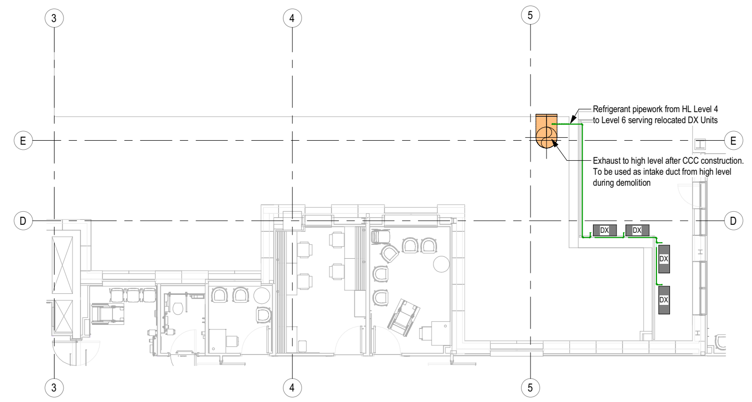
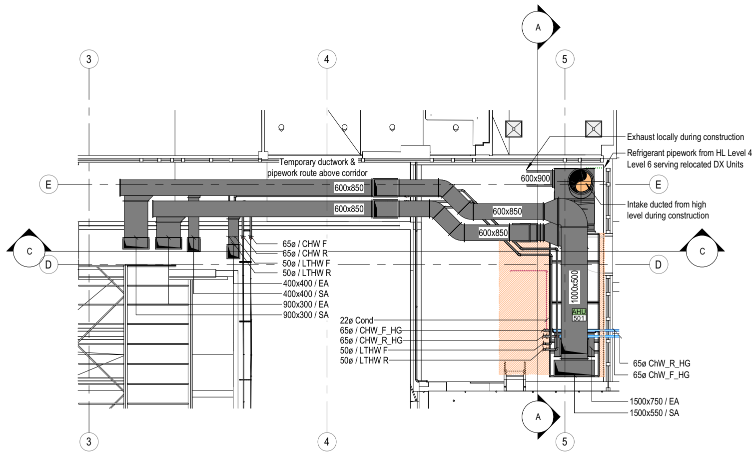
A.2 Services Engineering Proposals



1 Interface 64 - Level 6 Advanced Works
1 : 100



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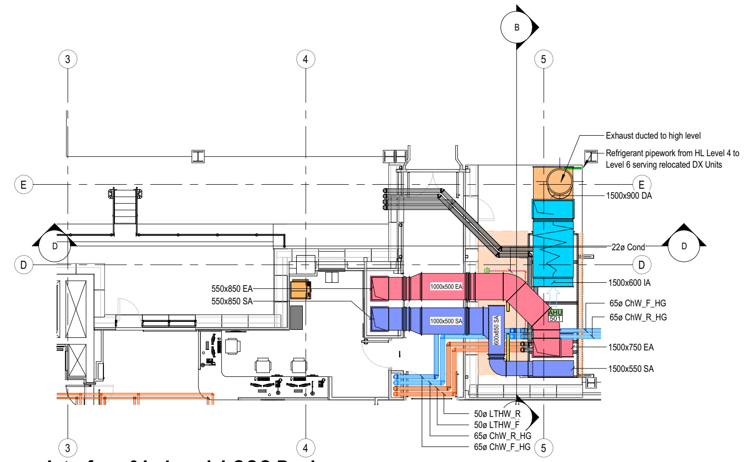
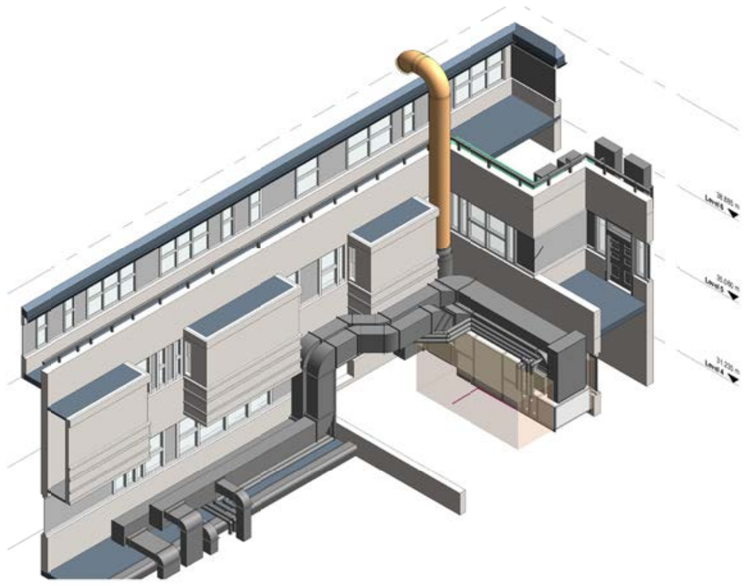
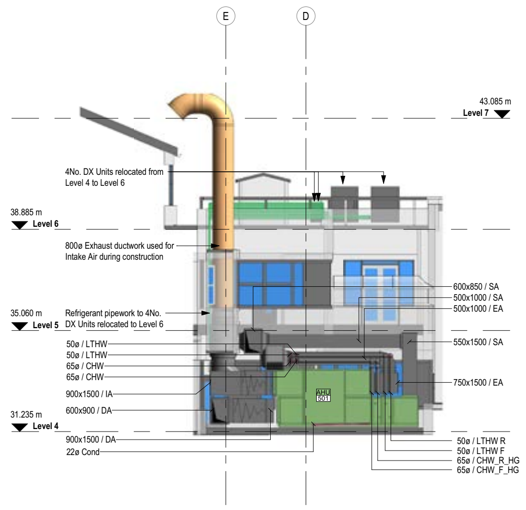


3 Interface 64 - Level 4 CCC Design
1 : 100



4 3D View - Advanced Works

5 3D View - CCC Design



A Section A - Advanced Works
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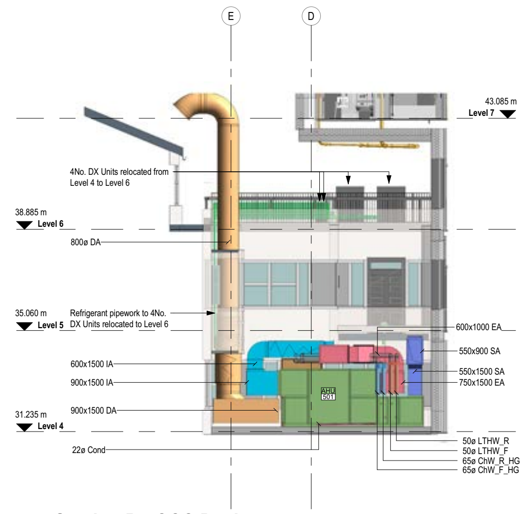
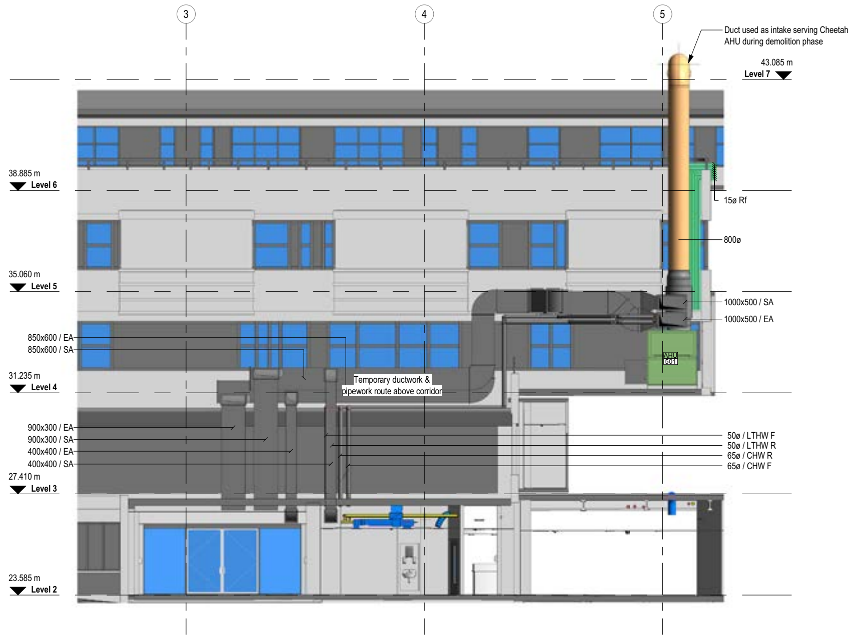


B Section B - CCC Design
1 : 100



C Section C - Advcanced Works (South Elevation)
1 : 100

D Section D - CCC Design (South Elevation)
1 : 100

LEGEND

SYSTEMS:-

LTHW_F	LOW TEMPERATURE HOT WATER FLOW	
LTHW_R	LOW TEMPERATURE HOT WATER RETURN	
MTHW_F	MEDIUM TEMPERATURE HOT WATER FLOW	
MTHW_R	MEDIUM TEMPERATURE HOT WATER RETURN	
Rf	REFRIGERANT	
ChW_F_HG	HIGH GRADE CHILLED WATER FLOW	
ChW_R_HG	HIGH GRADE CHILLED WATER RETURN	
CdW_F	CONDENSER WATER FLOW	
CdW_R	CONDENSER WATER RETURN	
	DEMOLITION	
EA	EXTRACT AIR	
IA	INTAKE AIR	
DA	DISCHARGE AIR	
SA	SUPPLY AIR	
	FIRE RATED DUCTWORK	

REFERENCE:-

?? / ?? — EQUIPMENT — SEE ABBREVIATIONS — UNIQUE NUMBER

?? / ?? — EQUIPMENT — SEE ABBREVIATIONS — UNIQUE NUMBER

ABBREVIATION:-

AHU	AIR HANDLING UNIT
AV	AIR VENT
CAS	CASSETTE UNIT
CB	CHILLED BEAM
CC	COOLING COIL
CFR	CONSTANT FLOW REGULATOR
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
DC	DRAIN COCK
DT	DRIP TRAY
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT
FM	FLOW METER
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PICV	PRESSURE INDEPENDENT CONTROL VALVE
STR	STRAINER
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FA	FROM ABOVE
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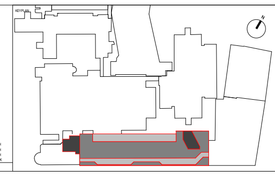

CLIENT
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PROJECT TITLE	GOSH Children's Cancer Centre
PROJECT NUMBER	P2007598
DRAWING TITLE	Advanced Works - Interface 64 Cheetah Ward AHU & Chiller Reprovision
DRAWING NO.	GOSHCCC-BDP-ZZ-ZZ-DR-J-5000-1003
STATUS/SUITABILITY	S3 - For Review & Comment
SCALE	1 : 100
DRAWING SIZE	@ A0
REVISION DATE	07/12/2023
DRAWN BY	JB
CHECKED BY	MH
APPROVED BY	MH
PURPOSE OF ISSUE	Stage 4 Advanced Works Issue
REVISION	P03

Level 2 VCB - Strip-out Drawing

- HOARDING AT SITE POSSESSION
- HOARDING DURING CONSTRUCTION PHASE
- DEMOLITION/ SERVICES TO BE REMOVED
- ASSUMED EXISTING LTHW F&R ROUTE TO BE CONFIRED ON SITE
- LTHW F&R PIPEWORK TO BE REMOVED
- NEW LTHW F&R TO SERVE LEVEL 4 AHU
- ASSUMED EXISTING CHW F&R ROUTE TO BE CONFIRED ON SITE
- CHW F&R PIPEWORK TO BE REMOVED
- NEW CHW F&R FROM MRI PLANTROOM
- PROPOSED CONNECTION LOCATION TO EXISTING SERVICES

VENTILATION LAYOUT TAKEN FROM DRAWING B2-MEC (21/05/2018)

PROPOSED CONNECTION LOCATION TO EXISTING DUCTWORK

LTHW F&R ROUTE FROM EXISTING PLANT TO BE CONFIRMED BY SURVEY

SUPERSEDED LAYOUT. SHELL SPACE SERVICES TO BE REMOVED FOR NEW DUCT ROUTE FROM LEVEL 4 AHU

SLAB BREAKTHROUGH ZONES FOR NEW DUCTWORK & PIPEWORK

NEW LTHW & CHW ROUTE TO LEVEL 4

AREA BEING INSTALLED AS PART OF SECOND PHASE

SHELL SPACE

SUPPLY & EXTRACT DUCTWORK RISES TO AHU AT LEVEL 4. PLANT ARE SEE DRAWING 6485/0313/M03

RISER ASSUMED TO BE CHW & LTHW F&R ROUTE TO LEVEL 4 AHU & CHILLER TO BE CONFIRMED BY TRUST

RECORD DRAWING

Level 2 VCB - Connection into existing services

- HOARDING AT SITE POSSESSION
- HOARDING DURING CONSTRUCTION PHASE
- DEMOLITION/ SERVICES TO BE REMOVED
- ASSUMED EXISTING LTHW F&R ROUTE TO BE CONFIRED ON SITE
- LTHW F&R PIPEWORK TO BE REMOVED
- NEW LTHW F&R TO SERVE LEVEL 4 AHU
- ASSUMED EXISTING CHW F&R ROUTE TO BE CONFIRED ON SITE
- CHW F&R PIPEWORK TO BE REMOVED
- NEW CHW F&R FROM MRI PLANTROOM
- PROPOSED CONNECTION LOCATION TO EXISTING SERVICES

VENTILATION LAYOUT TAKEN FROM DRAWING B2-MEC (21/05/2018)

PROPOSED CONNECTION LOCATION TO EXISTING DUCTWORK

RELOCATE EXISTING FCU 04 OR FCU 05 TO SERVE LOBBY

LTHW F&R ROUTE FROM EXISTING PLANT TO BE CONFIRMED BY SURVEY

SUPERSEDED LAYOUT. SHELL SPACE SERVICES TO BE REMOVED FOR NEW DUCT ROUTE FROM LEVEL 4 AHU

SLAB BREAKTHROUGH ZONES FOR NEW DUCTWORK & PIPEWORK

NEW LTHW & CHW ROUTE TO LEVEL 4

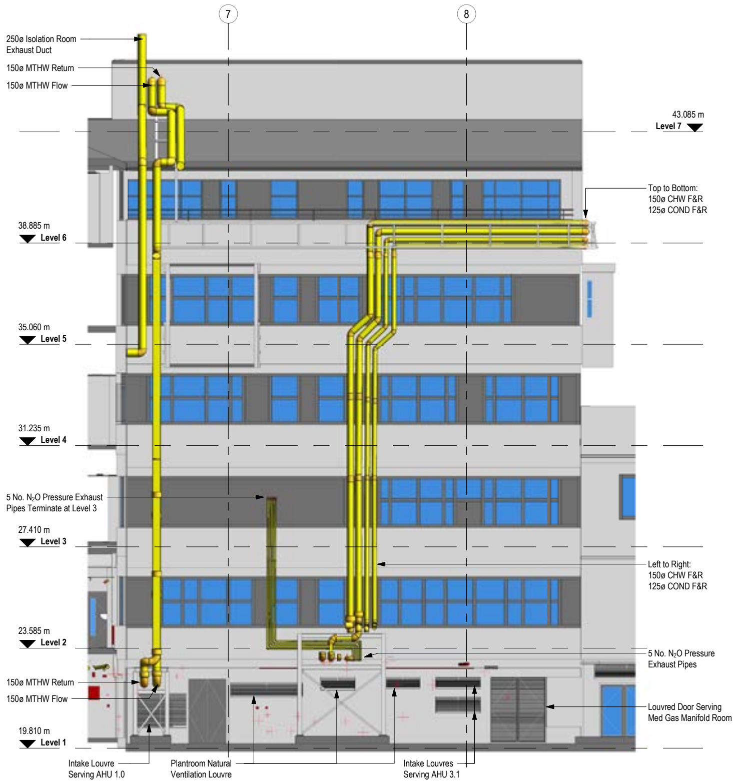
AREA BEING INSTALLED AS PART OF SECOND PHASE

SHELL SPACE

SUPPLY & EXTRACT DUCTWORK RISES TO AHU AT LEVEL 4. PLANT ARE SEE DRAWING 6485/0313/M03

RISER ASSUMED TO BE CHW & LTHW F&R ROUTE TO LEVEL 4 AHU & CHILLER TO BE CONFIRMED BY TRUST

RECORD DRAWING



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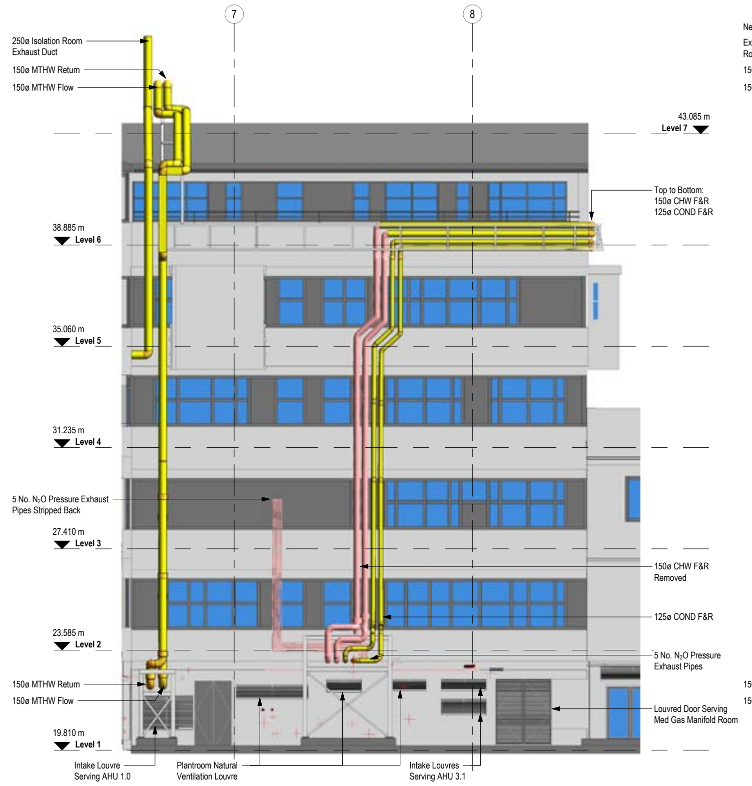
1 : 100



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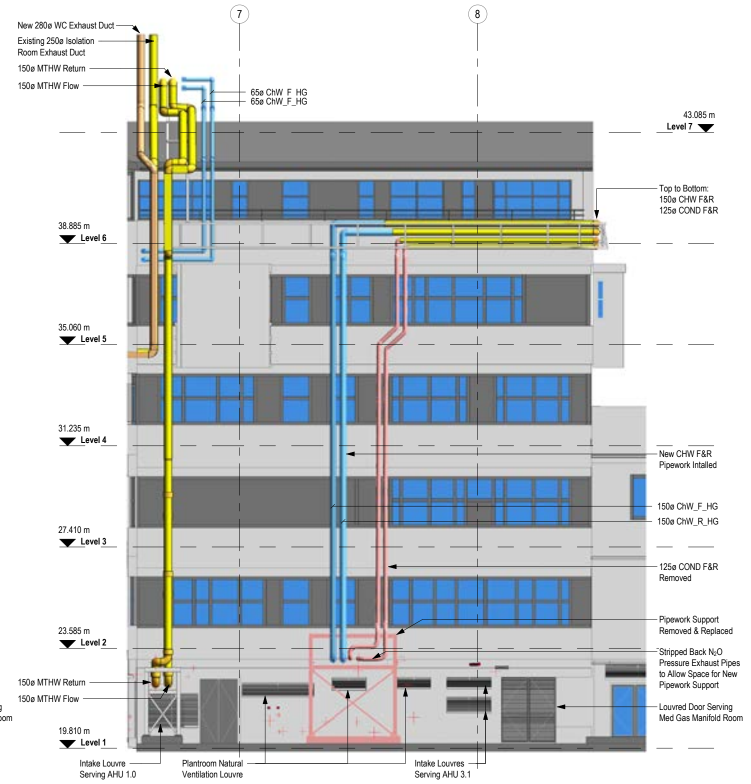

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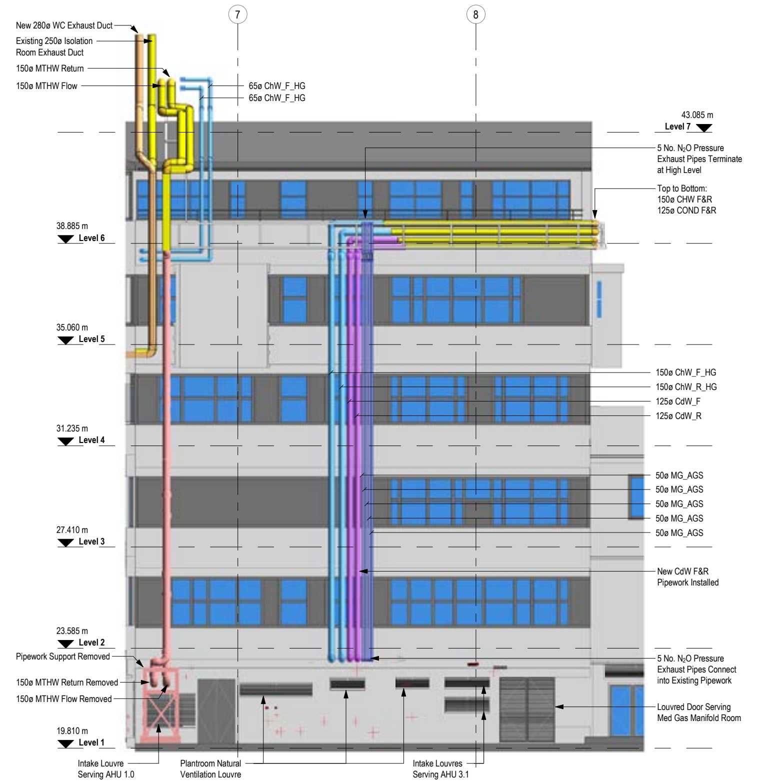
1 : 100



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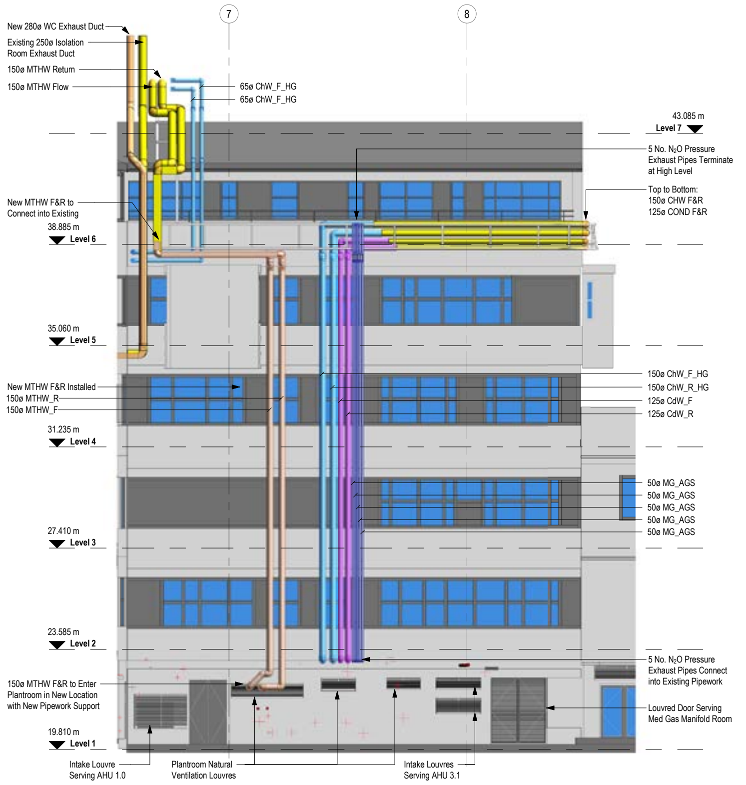
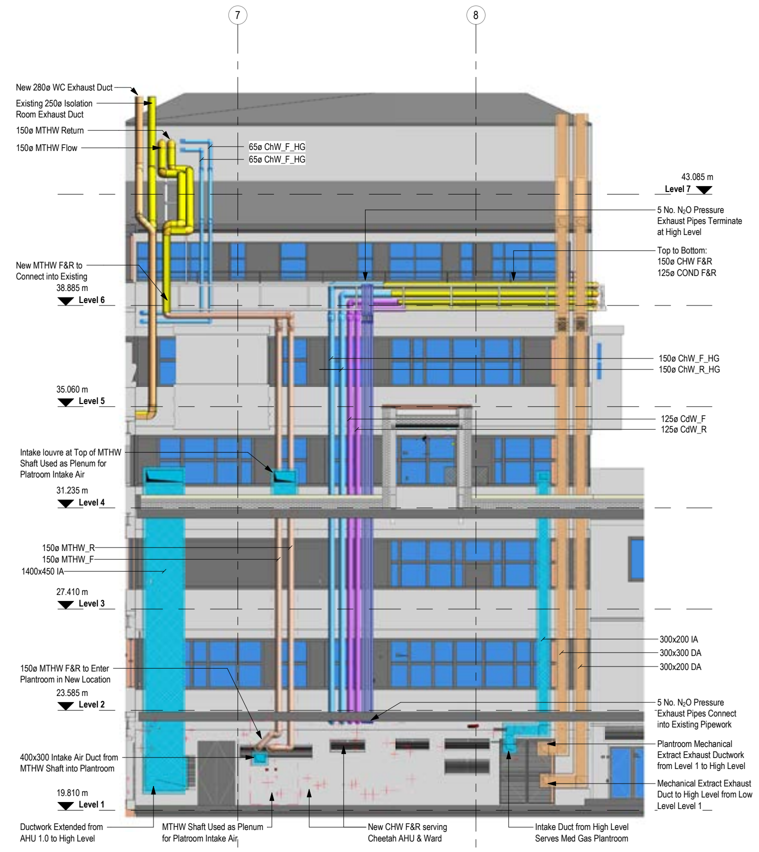
1 : 100



5 **Section - Advanced Works Phase 4**
1 : 100

6 **Section - Advanced Works Phase 5**
1 : 100



7 **Section - Proposed CCC Design**
1 : 100

LEGEND

SYSTEMS:-

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LTHW_R	LOW TEMPERATURE HOT WATER RETURN
MTHW_F	MEDIUM TEMPERATURE HOT WATER FLOW
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	DEMOLITION
EA	EXTRACT AIR
IA	INTAKE AIR
DA	DISCHARGE AIR
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	FIRE RATED DUCTWORK

REFERENCE:-

EQUIPMENT
SEE ABBREVIATIONS
UNIQUE NUMBER

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ABBREVIATION:-

AHU	AIR HANDLING UNIT
AV	AIR VENT
CAS	CASSETTE UNIT
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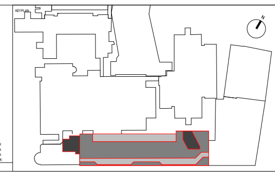
REVISION	DATE	DESCRIPTION	DRW	CHK
P03	07/12/2023	Stage 4 Advanced Works Issue	JB	MH
P02	23/11/2023	Stage 4 Advanced Works Issue	JB	MH
P01	27/10/2023	Stage 4 Advanced Works Issue	JB	MH

KEYPLAN



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DESIGN LEAD
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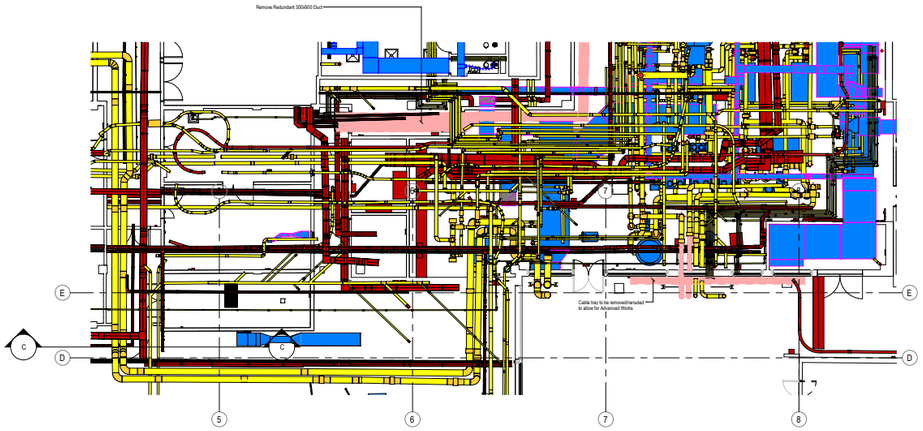
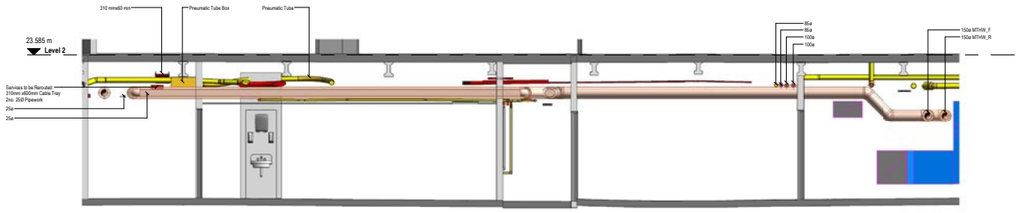
United Kingdom
T +44 [0]20 7812 8000
www.bdp.com

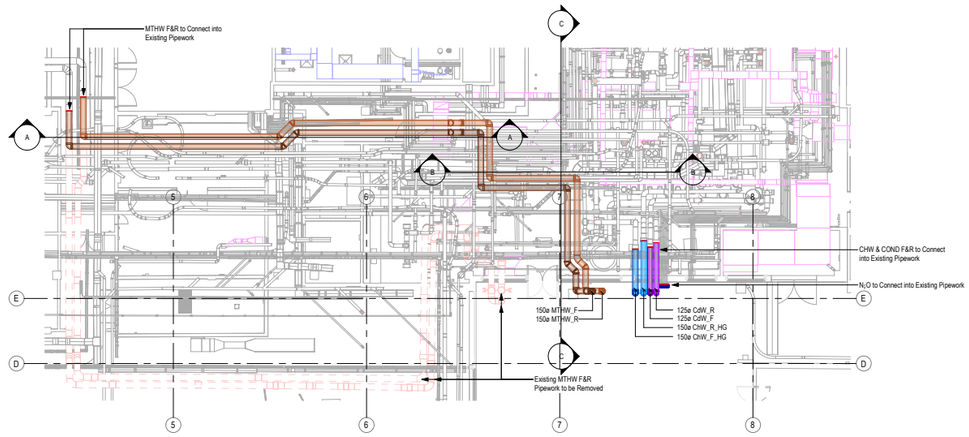
PROJECT TITLE: GOSH Children's Cancer Centre
PROJECT NUMBER: P2007598
DRAWING TITLE: Advanced Works - Interface 11
VCB South Elevation
DRAWING NO.: GOSHCCC-BDP-XX-XX-DR-J-5000-0001
STATUS/SUITABILITY: S3 - For Review & Comment
SCALE: 1 : 100 DRAWING SIZE: @ A0
REVISION DATE: 07/12/2023
DRAW BY: JB CHECKED BY: MH APPROVED BY: MH
PURPOSE OF ISSUE: Stage 4 Advanced Works Issue
REVISION: P03



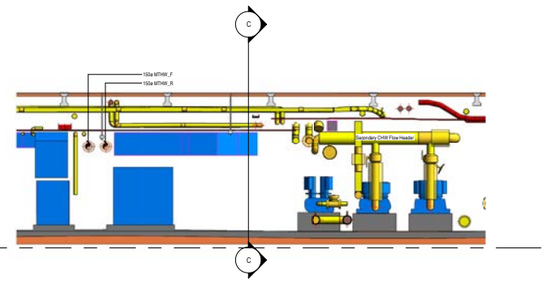
1 Interface 11 - Existing Level 1 Layout
1 : 100



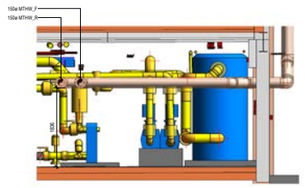
A Section A
1 : 50



2 Interface 11 - Advanced Works Level 1 Layout
1 : 100



B Section B
1 : 50



C Section C
1 : 50

LEGEND

SYSTEMS:-

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LTHW_R	LOW TEMPERATURE HOT WATER RETURN	ChW_R_HG	HIGH GRADE CHILLED WATER RETURN	IA	INTAKE AIR
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Rf	REFRIGERANT		DEMOLITION		FIRE RATED DUCTWORK

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SEE ABBREVIATIONS
UNIQUE NUMBER

EQUIPMENT
SEE ABBREVIATIONS
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ABBREVIATION:-

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AV	AIR VENT	FC	FLEXIBLE CONNECTION	IV	ISOLATION VALVE	TA	TO ABOVE
CAS	CASSETTE UNIT	FCU	FAN COIL UNIT	PHX	PLATE HEAT EXCHANGER	FB	FROM BELOW
CB	CHILLED BEAM	FM	FLOW METER	PICV	PRESSURE INDEPENDENT CONTROL VALVE	TB	TO BELOW
CC	COOLING COIL	FMD	FLOW MEASURING DEVICE			HL	HIGH LEVEL
CFR	CONSTANT FLOW REGULATOR	FOCS	FIXED ORIFICE COMMISIONING SET	STR	STRAINER	LL	LOW LEVEL
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT	FV	FLUSHING VALVE	TS	TEMPERATURE SENSOR		
DC	DRAIN COCK	HC	HEATING COIL	TP	TEST POINT		

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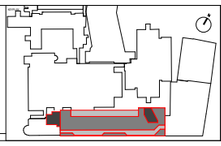
P03	07/12/2023	Stage 4 Advanced Works Issue	JB	MH
P02	20/11/2023	Stage 4 Advanced Works Issue	JB	MH
P01	31/10/2023	Stage 4 Advanced Works Issue	JB	MH
REVISION	DATE	DESCRIPTION	BY	CHK



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PROJECT	GOSH Children's Cancer Centre
PROJECT NO.	P2007598
DRAWING TITLE	Advanced Works - Interface 11 Level 1 Layout
DRAWING NO.	GOSHCCC-BDP-ZZ-01-DR-J-5000-1002
PURPOSE OF ISSUE	S3 - For Review & Comment
SCALE	As indicated @ A01
ISSUE DATE	07/12/2023
DRAWN	JB
CHECKED	MH
APPROVED	MH
STAGE	Stage 4 Advanced Works Issue
REVISION	P03

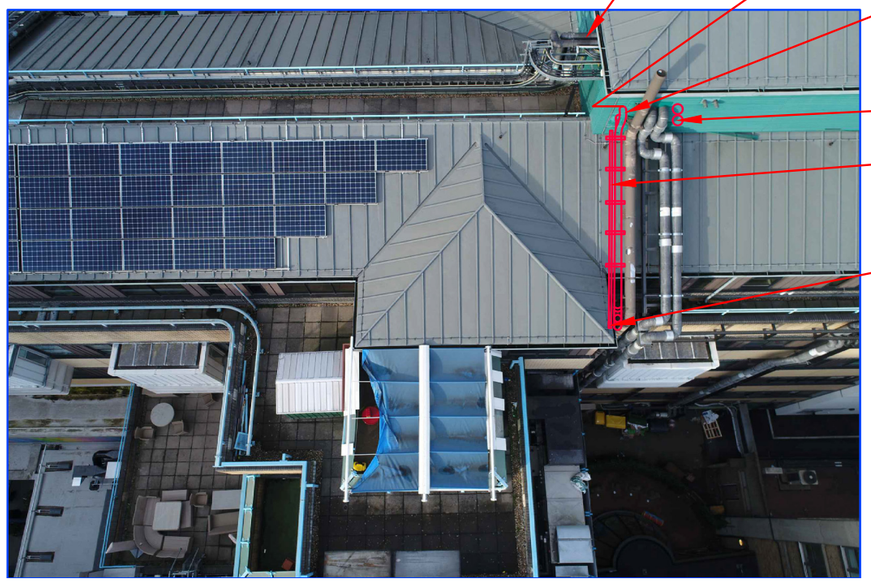
cable tray and other services will require
adjustment to all for new 65Ø connections

100Ø install new connections with IV & PICV (not motorised)
valve for balancing for Angio service

existing 100Ø CHW F&R

65Ø install new connections with IV & PICV (not motorised)
valve for balancing with 65Ø by pass for flushing / AV's at high point

65Ø install new flushing by pass



65Ø CHW F&R served from Angiography Pumps Grundfos
TPED 100-370/4 A-F-A BAQE Pumps design duty 36.55 L/S
Angio service flow rate = 2.14 L/S.

65Ø CHW F&R alternative location for exist from plant room

65Ø CHW F&R with new steel beam channel supports tie
back to existing steel beam supporting 300 Ø extract duct

65Ø CHW F&R drop down to level 4 and run through
Matron's office. As for Option shown on BDP IFC 116 Rev
P03

P2007598- Great Ormond Street Hospital For Children NHS Foundation Trust - Children Cancer Centre

Title	Interface 64 - Air Handling Unit Schedule
Outline Description	Equipment Schedule for compact air handling unit Serving Cheetah Ward

Doc No:	GOSHCCC-BDP-ZZ-ZZ-SH-M-5000-XXX
Issue:	RIBA Stage 4
Rev:	P02
Produced by:	M Harris
Published Date:	23.11.2023

BDP.

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Clerkenwell
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BDP.

P2007598- Great Ormond Street Hospital For Children NHS Foundation Trust - Children Cancer Centre

REV	DESCRIPTION	ORIG	REVIEW	BDP APPROVAL	DATE	CLIENT APPROVAL
P01	RIBA Stage 4 - Advanced Works Prelim Issue	M Harris	J Binnie	M Harris	13.10.2023	
P02	RIBA Stage 4 - Advanced Works Issue	M Harris	J Binnie	M Harris	23.11.2023	

EQUIPMENT SCHEDULE

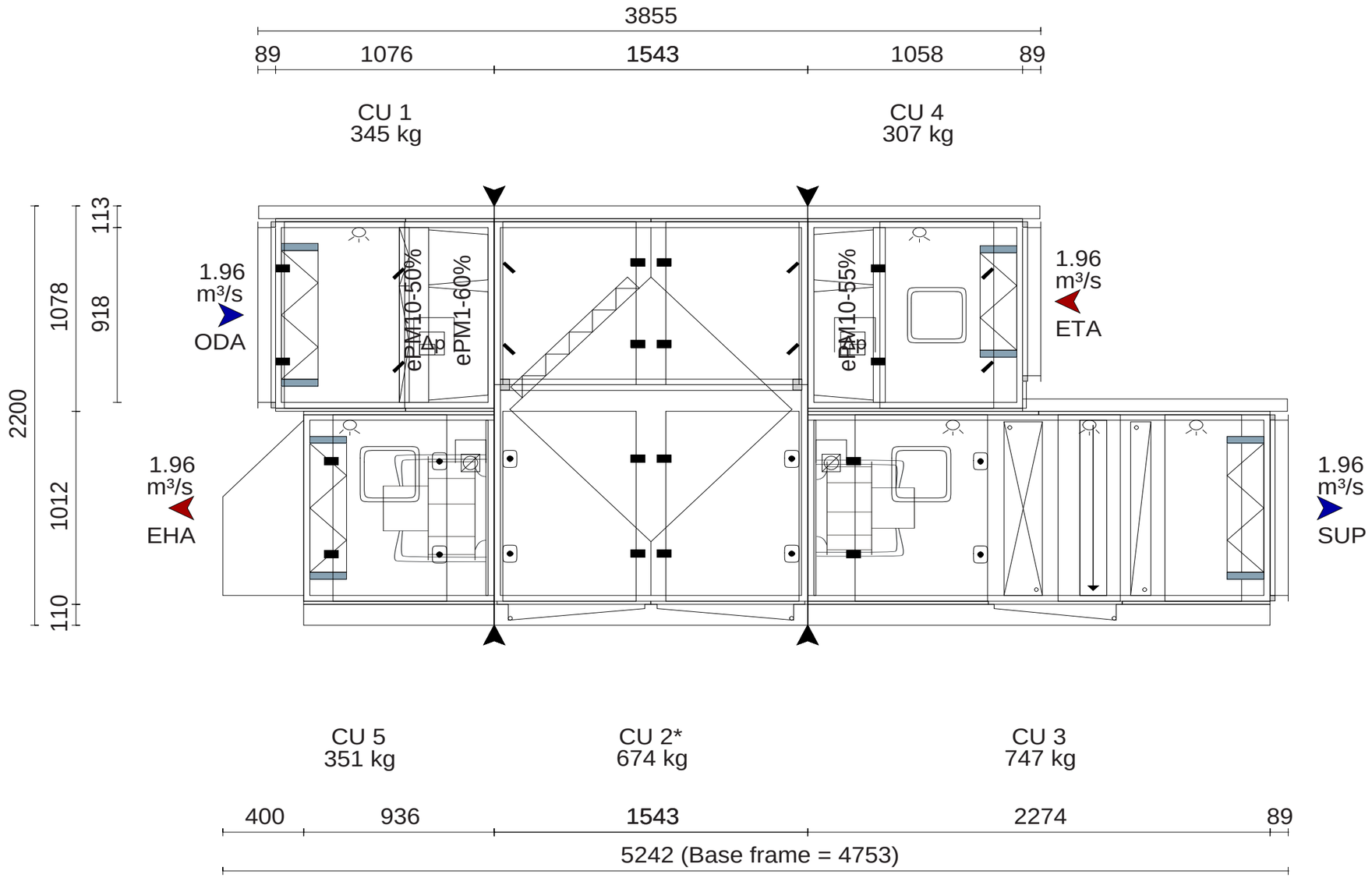
Project title **P2007598- Great Ormond Street Hospital For Children NHS Foundation Trust - Children Cancer Centre**
Schedule title **Interface 64 - Air Handling Unit Schedule**
Schedule ref **GOSHCCC-BDP-ZZ-ZZ-SH-M-5000-XXXX**
Date 23.11.23
Revision P02

Equipment Details

Manufactured to meet the requirements of the performance data and as below:

Schedule of Air Handling Units and Performance

Ref	Area Served	Internal / External	Fans									Filters			Heating												Cooling Coil						Humidification					Room Side Attenuators		Atmospheric Side Attenuators		Notes
	Department		Supply				Extract				Maxiumum Specific Fan Power	Pre Filter	Main Filter	Return Air Filter	Fog Coil				Heat Recovery				LTHW Heater																			Supply	Extract	Supply	Extract	
			Air Vol	System Static Pressure External to AHU	Duty / Standby Provision	Motor Size	Air Vol	System Static Pressure External to AHU	Duty / Standby Provision	Motor Size					Inlet Air Temp	Outlet air Temp	Heating Capacity	LTHW Flow Rate	Type	Min Efficiency	Return Air Temp	Inlet Air Temp	Outlet air Temp	Inlet Air Temp	Max supply air Temp	Heating Capacity	LTHW Flow Rate	Inlet air temp	Inlet air enthalpy	Outlet Air Temp	Outlet Air Enthalpy	Cooling Capacity	Chilled Water Flow Rate	Inlet air Moisture content	Min Supply Air Humidity	Supply air Moisture content	Humidifier Duty	Humidifier Duty	Max NR Level in Supply duct	Max NR Level in Intake duct	Max NR Level at unit intake	Max NR Level at unit discharge	
			m^3/s	Pa		kW	m^3/s	Pa		kW	W/l/s				°C	°C	kW	kg/s			°C	°C	°C	°C	°C	kW	kg/s	°C DB/WB	Kj/Kg	°C DB/WB	Kj/Kg	kW	Kg/s	g/g		g/g	kg/hr	kW	NR	NR	NR	NR	
Interface 64	**(Located on Level 4)**																																								
AHU-501	Cheetah OPD (L2)	Internal	1.92	400 (provisional)	No	2.51 TBC	1.92	400 (provisional)	No	2.51 TBC	2.60	M5	ISO 16890 ePM1 >50%	M5	-7	-2	12.0	0.408	PHX	73%	21	-7	13.4	13.4	19	13.3	0.454	33/20.5	58.5	16/14	39.1	46.56	1.848						-	-	-	-	Attenuators to be duct mounted.



SU	Casing units	Weight
1	1	345 kg
2*	2	674 kg
3	3	747 kg
4	4	306 kg
5	5	351 kg

SU	Dimensions [mm]		
	L	B	H
1	1165	1889	1078
2*	1543	1807	2200*
3	2363	1821	1188
4	1147	1889	1078
5	1336	1821	1122

* The casing unit is separeted. The exact SU-sizes are available on request.

EUROVENT CERTIFIED PERFORMANCE ENERGY EFFICIENCY
www.eurovent-certification.com
AHU 13.02.005
A+ 2016
Report to performance data

TROX® TECHNIK

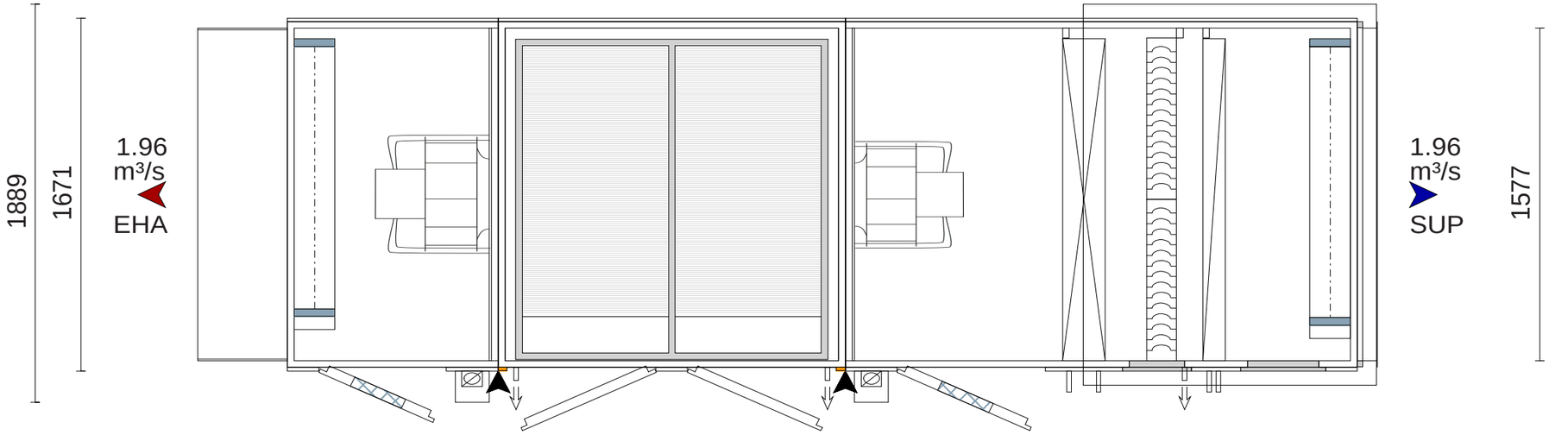
X-CUBE Configurator V4.1.0.34 (20/06/2023)

X CUBE

Project:	GOSH Cheetah Ward		
Unit:	Cheetah Ward (without fog coil)		
Quotation no.:	79027 - 000	Position:	30
Order no.:		Section:	
Date:	24/10/2023		
Editor:	Sayers, Amanda		

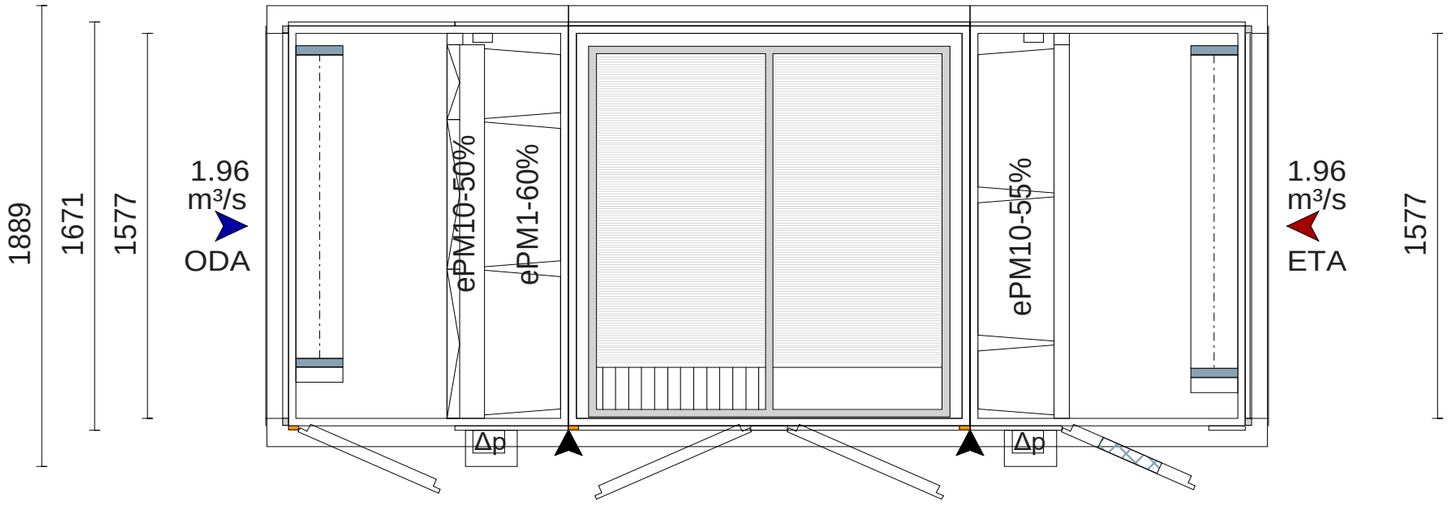
Supply air 2515 / Extract air 2515
Total weight: 2423 kg
Base frame (BxHxL): 1637 mm * 110 mm * 4893 mm
Panel dimensions in brackets
85 mm Roof overhang
4x Lifting eyes

X CUBE



Project:	GOSH Cheetah Ward		
Unit:	Cheetah Ward (without fog coil)		
Quotation no.:	79027 - 000	Position:	30
Order no.:		Section:	
Date:	24/10/2023		
Editor:	Sayers, Amanda		

Supply air 2515 / Extract air 2515
Total weight: 2423 kg
Base frame (BxHxL): 1637 mm * 110 mm * 4893 mm
Panel dimensions in brackets
85 mm Roof overhang
4x Lifting eyes



TROX® TECHNIK

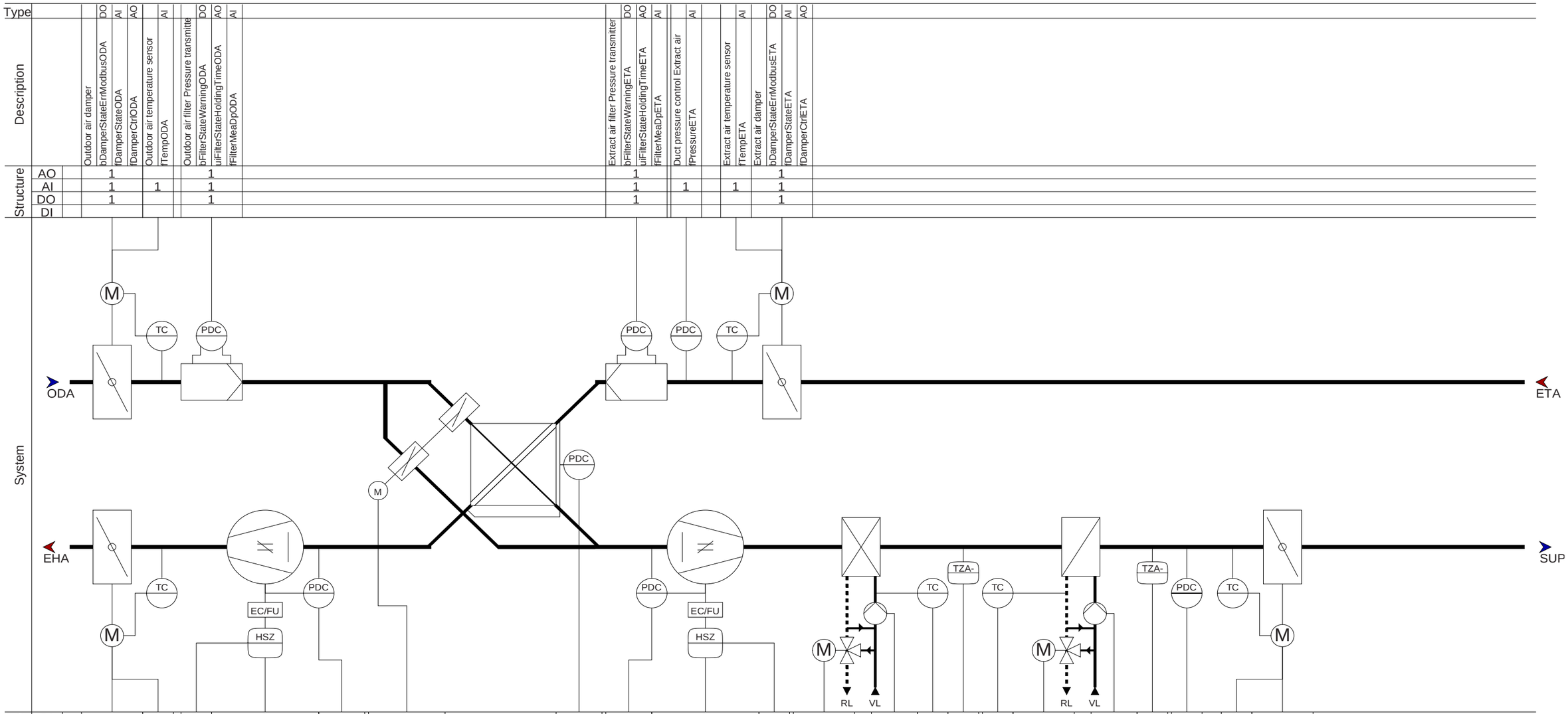
X-CUBE Configurator V4.1.0.34 (20/06/2023)

X-CUBE

Project:	GOSH Cheetah Ward		
Unit:	Cheetah Ward (without fog coil)		
Quotation no.:	79027 - 000	Position:	30
Order no.:		Section:	
Date:	24/10/2023		
Editor:	Sayers, Amanda		

Supply air 2515 / Extract air 2515
Total weight: 2423 kg
Base frame (BxHxL): 1637 mm * 110 mm * 4893 mm
Panel dimensions in brackets
85 mm Roof overhang
4x Lifting eyes

X-CUBE



TROX® TECHNIK

X-CUBE Configurator V4.1.0.34 (20/06/2023)

X-CUBE

Project:	GOSH Cheetah Ward		
Unit:	Cheetah Ward (without fog coil)		
Quotation no.:	79027 - 000	Position:	3
Order no.:		Section:	
Date:	24/10/2023		
Editor:	Sayers, Amanda		

X-CUBE

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

Project:	GOSH Cheetah Ward
Unit:	Cheetah Ward (without fog coil)
Version:	000
Quotation no.:	79027
Item:	3
Section:	
Last edited:	24/10/2023
Editor:	Sayers, Amanda

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Unit data

Variant:	Weatherproof (Casing type: X-CUBE)		
Type:	Supply air 2515 / Extract air 2515		
Length:	4893 mm	Surface (Outside):	Powder-coated
Width:	1671 mm		Similar to RAL 9016
Height:	2134 (2200) mm	Base frame:	110 mm
Weight:	2423 kg		

	Supply air	Extract air
Volume flow rate:	1.96 m³/s	1.96 m³/s
External pressure:	400 Pa	350 Pa
Internal pressure:	473 Pa	219 Pa
Air velocity:	1.4 m/s (V1)	1.4 m/s (V1)
Surface (Internal):	Powder-coated Similar to RAL 9016	Powder-coated Similar to RAL 9016
SFPv value:	Supply air: 1043 W/(m³/s)	Extract air: 745 W/(m³/s) Total: 1788 W/(m³/s)

ErP ready

Greater London

Fractional efficiency of supply air unit
(calculated according to ISO 16890)

Fractional efficiency ePM1:	60%
Fractional efficiency ePM2.5:	70%
Fractional efficiency ePM10	90%

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

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Supply air unit

3.1	**Casing unit 1**		1076 mm	345 kg
3.1.2	**Intake / discharge section**	1 Pa	180 mm	56.1 kg

Connection: On the left (Damper (internal))

Volume flow rate:	1.96 m³/s
Multileaf damper:	JZ-LL
Variant:	Galvanised steel
Pressure drop (Open):	1 Pa
Leakage class:	4 (To EN 1751)
Weight:	56.1 kg
Damper dimensions (W x H):	1x 1242 x 675 mm
Torque:	15 Nm
Connector:	Noise insulating connector
Material:	Galvanised steel, uncoated
Dimensions (W x H):	1x 1577 x 918 mm

Accessories:
1x Damper actuator with spring return, Position: Operating side, Voltage: 24V AC/DC, Capacity: 7 VA, Torque: 20 Nm, Function: Modbus

3.1.3	**Maintenance chamber**		400 mm	0 kg

Accessories:
1x Inspection access door
1x LED lighting 24V DC / 7 W

3.1.4	**Filter**	259 Pa	436 mm	42.6 kg

Volume flow rate:	1.96 m³/s
Variant:	Z-Line filter
Type:	ZL-ePM10-50%-PLA
Filter class (ISO 16890):	ePM10-50%
Differential pressure A / E / D:	57 / 157 / 157 Pa
Air velocity:	1.5 m/s
Filter area:	4.9 m²
Pocket depth:	48 mm
Quantity:	2x 592 x 592 mm 1x 287 x 592 mm 2x 592 x 287 mm
Filter frame:	Powder-coated
Type of inspection access:	Upstream side
Volume flow rate:	1.96 m³/s
Variant:	Compact filter
Type:	MFI-ePM1-60%-PLA
Filter class (ISO 16890):	ePM1-60%
Fractional efficiency ePM1/2,5/10:	60/70/90 %
Eurovent energy efficiency	A
Differential pressure A / E / D:	34 / 102 / 102 Pa
Air velocity:	1.5 m/s
Filter area:	56.7 m²
Pocket depth:	292 mm
Quantity:	2x 592 x 592 mm

Accessories:
2x Pressure measurement point
1x Differential pressure indication with mark pointer
1x Diff. pressure transducer without display

Data sheet for quotation

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Item: 3
Section:
Last edited: 24/10/2023
Editor: Sayers, Amanda

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	1x 287 x 592 mm 2x 592 x 287 mm	
Filter frame:	Powder-coated	
Type of inspection access:	Upstream side	

3.2	**Casing unit 2**		1543 mm	673.7 kg
3.2.2	**Heat recovery - plate heat exchanger**	142 Pa	1483 mm	174 kg

Volume flow rate:		1.96	m³/s
Type		KV-100/P1/1520/BSK175,H	
Variant:		Cross flow	
Bypass:		Bypass installed on one side	
Bypass width:		175	mm
Bypass damper torque:		11	Nm
Pressure drop (Supply air):		142	Pa
Efficiency class:		H2	(EN 13053 / 2020)
Thermal efficiency EN308:		73.8	%
Energy efficiency:		72	%
Operating status:	II	I	
Th. efficiency of dry air:	73.8	73.5	%
Th. efficiency of humid air:	73.8	79.3	%
Outdoor air temperature:	33	-7	°C
Outdoor air humidity:	31.3	90	%
Supply air temperature:	26.4	15.2	°C
Supply air humidity:	45.8	17.6	%
Extract air temperature:	24	21	°C
Extract air humidity:	50	40	%
Exhaust air temperature:	30.6	2.7	°C
Exhaust air humidity:	33.8	100	%
Capacity (dry):	-15.7	52.4	kW

Accessories:
2x Condensate drip tray in stainless steel, Connection side: Operating side
1x Diff. pressure transducer without display
4x Inspection access door
1x Damper actuator Bypass damper, Voltage: 24V AC/DC, Capacity: 4 VA, Torque: 20 Nm, Function: Modbus

3.3	**Casing unit 3**		2274 mm	746.6 kg
3.3.2	**Fan**	873 Pa	512 mm	63 kg

X-CUBE Configurator V4.1.0.34 (20/06/2023)

TROX TECHNIK

Data sheet for quotation

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Last edited: 24/10/2023
Editor: Sayers, Amanda

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Volume flow rate:	1.96	m³/s
Type:	GR45I-ZID.GG.CR	
Variant:	Plug fan with EC motor	
Fan mounting plate:	Powder-coated	
Static pressure increase:	873	Pa
Operating speed:	2052	1/min
Motor margin:	40.8	%
Total power consumption:	2.5	kW
System efficiency (static):	69.2	%
SFP class / SFPv value:	SFP 2 / 1043	W/(m³/s)
Power consumption class for motors:	P1 (Pm_{ref} = 3.6kW)	
Calibration factor:	220	
Effective pressure:	1029	Pa

Sound power level
1. Intake side $L_{W,5}$ 75 dB
2. Discharge side $L_{W\,6}$ 86 dB

	63	125	250	500	1 k	2 k	4 k	8 k	
1.	68	74	76	74	68	67	63	62	dB
2.	73	82	82	81	80	80	77	71	dB

Motor

Nominal capacity:	3.4	kW
Nominal speed:	2300	1/min
Nominal voltage:	400	V
Mains:	3~ 400V 50Hz	
Rated current consumption:	5.4	A
Efficiency-Class:	IE5	
Protection class:	IP55	

The fan is calculated for dry conditions.
The recommended final pressure drop of the filter is used for fan calculation.
The size of the fan casing has been taken into account.

Accessories:
2x Cable gland 2xM20 (UV-resistant)
3x Pressure measurement point
1x Local isolator - load current
1x Diff. pressure transducer without display

3.3.3	**Maintenance chamber**		346 mm	0 kg

Accessories:
1x Inspection access door
1x Inspection window
1x LED lighting 24V DC / 7 W

3.3.4	**Air cooler (Cooling coil)**	52 Pa	344 mm	101 kg

Volume flow rate:	1.96	m³/s
Variant:	Cu / AlPr	
Type:	Cu-AlPr-Inox304 P3012AR 5R-28T-1336A-2.5pa 14C 1 1/2"	
Fin spacing:	2.5	mm
Air velocity:	1.9	m/s
Pressure drop - dry air:	44	Pa

Accessories:
1x Condensate drip tray in stainless steel, Connection side: Operating side
1x Droplet eliminator
1x 3-way, Control ball valve, Modbus actuator, unmounted (R3050-25-

Data sheet for quotation

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Item:	3
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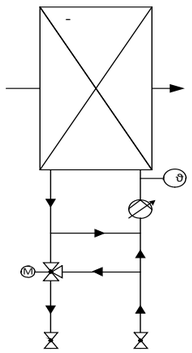
Pressure drop - wet air:	67 Pa
Pressure drop - droplet eliminator:	8 Pa
Capacity:	45.6 kW
Air temperature (Intake):	33 °C
Air humidity (Intake):	31.3 %
	9.8 g/kg
Air temperature (Outlet):	16 °C
Air humidity (Outlet):	80.4 %
	9.13 g/kg
Condensate quantity:	6.29 kg/h
Operating fluid:	Water
Operating fluid temperature (Intake):	6 °C
Operating fluid temperature (Outlet):	12 °C
Heat exchanger volume:	26.1 l
Operating fluid flow rate:	6.52 m³/h
Pressure drop Operating fluid:	43.1 kPa
Tube rows:	5
Connection direction:	A- straight
Connection:	DN 40
Connection side:	Operating side

S4 2" IG-1 1/4", Kvs value: 25, ΔP: 6.8kPa) Selection based on the injection circuit.
1x Anti-frost thermostat mounted on heat exchanger frame

Circuit schema for valve selection (Injection):



3.3.5	**Maintenance chamber**		306 mm	0 kg

Accessories:
1x Inspection access panel with compression latches and handles
1x LED lighting 24V DC / 7 W

3.3.6	**Air heater (Heating coil)**	11 Pa	220 mm	29 kg

Volume flow rate:	1.96 m³/s
Variant:	Cu / Cu
Type:	Cu-Cu-FeZn P40AC 1R-21T-1356A-4.0pa 3C 3/4"
Fin spacing:	4 mm
Air velocity:	1.7 m/s
Pressure drop:	11 Pa
Capacity:	13.3 kW
Air temperature (Intake):	13.4 °C
Air humidity (Intake):	17.6 %
	1.67 g/kg
Air temperature (Outlet):	19 °C
Air humidity (Outlet):	12.3 %
	1.67 g/kg
Operating fluid:	Water
Operating fluid temperature (Intake):	45 °C
Operating fluid temperature (Outlet):	38 °C
Heat exchanger volume:	7.3 l
Operating fluid flow rate:	1.66 m³/h
Pressure drop Operating fluid:	19.9 kPa
Tube rows:	1

Accessories:
1x 3-way, Control ball valve, Modbus actuator, unmounted (R518 1 1/4" AG-3/4", Kvs value: 6.3, ΔP: 6.9kPa) Selection based on the injection circuit.
1x Anti-frost thermostat mounted on heat exchanger frame

Circuit schema for valve selection (Injection):

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

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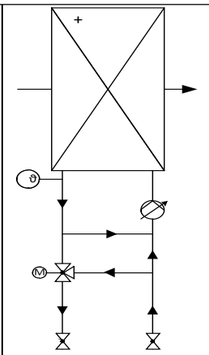
Connection direction:	A- straight
Connection:	DN 20



3.3.7	**Maintenance chamber**		306 mm	0 kg

Accessories:
1x Inspection access panel with compression latches and handles
1x LED lighting 24V DC / 7 W

3.3.8	**Intake / discharge section**	1 Pa	180 mm	46.1 kg

Connection: On the right (Damper (internal))

Volume flow rate:	1.96 m³/s
Multileaf damper:	JZ-HL
Variant:	Galvanised steel
Pressure drop (Open):	1 Pa
Leakage class:	2 (To EN 1751)
Weight:	46.1 kg
Damper dimensions (W x H):	1x 1284 x 675 mm
Torque:	10 Nm
Connector:	Noise insulating connector
Material:	Galvanised steel, uncoated
Dimensions (W x H):	1x 1577 x 918 mm

Accessories:
1x Damper actuator, Position: Operating side, Voltage: 24V AC/DC, Capacity: 4.5 VA, Torque: 15 Nm, Function: Modbus

Extract air unit				
3.4	**Casing unit 4**		1058 mm	306.5 kg
3.4.2	**Intake / discharge section**	2 Pa	180 mm	40.9 kg

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Connection: On the right (Damper (internal))

Volume flow rate:	1.96 m³/s
Multileaf damper:	JZ-HL
Variant:	Galvanised steel
Pressure drop (Open):	2 Pa
Leakage class:	2 (To EN 1751)
Weight:	40.9 kg
Damper dimensions (W x H):	1x 1284 x 510 mm
Torque:	10 Nm
Connector:	Noise insulating connector
Material:	Galvanised steel, uncoated
Dimensions (W x H):	1x 1577 x 778 mm

Accessories:
1x Damper actuator, Position: Operating side, Voltage: 24V AC/DC, Capacity: 4.5 VA, Torque: 15 Nm, Function: Modbus

3.4.3	**Maintenance chamber**		466 mm	0 kg

Accessories:
1x Inspection access door
1x Inspection window
1x LED lighting 24V DC / 7 W

3.4.4	**Filter**	75 Pa	352 mm	27 kg

Volume flow rate:	1.96 m³/s
Variant:	Compact filter
Type:	MFI-ePM10-55%-PLA
Filter class (ISO 16890):	ePM10-55%
Fractional efficiency ePM1/2,5/10:	40/45/80 %
Eurovent energy efficiency	B
Differential pressure A / E / D:	25 / 75 / 75 Pa
Air velocity:	1.5 m/s
Filter area:	56.7 m²
Pocket depth:	292 mm
Quantity:	2x 592 x 592 mm 1x 287 x 592 mm 2x 592 x 287 mm
Filter frame:	Powder-coated
Type of inspection access:	Upstream side

Accessories:
2x Pressure measurement point
1x Differential pressure indication with mark pointer
1x Diff. pressure transducer without display

3.2	**Casing unit 2**		1543 mm	673.7 kg
3.2.2	**Heat recovery - plate heat exchanger**	142 Pa	1483 mm	174 kg

Volume flow rate:	1.96 m³/s
Pressure drop (Extract air):	142 Pa

Accessories:

3.5	**Casing unit 5**		936 mm	350.7 kg
3.5.2	**Fan**	569 Pa	535 mm	75 kg

X-CUBE Configurator V4.1.0.34 (20/06/2023)

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Volume flow rate:	1.96 m³/s
Type:	GR50I-ZID.GG.CR
Variant:	Plug fan with EC motor
Fan mounting plate:	Powder-coated
Static pressure increase:	569 Pa
Operating speed:	1493 1/min
Motor margin:	122.7 %
Total power consumption:	1.6 kW
System efficiency (static):	69.8 %
SFP class / SFPv value:	SFP 1 / 745 W/(m³/s)
Power consumption class for motors:	P1 (Pm_{ref} = 2.4kW)
Calibration factor:	280
Effective pressure:	635 Pa

Sound power level

1. Intake side $L_{W,5}$ 71 dB
2. Discharge side $L_{W\,6}$ 79 dB

	63	125	250	500	1 k	2 k	4 k	8 k	
1.	66	77	73	69	63	60	57	54	dB
2.	70	82	75	76	74	71	68	62	dB

Motor

Nominal capacity:	3.5 kW
Nominal speed:	1950 1/min
Nominal voltage:	400 V
Mains:	3~ 400V 50Hz
Rated current consumption:	5.6 A
Efficiency-Class:	IE5
Protection class:	IP55

The fan is calculated for dry conditions.
The recommended final pressure drop of the filter is used for fan calculation.
The size of the fan casing has been taken into account.

Accessories:
2x Cable gland 2xM20 (UV-resistant)
3x Pressure measurement point
1x Local isolator - load current
1x Diff. pressure transducer without display

3.5.3	**Maintenance chamber**		161 mm	0 kg

Accessories:
1x Inspection access door
1x Inspection window
1x LED lighting 24V DC / 7 W

3.5.4	**Intake / discharge section**	1 Pa	180 mm	76.5 kg

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

Quotation no.:	79027		
Item:	3		
Section:		Phone	+44 1842 851364
Last edited:	24/10/2023	E-mail	asayers@troxuk.co.uk
Editor:	Sayers, Amanda		

Connection: On the left (Damper (internal))

Volume flow rate:	1.96	m³/s
Multileaf damper:	JZ-LL	
Variant:	Galvanised steel	
Pressure drop (Open):	1	Pa
Leakage class:	4	(To EN 1751)
Weight:	76.5	kg
Damper dimensions (W x H):	1x 1242 x 675	mm
Torque:	15	Nm
Connector:	Weather hood	
Material:	Galvanised steel, powder-coated	
Dimensions (W x H):	1x 1577 x 918	mm

Accessories:

1x Damper actuator with spring return, Position: Operating side, Voltage: 24V AC/DC, Capacity: 7 VA, Torque: 20 Nm, Function: Modbus

Unit accessories

1x Diff. pressure transducer without display
1x Diff. pressure transducer without display
2x Open end wrench, unmounted

Transport

Unloading by crane

Technical data for the casing X-CUBE

(as measured by TÜV Süd, Germany, using a model box)
Casing characteristics according to EN 1886

Thermal transmittance:	T2
Thermal bridging:	TB2
Casing air leakage (-400 Pa):	L1 (M)
Casing air leakage (+700 Pa):	L1 (M)
Mechanical strength of the casing (-1000 Pa):	D1 (M)
Mechanical strength of the casing (+1000 Pa):	D1 (M)
Filter bypass air leakage rate (400 Pa):	F9

Acoustic data

Sound power level Lw [dB]	63	125	250	500	1k	2k	4k	8k	LwA [dB(A)]
Air inlet of supply air unit (ODA)	64	69	70	66	58	50	40	34	66
Air outlet of supply air unit (SUP)	73	82	82	81	80	80	77	71	86
Air inlet of extract air unit (ETA)	63	73	68	63	57	52	45	40	65
Air outlet of extract air unit (EHA)	70	82	75	76	74	71	68	62	79

Case-radiated noise Lw [dB]	63	125	250	500	1k	2k	4k	8k	LwA

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

Quotation no.:	79027		
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									[dB(A)]
Total	60	72	58	49	47	46	39	25	59

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

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Controls			
Quantity	**Description**	**Quantity**	**Description**
1	Basic module	**1**	Cabinet heating
1	Cabinet thermostat	**2**	Circuit breaker (3P, 16A)
1	Main switch 400V / 63A	**4**	PT1000
3	PT1000 contact sensor	**1**	Syphon heating supply
1	Terminal box	**1**	Touch panel (7") in switch cabinet
1	Wall-mounted switch cabinet BxHxT: 800x800x250mm Cable entry on cabinet: Bottom		

Electrical components (feeding procedure)	I_{max}	S_{max}	**U**
AHU switch cabinet	14.25 A	8.8 kVA	400 V

Please note:
Wires and cables for field devices supplied separately or for external trades are to be provided by others.
Bus components have to be connected in series; the last device on the bus requires a terminal resistor.
The cable has to be suitable for Modbus; we recommend HELUKABEL PAAR-TRONIC-CY-2X2X1-QMM.
Be sure to comply with the wiring diagram.

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

Project:	GOSH Cheetah Ward
Unit:	Cheetah Ward (without fog coil)
Version:	000
Quotation no.:	79027
Item:	3
Section:	
Last edited:	24/10/2023
Editor:	Sayers, Amanda

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Integral controls - function description

- Alarm management
  - ♦ Recognition and processing of more than 600 individual alarms/warnings
  - ♦ 2 event categories (alarms and warnings)
    - Warning = Message is displayed, system remains in operation
    - Alarm = Message is displayed, system shuts down
  - ♦ Alarm and warning display as text, including time stamp and priority
  - ♦ Automatic saving of events and acknowledgements to csv files
    - Up to 2000 events can be saved
    - Each entry includes time stamp, error text and priority
    - Message acknowledgement also with user name
  - ♦ Alarm signaling via BMD interface
- Scheduling with timer programmes
  - ♦ Battery powered real time clock, automatic switching between summer time and winter time
  - ♦ Up to 7 individual daily schedules with 10 switching points each
  - ♦ Automatic calculation of 18 bank holidays (only in Germany)
  - ♦ 5 configurable holidays
  - ♦ 7 configurable holiday/vacation periods
  - ♦ Option to extend operating time; automatic deactivation after set time has elapsed
- Interface to central BMS
  - ♦ BACnet/IP, certified for Revision 14
- Configuration display / Data logging
  - ♦ Web based user interface
  - ♦ Automatic saving of the pricipal setpoint and actual values on SD cards for 30 days; saving interval: 1 minute
- Available languages
  - ♦ UI languages: German, English, French
  - ♦ Other languages can be requested
- User management and user access rights
  - ♦ User management: up to 5 users, 3 user groups with different access rights
- Selected strategy: Air transport / fan control
  - ♦ Volume flow rate control with the duct pressure being limited
- Selected strategy: Temperature control
  - ♦ Control of the supply air temperature

X-CUBE Configurator V4.1.0.34 (20/06/2023)

Data sheet for quotation

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Technical data according to regulation No 1253/2014 (ErP)
Unit complies with Ecodesign directive 2018.

Manufacturer:	TROX GmbH
Model identifier:	TROX X-CUBE Supply air 2515 / Extract air 2515
Type:	NRVU BVU
Actuator type:	Variable speed drive
Heat recovery:	Other (Plate heat exchanger)
Thermal efficiency:	73.76 %
Volume flow rate:	Supply air 7056 m³/h Extract air 7056 m³/h
Total power consumption:	Supply air 2.47 kW Extract air 1.6 kW
SFP_{int}:	Supply air 254 W/(m³/s) Extract air 239 W/(m³/s) Total 493 W/(m³/s)
Air velocity:	Supply air 1.4 m/s Extract air 1.4 m/s
External pressure:	Supply air 400 Pa Extract air 350 Pa
Internal pressure drop of ventilation components:	Supply air 176 Pa Extract air 167 Pa
Static efficiency - system (Operating status):	Supply air 69.2 % Extract air 69.8 %
Efficiency (EU-327):	Supply air 75.0 % Extract air 75.2 %
Case-radiated noise:	59 dB(A)
Max. external leakage rate:	1.31%
Internal leakage rate:	1.29%
Energy classification of filters:	Supply air (Eurovent energy efficiency) Extract air B (Eurovent energy efficiency)

Note the information on filters and the filter warning above. Filters should be changed regularly. This will result in increased energy efficiency and lower power consumption, and it helps to protect the environment.

Data for calculation of Eurovent energy efficiency

Outdoor air temperature	-7 °C
Mixing ratio	0 %
Region	Greater London

Great Ormond Street Hospital for Children
NHS Foundation Trust

BUILDERS SISK CONTRACTORS Established 1859

BDP.