

Intended for
Banyards

Document type
Technical Report

Date
September 2021

Report reference
2926-RAM-XX-XX-RP-YA-00001

BLACKLEY CREMATORIUM: NOISE ASSESSMENT TO DISCHARGE CONDITION 6

BLACKLEY CREMATORIUM: NOISE ASSESSMENT TO DISCHARGE CONDITION 6

Project name **Blackley Crematorium**
Report no. **2926-RAM-XX-XX-RP-YA-00001**
Recipient **Banyards**
Document type **Technical Report**
Version **P01**
Date **15/09/2020**
Prepared by **Ryan McNulty**
Checked by **Jonathan Howson**
Approved by **Simon Taylor**
Description **Noise assessment prepared to discharge Condition 6**

Ramboll
Arkwright House
Parsonage Gardens
Manchester M3 2LF
United Kingdom

T +44 (0) 161 827 1890
<https://uk.ramboll.com>

This report is produced by Ramboll at the request of the client for the purposes detailed herein. This report and accompanying documents are intended solely for the use and benefit of the client for this purpose only and may not be used by or disclosed to, in whole or in part, any other person without the express written consent of Ramboll. Ramboll neither owes nor accepts any duty to any third party and shall not be liable for any loss, damage or expense of whatsoever nature which is caused by their reliance on the information contained in this report.

Ramboll UK Limited
Registered in England & Wales
Company No: 03659970
Registered office:
240 Blackfriars Road
London
SE1 8NW

CONTENTS

1.	SUMMARY	2
2.	Criteria	3
2.1	Manchester City Council guidance	3
2.2	BS4142:2014+A1:2019	3
3.	Baseline noise survey	5
4.	Plant items	7
4.1	Internal plant	7
4.2	External plant	8
5.	Assessment	9
5.1	Nearest noise sensitive receptors and Rating limit	9
5.2	Noise predictions	9
5.3	Acoustic feature corrections	11
5.4	BS4142 assessment	12
5.5	Conclusion	12
5.6	Statement of uncertainty	13
Appendix 1 – Noise survey details		14
Appendix 2 – Plant data		15

1. SUMMARY

Ramboll has been appointed by Banyards to assess noise from a Manchester City Council (MCC) scheme to replace the cremators, and associated plant and ventilation system at Blackley Crematorium.

This assessment supports the discharge of Condition 6 of the planning approval for the scheme (ref 130137/VO/2021), as reproduced below:

Condition 6

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.

Prior to first use of any external equipment hereby approved, a scheme shall be submitted to and approved in writing by the City Council as Local Planning Authority, in order to secure a reduction in the level of noise emanating from the site. This shall include details of post completion testing, to confirm that the noise criteria has been met.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site, pursuant to saved policy DC26 of the Unitary Development Plan for the City of Manchester and policies DM1 and SP1 of the Manchester Core Strategy. The noise assessment submitted only provides the noise levels for the various items of plant, rather than an actual cumulative rating assessment of noise at the nearest receptor in relation to the background noise levels.'

A noise survey has been done during the night to represent the worst-case times that noise emissions from the new plant could potentially disrupt nearby sensitive receptors.

Based on the manufacturer's noise data for the external plant, the resulting cumulative rating level is predicted to be more than 5dB lower than existing background levels at the nearest noise sensitive receptors to the Crematorium which complies with the requirements set by MCC.

Therefore, this assessment supports the full discharge of Condition 6.

2. CRITERIA

2.1 Manchester City Council guidance

For developments such as Blackley Crematorium, plant items must be assessed in accordance with the methodology in BS4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*' (BS4142) to minimise the impact of noise on the nearest sensitive receptors.

The noise limits set out in Condition 6 are based on MCC '*Planning and Noise – Technical Guidance*' (2015) which sets out the City's criteria for noise emissions from fixed external plant items.

2.2 BS4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*'

BS4142 provides a methodology for assessing levels from new noise sources against the existing noise climate. The standard defines the new noise source (e.g. plant, or commercial operation etc) as the 'specific' noise level.

Since certain acoustic features (tonality, impulsivity, intermittency etc.) can increase the significance of a new noise source when compared to existing background noise levels, BS4142 identifies that suitable acoustic penalties should be applied to the specific noise level where this is the case. This results in a 'Rating Level' of the noise source(s) under consideration.

When comparing the specific noise against existing background levels, BS4142 highlights that certain acoustic features can increase any significance of impact:

Tonality

For sound ranging from not tonal to prominently tonal, a correction of between 0 dB and +6 dB should be added. Subjectively, this penalty should be 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this penalty should be 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, but are still distinctive against the existing noise environment, a penalty of +3 dB can be added.

Intermittency

When the specific sound has identifiable on/off conditions, such as an item of plant. the specific sound level ought to be representative of the normal "on/off" sequence. The specific noise level is the average noise level over the "reference time interval" (which is the time period used for the purposes of the assessment). The level will therefore depend on the "on-time". A specific level will be very similar to the source level for a source which is on for most of the time and conversely, the specific level will be much lower if the source is off for most of the time. If the intermittency itself is readily distinctive against the existing noise (for example, if it switches on and off rapidly and continuously) then a penalty of +3 dB can be added.'

Comparison of the Rating Level to the background noise level determines the significance of the new noise source at the receptor(s) under assessment. If the Rating Level is higher than the background noise level, BS4142 identifies there may be an impact:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the Rating Level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the Rating Level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

As stated in Section 2.1, MCC require the cumulative Rating Level of plant to be 5dB lower than background noise levels.

3. BASELINE NOISE SURVEY

Blackley Crematorium is located to the west of Middleton Road (A576). Various residential dwellings surround the site at distances of 200m or greater.

Figure 1 below shows the Crematorium building and its location to set the context of this assessment.

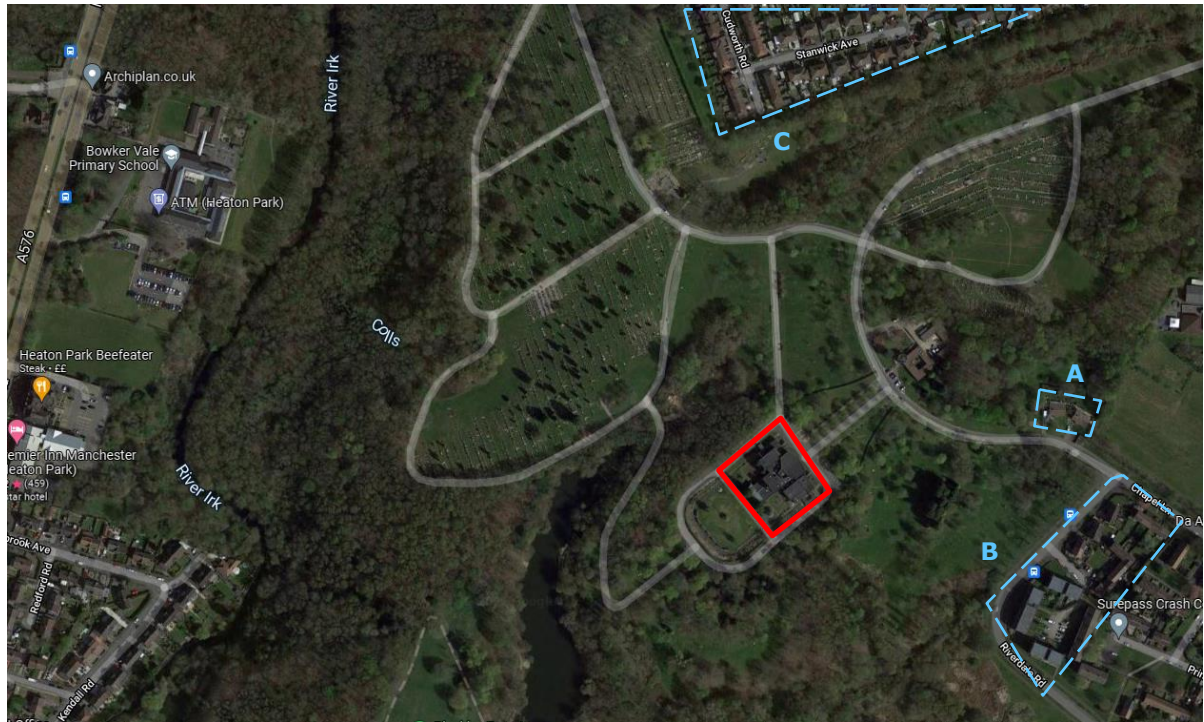


Figure 1 – Blackley Crematorium in context to the surrounding receptors and the A576

The nearest receptors are:

- Two bungalows within Blackley Cemetery itself (A)
- Chapel Lane to the east and Riverdale Road to the southeast (B)
- Cudworth Road and Stanwick Avenue to the north (C)

To set limits for new plant items serving the Crematorium, Ramboll measured noise levels on Tuesday 31 August into the following morning.

Since the properties to the east would be less exposed to road traffic on the A576, and are closer to the crematorium, measurements were made at the two bungalows and at Chapel Lane/Riverdale Road. It is expected that similar, if not marginally higher background noise levels would be experienced at Cudworth Road and Stanwick Avenue.

To consider the most onerous times of operation, Ramboll measured between 23:00 to 00:00 on a weekday night. This would represent the quietest period when someone may be heading off to bed.

Ramboll agreed the survey times and measurement locations with Graeme Souter of MCC's Environmental Protection team.

The locations of the selected measurement positions are presented in Figure 2 below, and survey details are provided in Appendix 1.

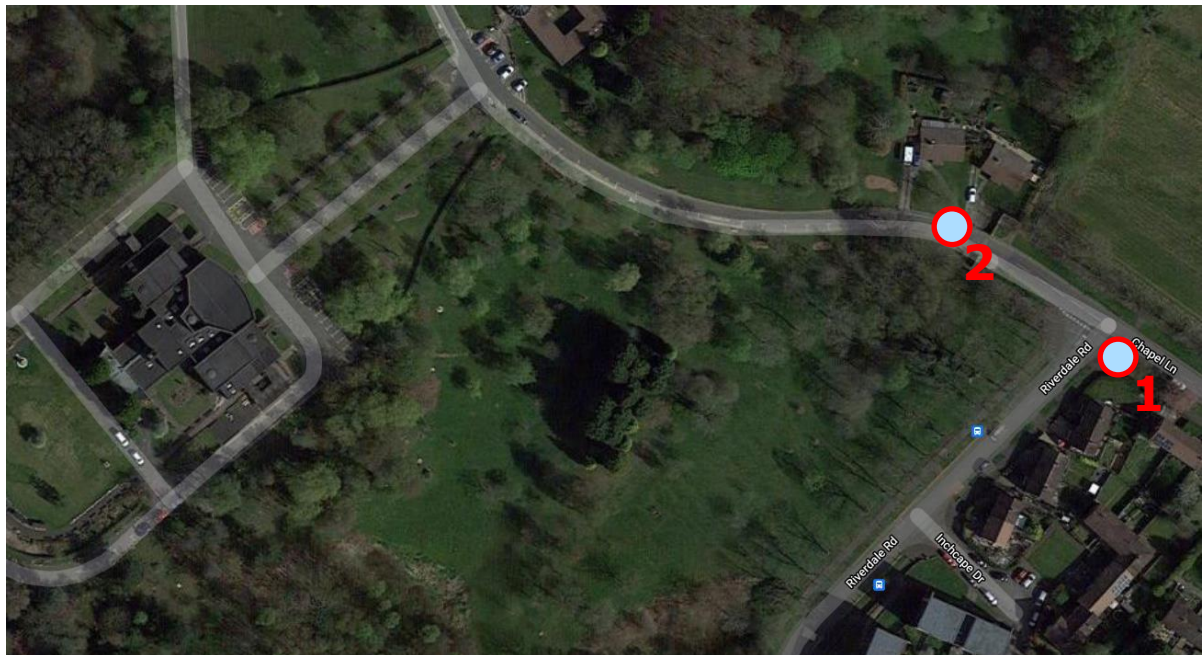


Figure 2 – Noise monitoring positions

Location	Date	Time, hh:mm	L _{Aeq} (dB)	L _{A90} (dB)
1	31/08/2021	23:08 to 23:23	53	38
		23:41 to 23:56	51	35
2	31/08/2021	23:24 to 23:39	40	34
	01/09/2021	00:00 to 00:15	38	34

Table 1 – Measured noise levels

Generally, noise levels in the vicinity of the nearest properties are low in the absence of local traffic. After 23:30 local traffic is low and the only audible noise source in the area is distant traffic on the A576 and M60 motorway.

4. PLANT ITEMS

Noise data for the plant items proposed at Blackley Crematorium are provided in Appendix 2, with a summary provided below.

4.1 Internal plant

Internally, the proposals for the crematorium include 2 new cremators, and associated plant items.

Item	Overall, dBA at 1m
Bag filter cleaning system	75
Cooler cleaning system	75
Compressor	64
Combustion air fan (x 2)	69
Combustion air and bypass, combustion air fan speed, ejector fan speed	72
Induced draught fan	67
FT III cremator committal end	58

Table 2 – Proposed internal plant serving Blackley Cremator

Based on the literature provided by Facultatieve Technologies, it is understood that the bag filter, cooler cleaning system and compressor all operate during plant closedown when staff have left the building. In addition, the cooler cleaning system and compressor are stated to be intermittent in their operation, producing short pulses over 12 to 60 second intervals for several minutes.

Acoustic feature corrections are discussed in section 5.

4.2 External plant

Item	Overall, dBA at 1m (unless stated)
Air blast cooler	66
Stack outlet	37 at 30m
Daikin ASHP (RXM42M) in external rear area	48
Nuaire OPUSBOX supply inlet (curve 3)	54
Nuaire OPUSBOX supply outlet (curve 3)	60
Elta Skyflow roof mounted fans (2 volt)	44
Elta plate fans (window plenum)	52

Table 3 – Proposed external plant serving Blackley Cremator

The louvres to the building are assumed to have no acoustic properties and a limited reduction of noise expected. The following sound insulation performance is assumed.

Description	Overall, dB R _w	R, dB @ octave band centre frequency						
		63	125	250	500	1k	2k	4k
Non-acoustic louvre (estimated)	4	0	0	0	1	3	3	3

Table 4 – Estimated sound insulation performance of non-acoustic louvres

5. ASSESSMENT

5.1 Nearest noise sensitive receptors and Rating limit

The nearest sensitive receptors to the development are the bungalows and closest properties on Riverdale Road, which are around 200m from the central part of the Crematorium building itself. Houses to the north of the site at Cudworth Road and Stanwick Avenue are around 240m from the central part of the building.

To comply with the requirements of Condition 6, the rating level of plant must not exceed the following target:

Typical background at most sensitive time of the day	Rating level target at the nearest sensitive properties
34 dB L _{A90}	29 dB L _{A_r,T_r}

Table 5 – Rating level limit at the nearest sensitive properties

5.2 Noise predictions

To accurately predict noise levels from the plant items in Section 4, Ramboll has used CadnaA noise modelling software.

The following apply to the model:

- All roof or ground mounted plant items are at 0.5m above the relative roof or ground height within the model, except for the air blast cooler (1.4m) and stack (12m).
- The surrounding ground is a mix of hard and mostly soft surfaces. A reflection coefficient of 0.8 is used in the model to represent soft ground (0 = fully reflective, 1 = fully absorptive).
- The height of the Crematorium and its chimney are based on architect's drawings. The bungalows are estimated as 5m in height, surrounding houses are set to 8m and the 4 storey apartment blocks on Riverdale Road set to 12m.
- The order of reflections in the model is set to 2. All buildings are input as fully reflective surfaces.
- The model considers receptor points at 4m above ground to consider bedroom windows, and 1.5m to the bungalows.

The output of the noise model is present below, and the predicted noise levels at the closest four properties tabulated.



Figure 3 – Predicted noise levels at nearest receptors

Receptor	Predicted noise levels, dB L _p								
	Overall, dBA	63	125	250	500	1k	2k	4k	8k
Bungalows	18	38	26	22	12	0	1	0	0
Riverdale Road	17	38	26	20	11	0	1	0	0
Riverdale Road apartments (3 rd floor)	19	40	27	23	13	0	2	1	0
Cudworth Road and Stanwick Ave	16	38	23	19	11	0	0	0	0

Table 6 – Predicted noise levels of plant operating simultaneously

Note:

The above levels are based on all plant items running at the same time, which would be a worst-case scenario.

As per the notes in section 4, some internal plant items operate only when the system is shutting down. Therefore, noise breakout from the louvres could be marginally lower at other times as a result.

5.3 Acoustic feature corrections

Ramboll understand that all plant items serving the crematorium will be used over sustained periods of time when in use, which would not typically be considered intermittent. However, to allow for occasional switching in or out of plant which may be '*readily distinctive against the residual acoustic environment*' an acoustic feature correction of +3dB has been allowed for in this assessment.

As noted in section 4, some internal items could be impulsive when the system is shutting down. Ramboll understand this would be around the time staff are leaving and therefore not likely to happen during later hours of operation. Where this is the case, such impulsive noise breaking out of the building is expected to be masked by higher background levels and local traffic. BS4142 states a '*penalty should be 3 dB for impulsivity which is just perceptible at the noise receptor*' which has been applied for robustness.

Based on the spectral shapes of the predicted noise levels in Table 6, the noise levels at the surrounding receptors are not tonal.

Therefore, a +6dB acoustic feature correction has been applied to the BS4142 assessments in Table 7 to allow for intermittent and impulsive characteristics as discussed above.

5.4 BS4142 assessment

MCC requires the rating level ($L_{Ar,Tr}$) of any external plant items or atmospheric openings, when assessed in accordance with BS4142 to be controlled to 5dB below existing background noise levels (L_{A90}).

Based on the above predicted noise levels, Table 7 below provides a BS4142 assessment.

Description	Bungalows	Riverdale Road	Riverdale Road (apts)	Cudworth Road, Stanwick Ave
Specific noise level (see Table 6), dB(A)	18	17	19	16
Acoustic feature corrections (see Section 5.3), dB	+6	+6	+6	+6
Rating level, dB $L_{Ar,T}$	24	23	25	22
Background level (Table 5), dB L_{A90}	34	34	34	34
Excess of rating level over background	-10	-11	-9	-12
Complies with MCC requirements	✓	✓	✓	✓

Table 7 – BS4142 assessment

5.5 Conclusion

The above tables show that noise levels at the nearest receptors to Blackley Crematorium, as based on the cumulative level of all plant items operating at the same time, comply with the Manchester City Council's requirement for plant to be at least 5dB below existing noise levels at the nearest receptors, as per Condition 6.

BS 4142 identifies '*Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact*'.

Therefore, this assessment supports the full discharge of Condition 6.

5.6 Statement of uncertainty

The assessment within this document is based on manufacturer's datasheets, and from discussions with plant manufacturers and Banyards (building services contractor). All information provided in this report reflects what Ramboll understand will be installed.

The overall noise assessment is based on all plant and building services items operating at duties reflected by the data presented in this assessment. This assessment considers the worst-case scenario of all plant items operating cumulatively at the most sensitive time of operation. It is expected this will not normally be the case and overall noise levels will be lower as a result, and background noise levels higher during the day when the crematorium will be most in use.

To provide a robust assessment, most surrounding surfaces such as building facades and intervening ground is reflective within the model. It is expected that this overestimates the sound propagation of various plant items, since ground or building features will help to attenuate sound over distance. Again, this would be a worst case scenario.

Where measurements were taken to inform the background levels at the nearest properties, the amount of uncertainty was minimised as far as practicable by:

- Calibrating the equipment before and after the survey, using a windshield
- Selecting a suitable period for observation (dry day, no wind)
- Choosing monitoring locations representative of the nearest receptors
- Excluding spurious data
- Attending all measurement periods to understand the local noise climate

APPENDIX 1 – NOISE SURVEY DETAILS

Location

Chapel Lane and Riverdale Road, Blackley, Manchester

Date, time

Tuesday 31 August & Wednesday 1 September (Ryan McNulty, RAMBOLL UK)

Weather

Approx. 15°C, no wind. 50-80% cloud cover, dry road surfaces

Equipment

- Brüel and Kjær Type 2270 'Class 1' Sound Level Analyser (serial number 3002075)
- Brüel and Kjær Type 4231 Acoustic Calibrator (serial number 2642788)

Before and after the survey the sound level meter was checked calibrated to an accuracy of ± 0.1 dB using the sound level calibrator.

Attended noise levels were measured at a height of 1.5m above the relative ground level.

Noise levels are as reported in the main report body and below. Further data and spectral information available on request.

Measured data

Location	Date	Time, hh:mm	L _{Aeq} (dB)	L _{A90} (dB)
1	31/08/2021	23:08 to 23:23	53.4	37.8
		23:41 to 23:56	51.1	35.2
2	31/08/2021	23:24 to 23:39	39.5	33.5
	01/09/2021	00:00 to 00:15	37.8	34.3

APPENDIX 2 – PLANT DATA

Free Field Noise Levels
Octave band centre frequ Hz

63	125	250	500	1000	2000	4000	8000
dB	dB	dB	dB	dB	dB	dB	dB

Air Blast Cooler	30	51	46	47	43	54	63	63	66	dB(A) @ 1m
Variable speed operation	0	21	17	17	13	24	33	33	37	dB(A) @ 30m
Variable speed fans, noise data at 50 Hz, Note the air blast coolers rarely run above 25 to 30 Hz										

External Noise from Stack	47	44	39	34	20	25	29	28	37	dB(A) at 30m
Variable speed fan, noise data at 50 Hz										

Bag Filter Cleaning System									75	dB(A) at 1m
Operates during plant closedown, usually after staff have left the building Series of short pulses at 12 second intervals for several minutes										

Cooler Cleaning System									75	dB(A) at 1m
One set per cremator Operates during plant closedown, usually after staff have left the building Series of short pulses at 60 second intervals for several minutes										

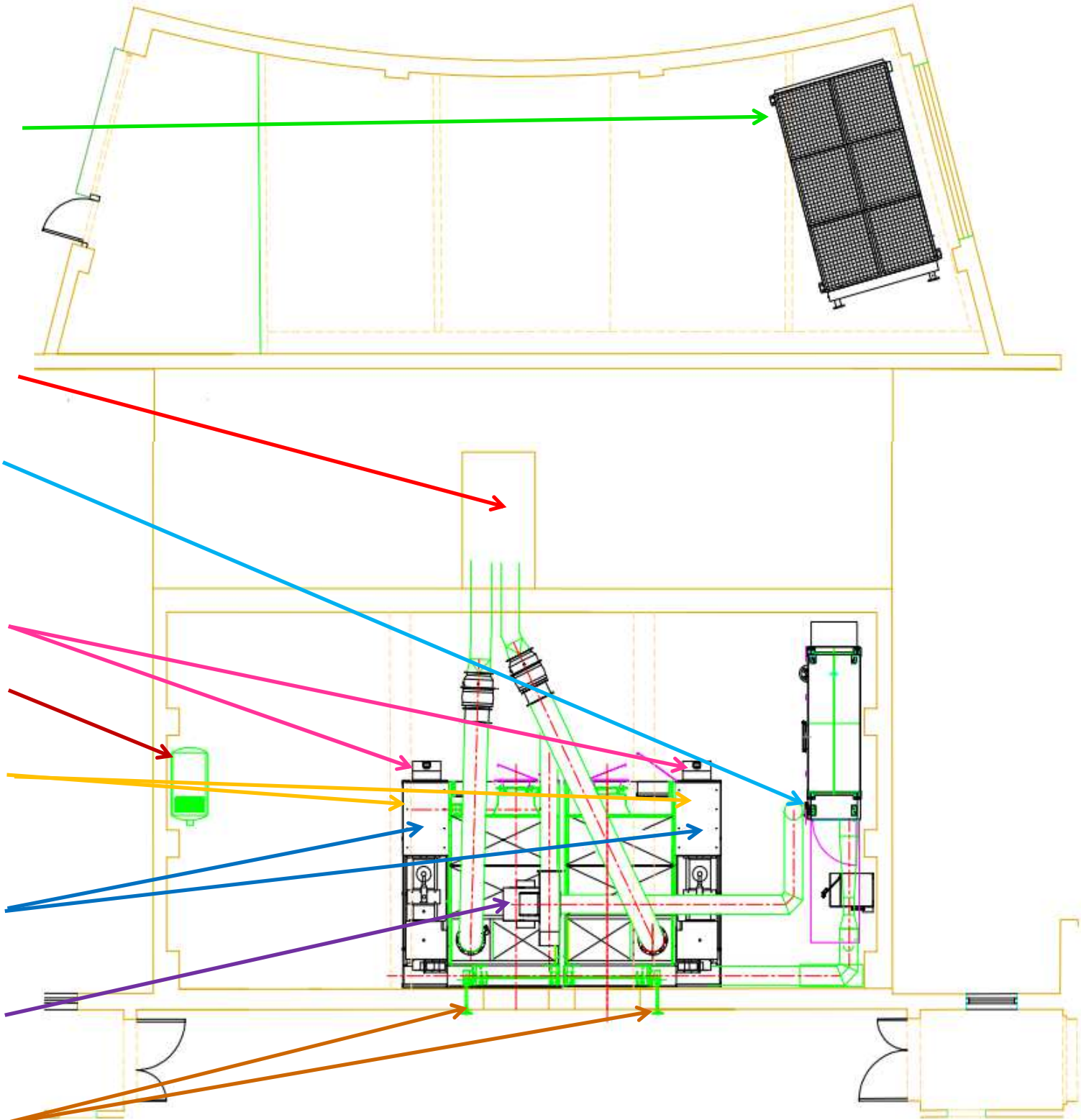
Compressor	Intermittant operation								64	dB(A) at 1m
Operates during plant closedown, usually after staff have left the building										

Combustion Air Fan	40 Hz	93	79	60	45	39	23	10	7	69	dB(A) at 1m
One per cremator											

Combustion air and Bypass											
Combustion Air Fan speed	40 Hz										
Ejector Fan Speed	40 Hz										
Fans running together		96	82	63	48	42	26	13	10	72	dB(A) at 1m
One set per cremator Bypass operation only when flue gas treatment system unavailable (not normal condition)											

Induced Draught Fan		84	78	69	66	50	41	35	28	67	dB(A) at 1m
Heavy gauge fan casing + 100mm lagged double skin construction Variable speed fan, noise data at 50 Hz											

FTIII Cremator Committal End		43	45	48	54	56	48	44	37	58	dB(A) at 1m
-------------------------------------	--	----	----	----	----	----	----	----	----	-----------	--------------------



The information on this drawing is CONFIDENTIAL to Facultative Technologies who retain COPYRIGHT of all information disclosed. Express permission from Facultative Technologies must be obtained in writing before any disclosure to a third party can take place.

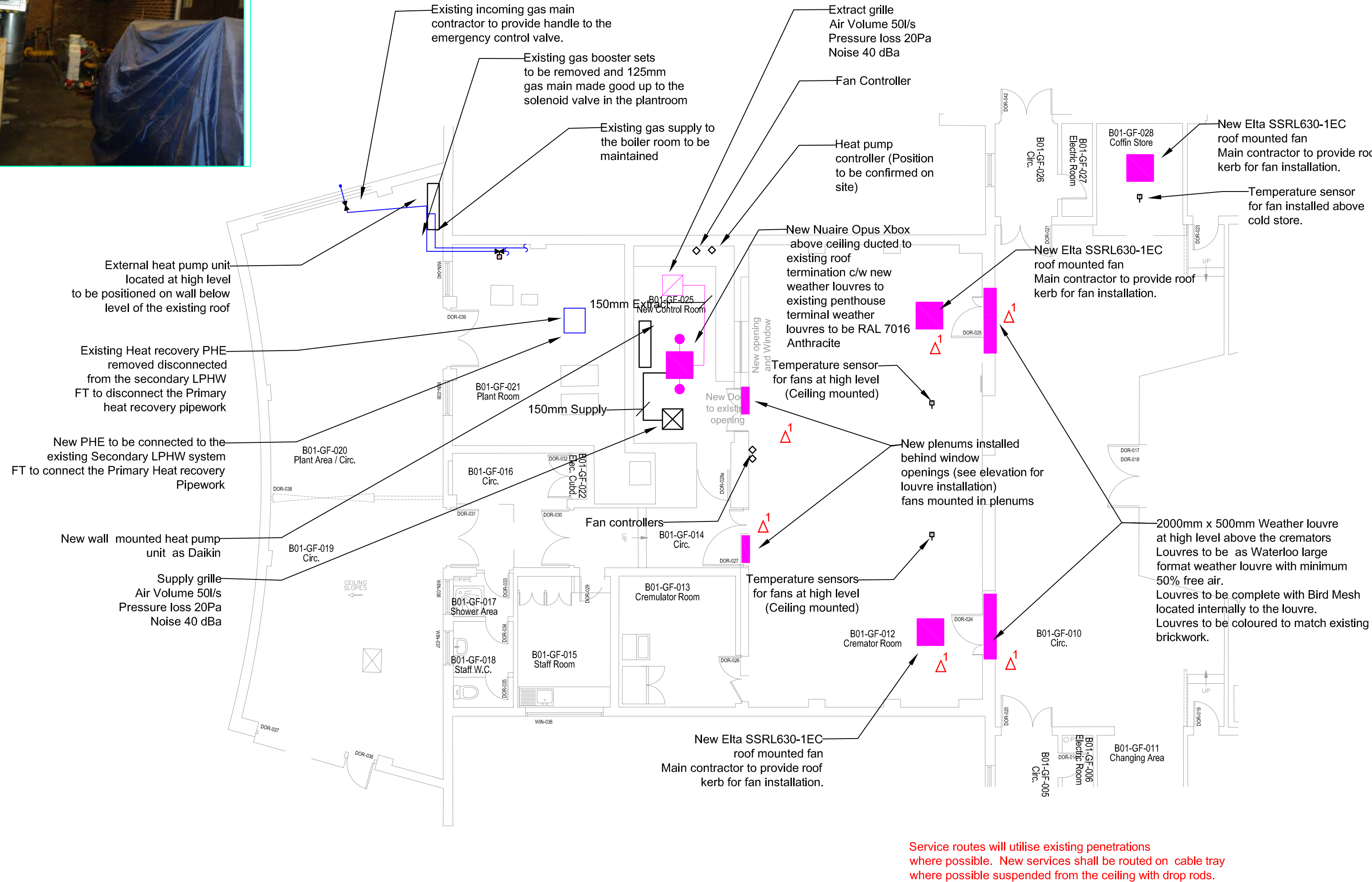
Facultative Technologies Ltd
Moor Road
Leeds LS10 2DD, England
Phone : +44 (0)113 276 8888
Fax : +44 (0)113 271 8188
E mail : info@facultative-technologies.co.uk



Drawn	D Solaru	Title
Date	01-Apr-21	Estimated Equipment Noise
Project	Blackley Crematorium	Blackley Crematorium
		Drg No 8126 NS 0001 P1



Position of external heat pump in rear yard at high level adjacent to existing window



Service routes will utilise existing penetrations where possible. New services shall be routed on cable tray where possible suspended from the ceiling with drop rods.

All Works identified on this drawing are to be carried out by the Mechanical contractor with the exception of the works identified to be by FT.

This Drawing shall be read in conjunction with the MEP specification

Builders works shall be carried out by the Main contractor.

Works to be carried out by FT

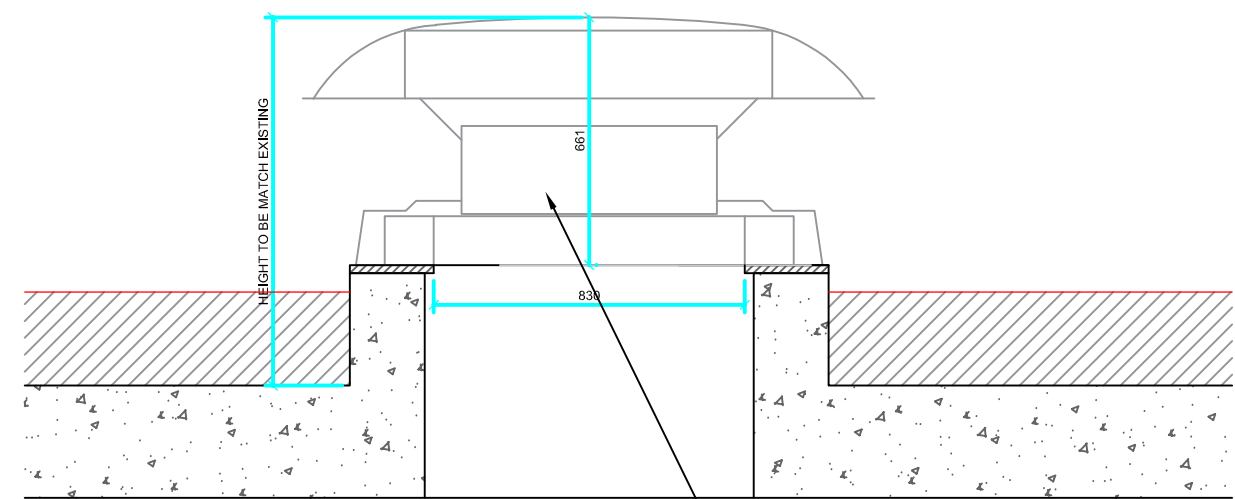
1. Alterations to the Gas main from the solenoid valve in the plant room to the cremators
2. Disconnection of the Primary side pipework to the heat recovery PHE
3. Supply of new Heat recovery PHE
4. Reconnection of Primary side pipework to the heat recovery PHE

Phasing of the Mechanical Works

Ventilation to the Cremator room and alterations to the gas supply/ removal of boosters shall be carried out before the first new Cremator is commissioned.

Works to the control room shall be carried out after the last new Cremator is installed

Work to the PHE shall be carried out in conjunction with the Cremator specialists programme



New roof mounted fan to replace existing. Fan dimensions and kerb detail to be as existing.

Notes

Design Risk Management Banyards

Residual Risk Following Design Risk Assessment

Hazard	Risk Impact	Action Required
1	Risk from falling from height - The contractor shall allow for safe systems of work where equipment has to be located at height.	

Note:
The Contractor is to note that the Risks identified in this table have not been able to be negated as part of the design process and as such the appropriate action shall be allowed for within the Tender & Construction phase.

1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING HIS TENDER. ANY ADDITIONAL COSTS FOR WORKS THAT COULD HAVE BEEN DETERMINED BY VISITING SITE WILL NOT BE CONSIDERED.
4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO COMMENCEMENT OF WORKS.

T5	UPDATED WITH LA COMMENTS	RH	JB	AP	TB	11-06-21
T4	UPDATED FOR PLANNING	RH	JB	AP	TB	10-06-21
T3	TENDER ISSUE	RH	JB	AP	TB	20-05-21
T2	Ventilation to Control room added	RH	JB	AP	TB	17-05-21
T1	TENDER ISSUE	RH	JB	AP	TB	15-04-21
T0	TENDER ISSUE	RH	JB	AP	TB	31-03-21
Rev.	Description	App.	Chk.	Dm.	Date	

Client



Project

Blackley Crematorium
Cremator Replacement

Drawing Title

Proposed Mechanical Services

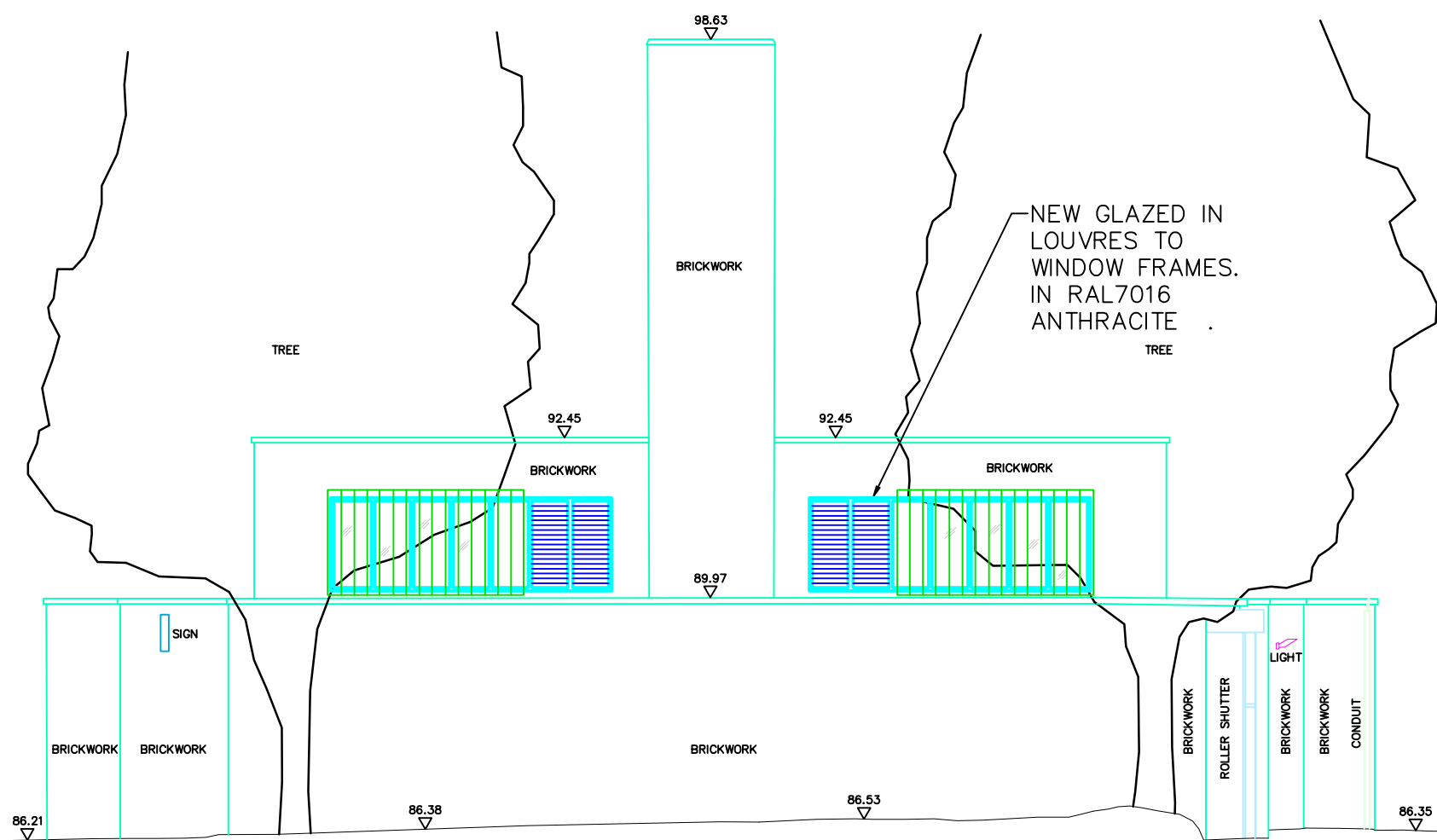
Banyards

Status

TENDER

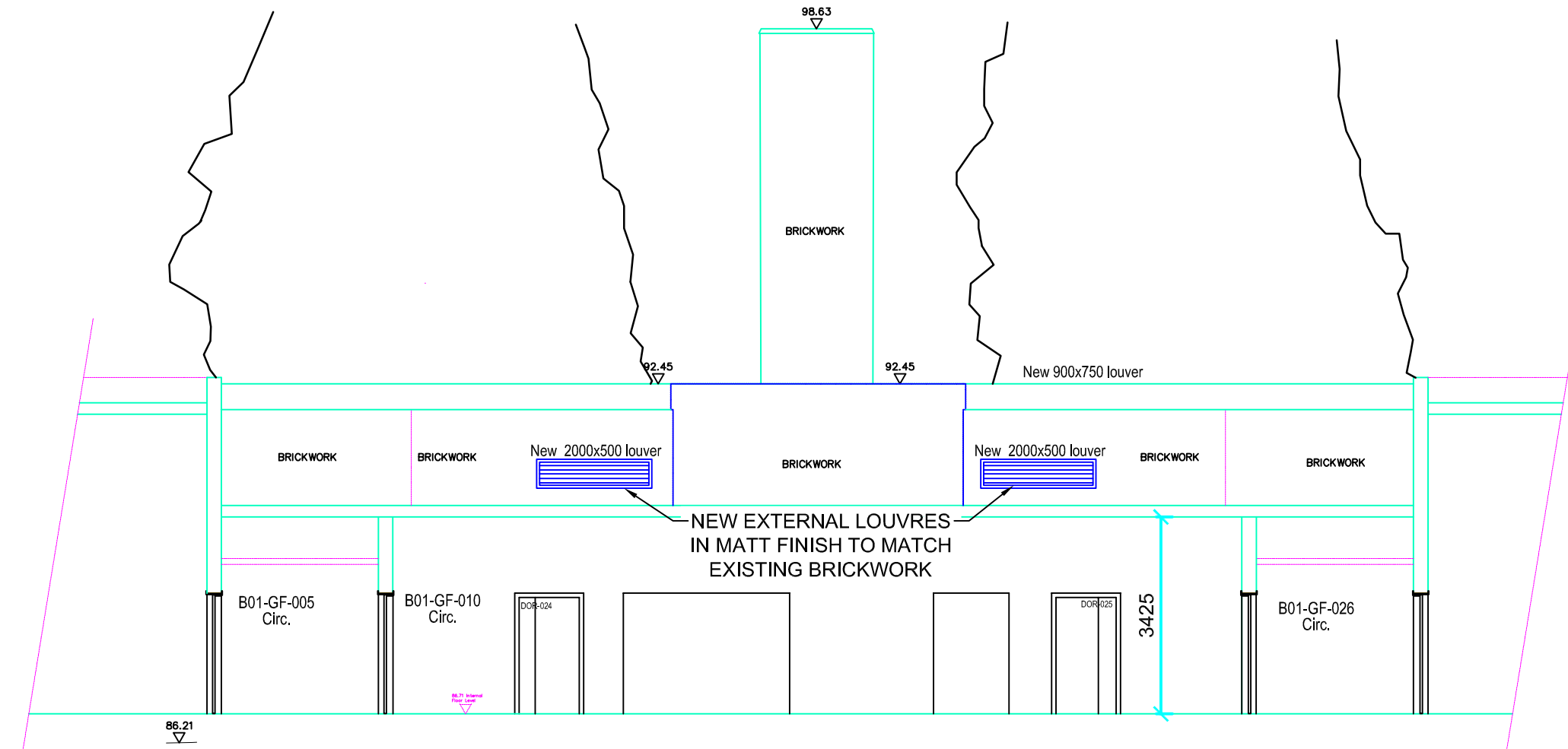
BCL No 10460 BIM No. N/A Scale 1:100 @A1

Drawing Number 8871-BAN-ZZ-00-DR-M-44102 Revision T5



Datum 84.00m

Elevation 02

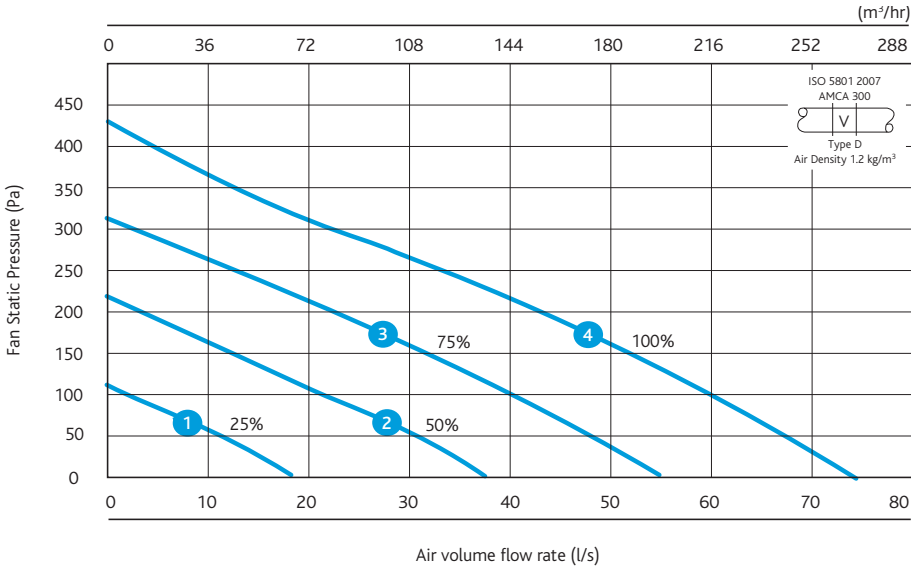


Datum 84.00m

Elevation 04

PERFORMANCE - OPUSXBOX

OPUSXBOX



Casing



Code descriptions

OPUSXBOX

OPUSXBOX

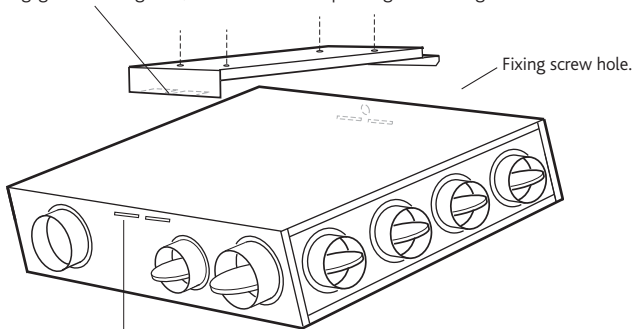
ELECTRICAL, SOUND & WEIGHT

Curve	Ref	W* *	FLC (amps)	SC* (amps)		Sound figures Induct sound power level re 1pW							Breakout dBA @3m	Weight (Kg)
						125	250	500	1K	2K	4K	8K		
1 (25%)	Supply fan	5	0.05	0.05	Inlet	29	31	28	15	16	7	2	15	25
					Outlet	19	26	23	14	8	4	4		
	Extract fan	5	0.05	0.05	Inlet	18	26	17	7	4	5	5		
					Outlet	35	39	43	34	34	26	16		
2 (50%)	Supply fan	17	0.1	0.1	Inlet	45	47	44	31	32	23	15	29	
					Outlet	35	42	39	30	24	12	9		
	Extract fan	17	0.1	0.1	Inlet	34	42	33	23	19	9	9		
					Outlet	51	55	59	50	50	42	32		
3 (75%)	Supply fan	51	0.3	0.3	Inlet	55	57	54	41	42	33	25	38	
					Outlet	45	52	49	40	34	22	19		
	Extract fan	51	0.3	0.3	Inlet	44	52	43	33	29	19	19		
					Outlet	61	65	69	60	60	52	42		
4 (100%)	Supply fan	120	0.7	0.7	Inlet	62	64	61	48	49	40	32	44	
					Outlet	52	59	56	47	41	29	26		
	Extract fan	120	0.7	0.7	Inlet	51	59	50	40	36	26	26		
					Outlet	68	72	76	67	67	59	49		

*Fans are programmed with a soft start, therefore starting current is the same as the FLC.
Please note step curves shown are for information purposes only and are not individual units. The units actual duty range is infinitely variable.
**W = Watts are total power consumption.

INSTALLATION

Bracket tongues engage with casing slots, then unit rotated up to align with fixing screw hole.



Slots in casing either side of unit to allow alternative mounting option.

SKYFLOW SSRL



Sound Data

Single Phase 220V to 277V / 50Hz or 60Hz

Product Code	Control Voltage V		Sound Power Level dBW @ Octave Band Hz								Total dB
			63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
SSRL560-1EC	10	Inlet	74	81	86	83	83	79	77	76	90
		Outlet	76	82	85	82	78	76	74	74	89
	8	Inlet	69	78	78	75	75	74	72	70	84
		Outlet	73	83	77	76	72	70	69	67	85
	5	Inlet	68	63	65	61	64	63	58	54	73
		Outlet	66	68	63	58	59	59	55	51	72
	2	Inlet	48	43	42	38	49	46	38	37	54
		Outlet	44	43	42	36	49	45	37	36	53
SSRL630-1EC	10	Inlet	75	84	89	86	84	82	79	79	93
		Outlet	75	79	84	83	79	78	75	76	89
	8	Inlet	69	84	80	80	78	76	75	73	88
		Outlet	68	79	77	74	73	72	71	70	83
	5	Inlet	70	70	67	65	65	66	61	57	76
		Outlet	65	73	66	60	62	60	54	52	75
	2	Inlet	46	43	48	38	48	45	39	37	54
		Outlet	47	41	47	38	47	48	42	40	54
SSRL710-1EC	10	Inlet	74	88	89	86	88	87	83	81	95
		Outlet	75	87	84	82	82	83	80	78	92
	8	Inlet	69	83	84	81	83	82	78	76	90
		Outlet	70	82	79	77	77	78	75	73	87
	5	Inlet	74	74	67	68	69	68	64	58	79
		Outlet	65	73	65	64	64	64	61	56	75
	2	Inlet	48	47	46	41	48	50	41	38	55
		Outlet	46	49	46	43	45	46	37	33	54

Data provided at standard air density of 1.2 kg/m³.
 Tests and preparation of the sound data have been carried out in accordance with BS 848 Part 2:1985 at 50% peak pressure.
 The Sound Power Level Spectra are in dB re-1pW.



Represented by:
ELTA FANS LTD (BUILDING SERVICES)
Tel: +44 (0)1384 275800 Fax: +44 (0)1384 275810 email: sales@eltafans.co.uk
46 Third Avenue, Pensnett Trading Estate, Kingswinford, West Midlands DY6 7US, UK
Version 5.21.31 Copyright © 2010-19 Elta Group

Technical Data - Fan Model SPA630/4-1EC (5 speed)

Location:

Designation:

Please Note: Data shown is nominal - enter more criteria for accurate detail.

Performance - Required

Air Flow : 0.00 m³/s
Static Pressure : 0 Pa
Selection Pressure: 0 Pa
Installation Type: n/a
Air Density: 1.204 kg/m³
- Atmos. Temp: 20 °C
- Altitude: 0 m
- Humidity: 0.0 %

Actual

Air Flow: 0.00 m³/s
Static Pressure: 0 Pa
Total Pressure: 0 Pa

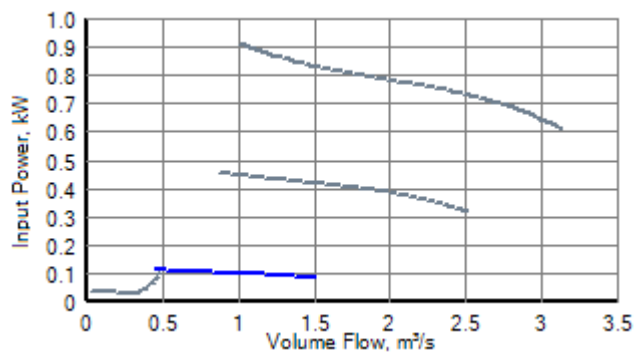
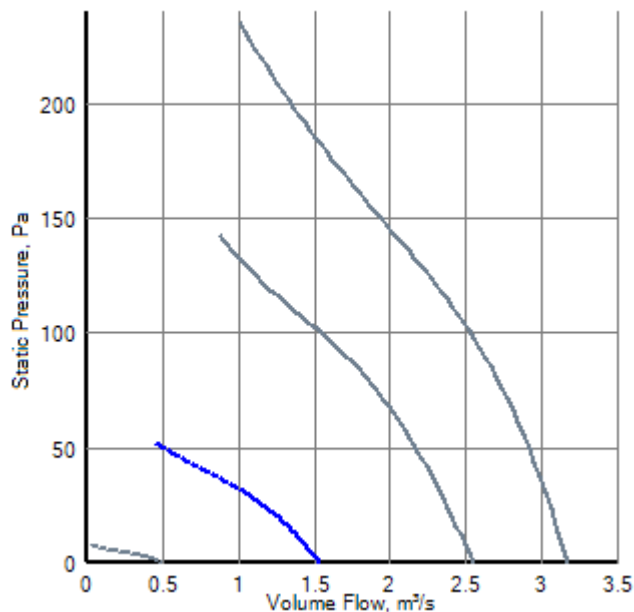
Fan Data

Catalogue Code: SPA630/4-1EC (5 speed)
Description: Axial Plate

Diameter: 630 mm
Impeller Type: Axial
Blade Material: -
Speed: 505 r/min @50 Hz
Power, Abs: -
Input Power: 0.14 kW
Efficiency Total: -
SFP: -
Fan Weight: 39.0 kg

Motor Data (at STP)

Motor Type:
Electrical Supply: 230V 1ph 50Hz
Motor Frame:
Motor Power: 0.91kW
FLC/Start: 4.10A / -
Motor Speed: -
Motor Efficiency: -



Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	67	60	56	54	59	50	41	34	69	40
Outlet (dB):	68	60	57	53	59	48	40	34	69	40

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.



Represented by:
ELTA FANS LTD (BUILDING SERVICES)
Tel: +44 (0)1384 275800 Fax: +44 (0)1384 275810 email: sales@eltafans.co.uk
46 Third Avenue, Pensnett Trading Estate, Kingswinford, West Midlands DY6 7US, UK
Version 5.21.31 Copyright © 2010-19 Elta Group

Technical Data - Fan Model SPA630/4-1EC (5 speed)

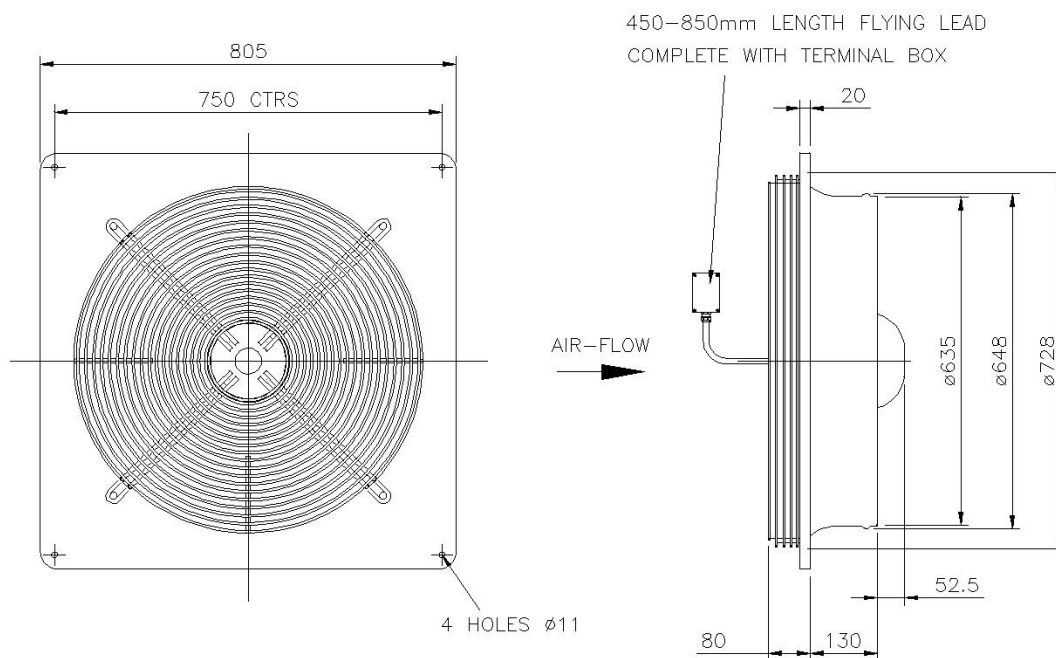
Location:

Designation:

Energy Related Product Data

Overall Efficiency:	46.3%	At Maximum Efficiency Point	Input Power:	0.78 kW
Measurement Category:	A		Air Flow:	2.26 m ³ /s
Efficiency Category:	Static		Pressure:	142 Pa
FMEG:	53 (Integrated)		Speed:	1050 r/min
Specific Ratio:	1			

Drawing for Fan Model SPA630/4-1EC



Specifications Table for RXM-M

			RXM20M2V1B	RXM25M2V1B	RXM35M2V1B	RXM42M1V1B	RXM42M2V1B	RXM50MV1B	RXM50M2V1B	RXM60M2V1B	RXM71M2V1B
Dimensions	Unit	Height	mm	550	550	550	735	735	735	735	734
		Width	mm	765	765	765	825	825	825	825	870
		Depth	mm	285	285	285	300	300	300	300	320
Weight	Unit	kg	32	32	32	47	47	44	47	44	56
Compressor	Type			Hermetically sealed swing compressor	Hermetically sealed swing compressor	Hermetically sealed swing compressor	Hermetically sealed swing compressor	Hermetically sealed swing compressor	Hermetically sealed swing compressor	Hermetically sealed swing compressor	Hermetically sealed swing compressor
Operation range	Cooling	Ambient	Min.			-10					
			Max.			46					
	Heating	Ambient	Min.			-15					
			Max.			18					
Sound pressure level	Cooling		High	dBA	46	49	48	48		48	
		Nom.		dBA			48		48		47
		Low		dBA				44		44	
	Heating		High	dBA	47	49	48	49		49	
		Nom.		dBA					49		48
	Low			dBA				45		45	