



**Independent Acoustic
Consultancy Practice**

Environmental Noise Assessment

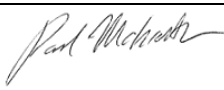
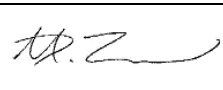
**Proposed Hotel
30-31 High Street
Merthyr Tydfil**

6027/ENS1

Environmental Noise Assessment

Project:	Proposed Hotel
Site Address:	30-31 High Street Merthyr Tydfil CF47 8DP
HA Reference:	6027/ENS1
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EXECUTIVE SUMMARY

This is a noise impact assessment in support of a planning application for a boutique hotel conversion of 30-31 High Street, Merthyr Tydfil, CF47 8DP.

This part of High Street is a main pedestrianised commercial street in Merthyr Tydfil town centre, and is generally unaffected by road traffic, except for occasional pass-bys on Masonic Street. Vehicular access is also restricted to 1100-2100hrs, so no night-time or early morning deliveries can take place on this part of the High St (no such activity was recorded during our monitoring). This part of the High Street is not considered very busy compared with areas of the town centre with more bars and night-clubs. Gillar Street Car Park is located to the rear with the main rail line out of Merthyr Tydfil station around 50m to the east.

Located next door is the Merthyr Conservative Club which has a first floor function room where live music can be played. The function room does not share a party wall with 30-31 High Street however. The New Crown Inn public house, a renowned live music venue, is located around 25m south on High Street. Its beer garden is located to the rear.

This report details results of an assessment covering road / rail, street noise, as well as live music break-out from the Merthyr Conservative Club and New Crown Inn public house, which are nearby.

An environmental noise survey has been carried out to assess the existing ambient and background noise climate.

- Covid-19 Restrictions

Although many Covid-19 restrictions at the time of the noise survey had been lifted by the Welsh Government, live music events were not currently permitted and were not taking place at the venues.

In line with current guidance issued by the Institute of Acoustics (IOA) & Association of Noise Consultants (ANC) for noise assessments during the current Covid-19 restrictions, we have referred to the Hunter Acoustics database of music source noise levels for similar sized venues. This has allowed a robust assessment of live music break-out from the nearby venues.

We have initially based this planning assessment on residential planning guidance for what is a hotel development. Results of the survey indicate the overall external noise climate measured is generally low. Referring to database survey results, additional attenuation measures are indicated to control live music break-out from the Merthyr Conservative Club and New Crown Inn, as well as occasional street noise/people shouting at in the evening.

- **Controlling Noise Intrusion to Habitable Rooms**

The report goes on to review sound reduction specifications for:

- High performance acoustic or secondary glazing
- Mechanical ventilation to bedrooms

Noise intrusion is indicated to fall within current planning guidance figures quoted by the World Health Organisation and BS 8233:2014. This includes live music break-out from the Merthyr Conservative Club function room and the New Crown Inn.

1. INTRODUCTION

A boutique hotel is proposed consisting of hotel bedrooms at 1st and 2nd floor levels above ground floor and basement restaurant at 30-31 High Street, Merthyr Tydfil, CF47 8DP.

This noise impact assessment covers road, rail, early morning deliveries, street noise, as well as live music break-out from the Merthyr Conservative Club (MCC) and the New Crown Inn public house.

The New Crown Inn is a well-established public house, renowned for live music event. It has no restrictions on the number of events, provision of entertainment, or noise limits for live & recorded music indoors and is licensed for music 7 nights a week until 0000hrs weekdays and until 0130hrs weekends and bank holidays. They regularly hold live music events on most evenings 2000-0000hrs. At weekends, live bands normally finish at 0000hrs and recorded music played until 0100hrs. We are also advised that they regularly hold music festival type events during which bands would play from 1400hrs until 0000hrs.

The MCC has a large upstairs function room which can be used for weddings, parties and other events with live music, and can typically hold events once a week. The function room does not share a party wall with 30-31 High Street; however, a currently vacated first floor apartment within the MCC does share the party wall.

In line with the “agent of change” principle it is proposed to carry out an assessment of entertainment noise from each venue which could impact on the amenities of hotel residents and possibly generate complaints which may impact the existing businesses.

This report therefore details;

- i) A review of current planning guidance relating to transport, street and music noise intrusion on a hotel development.
- ii) Results of a 24 hour environmental noise survey carried out to assess the existing ambient and background noise climate. Results are used to confirm existing road and rail noise levels impinging on the site, as well as background levels used as the basis for setting services plant environmental noise criteria.
- iii) Results of a noise break-out test from the Merthyr Conservative Club and the New Crown Inn to outside the development façade. A robust assessment of music break-out levels from the venues has been carried out, based on database measurements taken by Hunter Acoustics at a live music venue in Cardiff.
- iv) An assessment of noise break-in from occasional L_{max} night/early morning sources.

2. PLANNING GUIDANCE & CRITERIA

2.1 Planning Policy Wales

The Welsh Government's Planning Policy Wales (Edition 11) dated February 2021, states the following;

"6.7.5 ...The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable."

"6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport-related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken."

The Welsh Government adds: *"Under the agent of change principle, if new developments or uses are to be introduced near a pre-existing business, such as a live music venue, it is the responsibility of the developer to ensure solutions to address and mitigate noise are put forward as part of proposals and are capable of being implemented."*

2.2 Technical Advice Note (Wales) 11

As an apartment hotel development, we have initially compared the existing noise climate with guidance of TAN 11.

Noise bands defining categories A-D of TAN 11 are set in terms of $L_{Aeq,16hr}$ daytime and $L_{Aeq,8hr}$ night time levels for road, rail and air traffic noise and mixed sources, free field 1.2-1.5m above ground level as follows;

Table 2.1 – TAN11 Noise Exposure Categories

Recommended noise exposure categories for new dwellings near existing noise sources (ref Table 2 of TAN 11 (Wales) October 1997)					
Noise Source	Time	Noise Exposure Categories			
		A	B	C	D
Road Traffic	07:00-23:00	<55	55-63	63-72	>72
	23:00-07:00	<45	45-57	57-66	>66
Rail Traffic	07:00-23:00	<55	55-66	66-74	>74
	23:00-07:00	<45	45-59	59-66	>66
Air Traffic	07:00-23:00	<57	57-66	66-72	>72
	23:00-07:00	<48	48-57	57-66	>66
Mixed Sources ⁽⁴⁾	07:00-23:00	<55	55-63	63-72	>72
	23:00-07:00	<45	45-57	57-66	>66

Note: In addition, sites where individual noise events regularly exceed 82dB(A) $L_{max}(slow)$, several times in any night time hour should be treated as being in NEC C, unless the $L_{eq}(8 \text{ hour})$ already puts the site in NEC D.

(4) Mixed sources: this refers to any combination of road, rail, air and industrial noise sources. The "mixed source" values are based on the lowest numerical values of the single source limits in the table. The "mixed source" NECs should only be used where no individual noise source is dominant.

2.3 British Standard 8233:2014

British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' includes internal noise criteria of habitable rooms in residential dwellings, as shown below;

Table 2.2 – BS 8233:2014 Internal Ambient Noise Criteria for Habitable Rooms

Location	Desired		Reasonable *	
	07:00 to 23:00	23:00 to 07:00	07:00 to 23:00	23:00 to 07:00
Living room	35 dB $L_{Aeq,16hr}$	-	40 dB $L_{Aeq,16hr}$	-
Dining room/area	40 dB $L_{Aeq,16hr}$	-	45 dB $L_{Aeq,16hr}$	-
Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$	40 dB $L_{Aeq,16hr}$	35 dB $L_{Aeq,8hr}$

* NOTE 7 states “Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.

In addition BS 8233:2014 states: “Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.”

Reference is therefore made to World Health Organisation (WHO) ‘Guidelines for Community Noise, 1999’ which states “For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991)”.

2.4 British Standard 4142:2014

British Standard 4142:2014 “Methods for rating and assessing industrial and commercial sound”, provides guidance for the assessment of industrial noise affecting residential receivers.

This standard describes a rating method comparing L_{Aeq} noise levels from the industrial source with pre-existing background L_{A90} levels at the residential receiver. It advises at a difference (industrial noise - background) of:

- +10dB or higher, likely to be an indication of a significant adverse impact, depending on the context.

- A difference of + 5dB, 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 or a significant 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.

A sliding scale of penalties can be applied to industrial/commercial sound levels which have acoustically distinguishing characteristics, including tonality, impulsivity and intermittency.

Tonality – A penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible.

Impulsivity – A penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it clearly perceptible, and 9dB where it is highly perceptible.

Other sound characteristics – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied

Intermittency – If intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.

BS 4142:2014 states under section 11;

“Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

- 1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.”

2.5 Live Music Break-In

The Noise Council's 'Code of Practice on Environmental Noise Control at Concerts' and the draft 'Code of Practice on Control of Noise from Pubs & Clubs' Nov '99 gives guidance and noise criteria for live music

However, this applies to music events and venues being established near to existing residential receivers, and is not considered appropriate for assessing new residential development near to existing well-established venues, in line with the Agent of Change principle.

The following music criteria are proposed to demonstrate good internal acoustic conditions:

2.5.1 Subjective-Objective Method

An objective limit has been calculated based on an EHO's subjective assessment of what would constitute a statutory noise nuisance at a similar site in Cardiff.

The limit equated to around an overall 25dB L_{Aeq} inside a bedroom (with the window partially open). The 25dB L_{Aeq} internal limit is 5dB lower (tighter) than the 30dB $L_{Aeq,T}$ sleep disturbance guidance figure quoted by the World Health Organisation.

However, this limit was based on an existing residential dwelling, rather than an hotel development in a town centre. It is therefore proposed to work to 30dB L_{Aeq} inside hotel rooms in line with the WHO Sleep Disturbance guidelines.

3. ENVIRONMENTAL NOISE SURVEY

An environmental noise survey was set up at the front and rear facades of the existing building at 2nd floor level.

Covid-19

The majority of Covid-19 restrictions at the time of the noise survey had been lifted by the Welsh Government, and the noise climate on High Street and surrounding areas is likely to be relatively normal, including deliveries and New Crown beer garden noise. The results of the survey are reported below; however, it is also proposed to refer to Hunter Acoustics database figures for deliveries and external 'beer garden' noise.

Under the Welsh Govt guidance at the time of the survey, live music events were not currently permitted and were not taking place at the venues. Additional data has been taken from Hunter Acoustics' measurement database to confirm typical Live Music Venue Noise Break-Out.

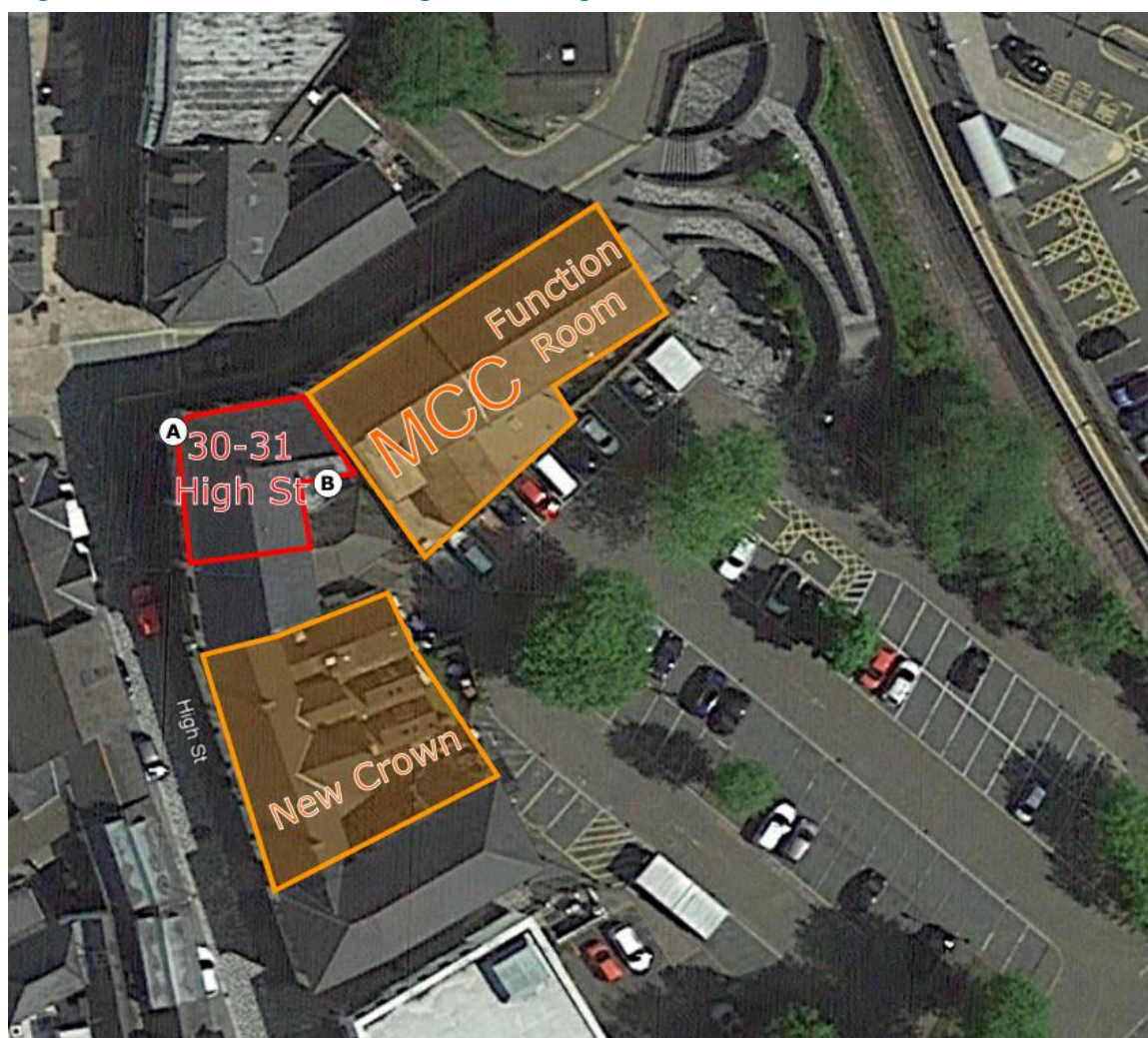
Database figures include octave band frequency spectra (L_{Aeq} & L_{Amax}) as well as overall dB(A) levels allowing a detailed assessment of sound insulation performance requirements for the proposed apartment glazing/ventilation scheme.

We assess this to be a robust assessment which can allow this planning application to proceed, in line with Institute of Acoustics and Association of Noise Consultants guidance for assessments during the current crisis.

3.1 Procedure

Continuous noise monitoring was carried out at Position A from 1310hrs on Friday, 18 June 2021 to 0930hrs on Monday, 21 June 2021, and at Position B from 1015hrs on Friday, 25 June 2021 to 0915hrs on Monday, 28 June 2021 as shown in Figure 3.1 below.

Data including L_{Amax} , L_{Aeq} and background L_{A90} was logged at 15 minute intervals over the monitoring period, along with continuous audio and 100ms data to allow source identification and further detailed analysis of results if required.

Figure 3.1 – Site Plan Showing Monitoring Locations

Site plan in Figure 3.1 above shows the development site and continuous monitoring positions used, namely:

Table 3.1 – Continuous Monitoring Location Details

Position	Description
A	Microphone located out of 2 nd floor window overlooking High Street, Masonic Street & Swan Street
B	Microphone located out of 2 nd floor window overlooking Gillard St Car Park and New Crown Beer Garden, with rail line beyond

3.2 Meteorological Conditions

Approximate weather conditions are shown in time history graphs in Figures B.1 – B.8 of Appendix B.

To summarise, the weather conditions during the monitoring period were generally dry, with occasional light rain showers; gentle to moderate breeze throughout.

3.3 Measurement Equipment

The following measurement equipment was used during the surveys:

Table 3.2 – Noise Monitoring Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
Norsonic AS	Calibrator (113.95dB @ 999.27Hz)	1251	24202	14 August 2020	U35462
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-08723-E0	30 October 2019	FL-19-235
	Preamplifier	MA220	1820	30 October 2019	FL-19-235
	Microphone	Capsule	9381	30 October 2019	FL-19-235
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-14577-E0	22 June 2020	TCRT20/1313
	Preamplifier	MA220	7485	22 June 2020	TCRT20/1313
	Microphone	Capsule	A15594	22 June 2020	TCRT20/1313

Measurement systems were calibrated before and after the surveys and no variation occurred. *Note: Copies of traceable calibration certificates for all equipment are available upon request.*

3.4 Results

Time history graphs in Figure B.9 and Figure B.10 of Appendix B show L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels measured at positions A and respectively.

Construction noise measured on 19th & 20th June at Position A has been excluded. Atypical noise at the start of monitoring on Friday 25th at Position B between 1100hrs and 1500hrs has been excluded.

3.4.1 Ambient $L_{Aeq,T}$ Levels

The following free-field $L_{Aeq,16hr}$ daytime (0700-2300hrs) and $L_{Aeq,8hr}$ night-time (2300-0700hrs) noise levels were measured;

Table 3.3 – Summary of Free-Field Daytime $L_{Aeq,16hr}$ and Night-time $L_{Aeq,8hr}$ Results

Position A	
Friday 13:15 18/06/2021 - Saturday 07:00 19/06/2021	Daytime $L_{Aeq,8hr} = 55$ dB
	Night-time $L_{Aeq,8hr} = 46$ dB
Saturday 07:00 19/06/2021 - Sunday 07:00 20/06/2021	Daytime $L_{Aeq,16hr} = 55$ dB
	Night-time $L_{Aeq,8hr} = 46$ dB
Sunday 07:00 20/06/2021 - Monday 07:00 21/06/2021	Daytime $L_{Aeq,16hr} = 55$ dB
	Night-time $L_{Aeq,8hr} = 46$ dB

Position B	
Friday 15:00 25/06/2021 - Saturday 07:00 26/06/2021	Daytime $L_{Aeq,10hr} = 53$ dB
	Night-time $L_{Aeq,8hr} = 45$ dB
Saturday 07:00 26/06/2021 - Sunday 07:00 27/06/2021	Daytime $L_{Aeq,16hr} = 53$ dB
	Night-time $L_{Aeq,8hr} = 45$ dB
Sunday 07:00 27/06/2021 - Monday 07:00 28/06/2021	Daytime $L_{Aeq,16hr} = 51$ dB
	Night-time $L_{Aeq,8hr} = 45$ dB

Noise levels are relatively low at both positions, generally falling under NECs A of TAN 11.

3.4.2 $L_{Amax,F}$ levels (Street Noise)

Generally, maximum noise levels during the night did not exceed 82dB $L_{Amax,F}$.

However, constant noise from passers-by on the street and from the beer gardens was observed at both Positions A & B. Typical L_{Aeq} and $L_{Amax,F}$ levels for these activities/sources are here summarised below

Table 3.4 – Street Noise Levels – Position A

Position A	dB $L_{Aeq, T}$	dB $L_{Amax, F}$
Street Noise: 18/6/21 19:00-23:00	54	78
Street Noise: 19/6/21 18:30-22:00	55	89*
Street Noise: 20/6/21 21:00-21:10	60	76
Street Noise: 20/6/21 22:43-22:47	55	81

* *Isolated shouts*

At Position A, people on the street was generally consistent through the evenings until around 2300hrs. No significant street activity was recorded after 2300hrs. L_{max} levels were around 76-81dB, except for an isolated shout.

This part of the High Street is not considered very busy or rowdy compared with areas of the town centre with more bars and night-clubs. However, as live music was not taking place at the New Crown activity may have been reduced during the monitoring period.

For a robust assessment we have assumed higher street noise levels on High Street for people leaving the New Crown later during the early hours, based on database figures.

Table 3.5 – Beer Garden Noise Levels – Position B

Position B	dB $L_{Aeq, T}$	dB $L_{Amax, F}$
Beer Garden: 26/6/21 19:54-20:00	60	83*
Beer Garden: 26/6/21 21:20-21:35	55	68
Beer Garden: 26/6/21 22:00-23:00	54	70
Glass Disposal: 25/6/21 21:38 (10s)	70	78
Glass Disposal: 26/6/21 18:50 (10s)	70	79

*Isolated shout

At Position B, Beer Garden activity and people outside the pub was generally consistent through the evenings until around 2300hrs. However, this could continue after 2300hrs when the New Crown remains open later. L_{max} levels were around 70dB, except for an isolated shout.

No glass disposal was recorded after 2300hrs. However, this could occur after 2300hrs when the New Crown remains open later.

The following L_{max} spectra of shouting and glass disposal have been measured and would be used in our assessment

Table 3.6 – L_{max} Levels

Description	$L_{max, F}$ at Octave Band Centre Frequencies, Hz (dB)				
	125	250	500	1k	2k
Shouting on High Street	64	67	85	89	89
Glass Disposal	78	67	74	70	75

3.4.3 Background $L_{A90, T}$ levels

Referring to time history charts the following minimum consistent daytime and night-time background L_{A90} sound levels have been determined;

Table 3.7 – Minimum Consistent Daytime and Night-time Background L_{A90} Results

Period		Position A	Position B
Daytime (0700-2300hrs)	$L_{A90, 1hr}$ (dB)	46	51
Night-time (2300-0700hrs)	$L_{A90, 15min}$ (dB)	33	38

Note: The background noise climate at Position B was controlled by services plant on neighbouring buildings, including kitchen plant at the New Crown which was generally indicated to be switched off at around 2145hrs, referring to the audio, although other continuous plant noise sources remain present during the night-time.

These levels would be used as the basis for setting environmental noise limits for services plant at the closest neighbouring residential receivers.

4. NOISE BREAK-OUT TEST FROM THE NEW CROWN INN & MERTHYR CONSERVATIVE CLUB

A noise breakout assessment was carried out on Friday 18th June to assess the noise break-out from the New Crown Inn & Merthyr Conservaive Club.

Broadband pink noise was generated in the main spaces using a pink noise generator and a high performance amplifier/loudspeaker system with active sub-woofer.

Figure B.11 in Appendix B shows the external measurement positions.

**At Positions 4-6 & 10 at 30-31 High Street locations the source noise levels were not clearly audible over the background sound levels. The assessmernt concentrates on the near-field noise levels to predict music noise levels to the hotel bedrooms.*

The following measurement equipment was used during the break-out test:

Table 4.1 – Noise Break-Out Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-13022-E0	20 August 2019	TCRT19/1649
	Preamplifier	MA220	6853	20 August 2019	TCRT19/1649
	Microphone capsule	MC230	A14127	20 August 2019	TCRT19/1649
Norsonic AS	Calibrator (114.08dB @ 1kHz)	1251	31429	09 March 2021	UCRT21/1323
NTi	Noise Signal Generator	Minirator MR1			
RCF	Amplifier & Loudspeakers	ART310 A			
	Loudspeaker Tripods				
Electro-Voice	Active Sub-woofer	ELX200			

Measurement systems were calibrated before and after the surveys and no variation occurred.

4.1 New Crown Inn

Jorge D'Ascencao, the proprietor of the New Crown Inn advised that amplified music takes place in a ground floor space with the stage at the southern end of the building.

Windows on the west, south and east elevations can be opened, especially during warm evenings/nights, as the room is not fitted with any mechanical ventilation. Entrance doors to the west and east are also usually kept open to allow ingress/egress to the pub and to the external seating areas.

External measurements were taken at Positions 1-6 indicated on marked up site plan. Noise generating equipment was positioned at the stage location. Measurements were carried out with doors open.

Table 4.2 – External Sample Monitoring Location Details

Position	Description
1	3m from New Crown on High St, opposite entrance door (open)
2	3m from New Crown on High St, 10m away from entrance door (open)
3	Rear of the New Crown, in rear Beer Garden
4	Outside Ground Floor, front of 30-31 High Street
5	Outside Second Floor Window, front of 30-31 High Street
6	At second Floor level on stairs, rear of 30-31 High Street

Figure B.12 show full third-octave band measurement results. Table 4.3 below summarises results of break-out tests.

Table 4.3 – New Crown Measurement Results

	dB(A)	dB, Octave-Band Centre Frequency, Hz							
		63	125	250k	500k	1k	2k	4k	8k
Source	92.2	100.0	97.1	88.8	88.3	86.2	82.6	84.3	82.6
Pos 1	65.5	74.0	69.0	63.3	62.9	60.8	55.2	55.1	51.8
Pos 2	58.8	70.9	65.9	55.0	56.2	53.4	49.3	47.3	43.5
Pos 3	59.0	80.6	69.8	56.2	55.2	52.1	49.5	48.6	45.5
Pos 4	56.9	66.8	64.0	58.3	54.3	50.9	46.7	43.1	37.9
Pos 5*	51.0	60.4	52.8	53.3	49.4	44.4	40.7	37.9	30.5
Pos 6	54.3	63.8	58.8	56.2	51.5	49.1	41.8	34.8	27.5

*Façade receiver, corrected to give free-field values.

4.2 Merthyr Conservative Club Function Room

The landlord of the MCC advised that amplified music takes place in the first floor function room, at the opposite end of the building from 30-31 High St. The stage is at the far eastern end of the room.

Windows on the north and south elevations are understood to be rarely opened. A fire door on the southern elevation also remains shut.

External measurements were taken at Positions 7-10 indicated on marked up site plan. Noise generating equipment was positioned at the stage location. Measurements were carried out with windows and doors closed.

Table 4.4 – External Sample Monitoring Location Details

Position	Description
7	10m from MCC Function Room, in car park, opposite fire door (closed)
8	5m from MCC Entrance, in car park
9	3m from MCC Function Room on Masonic Street
10	Outside Ground Floor of 30-31 High Street, on Masonic St

All positions 1.5m above ground level

Figure B.13 shows full third-octave band measurement results. Table 4.5 below summarises results of break-out tests.

Table 4.5 – MCC Measurement Results

	dB(A)	dB, Octave-Band Centre Frequency, Hz							
		63	125	250k	500k	1k	2k	4k	8k
Source	101.4	101.6	104.2	97.8	97.7	95.5	93.0	92.2	92.2
Pos 7	56.5	67.6	67.9	59.4	52.5	47.6	44.4	40.1	33.9
Pos 8	51.6	65.5	58.8	53.3	48.9	45.1	40.4	36.6	30.9
Pos 9	57.3	67.7	64.1	60.5	53.5	50.7	47.1	46.3	36.5
Pos 10	55.3	63.0	64.0	58.2	52.2	48.5	43.0	45.0	32.3

4.3 Overall Sound Reduction

The table below summarises overall level differences at different positions, which would be used in assessing music noise levels to external façades of proposed hotel bedrooms:

Table 4.6 – Measured Level Differences (Sound Reduction)

	dB, Octave-Band Centre Frequency, Hz							
	63	125	250k	500k	1k	2k	4k	8k
Pos 1	26.0	28.1	25.5	25.4	25.4	27.4	29.2	30.8
Pos 2	29.1	31.2	33.8	32.1	32.8	33.3	37.0	39.1
Pos 3	19.4	27.3	32.6	33.1	34.1	33.2	35.7	37.1
Pos 4	33.2	33.1	30.5	34.0	35.3	35.9	41.2	44.7
Pos 5	39.6	44.3	35.5	38.9	41.7	42.0	46.4	52.1
Pos 6	36.2	38.3	32.6	36.8	37.1	40.9	49.4	55.0
Pos 7	34.0	36.3	38.5	45.3	47.9	48.6	52.1	58.2
Pos 8	36.1	45.4	44.6	48.8	50.4	52.6	55.6	61.3
Pos 9	33.9	40.1	37.4	44.2	44.8	45.8	45.9	55.7
Pos 10	38.6	40.2	39.6	45.6	47.0	50.0	47.1	59.8

5. SOUND INSULATION TESTS

Sound insulation tests were carried out across existing structures in measured and assessed in accordance with Building Regulations ADE2003.

The following equipment was used in our sound tests:

Table 5.1 – Sound Insulation Test Equipment

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
Norsonic AS	Type 1 - Integrating - averaging Sound Level Meter	140	1403003	04 October 2019	U33025
	Preamplifier	1209	12403	04 October 2019	Included
	Microphone	1225	91797	04 October 2019	33024
Norsonic AS	Calibrator (114.08dB @ 1kHz)	1251	31429	09 March 2021	UCRT21/1323
Sennheiser	Bodypack Transmitter 606-648 MHz	SK100	1427385553	-	-
Sennheiser	Bodypack Receiver 606-648 MHz	EK100	1427312753	-	-
RCF	Amplifier & Loudspeaker	ART310A			
	Loudspeaker Tripod				

5.1 Separating Wall between MCC Apartment and 30-31 High Street

At first floor level of the Merthyr Conservative Club there is a [currently unoccupied] residential apartment which shares a separating wall with the proposed hotel development.

It is assumed that the separating wall construction is of solid brick/stone/masonry.

The result of the test achieved 52dB $D_{nT,w}+C_{tr}$, meeting minimum Building Regs performance requirements by a good margin. Test form is given in Figure B.14 of Appendix B.

5.2 Separating Floor between Ground Floor Restaurant and First Floor

The existing ground floor restaurant space is to be retained as a restaurant as part of the redevelopment, with hotel bedrooms at first floor above.

It is assumed that the existing separating floor construction is a timber construction.

The result of the test achieved 43dB $D_{nT,w}+C_{tr}$, just meeting the minimum Building Regs conversion standard. Test form is given in Figure B.15.

A straight level difference of 52dB $D_{nT,w}$ was also measured. This is likely to be sufficient to control normal restaurant noise levels to hotel bedrooms above.

However, the existing floor performance could be used as a basis for specifying upgrades if a higher separation is required between ground floor restaurant and first floor hotel bedrooms (to be confirmed at detailed design stage).

6. HUNTER ACOUSTICS DATABASE NOISE SOURCES

With Covid-19 restrictions on live music venues, in addition to the low-level road/rail and plant noise sources measured during the survey, we have referred to database figures from previous similar surveys for live music break-out from the New Crown and MCC, and for late night street noise (shouting).

The following paragraphs discuss the various source levels used in our assessment. These spectra are then used to assess noise intrusion through the external building fabric/glazing of the proposed residential facades for comparison with criteria discussed in section 0.

6.1 Source Music Noise Levels

Source music noise levels can vary greatly depending on the band, DJ and sound engineers, as well as the amplification and speaker equipment used.

Para 4.3 of 'Code of Practice on Environmental Noise Control at Concerts' by The Noise Council states; *"Research shows that the music noise level in the audience by the mixer position at pop concerts is typically 100dB(A), and that levels below 95dB(A) will be unlikely to provide satisfactory entertainment for the audience."*

A subjective source music level test was carried out with the operator of the New Crown, with music levels adjusted until they were agreed representative of music levels within the venue. An overall level of around 95dB(A) in the middle of the room was confirmed representative of recorded music, and we were advised that live bands were louder than this.

This is in line with our experience of typical source music levels for recorded music and live bands. Note that this subjective assessment did not include a full unamplified drum-kit or bass amplifiers and low-frequency levels were not considered representative; however the overall level was assessed reasonable.

Therefore based on the above and Hunter Acoustics database figures for similar sized live music venues, as well as night-clubs, the following source music noise levels have been used in our assessment (based on a live band with unamplified drum kit):

Table 6.1 - Typical Source Music Levels

Space	$L_{Aeq, 5min}$ (dB)	L_{eq} at Octave Band Centre Frequencies, Hz (dB)							
		63	125	250	500	1k	2k	4k	8k
Main Venue – Live Band	102	105	105	100	100	95	95	90	85

7. EXTERNAL MUSIC NOISE BREAK-IN ASSESSMENT

7.1 Façade Music Noise Levels

An evaluation of music break-out levels has been carried out from the New Crown and MCC Function Room, based on source levels quoted in Table 6.1 above and the measured level differences quoted in Table 4.6.

The following table summarises music noise levels to:

- The West (High Street) Elevation – from the New Crown
- The East (Gillar St Car Park) Elevation – from the New Crown
- The North (Masonic St) Elevation – from the MCC

Table 7.1 – Music Levels from Venues to Hotel Facades

Façade	dB(A)	dB, Octave-Band Centre Frequency, Hz							
		63	125	250k	500k	1k	2k	4k	8k
West (New Crown)	68	72	72	69	66	60	59	49	40
South/ East – Rear (New Crown)	65	69	67	67	63	58	54	41	30
North (MCC)	57	66	65	60	54	48	45	43	25

7.2 Façade Sound Insulation Treatments

The following assessment specifies façade sound insulation treatments in order to meet internal noise criteria discussed in section 2 of this report, based on the façade music noise levels quoted in Table 7.1. The assessment concentrates on music break-out. (Section 8 below summarises overall noise levels from various sources into habitable rooms against proposed criteria)

The assessment uses methodology detailed in annex A of BS8233 2014, extended to include the 63Hz octave band, predicting façade sound reduction, demonstrating that with the best practical means façade sound insulation measures, good internal acoustic conditions can be secured by design.

The initial review is based on the existing double-glazed sash windows being retained. The current windows do not have trickle ventilators. Mechanical ventilation should be fitted to the proposed hotel bedrooms so that windows are not ordinarily opened.

The critical assessment is to the western and eastern façades to control music noise from the New Crown. The assessments are therefore based on including secondary glazing to the existing windows. New windows are proposed to Bedrooms 5 & 10; a high performance double-glazing option has been reviewed, as a possible alternative to secondary glazing.

For the northern façades (Bedrooms 1 & 6) music noise break-out levels from the MCC Function Room are not indicated to be as significant. The existing windows are likely to be sufficient (closed, with ventilation provided by mechanical means).

For our initial assessment:

7.2.1 Glazing

Based on the low-frequency music noise levels from the New Crown, the following glazing sound reduction performance is indicated to be required.

Our assessment is based on the existing glazing remaining – assumed to be double glazed 4 / 16 / 4 – with 10mm secondary glazing spaced 100mm off the existing window.

The following minimum overall sound reduction figures have been used in our assessment, equivalent to 42dB R_w+C_{tr} :

Table 7.2 – Secondary Glazing Sound Reduction Performance

Sound Reduction Performance, dB R_w						
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
20	30	37	44	47	54	55

To Bedrooms 5 & 10 a high performance double glazed unit could be utilised, meeting the following minimum performance, equivalent to 36dB R_w+C_{tr} :

Table 7.3 – Acoustic Double Glazing Sound Reduction Performance (Beds 5 & 10)

Sound Reduction Performance, dB R_w						
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
19	24	29	41	47	47	50

For budgetary guidance, these are based on Pilkington 8 / 16 / 9.1 Optiphon figures

For Bedrooms 1 & 6 on the northern façade, the existing windows are indicated sufficient to control music noise from the MCC, based on the following sound reduction performance figures for a double glazed timber sliding sash window:

Table 7.4 – Acoustic Double Glazing Sound Reduction Performance (Beds 1 & 6)

Sound Reduction Performance, dB R_w						
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
20	25	19	28	36	42	45

For budgetary guidance, these are based on Bereco data for 4 / 16Ar / 4 ESGT (28dB R_w+C_{tr})

7.2.2 Mechanical Ventilation:

Hotel rooms shall be provided with mechanical ventilation, so that windows are not ordinarily opened. The proposed mechanical ventilation system, including any openings in the façade, shall not compromise the required sound insulation performance of the façade.

Detailed assessment of the façade sound reduction through the proposed secondary glazing, mechanical ventilation, and external wall & roof sections should be carried out by a Suitably Qualified Acoustician at detailed design stage.

7.3 West Façade

Bedrooms 2, 3, 4, 7, 8, 9:

Walls: Existing brick/masonry wall

Roof: Existing pitched tiled roof, with existing plaster / plasterboard ceiling

Glazing: Min 42dB R_w+C_{tr} Secondary Glazing

Vent': Mechanical ventilation. No trickle vents in façade.

Predicted external façade calculation is shown in Table B.1. Overall façade sound insulation performance is therefore indicated capable of meeting 30dB L_{Aeq} internally.

7.4 East Façade

Bedrooms 5, 10:

Walls: Existing brick/masonry wall

Roof: Existing pitched tiled roof, with existing plaster / plasterboard ceiling

Glazing: Min 36dB R_w+C_{tr} Acoustic Double Glazing (or Secondary Glazing)

Vent': Mechanical ventilation. No trickle vents in façade.

Predicted external façade calculation is shown in Table B.2. Overall façade sound insulation performance is therefore indicated capable of meeting 30dB L_{Aeq} internally.

7.5 North Façade

Bedrooms 1, 6:

Walls: Existing brick/masonry wall

Roof: Existing pitched tiled roof, with existing plaster / plasterboard ceiling

Glazing: Existing windows

Vent': Mechanical ventilation. No trickle vents in façade.

Predicted external façade calculation is shown in Table B.3. Overall façade sound insulation performance is therefore indicated capable of meeting 30dB L_{Aeq} internally.

8. PREDICTED L_{MAX} NOISE LEVELS IN HABITABLE ROOMS

Taking the sound reduction performance from outside to inside from proposed sound insulation treatments discussed in Section 7 from the external sources discussed under Table 3.6 of this report, gives predicted L_{max} levels in habitable rooms from non-music sources through façade constructions as specified in Section 7. This demonstrates that with the proposed sound insulation measures designed to control music, external L_{max} levels can be suitably controlled.

Table 8.1 shows the calculation of internal L_{Amax} levels taken from the external L_{Amax} levels for the various sources. Overall internal L_{Amax} /dB(A) levels are quoted in bold on the right hand column in the table;

Table 8.1 – L_{max} in Habitable Rooms

L_{Max} Assessments - West Façade	63	125	Octave Band Centre Frequency (Hz)						dB(A)
			250	500	1k	2k	4k	8k	
Façade Sound Reduction (Outside to inside)	22.7	29.9	36.4	45.1	48.4	52.8	52.5	52.5	
Shouting on High Street		64.5	66.6	85.2	89.5	88.8			89
Internal : Habitable Room		34.6	30.1	40.1	41.1	36.0			44
L_{Max} Assessments - East Façade	63	125	Octave Band Centre Frequency (Hz)						dB(A)
			250	500	1k	2k	4k	8k	
Façade Sound Reduction (Outside to inside)	21.3	26.2	32.2	43.2	48.0	49.6	50.5	50.5	
Glass Disposal	74.3	78.1	67.3	74.3	69.6	74.9	75.9	63.6	81
Internal : Habitable Room	53.0	51.8	35.2	31.1	21.6	25.3	25.4	13.1	38
Shouting in Beer Garden		58.5	60.6	79.2	83.5	82.8			83
Internal : Habitable Room		32.3	28.4	36.0	35.5	33.2			39

L_{Amax} levels in habitable rooms therefore meet the recommended 45dB L_{Amax} criterion (with specified mitigation measures detailed in Section 7).

9. PLANT NOISE LIMITS

Plant noise levels (e.g from ground floor restaurant plant) at the hotel bedrooms themselves would be suitably controlled by the proposed sound insulation measures discussed in Section 7.

It should be confirmed where the nearest other residential receivers are (e.g. any flats above commercial premises on High St). At this stage we propose to design to a rating level at least 5dB lower than background noise levels at the nearest residences. Based on levels determined in Table 3.7, this equates to the following;

Table 9.1 – Proposed Rating Level Limits for Any New Fixed Services Plant

Period		At Nearest Noise Sensitive Receptor
Daytime (0700-2300hrs)	$L_{Ar,1hr}$ (dB)	41
Night-time (2300-0700hrs)	$L_{Ar,15mins}$ (dB)	35*

** In our experience, where low rating level limits are indicated based on the 5dB below background criterion, a lower limit has been negotiated. For a city centre site, a 35dBL_{Ar} lower limit is assessed practical.*

The noise rating level of the proposed plant should be assessed in accordance with BS 4142:2014 by a suitably qualified acoustician to ensure the above criteria are met. These criteria require corrections for tonality, impulsivity and intermittency to be included in the analysis.

Criteria are to apply at the closest noise sensitive receivers with all plant operating normally.

Proposed limits shall be confirmed acceptable with the Local Planning Authority/Environmental Health Officer prior to any orders being placed.

10. CONCLUSION

An environmental noise assessment has been carried out for the Proposed Hotel, 30-31 High Street, Merthyr Tydfil, CF47 8DP. The assessment methodology has been based on other recent similar sites undertaken during Covid19 restrictions..

A noise survey has been undertaken at the site which is assessed representative of road/rail sources, existing commercial plant noise sources, and street & beer garden noise L_{max} levels . However, due to the latest COVID-19 restrictions, there were no live music events taking place at the New Crown and Merthyr Conservative Club. A detailed noise break-out survey was undertaken at both venues to assess music noise breaking-out and incident upon the external façades.

Overall, ambient noise climate during the day and night is relatively low; however, noise from live music at the New Crown and people on the street is likely to have an adverse impact in the evening and early hours of the morning. A scheme of façade sound insulation measures has been proposed including:

- Acoustic double or secondary glazing
- Mechanical ventilation to hotel bedrooms

Detailed assessment of the façade sound reduction though the proposed secondary glazing, mechanical ventilation, and lightweight wall & roof sections should be carried out by a suitably qualified acoustician at detailed design stage

This report also details results of sound insulation tests carried out between the first floor apartment of the Merthyr Conservative Club and 30-31 High St, as well as the existing floor between ground floor restaurant and first floor spaces. Results could be used to determine if any additional upgrades are required.

10.1 Summary

The report demonstrates that with the provision of suitable sound insulation measures to the external façade, good internal ambient noise conditions in hotel bedrooms can be secured by design.

Overall therefore the hotel development remains feasible, without prejudicing the existing operations of the New Crown or Merthyr Conservative Club; noise is indicated to be a controllable issue, governed by suitably worded conditions imposed on a planning permission to secure the recommendations of this report.

APPENDIX A - ACOUSTIC TERMINOLOGY

Human response to noise depends on a number of factors including loudness, frequency content and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

The following units have been used in this report:

dB(A)	The sound pressure level A-weighted to correspond with the frequency response of the human ear and therefore a persons' subjective response to frequency content.
L_{eq}	The equivalent continuous sound level is a notional steady state level which over a quoted time period would have the same acoustic energy content as the actual fluctuating noise measured over that period.
L_{max}	The highest instantaneous sound level recorded during the measurement period.
L_{10}	The sound level which is exceeded for 10% of the measurement period. i.e. The level exceeded for 6 minutes of a 1 hour measurement - used as a measure of background noise.
L_{90}	The sound level which is exceeded for 90% of the measurement period. i.e. The level exceeded for 54 minutes of a 1 hour measurement - used as a measure of background noise.
$L_{Ar,Tr}$	The 'rating' level, as described in BS 4142:2014 – the specific noise plus any adjustment for the characteristic features of the noise.
SSR	Sound sensitive receiver

APPENDIX B - DIAGRAMS, GRAPHS AND TABLES

Figure B.1 – Approximate Weather History for Friday, 18 June 2021

June 18, 2021

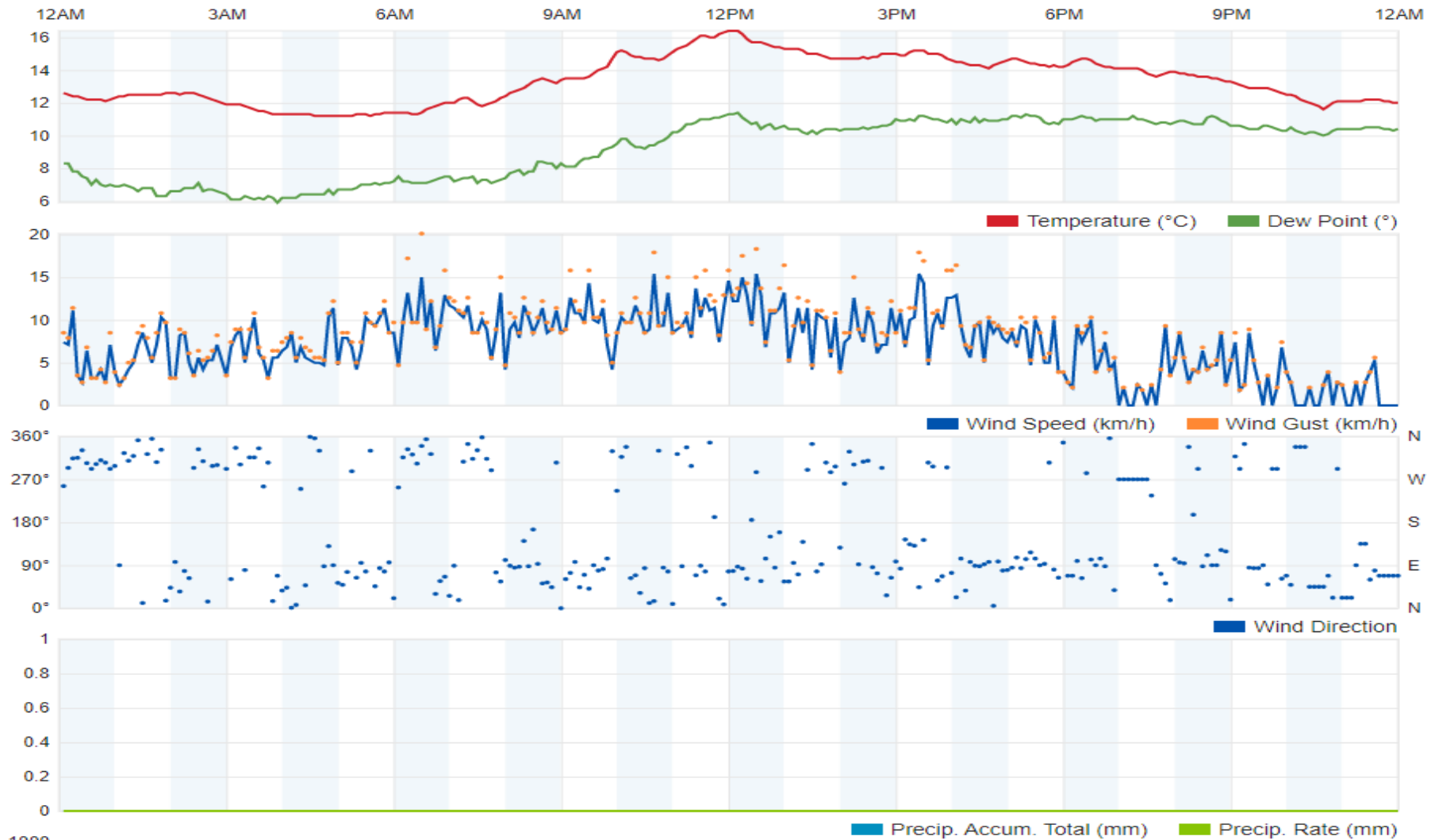


Figure B.2 – Approximate Weather History for Saturday, 19 June 2021

June 19, 2021

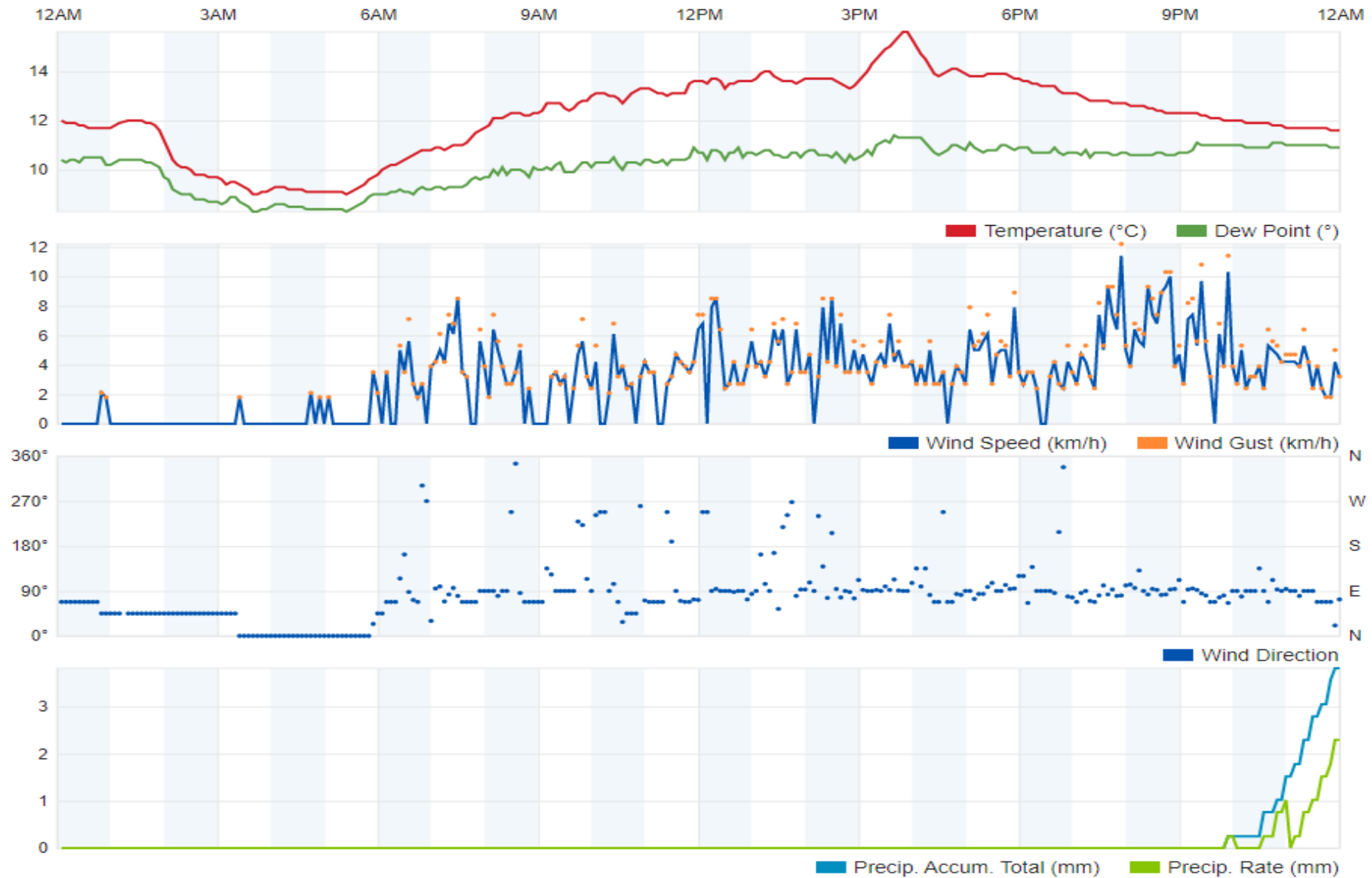


Figure B.3 – Approximate Weather History for Sunday, 20 June 2021

June 20, 2021

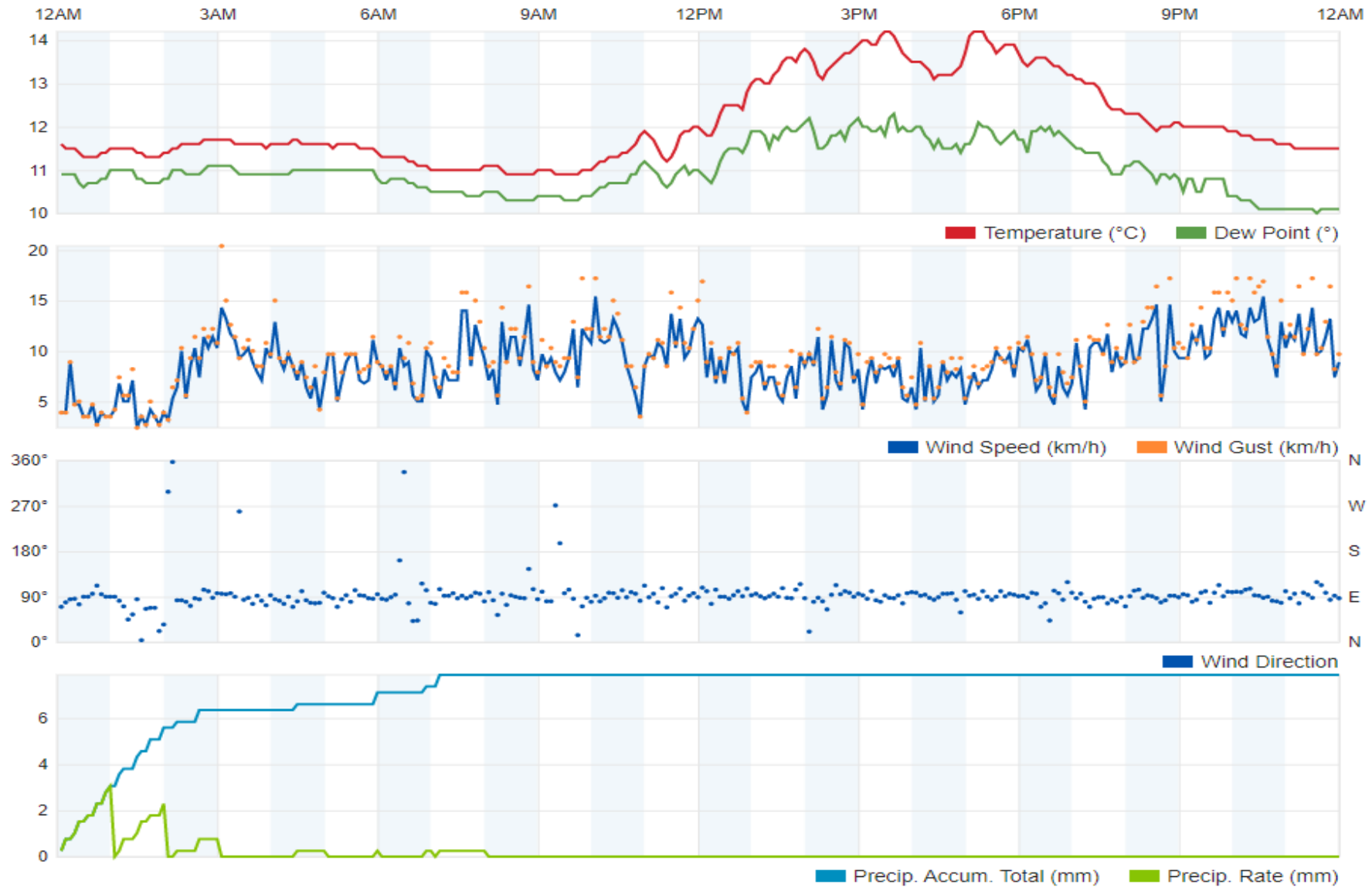


Figure B.4 – Approximate Weather History for Monday, 21 June 2021

June 21, 2021

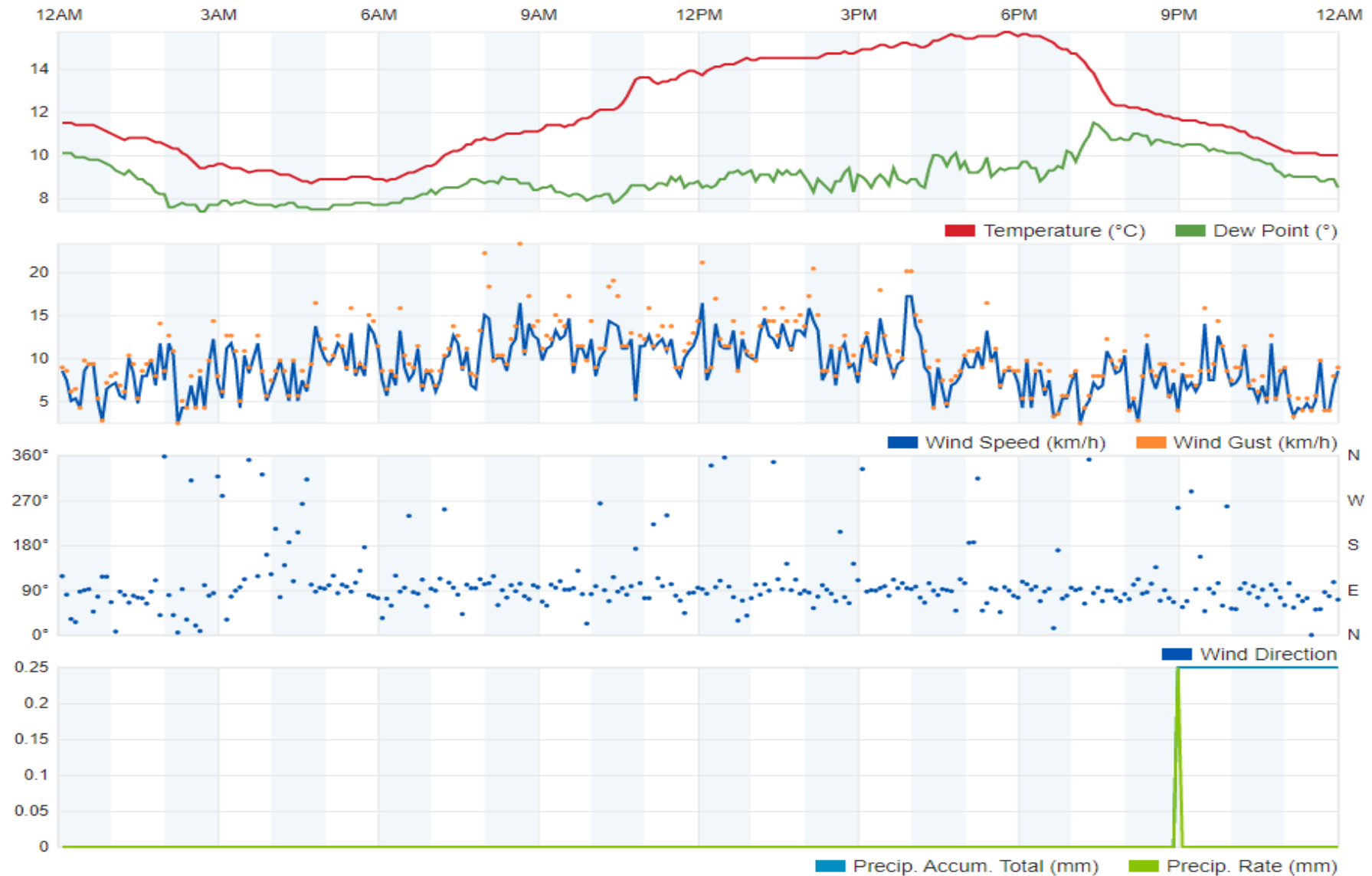


Figure B.5 – Approximate Weather History for Friday, 25 June 2021

June 25, 2021

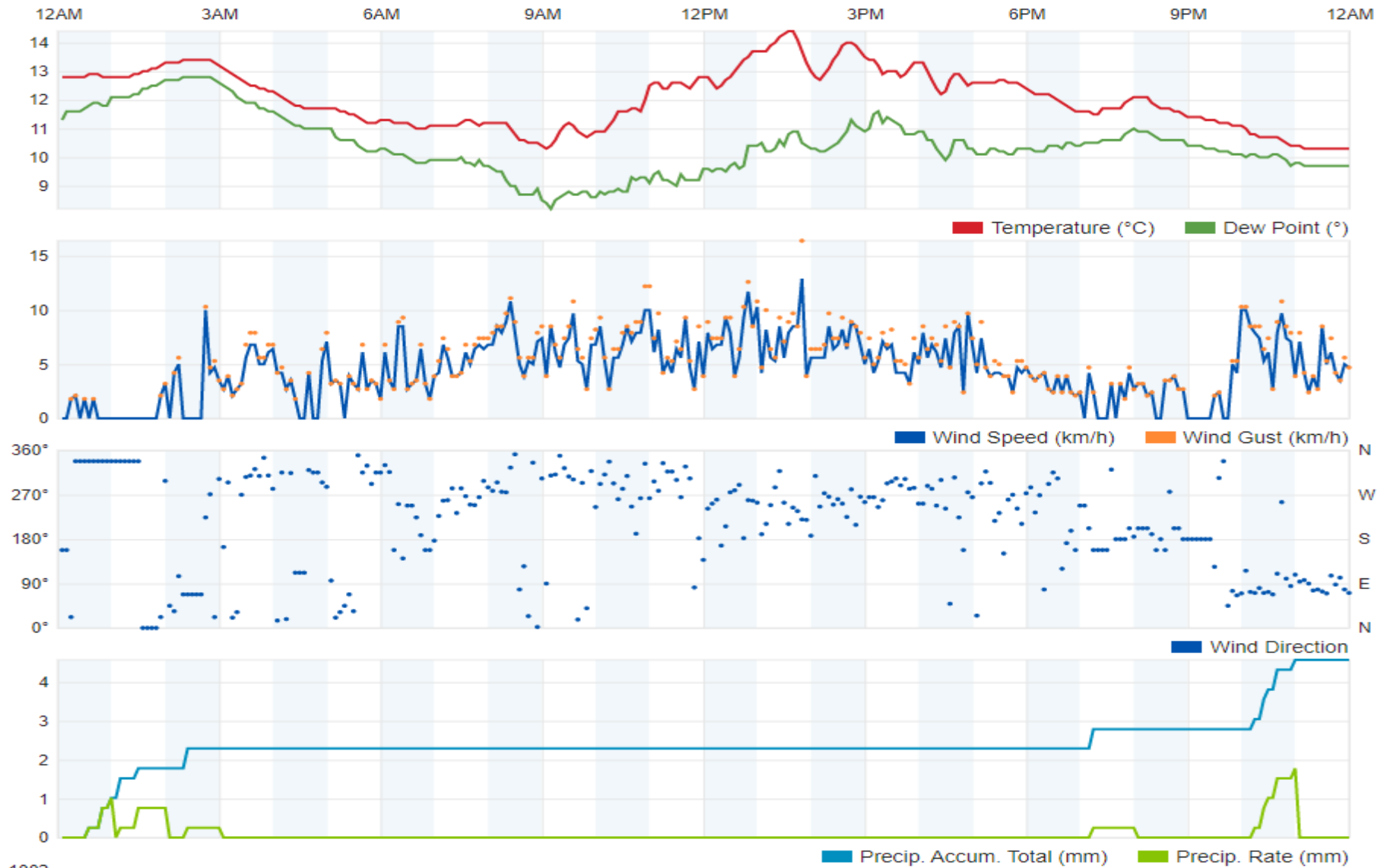


Figure B.6 – Approximate Weather History for Saturday, 26 June 2021

June 26, 2021

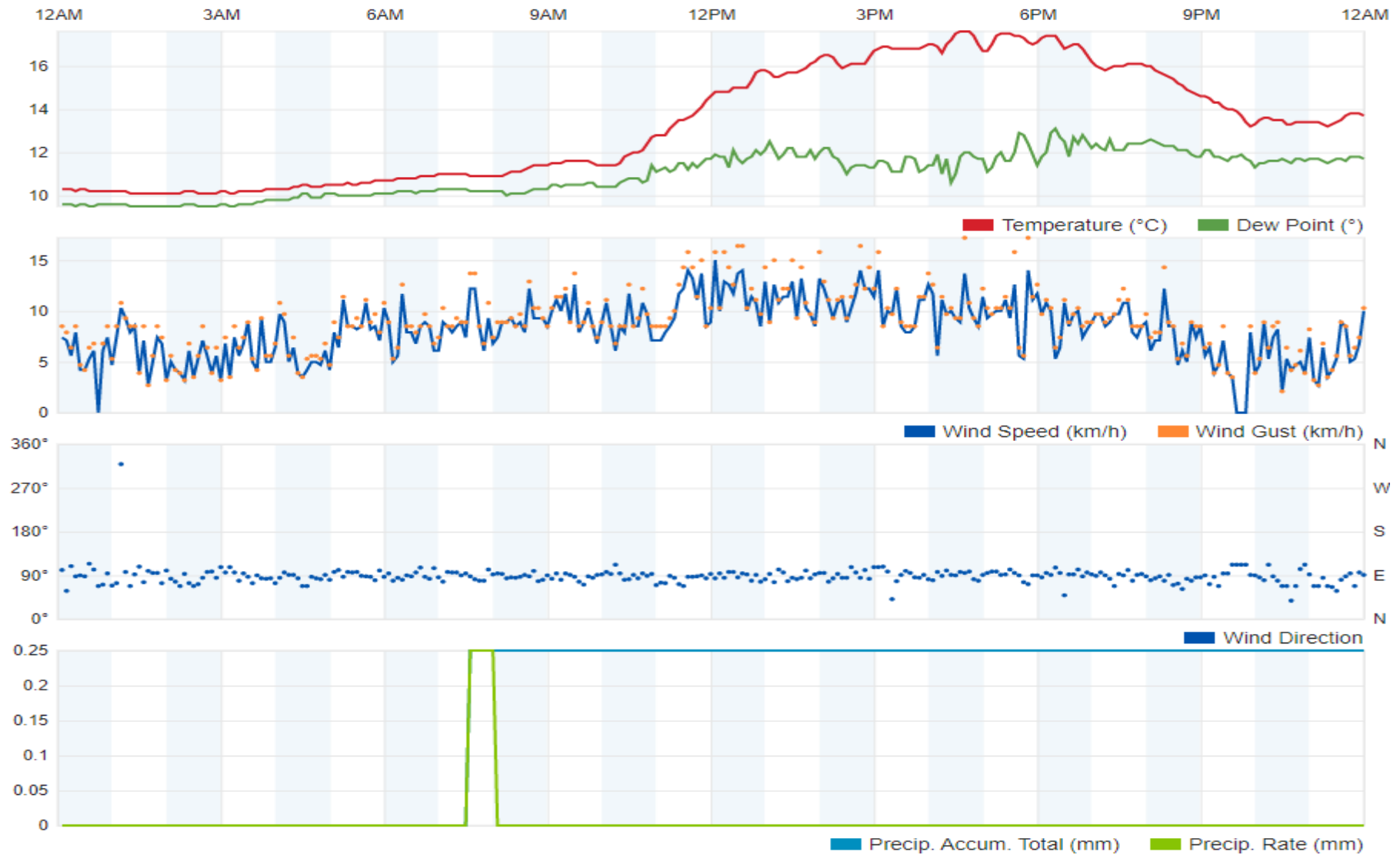


Figure B.7 – Approximate Weather History for Sunday, 27 June 2021

June 27, 2021

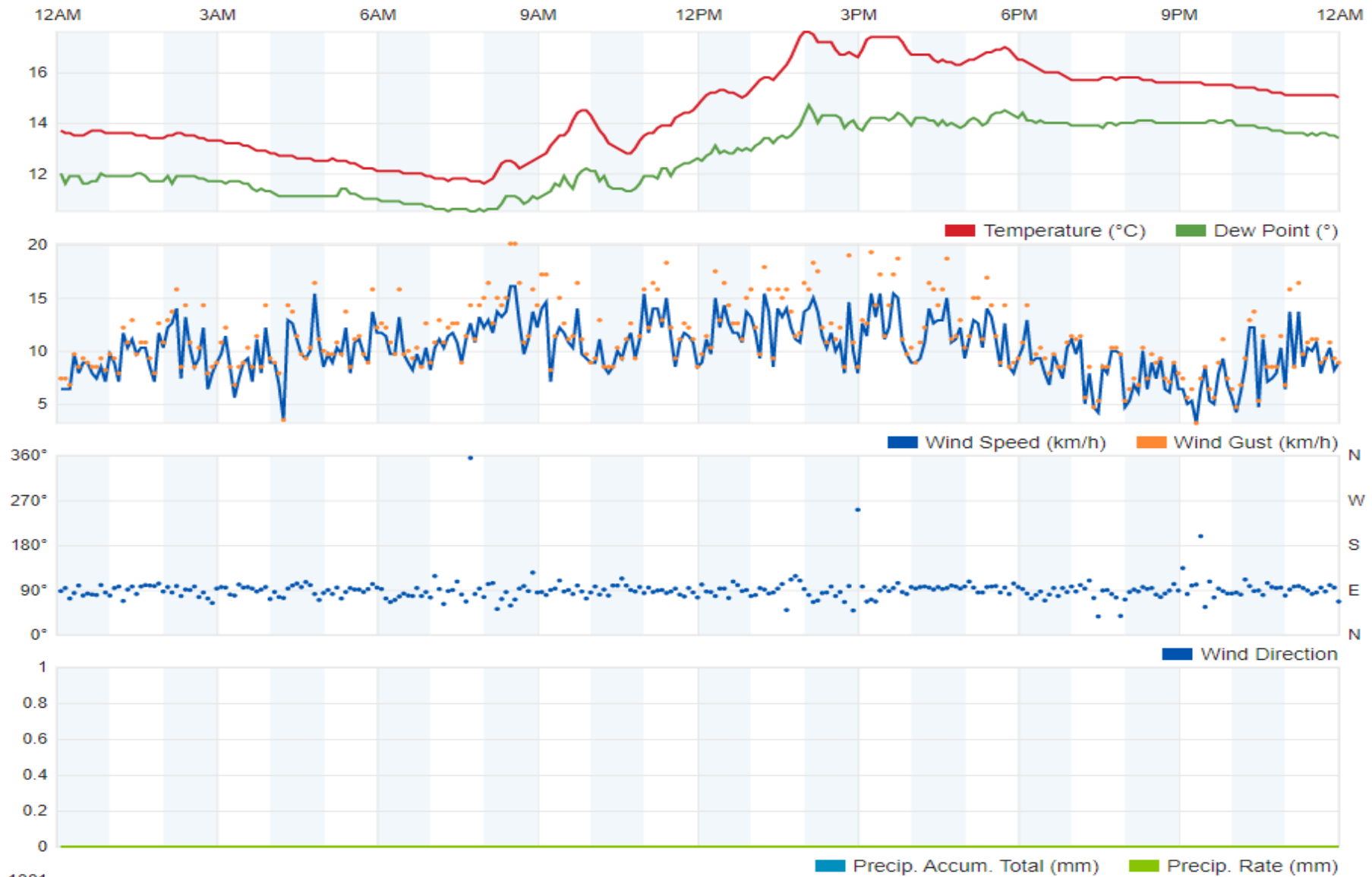
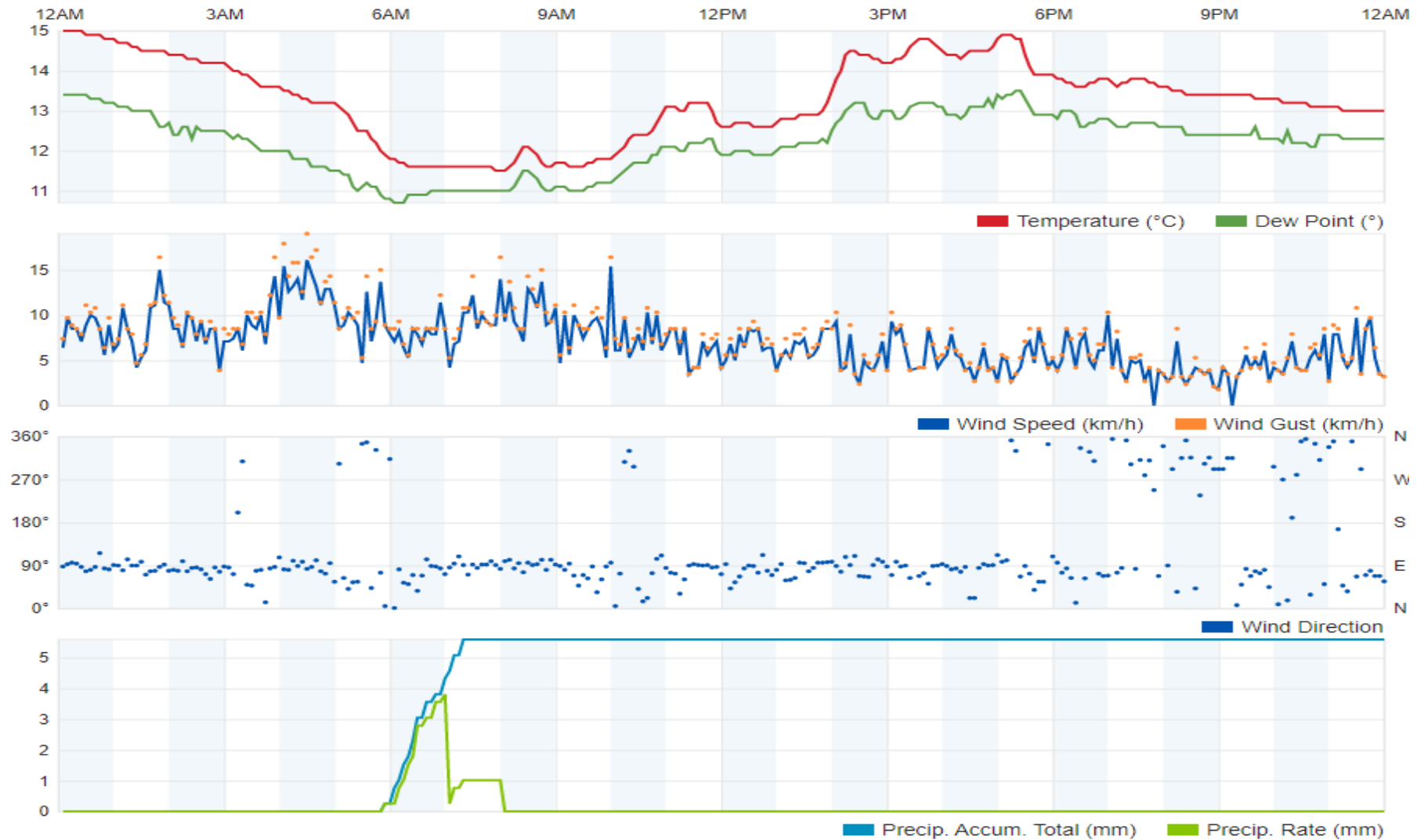


Figure B.8 – Approximate Weather History for Monday, 28 June 2021

June 28, 2021

Weather data taken from wunderground com **Weather Station ID: IMERTH2 Station Name: Cwm Car**

Latitude / Longitude: 51.812° N, 3.379° W **Elevation:** 363 **City:** Merthyr Tydfil

Figure B.9 – Time History at Position A (Friday, 18 June 2021 to Monday, 21 June 2021)

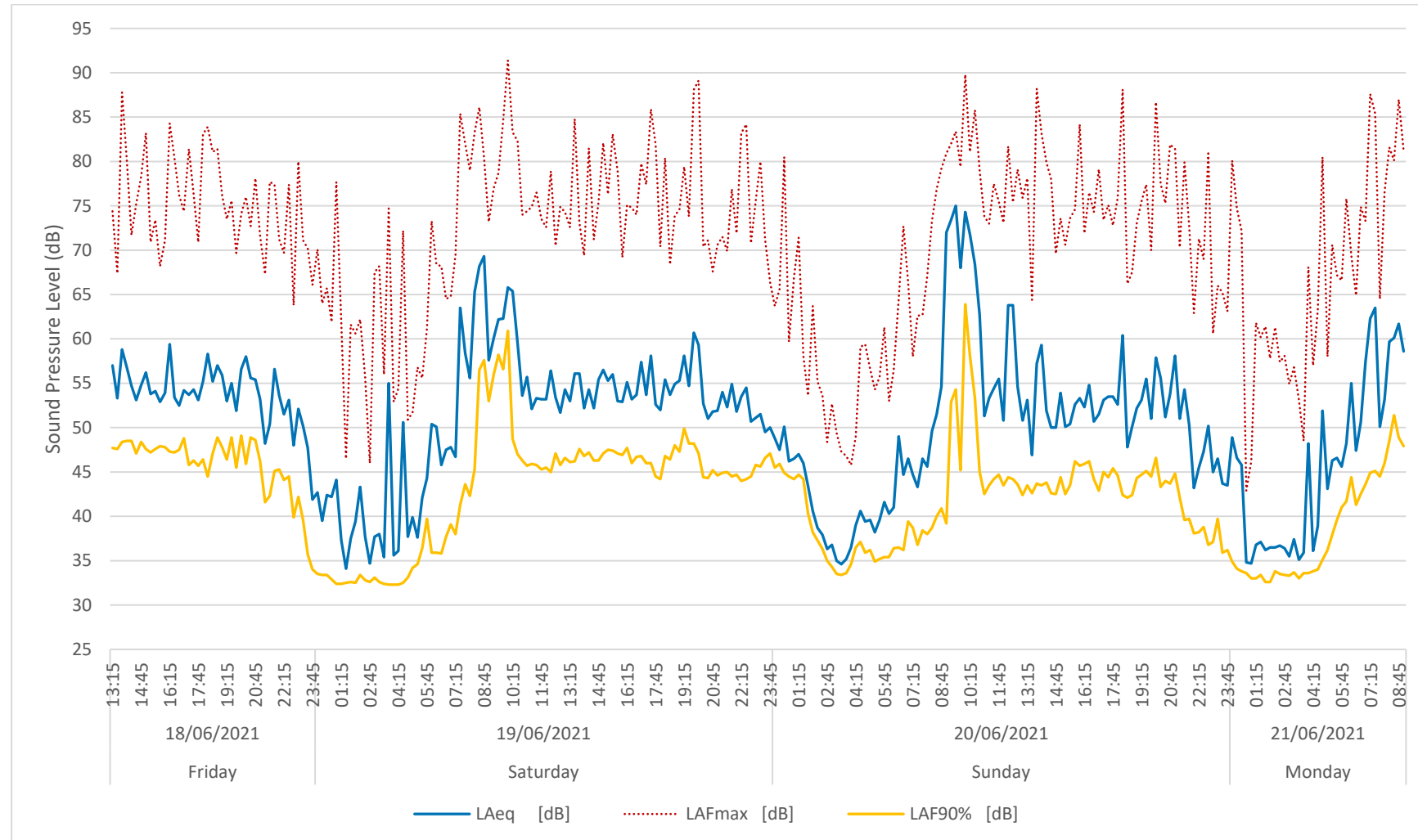


Figure B.10 – Time History at Position B (Friday, 25 June 2021 to Monday, 28 June 2021)

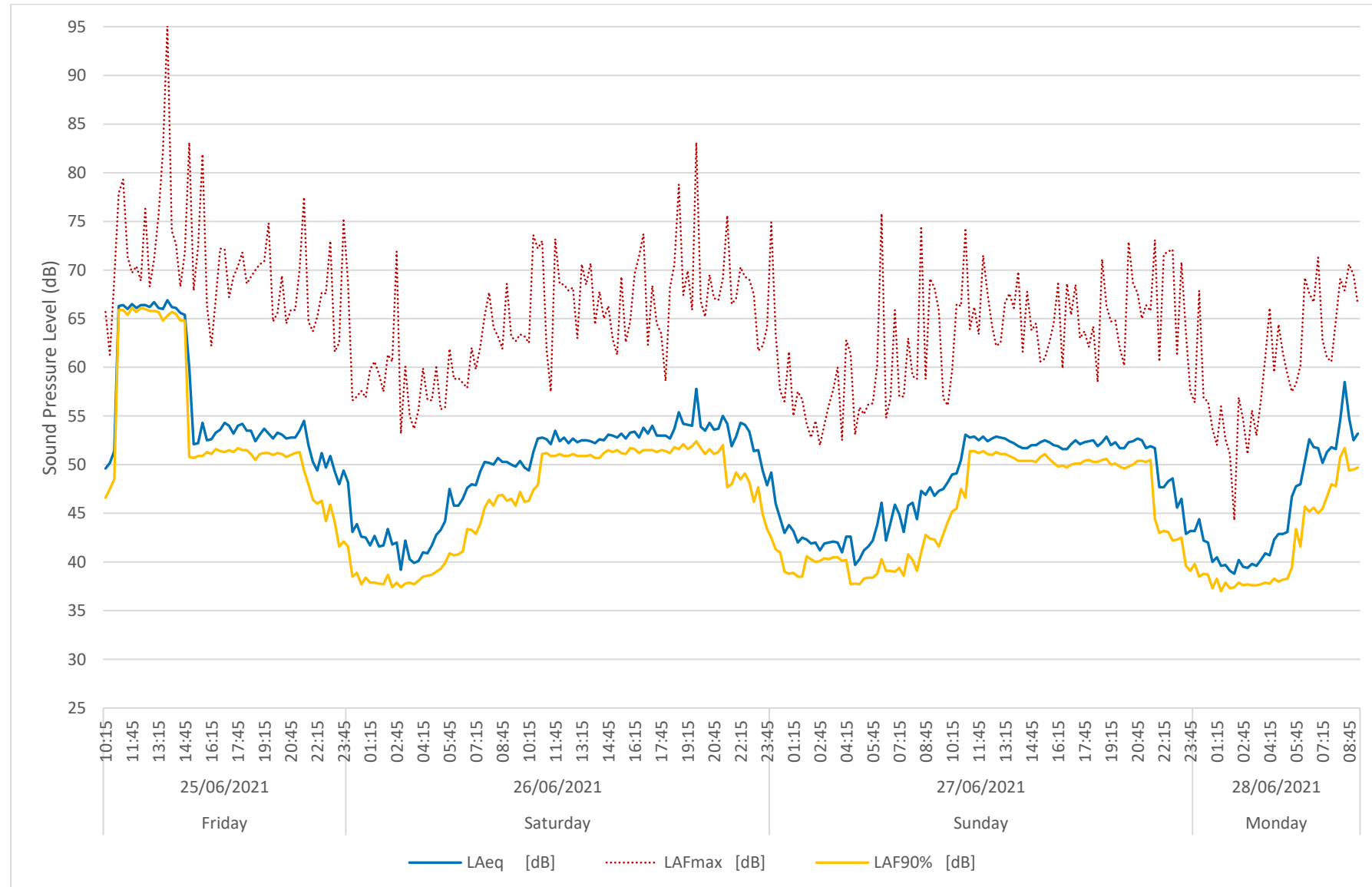
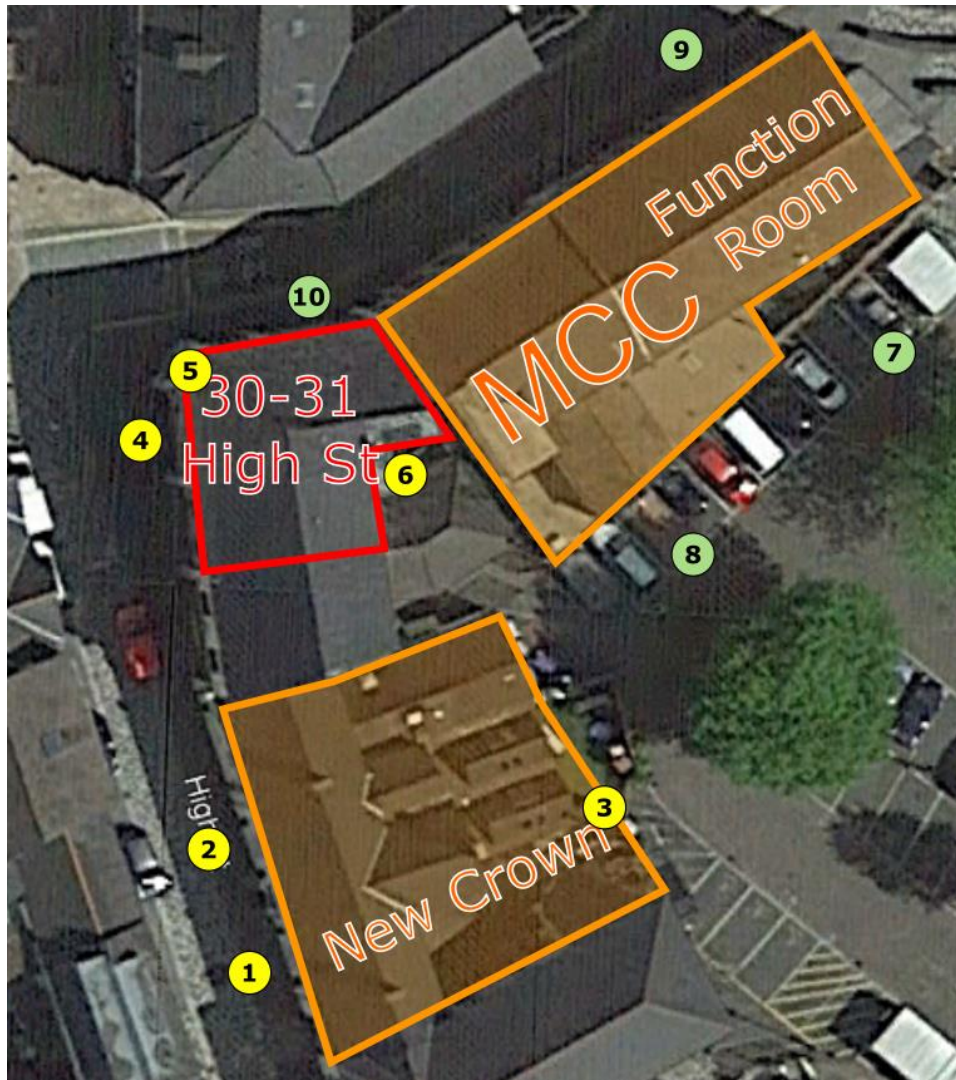


Figure B.11 – Noise Break Out Test – Measurement Positions



YELLOW Markers refer to positions used for the New Crown Break-out test

GREEN Markers refer to positions used for the MCC Break-out test

Figure B.12 – Third-Octave Band Spectra Noise Break-Out Tests – New Crown

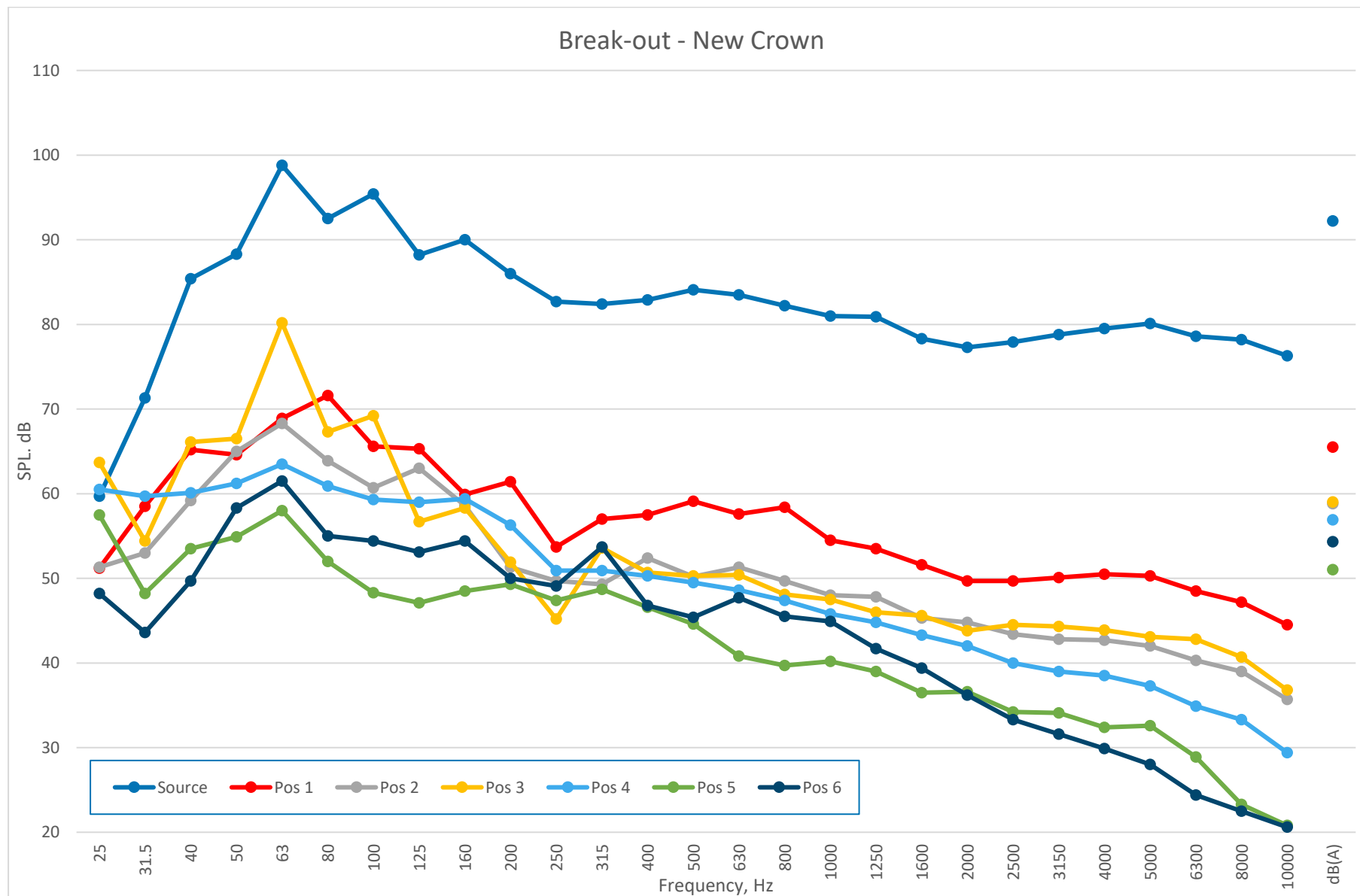


Figure B.13 – Third-Octave Band Spectra Noise Break-Out Tests – MCC

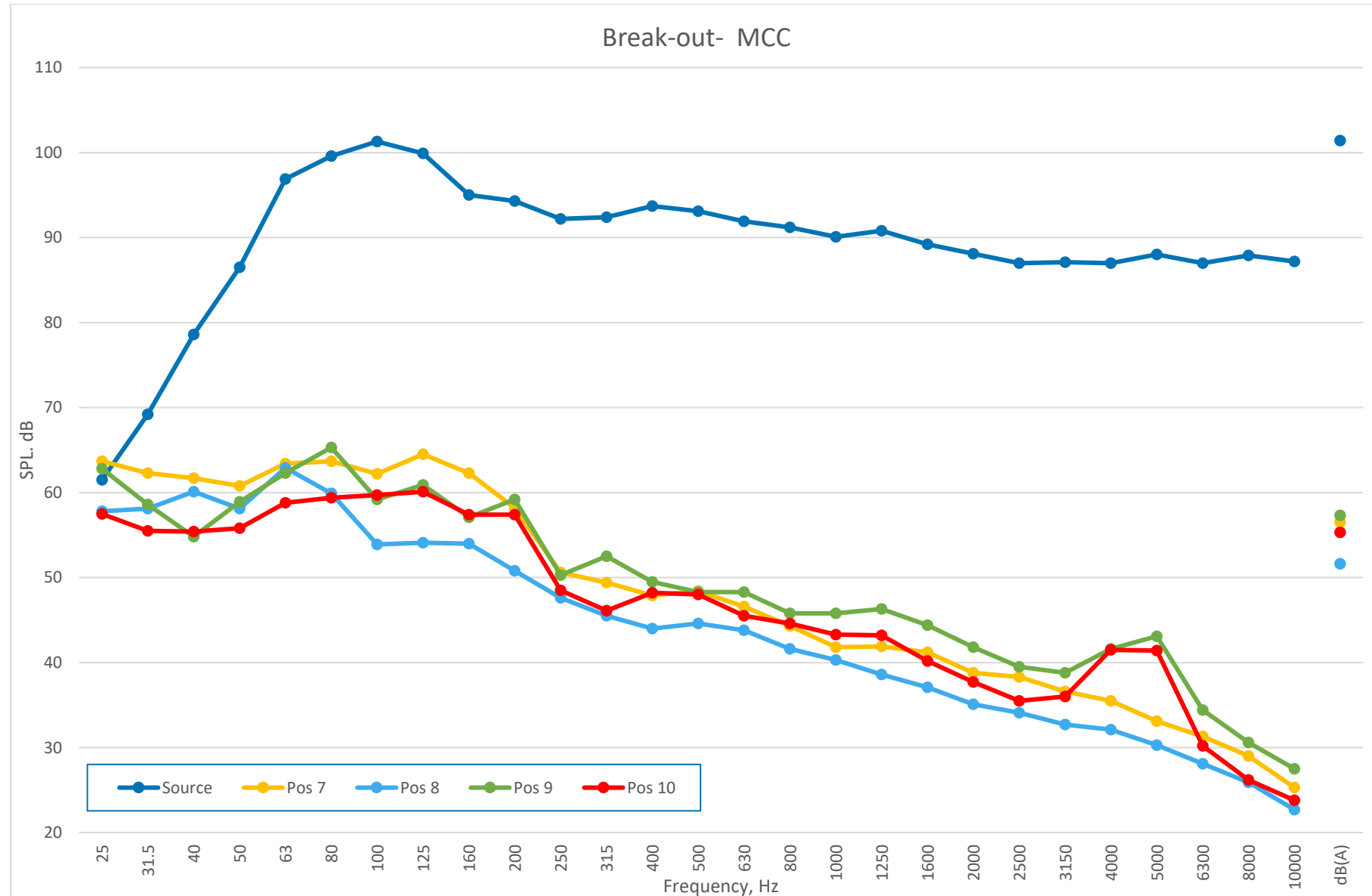


Figure B.14 – Separating Wall Sound Insulation Test

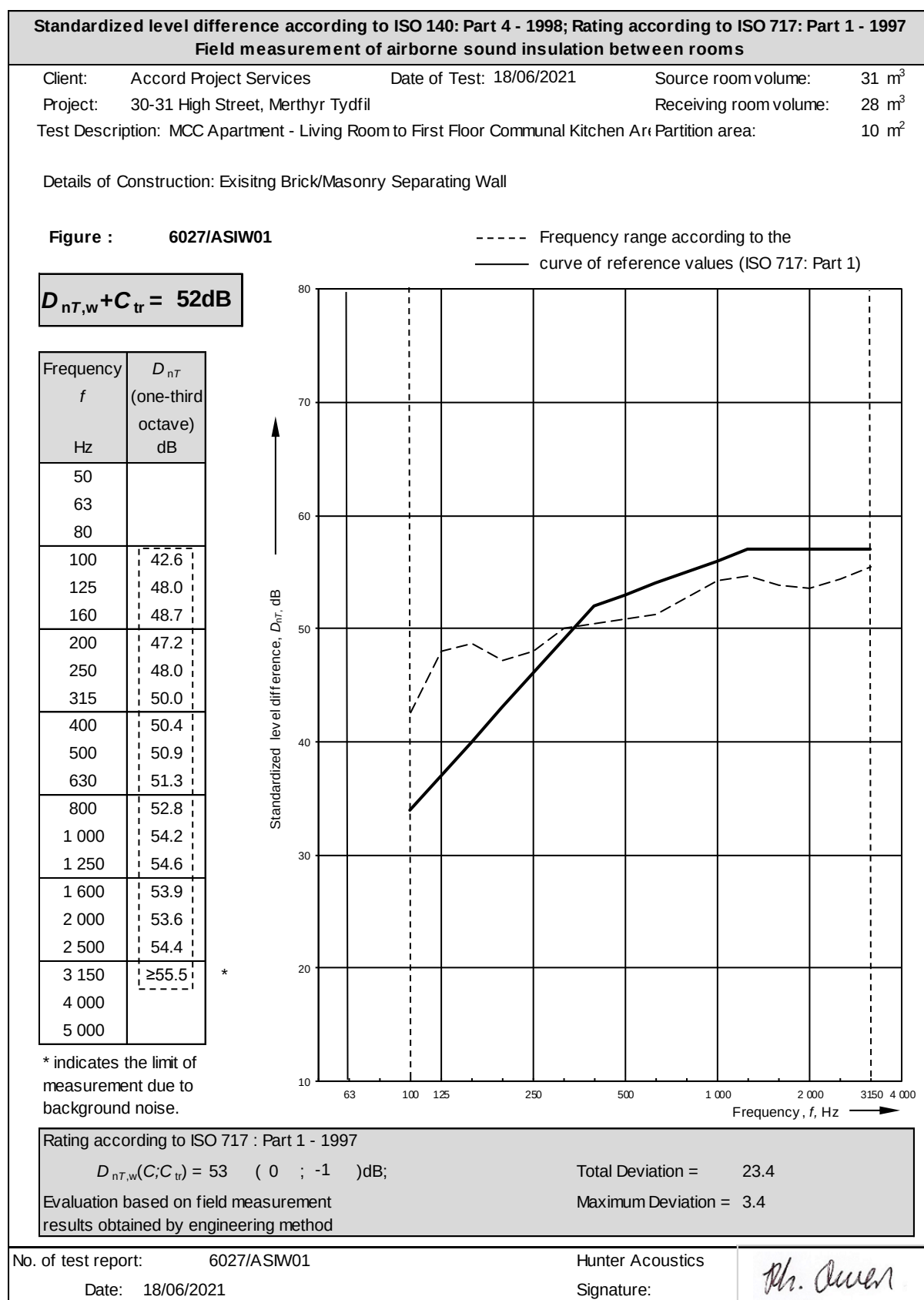


Figure B.15 – Separating Floor Sound Insulation Test

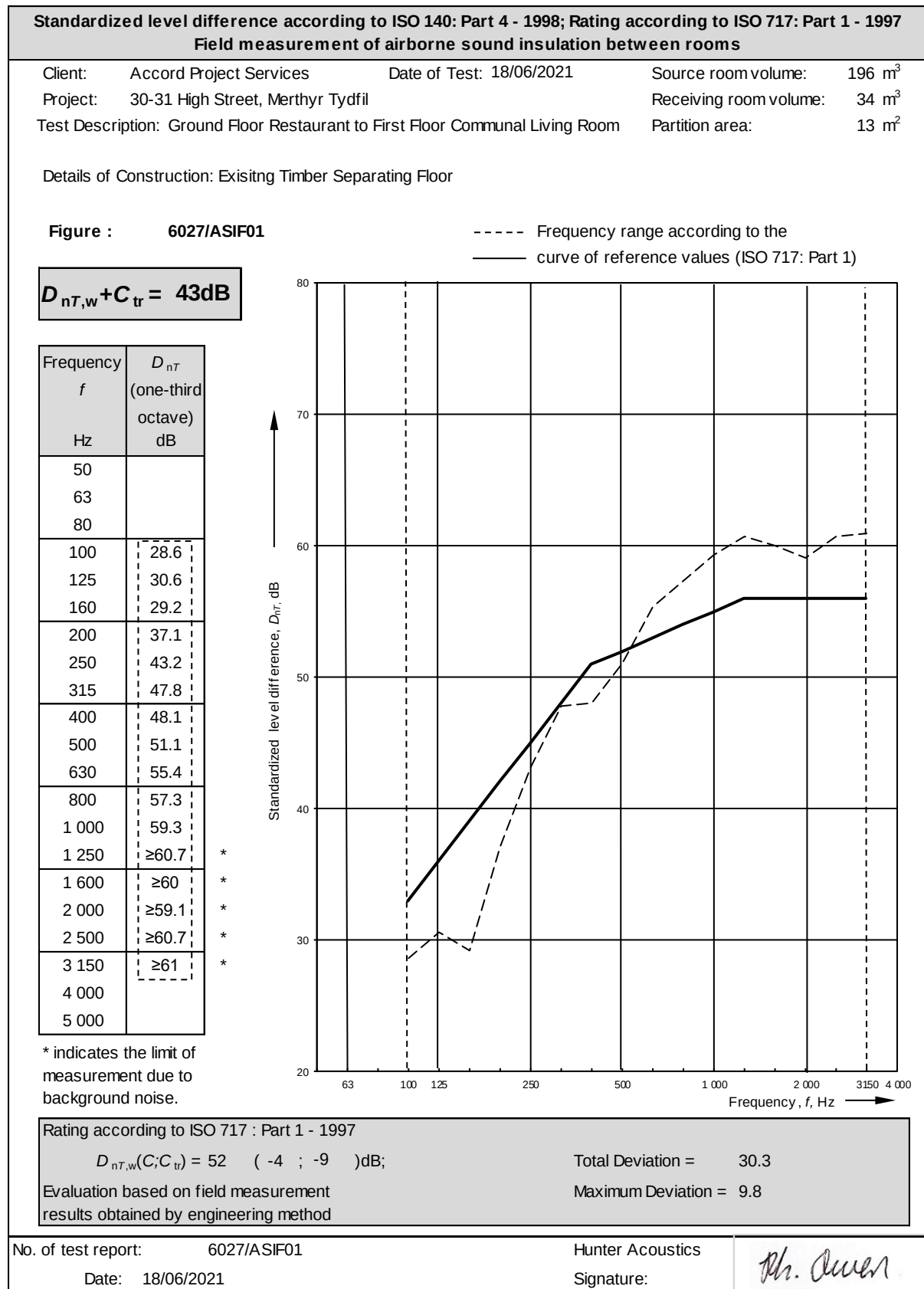


Table B.1 - BS8233: 2014 Sound Insulation Assessment – West Façade

30-31 High Street - West Façade											
Frequency Dependent Terms											
Term	Description		SRI (dB: BSENISO140) @ Octave band centre frequency (Hz)								A-weighted level
			63	125	250	500	1k	2k	4k	8k	Spectra shift
$L_{eq,tf}$	Predicted Façade Music Noise Level		72	72	69	66	60	59	49	40	68
$L_{eq,tf}$			71.8	71.9	69.5	66.0	59.7	59.1	48.8	40.3	68
$D_{n,e}$	Vent	Mechanical Ventilation	100	100	100	100	100	100	100	100	
R_{wi}	Insulated Glass Unit	Secondary Glazing: 6mm spaced 100mm off existing windows	20	30	37	44	47	54	55	55	
R_{ew}	Sound Insulation of wall	Existing Maonsry Walls	34	41	45	48	54	58	58	58	0
R_{rr}	Sound Insulation of roof	Existing roof & ceiling	28	31	36	45	48	52	52	52	5
A	Total Absorption		15.2	15.2	19.3	22.1	22.1	20.7	20.7	20.7	
Terms that are not frequency dependent											
Term	Derivation										Value (m ²)
S_f	Façade area (including window)										13.00
S_r	Roof area (exposed side)										16.64
S_{wi}	Window area										2.86
S_{ew}	$S_f - S_{wi}$										10.14
S_{rr}	Area of ceiling										16.64
S	$S_f + S_{rr}$										29.64
A_0	Reference absorption area of 10m ² and is independent of frequency										10.00

Term	Reference letter of result	Octave band centre frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
$L_{eq,tf}$	A	71.78	71.91	69.48	65.99	59.73	59.12	48.82	40.27
$D_{n,e}$		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
$\frac{A_{wi}}{S} 10^{\left(\frac{-D_{n,i}}{10}\right)}$	B	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
R_{wi}		20.0	30.0	37.0	44.0	47.0	54.0	55.0	55.0
$\frac{S_{wi}}{S} 10^{\left(\frac{-R_{wi}}{10}\right)}$	C	0.00096	0.00010	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000
R_{ew}		34.0	41.0	45.0	52.0	57.0	60.0	58.0	58.0
$\frac{S_{ew}}{S} 10^{\left(\frac{-R_{ew}}{10}\right)}$	D	0.00014	0.00003	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
R_{rr}		33.0	36.0	41.0	50.0	53.0	57.0	57.0	57.0
$\frac{S_{rr}}{S} 10^{\left(\frac{-R_{rr}}{10}\right)}$	E	0.00028	0.00014	0.00004	0.00001	0.00000	0.00000	0.00000	0.00000
$10 \log_{10}(B + C + D + E)$	F	-28.6	-35.8	-41.3	-49.4	-52.7	-57.3	-57.1	-57.1
A (furnished)		15.2	15.2	19.3	22.1	22.1	20.7	20.7	20.7
$10 \log_{10}\left(\frac{S}{A}\right)$	G	2.9	2.9	1.9	1.3	1.3	1.6	1.6	1.6
L_{eq} in Hotel Bedroom	A + F + G + K (K=3)	49.1	42.0	33.1	20.9	11.3	6.3	-3.7	-12.2
A-weighting dB		-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1
$L_{eq,2} + A$ -weighting	$L_{Aeq,125}$ etc.	22.9	25.9	24.5	17.7	11.3	7.5	-2.7	-13.3

Equivalent sound pressure level in room, L_{Aeq}	30
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Table B.2 - BS8233: 2014 Sound Insulation Assessment – East Façade

30-31 High Street - East Façade												
Frequency Dependent Terms												
Term	Description		SRI (dB: BSENISO140) @ Octave band centre frequency (Hz)								A-weighted level	Spectral shift
			63	125	250	500	1k	2k	4k	8k		
$L_{eq,ff}$	Predicted Façade Music Noise Level		69	67	67	63	58	54	41	30	65	0
$D_{n,e}$	Vent	Mechanical Ventilation	100	100	100	100	100	100	100	100		
R_{wi}	Insulated Glass Unit	8 / 16 / 9.1 Optiphon	19	24	29	41	47	47	50	50		
R_{ew}	Sound Insulation of wall	Existing Masonry Walls	34	41	45	48	54	58	58	58		0
R_{rr}	Sound Insulation of roof	Existing roof & ceiling	28	31	36	45	48	52	52	52		5
A	Total Absorption		10.2	10.2	13.0	14.8	14.8	13.9	13.9	13.9		
Terms that are not frequency dependent												
Term	Derivation										Value (m²)	
S_f	Façade area (including window)										15.75	
S_r	Roof area (exposed side)										9.50	
S_{wi}	Window area										2.20	
S_{ew}	$S_f - S_{wi}$										13.55	
S_{rr}	Area of ceiling										9.50	
S	$S_f + S_{rr}$										25.25	
A_0	Reference absorption area of 10m² and is independent of frequency										10.00	

Term	Reference letter of result	Octave band centre frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
$L_{eq,tf}$	A	68.79	66.68	67.39	63.21	57.92	54.14	40.58	29.96
$D_{n,e}$		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
$\frac{A}{S} 10^{\left(\frac{-D_{n,e}}{10}\right)}$	B	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
R_{wi}		19.0	24.0	29.0	41.0	47.0	47.0	50.0	50.0
$\frac{S_{wi}}{S} 10^{\left(\frac{-R_{wi}}{10}\right)}$	C	0.00110	0.00035	0.00011	0.00001	0.00000	0.00000	0.00000	0.00000
R_{ew}		34.0	41.0	45.0	52.0	57.0	60.0	58.0	58.0
$\frac{S_{ew}}{S} 10^{\left(\frac{-R_{ew}}{10}\right)}$	D	0.00021	0.00004	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000
R_{rr}		33.0	36.0	41.0	50.0	53.0	57.0	57.0	57.0
$\frac{S_{rr}}{S} 10^{\left(\frac{-R_{rr}}{10}\right)}$	E	0.00019	0.00009	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000
$10 \log_{10}(B + C + D + E)$	F	-28.2	-33.2	-38.1	-48.5	-53.3	-55.2	-56.1	-56.1
A (furnished)		10.2	10.2	13.0	14.8	14.8	13.9	13.9	13.9
$10 \log_{10}\left(\frac{S}{A}\right)$	G	3.9	3.9	2.9	2.3	2.3	2.6	2.6	2.6
Leq in Hotel Bedroom	A + F + G + K (K=3)	47.5	40.5	35.2	20.0	9.9	4.5	-9.9	-20.5
A-weighting dB		-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1
$L_{eq,2} + A$ -weighting	$L_{Aeq,125}$ etc.	21.3	24.4	26.6	16.8	9.9	5.7	-8.9	-21.6

Equivalent sound pressure level in room, L_{Aeq}	30
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Table B.3 - BS8233: 2014 Sound Insulation Assessment – North Façade

30-31 High Street - NorthFacade												
Frequency Dependent Terms												
Term	Description		SRI (dB: BSENISO140) @ Octave band centre frequency (Hz)								A-weighted level	Spectra shift
			63	125	250	500	1k	2k	4k	8k		
$L_{eq,ff}$	Predicted Façade Music Noise Level		66	65	60	54	48	45	43	25	57	0
$D_{n,e}$	Vent	Mechanical Ventilation	100	100	100	100	100	100	100	100		
R_{wi}	Insulated Glass Unit	Bereco Sliding Sash 4 / 16 / 4	20	25	19	28	36	42	45	45		
R_{ew}	Sound Insulation of wall	Existing Masonry Walls	34	41	45	48	54	58	58	58		0
R_{rr}	Sound Insulation of roof	Existing roof & ceiling	28	31	36	45	48	52	52	52		5
A	Total Absorption		19.3	19.3	24.5	28.0	28.0	26.3	26.3	26.3		
Terms that are not frequency dependent												
Term	Derivation										Value (m²)	
S_f	Façade area (including window)										14.50	
S_r	Roof area (exposed side)										23.20	
S_{wi}	Window area										1.70	
S_{ew}	$S_f - S_{wi}$										12.80	
S_{rr}	Area of ceiling										23.20	
S	$S_f + S_{rr}$										37.70	
A_0	Reference absorption area of 10m² and is independent of frequency										10.00	

Term	Reference letter of result	Octave band centre frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
$L_{eq,ff}$	A	66.43	64.77	60.36	54.43	48.02	45.03	42.88	25.16
$D_{n,e}$		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
$\frac{A_{wi}}{S} 10^{\left(\frac{-D_{n,e}}{10}\right)}$	B	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
R_{wi}		20.0	25.0	19.0	28.0	36.0	42.0	45.0	45.0
$\frac{S_{wi}}{S} 10^{\left(\frac{-R_{wi}}{10}\right)}$	C	0.00045	0.00014	0.00057	0.00007	0.00001	0.00000	0.00000	0.00000
R_{ew}		34.0	41.0	45.0	52.0	57.0	60.0	58.0	58.0
$\frac{S_{ew}}{S} 10^{\left(\frac{-R_{ew}}{10}\right)}$	D	0.00014	0.00003	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
R_{rr}		33.0	36.0	41.0	50.0	53.0	57.0	57.0	57.0
$\frac{S_{rr}}{S} 10^{\left(\frac{-R_{rr}}{10}\right)}$	E	0.00031	0.00015	0.00005	0.00001	0.00000	0.00000	0.00000	0.00000
$10 \log_{10}(B + C + D + E)$	F	-30.5	-34.9	-32.0	-41.0	-48.2	-53.6	-55.0	-55.0
A (furnished)		19.3	19.3	24.5	28.0	28.0	26.3	26.3	26.3
$10 \log_{10}\left(\frac{S}{A}\right)$	G	2.9	2.9	1.9	1.3	1.3	1.6	1.6	1.6
Leq in Hotel Bedroom	A + F + G + K (K=3)	41.9	35.8	33.2	17.7	4.1	-4.0	-7.5	-25.2
A-weighting dB		-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	-1.1
$L_{eq,2} + A$ -weighting	$L_{Aeq,125}$ etc.	15.7	19.7	24.6	14.5	4.1	-2.8	-6.5	-26.3

Equivalent sound pressure level in room, L_{Aeq}	27
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APPENDIX C - DRAWING LISTS

The following drawings have been used in our assessment;

Table C.1 – Malcolm Hughes Drawing List

Drawing Number	Rev	Date	Drawing Title
55932-MH-VFP-APS21_20_Jols-M2-G-0001	1	11/08/20	Building Floor Plans
55932-MH-VEL-APS21_20_Jols-DR-G-0001	1	11/08/20	Building Elevations

Table C.2 – Carl Golding Architectural Services Drawing List

Drawing Number	Rev	Date	Drawing Title
0014/SK01	F	Aug 2020	Proposed Concept Sketch Plan OPTION 01 - Basement
0014/SK02	F	Aug 2020	Proposed Concept Sketch Plan OPTION 01 – Ground Floor
0014/SK03	E	Aug 2020	Proposed Concept Sketch Plan OPTION 01 – First Floor
0014/SK04	E	Aug 2020	Proposed Concept Sketch Plan OPTION 01 – Second Floor
0014/SK05	E	Aug 2020	Proposed Concept Sketch Plan OPTION 01 – Third Floor