

Environmental Noise Impact Report

Proposed Mechanical Fixed Plant
To serve Suite A
First Floor
Castle Quay
Chester Road
Manchester
M15 4NJ

Date of Report: Tuesday 9th March 2021

Reference: 14123 Version 1

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1 General Information

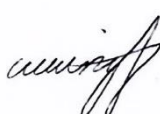
1.1 Client Instructing Survey

Quill Pinpoint Limited
Suite A
First Floor
Castle Quay
Chester Road
Manchester
M15 4NJ

1.2 Date of Noise Survey

Thursday 4th March 2021

1.3 Report Author

	Name	Position	Signature	Date
Prepared by	W Wright BSc MIOA	Acoustic Consultant		09/03/2021
For and on behalf of: Soundtesting.co.uk Ltd				

1.4 Report Checked

	Name	Position	Signature	Date
Report Checked	M S Hamer MSc MIOA	Acoustic Consultant		09/03/2021
For and on behalf of: Soundtesting.co.uk Ltd				



2 Introduction

Quill Pinpoint Limited has instructed Soundtesting.co.uk Limited to undertake an environmental noise survey in order to assess the impact of potential sound generated from the proposed external mechanical fixed plant on surrounding noise sensitive receptors.

The site is an existing 5-storey building that currently comprises ground and first floor commercial office space and residential dwellings on all floors above. A Toshiba MMY-MAP1406FT8P-UK air conditioning condenser unit has been installed at ground floor level on the east side of the building 6m (measured from elevation drawings) below the nearest noise sensitive receptor window located on the east façade of the building.

This report is prepared solely for Quill Pinpoint Limited. Soundtesting.co.uk Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions and the conclusions reached within this report.

2.1 An Environmental Noise Assessment

Soundtesting.co.uk Ltd has undertaken an environmental noise assessment at the above site with noise levels measured externally over several sample periods between 09:40 and 15:15 hours on Thursday 4th March 2021.

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering Local Planning Authority guidance and conditions.



3 Assumptions, Limitations & Uncertainty

- a. Due to the current COVID-19 Lockdown measures, background sound levels at the development site may be affected by reduced traffic flow and temporary closures of commercial premises.
- b. It is assumed that the technical data provided by mechanical plant manufacturers is up to date and correct.
- c. It is assumed that drawings and information supplied by Wroot Design Limited Architects are up to date and correct.



4 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise and vibration levels.

4.1 National Planning Policy

The National Planning Policy Framework (NPPF) July 2018 set out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which the Local Authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It should contain the following in relation to noise impacts.

170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.'

180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

'mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life'



NPPF characterises noise by grading and recommending actions and different effect levels as reproduced in Table 1

Table 1: Noise exposure hierarchy based on likely average response			
Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent



4.2 Criteria

4.2.1 Local Authority Criteria

The Local Planning Authority Manchester City Council have given conditional approval on application 126173/FO/2020, the proposal to install the external air conditioning condenser unit to serve the Wroot Design Ltd. offices at Suite A, Castle Quay.

Condition 3 relates to the potential noise impact.

“Before the equipment hereby approved is first brought into use, the building, together with any externally mounted ancillary equipment, shall be acoustically insulated in accordance with a scheme 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 equipment, so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Upon completion of the approved acoustic insulation scheme a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that the noise criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria, which shall then be implemented in accordance with timescales to be agreed in writing by the City Council as local authority.”

As per the above and given the similarity to BS4142 assessment methodology, Soundtesting.co.uk Ltd. will undertake and BS4142 type noise impact assessment using the requested 5dB below the typical background as the criteria.

4.3 BS4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound

This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature.

“The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background level and the context in which it occurs.

- a) Typically, the greater this difference, the greater the magnitude of the impact.*
- b) A difference of around +10dB or more is likely to be an indication of significant adverse impact, depending on context.*
- c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on context.*
- d) 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 significant 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 context.”*



4.4 Other Standards

4.5 Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments

By the Association of Noise Consultants [ANC] and the Institute of Acoustics [IOA]

The spread of the COVID-19 means that there is now encouraged home working, along with restricted travel arrangements being enforced by the Government.

Due to the current circumstances regarding the COVID-19 pandemic, road traffic is likely to be significantly less during lockdown and therefore, the noise environment is noticeably quieter.

Other sound sources may also have been affected, for example, due to changes in operating patterns at industrial and commercial premises.

A document produced by the Association of Noise Consultants [ANC] and the Institute of Acoustics [IOA] 'Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments' discusses "now that site visits cannot routinely occur, other approaches may have to be taken to establish an appropriate robust estimate of baseline conditions, such as using existing data (for example, from previous local surveys and noise maps) or undertaking baseline sound predictions."

The strategic noise mapping covers the major sources of transportation noise within large urban agglomerations and along road and rail corridors between them and was designed to provide a global view of noise exposure in line with the requirements of the Environmental Noise Directive for reporting above 55 dB L_{day} and 50 dB L_{night} ; however, it does not include all possible noise sources.

Sound levels measured during the survey at this site may be affected by the lockdown restrictions

4.6 Criteria Summary

In order to meet the requirements of Manchester City Council the assessment and recommendations will be made in reference to BS4142:2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound using the criteria set by the council of a plant rating level of 5dB below the typical $L_{A90, 1hour}$ background level.



5 Site Description

The development site is the existing 5 storey property at Castle Quay of Chester Road, Manchester which comprises ground and first floor commercial offices and residential dwellings on the floors above. To the north of the site is a Quay area and trainlines further north of that. Deansgate station is located approximately 300m east of the site. Directly east of the site is a 7-storey block of residential apartments. South of the site is the A56 Chester Road, a busy 6 lane road with a eastbound carriage with two lanes directly south of the site and a westbound carriage of 4 lanes including a bus lane south of that, with the Deansgate Interchange approximately 120m southwest of the site, linking Chester Road to the A635(M) dual carriageway, Chorlton Road and Blantyre Street.

The newly installed mechanical fixed plant is a Toshiba MMY-MAP1406FT8P-UK air conditioning condenser unit located in a side passage on the east side of the property. A 380mm deep brick wall follows the slope of the side road to the east of the property approximately 1m high above the road all the way along, however rising in height relative to the ground floor level at the north façade of the building. The condenser unit has been installed such the top of the unit is 100mm below the top of the brick wall. Office hours are from 08:30 – 17:30 the plant will be operating from 07:30 – 16:30.

Existing plant in the same area included two Mitsubishi Mr Slim Inverters (PUHZ RP125GA + PUHZ-P125YHA2.UK), a Mitsubishi City Multi (PUMY-P125YKM2), a Mitsubishi MUZ-GB50VA and a Daikin RY45DB7V1. The existing plant was operating intermittently during the survey beyond the control of the consultant.

5.1 Subjective Observations

During site attendance, subjectively the main source of noise was road traffic from surrounding main roads as well as passing trains on the trainlines to the north. A delivery to the residential premises to the east, as well as occasional vehicle movements resulted in engine noise and door slams during the survey. Pedestrians were also audible intermittently.

5.2 Weather

Table 2: Weather Conditions	
Description	Daytime Average
Temperature	6°C
Wind Speed	2.7m/s
Wind Direction	SW
Precipitation	Dry
Damp road/ wet ground	None
Fog/snow/ice	None



6 Noise Measurement Procedure

6.1 Personnel Present

Ben Bielicki BSc (Hons) MIOA

6.2 Survey Equipment Used

Table 3: Survey Equipment Used			
Manufacturer	Model	Serial No.	Description
Rion	NL52	01054205	Real Time Analyser Sound Level Meter
Pulsar	105	93357	Acoustic Calibrator

6.3 Calibration

The sound level meter was calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meter used during the survey is precision grade class 1.

Calibration certificates are available on request.



6.4 External Ambient Sound Measurements

The measurement locations chosen during the survey were deemed representative of the nearest noise sensitive receptor and suitable for the determination of the specific sound levels of the plant.

The sound level meter was set to measure broadband L_{Aeq} and L_{A90} in 5 minute periods and 1 second periods, as well as 1:1 octave and 1:3 octave spectrum analysis.

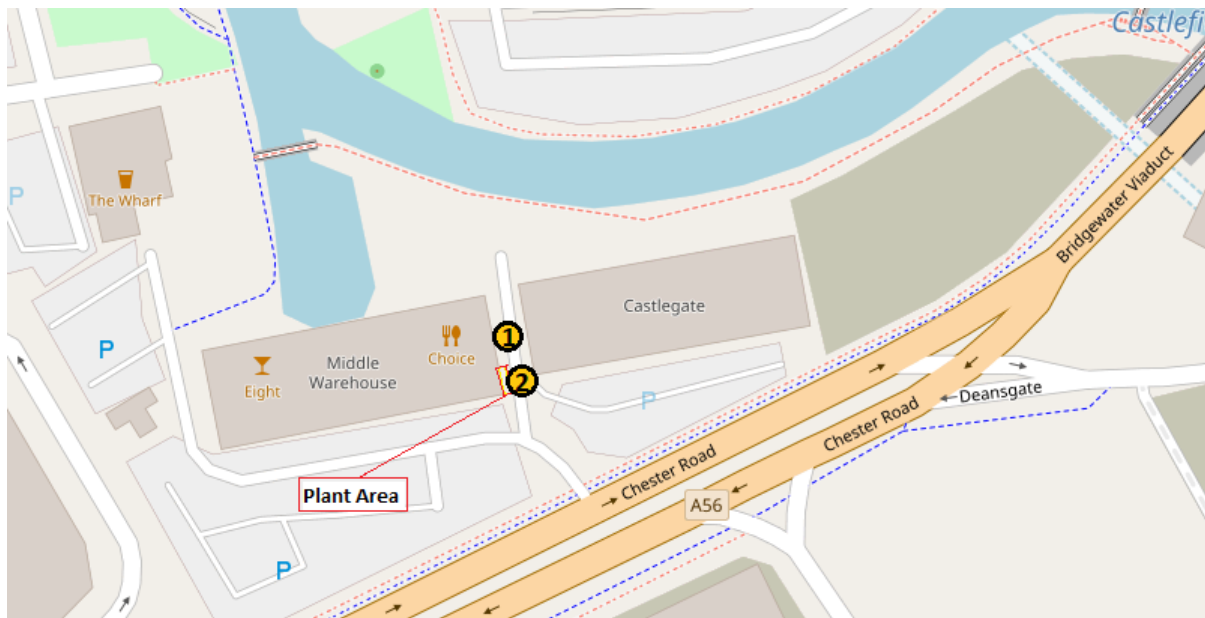
6.4.1 Monitoring Position 1

A microphone was positioned 3m above the ground 10m from the mechanical fixed plant being assessed to obtain background level measurements representative of those experienced at the windows above the plant area. The microphone was near 1 additional reflective surface, being 2.5m from the façade wall of the property.

6.4.2 Monitoring Position 2

A microphone was positioned 3m above the ground and 3m from the mechanical fixed plant being assessed to obtain ambient and residual sound levels with the new plant operating and without. The microphone was near 1 additional reflective surface, being 2.5m from the façade wall of the property.

The detail below shows the proposed development site and location positions of the meters





7 Results and Analysis

7.1 Background L_{A90} Measurement Analysis in Accordance with BS4142:2014 + A1:2019

All background levels are expressed as integers on the basis that a value of 0.5 is rounded up.

The following table shows the background levels measured at monitoring position 1 per hour over the sample measurement periods.

Table 4: Sample Background $L_{A90, 1 \text{ hour}}$	
Monitoring Position 1	
Time	$L_{A90, 1 \text{ hour}}$ (dB)
09:40 – 10:40	55
10:40 – 11:40	55
14:00 – 15:00	55

The lowest background level of $L_{A90, 1 \text{ hour}}$ 55 dB was measured during the average one-hour periods, which occurred during all three full hours of the daytime background measurement samples; therefore, this value will be used as the background level for the noise assessment.



8 BS4142:2014 Assessment of Mechanical Noise from Air Conditioning Plant

8.1 Subjective Assessment

BS 4142:2014 states that where appropriate a rating penalty should be established for a sound on a subjective assessment of its characteristics and to correct the Specific Sound Level if a tone, impulse or other characteristics occur.

BS4142:2014 says of Impulsivity:

“A correction of up to +9dB 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 can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible.”

BS4142 says of 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.”

Due to insufficient data from the air conditioning unit manufacturer and the new unit's sound level not being high enough over the residual levels on site; it is unlikely the units will be considered impulsive, tonal or to have any other detrimental acoustic characteristics. Due to the use of the property being an office, it is assumed that the unit will be used consistently throughout the working day, therefore a correction for impulsivity shall not be applied. Modern condenser units are typically designed to not be tonal during their operation. It is unlikely that there will be any of the above acoustic characteristics present in the operational noise of the proposed condensers and so long as the unit is regularly maintained this should remain the case.

During the operation of the new unit the consultant noted that the operational sound was just perceptible and barely distinguishable over the surrounding sources such as local traffic and existing plant. The consultant did not observe any tonality or impulsivity in the new plant operational sound.



8.2 Specific Sound Level

The mechanical plant requiring assessment is the Toshiba MMY-MAP1406FT8P-UK air conditioning condenser unit located in the side passage on the east side of the property. The sound power level of the AC unit is taken to be 83dB(A), as based on the model specifications provided by the manufacturer.

Sample sound measurements were undertaken whilst in attendance on site in order to determine the specific sound level of the plant in situ. Ambient and residual sound levels with the plant in question operating at what we were informed on site to be full capacity and not operating respectively resulted in sound levels similar to each other. In some instances the measured residual sound level was above that of the ambient levels. This would indicate that there is little to no contribution to the ambient sound level from the operation of the new condenser unit. This suggests that the new condenser unit sound pressure level at 3m must be no more than 10dB below the lowest measured ambient level in order not to have a contribution. The lowest ambient $L_{Aeq,5minutes}$ was 60dB(A) measured at 3m from the new unit, resulting in a sound pressure level at 3m of no more than 50dB(A). A time-history graph of the comparison of ambient and residual levels measured at 3m are included in the Appendix. It can be seen that the new plant has little to no influence on the sound environment.

The manufacturers technical data for the unit informs that the unit operating at full capacity should have a sound power level of 83dB(A). Using point source distance attenuation this would result in a sound pressure level at 3m of 63dB(A) which should have been distinguishable in the measured ambient levels. The cause of this discrepancy in stated manufacturers sound level details and those measured in situ is unknown. It is possible that the maximum required work for the 4No. internal cassettes is below the external unit's maximum capacity and therefore the outdoor unit is operating below maximum capacity.

As 63dB(A) at 3m was not measured from the operational condenser unit, the sound pressure level for the plant will be based on the measured ambient and residual levels giving no indication of influence from the new plant unit with a sound pressure level at 3m of no more than 50dB(A).

Given a sound pressure level at 3m of 50dB(A), further distance mitigation to 6m at the nearest receptor window gives a sound pressure level at 6m of 44dB(A).

This sound pressure level at the nearest receptor window is based on the measurements taken of the plant in operation as well as the residual sound level at the same measurement position. This is a true representation of the conditions as they are on site and are therefore in the consultants view more relevant for this specific case than the manufacturers sound level data.



8.3 Numerical Assessment

8.3.1 Assessment of Mechanical Plant

The table below demonstrates the difference between the mechanical plant noise and background noise at the nearest noise sensitive receptor.

Table 5: Assessment of Mechanical Plant During the Operational Hours	
Conservative Sound Pressure Level at 3m from Condenser Unit (dB)	50
distance attenuation to noise receptor - $20\log(6/3)$ (dB)	-6
Background Level L_{A90} (dB)	55
Sound Level at Noise Sensitive Receptor (dB)	44
Difference (dB)	-9

The sound pressure level is likely to be 9dB below the lowest $L_{A90, 1\text{hour}}$ background level at the nearest noise sensitive receptor during operational hours, indicating a likely low impact and meeting the Local Authority's requirement of 5dB below background level.

8.4 Context

The exact usage of the air conditioning units is unknown; therefore, for the purpose of the calculations, it has been assumed that all AC unit may be operating to full capacity, for at least one complete hour during the daytime period. It should be noted that a lower Specific Sound Level will occur when units are not operating at full capacity; nor operating for a complete hour during the daytime period.

Plant may have been operating at maximum required workload, however not at its own maximum capacity, resulting in lower operational sound levels.

The new condenser unit operation noise was 'just perceptible' and 'barely distinguishable' from background noise such as existing plant and traffic noise from surrounding road making it highly unlikely to be a cause for complaint.

Outside of COVID-19 lockdown, the operation of the nearby Bar Eight Irish Pub is likely to increase the background levels to a degree, creating a greater difference between the typical background level and the new plant noise level.



9 Conclusion

A noise assessment based on condition 3 stated by the council, with reference to BS4142:2014+A1:2019 has been undertaken. The assessment was based on the attending consultant's subjective assessment of the plant in operation whilst in attendance on site and the numerical guidance based on measured sound levels with the plant operating in situ. The assessment has provided an understanding of the impact of mechanical noise from the Toshiba MMY-MAP1406FT8P-UK air conditioning plant, demonstrating the likely low impact and meeting the criteria of 5dB below background set by Manchester City Council with no further noise mitigation required.



10 References

BS4142:2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound

National Planning Policy Framework (NPPF)

World Health Organisation Guidelines for Community Noise

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures

Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments

openstreetmap.org

www.google.co.uk/maps

10.1 Drawing References

469-LR-001 A Location Land Registration Plan

469-E-1 A Existing Arrangement Plan

469-P-1 A Proposed Arrangement Plan

469-E-2 B Existing Elevation Section

469-P-02 C Proposed Elevation Section



Appendix



Figure 1: Picture Showing Monitoring Position 1

Yellow: Microphone. Red: Plant being assessed. Green: Nearest receptor window





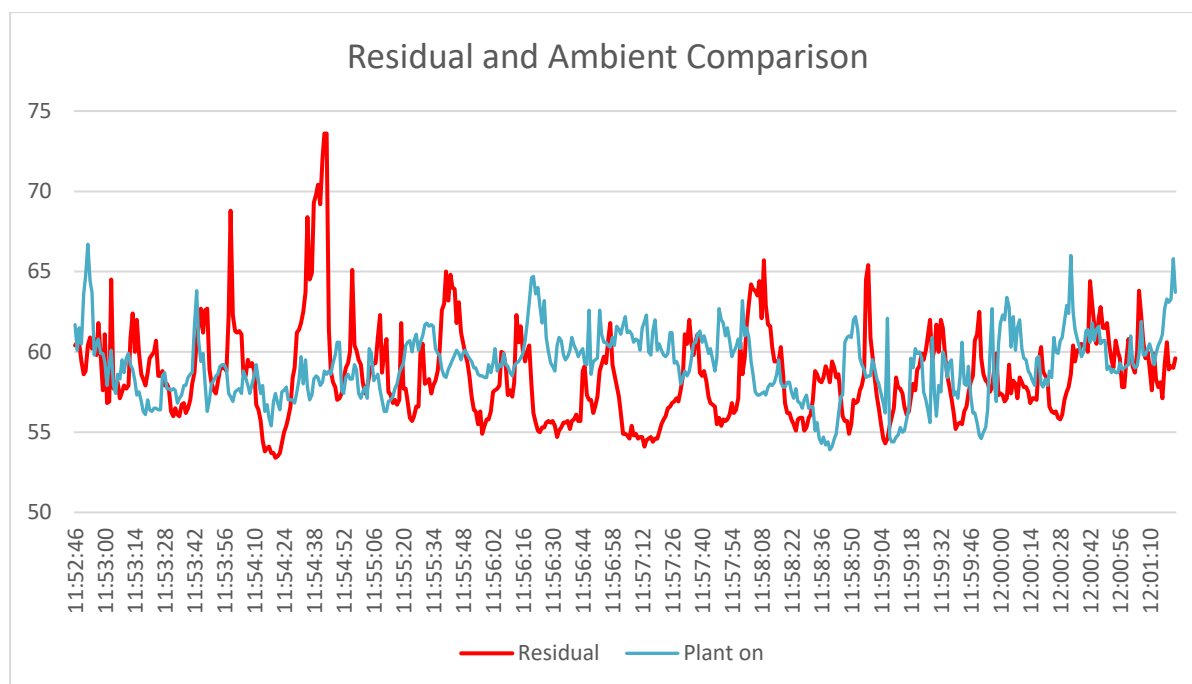
Figure 2: Picture Showing Monitoring Position 2





Measurement Results

Summary Graph of Comparison between Residual and Ambient



*Time along x-axis matches residual measurement. Ambient results have been superimposed over residual sample times to show direct comparison.