**BRAIDEN ACOUSTICS LTD**

Innovation Forum // 51 Frederick Road // Salford // Manchester // M6 6FP

# NOISE IMPACT ASSESSMENT

| | | | |
|---|---|---|---|
| Prepared For : | BTP Architects | Date : | 28 Jul 2023 |
| Site : | Former Taylor Valve Works, Dowker Street, Milnsbridge, Huddersfield, HD3 4JX | Report No. : | 11140 |

## 1 INTRODUCTION

Braiden Acoustics has been commissioned by BTP Architects to undertake an acoustic survey at the site of Former Taylor Valve Works, Dowker Street, Milnsbridge, Huddersfield, HD3 4JX in order support a planning application which proposes the erection of residential dwellings.

### 1.1 AIM

The aim of the report is to describe the site and its surroundings with regards to potential noise sources affecting the site. The noise assessment, along with any recommendations, shall also be described in order that future occupants are not disturbed by noise.

## 2 DESCRIPTION OF SITE

The site is currently an empty space with overgrown vegetation and some hardstanding, where the former Taylor Shaw Valves engineering works once stood, as shown in Figure 1.

*Figure 1*
*Street view of site*

### 2.1 SITE LOCATION AND NEIGHBOURING USES

The site is bounded by George Street to the south, Dowker Street to the east and partially by Armitage Road to the north.

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*Figure 2*
*Site location showing monitoring location (ML) and surrounding uses*

There are existing residential dwellings on the southern, eastern and northern boundaries of the site, with the rear of commercial units, fronting Market Street, to the west.

## 2.2 PROPOSED USE

The residential scheme is a mixture of houses and flats. The Schedule of Accommodation is shown below.

**Schedule of Accommodation**

14no 1B2P Flats @ 50m²
8no 2B3P Flats @ 61m²
2no 1B2P Flats @ 61m²
06no 2B3P House (Semi-Detached) @ 70m²
02no 2B4P House (Semi-Detached) @ 79m²
04no 3B4P House (Semi-Detached) @ 84m²
02no 3B5P House (Semi-Detached) @ 92m²
**38no Total**

1B2P Cottage Flat - 100% parking spaces
2B4P House - 100% parking spaces
3B5P House - 200% parking spaces

*Figure 3*
*Schedule of Accommodation*


*Figure 4*
*Proposed site layout*

## 3 ACOUSTIC CRITERIA AND METHODOLOGY

This is a residential development that may be susceptible to environmental noise, such as road traffic noise and/or noise from local industry. Recommended noise levels due to environmental noise are taken from BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings" [i] which, in turn, takes guidance from the research-based World Health Organisation "Guidelines for Community Noise." Where necessary, mitigation measures have been recommended so that the noise level thresholds are not breached.

Noise levels are usually given separately for the night-time – 2300-0700 hrs and day time – 0700-2300 hrs.

### 3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework is the current document for planning guidance. Paragraph 123 of the NPPF says that planning decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

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- mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

### 3.2 BS 8233: 2014

The British Standard BS 8233:2014 "Guidance on sound insulation and noise reduction for buildings" gives guidance on recommended indoor ambient noise levels for residential dwellings.

| Room | Criterion | $L_{Aeq,T}$ | |
|---|---|---|---|
| | | night | day |
| Bedroom | Sleeping | 30 | 35 |
| Dining Room/Area | Dining | -- | 40 |
| Living Room | Resting | -- | 35 |

*Table 1*
*Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)*

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

Internal noise levels in habitable rooms are calculated using either the simple or rigorous method as described in Annex G in BS 8233:2104.

#### 3.2.1 Noise levels in external living areas

For external living areas such as gardens and balconies, BS 8233:2014 § 7.7.3.2 recommends an upper limit of 55dB $L_{Aeq,day}$ although there is a caveat:

> *However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.*

#### 3.2.2 Maximum noise levels

In the 2014 edition of the Standard, the criterion of 45dB $L_{AFMax}$ inside bedrooms has been removed although there is Note 4:

> *NOTE 4 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 LAmax,P depending on the character and number of events per night. Sporadic noise events could require separate values.*

The use of the phrases 'may be set' and 'could require' imply that this is a discretionary criterion.

The $L_{Amax}$ criterion is used where the level is not exceeded more than 10 times during the night time period.

**3.3** BS 4142

BS 4142:1999 "Method for rating industrial noise affecting mixed residential and industrial areas" [ii] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (*specific noise level*), $L_{Aeq}$, to the background noise level, $L_{A90}$, at the nearest sensitive receptor (NSR).

When measuring the Background Noise Level, the Standard states:

> *Choose outdoor measurement locations that will give results that are representative of the ambient sound and residual sound at the assessment location(s). Make the measurement of the ambient sound level, the residual sound level and the background sound level at a height of 1.2 m to 1.5 m above the ground, unless there is a specific reason to use an alternative height (which should be justified), and under similar conditions, e.g. similar influence of reflections and measurement height above the ground. Where practical, minimize the influence of reflections by making the measurements at least 3.5 m from any reflecting surface other than the ground.*
>
> *Where it is necessary to undertake measurements above ground floor level, choose a location which is approximately 1 m from the facade on the relevant floor of the building if it is not practical to make the measurements at least 3.5 m from the facade at this elevation. NOTE When measurements for distant sources are made at 1 m from a facade, the measured level can be adjusted to an equivalent free-field level by subtracting a 3 dB correction factor. For sources that are relatively close or not perpendicular to the facade the correction may be 1 dB or 2 dB, in which case the reasons for not using a correction of 3 dB ought to be explained.*

Essentially, background noise measurement should be made free field. If measurements are made at the façade, then a correction should be made in order to represent the free field.

This Standard has been recently updated, BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" [iii]. Whereas the old standard added 5dB 'penalty' to the Specific Noise Level (SNL) if the noise source has a 'character' that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise 'character'. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the *rating level*. The new Standard gives the guidance for the following types of noise character:

> *Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.*
>
> *Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.*
>
> *NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source's tonal and/or impulsive characteristics could also vary with time.*
>
> *Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.*
>
> *Tonality*
>
> *For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 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 can be converted to a penalty of 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, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*

*NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.*

*Intermittency*

*When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*

Once a penalty for noise character is added to the Specific Noise Level then this is termed the *Rating Level*.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

*"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."*

### 3.4 COUNCIL NOISE CRITERIA

There are two issues of potential noise emanating from the site:

1. Environmental noise break in

#### 3.4.1 Residential noise criteria

For residential developments, the noise thresholds are taken from BS8233:

- *Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events should not normally exceed 45 dB LAmax,F by more than 15 times)*
- *Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq*
- *Gardens and terraces (daytime) 55 dB LAeq*

## 4 MONITORING DETAILS

### 4.1 MONITORING OVERVIEW

| | |
|---|---|
| Personnel: | John Braiden, BSc & MSc Acoustics, MIOA. |
| Equipment: | NTi XL2 integrated real time analyser & B&K 4231 calibrator. |
| Weather | 14- 18degC, <5m/s wind, 40-60% cloud |
| Time / Date: | From 15:50:50 on Friday 16/06/2023 for almost 19 hours |

The sound level meter was calibrated before after the measurements with no drift reported.

Monitoring was unmanned.

Background noise ($L_{A90}$), 'average' noise levels ($L_{Aeq}$) and maximum noise levels ($L_{Amax}$) where taken in 15 minute intervals.

## 4.2 MONITORING LOCATION

The monitoring location was at least 1.5m from the ground in the location marked in Figure 2 and in a free field position. The location is close to George Street and Market Street (which is the main high street) and also close to any potential industrial noise sources at the rear of the commercial units to the west .

## 4.3 MONITORING RESULTS

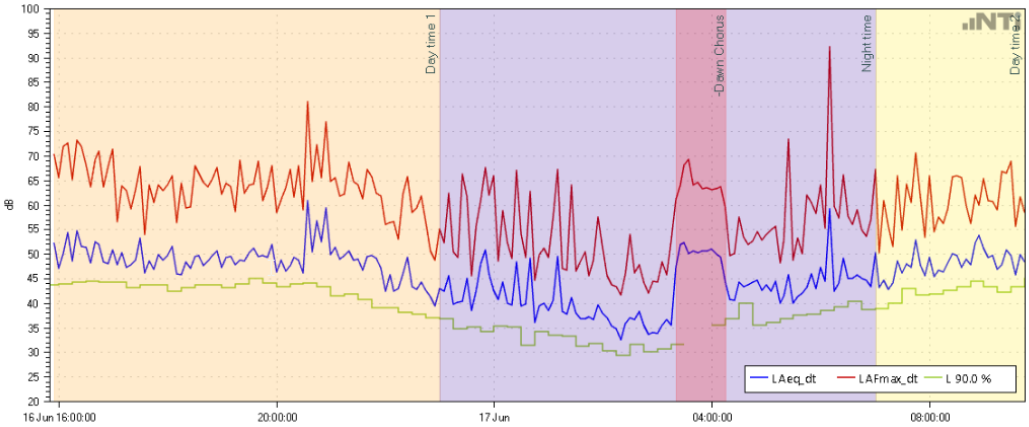


*Figure 5*
*Time history*

The noise climate was predominantly road traffic noise, especially at the junction of the George Street and Market Street.

There was no obvious industrial noise from the nearby commercial units during the noise monitoring.

| Day | Time | | Duration | Time Period | $L_{A90}$ dB | $L_{Aeq}$ dB | $L_{Amax}$ dB |
|---|---|---|---|---|---|---|---|
| | Start | Finish | | | | | |
| Fri/Sat | 15:50:50 | 23:00:00 | 07:09:10 | day | 41.4 | 50.4 | 80.9 |
| | 23:00:00 | 07:00:00 | 08:00:00 | Night | 32.6 | 44.9 | 92.1 |
| | 07:00:00 | 09:45:00 | 02:45:00 | day | 41.8 | 48.8 | 70.6 |

*Table 2*
*Summary of noise monitoring results*

The overall free field[1] noise levels are as follows:

$L_{Aeq}$ (night) 45 – 0 = 45 dB(A)

$L_{Aeq}$ (day) 50 – 0 = 50 dB(A)

### 4.3.1 Maximum noise levels

[1] Monitoring was made in a free field position.

An assessment has been made of maximum noise levels:

*"…noise events do not exceed 45 dB LAmax,F by more than 15 times."*

Figure 6 shows that 65 dB $L_{Amax}$ is not exceeded more than 15 times during the night time period.

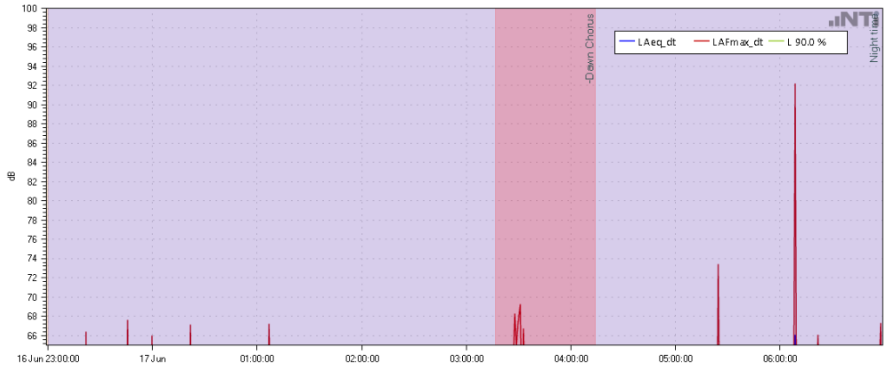


*Figure 6*
*Maximum levels showing no more that 15 events during the night time period.*

## 5 ACOUSTIC ASSESSMENT

### 5.1 ENVIRONMENT NOISE BREAK IN

Given the external noise levels, the initial glazing scheme can be suggested. However, it should be noted that this assumes windows closed in order to achieve the internal noise levels based on BS 8223.

The amount of attenuation from the building façades were readily computed using the simple method in Appendix G of BS 8233:2014 whereby the sound insulation index (SRI) of the glazing (the weakest element of the building façade, acoustically) is determined by simply deducting the required internal noise level from the external free field noise level.

#### 5.1.1 Façade effect

A -3dB façade correction was not necessary as the noise monitoring was free-field.

#### 5.1.2 Distance correction

There was a no distance correction applied even though the monitoring location was placed closer to the main noise sources.

#### 5.1.3 Barrier effect

There is no barrier correction for the whole of the site, as a worst-case methodology.

#### 5.1.4 BS 8233 assessment

The weakest structural element is the glazing. The required glazing was calculated using recommended internal values. The Table below shows the required Sound Reduction Indices (SRI) for the bedrooms (night) and living areas (day) on each relevant elevation.

Noise levels will be attributed to all elevations as a worst-case scenario.

| Façade | period | room | External Levels measured / calc'd | | Internal Levels recommended | | Required glazing | |
|---|---|---|---|---|---|---|---|---|
| | | | $L_{Aeq}$ (dB) | $L_{Amax}$[2] (dB) | $L_{Aeq}$ (dB) | $L_{Amax}$ (dB) | SRI ($R_w + C_{tr}$) | Example Spec[3] |
| ALL | night | bedroom | 45 | 65 | 30 | 45 | **20** | 4 (16) 4 |
| | day | lounge | 50 | | 35 | | **15** | 4 (16) 4 |

*Table 3*
*Calculated SRI values and recommended glazing*

All glazing for habitable rooms can achieve adequate internal noise levels with standard 4mm double glazing.

### 5.2 GARDENS

There are proposed gardens.

The daytime noise level of 55 dB has not been breached, so mitigation is not necessary. However, the following is recommended:

***The boundary treatment to the gardens should be close boarded timber fencing with a surface density of at least 10 kgm$^{-2}$.***

## 6 CONCLUSION

An acoustic survey has taken place at Former Taylor Valve Works, Dowker Street, Milnsbridge, Huddersfield, HD3 4JX to support a planning application for residential dwellings.

The main issue of noise was passing vehicles on the surrounding road network which resulted in modest noise levels.

Adequate internal noise levels can be achieved with standard 4mm double glazing.

No acoustic mitigation is required. However, the following is recommended:

***The boundary treatment to the gardens should be close boarded timber fencing with a surface density of at least 10 kgm$^{-2}$.***

## 7 REFERENCES


[i] BS8233: 2014
*Guidance on sound insulation and noise reduction for buildings*
British Standards Institute, 2014.

[ii] BS 4142: 1997
*Method for Rating industrial noise affecting mixed residential and industrial areas*
British Standards Institute, 1997.

[iii] BS 4142: 2014
*Methods for rating and assessing industrial and commercial sound*
British Standards Institute, 2014.


[2] not exceeded more than 15 times.

[3] Example glazing build up and performance from BS 12354-3 – table in Appendix. Other glazing build-ups available.


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# Appendix

## A1 BS12354-3 – Glazing spec

**Table B.1 - Examples of the sound reduction index of glazing**

| Glazing type | Sound reduction index (dB) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 k Hz | $R_w$ ($C$;$C_{tr}$) dB |
| **Single panes (mm)** | | | | | | | |
| 3 | 14 | 19 | 25 | 29 | 33 | 25 | 28 (–1; –4) |
| 4 | 17 | 20 | 26 | 32 | 33 | 26 | 29 (–2; –3) |
| 5 | 19 | 22 | 29 | 33 | 29 | 31 | 30 (–1; –2) |
| 6 | 18 | 23 | 30 | 35 | 27 | 32 | 31 (–2; –3) |
| 8 | 20 | 24 | 29 | 34 | 29 | 37 | 32 (–2; –3) |
| 10 | 23 | 26 | 32 | 31 | 32 | 39 | 33 (–2; –3) |
| 12 | 27 | 29 | 31 | 32 | 38 | 47 | 34 ( 0; –2) |
| **Laminated panes (mm) + plastic laminate (0,5 to 1) mm** | | | | | | | |
| 6+ | 20 | 23 | 29 | 34 | 32 | 38 | 32 (–1; –3) |
| 8+ | 20 | 25 | 32 | 35 | 34 | 42 | 33 (–1; –3) |
| 10+ | 24 | 26 | 33 | 33 | 35 | 44 | 34 (–1; –3) |
| **Double pane units with single or laminated panes (mm); air filled cavity from (6 to 16) mm** | | | | | | | |
| 4-(6-16)-4 | 21 | 17 | 25 | 35 | 37 | 31 | 29 (–1; –4) |
| 6-(6-16)-4 | 21 | 20 | 26 | 38 | 37 | 39 | 32 (–2; –4) |
| 6-(6-16)-6 | 20 | 18 | 28 | 38 | 34 | 38 | 31 (–1; –4) |
| 8-(6-16)-4 | 22 | 21 | 28 | 38 | 40 | 47 | 33 (–1; –4) |
| 8-(6-16)-6 | 20 | 21 | 33 | 40 | 36 | 48 | 35 (–2; –6) |
| 10-(6-16)-4 | 24 | 21 | 32 | 37 | 42 | 43 | 35 (–2; –5) |
| 10-(6-16)-6 | 24 | 24 | 32 | 37 | 37 | 44 | 35 (–1;–3) |
| 6-(6-16)-6+ | 20 | 19 | 30 | 39 | 37 | 46 | 33 (–2;–5) |
| 6-(6-16)-10+ | 24 | 25 | 33 | 39 | 40 | 49 | 37 (–1;–5) |

NOTE 1 This selection and the values are in accordance with prEN 12758-1. The single number ratings are deduced from results in 1/3-octave bands and therefore single number ratings deduced from the given octave band data might result in values which differ 1 dB at the most.

NOTE 2 Though it is known that for a given double pane unit the sound reduction increases with increasing cavity width, this effect has been found to be too small to take into account here for air filled cavities in the light of the inherent spread in results for nominally identical units.

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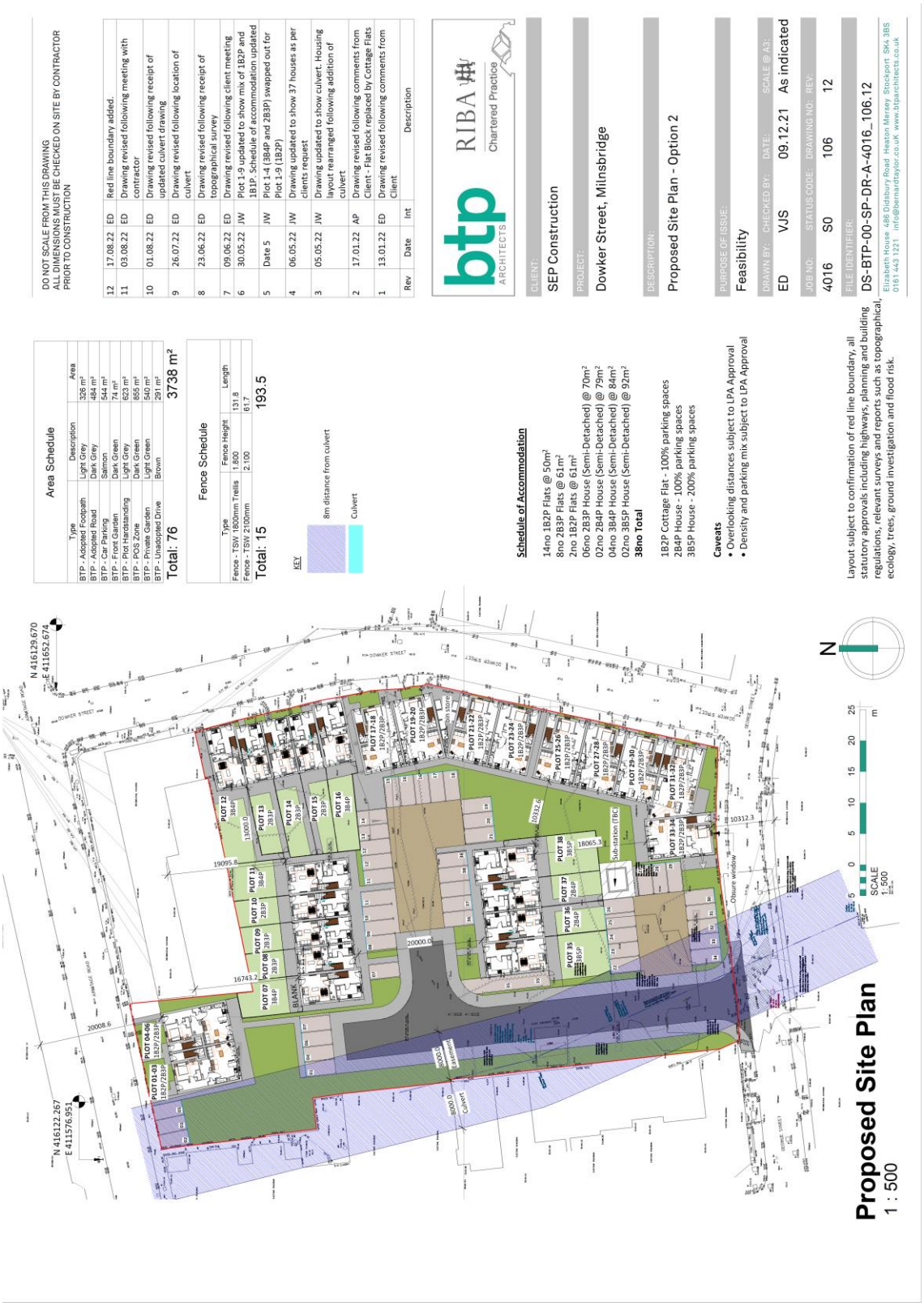
## A2 SITE LAYOUT DRAWING

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