

WSSC Commentary on the Proposed Lyminster By-pass Acoustic Fencing

Introduction

There are 2 No. Noise Assessment reports produced by consultants White Young Green (WYG).

- a. Discharge of Condition 36, Lyminster Bypass – Issue No. 2, 25th August 2017 (i.e. the section to the north of the A259 / the 'southern bypass').
- b. Discharge of Condition 18, Fitzalan Link Road, Noise Assessment – Issue No. 3, 19th August 2019* (i.e. the section to the south of the A259 / the 'Fitzalan Link').

*It should be noted that in the January 2020 re-application for the Discharge of Condition 18 it included the superseded WYG report Issue.

The WYG Noise Assessment reports are focused on the technical aspects of noise assessment, i.e. what the noise levels are likely to be, and what the technical performance of any acoustic fences should be. The reports should not define the materials of any fences, only the technical performance requirements. The reports do not directly specify the material(s), but they refer to 'details of the acoustic barrier...' that are shown in a sketch format in the report Appendices. The sketches show the following:

- a. Section to the north of the A259 (the 2017 Condition 36 report) shows a timber framed fence with 'vertical 25x100mm softwood [timber panelling], butt jointed in 2 layers with staggered joints'.
- b. Section to the south of the A259 (the 2019 Condition 19 report) shows a steel framed fence with vertical '96mm steel / aluminium panels'.

In broad terms acoustic fences are one of three types:

- a. Reflective.
- b. Absorptive.
- c. A hybrid of both reflective and absorptive.

The reports do not directly specify the type(s), but they refer to 'details of the acoustic barrier...' that are shown in sketches in the report Appendices. The sketches show the following:

- a. Section to the north of the A259 (the 2017 Condition 36 report) shows timber reflective type.
- b. Section to the south of the A259 (the 2019 Condition 19 report) shows vertical steel panels that could be interpreted as either reflective or absorptive.

Existing Timber Acoustic Fences on the WSCC network

Example 1: A264, Broadbridge Heath, grid ref: 514517,130627. This is a hybrid absorptive type that is comprised steel posts with a 'sandwich' of insulation material covered by a membrane and decorative vertical timber panels.

The fences were constructed circa 2014 but remain un-adopted due to the condition of membrane covering the insulating material. The covering material has broken down under UV light and is extremely weak and brittle to even the slightest of touches.



There are many examples of such fences where membrane has broken / is breaking down.



M3 near J8



Rocky Lane, Haywards Heath

Example 2: A24 (A264 SB off slip), Broadbridge Heath, grid ref: 515230,130510. This is a reflective type that is comprised steel posts with vertical timber panels.

This fence was constructed circa 2016 and is currently performing satisfactorily.



Design Standards and Performance

The current design standard for 'Roadside environmental mitigation and enhancement' is the Design Manual for Roads and Bridges (DMRB) document LA 119 (formerly HA 66/95). This standard is a relatively new document that was only published in October 2019 so it is acknowledged as not being the design standard at the time of production of the WYG reports. Nevertheless, the new standard draws in technical performance criteria regarding 'acoustic durability' with a maximum of 0.25 dB loss in performance per year (ref cl 5.7), and a 'non-acoustic durability' (i.e. life span) of a minimum of 20 years.

In broad terms, most timber fences are designed to last anywhere between 15-25 years depending on the supplier. Through experience, engineering judgement and information provided by manufacturers of timber acoustic fences, it is the subjective opinion of the WSCC Structures Department (responsible for the Technical Approval of the acoustic fences) that timber acoustic fences have a poor track record with regards to their longevity. Moreover, there is a lack of evidence to support manufacturers claims that the fences can perform to their acoustic attenuation requirements throughout their intended life span.

Discussions regarding the longevity and loss of performance of timber fences has been a source of contention within the industry for several years, hence the new standard (LA 119) has sought to address this by defining criteria for acceptable losses in performance. Whilst arguably the suppliers need time to catch up with the durability criteria defined within LA 119, it should be noted that no timber fences have been identified that conform to LA 119. Generally, timber fences are supplied with a 'Declaration of Performance' as opposed to a guarantee.

The acoustic properties of timber elements typically rely of the density of the timber. However, the density of timber varies based on the type of timber, natural variations and its age / condition. On the technical specification for many types of timber fences the performance characteristics are linked to the density of the timber at the time of manufacturer or installation. None of the suppliers are able to define the rates at which the timber will degrade as that is based on many factors that are beyond their control. For example, where a fence is in shade and/or damp conditions the rate at which the timber degrades will be accelerated. As a result, the age wherein a timber fences is likely drop below its designated performance criteria is very difficult to predict and hence the 'Declaration of Performance' vs a guarantee.

Should an acoustic fence drop below its performance criteria it will have a social / noise impact, but also expose the asset owner to 'Part 1' legal claims as a result of the fence not performing. In the case of the Lyminster Bypass, WSCC and Persimmons would be exposed to such claims for up to 7 years post completion. Risk cannot always be mitigated, but it should be reduced as far as reasonably practicable.

Wherever possible new structures should be maintenance free for as long as reasonable practicable. This is not only due to the direct cost implications to the asset owner of having to undertake early maintenance, but the disruption and therefore significant indirect costs to the travelling public for the more frequent

maintenance intervals. For assets such as acoustic fences and other structures, the 'whole life' cost of an asset is generally assessed over a 120 year period. It should be noted that even a metallic fence is likely to last up to 60 years compared to a bridge at 120+ years but the calculation for assessing the 'whole life' costs is 120 years. E.g. considering 2 No. fences, the first costing £120k and will last say 120 years, the second costing £60k and will last say 60 years. Arguably over the same 120 year period they will cost the same but the cost of installing the replacement fence at 60 years, the indirect costs such disruption to the travelling public, and ecological impacts are also to be borne in mind / included. Therefore, the cheaper item is a false economy.

For the reasons outlined above decisions regarding the proposed acoustic fences should be taken with a holistic view of form vs function. A metallic fence will provide far longer acoustic and non-acoustic lifespans (up to 60 years), and therefore provide longer term savings, but subjectively it doesn't have the aesthetic appeal of a timber alternative.

A 'weathering steel' acoustic fence is the preferred solution of the WSCC Structures Department that not only meets the acoustic and non-acoustic criteria, but also has an aesthetic appeal. The following section looks at potential options.

Options for Metal Acoustic Fences

Naturally there are a number of suppliers for metal acoustic fences (e.g. Modularwalls, Gramm, Bosco Italia, Quietstone) but due to the more complex manufacturing processes involved there are significantly less than the number of timber acoustic fence suppliers.

The proposed and preferred supplier, but not exclusively limited to, is Gramm Barrier Systems Ltd. <https://www.grammbarriers.com/>

Weathering steel

Weathering steel starts off with a normal metallic appearance but soon (3-6 months) takes on a rusty appearance as illustrated in the before and after example photos of a fence installed on the on M6 near Carlisle in September 2019. It should be noted that the previous acoustic fence was a timber absorptive type that after approx. 9 years service life was suffering from defects and an unacceptable loss in acoustic performance. The previous acoustic fence can be seen on Google Streetview at: <https://www.google.com/maps/@54.9344892,-2.9601911,3a,75y,269.85h,90t/data=!3m9!1e1!3m7!1sUQmRunFmFtVM5HwRBbqdw!2e0!7i13312!8i6656!9m2!1b1!2i43>



M6 near Carlisle – Before steel has weathered



M6 near Carlisle – After steel almost fully weathered

The above photos show a 'panelled' system but it equally possible to have the panels with a formed ridged to provide or more plank like appearance. The following photos show a painted system, but it is proposed to have weathering steel (not painted).



Proposed to have the ridged panel on the LHS but in weathering steel (RHS)

