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By email: [REDACTED]

18<sup>th</sup> May 2017

Dear [REDACTED]

### **Information request**

**Reference number:** FOI2017/00552

Thank you for your request of 27<sup>th</sup> April 2017. You requested the following information:

*Since 2010 I have noticed this high pitch sound when traveling on trains to various locations. This sound can be picked up on the hearing aids or even a device may pick it up if possible near to a source of it. It is clearer using a telephone pick up coil and recording device because it records electromagnetic sounds as I have an interest with them since a child.*

*I believe these lines are a Diesel type but I have heard it on other types of lines particularly Fenchurch Street to Grays line, Hornchurch station and Watton at Stone Station. The sound I am describing is a constant tone but there appears to have 2 pitch (may vary with more tracks as the lines I heard them from are 2 lines). If you are on the train the sounds can vary with volume when passing certain areas. These sounds can be picked up as a single pitch tone at Thorpe on Hill Level crossing but walking along the public footpath towards Eagle Level crossing, the tones change from 1 to 2 pitches. At Eagle Barnsdale 2 pitches can be heard when crossing the level crossing but the camera can pick it up too but very faintly. I do believe Eagle Barnsdale may have a terminating box as this sound was not present at Swinderby Station but seems to start again at Collingham Station. At collingham station the sound appears to be loudest when standing on the end nearest to the level crossing on the platform going towards Lincoln. This sound is loudest when walking over a level crossing with the coil hanging near enough the tracks. I noticed when standing near to a level crossing on the tone side (going towards Lincoln) at Thorpe on the Hill the sound is turned off when a train passes by then back on. This sound is not heard at Lincoln, Hykeham or between Peterborough to Lincoln. These sounds occur in certain locations.*

*Do you know what these sounds are?  
Are they to do with the signals?  
Am I picking up the GSM-R Radio system?*

*I have also heard these sounds when travelling between Doncaster and Hull.*

*I attached a sound file be warned it may be loud on the headphones. I just think they are unique sounds.*

I have processed your request under the terms of the Freedom of Information Act 2000 (FOIA).

Please note that it is difficult for us to give a precise response to this query because it is impossible for us to say exactly what the sound is that you have recorded.

However, to assist you, we believe these sounds are likely to be audio frequency track circuits which are part of the signalling system. It is unlikely to be the GSM-R system, as this uses the same high frequency radio technology as mobile phones (GSM) and is not as localised or significantly affected by passing trains but is principally used for communications between drivers and signallers.

Audio frequency track circuits would seem to match the characteristics described as they can be heard audibly and the electrical signal being passed through the rails could be picked up electrically as well. These work by transmitting an audio frequency electrical signal through the rail to a receiver connected to the rail some distance away. When a train is on the track between the two, the train's axles complete the circuit between the rails and prevent the frequency from being detected by the receiver so the signalling system knows when there is no train in each section of track. As a result of this functionality, any signal/sound picked up would be likely to change as a train passes. A number of different frequencies are used to avoid confusion between different sections of track which would correspond to the difference in pitches to an observer.

Frequency track circuits are used as they don't require joints to separate adjacent track circuits which require maintenance and are prone to faults. They are immune to interference from electrification although they do depend on electronic equipment to operate and have to be designed to avoid electrical connections interfering with the receivers (which could delay trains). There are over 13,000 of these used around our network so they are quite common.

We have checked our asset database for audio frequency track circuits; types include Aster, TI21 (also now known as EBI Track 200), FS2500/FS2600 (similar to

TI21), EBI Track 400. The locations included in the query correspond to locations with these types of track circuits and the areas mentioned where the sound was not noticed appear not to have them either.

- Lines from Fenchurch street have TI21s
- The Hertford loop that goes through Watton-on-Stone has TI21s
- Thorpe-on-the-Hill, Eagle, Eagle Barnsdale and Collingham all have Asters
- The line from Doncaster to Hull has Asters
- Hornchurch is a London Underground station so we do not have this data.

If you have any enquiries about this response, please contact me in the first instance at [FOI@networkrail.co.uk](mailto:FOI@networkrail.co.uk) or on 01908 782405. Details of your appeal rights are below.

Please remember to quote the reference number at the top of this letter in all future communications.

Yours sincerely

Anisha Pandya  
Information Officer

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If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at:

Information Commissioner's Office  
Wycliffe House  
Water Lane  
Wilmslow  
Cheshire SK9 5AF

**Web:** [www.networkrail.co.uk/foi](http://www.networkrail.co.uk/foi)