

DfT Reference: TWA/24/APP/03
Document Ref: CD26-01-APP-W11-2
The Cambourne to Cambridge Order

Cambridgeshire County Council

Transport and Works Act 1992
Transport and Works (Inquiries Procedure) Rules 2004

Inquiry into:
THE CAMBOURNE TO CAMBRIDGE ORDER

APPENDICES TO PROOF OF EVIDENCE
of
Toby Lewis MSc LLM CEnvH CSci FIOA FCIEH MIEEnvSci MIAQM
of WSP

On behalf of Cambridgeshire County Council

29 July 2025

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Appendix A – Emails

A1 Email exchange with Cambridge City Council 10/01/2022

From: Greg Kearney <[REDACTED]>
Sent: 11 January 2022 12:00
To: Lewis, Toby <[REDACTED]>; Lesley Beevers <[REDACTED]>
Cc: Thomas, Damien <[REDACTED]>; Adam Finch <[REDACTED]>; Nick Atkins <[REDACTED]>; Chenge Taruvinga <[REDACTED]>; Philippa Kelly <[REDACTED]>; Peter Gibson <[REDACTED]>
Subject: RE: Cambridge to Camborne scheme

Hi Toby

Your response / comments noted. Proposals acceptable and all sounds a sensible way forward.

Best of luck with it all including weather etc.

Regards

Greg

Greg Kearney

Principal Environmental Health Officer

Environmental Quality & Growth

Environmental Health /Environmental Services

Cambridge City Council

PO Box 700

Cambridge

CB1 0JH

[REDACTED] : Tel: [REDACTED]

From: Lewis, Toby
Sent: 11 January 2022 11:00
To: Greg Kearney ; Lesley Beevers
Cc: Thomas, Damien ; Adam Finch ; Nick Atkins ; Chenge Taruvinga ; Philippa Kelly ; Peter Gibson
Subject: RE: Cambridge to Camborne scheme

Hi Greg,

Many thanks for the helpful reply – all good here thanks.

As you say, Nick is on leave but Peter and I had a team's call yesterday when we went through the scheme alignment and proposed monitoring locations together which was helpful. Happy to do the same with you if you like.

With reference to your comments below:

Agreed – What about Cambridge America Cemetery – I think measurements at the houses on Cambridge Road (around no.17) immediately to the south of the proposed link would be more valuable.

What about properties along St Neots Rd between Highfields Caldecote and Harwick and or Hardwick itself as close to route? I did think about this and discussed it with Peter. I think the monitoring at Camborne and Scotland Road will be pretty representative and will enable us to verify the A14 noise model predictions well. As the important baseline parameter at the majority of locations will be the $L_{Aeq,T}$, (to inform construction noise baseline and absolute rtn levels) we will be able to derive that at locations close to the A14 from the model in any event.

What about close to Perry Court of Clerk Maxwell Road – as route appears to be close to these residential properties? Good point wrt to Perry Court – it probably has a lower residual/background sound level than Adams Road, which won't be well quantified by the baseline modelling as it's not currently open for motorised transport, so I could locate there as an alternative to Adams Road.

What about somewhere between Herschel Rd and Cranmer road as route appears to run through there? Good point here too Greg. Like Perry Court, it is currently a private road with minimal motorised transport, so the baseline model predictions won't be terribly helpful and a measurement would be worthwhile.

I'd be happy to leave the equipment out for 7 days if the forecast is reasonable. We generally look to capture a couple of weekdays plus a weekend as long as we're content we've got representative conditions and good MET. At the moment I'm just really pleased we have an acceptable five-day forecast as they're hard to find this time of year!

Thanks again and do just let me know if you'd like a call.

Kind regards

Toby

Toby Lewis

Technical Director, Acoustics

I have limited availability on Fridays



T+ [REDACTED]

M+ [REDACTED]

From: Greg Kearney <[REDACTED]>

Sent: 11 January 2022 10:06

To: Lewis, Toby <[REDACTED]>; Lesley Beevers <[REDACTED]>

Cc: Thomas, Damien <[REDACTED]>; Adam Finch <[REDACTED]>; Nick Atkins <[REDACTED]>; Chenge Taruvinga

<[REDACTED]>; Philippa Kelly

<Philippa.Kelly@greatercambridgeplanning.org>; Peter Gibson <[REDACTED]>

Subject: RE: Cambridge to Camborne scheme

Hi Toby

I hope you well – all as best here.

This is one of the wider GCP Transport projects 'GREATER CAMBRIDGE PARTNERSHIP DEVELOPMENTS: CAMBOURNE TO CAMBRIDGE RAPID TRANSPORT ROUTE' were under a PPA development Project **design** and **regulatory** work streams and meetings are meant to be kept separate e.g. Env Health wise relevant project team arrangements = **Nick Atkins at SCDC Design** and **Adam Finch and myself at City regulatory**? Not clear cut in PPA on who should do what and I assume Nick has been involved in Design? Nick is on leave until the 17th Jan so not possible to catch up with him and I note your intention to install equipment tomorrow the 12th Jan 2022!

It is a while since I have had any involvement with this project, the last been with Mott Macdonald in Feb 2020 and agreeing proposed 'C2C Noise and Vibration EIA Proposed Assessment Methodology'. At the time I understand the preferred route had not been chosen but now appears to be with Scotland Rd travel hub as per your email below and plan – we not always kept fully informed / in the frame or aware of all the GCP work and County decisions? Are WSP now doing the noise work?

I am not overly familiar with potential sensitive receptors in SCDC closest to C2C and any changes to the existing highway or any new route? and we not familiar with possible recent residential planning approvals in SCDC. However I respect your professional judgement on selection of representative noise sensitive residential receptors as proposed and considering the challenges of securing suitable monitoring locations. Have scanned the outline route as detailed in your email I provide the following comments in red below on you proposed sites **and see below - possible additional options?:**

Subject to the availability of suitable sites I'm minded to install kit at representative receptors at:

- 1) *North-east Camborne close to the new proposed link (maybe Bristol Drive). Agreed - appears fine for upper Cambourne area.*
- 2) *Scotland Road, adjacent to the proposed transport hub. Agreed – somewhere near semi-detached properties on right going North (opposite PX Farm)*
- 3) *Cambridge Road, Cotton, close to the new proposed link Agreed – What about Cambridge America Cemetery (although not residential is probably considered very sensitive place for reflection etc- bit like Crematorium on A14 route?)*
- 4) *Adams Road or Wilberforce Road, Cambridge (close to where the new link will come in by the Sports Ground). Noted but see below as well as possible additional options?*

What about properties along St Neots Rad between Highfields Caldecote and Harwick and or Hardwick itself as close to route?

What about close to Perry Court of Clerk Maxwell Road – as route appears to be close to these residential properties?

What about somewhere between Herschel Rd and Cranmer road as route appears to run through there?

In terms of representative background noise surveys we usually recommend a minimum of 7 days to include a weekend period subject to acceptable weather / met conditions etc.

I have also copied the relevant planners in who I think are leading on / aware of these GCP projects to keep them informed?

I hope the above of assistance and happy to chat as necessary if clarifications required – telephone number below which diverts to mobile.

Regards

Greg

Greg Kearney
Principal Environmental Health Officer
Environmental Quality & Growth
Environmental Health /Environmental Services
Cambridge City Council
PO Box 700
Cambridge
CB1 0JH

[REDACTED] : Tel: [REDACTED]

From: Lewis, Toby <[REDACTED]>
Sent: 10 January 2022 14:55
To: Ben Walther <[REDACTED]>; Lesley Beevers <[REDACTED]>
Cc: Thomas, Damien <[REDACTED]>; Greg Kearney <[REDACTED]>;
Adam Finch <[REDACTED]>
Subject: RE: Cambridge to Camborne scheme

Thanks for the quick reply Ben. Mine was good too thanks.

Greg/Adam – Hope you're both well. If either of you need to touch base with me on this or have a quick walk through the plans just let me know.

KR

Toby

Toby Lewis

Technical Director, Acoustics

I have limited availability on Fridays



T+ [REDACTED]

M+ [REDACTED]

From: Ben Walther <[REDACTED]>
Sent: 10 January 2022 14:51
To: Lewis, Toby <[REDACTED]>; Lesley Beevers <[REDACTED]>
Cc: Thomas, Damien <[REDACTED]>
Subject: RE: Cambridge to Camborne scheme

Afternoon Toby

All super here thanks, hope you had a nice break.

I havent had any real involvement with the travel hub proposals so I've asked Greg the question if it was he or Adam who provided some comments last year to our planning/project team. One of us will get back to you once we've sorted it our end.

Regards,

Mr Ben Walther

Principal Environmental Health Officer

Environmental Quality & Growth Team

Environmental Services

Cambridge City Council

From: Lewis, Toby <[REDACTED]>

Sent: 10 January 2022 14:41

To: Lesley Beevers <[REDACTED]>; Ben Walther <[REDACTED]>

Cc: Thomas, Damien <[REDACTED]>

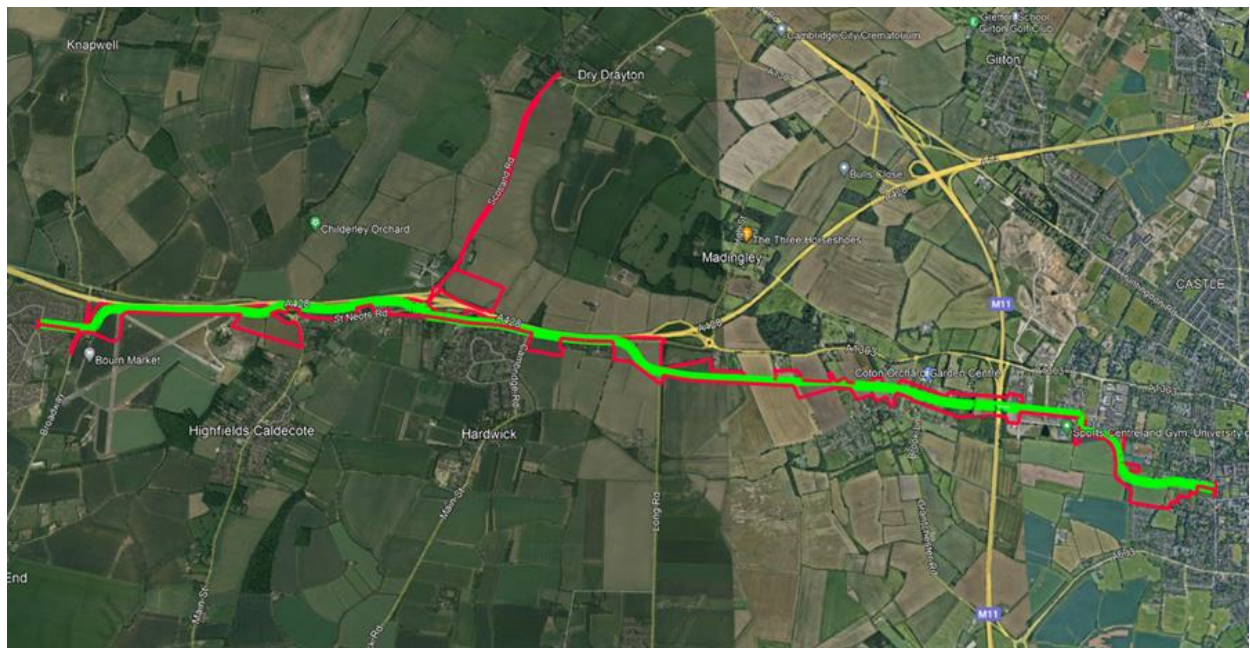
Subject: Cambridge to Camborne scheme

Morning Both,

Hope you had great Christmases and New Year's!

As you may know, we're doing the ES for this scheme and I'd like to get some noise monitoring kit out this week while the weather forecast is nice and calm. I'll probably install Wednesday and collect Monday.

My priority will be background sound levels near the travel hub but I would like some absolute baseline levels at receptors closest to changes to the highway (primarily to underpin construction noise limits but also to inform the assessment of future changes to RTN levels).



Subject to the availability of suitable sites I'm minded to install kit at representative receptors at:

- 1) North-east Camborne close to the new proposed link (maybe Bristol Drive).
- 2) Scotland Road, adjacent to the proposed transport hub.
- 3) Cambridge Road, Cotton, close to the new proposed link
- 4) Adams Road or Wilberforce Road, Cambridge (close to where the new link will come in by the Sports Ground).

Could I invite your thoughts and/or agreement please?

Many thanks

Toby

Toby Lewis *MSc LLM CEnvH CSci FIOA MCIEH MEnvSci MIAQM*

Technical Director, Acoustics

I have limited availability on Fridays



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M+ [REDACTED]

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CB2 1LA

wsp.com

A2 Email exchange with South Cambridgeshire District Council

10/01/2022

From: Peter Gibson <[REDACTED]>

Sent: 11 January 2022 16:53

To: Lewis, Toby <[REDACTED]>

Subject: RE: Cambridge to Camborne scheme

Toby,

I just realised that I didn't respond to this.

Further to our teams meeting, I am happy with the proposed monitoring locations that were discussed.

Kind regards,

Peter Gibson | Principal Officer (Environment Planning)



South Cambridgeshire Hall | Cambourne Business Park | Cambourne | Cambridge | CB23 6EA

t: [REDACTED] | **m:** [REDACTED] | **e:** [REDACTED]

www.scambs.gov.uk | facebook.com/south-cambridgeshire | twitter.com/SouthCambs

From: Lewis, Toby

Sent: 10 January 2022 15:21

To: Peter Gibson

Subject: RE: Cambridge to Camborne scheme

Hi Peter,

Many thanks for the email. Shall I talk you through it on a teams call? Then I can share screens. 15:30?
Or 16:00?

KR

Toby

Toby Lewis

Technical Director, Acoustics

I have limited availability on Fridays



T+ [REDACTED]

M+ [REDACTED]

From: Peter Gibson <[REDACTED]>

Sent: 10 January 2022 15:18

To: Lewis, Toby <[REDACTED]>

Subject: FW: Cambridge to Camborne scheme

Hi Toby,

I've been asked to contact you concerning the scheme. I assume it's the A428 but it would be good to know what the work entails.

Could you please provide me with a map (rough google map is fine) with the areas that you have identified.

Happy to chat on the phone if easier.

Many thanks,

Peter Gibson | Principal Officer (Environment Planning)



South Cambridgeshire Hall | Cambourne Business Park | Cambourne | Cambridge | CB23 6EA
t: 01954 712943 | m: 07749 711511 | e: [REDACTED]

www.scambs.gov.uk | facebook.com/south-cambridgeshire | twitter.com/SouthCambs

From: Lesley Beevers <[REDACTED]>

Sent: 10 January 2022 14:47

To: Peter Gibson <[REDACTED]>

Subject: FW: Cambridge to Camborne scheme

Can you contact Toby with regard to this please.

Lesley

From: Lewis, Toby <[REDACTED]>

Sent: 10 January 2022 14:41

To: Lesley Beevers <[REDACTED]>; Ben Walther <[REDACTED]>

Cc: Thomas, Damien <[REDACTED]>

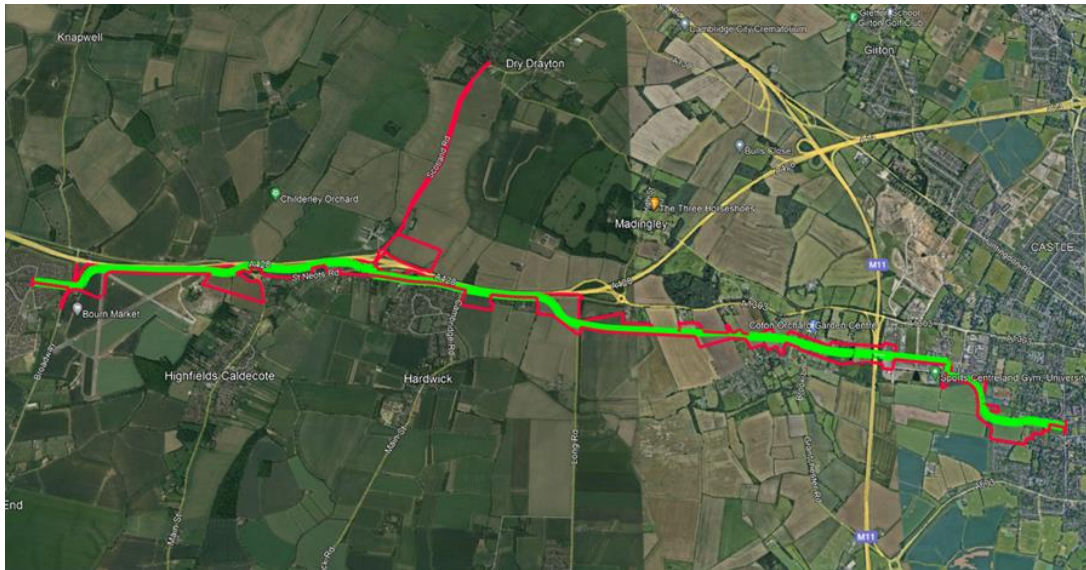
Subject: Cambridge to Camborne scheme

Morning Both,

Hope you had great Christmases and New Year's!

As you may know, we're doing the ES for this scheme and I'd like to get some noise monitoring kit out this week while the weather forecast is nice and calm. I'll probably install Wednesday and collect Monday.

My priority will be background sound levels near the travel hub but I would like some absolute baseline levels at receptors closest to changes to the highway (primarily to underpin construction noise limits but also to inform the assessment of future changes to RTN levels).



Subject to the availability of suitable sites I'm minded to install kit at representative receptors at:

- 1) North-east Camborne close to the new proposed link (maybe Bristol Drive).
- 2) Scotland Road, adjacent to the proposed transport hub.
- 3) Cambridge Road, Cotton, close to the new proposed link
- 4) Adams Road or Wilberforce Road, Cambridge (close to where the new link will come in by the Sports Ground).

Could I invite your thoughts and/or agreement please?

Many thanks

Toby

Toby Lewis MSc LLM CEnvH CSci FIOA MCIEH MEnvSci MIAQM

Technical Director, Acoustics

I have limited availability on Fridays



T+ [REDACTED]

M+ [REDACTED]

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wsp.com



A3 Email exchange with Clare Hall Domestic Bursar 12/01/2022

From: Lewis, Toby

Sent: 12 January 2022 10:36

To: Clare Hall Domestic Bursar <[REDACTED]>

Cc: D. Smith <[REDACTED]>; Clare Hall Porters <[REDACTED]>

Subject: RE: Sound Level Meter Installation

Noted, thank you Harry. I should be down there early this afternoon.

KR

Toby

Toby Lewis

Technical Director, Acoustics

I have limited availability on Fridays



T+ [REDACTED]

M+ [REDACTED]

From: Clare Hall Domestic Bursar

Sent: 12 January 2022 10:10

To: Lewis, Toby

Cc: D. Smith ; Clare Hall Porters

Subject: RE: Sound Level Meter Installation

Just so you know, about half of the area covered by the arrow is not ours(!) The only area which would be suitable on our plot is towards the left edge of the arrow, near our BBQ site (where we used to have bee hives – the Porters and Gardens will know what this means).

Harry

From: Lewis, Toby <[REDACTED]>

Sent: 12 January 2022 10:01

To: Clare Hall Domestic Bursar <[REDACTED]>

Cc: D. Smith <[REDACTED]>; Clare Hall Porters <[REDACTED]>
Subject: RE: Sound Level Meter Installation

Fantastic, Thanks Harry, will do. I'm after a quiet location, so away from Grange Road. I was thinking somewhere along the white arrow shown below although other options would work too if that's impractical.



Toby Lewis

Technical Director, Acoustics

I have limited availability on Fridays



T+ [REDACTED]

M+ [REDACTED]

From: Clare Hall Domestic Bursar <[REDACTED]>
Sent: 12 January 2022 09:56
To: Lewis, Toby <[REDACTED]>
Cc: D. Smith <[REDACTED]>; Clare Hall Porters <[REDACTED]>
Subject: RE: Sound Level Meter Installation

Dear Toby,

No great objection here but:

1. Check in with the Porters' Lodge (cc'd) on arrival, phone [REDACTED] – located off Herschel Road near Grange Road (directly opposite Robinson College). Parking variable; we do have a car park but spaces are **tight** and you might want to take your chances on the road.
2. Which part of our south boundary are you interested in? The boundary runs along the entire length of our estate (east to west), and where you want to site any equipment might affect the Gardens team (Head Gardener, David Smith also cc'd) so please make sure you check with him directly before installing anything (or walking on the grass!)

I'll leave you in the capable hands of the Porters and Gardens teams.

Kind regards,

Harry

From: Lewis, Toby <[REDACTED]>
Sent: 12 January 2022 09:36
To: Clare Hall Domestic Bursar <[REDACTED]>
Subject: Sound Level Meter Installation

Good morning Harry,

I have a slightly unusual request for you.

I'm undertaking a noise survey on behalf of the Greater Cambridgeshire Partnership in connection with the Camborne to Cambridge scheme. The south boundary of the grounds at Clare Hall would make a perfect monitoring location, if you are prepared to give me permission to install a sound level meter there. It is just a small case with a tripod mounted microphone. I would install later today and leave it there for a week. Would that be OK please?

Many thanks

Toby

Toby Lewis MSc LLM CEnvH CSci FIOA MCIEH MEnvSci MIAQM

Technical Director, Acoustics

I have limited availability on Fridays



T+ [REDACTED]

M+ [REDACTED]

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Appendix B – WSP Monitoring Location ML5

Clare Hall

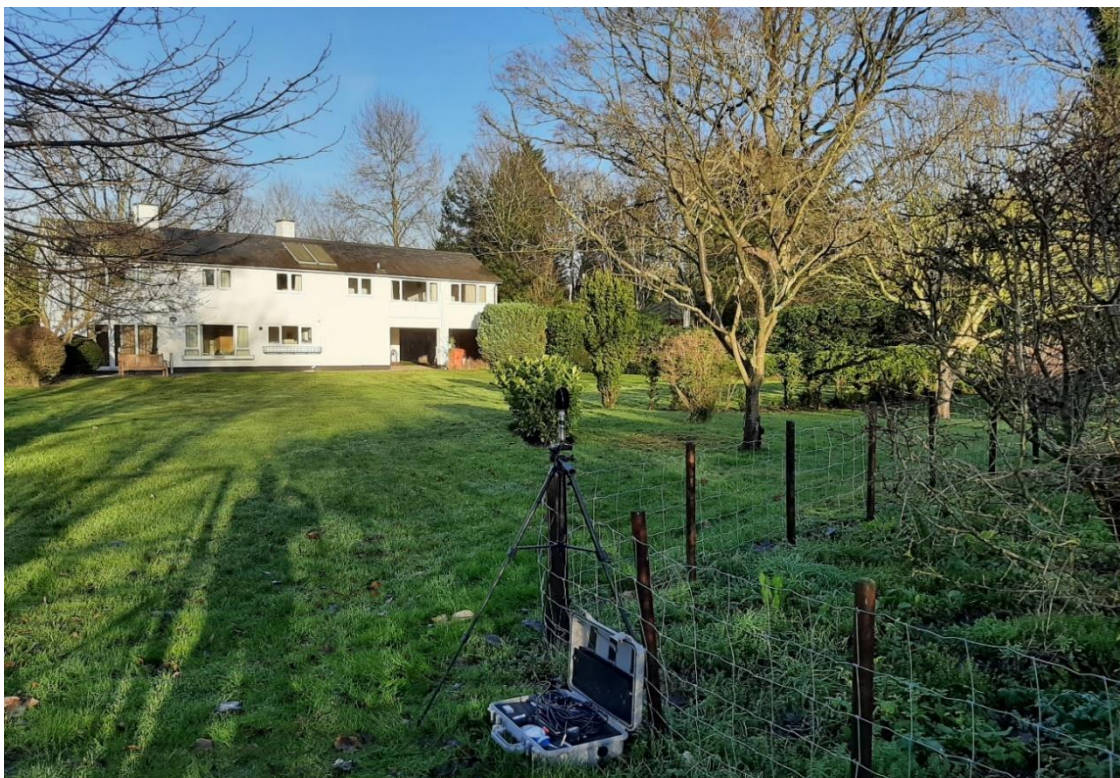
B1 Aerial photograph of WSP ML5



B2 In-situ photograph of WSP ML5 taken from the north



B3 In-situ photograph of WSP ML5 taken from the south



Appendix C – Additional information regarding Clare Hall Statement of Case (noise)

C1 Email between Dentons and Womble Bond Dickinson (21 May 2025)

From: Horner, Thomas <[REDACTED]>
Sent: 21 May 2025 20:03
To: Emma Welch
Cc: Victoria Redman; Richard Guyatt; Adam Richards; Vas, Michele
Subject: RE: Cambourne to Cambridge Scheme [WBDUK-AC.FID151481929] [DEN-UK_ACTIVE.FID10577279]

Hi Emma,

In response to your question regarding the sound insulation tests, Clare Hall's consultant has confirmed that:

"The sound insulation testing for the glazing was conducted in general accordance with BS EN ISO 16283-3. In particular the "Element Loudspeaker Method" as detailed in section 9.5 of the standard.

BS EN ISO 16283-3:2016. Field Measurement of Sound Insulation in Buildings and of Building Elements – Part 3: Facade Sound Insulation"

I trust that is sufficient information.

Clare Hall is still reviewing points raised in the applicant's Statement of Case and continues to reserve the right to raise further details of objection.

Kind regards,

Tom

Thomas Horner

Associate



London

C2 Email exchange with Mr Blacklock of Create June/July 2025

From: Lewis, Toby

Sent: 01 July 2025 17:02

To: Jody Blacklock <[REDACTED]>

Cc: 'Horner, Thomas' <[REDACTED]>; 'Vas, Michele' <[REDACTED]>;

Graham Sinclair <[REDACTED]>

Subject: RE: Clare Hall, Cambridge

Hi Jody,

Many thanks, much appreciated. I'll try to get a look at this later in the week.

Kind regards

Toby

Toby Lewis

Technical Director (Acoustics)

MSc LLM CEnvH CSci FIOA FCIEH MEnvSci MIAQM

I do not work on Monday afternoons, Wednesdays or Friday afternoons

I will be on leave 01 – 15 August 2025

T+ [REDACTED]

M+ [REDACTED]



WSP UK Limited, a limited company registered in England & Wales with registered number 01383511.

Registered office: WSP House, 70 Chancery Lane, London, WC2A 1AF.

From: Jody Blacklock <[REDACTED]>
Sent: 01 July 2025 16:45
To: Lewis, Toby <[REDACTED]>
Cc: 'Horner, Thomas' <[REDACTED]>; 'Vas, Michele' <[REDACTED]>;
Graham Sinclair <[REDACTED]>
Subject: RE: Clare Hall, Cambridge

Good afternoon Toby,

Many thanks for your email. Apologies for it taking a while to come back to you but it's a bit crazy at the moment. Anyways, info below in red. Sorry, but we don't really have any individual reports as we crunched the numbers for the Statement of Case. We are in the process of preparing the Proof of Evidence report, which will have all the relevant data, photographs, qualifications etc, but that is very much still WIP I'm afraid.

Should you need anything else, then please don't hesitate to call or email me again.

Kind regards,

Jody Blacklock BEng (Hons), CEng, MIOA, MCIBSE

Technical Director (Chair of IoA Eastern Branch)

Acoustics

t. [REDACTED] m. [REDACTED] w. www.createce.co.uk



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From: Lewis, Toby <[REDACTED]>
Sent: 19 June 2025 16:51
To: Jody Blacklock <[REDACTED]>
Subject: Clare Hall, Cambridge

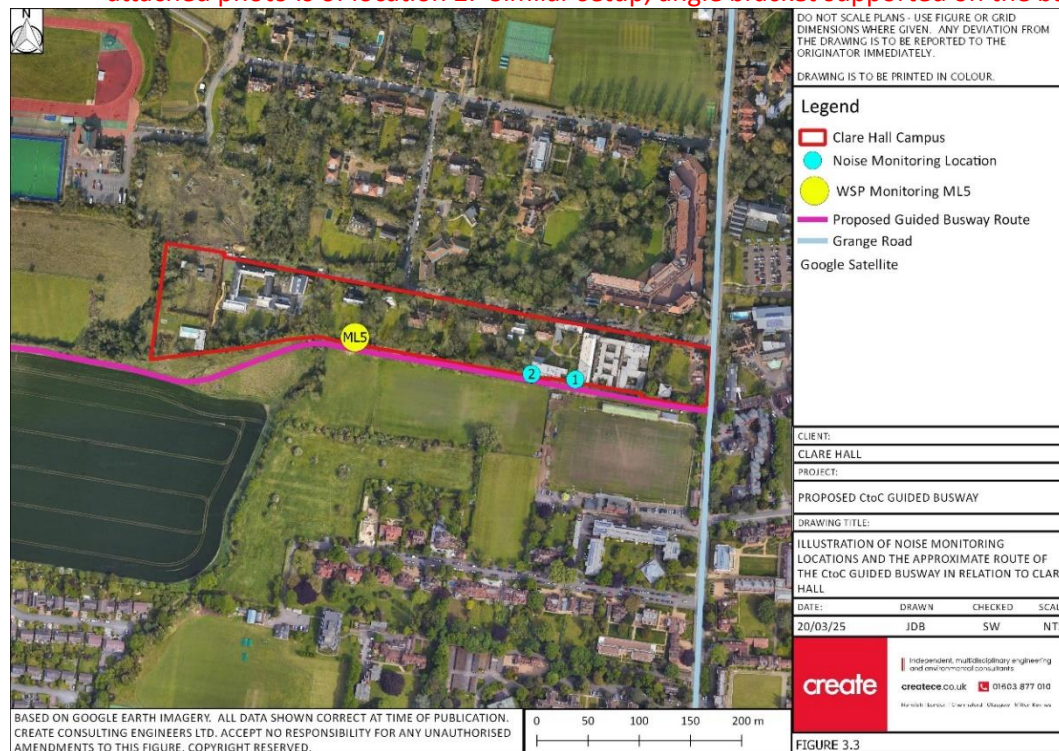
Hi Jody,

I hope you're well?

I'm working on the proposed Camborne to Cambridge busway TWAO on behalf of the Greater Cambridgeshire Partnership.

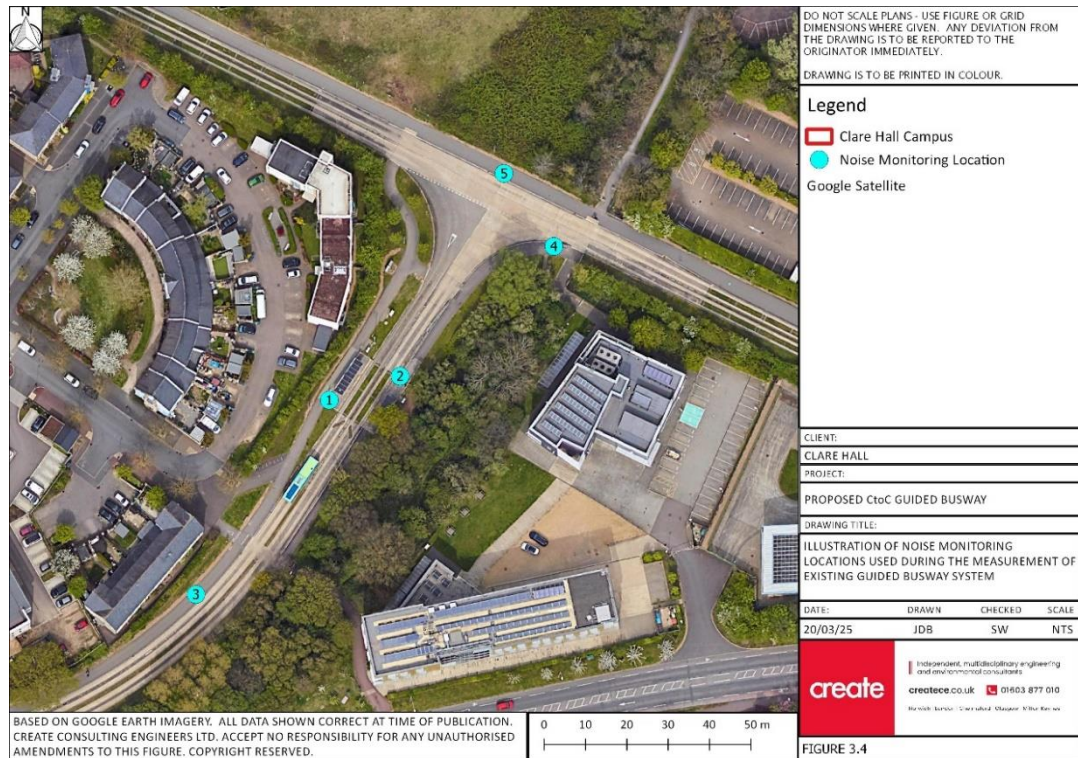
I've read through the March 2025 Statement of Case Acoustics you wrote for them and was wondering if you could provide some supporting information, please?

- 1) You mention Create made baseline measurements at Clare Hall (Section 3) but don't say who did them, with what, where or how. Is there a baseline measurement report you could share please? Locations/photos/data would be particularly helpful. **Sorry, but we have not prepared a baseline measurement report, so unable to share that. My colleague Sam Ward (MIOA) installed and calibrated the equipment and I performed the post calibration and removed the monitoring equipment. All equipment was within the required calibration timeframes and were field calibrated using a Nor1251. Monitoring equipment were two Norsonic 140s with the environmental kits. I'm afraid that I don't have a photo of measurement location 1, but the attached photo is of location 2. Similar setup, angle bracket supported on the balustrade.**



- 2) You mention measurements of bus movements on the guided busway as well (Section 3) but, again, there's no supporting information like assessor, kit, exact location, photos, descriptions, data etc. If there is a report, I'd love to see it. **Sorry, again there is no report available at this**

time. Sam Ward performed these measurements before deploying the monitors at their long term positions. Same Nor140s were used. I've attached the raw Excel file with the measured data in it.



- 3) You also mention sound insulation measurements citing a remarkably low value for a closed window/open vent (Section 3). Could you please provide full details of how this test was done? The measurements were in line with the Global Loudspeaker Method from BS EN ISO 16283-3. In all honesty, the main building façade is quite lightweight, so it wasn't just the windows and vents giving these low results.
- 4) You've stated that you calculated construction and operational busway noise levels at Clare Hall (Sections 4 and 6) but provide no supporting info. Could you please provide me with the details of the modelling? Modelling has not been undertaken, and probably will not be. All calculations have been carried out in Excel, using our in-house construction noise calculator.

Many thanks in anticipation.

Kind regards

Toby

Toby Lewis

Technical Director (Acoustics)

MSc LLM CEnvH CSci FIOA FCIEH MEnvSci MIAQM

I do not work on Monday afternoons, Wednesdays or Friday afternoons

T+ [REDACTED]

M+ [REDACTED]



WSP

62-64 Hills Road,
Cambridge CB2 1LA
United Kingdom

wsp.com

C3 Photograph attachment to email from Mr Blacklock



C4 Create bus monitoring locations/data (extract from attachment to email from Mr Blacklock)

	A	B Measurement Ref	C Bus Reg	D	E Notes	F Distance of Measurement	G SEL
1							
2							
3		1	AE12 CJV	Diesel	Passing at 20mph, then stopping / Idling / Pulling away	3m	82.4
4		2	AE12 CJO	Diesel	Passing at 20mph, pulling up to a stop/ Idling / Pulling away	1m	87.2
5		3	AE18 ???		Passby at 20mph	1m	84
6		3	BF65 WKO	Diesel	Passby at 20mph	1m	75.9
7		1	BF65 WKT	Diesel	Idling and pulling away	1m	86
8		2	BF65 WKT	Diesel	Passby at 20mph, idling and pulling away	1m	80.4
9		4	BU69 XYZ	Diesel - Euro VI	Double decker passby	1m	77.5
10		4	AE12 CJJ	Diesel	Junction turn in at 20mph	1m	74.8
11		5	BF65 WKZ	Diesel	Bus pulling up, stopping and turning out left	6m	70.6
12		5	BF65 WKS	Diesel	Bus turning in to junction at 20 mph	6m	75.6
13		5	BF65 WKY	Diesel	Turning out left (slowly)	6m	67.9
14		4	YH17 ???		double decker passby at 30mph	1m	80.5
15		1	AE09 ???		Passing at 20mph, then stopping / Idling / Pulling away	1m	84.5
16		3	BV18 YCA	Diesel	passby	1m	83.7
17		2	BV69 XXB	Hybrid	Idling and pulling away	1m	84.3
18		1	AE09 GYZ	Diesel	pull up and idle	1m	85.1
19		3	DF65 WKV	Diesel	passby	1m	85.4

C5 Create construction noise assumed plant and predictions (extract from attachment to email from Mr Blacklock)

Site Clearance	BS 5228-1 Calculation Method			Category Threshold (dB): 65				
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1	NSR 2	NSR 3	NSR 4
					40 mtrs	5.5 mtrs	60 mtrs	23 mtrs
Tracked Excavator	76	2	50%	76	64	81	60	69
Dump Truck (empty)	87	2	10%	80	68	85	64	73
Dump Truck (Tipping)	79	1	15%	71	59	76	55	64
Road Planer	82	1	5%	69	57	74	53	62
Excavator with hydraulic breaker	83	1	25%	77	65	82	61	70
Hand Held Pneumatic Breaker	86	1	25%	80	68	85	64	73
HGV to remove waste	80	1	10%	70	58	75	54	63
Dozer	79	1	50%	76	64	81	60	69
Vibratory Roller	80	1	25%	74	62	79	58	67
Generator	66	1	100%	66	54	71	50	59
0	0	1	100%	0	-12	5	-16	-7
Cumulative dB Sum at NSR					74	91	70	79

Road / Structure Construction	BS 5228-1 Calculation Method			Category Threshold (dB): 65				
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1	NSR 2	NSR 3	NSR 4
					40 mtrs	5.5 mtrs	60 mtrs	23 mtrs
Dump Truck (Tipping)	79	1	25%	73	61	78	57	66
Dump Truck (empty)	87	1	10%	77	65	82	61	70
Asphalt Paver	75	1	50%	72	60	77	56	65
Vibratory Roller	80	1	50%	77	65	82	61	70
Excavator with hydraulic breaker	83	1	10%	73	61	78	57	66
Generator	66	1	100%	66	54	71	50	59
Delivery Lorry	80	1	10%	70	58	75	54	63
0	66	1	100%	66	54	71	50	59
Cumulative dB Sum at NSR					70	87	66	75

Bridge Construction	BS 5228-1 Calculation Method			Category Threshold (dB): 65				
Equipment Type	dB at 10m	Number of Units	Percent on Time	dB Result at 10m	NSR 1	NSR 2	NSR 3	NSR 4
					40 mtrs	5.5 mtrs	60 mtrs	23 mtrs
Crane	77	1	15%	69	57	78	57	66
Wheeled Backhoe	69	1	25%	63	51	82	61	70
Concrete Pump & Truck	67	1	10%	57	45	77	56	65
Cutting Tools	87	1	5%	74	62	82	61	70
Piling Rig	87	1	25%	81	69	78	57	66
Gas Cutter (Top of Piles)	68	1	10%	58	46	71	50	59
Generator	66	1	100%	70	58	75	54	63
Telehandler	71	1	25%	65	53	71	50	59
Asphalt Paver	75	1	25%	69	57	5	-16	-7
Cumulative dB Sum at NSR					70	87	66	75

Site Clearance	BS 5228-1 Calculation Method			Road / Structure Construction	BS 5228-1 Calculation Method		
Equipment Type	dB at 10m	Number of Units	Percent on Time	Equipment Type	dB at 10m	Number of Units	Percent on Time
Tracked Excavator	76	2	50%	Dump Truck (Tipping)	79	1	25%
Dump Truck (empty)	87	2	10%	Dump Truck (empty)	87	1	10%
Dump Truck (Tipping)	79	1	15%	Asphalt Paver	75	1	50%
Road Planer	82	1	5%	Vibratory Roller	80	1	50%
Excavator with hydraulic breaker	83	1	25%	Excavator with hydraulic breaker	83	1	10%
Hand Held Pneumatic Breaker	86	1	25%	Generator	66	1	100%
HGV to remove waste	80	1	10%	Delivery Lorry	80	1	10%
Dozer	79	1	50%				
Vibratory Roller	80	1	25%				
Generator	66	1	100%				