

TRANSPORT AND WORKS ACT 1992

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**NETWORK RAIL (CAMBRIDGE SOUTH INFRASTRUCTURE ENHANCEMENTS)
ORDER**

SUMMARY PROOF OF EVIDENCE

ON MATTERS OF RESEARCH AND THE UNIVERSITY

KARL WILSON ON BEHALF OF THE UNIVERSITY OF CAMBRIDGE

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1 QUALIFICATION AND EXPERIENCE

- 1.1 My qualifications and experience are set out in section 1 of my main Proof of Evidence.
- 1.2 I am Operations Director for the University's Biomedical Services Department. I am based full time at the Anne McLaren Building ("**AMB**") and am primarily responsible for leading the operations there to further the work of the University's biomedical and clinical medicine departments. These departments support over 1000 individual license holders, 200 project licence holders and 180 direct staff.
- 1.3 I am also responsible for day-to-day compliance with the requirements of the Home Office Establishment License ("**Establishment Licence**") for the AMB.

2 SCOPE AND NATURE OF EVIDENCE

- 2.1 The purpose of my evidence is twofold (i) to explain the research and imaging work undertaken within the AMB and its importance, both to the University and globally; and (ii) to explain the significant concerns held by the University about the potential effect of the proposed Scheme on that work, which in my view Network Rail has not sufficiently understood when applying for the Order.
- 2.2 Much of the work in the AMB has the potential to be affected by noise and vibration. These effects could cause inaccuracies or inconsistencies of results, damaging, potentially years of research and incurring significant financial and reputational loss to the University.
- 2.3 My evidence is to be read with the other expert evidence submitted by the University, in particular that relating to noise and vibration, prepared by Rupert Thornely-Taylor.
- 2.4 The land interests of the University in the Cambridge Biomedical Campus ("**CBC**") are addressed in the evidence of Paul Milliner. In my evidence I focus on the AMB

3 THE IMPORTANCE OF THE CAMBRIDGE BIOMEDICAL CAMPUS AND THE ANNE MCLAREN BUILDING

The CBC

- 3.1 The CBC is the largest centre of medical research and health science in Europe. Locating world-leading academic and industry scientists on the same site as the

teaching hospitals of the University creates the optimum environment for the rapid and effective translation of research into routine clinical practice.

3.2 The School of Clinical Medicine, which is housed in multiple buildings across the CBC aspires to change the practice of medicine and improve biological understanding in a wide range of clinical specialties and scientific disciplines. The School also supports key enabling technologies and facilities in imaging, bioinformatics and biological systems. There are very few facilities worldwide which offer this range and quality of work and facilities. The main areas of research interest are:

- Cancer Research
- Cardio-Respiratory Medicine
- Cellular mechanisms of disease
- Diabetes, Endocrinology and Metabolism
- Epidemiology, Public Health and Primary Care
- Genetics and Genetic Medicine
- Haematological and Transplantation Medicine
- Infection and Immunity
- Neurosciences and Mental Health
- Stem Cells and Regenerative Medicine

3.3 All of these areas are supported by the work in the AMB.

The AMB and its importance

3.4 The biomedical research facility at the AMB represents a major investment in UK scientific research and is a one-of-a-kind facility within the CBC. The AMB was opened in October 2019 as a new biomedical research facility to help further our understanding of how diseases occur and in the development of new treatments for conditions including cancer, dementia and diabetes. It supports globally important research activities across the CBC, including pioneering research into Covid-19. This includes: the use of imaging equipment to test the flow of dyes that is then adopted for wider

imaging purposes in medical treatment (including nuclear medicine); the modelling of disease including through the use of genetic modification to develop cures; and the replication of organs in vitro to aid drug development and organ replacement technology.

- 3.5 University researchers at the AMB use MRI equipment for testing disease treatments, and to acquire sub-millimetre images in lab specimen and animals. The University's research studies include imaging abdominal and brain cancers, brain aneurysms, thrombectomies human cadaveric specimens, and cardiac and respiratory diseases. Work is performed with the University and Addenbrooke's Hospital researchers and with pharmaceutical companies, including AstraZeneca. High resolution imaging with limited noise and vibration interruptions are vital to ensure that these studies run efficiently and with limited disruptions to ensure the highest clinical impact.
- 3.6 As is common in biomedicine, research at the AMB involves the use of rodents and fish. This necessitates an Establishment Licence to be held to which Establishment Licence Conditions attach. The Establishment Licence conditions require, but in any event the University and other occupiers of the AMB aim to meet, the highest standards of animal welfare, underpinned by the principles of the '3Rs' of animal research. In total, the AMB houses over 25,000 rodents (excluding the animal research use of Astra Zeneca, who occupy part of floor 2) and several thousand fish.
- 3.7 Whilst delays due to COVID-19 mean that the AMB is still currently expanding its operational capacity, the AMB is nonetheless currently hosting 119 individual research grants (it has hosted others to date). The AMB recovers circa £3m of grant funding directly from researchers in receipt of grant funding, but its work overall supports a total of circa £41.5m per annum of research grants. In 2020/2021 these grants overall accounted for £34.8m relating to research activity in the School of Clinical Medicine (12% of that activity) and £6.7m relating to the School of Biological Sciences (5.5% of that activity). The individual research grants are used by the holders of project licenses to meet the costs of receiving services and occupying research space within the AMB. Services provided within the AMB include a range of important services relating to animal welfare and the carrying out of scientific procedures to support research work. Other than the 80+ staff who work permanently in the building over 650 researchers and support staff have daily access.
- 3.8 The AMB itself provides unique service and support space not found anywhere else within the CBC. Because of the highly regulated nature of these spaces they have to

be designated with specific environmental conditions so are not easily created or replicated. This means that the AMB researchers, from both the University and collaborative partners, use it as a specialist hub, whilst maintaining their own labs elsewhere on the CBC, often taking samples and work back and forth in support of a range of academic research goals. This supports the University aim to translate research and clinical excellence into practical human health benefits, such as new therapeutics, devices, diagnostics or other interventions.

4 IMPACTS OF THE SCHEME ON THE AMB AND RESEARCH

- 4.1 Given the breadth of research activities and the specialist nature of the work undertaken, the AMB has specialist working requirements in respect of environmental laboratory conditions, with an extremely narrow tolerance range beyond which research outcomes would be rendered unreliable.
- 4.2 High-resolution imaging equipment is acutely sensitive to vibration and noise. The major concern of the University is the potential for further construction activity or operational effects of railway-associated development to affect this work. Increased ground vibrations risk causing image artefacts³ (i.e. abnormalities in the images) which in turn would render certain vital pieces of research useless. It is critical that this is avoided in order for on-going research and experiments to be continued.
- 4.3 The AMB also has specialist working requirements in respect of environmental laboratory conditions, with an extremely narrow tolerance range beyond which research outcomes would be rendered unreliable. In the case of mice, the successful breeding of which is essential, the effect of excessive noise and vibration would be behavioural disturbance and interference with reproduction, including infertility, abortion, mismothering or cannibalism of pups. The most commonly recorded consequence of elevated vibration levels is an increase in stress hormones with breeding animals being most sensitive. Intermittent or persistent noise levels also have the potential to affect studies and the breeding potential of the rodents within the AMB.
- 4.4 In relation to fish, the potential effects are behavioural disturbance and hearing damage. In particular, exposure to noise and vibration causes stress response behaviour, increased susceptibility to disease and reduced survival.
- 4.5 If not properly assessed and mitigated, my concern is that the stress and anxiety caused by noise and vibration from the proposed scheme could cause significant impact to research with these species, by substantially disrupting and invalidating

research results. All this may call into question results and damage the impact of research outcomes, with serious implications for the work of the AMB and the wider research activity and reputation of the University.

5 NETWORK RAIL PREPARATION AND PROMOTION OF THE ORDER SCHEME

- 5.1 Other witnesses have addressed the technical aspects of the assessment work undertaken by Network Rail to support the draft Order. The conclusion that I draw from their evidence is that the material submitted by Network Rail has failed to properly understand, assess or mitigate the particular effects that would arise on such a specialist and sensitive facility as the AMB. This confirms my own impression from reading the chapters in the environmental statement which addressed noise and vibration in particular. The preparation of my own evidence has been difficult given the lack of specific and clear information on potential impacts on identified receptors, including rodents and fish, without any clear assessment of the steps that could be taken to prevent those impacts from arising, based on identifiable or agreed criteria relating to noise and vibration in particular (but also electromagnetic interference).

6 CONCLUSION

- 6.1 As matters stand the University has sought through its evidence to explain why further detailed information is necessary to understand the potential effects on the AMB and the detailed mitigation strategy that is required to ensure the operations can continue effectively there.
- 6.2 In the absence of that information, the University has sought to identify key criteria which would avoid disturbance and impacts on the effective operation of the AMB. However, until measures can be secured that properly protect the work carried on within the AMB, I am unable to conclude that the Scheme would avoid huge potential risks to its operation.

Karl Wilson

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