Cambridge Approaches

Response to the East West Rail 2026 Non-Statutory Consultation

Impact on the Mullard Radio Astronomy Observatory, Lord's Bridge

June 2026

Executive Summary

ES.1 The Mullard Radio Astronomy Observatory (MRAO) at Lord's Bridge is one of the world's leading radio astronomy facilities, operated by the Cavendish Laboratory of the University of Cambridge. It hosts an array of instruments physically located at Lord's Bridge — including the AMI interferometer (18 dishes in two arrays), the e-MERLIN 32-metre dish, the REACH low-frequency antenna, the COAST precision optical interferometry facilities, and several further arrays. These instruments cannot easily be relocated: the site occupies a natural low bowl providing electromagnetic shielding from all sides. Suitable alternative sites are extremely rare — one potential site has been identified in Ireland; none is known in England.

ES.2 The proposed EWR route rises to 10–11 metres above ground level for approximately one kilometre at the Bourn Brook viaduct and its approaches — the section closest to MRAO. EWRCo proposes to operate battery-electric trains between Cambourne and Hauxton Junction through this section; EWRCo also makes passive provision for overhead line equipment along this section, meaning electrification could be introduced in future. Battery-electric traction systems switch very large currents and therefore produce broadband electromagnetic emissions across the frequency range on which MRAO operates (40 MHz to 22.5 GHz). The proposed route also introduces a new permanent source of ground-borne vibration, compounded by provision for 775-metre diesel freight trains at up to one per hour in each direction, potentially 24 hours a day.

ES.3 Planning Policy TI/7 of the South Cambridgeshire Local Plan (2018) designates the Lord's Bridge Restricted Area, within which planning permission shall only be granted for development "that would not result in any risk of interference" with the Observatory. The onus is on EWRCo to prove that there would be no impact. Furthermore, EWRCo's presence must not foreclose MRAO's ability to install new instruments or expand its capabilities in future. The proposed alignment passes through the heart of this Restricted Area. EWRCo has never formally assessed its proposals against this requirement. [1 7]

ES.4 EWRCo selected Route Option E in January 2020 despite its internal technical assessment having concluded that Route Options A, C and D were "the safest and least obstructive" for the MRAO. That internal assessment — marked "For internal use only" but subsequently released under the Freedom of Information Act — contained no quantified EMI analysis and no reference to the relevant international standard (ITU-R RA.769-2). EWRCo's Environmental Sustainability Strategy commits to avoidance as the first step of the mitigation hierarchy; the route option assessment was the moment at which avoidance could have been secured, and it was foreclosed on an inadequate technical basis. This is the third public consultation in which MRAO has been raised as a critical concern by Cambridge Approaches. No measurements have been published. No mitigation has been identified. [2 15]

ES.5 EWRCo's technical partner (Mott MacDonald) admitted in April 2024 that on raw ITU-R RA.769-2 figures, an unmitigated railway would need to be "several hundred kilometres" from MRAO to be compatible. Three mitigation options have been discussed — filtering at the receiver, a Faraday cage along the track, and a metal wall inside the MRAO site — none of which EWRCo's engineers are confident can be made to work. That EWRCo's Chief Executive approached the University in early 2026 to ask the price of relocating MRAO — described by the University as perhaps running into hundreds of millions of pounds, which EWRCo declined to pursue — demonstrates that no workable mitigation solution has been found. [3] [14]

ES.6 The University of Cambridge demonstrated the severity of the MRAO interference constraint in July 2024 when its Estates Committee formally abandoned its solar farm proposal at Lord's Bridge — a project for which South Cambridgeshire District Council had already granted planning permission — because "the construction and operation of the planned solar farm would have a sufficiently detrimental impact on the research undertaken at the Mullard Radio Astronomy Observatory that the simultaneous land uses at Lord's Bridge are incompatible." A solar farm has a typical design life of 25–30 years and can be decommissioned and the land restored. A railway is effectively permanent infrastructure with a design life well in excess of 100 years and no realistic prospect of removal. The interference burden on MRAO would be irreversible for the lifetime of the Observatory. The proposals from Cemex in 2010 to install new quarrying equipment at the Barrington Pit were also abandoned to protect the MRAO. [4]

Cambridge Approaches makes five demands:

(1) Route relocation or tunnelling. The route must be moved outside the Lord's Bridge Restricted Area entirely, or tunnelled throughout its passage near MRAO. EWRCo's Environmental Sustainability Strategy (October 2024) states that "the adoption of the mitigation hierarchy is fundamental to sustainable infrastructure" and defines its first step as "Avoidance — measures taken to avoid creating impacts from the outset." The route option assessment in 2019–2020 was the moment at which avoidance should have been applied; it was not, because the assessment was technically inadequate. Cambridge Approaches' parallel consultation response on alternatives to the Southern Approach identifies two viable routes — the Northern Approach to Cambridge with turnback (NATC+) and a Long Tunnel — both of which avoid the MRAO entirely. The NATC+ offers a 30% saving in base construction cost against the current proposal while directly serving all three Cambridge stations; neither alternative carries any [significant] MRAO or Eversden and Wimpole Woods SAC risk.

(2) Publication of measurements. EWRCo must publish the Cardiff EMC measurements of emissions from Class 756 Stadler tri-mode trains and full EMC modelling for the MRAO interface as soon as possible and in any event before the DCO examination process begins. The public and statutory consultees must be able to scrutinise this data before the DCO is submitted, not discover it for the first time in the examination room.

(3) No burden on the University; binding emissions standard. EWRCo must not place the burden of achieving EMC compliance on the University of Cambridge. Filtering at the receiver, signal-processing workarounds, and any measures that reduce the scientific sensitivity of MRAO instruments constitute harm, not mitigation. EWRCo must establish a binding emissions specification for all rolling stock — including freight services — that will ever operate on EWR, not merely the train type tested in Cardiff. It must also allow reasonable freedom for future development of equipment at this internationally significant site.

(4) Proposals not ready for DCO. The absence of any specific mitigation proposal in this consultation, which closes on 9 June 2026, itself demonstrates that the proposals are not ready for DCO submission. A DCO application incorporating significant permanent new structures — Faraday cages, metal walls, screening structures of any kind — which have never been shown to the public, is not a properly consulted scheme. EWRCo must not be permitted to submit a DCO until a specific, costed mitigation proposal has been published and subject to public comment.

(5) No DCO without University confirmation. No DCO should be granted until the University of Cambridge has confirmed in writing, on the basis of completed technical assessment, that MRAO can continue operating without any degradation to its scientific output for the full operational life of the railway. Other planning applications in the Lord's Bridge area have been refused or withdrawn precisely because of the MRAO sensitivity constraint and Policy TI/7 — including the University's own solar farm, abandoned despite planning permission already having been granted. EWRCo is not entitled to special treatment that would be refused to any other applicant (see para. 3.4).

1. Introduction

1.1 This response is submitted by Cambridge Approaches in respect of EWRCo's 2026 Non-Statutory Consultation (NSC). It addresses solely the impact of the proposed East West Rail route on the Mullard Radio Astronomy Observatory (MRAO) at Lord's Bridge, near Barton, Cambridgeshire.

1.2 This is the third public consultation in which MRAO has been raised as a critical concern by Cambridge Approaches (2021, 2024, and 2026). It is the last public consultation before EWRCo intends to submit its Development Consent Order (DCO) application in summer 2027. Once the DCO is submitted, members of the public may attend and speak at examination hearings, but this is procedurally demanding, requires written submissions in advance, and is not a meaningful substitute for consultation on specific proposals at this stage.

1.3 Cambridge Approaches has studied EWRCo's consultation materials, documents released under the Freedom of Information Act, formal technical submissions by the University of Cambridge, notes of technical and consultation meetings, and EWRCo's internal engineering assessments. The picture they paint is of a fundamental unresolved conflict — not a manageable design challenge — which has been systematically obscured from public view.

2. The Mullard Radio Astronomy Observatory

2.1 The MRAO is operated by the Cavendish Laboratory of the University of Cambridge and has been a principal site for radio astronomy research for over 70 years. It has contributed to fundamental discoveries in cosmology, including work that led to Nobel Prizes. The Observatory's instruments span a frequency range of 40 MHz to 22.5 GHz. The Arcminute Microkelvin Imager (AMI) is an interferometric pair consisting of the Small Array (ten 3.7-metre dishes) and the Large Array (eight 13-metre dishes, formerly the Nobel Prize-winning

5-km Ryle Telescope). All 18 dishes are operated by the Cavendish Astrophysics Group to observe the Cosmic Microwave Background and map galaxy clusters. Table 1 lists the instruments physically located at Lord's Bridge and their sensitivity to the railway.

Instrument	Description	Sensitivity
AMI Small Array	Ten 3.7-metre dishes; 13.5–18 GHz; CMB and galaxy cluster observation	EMI
AMI Large Array	Eight 13-metre dishes (former 5-km Ryle Telescope); 13.5–18 GHz; CMB and galaxy cluster observation	EMI
e-MERLIN 32m dish	Lord's Bridge node of the national e-MERLIN network; 1.3–22 GHz	EMI
REACH antenna	10–250 MHz; detecting the 21 cm hydrogen-line signal from the infant universe (Cosmic Dawn)	EMI
HERA array	Low-frequency array for epoch-of-reionisation research	EMI
MFAA array	Low-frequency aperture array development instrument	EMI
4C array	Survey array	EMI
IPS array	Interplanetary scintillation monitoring	EMI
1-mile and half-mile arrays	Long-baseline interferometry	EMI
COAST laboratory	Optical aperture synthesis telescope; requires VC-D vibration stability (0.1–200 Hz)	Vibration
COAST bunker	Precision optical interferometry and lithographic ruling; requires 48-hour continuous stable periods	Vibration

Table 1: Instruments at the Mullard Radio Astronomy Observatory, Lord's Bridge, and their sensitivity to electromagnetic interference (EMI) and vibration.

2.2 Radio telescopes operate at or near the noise floor of the universe. The MRAO has formally specified to EWRCo that electromagnetic emissions from EWR must be kept below −225 dBm/Hz (a spectral power density of approximately 3×10^{-26} watts per hertz at the antenna terminals — a level comparable to the thermal noise of a resistor cooled close to absolute zero) in any polarisation, from any direction above the horizon, at any point in the Observatory. By the 2030s MRAO anticipates tightening this requirement to −235 dBm/Hz.

2.3 The Observatory is a national asset. The MRAO confirmed to EWRCo in April 2024 that Jodrell Bank Observatory passes certain research to MRAO precisely because it cannot be conducted at Jodrell Bank due to interference from the nearby M6 motorway. If MRAO is compromised by EWR, that research will move outside the United Kingdom. EWRCo acknowledged this as "very important information" and took an action to confirm it in writing. [6]

2.4 In July 2024, the University of Cambridge's Estates Committee formally abandoned its proposal to develop a solar farm at Lord's Bridge. South Cambridgeshire District Council had already granted planning permission for the scheme. The University's notice in the Cambridge University Reporter stated that "further work on the project has led to the conclusion that the construction and operation of the planned solar farm would have a sufficiently detrimental impact on the research undertaken at the Mullard Radio Astronomy Observatory that the simultaneous land uses at Lord's Bridge are incompatible." The

extensive proposals from Cemex to redevelop their quarrying equipment at Barrington Pit in 2010 were also abandoned at a late stage due to concerns about the MRAO. [4]

2.5 This is the clearest available demonstration of the sensitivity of MRAO to new sources of electromagnetic interference. A solar farm involves relatively low-level switching equipment and has a typical design life of 25–30 years; a railway is effectively permanent infrastructure with a design life well in excess of 100 years and no realistic prospect of removal. A railway carrying battery-electric trains within 850 metres on a 10–11 metre embankment represents a far more powerful and permanent interference source. If a solar farm is incompatible with MRAO research, the proposed railway must be considered incompatible by any consistent standard.

3. Planning Policy and Radio Regulations

3.1 Planning Policy TI/7 of the South Cambridgeshire Local Plan (2018) designates the Lord's Bridge Restricted Area and the wider Lord's Bridge Consultation Zone around the MRAO. Within the Restricted Area, the policy provides that planning permission will only be granted for development "that would not result in any risk of interference" with the Observatory. This is not a threshold of acceptable impact — it is an absolute prohibition on risk. The onus is on EWRCo to prove that there would be no impact. Furthermore, EWRCo's presence must not foreclose MRAO's ability to install new instruments or expand its capabilities as it has done over the years: Policy TI/7 protects the Observatory's future as well as its present. EWRCo is not the first developer to be confronted with this policy — other planning applications in the Lord's Bridge area have been refused or withdrawn precisely because of the MRAO sensitivity constraint. EWRCo is not entitled to special treatment that would be refused to any other applicant. [7]

3.2 The proposed EWR alignment passes through the heart of the Lord's Bridge Restricted Area. The University of Cambridge drew EWRCo's attention to Policy TI/7 in May 2021, noting — with some understatement — that it "assumed" EWRCo was aware of it. There is no evidence in EWRCo's public-facing consultation documents that TI/7 has been formally assessed, or that the "any risk of interference" test has been applied to any alignment option.

3.3 EWR is not a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008 in the formal sense, though it is proceeding by way of a DCO. EWRCo's engineer confirmed at the April 2026 Shelford Rugby Club event that South Cambridgeshire Local Plan policies — including TI/7 — are material considerations. As Cambridge Approaches noted in its 2021 consultation response, EWR may not be obliged by statute to respect local plan policies, but "the laws of physics still apply." The electromagnetic quiet zone at Lord's Bridge is a physical reality, not a planning designation that can be disapplied by a DCO. [1] [13]

3.4 MRAO's most fundamental protection comes from Ofcom's statutory duty to manage the radio spectrum and protect allocated uses under the ITU Radio Regulations. A DCO is a planning and land use instrument. It operates under the Planning Act 2008. It has no power to disapply Ofcom's statutory functions under the Wireless Telegraphy Act 2006 or the Communications Act 2003, nor to override the UK's international obligations under ITU Radio Regulations. These are entirely separate statutory regimes. NSIP status confers no authority over them whatsoever. In this case, a relevant and very stringent standard is the '*Protection criteria used for radio astronomical measurements*', Rec. ITU-R RA.769-2 (see

requirements in Table 1). The sensitivity of these instruments is quite remarkable. EWR Co.'s design therefore has to demonstrate compliance with all the relevant radio regulations. If the railway does not comply, then the University would be entitled to significant compensation.

TABLE 1

Threshold levels of interference detrimental to radio astronomy continuum observations

Centre frequency [1] f_c (MHz)	Assumed bandwidth Δf (MHz)	Minimum antenna noise temperature T_A (K)	Receiver noise temperature T_R (K)	System sensitivity [2] (noise fluctuations)		Threshold interference levels [2] [3]		
				Temperature ΔT (mK)	Power spectral density ΔP (dB(W/Hz))	Input power ΔP_H (dBW)	pfd $S_H \Delta f$ (dB(W/m^2))	Spectral pfd S_H (dB(W/(m^2 · Hz)))
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
13.385	0.05	50 000	60	5 000	–222	–185	–201	–248
25.610	0.12	15 000	60	972	–229	–188	–199	–249
73.8	1.6	750	60	14.3	–247	–195	–196	–258
151.525	2.95	150	60	2.73	–254	–199	–194	–259
325.3	6.6	40	60	0.87	–259	–201	–189	–258
408.05	3.9	25	60	0.96	–259	–203	–189	–255
611	6.0	20	60	0.73	–260	–202	–185	–253
1 413.5	27	12	10	0.095	–269	–205	–180	–255
1 665	10	12	10	0.16	–267	–207	–181	–251
2 695	10	12	10	0.16	–267	–207	–177	–247
4 995	10	12	10	0.16	–267	–207	–171	–241
10 650	100	12	10	0.049	–272	–202	–160	–240
15 375	50	15	15	0.095	–269	–202	–156	–233
22 355	290	35	30	0.085	–269	–195	–146	–231
23 800	400	15	30	0.050	–271	–195	–147	–233
31 550	500	18	65	0.083	–269	–192	–141	–228
43 000	1 000	25	65	0.064	–271	–191	–137	–227
89 000	8 000	12	30	0.011	–278	–189	–129	–228
150 000	8 000	14	30	0.011	–278	–189	–124	–223
224 000	8 000	20	43	0.016	–277	–188	–119	–218
270 000	8 000	25	50	0.019	–276	–187	–117	–216

[1] Calculation of interference levels is based on the centre frequency shown in this column although not all regions have the same allocations.

[2] An integration time of 2 000 s has been assumed; if integration times of 15 min, 1 h, 2 h, 5 h or 10 h are used, the relevant values in the Table should be adjusted by +1.7, –1.3, –2.8, –4.8 or –6.3 dB respectively.

[3] The interference levels given are those which apply for measurements of the total power received by a single antenna. Less stringent levels may be appropriate for other types of measurements, as discussed in § 2.2. For transmitters in the GSO, it is desirable that the levels be adjusted by –15 dB, as explained in § 2.1.

Rec. ITU-R RA.769-2

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Comparison with M11 interference

3.5 A back-of-envelope calculation comparing the EWR interference environment with the M11 motorway — the protection against which forms the baseline for MRAO's existing quiet zone — illustrates why EWRCo's mitigation proposals are implausible. The M11 cutting with its earth banks and metal walls was engineered to just satisfy the MRAO interference threshold. EWR would need to do substantially better than that from a far more adverse starting position.

Factor	M11 (baseline)	EWR	Deficit (dB)
1. Emission current (traction inverter vs ICE ignition)	~10A primary coil switching	~2,000A traction inverter	**~46 dB**
2. Range (inverse 4th power law)	~3 km from MRAO	~850 m from MRAO	**~22 dB**
3. Barrier attenuation	Cutting + metal walls (~30 dB edge diffraction)	No equivalent barrier proposed	**~30 dB**
4. Transmitter height (Hata model)	~1 m (car roof)	~14 m (train on embankment)	**~14 dB**
Total deficit vs M11 threshold			**~112 dB**

3.6 Four factors determine how much worse the EWR situation is compared to the M11. First, emission power: the M11 mitigation was designed against ICE vehicle ignition systems, whose primary coil switching current is approximately 10 amperes. A battery-electric train traction inverter switches approximately 2,000 amperes at 750 volts DC. Radiated magnetic field interference scales with the rate of change of current (di/dt); the ratio of 200:1 in switching current corresponds to approximately 46 dB more radiated power from a single train than from a single car on the M11. Second, range: the M11 is approximately 3 km from MRAO; the EWR alignment passes within approximately 850 metres. Under the land-mobile inverse fourth-power propagation law — which applies here due to near-cancellation between direct and ground-reflected waves — a 3.5-fold reduction in distance produces approximately 22 dB more signal at the receiver. Third, barrier attenuation: the M11 cutting and metal walls provide approximately 30 dB of edge-diffraction attenuation; the EWR proposal includes no equivalent structure. Fourth, transmitter height: cars on the M11 present an effective emission height of approximately 1 metre; a train on a 10–11 metre embankment presents an emission height of approximately 14 metres. Applying Hata's empirical propagation model, this height difference produces approximately 14 dB additional signal at MRAO, partly because the elevated train escapes the near-cancellation regime that underpins the inverse fourth-power loss.

3.7 Summing these four factors: 46 + 22 + 30 + 14 = 112 dB. The M11 mitigation was calibrated to just meet the MRAO threshold. EWR, without equivalent mitigation, starts approximately 112 dB worse than that threshold — a factor of approximately 16 billion in power terms. Even allowing generous uncertainty of plus or minus 15 dB across all four factors, the deficit remains between 82 and 142 dB. No mitigation proposal EWRCo has discussed — filtering at the receiver, a Faraday cage, a metal wall — approaches this scale of attenuation. Cambridge Approaches is not aware of any engineering solution apart from a tunnel that would close a deficit of this magnitude at this geometry.

4. The Nature of the Interference Threats

4.1 The railway poses two distinct and independent threats to MRAO: electromagnetic interference (EMI) and ground-borne vibration. Both must be resolved simultaneously and completely. A mitigation that addresses one but not the other is insufficient.

Electromagnetic interference

4.2 EWRCo proposes to operate hybrid trains in battery-electric mode between Cambourne and Hauxton Junction — the section of route closest to MRAO. EWRCo also makes passive provision for overhead line equipment along this section, meaning electrification could be introduced in future and make the broadband interference problem potentially more severe. Battery-electric traction systems switch very large currents through inverters and motors, producing broadband electromagnetic emissions across the full frequency spectrum. This is not a narrow-band interference problem that can be “tuned around.” Broadband noise raises the noise floor across all frequencies simultaneously, degrading the sensitivity of every instrument in the Observatory.

4.3 The standard cited by EWRCo — BS EN 50121-2, the railway electromagnetic compatibility standard — defines maximum permitted emission levels to protect railway equipment from interference, not to protect radio telescopes operating at the noise floor of the universe. The University of Cambridge has explicitly stated that BS EN 50121-2 compliance is inadequate for this purpose. [8]

4.4 In April 2024, EWRCo's technical partner Mott MacDonald applied ITU-R Recommendation RA.769-2 — the international standard for the protection of radio astronomy — to the EWR/MRAO interface. The meeting minutes record that the calculation showed an unmitigated railway would need to be "several hundred kilometres" from the Observatory to be compatible. Terrain shielding was suggested as a factor that might reduce this figure, but no such analysis had been conducted and no results had been published. [3]

4.5 The M11 motorway was constructed approximately 1.6 km from the MRAO around 1980. To protect the Observatory at that distance, the motorway was placed in a cutting with metal fences along the edge, specifically engineered using edge diffraction calculations at the critical 21 cm hydrogen-line wavelength to place the MRAO boresight in the first zero of the diffraction pattern. This required detailed engineering design even at 1.6 km, for a road carrying conventional vehicles. The proposed EWR alignment brings battery-electric trains to within 850 metres on a 10–11 metre embankment — closer, higher, and generating far more powerful electromagnetic emissions.

Vibration

4.6 The COAST optical interferometry facility at Lord's Bridge requires vibration stability to VC-D standard across the frequency range 0.1 to 200 Hz. The MRAO has confirmed that vibration from heavy vehicles on the A603 Cambridge Road — approximately 700 metres from the COAST laboratory — already disrupts experiments, such that work is sometimes conducted at night to avoid vehicle movements. [5]

4.7 The proposed railway introduces a new permanent source of ground-borne vibration at approximately 850 metres from COAST. The EWR design has capacity for 775-metre diesel freight trains running at up to one per hour in each direction, potentially 24 hours a day. Unlike road traffic, which is variable and intermittent, freight trains produce heavy periodic impulse loading — the worst possible vibration profile for precision optical instruments. The COAST facility requires continuous stable periods of up to 48 hours for certain experiments, including lithographic ruling of diffraction gratings for international telescope programmes. A single freight train passage exceeding the VC-D threshold invalidates an experiment that may have been running for many hours.

5. Six Years of Holding Language

5.1 EWRCo selected Route Option E in January 2020. Prior to that selection, its internal engineering report (April 2019, reference E300-PM-EN-RPT-EWR-000001, marked "For internal use only — do not share without written authorisation", subsequently released under the Freedom of Information Act) had assessed the interface with MRAO and concluded that Route Options A, C and D were "the safest and least obstructive from the institute's point of view." The April 2019 report made no mention of the lower frequency spectrum (below approximately 900 MHz) on which MRAO critically operates, and contained no quantified EMI analysis and no reference to ITU-R RA.769-2 (see para. 4.4). Even on its limited terms, it pointed away from Route Option E. [2]

5.2 EWRCo's Environmental Sustainability Strategy (October 2024) states that "the adoption of the mitigation hierarchy is fundamental to sustainable infrastructure" and defines its first step as "Avoidance — measures taken to avoid creating impacts from the outset." The route option assessment in 2019–2020 was precisely that moment — the point at which avoidance was either secured or foreclosed. It was foreclosed on an assessment that

contained no quantified EMI analysis and no reference to the relevant international standard. EWRCo has never published a reasoned case for why avoidance was not achievable. By its own published standard, the mitigation hierarchy was not properly applied at the stage when it most mattered. [15]

5.3 Every public consultation since 2021 has contained essentially the same statement: that MRAO impacts are "predicted to be capable of mitigation, subject to detailed design." In its 2021 consultation response, Cambridge Approaches challenged this language directly, noting that EWRCo had provided no explanation of the impacts, the proposed mitigations, or the basis for its confidence, and that — through private correspondence with the University — "no solutions have yet been proposed to them by EWR Co." Cambridge Approaches formally escalated this through its solicitors Leigh Day in May 2021, and again in April 2023 — the latter letter copied to the Secretary of State for Transport and the Rail Minister. EWRCo has never substantively responded. [9] [12] [13]

5.4 The chronology below illustrates that EWRCo's public position on MRAO has been static for five years, while its private technical understanding has moved in the opposite direction. As late as November 2023, EWRCo was still asking MRAO for basic parameters including the maximum height of the Observatory's dishes. In April 2024 it discovered, through its calculations, that the problem was orders of magnitude more severe than its public language had suggested. [6]

Year	Consultation	EWRCo public statement on MRAO	Data published?	Mitigation committed?
2020	Route Option E selected (Jan 2020)	None — no public statement on MRAO	No	No
2021	Second Non-Statutory Consultation	"Impacts are predicted to be capable of mitigation, subject to detailed design"	No	No
2023	Route alignment announced (May 2023)	No specific MRAO statement	No	No
2024	Third Non-Statutory Consultation	"We are working with the University of Cambridge to understand impacts"	No	No
2026	Fourth NSC (this consultation)	"We will continue to work with the University of Cambridge to assess and understand the EMC/EMI and vibration impacts"	No	No

5.5 In the 2024 consultation feedback summary — a document of 277 pages — MRAO appears only twice, both times under the heading "a few respondents." The University of Cambridge's formal 40-page technical submission of January 2025, which concluded that the University "cannot support the current route proposals," is dissolved — without response or commitment — into the category of "a few respondents." [10]

6. The Three Proposed Mitigations and Why They Fail

6.1 EWRCo's engineer discussed three potential mitigation approaches at the April 2026 Shelford Rugby Club consultation event. None is adequate. [1]

6.2 Filtering at the receiver. Filtering at the MRAO's receiver end would reduce the impact of specific known interference signals, reducing the blocking of the MRAO receivers, but it cannot remove in-band interference in the MRAO receiver band. EWRCo has not proposed to apply filtering on the output of their trains or even considered whether that would be possible. However, as the University of Cambridge has explicitly stated, any filtering reduces the sensitivity of the instruments to the scientific signals they are designed to detect, because of the losses through the filters. The MRAO has told EWRCo it "does not want the noise floor to be increased from the spectral regions they currently operate within." Imposing filtering to accommodate EWR's emissions constitutes harm, not mitigation. [5]

6.3 A Faraday cage. A Faraday cage has been discussed as a means of screening the railway. The structure would need to be at least 11 metres high — a height driven by EWRCo's passive provision for overhead line equipment, which requires sufficient clearance for a future catenary. That 11-metre cage would sit on top of the 10–11 metre embankment, producing a combined structure approximately 22 metres above the surrounding ground level, and would need to extend for several hundred metres to be effective — a structure comparable in scale and controversy to the HS2 bat tunnel at Sheephouse Wood, itself a symbol of mitigation costs spiralling as a direct consequence of a flawed route choice. All of this is a consequence of EWRCo's 2020 route decision. EWRCo's engineer expressed uncertainty about the correct mesh pitch required to attenuate emissions at the relevant wavelengths. And even if correctly specified, EWRCo's passive OLE provision means future catenary wires could be installed, acting as antennas, thus extending the length of the required Faraday cage. This enormous structure would require its own planning process; no public consultation on it has been proposed.

6.3a The reason for that uncertainty is that no mesh pitch can work across MRAO's full operating range of 40 MHz to 22.5 GHz. The table below shows the theoretical shielding effectiveness of mesh Faraday cages at different aperture sizes across the MRAO frequency range. At 22.5 GHz a 10mm mesh is completely transparent; a 1mm mesh provides only 16.5 dB; a 0.1mm mesh provides only 36.5 dB. To achieve the ~112 dB required to bring EWR to the M11 baseline would require a mesh aperture of approximately 0.017 micrometres — effectively a solid metal sheet. And a solid enclosure open at both ends for train entry and exit provides no useful low-frequency shielding at all.

Frequency	Wavelength	10mm mesh	1mm mesh	0.1mm mesh
40 MHz	7,500 mm	51.5 dB	71.5 dB	91.5 dB
100 MHz	3,000 mm	43.5 dB	63.5 dB	83.5 dB
500 MHz	600 mm	29.5 dB	49.5 dB	69.5 dB
1 GHz	300 mm	23.5 dB	43.5 dB	63.5 dB
5 GHz	60 mm	9.5 dB	29.5 dB	49.5 dB
10 GHz	30 mm	3.5 dB	23.5 dB	43.5 dB
22.5 GHz	13 mm	TRANSPARENT	16.5 dB	36.5 dB

6.4 A metal wall. A metal wall would need to be at least 25 metres high to screen MRAO's existing dishes, extending for a comparable distance. EWRCo's engineer was notably evasive about its feasibility. Beyond its scale, a wall of this height would act as a barrier to the commuting routes of Barbastelle bats from the Eversden and Wimpole Woods Special Area of Conservation — a Habitats Regulations issue EWRCo has not resolved. The same concern applies to the Faraday cage: if the bat underpass under the railway proves ineffective for Barbastelle commuting, any large longitudinal structure along this section would compound the SAC barrier problem. EWRCo cannot resolve the MRAO problem without potentially worsening the SAC problem, and vice versa.

6.5 EWRCo has also asked the University to consider accommodating the railway's emissions through signal-processing algorithms — software written to work around interference rather than eliminate it. This is not mitigation. It imposes a permanent operational burden on the University's research programme, and as EWRCo acknowledged in April 2024, some interference cannot be processed away. [3]

6.6 In the April 2024 technical meeting, an EWRCo/Mott MacDonald representative noted internally that tunnel construction would be "quite extreme especially when we have not done the basic assessment." That a tunnel was dismissed before the basic assessment was completed is telling: the purpose of the assessment should be to determine what mitigation is required, not to exclude options in advance of it. [3]

6.7 Even if the Cardiff EMC measurements — taken using Class 756 Stadler tri-mode trains as a proxy for EWR's proposed rolling stock — show acceptable emission levels, this would not constitute a binding standard for the line. EWRCo has made no commitment that all future rolling stock operating on EWR, including freight services, will meet an equivalent specification. A one-off measurement programme on one train type is not a substitute for a binding emissions ceiling applied to every train type that will ever run on EWR. Without such a specification, any mitigation designed around today's rolling stock could be rendered inadequate by future procurement decisions.

7. The Public Consultation Deficit

7.1 The 2026 NSC is the last public consultation before EWRCo submits its DCO application. Once the DCO is submitted, members of the public may attend and speak at examination hearings, but this is procedurally demanding, requires advance written submissions, and is a very different process from being shown specific proposals and invited to comment. It is not a meaningful substitute for consultation on what EWRCo actually intends to build near MRAO.

7.2 Any mitigation scheme for MRAO involving significant new structures would be a major, permanent intervention in the landscape visible from communities including Barton, Comberton, Great Eversden, Little Eversden, Harlton, Haslingfield, Toft, Kingston, and surrounding villages. Those communities have had no opportunity to comment on any specific proposal, because EWRCo has not made one. The 2026 NSC offers one sentence on the subject. That is not a consultation on MRAO; it is a placeholder. [11]

7.3 The 2026 NSC has removed a proposed construction compound south of MRAO from the proposals. This is welcome. But removing a temporary construction compound does not address the fundamental and permanent operational conflict between the railway and the

Observatory. The substantive question — what mitigation will be built, where, and how large — remains entirely unanswered.

8. Conclusions and Demands

8.1 EWRCo selected Route Option E in January 2020 knowing — from its internal assessment (reference E300-PM-EN-RPT-EWR-000001, marked "For internal use only" but released under the Freedom of Information Act) — that it was the most problematic route option for MRAO. In six years of engagement it has discovered that the problem is far worse than that assessment suggested: its calculations show that an unmitigated railway would need to be hundreds of kilometres away to be compatible. It has explored three mitigation options that its engineers are not confident will work. Throughout this period it has told every public consultation that impacts are capable of mitigation. No evidence has ever been provided to support that confidence. [2]

8.2 The University of Cambridge has stated that it "cannot support the current route proposals." It has demonstrated the severity of the MRAO constraint by abandoning its solar farm — with planning permission already in hand — because the land uses are incompatible. Planning Policy TI/7 sets an absolute threshold: no development that would result in any risk of interference. That threshold has not been met and has not been formally assessed. [4] [8]

8.3 The difficulty of resolving this problem is illustrated by a request made in early 2026 by EWRCo's Chief Executive to the University for the price of relocating the entire MRAO site. The University's response — assumed to run into hundreds of millions of pounds — was declined by EWRCo. The fact that outright relocation was being actively costed as late as 2026 demonstrates that EWRCo does not have a workable mitigation solution and that the cost of the only certain solution is unacceptable to it. This is a problem of EWRCo's making, arising directly from its 2020 route choice, and it must not be allowed to disappear into private negotiation between EWRCo and the University. [14]

8.4 Cambridge Approaches therefore demands the following:

(1) Route relocation or tunnelling. The route must be moved outside the Lord's Bridge Restricted Area entirely, or tunnelled throughout its passage near MRAO. EWRCo's Environmental Sustainability Strategy commits to avoidance as the first step of the mitigation hierarchy; that step was not properly applied in the route option assessment. Cambridge Approaches' parallel consultation response on alternatives to the Southern Approach to Cambridge demonstrates that two viable alternatives — the NATC+ (36% cheaper in base construction cost, serving all three Cambridge stations) and the Long Tunnel — both avoid the MRAO and SAC problems entirely. EWRCo has not assessed these alternatives to an equivalent level of detail. That imbalance must be corrected before any commitment is made to the current route.

(2) Publication of measurements. EWRCo must publish the Cardiff EMC measurements — taken using Class 756 Stadler tri-mode trains as a proxy for EWR's proposed rolling stock — and the full EMC modelling for the MRAO interface, as soon as possible and in any event before the DCO examination process begins. The public and statutory consultees must be able to scrutinise this data before the DCO is submitted, not discover it for the first time in the examination room.

(3) No burden on the University; binding emissions standard. EWRCo must not place the burden of achieving EMC compliance on the University of Cambridge. Filtering at the receiver, signal-processing algorithms, and any measures that reduce the scientific sensitivity of MRAO instruments constitute harm, not mitigation. EWRCo must establish a binding emissions specification for all rolling stock — including freight services — that will ever operate on EWR, not merely the train type tested in Cardiff.

(4) Proposals not ready for DCO. The absence of any specific mitigation proposal in this consultation, which closes on 9 June 2026, itself demonstrates that the proposals are not ready for DCO submission. A DCO application incorporating significant permanent new structures — Faraday cages, metal walls, screening structures of any kind — which have never been shown to the public is not a properly consulted scheme. EWRCo must not be permitted to submit a DCO until a specific, costed mitigation proposal has been published and subject to public comment.

(5) No DCO without University confirmation. No DCO should be granted until the University of Cambridge has confirmed in writing, on the basis of completed technical assessment, that MRAO can continue operating without any degradation to its scientific output for the full operational life of the railway. Other planning applications in the Lord's Bridge area have been refused or withdrawn precisely because of the MRAO sensitivity constraint and Policy TI/7 — including the University's own solar farm, abandoned despite planning permission already having been granted. EWRCo is not entitled to special treatment that would be refused to any other applicant.

Endnotes

1. Notes of Cambridge Approaches meeting with EWRCo Engineer responsible for MRAO (Shelford Rugby Club, 30 April 2026).

2. East West Railway Company Ltd, internal report E300-PM-EN-RPT-EWR-000001 V01, April 2019, "East West Rail and its interface with Mullard Radio Astronomy Observatory" (originally marked "For internal use only — do not share without written authorisation"). Released under the Freedom of Information Act.

3. EWR/MRAO Monthly Technical Meeting Minutes, 9 April 2024 (produced by Mott MacDonald). Released under Freedom of Information reference FOI-2024-576.

4. Cambridge University Reporter, No. 6750, 24 July 2024, Notice: "Lord's Bridge, Cambridge Road." https://www.admin.cam.ac.uk/reporter/2023-24/weekly/6750/section1.shtml

5. University of Cambridge / MRAO, technical briefing document provided to EWRCo, 29 January 2024; and MRAO formal EMI limits provided by email dated 5 April 2024. Both released under FOI reference FOI-2024-576.

6. EWR/MRAO Monthly Technical Meeting Minutes, 28 May 2024 (produced by Mott MacDonald); and EWR/MRAO correspondence, November 2023. Released under FOI reference FOI-2024-576.

7. South Cambridgeshire Local Plan (2018), Policy TI/7, page 241.

8. University of Cambridge, "East West Rail Consultation Response," January 2025 (Graham Matthews, Director of Estates). Submitted to EWRCo's 2024 Non-Statutory Consultation.

9. Leigh Day, letter to East West Railway Company Limited, 10 May 2021 (Cambridge Approaches EIR/FOI Request), Request 12 (pages 16–17).

10. East West Railway Company Limited, "2024 Consultation Feedback Summary Report," November 2025.

11. East West Rail 2026 Non-Statutory Consultation Brochure, April 2026, page 122.

12. Leigh Day, letter to East West Railway Company Limited, 4 April 2023 (Cambridge Approaches). Copied to the Secretary of State for Transport, the Rail Minister, and the Director of Rail Infrastructure Central.

13. Cambridge Approaches, Response to the East West Rail Second Non-Statutory Consultation, June 2021, Section 4.3 (pages 27–28). https://cambridgeapproaches.org/wp-content/uploads/2021/06/Cambridge-Approaches-consultation-response-submitted.pdf

14. Notes of EWRCo design update meeting, Hauxton, 14 March 2026 (Cambridge Approaches attendance notes).

15. East West Railway Company Ltd, Environmental Sustainability Strategy, October 2024, page 15. https://ewr-production-files.s3.eu-west-2.amazonaws.com/public/Environmental-sustainability-strategy.pdf

16. Cambridge Approaches, "Alternatives to the Southern Approach to Cambridge," 2026 Non-Statutory Consultation Response, v2.1, May 2026. https://cambridgeapproaches.org/wp-content/uploads/2026/05/EWR_Consultation_Response_Alternatives_to_SATC-v2.1.pdf