

Post-Hearing Submission: Equine Physiological Response to Stress

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Even when a horse appears to habituate to repeated noise, unseen physiological stress may persist.

Visible reactions can lessen while heart rate remains elevated, grazing is disrupted and the horse avoids the noisy area.

Henke-von der Malsburg and König von Borstel's 2026 study, "Constant traffic noise affects the behavior and physiology of naïve horses at pasture," gives direct evidence for this concern. The researchers exposed 20 horses to recorded motorway noise.

The horses' initial startle response subsided within minutes and some behaviour partly habituated. Yet grazing was markedly disrupted: median time spent foraging halved, from 81% of observation time at baseline to 41% during the first exposure phase, and across the study, including the noise-free days between exposures, the horses spent significantly less time foraging than before the noise began. They also continued to avoid the area near the noise source, and vigilance rose six-fold.

Heart rate rose from an average of 57.6 to 66.8 beats per minute during the first exposure phase. The authors concluded that, although some behavioural habituation occurred, persistent avoidance and elevated heart rates indicated continued physiological arousal, and that behavioural habituation may mask continued physiological strain. A quieter outward response can therefore occur alongside disrupted grazing, continued avoidance and physiological arousal (Henke-von der Malsburg & König von Borstel, 2026).

Noise levels. Ambient noise during the study's control periods averaged 38 dB, and noise equivalent to a motorway 500 m away (at least 54 dB) was enough to alter behaviour and physiology.

Relevance to construction. If anything, the study is likely to understate the effect of construction. It used steady traffic noise, whereas construction noise is intermittent, variable and includes high-impact sources. In my professional opinion, noise of that kind is more likely to provoke startle, and less likely to be habituated to, than steady noise. Even with steady noise, avoidance and elevated heart rate persisted throughout one to two weeks of exposure. The study horses were naïve to motorway noise; stud stock, including each season's new foals, are similarly naïve to construction noise. The authors themselves note that their results may underestimate responses to real traffic noise, because the noise was played only in daytime, allowing the horses to recover overnight, and because sound from their loudspeakers fell away more steeply with distance than it would from a real source.

The applicant's position. The applicant's Equine Business Report [EXAM/9.62] states that, after a fright, stress hormones resolve back to homeostasis (paragraph 4.2.4), that once habituated horses no longer react to a noise (paragraph 4.2.10), and on that basis concludes that significant effects are unlikely (paragraph 4.2.39). This treats behavioural calm as physiological recovery. The 2026 study shows that arousal, reduced grazing and avoidance persisted after outward reactions had subsided, and the applicant's own source

on habituation found that heart rate continued to vary after behavioural responses had ceased (Christensen et al., 2006).

Wind. Sound carries further downwind, which is why standard outdoor noise-prediction methods assume conditions favourable to propagation (ISO, 2024). The prevailing wind direction relative to the paddocks should therefore be considered. Adverse behaviour in horses has also been associated with combined hot and windy conditions (Janczarek et al., 2015).

1. Potential welfare effects

1.1 Reduced grazing and nutrition

If disturbance repeatedly reduces grazing and horses cannot make up the lost time, intake and body condition may be affected (Henke-von der Malsburg & König von Borstel, 2026).

In-foal mares. Placental development is closely linked with fetal growth (Allen et al., 2002). In my opinion, a sustained loss of grazing time could make it harder for an in-foal mare to hold condition, particularly a mare already under nutritional pressure.

Mares with foals at foot. Lactation creates substantial nutritional demand: in early lactation a mare produces milk equivalent to around 3% of her body weight each day (Ofstedal et al., 1983), and body condition at foaling affects the fat content of her milk (Doreau et al., 1993; Reiter & Reed, 2023). If disturbance repeatedly limits grazing, a mare may find it harder to maintain condition and meet that demand, and her foal could be affected indirectly if her condition, nursing or resting routine is disrupted.

Yearlings. Plane of nutrition influences growth and bone development in yearlings (Ott & Asquith, 1986). Repeated disturbance that reduces forage intake is therefore a plausible risk to growth and condition.

Gastric ulceration. Intermittent feed deprivation is an established cause of squamous gastric ulceration (Murray & Eichorn, 1996; Sykes et al., 2015). Repeated interruption of grazing could lengthen gaps between forage intake and so increase this risk.

Foals. Young foals rely mainly on milk (Ofstedal et al., 1983). Gastric lesions have been reported in Thoroughbred foals from four days of age, with ulceration most frequent between 61 and 90 days (Okai et al., 2015), making foal gastric health a relevant consideration during prolonged disruption.

1.2 Reduced usable paddock area, disrupted turnout and conflict

Horses in the 2026 study spent more time farther from the noise source. If several horses avoid the same part of a paddock, they are concentrated into a smaller usable area. Agonistic approaches and retreats are more frequent in paddocks than in larger fields and are associated with shorter distances between horses (Torres Borda et al., 2025), so reduced usable space could increase displacement and competition for grazing, water and shelter.

Usable space also matters for musculoskeletal health. Musculoskeletal disease and injury are already common on Thoroughbred stud farms: in a UK and Ireland cohort of 275 foals, almost half needed veterinary intervention for a musculoskeletal problem before 18 months of age, most of it developmental orthopaedic disease (Mouncey et al., 2023). In a follow-up cohort of 134 foals, each additional acre of average daily turnout area in the fourth month of life was associated with a 24% lower rate of later musculoskeletal disease and injury, and the authors concluded that disruptions to turnout routines increase injury risk (Mouncey et al., 2024). If noise avoidance reduces the area foals effectively use, or stock must be brought in or moved to avoid the works, this evidence is directly relevant. The applicant

accepts that horses in paddocks are likely to stay at the side of the field opposite the construction (paragraph 4.2.14). That is the loss of usable area described here, and on this evidence it is a risk factor for musculoskeletal injury in foals, not a form of mitigation.

This is particularly relevant to Ladyswood Stud and West Park Stud, both of which have limited acreage. The applicant's own figures place both studs at 0 m from the nearest works area, with Ladyswood Stud also 125 m and 225 m from further works areas and West Park Stud 50 m from another (Table 1). On holdings of this size there is little or no spare grazing to which mares and foals can be moved, so any part of a paddock that horses avoid is a direct loss of the turnout area that the Mouncey evidence shows is protective for foals.

1.3 Escape galloping and orthopaedic injury

A construction startle may cause a foal to flee or gallop repeatedly. In a case series of 18 proximal sesamoid fractures in Thoroughbred foals, most affected foals were under two months old, and fractures commonly occurred when foals galloped to exhaustion trying to keep up with their dams (Ellis, 1979). Sustained escape galloping is therefore a credible concern for young foals.

Angular limb deformities are common in young foals, and exercise modification is part of managing some affected foals (García-López, 2017). Repeated uncontrolled high-speed movement is therefore a particular concern for foals with a known or developing deformity.

The applicant concludes that foals would not be affected to a disproportionately greater extent than mature horses (paragraph 4.2.15). That conclusion rests on a study of stock-type weanlings with a mean age of 256 days (Powell et al., 2023), not neonatal Thoroughbred foals at foot. The applicant also accepts that young foals are more reactive because they are naive to noises and novel stimuli (paragraph 4.2.13), and the consequences of a young foal's flight, set out above, are orthopaedic.

1.4 Signs of arousal and effects on nursing

Crib-biting, weaving and box walking are the most prevalent equine stereotypies (Sarrafchi & Blokhuis, 2013), and restricted feeding, reduced social contact and diminished locomotor activity have been identified as critical to their development (McBride & Hemmings, 2009). Repetitive fence pacing at pasture is, in my professional opinion, the field equivalent of box walking. Stereotypies generally develop over weeks to months and are strongly influenced by management (Waters et al., 2002), so I do not suggest that construction would itself create new stereotypies in most horses. Rather, fence pacing (as described at the hearing) and restlessness during works are observable indicators of arousal or difficulty settling, and established stereotypies may worsen in susceptible horses (Nicol, 1999; Wickens & Heleski, 2010; Sarrafchi & Blokhuis, 2013).

Thoroughbred foals nurse in frequent short bouts (Carson & Wood-Gush, 1983). A mare that repeatedly walks the fence line could interrupt those bouts, because the foal must follow and reposition to suck.

Pacing also disrupts the foal's rest. Young foals lie down frequently throughout the day (Murase et al., 2018; see Section 1.5), and a foal whose dam repeatedly walks the fence line is likely to get up and follow her rather than settle, reducing its opportunities to rest. The applicant suggests that young foals respond to their mothers being present and calm (paragraph 4.2.13). That reassurance depends on the mare being calm; a mare pacing the fence line is not, and her foal follows her.

1.5 Sleep: daytime noise and night-time lighting

Horses can only achieve REM sleep lying down, and they lie down when they perceive their surroundings as secure; prey species sleeping in riskier settings obtain less REM sleep

(Greening & McBride, 2022). The authors of the 2026 pasture study make the same point, cautioning that continuous night-time noise could disrupt the recumbent sleep horses need without this being observable during the day (Henke-von der Malsburg & König von Borstel, 2026).

Sleep is not confined to the night. Horses are polyphasic sleepers, taking several sleep bouts across the 24-hour day (Greening & McBride, 2022), and adult horses typically spend 3–15% of the day lying down (Kelemen et al., 2021). Foals lie down far more. Thoroughbred foals aged 2–60 days on a breeding farm spent 44.6% of the 24-hour day lying down, in around 27 bouts per day, including while at pasture during daytime turnout (Murase et al., 2018). Daytime construction noise therefore coincides with a substantial part of foals' rest, and loud, intermittent noise could repeatedly interrupt it. The same study found that wet weather prevented foals from lying down at pasture, which shows how readily lying behaviour is displaced by environmental conditions.

At night, sudden activation of motion-sensor lighting, glare and moving shadows are the kinds of sudden stimuli that provoke startle in horses (Powell et al., 2023). In my opinion they could reduce the sense of security horses need to lie down.

The applicant's report records Interested Parties' concerns about lighting (paragraph 2.1.2) and about dusk and night-time checks on heavily pregnant mares (paragraph 2.1.6), but I have found no assessment in it of the effect of lighting on horses. Night-time disturbance is also not limited to light: the report accepts that battery storage infrastructure emits sound whenever it is charging, discharging or running cooling cycles, not only during daylight hours (paragraph 4.3.8).

Sustained loss of recumbent sleep has welfare consequences. Daytime sleepiness increases injury risk, and spontaneous collapse episodes in horses have been linked to sleep deprivation (Greening & McBride, 2022). Because foals rest in frequent bouts throughout the day and night, repeated disturbance of mare and foal groups, whether by noise during the day or lighting at night, is of particular concern.

These concerns rest on established equine sleep physiology and foal behaviour. Light at night also acts directly on the horse's physiology: blue light suppresses melatonin in horses in a dose-dependent way, with the threshold lying between 3 and 10 lux and exposure of a single eye being sufficient (Walsh et al., 2013), whereas red light permits the normal nocturnal rise in melatonin (Murphy et al., 2019).

1.6 Photoperiod and breeding

Mares are long-day breeders and respond to relatively modest artificial light (Guillaume et al., 2000; Murphy et al., 2014). Studs therefore manage light deliberately, often using controlled lighting programmes to time the breeding season. The concern is not simply that light affects mares, but that uncontrolled light from an adjoining site removes the stud's control over it.

1.7 Barn noise and reproductive examination safety

A nervous, stressed or newly arrived mare may startle at loud, abrupt sounds whose source she cannot see. In a New Zealand owner survey on fireworks, running was the most common response, 35% of respondents reported horses breaking through fences and 26% reported injuries (Gronqvist et al., 2016). Fireworks differ from construction noise, but they illustrate how horses respond to sudden, unpredictable sound.

Reproductive scanning is carried out with the mare restrained in stocks, a purpose-built frame, while the veterinarian performs transrectal palpation or ultrasound. If a mare startles while confined, she could strike the stocks or fall, and the veterinarian working at her hindquarters is exposed to kick or crush injury. In a UK survey of 620 equine veterinary

surgeons, a kick from a hindlimb was the main cause of their worst injury, and a third of these injuries resulted in hospital admission (Parkin et al., 2018). A Swiss study identified the type of procedure and the treatment location as risk factors for kick injuries, and found that severe injuries arose from unforeseen events that frightened the horse (Jägglin et al., 2005). The applicant's mitigation is early notification of high-noise works so that equine businesses can plan their own operations, including the timing of farrier visits (paragraph 4.2.19), and it assumes that horses in buildings more than 30 m from the works will do no more than become more alert (paragraph 4.2.17). Neither takes account of a mare restrained in stocks. This risk cannot be managed by rescheduling examinations. During the breeding season, mares are scanned every morning, and the timing is fixed by the need to book stallion covering slots. Mares are followed through their cycles and receive uterine treatments, and pregnant mares may need ultrasound for fetal monitoring. Scanning therefore cannot be moved to avoid noisy works. The only effective mitigation is to avoid high-noise works during the morning scanning period.

1.8 Sedation, stabling and colic risk in post-partum mares

A mare that is distressed and wound up by noise is likely to be more difficult to handle. If she continues to respond to the stimulus, routine veterinary procedures, such as reproductive examinations and uterine treatments, may require sedation, and that sedation may need to be repeated. The sedatives used in horses, alpha-2 adrenoceptor agonists such as xylazine and detomidine, reduce gastrointestinal motility (Elfenbein et al., 2009). The stress response itself also diverts blood away from the gut, as the applicant accepts (paragraph 4.2.3). Repeated stress and repeated sedation in a horse whose gut is already vulnerable is therefore a clinical concern.

Post-partum mares are exactly such horses. Broodmares are at substantially increased risk of large colon volvulus, a life-threatening form of colic (Suthers et al., 2013). In a prospective study of 1,044 Thoroughbred broodmares on 29 stud farms in the UK and Ireland, colic risk was highest immediately after foaling and declined over roughly the first 50 days. Increasing hours stabled and recent NSAID use were also associated with increased risk (Cullen et al., 2026).

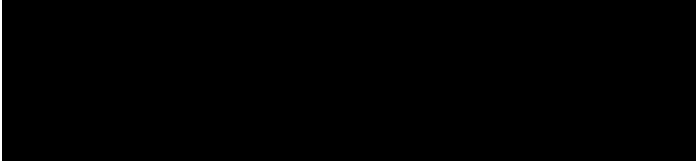
This leaves the stud without a safe option. A mare who remains wound up by the noise may need repeated sedation for routine veterinary procedures, and each dose suppresses gut motility. Bringing her in to avoid the noise increases the hours she is stabled, which is itself associated with post-partum colic. Any injury sustained in a startle may require NSAIDs, a further risk factor (Cullen et al., 2026). In my professional opinion, repeated noise-induced stress in post-partum mares therefore carries a real risk of colic, with potentially fatal consequences.

2. Conclusion

The central issue is whether horses on the adjoining holding can continue to feed, rest, sleep and use their pasture normally during construction and operation. The best available evidence shows that horses exposed to unfamiliar noise at pasture graze less, avoid the noise source and remain physiologically aroused even after their outward reactions subside. For breeding stock, those effects carry through to mare condition, foal development, colic risk, injury risk and safe handling. The applicant's embedded mitigation of avoiding works immediately adjacent to breeding facilities and foaling areas (paragraph 4.2.18) does not address effects that, on the evidence, arise at distances of hundreds of metres.

The Examining Authority's request for evidence on Thoroughbred reactivity, and my response to the studies relied on in the applicant's Equine Business Report [EXAM/9.62], are addressed in my separate submission, Post-Hearing Submission: Thoroughbred Reactivity. The risk to local horse riders from construction traffic is addressed in my separate submission, Post-Hearing Submission: Construction Traffic and Equestrian Road Safety. The applicant's reliance on a 30 m flight zone is addressed in my separate submission, Post-Hearing Submission: The Applicant's 30 m Flight Zone, and the hazards of the battery energy storage system to equine operations in my separate submission, Post-Hearing Submission: BESS Hazards to Equine Operations.

Signed:

A large black rectangular box redacting the signature of Dr Annemarie Farrington.

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Post-Hearing Submission: Thoroughbred Reactivity

Response to the Examining Authority's request

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At the hearing, the Examining Authority asked me to set out the evidence that Thoroughbreds are more reactive than the horses in the studies relied on by the applicant. This note responds to that request and should be read alongside my main submission, Post-Hearing Submission: Equine Physiological Response to Stress.

1. Thoroughbreds are among the most reactive breeds

Breed differences in horse personality are well documented, and they are greatest for exactly the traits that determine how a horse responds to disturbance. In a survey of 1,223 horses across eight breeds, anxiousness and excitability showed the most variation between breeds of any personality component (Lloyd et al., 2008). Thoroughbreds scored at the anxious and excitable end of the range, alongside Arabs and Welsh ponies and cobs, whereas Irish Draughts scored low for excitability.

A separate owner survey of around 850 horses reached the same conclusion. Arabians, Thoroughbreds, Saddlebreds and Tennessee Walking Horses were the most nervous breed groups, while Quarter Horses, Paints, Appaloosas, draught breeds and ponies were the least nervous (Sackman & Houpt, 2019). Nervousness in that study included anxiety, excitability and difficulty adjusting to new situations.

2. The difference is physiological, not only behavioural

Controlled studies show that this breed difference is measurable in the horse's physiology. When a plastic bag was applied to the neck in a standardised novel object test, Thoroughbreds showed significantly higher behavioural reactivity scores than Jeju crossbred horses, together with lower heart rate variability (RMSSD), indicating greater excitement and fear and a stronger shift towards sympathetic ("fight or flight") activation (Lee et al., 2021).

The stress hormone system shows the same pattern. In 149 sport horses given a standardised adrenocorticotrophic hormone (ACTH) stimulation test, breed significantly affected the cortisol response: Thoroughbreds and Warmbloods produced a greater adrenal cortisol response than Franches-Montagnes horses (Sauer et al., 2019). The same study found that horses spending more time outside had lower cortisol responses, which is relevant where noise reduces the usable turnout available to stud stock.

3. Reactivity persists despite familiarity

In Thoroughbreds, a strong response to a sudden stimulus is not reliably removed by experience. In a standardised startle test, 3 of 12 retired Thoroughbred racehorses retained a high reactivity score after three months of transition training, and these horses also showed higher peak heart rates and longer responses (Ryu et al., 2024). In 42 young Thoroughbreds, the same horses behaved significantly differently in a novel object test depending on whether they were tested in a round pen or a paddock (Klitzing et al., 2025). A Thoroughbred's calm response in one setting, or to one familiar sound, therefore cannot be used to predict its response in another.

4. The horses in the applicant's studies

None of the behavioural studies relied on in the applicant's Equine Business Report [EXAM/9.62] was carried out on Thoroughbreds, and none was carried out on broodmares, neonatal foals or horses exposed to construction noise.

Janicka et al. (2024). This is the source for the applicant's statement that horses habituate to a new noise within one to seven repeats (paragraph 4.2.10). The study used 20 Warmblood horses and recorded sounds that had been selected because they were distracting, not frightening. The applicant presents one to seven repeats as a general rule, but the authors reported great variability between individual horses in the number of playbacks needed. In the group's earlier study of the same kind of recorded sounds, reactions were generally weak and short-term, and the strongest stress responses were to unfamiliar sounds; the authors concluded that the threat a sound poses depends on its unpredictability and novelty (Janicka et al., 2022). Habituation to mild, distracting recorded sounds does not establish habituation to intermittent, high-impact construction noise.

Christensen (2005). The applicant cites this thesis for the principle that horses learn to ignore stimuli that have no consequences (paragraph 4.2.5). The experiments used naive two-year-old Danish Warmblood stallions. In the published version of the habituation experiment, horses exposed to the full stimulus from the outset (classic habituation) fared worst: horses introduced to the stimulus gradually showed fewer flight responses and learned to react calmly in fewer sessions. Variations in heart rate also persisted even when behavioural responses had ceased (Christensen et al., 2006). Construction noise is not introduced gradually; stud stock would be exposed to it at full intensity, the approach that worked least well in the applicant's own source. The applicant's own source therefore supports the central point of my main submission: a horse that appears to have settled may still be physiologically aroused.

Powell et al. (2023). The applicant relies on this study to conclude that foals would not be affected to a disproportionately greater extent than mature horses (paragraph 4.2.15). The study used 74 stock-type weanlings, typical of Quarter Horse breeding, with a mean age of 256 days, exposed to a single opening umbrella. Quarter Horse and stock-type breeds are among the least nervous breed groups (Sackman & Houpt, 2019), and weanlings of eight to nine months are not comparable to neonatal Thoroughbred foals at foot. The applicant itself accepts that young foals are more reactive because they are naive to noises and novel stimuli (paragraph 4.2.13).

Birke et al. (2011) and Pollard & Furtado (2021). These are cited for the flight zone and for horses on public roads respectively. They concern horses' responses to an approaching person and ridden horses in traffic. Neither addresses breeding stock at pasture or construction noise.

The applicant's conclusions on habituation are therefore drawn from Warmbloods, stock-type weanlings and ridden horses, tested with mild or single stimuli under controlled conditions. The evidence in Sections 1 to 3 shows that Thoroughbreds are more anxious and excitable than stock-type and draught breeds, show a stronger physiological stress response, and can continue to react despite training. The applicant accepts that Thoroughbred breeding and stud operations are potentially the most sensitive receptors (paragraph 4.2.41); its evidence on habituation does not come from those horses.

5. The 30 m flight zone

The applicant relies on a "flight zone" of 5–30 m (paragraph 4.2.6) to conclude that construction activity more than 30 m away will cause little or no reaction in horses (paragraphs 4.2.11, 4.2.12 and 4.2.17). I address this in full in my separate submission, Post-Hearing Submission: The Applicant's 30 m Flight Zone. In summary, the figure does

not appear in the source the applicant cites, which is a code of practice on how to approach, catch and move horses; measured flight distances vary from about 2 m to 146 m; and a flight zone describes how a horse reacts to something approaching it, not how it reacts to noise.

The concept is particularly inappropriate for Thoroughbreds. The applicant accepts that the more anxious the horse, the larger its flight zone (paragraph 4.2.6), and its own source states that a horse's flight zone increases as it becomes more fearful (Equine Canada & NFACC, 2013). Sections 1 to 3 show that Thoroughbreds are among the most anxious and reactive breeds. Even on the applicant's own reasoning, a single figure derived for horses in general cannot be applied to them.

6. Relevance to construction noise

Construction will generate a range of sudden, intermittent and high-impact noise, of which piling is one example; others include rock breaking, plant movement and reversing alarms. A population predisposed to anxiousness and excitability, with a larger cortisol response to stress and a tendency for strong reactions to persist despite training, is the population most likely to be affected by that noise. The consequences for these horses, including disrupted grazing and rest, escape galloping in foals and risks during handling and reproductive examination, are set out in my main post-hearing submission.

The pasture study showing that noise halved grazing time used mainly Warmbloods, ponies and Gypsy horses, with only one Thoroughbred among its 20 horses (Henke-von der Malsburg & König von Borstel, 2026). On the evidence above, Thoroughbred mares and foals would be expected to respond at least as strongly.

7. Conclusion

Thoroughbreds are consistently identified as one of the most anxious, excitable and nervous horse breeds, and controlled studies show that this is reflected in their heart rate and stress hormone responses. Evidence drawn from calmer breeds, or from horses accustomed to noise, is likely to underestimate the response of the Thoroughbred mares and foals on the adjoining stud, and the applicant's 30 m flight zone provides no basis for concluding that they will be unaffected by construction noise.

Signed:

A large black rectangular box redacting the signature of Dr Annemarie Farrington.

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Date: 30 September 2026

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Post-Hearing Submission: The Applicant's 30 m Flight Zone

Response to the Examining Authority

Dr Annemarie Farrington

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The applicant's Equine Business Report [EXAM/9.62] relies on a horse's "flight zone" of 5–30 m to conclude that construction activity more than 30 m away will cause little or no reaction in horses. This submission responds to the Examining Authority's request for the research on that point. It shows that the figure comes from a guide to handling horses, not from any research on noise; that the guide contains no such figure; that measured flight distances vary widely; and that the flight zone tells us nothing about how horses respond to construction noise. It should be read alongside my separate submission, Post-Hearing Submission: Thoroughbred Reactivity, which summarises this point at Section 5.

1. What the applicant says

At paragraph 4.2.6 the report states:

"A horse's flight zone is roughly a circle with a radius of approximately 5-30 metres, dependant on the risk and temperament of the horse. At a distance of greater than this, any threat perceived is unlikely to elicit little more than visual observation as a response."

It then treats 30 m as a threshold. At paragraph 4.2.11 it states that "at over 30 metres, onsite movements of people or construction machinery is not likely to elicit a response at all"; at paragraph 4.2.12 that beyond 30 m the reaction is likely to be mild; and at paragraph 4.2.17 that horses in stud buildings more than 30 m from the works are unlikely to do anything other than be more alert.

The authorities given for the flight zone are the Canadian Code of Practice for the Care and Handling of Equines, Appendix G (Equine Canada & NFACC, 2013; footnote 15), and Birke et al. (2011) (footnote 16). Later in the same report, at paragraph 4.3.16, the applicant cites the same Code of Practice (footnote 28) for a different figure: "The flight distance for a horse is within a few metres."

2. What the applicant's sources actually say

2.1 The Code of Practice, Appendix G: a guide to handling horses

The Code of Practice is a Canadian welfare code covering the day-to-day care of horses. Appendix G is not a scientific study and does not deal with noise. It is a one-page practical guide for people handling horses, referred to from two places in the Code: Section 6.2, "Behaviour and Handling", and Section 5.1, "Handling at Loading and Unloading". Section 6.2 explains that it is particularly relevant to handling groups of horses or single horses not on a halter, and that handling should be based on the concepts of field of vision, flight zone and point of balance.

In other words, the flight zone in the Code is a tool for people who need to approach, catch, halter, lead, move or load a horse calmly. It tells a handler how close they can walk up to a horse before it moves away, and where to stand to move it forward or back. Appendix G

defines it as follows, taking its definition from a chapter on livestock handling by the animal handling specialist Temple Grandin (Grandin, 2010):

“This is the space surrounding a horse that, when penetrated, causes the horse to move to reestablish a comfortable distance. Low-stress handling is based on applying and releasing pressure on the edge of the flight zone ... You have entered a horse’s flight zone the moment your approach causes the horse to move away. As a horse becomes more fearful, its flight zone will increase.”

Appendix G gives no distance. Neither its text nor its two diagrams, which show a horse’s field of vision and the flight zone as an unmeasured circle around the horse, contain any measurement. There is no 5–30 m range, no 30 m threshold and no statement that horses beyond any distance will respond only by watching. It states that the zone is not fixed but grows with fear. Where the Code does address noise, it does so separately and without reference to distance: it advises handlers to avoid sudden actions or noises that may startle or frighten horses, because horses have sensitive hearing (Section 6.2).

The applicant cites this one source for a flight zone of 5–30 m at paragraph 4.2.6 and for a flight distance of “a few metres” at paragraph 4.3.16. Neither figure appears in it.

2.2 Birke et al. (2011)

Birke and colleagues measured the distance at which horses moved away from a person walking towards them. In adult riding horses, the mean flight distance was about 7 m when the person approached directly and about 2 m when they approached in a relaxed way. The study did not find a flight zone of 5–30 m, did not propose any 30 m threshold and did not examine noise.

Neither of the applicant’s sources therefore supports the figures it attributes to them.

3. What research measuring flight distance shows

Where horses’ flight distances have actually been measured, they vary widely according to the horse’s experience. Brubaker and Coss (2015) measured the distance at which wild horses in the United States fled from a person approaching on foot. Horses with little exposure to people fled at an average of 146 m, around five times the applicant’s upper figure. Horses used to people fled at an average of 17 m. The authors attribute the difference to habituation.

This is consistent with the applicant’s own source, which states that the flight zone increases with fear, and with the European Food Safety Authority, whose scientific opinion on equine welfare states that the size of the flight zone depends on the tameness of the animal and increases as a horse becomes more fearful (EFSA Panel on Animal Health and Animal Welfare, 2022).

Taken together, published measurements range from about 2 m in handled riding horses to 146 m in horses unused to people. There is no scientific basis for a fixed flight zone of 5–30 m, and none for treating 30 m as a distance beyond which horses will not react. Measured flight distances vary more than seventy-fold depending on what a horse is used to, so no fixed radius can be stated, and a horse’s familiarity with its handlers says nothing about its response to unfamiliar construction noise.

4. Why the flight zone tells us nothing about construction noise

4.1 It measures the wrong thing

A flight zone is the distance at which a horse moves away from something approaching it, usually a person. It says nothing about how a horse responds to a sound coming from a

source that is not approaching it, may not be visible and may be hundreds of metres away. Using a handling distance to predict the effect of construction noise is like using the distance at which a person steps back from a stranger to predict whether they would be woken by a car alarm. The two are simply not related.

Sound is not limited by a flight zone. Whether a noise affects a horse depends on how loud it is when it reaches the horse, how sudden and unpredictable it is, and whether the horse has heard it before. A 30 m rule would mean that a noise 31 m away has no effect however loud or sudden it is, which is plainly wrong. The noise levels expected at the studs are addressed by the acoustic evidence; my point is that distance from a handling guide is not a substitute for that assessment.

4.2 The applicant's own report says so

The applicant's report accepts that horses hear sounds as quiet as 7 dB and are more sensitive than humans at high frequencies (paragraph 4.2.8), and that their ears can be turned towards the source of a sound (paragraph 4.2.9). It accepts that horses will react or startle to irregular or more sudden loud noises (paragraph 4.2.12), and that they respond more to sudden noises than to new ones (paragraph 4.2.14). None of these statements is limited to 30 m, and none could be: they describe hearing, not handling.

The report also describes reactions well beyond 30 m. It accepts that horses in paddocks are likely to stay on the side of the field opposite the construction (paragraph 4.2.14): that is avoidance of the works at a distance. It describes the response beyond 30 m as the head up and ears pricked (paragraph 4.2.12): that is vigilance, a stress response. And at paragraph 4.2.17 it applies the 30 m rule to horses inside stud buildings, where they cannot see the works at all. A flight zone depends on the horse seeing something approach; a horse in a stable reacting to an unseen bang has no flight zone to speak of.

4.3 The research on noise

Horses at pasture exposed to recorded traffic noise, at a level equivalent to a motorway 500 m away, halved the time they spent grazing, avoided the area near the noise source and showed raised heart rates. Some outward habituation occurred, but the authors concluded that behavioural habituation may mask continued physiological strain (Henke-von der Malsburg & König von Borstel, 2026).

Research on sounds of different origin found that horses showed their strongest stress responses to unfamiliar sounds, and that the threat a sound poses depends on its unpredictability and novelty (Janicka et al., 2022). Construction noise is both unfamiliar and unpredictable. In the applicant's own source on habituation, heart rate continued to vary after horses had stopped reacting outwardly (Christensen et al., 2006).

This is a widespread problem, not an occasional one. In a survey of 1,836 horse owners in the UK and US, 22% reported that their horse had shown unusual behaviour during loud noise events, including running, walking the fence line, breaking through fences and sweating. In the most anxious horses, the anxiety did not improve over time, and a quarter of them had been injured during noisy events. The authors concluded that noise anxiety can lead to negative welfare consequences for horses (Riva et al., 2022). None of these findings depends on how close the source of the noise was.

Fireworks show the same thing in practice. In an owner survey, horses were reported running, breaking through fences and being injured during fireworks (Gronqvist et al., 2016). In my professional experience, fireworks are rarely set off within 30 m of a paddock; horses react to them because of the noise, not because anything has entered their flight zone.

4.4 No flight does not mean no harm

Even within its own terms, the flight zone predicts only whether a horse will move away. The harms set out in my main submission, Post-Hearing Submission: Equine Physiological Response to Stress, including reduced grazing, raised heart rate, lost rest and sleep, disrupted nursing and difficulty in handling, all occur without a horse taking flight. A horse standing at the far side of its paddock with its head up, not grazing, is not unaffected because it has not bolted.

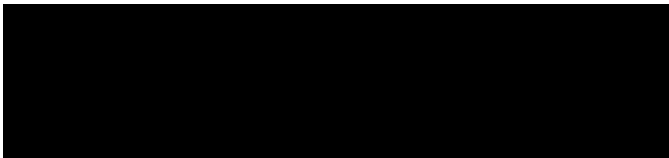
4.5 Stud horses are the least habituated

The horses on a stud are among those least accustomed to construction noise and machinery. Foals and youngstock have no previous experience of it. On the applicant's own source, a more fearful horse has a larger flight zone, and on the measured evidence, horses unused to a stimulus react at far greater distances. If the flight zone were relevant at all, stud stock would be at the top of the range, not the bottom.

Conclusion

The 30 m figure comes from a handling guide: a Canadian code of practice explaining how to approach, catch and move horses calmly. That guide gives no distance at all, and the applicant cites it elsewhere for "a few metres". The research that has measured horses' flight distances shows they are not fixed, ranging from about 2 m to 146 m depending on the horse's experience. Most importantly, a flight zone describes how a horse reacts to something approaching it, not how it reacts to noise. The applicant's own report accepts that horses hear very quiet sounds, startle at sudden ones and move away from works at a distance, and the research shows that noise affects grazing and heart rate whether or not a horse takes flight. In my opinion, presenting 30 m as a distance beyond which horses will not react to construction activity has no basis in the evidence and is misleading. The conclusions that rely on it (paragraphs 4.2.6, 4.2.11, 4.2.12, 4.2.17 and 4.3.16) should be given no weight.

Signed:

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Post-Hearing Submission: Construction Traffic and Equestrian Road Safety

Evidence on horse reactivity, collisions and injury severity

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The safety of local horse riders sharing roads with construction traffic was raised at the hearing. This note sets out the published evidence on that risk. A ridden horse is not a passive vehicle. It is a large flight animal capable of rapid sideways, backward or forward movement when startled. An encounter with a construction lorry combines visual bulk, close proximity, engine and trailer noise, air brakes, rattling loads and restricted escape space. On a narrow rural road, a single involuntary reaction can put the horse and rider into the path of the lorry, another vehicle, a wall, a ditch or a roadside structure.

The applicant accepts much of this. Its Equine Business Report [EXAM/9.62] states that horses are usually more fearful of larger vehicles, that HGVs are more likely to elicit a response because of engine noise, road noise and percussive noise from trailers, loads and suspension, that any sudden noises or movements will elicit a response, and that restricted spaces are likely to elicit a greater negative response due to panic or fear (paragraphs 4.2.26 to 4.2.27). The question is therefore not whether the risk exists, but whether the proposed mitigation can remove it. The evidence below shows that it cannot.

1. Horse riders are among the most vulnerable road users

Police-recorded data for Great Britain identified 1,031 injury incidents involving ridden horses between 2010 and 2019. Horse riders accounted for 238 of the 267 serious injuries and 17 of the 18 fatalities. Compared with car occupants, horse riders had 73 times the odds of severe or fatal injury, and the odds of severe or fatal injury almost doubled on roads with 60–70 mph limits compared with 20–30 mph roads (Pollard & Grewar, 2023). The motor-vehicle occupant is protected by the vehicle; the rider is exposed at height and may be thrown, crushed or struck.

The toll continues. In 2025, 2,810 road incidents involving horses were reported to the British Horse Society, in which 59 horses died, 82 were injured and 86 people were injured (British Horse Society, 2026). When a horse is killed in a road incident, the rider or handler is almost 12 times as likely to suffer severe or fatal injury (Pollard & Grewar, 2020). The Highway Code itself records that horse riders are often children (Department for Transport, Rule 215).

2. Close passing is strongly associated with collision

In an analysis of 4,107 horse-related road incidents reported to the British Horse Society between 2010 and 2020, drivers passed too closely in 84.2% of incidents. Compared with speeding alone, close passing alone was associated with 18.3 times the odds of a collision, and close passing combined with speeding with 4.4 times the odds; speeding was associated with more than double the odds of the horse being killed (Pollard & Grewar, 2020). A large construction vehicle and a horse sharing limited road width is exactly the circumstance in which close passing occurs. Over half of the incidents occurred between 10 am and 2 pm (Pollard & Grewar, 2020), which falls within normal construction working hours.

3. Near misses are common and rise with road use

In a survey of 6,390 UK equestrians, 84% used roads at least weekly. In the previous year, 67.7% had experienced a near miss and 6.1% an injury-causing incident, and near misses became more likely as weekly road use increased (Pollard & Furtado, 2021). The applicant cites this study (paragraph 4.2.29). In a separate national survey of 1,976 equestrians, 79.1% had experienced a near miss and 15.6% a collision (Trump & Parkin, 2020). Every additional construction vehicle movement on a riding route is another opportunity for a close pass, a sudden noise or a startle.

4. Injury does not require impact

Of 145 vehicles recorded in police collision reports involving horses in Devon, 80 had not actually struck the horse; the authors concluded that avoiding impact with a horse is not sufficient to avoid injury (Trump & Parkin, 2020). A rider can be thrown, crushed against a wall or struck by another vehicle because the horse reacted to a lorry that never touched it. Assessments that consider only the risk of collision therefore understate the danger.

5. Construction vehicles are not ordinary traffic

A horse described as used to traffic cannot be assumed to tolerate construction vehicles. Habituation in horses is specific to the stimulus: after training to one novel object, the fear response to that object was reduced, but the fear response to another object remained (Leiner & Fendt, 2011). Horses do not fully generalise their responses between different stimuli (Christensen, 2005), and their strongest stress responses are to unfamiliar sounds, with the threat a sound poses depending on its unpredictability and novelty (Janicka et al., 2022). Familiarity with cars is therefore no evidence of tolerance of air brakes, trailer couplings, rattling loads and the visual bulk of an HGV, the features the applicant itself identifies (paragraph 4.2.26).

6. Startle is involuntary and can defeat rider control

Novel auditory and visual stimuli produce a measurable sympathetic (“fight or flight”) response in horses, with heart rate rising alongside alert behaviour (Christensen, 2005). The Highway Code warns drivers that horses are flight animals that can move incredibly quickly if startled and can be unpredictable despite the efforts of their rider (Department for Transport, Rule 215). The danger arises from the speed and involuntary nature of the response, not from poor riding.

The rider cannot simply override this. When riders and handlers were told that an umbrella would be opened as they passed, the heart rates of both the people and the horses rose, even though the umbrella was never opened (Keeling et al., 2009). A rider who knows a lorry is approaching on a narrow lane becomes more anxious, and that anxiety is transmitted to the horse, making a startle more likely at exactly the wrong moment.

7. Driver training and guidance cannot remove the risk

The applicant’s mitigation relies on drivers following the Highway Code, driver training and signage (paragraphs 4.2.29 to 4.2.31). The evidence shows that guidance does not reliably change behaviour at the point of passing. In 2022 the Highway Code was strengthened to require drivers to pass horses at no more than 10 mph and at least 2 m away; yet in 2023, 85% of incidents reported to the British Horse Society were still attributed to vehicles passing too closely or too quickly (Road Safety GB, 2024), in 2024 the figure was 81% (British Horse Society, 2025), and in 2025, 83% of incidents occurred because a driver passed too quickly (British Horse Society, 2026).

Qualitative research explains why. Drivers often intended to overtake horses safely, but did not realise how vulnerable passing very wide and slowly made them feel until they had begun the manoeuvre, and then sped up or cut in too soon. Their skills could also be impeded by frustration at a slow-moving horse, compounded by a view that leisure riding should not obstruct necessary work journeys (Chapman & Musselwhite, 2011). That is precisely the situation of a construction driver working to a delivery schedule. Training also covers only the applicant's own drivers; it does nothing about the horse's response, which the applicant accepts will occur to any sudden noise or movement (paragraph 4.2.26).

8. A compliant pass may be impossible on narrow roads

Rule 215 of the Highway Code instructs drivers to pass horses at no more than 10 mph and allow at least 2 m of space (Department for Transport, Rule 215). Where the road width cannot accommodate an HGV, a horse and 2 m of separation, a compliant pass is physically impossible. The absence of a verge, walls, hedges, bends and poor forward visibility further removes escape space and reaction time, and the applicant accepts that restricted space increases panic and fear (paragraph 4.2.27).

The applicant's own reasoning also undermines its mitigation. It states that safe passing distance depends on the horse's flight zone (paragraph 4.2.29), which it puts at 5–30 m (paragraph 4.2.6). An HGV passing at the Highway Code minimum of 2 m is therefore well inside the flight zone the applicant itself describes. On the applicant's own account, even a fully compliant pass places the horse within the distance at which it would be expected to take flight. The flight zone concept is addressed in detail in my separate submission, Post-Hearing Submission: The Applicant's 30 m Flight Zone.

9. Loss of safe access to riding routes

For many riders, local roads are the necessary link between a yard and a bridleway, field or wider hacking route. Road use depends on the proximity of off-road routes, and injury-causing incidents are associated with increasing road-use anxiety or riders stopping road use altogether (Pollard & Furtado, 2021). The applicant proposes that bridleways and byways may be re-routed or temporarily closed during peak construction (paragraph 4.2.33). Closing off-road routes pushes riders onto the roads that construction traffic will use, increasing exposure at the same time as the traffic increases. Riders who cannot avoid the construction corridor face either a direct injury risk or the loss of safe exercise for their horses.

Conclusion

Horse riders are among the most vulnerable road users, and national data show that close passing, speed and repeated exposure are associated with collisions, horse fatalities and severe rider injury. Behavioural studies show why: horses react involuntarily to unfamiliar sounds and large vehicles, familiarity with ordinary traffic does not transfer to construction vehicles, and rider anxiety increases the likelihood of a startle. The applicant accepts that HGVs are more likely to provoke a reaction and that restricted space worsens it. Its mitigation relies on driver behaviour that national data show has not eliminated close or fast passing, and on a passing distance that falls within its own stated flight zone. Where local riders and construction traffic must share narrow rural roads, the resulting risk is a material public-safety effect, not an ordinary traffic interaction or a recreational inconvenience.

Signed:

A large black rectangular box redacting the signature of Dr Annemarie Farrington.

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Post-Hearing Submission: BESS Hazards to Equine Operations

Toxic emissions, human exposure thresholds and emergency response on a stud farm

Dr Annemarie Farrington

[REDACTED]

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This submission addresses four points arising from the hearing: the hazards a battery energy storage system (BESS) poses to an equine operation; why human exposure thresholds such as Acute Exposure Guideline Levels (AEGLs) should not be used to judge the risk to horses; why the data that would be needed to set equine thresholds cannot be obtained; and why, on a working stud farm, evacuating or treating horses during an incident is not a realistic option.

The applicant's Equine Business Report [EXAM/9.62] already accepts that horses are more sensitive to airborne pollutants than people, and its conclusions describe them as sensitive to airborne irritants (paragraph 6.1.15). It acknowledges that they breathe several times more air than a human, far more again when exercising, that they are obligate nasal breathers and that they are prone to airway inflammation (paragraphs 4.3.13 and 4.3.14). Having accepted all of this, it then concludes that a thermal runaway event would not affect horses at the nearest stud (paragraph 4.3.15). I do not believe that conclusion follows.

1. Hazards of a BESS to an equine operation

1.1 Fire, explosion and duration

Lithium-ion battery failures can involve explosion as well as fire. In the UK, an explosion and fire occurred at the Carnegie Road battery site in Liverpool in 2020 (Merseyside Fire and Rescue Service, 2022), and in 2025 a fire involved two battery containers at a solar farm with battery storage near Cirencester (EPRI, BESS Failure Incident Database). The Carnegie Road incident happened in the middle of the night.

These incidents are also not short-lived. The Moss Landing fire in California in January 2025 was left to burn itself out and continued for several days (Anadolu Agency, 2025; San José State University, 2025). In September 2026, some twenty months later, batteries left in the damaged building caught fire again and residents were once more told to shelter in place (Bloomberg, 2026; CalMatters, 2026). Fire service guidance in the UK now expects operators to plan for re-ignition (National Fire Chiefs Council, 2025).

1.2 Toxic gases

Burning lithium-ion batteries give off hydrogen fluoride, a highly irritant gas. Laboratory fire tests on a range of commercial battery cells found substantial quantities of hydrogen fluoride, along with other fluoride gases, and the authors concluded that this could pose a serious toxic threat from large battery installations (Larsson et al., 2017). Scaled up to a grid battery, their figures amount to tens of kilograms of hydrogen fluoride or more for each megawatt-hour of capacity involved.

Not all of this is visible. Once batteries are burning there is usually thick, dark smoke, and hydrogen fluoride is carried with it. But hydrogen fluoride itself is colourless, and it can be present where there is little or no visible smoke: when a battery vents gas before it catches fire, often as a pale vapour that is easily mistaken for steam, or when a fire is smouldering or

flaring up again. Hot smoke also tends to rise before coming back down to ground level further downwind, so the area affected is not simply the area next to the site. In practical terms, this means exposure cannot be judged by eye. Stud staff could not tell from looking across a paddock whether the horses in it were breathing an irritant gas.

1.3 Contamination of pasture

Smoke from a battery fire also carries metal particles. Soil sampling after the Moss Landing fire found nickel, manganese and cobalt from the battery cathodes deposited on the surrounding land, at levels far above those recorded before the fire (San José State University, 2025; Aiello et al., 2025). Horses graze close to the ground and take in soil with their grass, so contaminated pasture is a route of exposure that applies to them in a way it does not to people.

1.4 The emergency response

A serious incident brings its own disturbance. At Moss Landing, around 1,500 people were evacuated and a main road was closed (Associated Press, 2025). Sirens, lights, road closures and emergency vehicles are exactly the kind of stimuli that unsettle horses, and the applicant accepts that horses would react to them (paragraph 4.3.12).

1.5 The applicant's assessment

The applicant states that studies show the effects of smoke from thermal runaway are confined to within a few metres of the source (paragraph 4.3.15). No study is identified, and the experience at Moss Landing suggests otherwise. The report places the BESS about 670 m from Townlease Farm, which it describes as a stud farm (paragraph 4.3.15). Current National Fire Chiefs Council guidance asks developers to identify sensitive receptors within 1 km of a BESS and to consider business continuity and plume modelling (National Fire Chiefs Council, 2025; Fire Protection Association, n.d.). On the applicant's own figures, that stud falls well inside that distance.

I would also note that the report describes a horse's flight distance as a few metres in this section (paragraph 4.3.16), whereas earlier it gives a figure of 5–30 m (paragraph 4.2.6). I deal with the flight zone in my separate submission, Post-Hearing Submission: The Applicant's 30 m Flight Zone.

2. Why AEGLs are not an appropriate measure for horses

AEGLs were discussed at the hearing as a basis for judging exposure to gases from a BESS fire. It is worth noting that the applicant's Equine Business Report does not identify hydrogen fluoride at all, nor does it assess exposure against any threshold. It relies instead on separation distance and on general air quality guidance (paragraph 4.3.15). For the reasons below, neither AEGLs nor that guidance can tell us whether horses would be harmed.

AEGLs were developed to protect people. They describe the airborne concentrations above which members of the public might suffer discomfort, lasting harm or death over exposures of between ten minutes and eight hours, and the susceptible groups they are designed to cover are human ones, such as children and the elderly (US Environmental Protection Agency, n.d.). The air quality guidance referred to in the applicant's report is likewise based on human health.

They also assume that the person exposed can do something about it. The second AEGL tier is defined partly by an impaired ability to escape (US Environmental Protection Agency, n.d.), and in a real incident people are told to leave the area or to stay indoors with windows shut and ventilation off, as at Moss Landing (Anadolu Agency, 2025). A horse in a paddock can do neither. Stables are built to be well ventilated, not sealed, and a horse will remain exposed for as long as the smoke or gas is over it.

Horses also take in far more air than people, as the applicant accepts. A frightened horse will not stand still while smoke or gas drifts across a paddock; it will gallop, and its breathing will increase dramatically. In my professional opinion, at any given concentration of an irritant gas, a horse's airways will receive a considerably larger dose than the human exposures on which AEGLs are based.

Within any group of horses there will be individuals that are more vulnerable still. Equine asthma occurs in horses of all breeds and types, and is characterised by airways that over-react to irritants (Couëtil et al., 2016). On a stud farm, the animals I would be most concerned about are newborn foals, which breathe faster and have immature airways, and heavily pregnant mares, where any harm to the mare may also affect the foal she is carrying. None of these is reflected in a human threshold.

Finally, AEGLs are worked out from human data where it exists and otherwise from studies in laboratory animals, adjusted to protect people. Nothing in that process makes them applicable to horses. The US Environmental Protection Agency itself cautions that their suitability for any particular situation needs to be checked, and that other limits may be more appropriate (US Environmental Protection Agency, n.d.). Meeting an AEGL at the boundary of a stud farm does not tell us that the horses on it would be safe.

3. Why direct experiments on horses are not possible under UK law

It may be asked why there are no equine-specific limits for battery fire gases. The answer is that they could not lawfully be produced. Experiments that may cause an animal pain, suffering, distress or lasting harm are regulated under the Animals (Scientific Procedures) Act 1986. Horses are among the species given special protection: work on them may only be licensed where the purpose cannot be achieved using other species, and no licence may permit procedures causing severe suffering that is likely to be long-lasting and cannot be relieved (Schedule 2B, paragraph 4; Schedule 2C, paragraph 14).

Finding out the concentrations at which hydrogen fluoride seriously injures or kills horses would mean deliberately exposing horses to those outcomes. As I understand the legislation, that could not be licensed. The lack of equine data should therefore not be read as evidence that horses are unaffected. It is a gap that cannot be filled by experiment, and in its absence the risk has to be judged on what we know of equine physiology, with a degree of caution.

4. Why treatment and evacuation are practically impossible on a stud farm

Advice on evacuating horses from wildfires is to move them early, ideally the day before a high-risk day, precisely because moving horses in an emergency is so much harder than moving people or small animals (Thompson et al., 2018). A battery fire comes with no such forecast. It can start at any time of day or night, as the Liverpool incident showed.

Moving horses safely takes time and people. Every horse has to be caught, led and loaded, often one at a time. Frightened horses may refuse to load, and some may run back into their stables. Sedation does not solve this, since sedated horses can be unsteady and may still react unpredictably (UC Davis Center for Equine Health, n.d.-b). A stud farm adds its own problems: mares with young foals at foot that must travel together, youngstock that may never have been loaded, and heavily pregnant mares. Horse transport may also be unable to reach a farm once roads are closed and cordons are in place (UC Davis Center for Equine Health, n.d.-a; Associated Press, 2025).

Even if horses could be moved, there is rarely anywhere suitable to take them at short notice. The Horserace Betting Levy Board Codes of Practice advise that pregnant mares are kept apart from other horses, do not travel with them, and that new arrivals are isolated,

because transport and changes of surroundings and companions in late pregnancy can trigger herpesvirus abortion (Horserace Betting Levy Board, Codes of Practice: Equine Herpesvirus). A rushed evacuation would break all of these precautions at once.

Sheltering horses in place is not a realistic alternative either. Staying indoors with the windows shut is advice for people, as at Moss Landing in 2025 and again in September 2026 (Anadolu Agency, 2025; CalMatters, 2026). Horses at grass cannot follow it, and bringing them in offers little protection, because stables are built to be well ventilated rather than sealed. Because the gas may not be visible, there may also be no clear signal of when to bring horses in at all.

Treatment is the last line of defence, and in my view it would not be available in any meaningful way. Smoke or gas drifting over a stud would affect a whole group of horses at once, foals and pregnant mares included. There is no established protocol for treating hydrogen fluoride inhalation in horses, vets cannot work inside an emergency cordon, and only a handful of equine vets are likely to be available locally at short notice. The applicant's mitigation rests on its Outline Battery Safety Management Plan (paragraph 4.3.17), which deals with managing an incident at the BESS itself. It does not, and realistically cannot, provide for the evacuation or treatment of horses on neighbouring farms.

Conclusion

A BESS fire can start without warning, last for days, flare up again long afterwards, release hydrogen fluoride and leave metal contamination on surrounding land. The applicant accepts that horses are more sensitive to air pollution than people, yet relies on human exposure limits and an unsupported assumption that effects stay within a few metres. AEGLs are designed for people who can leave or shelter indoors, not for horses that breathe far more air and cannot get away from smoke or gas, and equine limits cannot lawfully be established by experiment. On a stud with foals and pregnant mares, neither evacuation nor treatment can be relied upon. In my view, the risk to horses within 1 km of the BESS has to be assessed on its own terms, not by reference to limits designed for people.

Signed:

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