Before the Independent Hearing Commissioner
At Ashburton District Council

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under: the Resource Management Act 1991

in the matter of: application LUC23/0109 to the Ashburton District Council relating to the proposed equestrian centre located on 279 Stranges Road, Ashburton

between: **Southern Parallel Equine Centre Limited**
Applicant

and: **Ashburton District Council**
Consent Authority

Statement of evidence of Dr Lucy Waldron

Dated: 20 March 2024

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STATEMENT OF EVIDENCE OF DR LUCY WALDRON

INTRODUCTION

1 My full name is Dr Lucy Anne Waldron.

2 I hold a Bachelor of Science (Biological Sciences) with Honours from the University of Lancaster, UK, and a Doctor of Philosophy (Ph.D.) in animal nutrition and feed quality from the Harper Adams University College, UK. I have been a professional animal nutritionist since 1995 and have worked globally covering all species, including horses.

3 I am the Director of LWT Animal Nutrition Limited, a specialist company which provides animal nutrition consultancy services internationally. I have held this role for over 14 years. I am a Research Fellow at Massey University and a visiting lecturer at the University of Saskatchewan, Canada. I have held several roles on global animal science committees and am Editor in Chief and Chief Scientific Editor to four peer review journals.

4 I have over 30 years' experience in animal nutrition, during this time I have held a number of roles, been a post-graduate examiner for multiple MSc and Ph.D. theses and have written and contributed to articles in scientific journals, press articles, and books.

5 I have a particular interest and experience in equine nutrition, having been active in equine nutrition research and product development since 1997. Since 2006 I have run, in conjunction with Massey University, an equine nutrition research facility in New Zealand, dealing with various feeding and clinical nutrition R&D (including youngstock), which has involved Master's and Ph.D. students, as well as commercial trials for New Zealand and overseas companies. Since 2006, I have employed sustainable agricultural practices on my land in New Zealand and have trialled and grown specialist pasture to ensure optimum feeding conditions for horses and for preserved forages. In the last 14 years I have been involved in R&D for sustainable agriculture, especially relating to soil and plant use, limiting nutrient leaching and preventing toxic algae and bacteria overgrowth in water. I was an expert witness in the Environment Court in 2012 regarding control of nitrogen pollution from farming. I have been involved in breeding performance horses for more than 20 years, and have qualifications in the management of equine reproduction, mares, foals and youngstock (DEFRA via Stallion AI Services, UK, 2006).

6 Attached at **Appendix 1** is my CV which sets out my experience and qualifications in more detail.

7 I have been engaged by Southern Parallel Equine Centre Limited (*SPEC*) to provide expert evidence in relation to its application for a resource consent (*Application*) to establish an equine centre in Lake Hood (the *Proposed Equine Centre*).

CODE OF CONDUCT

8 Although this is not an Environment Court hearing, I note that in preparing my evidence I have reviewed the Code of Conduct for Expert Witnesses contained in Part 9 of the Environment Court Practice Note 2023. I have complied with it in preparing my evidence. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where relying on the opinion or evidence of other witnesses. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

9 The purpose of my evidence is to set out the importance of quality pasture and quality soils in the context of horse nutrition and health.

HORSE NUTRITION

10 Horses have evolved to derive their energy and nutrients from long pasture forage (Waldron, 2012). Their dentition is designed for cutting plants off and then crushing and chewing them over molar teeth with large surface areas, after which the bolus is swallowed. Initial digestion occurs in the stomach, where digesta is exposed to acid, as the first step of protein digestion. Horses have evolved to graze high fibre pasture. Their energy is primarily derived from fibre fermentation in the hind gut, which is broken down by beneficial micro-organisms ('the microbiome').

11 Good pasture for horse nutrition should be high in fibre, which is the main source of energy for horses, derived from hind gut fermentation via the microbiome (micro-organisms) in the caecum. This microbial activity produces many vitamins, which are essential to the animal's health, function and mental state. In addition, high fibre intake is required to prevent gastric ulceration in horses. Protein intakes from forage should be optimised to prevent excess nitrogen excretion from urine, which is a major problem in conventional dairy farms where rye/clover is the predominant pasture.

12 Soil and pasture management is key to good nutritional supply and forage production for horses. Free draining soil, which has been properly fertilised and has an active microbiome to promote topsoil and expression of nutrients in plants allows abundant and sustainable grazing. In addition, such practises can prevent erosion and nutrient leaching into watercourses, preventing overgrowth of toxic algae and bacteria. Providing such pasture for horses can result in less reliance on bought-in forage and compound feed.

NEW ZEALAND PASTURE

13 In New Zealand, most agricultural pastures are designed for their productive growth and hardiness (e.g., against insect damage)

rather than with optimised nutrition for grazing animals in mind. This is because traditionally the growth performance of the plants has been a priority.

14 In the last decade or so, the importance of the nutrients within pasture, especially from an environmental point of view, has been highlighted in animal science. For example, typical rye/clover pasture leys for dairy cattle (which represent the majority of grazing animals) are known to be excessively high in protein, especially during wet, warm climate conditions.

15 Dairy cows can only utilise less than 16% protein in their feed, and all the rest is excreted, mainly in urine. In New Zealand, the average protein content of pastures is well over 22%, with more than 40% being reported in come seasons (New Zealand Association for Ruminant Nutritionists, pers. comms). Any protein above the 16% that can be utilised is excreted in urine, the main source of nitrate contamination in soil and waterways (Wilkinson and Waldron, 2017). Breeding horses typically require 14-18% protein in their diet (NRC 2007). Although not fully researched, horses may require more protein to maintain their relatively higher muscle mass, compared to dairy cows.

16 Lush, low fibre grasses have been shown to increase methane emissions from ruminants. This has been the focus of much research globally in the last 25 years, although any mitigation based on this science has yet to be formally adopted in New Zealand.

17 Unlike cows, horses are not ruminant, rather their digestive tract is the reverse of the ruminant system, thereby fermentation occurs at the end of the tract.

18 For horses, high fibre pasture is essential to maintain hind gut function, which is essential for energy and vitamin production. Volatile fatty acids from fermentation processes are necessary for correct functioning of cells in the lining of the gut responsible for the uptake of other nutrients. Imbalances between fibre and protein can result in weight loss, skin and cognitive issues, especially when protein content is very high.

19 In addition, traditional dairy pasture is high in sugar, which causes major problems in horses, as in other species. This is manifested as laminitis[1] (Pollitt, 2004) and poor behaviour, which can become irreversible if exposure is for longer durations and for multiple episodes.

20 Therefore, the composition of pasture species is a critical component of horse nutrition. Sewing a mix of early, mid and late heading, high fibre grasses, under sown with plantains, for example, can reduce the peaks and troughs in sugar and protein expression throughout

[1] A condition resulting in damage and inflammation of the tissue between the hoof and the underlying coffin bone.

the growing season to ensure horse health and nutrition. For breeding stock this is particularly important in order to prevent episodes of sugar intolerances in young animals.

PASTURE REARING SYSTEMS

21 When breeding horses, the soil (Voroney, 2019) and pasture type is key to producing youngstock that is strong, trainable, and well developed. Avoiding high sugar and protein pastures and ensuring pasture is high in fibre allows foals to develop their hind gut microbiome properly and avoid episodes of laminitis or behavioural problems. Ensuring all pasture species do not contain any endophytes (as in rye grass and other dairy grasses) or other fungal toxins is important to prevent organ and neural damage.

22 From conception to weaning and early training, the horses' feeding management can make all the difference. For example, in racehorses fed dairy pasture, incidents of severe gastric ulceration were high. Broodmares (le Jeune *et al.*, 2009), endurance horses (Nieto *et al.*, 2004) and show horses (McClure *et al.*, 1999) have all been shown to have a high risk of ulceration. Gastric ulceration in New Zealand Thoroughbred and Standardbred racehorses in training has been reported at 87% and 95% respectively, (Bell *et al.*, 2007). Feeding a high fibre pasture can reduce or prevent ulceration, allowing the animals to perform at their best (Stowers *et al.,* 2013). In the USA, the main centres of racehorse breeding for centuries have been in Kentucky, which has been attributed to the limestone base under the soil which supplies calcium, which is expressed in pasture. This is considered to allow young racehorses to develop denser bones, making them stronger at an early age.

23 The benefit of controlling and managing the pasture any horse is exposed to is that it allows avoidance of many problems throughout their lives which can have an effect on their performance. This will dictate whether or not they reach their potential. Wastage of horses due to poor nutrition management is rife in the race-and sport horse industry, and promoting proper feeding systems will prevent many welfare problems.

IMPORTANCE OF NUTRITIONAL BALANCE IN PASTURE

24 In nutrition for any species, quantity does not equate to quality. The correct balance of all nutrients in relation to energy production is the foundation of correct feeding. This is dependent upon the species of plant being grown, the climate and the quality of the soil (including mineral balance).

25 Grass and legume species produce different levels of physical structures and nutrients (fibre, protein, respectively, for example), including mineral trace elements. Digestibility characteristics are important as well. Even though fibre may be present in large amounts, if its digestibility is poor in horses, it will still result in low energy feeding value.

26 Fibre can be categorised into several forms, usually classified by the type of laboratory method used for assessment. As a broad rule of thumb, neutral detergent fibre (NDF) is a good indicator of energy release in fermentation systems, such as rumens. Digestion is related to the age and length of pasture species, as older grasses will contain more lignin, which is an indigestible fibre that binds to other nutrients, such as protein, making it less digestible. Other forms of fibre are readily fermentable by the microbiome, releasing energy. This important when considering moving horses to fresh pasture and timing of making preserved forage (hay or baleage). Keeping horses on very short pasture increases their risk of high sugar intakes.

27 Minerals are essential nutrients to all living things, and their expression and balance in pasture is dependent on several factors, which are mainly related to soil quality.

28 New pastures should be sown in early spring or autumn, when soils contain adequate moisture levels and the weather is warm enough to allow for emergence and establishment. This, ideally, should be done whilst building work is being undertaken, as it will take between four to six months (depending on climatic conditions) for pastures to grow (with sufficient cover of the plants). Before grazing, the pasture should be evaluated to determine numbers of plants per quadrant and vegetation coverage of soil.

IMPORTANCE OF SOIL STRUCTURE AND QUALITY FOR PASTURE

29 Crop (including grasses and legumes) feeding quality is only as good as the soil it is sown in – and the levels of water retention in soil as well as the balance of minerals (Voroney, 2019). Promoting the correct subterranean and root-interactive soil microbiome is also crucial for ensuring that plants can take up, utilise and express nutrients in their own structures. In order to determine the suitability of soils for horses, several factors must be taken into account.

30 For horses, as for other large mammals such as cattle, free draining soil is important to prevent compaction and heavy mud in high traffic areas, such as gateways. Microbe-rich loamy soil is very useful to keep water draining freely. A water holding, lower base layer (such as clay) can prevent drought affecting pasture growth. However, deep rooted grasses can be effectively used instead (in the absence of a lower soil water holding layer) to help maintain growth during dry periods and hold the lower levels of soil together, preventing topsoil losses. The expert evidence of Mr Victor Mthamo shows that the soil types on the proposed property are predominantly loam over clay – making them ideal for horse pasture. The level of the natural water table is important, especially as adverse weather events are on the increase, which can mean more land is under water for longer periods each year. In these

cases, developing good, long root structures is important for preventing excess water runoff and boggy conditions.

31 Regular soil tests to assess the amount and balance of minerals should be conducted, ideally each spring, to determine actual fertiliser requirements needed to balance levels during the growing season. Targeted fertilising is important to prevent the oversupply of nutrients not required. Where soil is oversupplied with one or more nutrients, these are captured in water run-off and have the potential pollute waterways.

32 Inorganic fertilisers have been shown to have various undesirable impacts on soil quality. They can be acidic, which affects the pH of the soil, which in turn changes the valency of any inorganic minerals added, making the latter unavailable for the plants to take up. Liming to balance the pH is essential to prevent this situation.

33 Research conducted in New Zealand has shown that the soil microbiome is important, as it is part of a natural cycle to convert inorganic nutrients into forms that are more readily absorbed and expressed in plant material, especially nitrogenous compounds. Supplementing the microbiome of soil can decrease nitrates in ground water run off by 91%, according to a recent study (Hobson *et al*., in press).

34 Ideally, organic forms of fertiliser should be used as well as other management practices, such as regular harrowing to increase organic matter return to soils, to ensure soil biology is optimised and organic matter and nutrients are not wasted. Modern practises include adding probiotics to stimulate the microbiome to increase root depth and plant growth and nutrient expression.

BENEFITS OF THE PROPOSED EQUINE CENTRE

35 I consider there are significant health benefits to horses which are reared from birth to point of sale on the same site:

35.1 When mares and their progeny are kept on appropriate pastures that are correctly managed and fertilised, they are not exposed to common New Zealand issues – such as lush, low fibre forage which typically contain endophytes which cause staggers and high levels of sugar that trigger laminitis. My previous property was well managed whereby soil analysis and balance were monitored regularly and paddocks were subsoiled, rolled and harrowed, to prevent such issues developing within grazing animals. This meant that weeds (such as ragwort, which contains toxins which accumulate in the liver, and can be fatal over a longer time period) were kept to a minimum (by cross grazing with ruminants), fibre was expressed in forage as much as biologically possible to limit sugar intakes, and endophyte exposure was avoided. In addition, water quality was controlled by the removal and control of toxic algae growth in troughs and dams. Toxic

algae causes neurological problems and tissue damage, and is often not well managed due to lack of awareness.

35.2 When horses (especially youngsters) are removed from such conditions, they are at high risk of being placed on paddocks which are based on dairy rye/clover swards (low fibre/high sugar) which may contain toxic weeds and are sown with pasture species which express various fungal toxins (rye endophytes and paspalum, for example). Rye grass staggers is a very prevalent condition in New Zealand, and especially affects horses. Low vitamin E (common in sheep pastures) can lead to neurological disease, especially during early development, which has been reported in New Zealand (including a clinical case I was involved with which presented as equine motor neurone disease). In areas where drought is an issue, kikuyu grasses are often sown. These contain compounds which affect bone development and maintenance (interfere with calcium availability – leading to soft, irregular bone formation) and saponins which are implicated in poor gut microbiome and colic.

35.3 Therefore, ensuring correct pasture quality is essential to avoid developmental disorders and preventing exposure to sugar and toxins which will then continue on into adulthood. Early nutritional experiences in all animals set the scene for any problems they may have as adults, especially regarding trainability and behaviour where neurological toxins have been ingested.

36 I also consider there are significant benefits to including a veterinary clinic on the site:

36.1 When breeding horses and running research trials, a vet on hand is important. During pregnancy and foaling, most mares cope without major assistance. However, in those that have a problem, it is essential to have someone on hand who is trained in dealing with these situations. This may be dealing with large foals being stuck, mares being exhausted and requiring manual assistance to safely expel the foetus, turning foals internally, ensuring standing and suckling, checking foal for genetic abnormalities, passing meconium, elimination of complete placenta, watching for signs of foaling colic, cleaning uterus, administration of oxytocin to ensure contractions and so on. I was trained in the UK by Stallion AI Services regarding artificial insemination, mare management and foaling. In my previous property I took mares in for foaling due to my own expertise and my close proximity to an excellent equine vet.

36.2 For research work, a nominated vet on hand is important to deal with any issues arising. This is because of the welfare ethics (based on five freedom legislation) around conducting R&D, even for simple feeding studies. For horses that require

blood sampling (especially with indwelling catheters), accurate sample collections, or regular health monitoring, a vet on-site is essential. I had a live in vet for these types of trials. Horses do tend to be rather accident prone, often requiring emergency treatment where time is of the essence. In addition, from a liability point of view, any research work done must be able to provide medical assistance immediately.

37 It is also important that the full extent of the Proposed Equine Centre is established at its outset. This is to allow pasture to be established enough to allow grazing. In addition, building sites are not suitable areas for horses, given the risks regarding loud noise, heavy vehicles and personnel not used to such animals.

RESPONSE TO SUBMISSIONS

38 The submission of John Skevington and Jo Ruane raises the concerns about:

38.1 The dual use of the grazing/training areas potentially not being feasible given that training horses tend to 'cut up' the pastures making them less suitable for grazing; and

38.2 The size of the site not being adequate for food supply given the number of horses proposed, and the need for external feed to be brought onsite.

39 My response to these concerns are:

39.1 If paddocks are correctly managed and fertilised, and if deep-rooted pasture is sown, the soil will be free draining and with less mineral and nitrogen run-off into water courses. Such modern methods for achieving this include direct drilling (to prevent disturbance of the soil layers), targeted fertiliser and lime applications (to only meet the needs of the soil as informed by testing) and sowing appropriate pasture species (not dairy rye/clover). Adding products to improve the soil microbiome will allow better uptake of minerals and nitrogen, preventing run-off.

39.2 As with all heavier animals (especially beef cattle), especially regarding adverse weather events, the ability to manage conditions underfoot is important. Providing shelter (whether as a building or as trees and riparian planting) will allow horses to stand in drier areas, limiting such damage.

39.3 Establishing paddocks in this manner will result in higher biomass production than conventional dairy pasture, allowing for grazing and forage harvesting for larger numbers of animals per hectare. Previous work on these types of pastures have shown (depending on climatic conditions) harvest of around 320 conventional bale equivalents per

hectare per year (own data – 42 large baleage squares plus 520 hay bales from 3.2 ha).

39.4 If the harvested pasture above if achieved (which is highly dependent on management and climatic conditions), an approximate level of forage on-site can be calculated. An average 500 kg thoroughbred horse typically needs at least half a bale of hay per day to maintain minimum forage intake. As an example, over a long winter (e.g. 4 months) each horse under these conditions would require 60 bales of hay. Hence one hectare yielding 320 conventional bale equivalents would feed 5 horses. Depending on the horses status (in foal, for example) this would typically be balanced via other specific compound feeds or supplements. However, if not in hard work or breeding it is possible to maintain horses on good quality baleage or hay plus a vitamin and mineral supplement, without the need for extra bought-in feed. This amount would need to be calculated based on horse body weight and status.

CONCLUSIONS

40 Ensuring correct soil preparation and pasture species selection will allow more sustainable pasture maintainance and production. Selection of pasture species for higher fibre content and deep roots allows better drainage, less soil structure damage and more nutrient expression in the plants. This has the benefit of preventing leaching into water courses and more nutrition for the animals, whilst avoiding common equine pasture-related problems such as laminitis, staggers, gastric ulcers and behavioural problems. This has the added benefit of higher biomas, making the unit less reliant on bought-in compound feed and forage.

Dated: 20 March 2024

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Dr Lucy Waldron

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APPENDIX 1

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Lucy Waldron Ph.D.

R.Nutr. (UK & NZ) Research Fellow (Massey), Accredited Animal Scientist, MNZRS, NZARN

Current Role

Animal/Agricultural Scientist

Strengths

- Professional nutritionist and animal scientist with international reputation and in-depth R&D expertise in the areas of animal health, nutrition and the environment, gained from working in livestock production in over 50 countries worldwide, including developing countries.
- Main career focus on replacement of drugs and chemicals in feed with natural, effective alternatives, and feeding animals to generate meat, milk and eggs with better nutritional or technical profiles (minerals, antioxidants, fatty acids) for human benefits. Since late 90's, working on feeding animals to prevent environmental pollution. Since 2011, involved in sustainable agriculture, including soil and pasture quality management, to reduce reliance on chemicals and inorganic production systems. Developed systems for promoting soil and pasture quality since 2006 in NZ.
- Commercial experience (since 1995) in multi-species nutrition (poultry, pigs, dogs, cats, calves, dairy, equine, aqua) & international feeding practices.
- Broad based knowledge in related disciplines: feed raw materials, processing and spoilage, animal physiology, health, immunity, microbiology, hormonal control, metabolism, soil and pasture quality, sustainable and regenerative agriculture, environmental issues and osmoregulation.
- Regulatory affairs experience in trial design and execution, data analysis and writing up in required formats for EU, FDA, Canada, Australia, New Zealand, Japan and China since 1996. Role included working with FEFANA and other lobbying and ministerial boards regarding implementation of regulatory frameworks and requirements.
- Feed mill and production audits, including biosecurity systems, improving efficiency, identifying risk issues.
- Established managerial skills obtained from running a laboratory, responsibility for line management and professional development of technical and sales team members in multiple countries.
- Widespread knowledge and understanding of funding mechanisms and requirements for securing research support from industry (including strategic alliances) and government bodies, also product registration and regulation in EU, US, Canada, Australia and NZ.
- Established solid network of contacts through collaboration with influential academic & commercial entities within animal nutrition, food, registration & agricultural sectors.
- Successful organisation & management of scientific teams on applied/commercial & research projects, including control of large-scale budget spend/ planning/ forecast/ income.
- Ability to analyse research holistically, and identify synergies between departments or areas of weakness that require extra input
- Dedicated post-graduate supervisor and respected thesis examiner, with a keen interest in producing successful students, and with a proven ability for ensuring studentship completion.
- Highly skilled at communicating complicated scientific concepts to a wide variety of audiences, from farmers to undergraduates, junior staff to peer academics, and funding bodies to investors
- Editor and reviewer for international journals and regular contributor to trade and public media.

Achievements

- Independent nutritional consultancy established in 2005 (current business since 2009) in New Zealand providing services for clients throughout Europe (West and East, including former Sovie states), Africa, Asia, USA, Canada, Brazil, Australia & New Zealand.
- Director of nutrition research facility in conjunction with Massey University in New Zealand, providing commercial and academic trials facility used by large and small companies and overse clients.
- Expert witness for environmental law court for establishing the OnePlan (2012) regarding the rol of nutrition and feeding strategies on urine nitrogen output from dairy cows – including constructi predictive model for N output based on feed.
- Developed novel feed products to regulatory authority standards, including product registration w EU & FDA (and other) authorities.
- Established in-house laboratory (including staffing, training, and management), providing analytical services for feed and production clients as well as in-house R&D use.
- Current and previous member of several professional bodi es, including the Nutrition Society (full registration status), NZ Nutrition Society, WPSA, BSAS.
- Involved in international consortia of partners, involving breeding companies and veterina practices, universities, regulatory affairs, commercial feed and supplement companies.
- Seasoned presenter at conferences and seminars, able to speak on a wide range of nutrition and related topics, registration, trial design and statistics as well as training for commercial, professional and lay delegates.
- Chairing international seminars, responsible for identifying speakers, inviting delegates, preparing proceedings and organising in-house event staffing.
- Successfully supervised graduate and post-graduate studentships, with consistent pass record for all theses completed to date.
- Involved as chapter contributor and editor for several books covering animal nutrition, health, production and statistics.
- Editor-in-Chief of World's Poultry Science Journal (2007-2020) and Journal of Applied Animal Nutrition (since 2011).Chief Scientific Editor British Poultry Science (since 2018).

Experience

Current role	**International Nutrition Consultant:** working in Europe, Asia and local markets in R&D and commercial technical roles across species. Editor and contributor for scientific publishing houses. Scientific writer for commercial and academic clients – including full peer review papers, independent media articles and in-house communications. Regular speaker at conferences and seminars, covering varying aspects of research and commercial developments internationally and locally. Consultation for animal nutrition, new product development and marketing, registration (EU, FDA and NZ mainly) and event sponsorship for all species including companion animals. Active researcher and Director of Nutrition Trial Facility for calves and horses.
Alltech Europe Dunboyne, Eire 2003 –2005	**Senior Technical Manager:** Managing technical aspects of a range of natural ingredients for animal feed (primarily poultry and companion animal) use. Leader of species-specialist team of scientists (EU Management Board), providing commercial technical support, R&D, Ph.D studentships and field trials for the region, product registration (EU, USA, Canada, Australia, NZ), new product development, training seminars, conferences and organising regional scientific events. Co-ordinating research across continents and in line with commercial needs of customers.
Braes Feed Ingredients Merseyside, UK 2001 – 2003	**Technical Ingredient Manager:** Uk Management Board. Developing range of phytogenic/ nutraceutical feed ingredients for use in livestock, equine & pet food sectors. Global responsibility & sole nutrition member of Feed/Food Division Management Team. NPD from product conception to market, via studentships and contract research. Registration of novel nutraceuticals and admixtures in EU, USA and Japan. Scientific due diligence for acquisition of technical companies within the investment portfolio.
Finnfeeds International Marlborough, UK 1995 – 2001	**Technical Manager:** Last post held: Technical Management of commercial sales of feed enzymes & betaine in Europe, Middle East & Africa. Other roles included setting up and running technical services laboratory in UK, registration for EU, FDA, Canada and Australia, trouble-shooting on farm, technical writing and data analysis, R&D projects and commercialisation/technical marketing of new and existing product in various countries.
Harper Adams University College, UK 1992 – 1995	**Researcher:** Academic teaching (statistics, animal science and laboratory practicals) & Commercial Trials Manager, running trials in ruminants, pigs, turkeys, agronomy. Various aspects of trials included nutrition, production, welfare and palatability and involved personnel organisation, management of animals or crops, lab analysis, data analysis and reporting.

Education

1992 – 1995
Harper Adams University College, UK

Ph.D. in animal nutrition & feed quality: Entitled 'The nutritive value of wheat for broiler chickens' supervised by Dr. S. P. Rose, *Viva voce* examiner: Dr. Kelvin McCracken (Queens, Belfast). Investigated the genetic and environmental variation in nutritional value of wheat grown in the UK. Included development of *in vitro* models for assessment of rate of digestion (adapted from Englyst human model and fore-runner of many commercial assays in pigs, poultry, calves, dogs (e.g. TNO, NL).

1991
University of Lancaster, UK

B.Sc. Hons. Biological Sciences (2:1): Specialising in animal physiology, general microbiology, plant & animal biochemistry. Dissertation on neural & muscle pharmacology.

Personal

- Lucy Anne Waldron (previous married name: Tucker)
- Born: 14th March 1970, Shifnal, Shropshire, UK
- NZ resident since March 2005
- Marital Status: Divorced. No children.
- Full, clean driving license held since 1987 (UK). Held NZ license since June 2005.
- Experienced global business traveller

Professional Training

- Home Office licensing course – animal trials & invasive procedures
- Metabolisable Energy procedures – Dr. J McNab, Roslin Institute, UK
- Advanced Presentation skills
- Time management
- Sales & Negotiation skills
- Communication skills
- Computing: MS Office ME, Lotus Notes, Database use & construction, PowerPoint, Genstat, SAS and UNISTAT statistics, FORMAT feed formulation, Optima pig model.
- Registered nutritionist with the Nutrition Society in UK and NZ
- Qualified DEFRA Equine AI Technician, semen collection, professional mare management, foaling and youngstock care

Student supervision

Karlette Fernandes – started 2012 equine nutrition PhD Massey University
Lana Bishop – started 2012 MSc student equine nutrition Massey University, NZ
Ishwari Singh – Massey University, NZ 2011. PhD student – working dog nutrition
Jody Blomfield – Waikato University and Equibreed NZ. 2009 MSc student – effect of minerals and omega oils on stallion fertility
Katherine Bell – Massey University NZ, 2009 Ph.D. thesis: Soya isoflavones and the health of domestic cats
Sarah Todd – Massey University NZ, 2006 Ph.D. thesis: Metabolism of selenium in cats and dogs.
Mohammed Ali Elmusharaf – University of Utrecht, Netherlands, 2006 Ph.D. thesis: The efficacy of Bio-Mos™ in broiler nutrition.
Michelle Lewis - Harper Adams University College UK, 2004. Ph.D. thesis: Effects of dietary inclusion of plant extracts of the growth performance of broiler chickens
Deborah Cross – Scottish Agricultural College, UK 2002. Ph.D. thesis: The performance of chickens fed diets with and without thyme oil and enzymes
Justin Collier – Harper Adams University College UK, 1997. 2nd industrial supervisor M.Phil. thesis (see publication list)
Niall Hogg – Harper Adams University College UK, and Hodmezovasarhely Research Station, Hungary 1996. B.Sc. dissertation: True metabolisable energy of wheat varieties that differ in intestinal viscosity in chickens
David Alder – Joint project between Harper Adams University College UK and Hodmezovasarhely Research Station, Hungary, 1996. B.Sc. dissertation: Viscosity in wheat fed to broilers.

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