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To the National Animal Welfare Advisory Committee (**NAWAC**)

FEEDBACK ON THE CODE OF WELFARE FOR PIGS

1. The New Zealand Animal Law Association (**NZALA**) has been invited by NAWAC to provide views on the current Code of Welfare for Pigs (**Code**).
2. NZALA is grateful for the opportunity to be involved in this review, and we trust that our feedback below is of assistance. We look forward to being further involved as this review, and the reviews of the other codes of welfare, progress.
3. This feedback first provides an overview of NZALA's concerns with the Code, and then discusses each area of concern in further detail. We then discuss alternatives to farrowing crates, in light of the Government's commitment to phasing these out within five years.

Overview

4. NZALA has numerous concerns in relation to the Code. These include:
 - **Provision of Adequate Nest-Building Material While Farrowing:** The Code does not adequately ensure that nesting material is provided to sows while farrowing. This is problematic, given that sows are highly motivated to use such materials, with nesting being a deeply ingrained behaviour in sows. In particular, the extent and type of material should be specified to provide clarity to farmers, and nesting material should be required to be provided to sows in farrowing systems constructed prior to 3 December 2010 (this is not currently the case).¹
 - **Space:** Space in general is an issue for pigs. The Code does not provide sufficient space to account for pigs' movement so as to ensure that their behavioural needs are met (including play, foraging and exploration). The intensive farming of pigs also leads to heightened aggression; increased skin lesions; increased incidence of negative social behaviour; higher stress levels; and more. NAWAC has recognised that pigs require more space and numerous scientific studies have confirmed this. The Code needs to be amended accordingly, such that more generous space allowances for pigs are made mandatory.
 - **Lack of Clarity Regarding Shelter for Pigs with Access to the Outdoors:** Where pigs are housed outside adequate space should be provided in the shelter that is provided to them and there should be clarity in the Code regarding stocking densities for pigs kept outdoors – this is not currently the case, with such requirements having been made the subject of local government regulations that are difficult to find.

1 Code of Welfare (Pigs) 2018, Minimum Standard No. 10(h) at 18.

- **Providing for the Behavioural Needs of Pigs:** The Code fails to sufficiently provide for the behavioural needs of pigs, including in relation to play, foraging, rooting, exploration and wallowing. Pigs have a wide range of behavioural needs and these are not currently protected under the Code, with the Code only ensuring that pigs are able to exhibit a limited range of behaviours, including feeding, drinking, sleeping, dunging and urination, vocalisation, thermoregulation and social contact.²
- **Premature Weaning of Piglets:** Pigs are weaned very early in commercial production, with a consequent impact on their physical health and behaviour. This aspect of the Code may need to be amended to ensure the needs of pigs are met.
- **Use of Elective Husbandry Procedures:** There are numerous elective husbandry procedures, which impact on the welfare of pigs. These include tail docking; the clipping and grinding of pigs' teeth; the use of nose rings, clips or wires; identification procedures that involve notching, tagging, punching or tattooing pigs' ears or bodies; tusk trimming of boars; and castration of piglets over the age of between two and seven days old.

A number of these procedures (including tail docking and clipping/grinding of teeth) are only necessary due to the intensive conditions in which pigs are kept and may be ameliorated through the provision of environmental enrichment. Additionally, all of these procedures may cause pigs pain and a number do not require pain relief to be provided (e.g. use of nose rings, clips or wires; identification procedures; and clipping/grinding of teeth where pigs are under five days of age).

- **Use of Electric Prodders and Goats:** Regulation 48 of the Animal Welfare (Care and Procedures) Regulations 2018 (**Regulations**) allows for the use of electric prodders on pigs, which causes pigs stress and pain. While the regulation only allows for the use of such prodders where pigs are over 150kg, they do not ensure that such prodders are only used for one second at a time; that multiple applications should be adequately spaced; or that shocks should be discontinued if the animal fails to respond. It is also not a requirement of regulation 49 that goats not be used on the ears and nose of animals, despite these areas being sensitive.
- **Ventilation:** High levels of ammonia are permitted in indoor systems, which may be harmful to pigs. It is not a requirement of the Code that these levels be measured and monitored by farmers.
- **Lighting:** The Code currently allows pigs to be kept in total darkness for 15 hours a day, with a low artificial light of only 20 lux being required for the other 9 hours of the day. This may lead to higher levels of aggression due to a consequent inability of pigs to discriminate between familiar and unfamiliar other pigs.
- **Mixing of Pigs:** The Code provides insufficient provision for the mixing of pigs, which can lead to stress and aggression if not adequately managed. There are no minimum standards in relation to this welfare issue and this should be addressed.
- **Genetic Selection of Pigs for Their Environment:** Genetic selection in relation to pigs should be more thoroughly addressed in the Code. In particular, the Code needs to account for the physical, health and behavioural impact of genetically selecting pigs for high productivity. Such impacts include leg weakness; and clumsier, heavier sows that are more likely to lie on top of their piglets. Alternatively, genetic selection could be used as a means

2 Code of Welfare (Pigs) 2018, Minimum Standard No. 9 at 16.

of reducing the need for farrowing crates through breeding for non-crushing sows with a greater maternal instinct; and genetically selecting for more robust piglets.

- **Welfare Assurance:** The Code currently includes recommended best practice, but no minimum standards, in relation to welfare assurance systems.
5. NZALA has concerns that a number of standards set by the Code in relation to the above are, or may be, inconsistent with the Animal Welfare Act 1999 (**Act**) (as has been established in relation to farrowing crates and mating stalls). For this reason, NAWAC should give particular consideration to the above matters, and whether they should be the subject of recommendations made under section 183A(2) of the Act.

Provision of Nesting Material During Farrowing

6. Minimum Standard 10 (Managing Interactions between Sows and Piglets) provides as a recommended best practice that “Sows should be provided with nest building material e.g. straw from at least 48 hours before farrowing.”³ Minimum Standard 10(h) further provides that “Sows, in any farrowing system constructed after 3 December 2010, must be provided with material that can be manipulated until farrowing.”⁴

7. Farrowing pigs are highly motivated to engage in nest-building activities. Held *et al* recognised, “the only resource to approach the value of food is the value of nesting material... prior to farrowing.”⁵ Similarly:⁶

... studies of the behaviour and physiology [of pregnant sows show that] additional space and provision of nesting substrates reduce behavioural and physiological indicators of distress in pre-parturient sows (e.g. Jarvis *et al.*, 1997; Damm *et al.*, 2002).

8. Nest-building has been linked with higher levels of oxytocin in sows and increased “positive maternal behaviours during farrowing”,⁷ such as a reduced risk of crushing and greater suckling success for piglets.⁸ Baxter *et al* note that several authors have linked high nest-building activity and a reduced risk of crushing:⁹

The more complete and functional the nest is, the more likely the sow is to end nest building and begin the more somnolent farrowing phase.

9. Conversely, Baxter *et al* found that not being able to nest during farrowing leads to elevated plasma cortisol levels in sows (indicating higher levels of stress).¹⁰ Weaver *et al* found that inability to nest leads to increased frequencies of stereotyped movements and increased restlessness.¹¹ It may also lead to sows carrying out nesting behaviours when piglets are born, leading to further posture changes and potentially to a higher risk of piglets being crushed.¹²

3 Code of Welfare (Pigs) 2018, Minimum Standard No. 10, Recommended Best Practice (b) at 18.

4 Code of Welfare (Pigs) 2018, Minimum Standard No. 10(h) at 18.

5 Suzanne Held, Jonathan J Cooper and Michael T Mendl “Advances in the Study of Cognition, Behavioural Priorities and Emotions in Marchant-Forde, Jeremy N. (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 73.

6 At 72.

7 EM Baxter, IL Anderson and SA Edwards “Sow welfare in the farrowing crate and alternatives” (2018) 27 *Advances in Pig Welfare* at 28 and 29.

8 Ibid.

9 EM Baxter, AB Lawrence, and SA Edwards “Alternative farrowing systems: design criteria for farrowing systems based on the biological needs of sows and piglets” (2011) 5 *Animal* 580-600 at 582.

10 EM Baxter, AB Lawrence, and SA Edwards “Sow welfare in the farrowing crate and alternatives” (2018) 27 *Advances in Pig Welfare* at 28 and 29.

11 Sean Weaver and Michael Morris “Science, pigs, and politics: a New Zealand perspective on the phase-out of sow stalls” (2004) 17 *Journal of Agricultural and Environmental Ethics* 51 at 56.

12 Anna K Johnson and Jeremy N Marchant-Forde “Welfare of Pigs in the Farrowing Environment” in Jeremy N. Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009), at 161.

10. A number of studies have identified the benefits of providing a certain quantity and/or type of nesting material. A 2014 report cited by MPI found that a lower number of injuries occur in piglets where a large amount of straw is provided (instead of small daily amounts being provided).¹³ It found too that the provision of such material led to piglets with higher weight gain over the first five days of life and higher body weight at weaning. MPI stated this indicates:¹⁴

... that the provision of large amounts of straw has a positive influence on the welfare of piglets, as well as the sow, by giving her the opportunity to perform nest building behaviour.
11. Bolhuis *et al* found that the provision of jute sacks and straw balls, while not sufficient in themselves for pigs to perform appropriate nest building behaviour and create a completely satisfactory nest, were favourable.¹⁵ For example, pigs were attracted to these materials and spent significantly more time on manipulating nesting material and less time manipulating the floor, rope and fence than sows without these nesting materials.
12. Da Silva *et al* recommended the use of nesting materials such as straw branches.¹⁶ Rosvold *et al* found straw compared more favourably than peat as a nesting material, with straw resulting in more time spent on nest building, increased lying time and less stereotypes.¹⁷ And Swan *et al* found that sows seem to benefit more from newspaper than straw or wood shavings (although this may have been due to the use of slatted floors, which caused wood shavings and straw to fall through and because sows ate some of the straw).¹⁸
13. Baxter *et al* also recommended the provision of malleable flooring (e.g. consisting of earth or sand) “to accommodate nest building activities.”¹⁹ Da Silva *et al* similarly recommended that earth or sand be provided at least 24 hours before parturition.²⁰
14. There is a growing evidence base for benefits of nesting behaviour on the piglets’ welfare (through improved sow behaviour and effects on hormones influencing colostrum production), and additional very recent work investigating nesting materials for sows in crates.²¹ It is evident that the most satisfying nest-building activities require both space and substrate,²² and providing for both these elements imparts the greatest benefits to piglets.²³

13 R Westin, N Holmgren, J Hultgren, B Algiers “Large quantities of straw at farrowing prevents bruising and increases weight gain in piglets” (2014) 115 Preventive Veterinary Medicine 181 to 190.

14 Ministry for Primary Industries *Welfare Pulse* (Issue 18, June 2015) at 14 citing Westin R *et al* (2014) Preventive Veterinary Medicine 115, 181 to 190.

15 JE Bolhuis, AME Raats-van den Boogard, AIJ Hoofs, NM Soede “Effects of loose housing and the provision of alternative nesting material on peri-partum sow behaviour and piglet survival” (2018) 202 Applied Animal Behaviour Science 28 to 33.

16 CA da Silva, X Manteca, CP Dias “Needs and challenges of using enrichment materials in the pig industry” (2016) 37 at 531.

17 EM Rosvold, RC Newberry, T Framstad, I Andersen “Nest-building behaviour and activity budgets of sows provided with different materials” (2018) 200 Applied Animal Behaviour Science 36 to 44.

18 K Swan, OAT Peltoniemi, C Munsterhjelm, A Valros “Comparison of nest-building materials in farrowing crates” (2018) 203 Applied Animal Behaviour Science 1 to 10.

19 EM Baxter, AB Lawrence, and SA Edwards “Alternative farrowing systems: design criteria for farrowing systems based on the biological needs of sows and piglets” (2011) 5 Animal 580 to 600 at 586.

20 CCA da Silva, X Manteca, CP Dias “Needs and challenges of using enrichment materials in the pig industry” (2016) *Semina: Ciências Agrárias* at 531.

21 KM Swan, OAT Peltoniemi, C Munsterhjelm, and A Valros. 2018. Comparison of nest-building materials in farrowing crates. *Applied animal behaviour science*, 203, 1 to 10.

22 S Jarvis, SK Calvert, J Stevenson, N van Leeuwen and AB Lawrence 2002. Pituitary- adrenal activation in pre-parturient pigs (*Sus scrofa*) is associated with behavioural restriction due to lack of space rather than nesting substrate. *Animal Welfare* 11, 371 to 384.

23 J Yun, KM Swan, C Farmer, C Oliviero, O Peltoniemi, and A Valros. 2014. Prepartum nest-building has an impact on postpartum nursing performance and maternal behaviour in early lactating sows. *Applied animal behaviour science*, 160, 31 to 37; J Yun, KM Swan, K Vienola, YY Kim, C Oliviero, OAT Peltoniemi, and A Valros. 2014. Farrowing environment has an impact on sow metabolic status and piglet colostrum intake in early lactation.

15. NAWAC recognised the importance of nest-building in its accompanying report on the Code of Welfare (Pigs) 2010. This report acknowledged that “*Nesting behaviour is the most critical element of farrowing behaviour for the sow’s welfare.*”²⁴ Hence, Minimum Standard 10(h) required that sows in a farrowing system must be provided with material that can be manipulated until farrowing. NAWAC have stated that this section requires sows to have “*access to materials that promote nest building behaviour expressed in the 48 h before farrowing, a behaviour that is also beneficial to the sow’s emotional state.*”²⁵
16. Unfortunately, it appears that nest-building activities are frustrated within a farrowing crate environment. NAWAC has “*been concerned for some time that the farrowing crate system is not compatible with the welfare benefits intended by Minimum Standard 10(h).*”²⁶ This is attributable to the lack of space provided for sows in farrowing crates and the lack of any provisions in the Code specifying the extent of what’s required for nesting materials prior to farrowing e.g. how much material should be provided; what this material should consist of;²⁷ and what surfaces would best accommodate nest-building. For example, NAWAC noted in 2015:²⁸
- [The] Minimum Standard to allow for nesting behaviour is not being met in many cases. Most farms seem not to [be] providing nesting material because the slatted system cannot handle substances like straw.
17. Similarly, MPI stated in 2017 that the suggested use of straw for nesting material “*presented significant compliance issues for the industry in slatted systems, particularly around animal hygiene and labour*”²⁹ and that:³⁰
- The existing Minimum Standard is currently not being met in a meaningful way by industry due to uncertainty about requirements and lack of meaningful welfare benefit that existing materials provide.
18. A proposed regulation regarding a requirement to provide nesting materials for farrowing sows has never been realised.³¹ As outlined by MPI, “*nesting material remains an area for potential future regulation.*”³²
19. We note that what is an adequate amount of nesting material depends on the function of the substrate. 2kg has been suggested by Lene Juul Pedersen (Professor of Animal Welfare at Aarhus University in Denmark) as a minimum amount on the basis of her research. If required for thermal comfort of the piglets then more would be needed (for example, 2.5cm depth to reduce conductive heat loss by 40% as researched by Mount in the 1960s.³³

24 Livestock Science, 163, 120 to 125; and J Yun, and A Valros. 2015. Benefits of prepartum nest-building behaviour on parturition and lactation in sows—a review. *Asian-Australasian journal of animal sciences*, 28(11), 1519.

25 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 12.

26 NAWAC Response to the Petition of Save Animals from Exploitation (SAFE) to end the use of farrowing crates, Submission to the Primary Production Select Committee, 27 July 2018 at 3 and 6.

27 At 3.

28 For instance, Naya Brangenberg informed us that her farm maintains 80% grass cover, such that sows can collect their own grass for nesting. They are also provided with straw (Interview with Naya Brangenberg, Farmer at Longbush Pork (the author, 24 April 2020)).

29 National Animal Welfare Advisory Committee Minute “General Meeting” (20 May 2015) at [C 3].

30 Ministry for Primary Industries *Appendix three: Animal welfare regulatory proposals that will not be progressed at this time* <<https://www.mpi.govt.nz/dmsdocument/18989-animal-welfare-appendix-three-proposals-that-will-not-progress-at-this-time/>> at 2.

31 Ibid.

32 Ministry for Primary Industries *Regulatory Impact Statement: Animal Welfare Regulations 2017* at 14 and 33.

33 Ministry for Primary Industries *Regulatory Impact Statement: Animal Welfare Regulations 2017* at 33.

34 LE Mount (1967): The heat loss from new born pigs to the floor. *Res. vet. Sci.*, 8: 175 to 186; and LE Mount (1968, Edward Arnold, London, UK) *The climatic physiology of the pig*.

20. Nesting materials are only required for farrowing systems constructed after 3 December 2010.³⁴ This appears to be anomalous. As the NZALA outlined in its submission on the proposed Animal Welfare (Care and Procedures) Regulations, there should at least be a sunset clause providing for a date at which those cages constructed prior to 2010 should have to comply.³⁵ There is no reason why a loophole should exist for these older cages.

Space

21. Minimum Standard 6 (Housing and Equipment) establishes that:³⁶
- All group housed pigs must be able to stand, move about and lie down without undue interference with each other in a space that provides for separation of dunging, lying and eating areas.
22. Minimum Standard 6(c) further provides for an equation to determine the “*minimum unobstructed lying space allowance for grower pigs.*” This calculation is as follows: Area (m²) per pig = 0.03 x liveweight^{0.67} (kg).³⁷ This formula is now also contained in regulation 25 of the Regulations.
23. However, the formula provided only represents the requirements for the stationary area occupied by a growing pig that is lying down. Neither Minimum Standard 6 nor regulation 25 specifically address the space that is required for a pig to move around so as to meet its physical, health and behavioural needs – despite the fact that MPI has stated that “*this is the minimum lying space requirement, and may not be the ideal space for welfare requirements in all situations.*”³⁸
24. The amount of space provided for through this calculation is highly restrictive. We used MPI’s Pig Space Calculator to determine what the stocking density for a pig might look like in practice.³⁹ Given an average weight of 69kg per pig,⁴⁰ 195 pigs could be kept in an area 100m². This equates to an area of 0.51m² per pig. Cho and Kim reviewed the optimum stocking density for pigs with reference to growth performance and stress on pigs.⁴¹ The authors concluded that nursery (10kg – 30kg), growing (30kg – 85kg) and finishing pigs (85 kg – 110kg) require space allowances of greater than 0.3m², 0.6m² and 0.9m², respectively.
25. Under MPI’s calculator, nursery pigs would have 0.14m² (at 10kg) – 0.29m² (at 30kg); growing pigs would have 0.29 (at 30 kg) – 0.59m² (at 85 kg); and finishing pigs would have 0.59 m² (at 85 kg) – 0.67 m² (at 110 kg). These space allowances are not commensurate with Cho and Kim’s findings in regards to finishing pigs weighing 85kg – 110kg, which recommend that pigs at this weight have a spatial allowance of 0.9m² per pig – rather than the 0.67m² provided for in MPI’s calculator.

34 Code of Welfare (Pigs) 2018, Minimum Standard No 10(h) at 18.

35 National Animal Welfare Advisory Committee *Submission on the Proposed Animal Welfare Regulations* (May 2016) at 22.

36 Code of Welfare (Pigs) 2018, Minimum Standard No. 6(b) at 12. Minimum Standard No. 12 (Managing Boars) at 20 provides for an equivalent provision in relation to boars, stating that boars must have sufficient space to stand up, turn round and lie down and also for separation of dunging, lying and eating areas.

37 Code of Welfare (Pigs) 2018, Minimum Standard No 6(c) at 12.

38 Ministry for Primary Industries “Guide to the Animal Welfare (Care and Procedures) Regulations” <<https://www.mpi.govt.nz/protection-and-response/animal-welfare/guide-to-the-animal-welfare-care-and-procedures-regulations/>>.

39 Ministry for Primary Industries “Pig Space Calculator” <<https://www.agriculture.govt.nz/protection-and-response/animal-welfare/codes-of-welfare/resources/pig-space-calculator/>>.

40 Pig Progress “New Zealand’s pig industry: Surviving through isolation” <<https://www.pigprogress.net/World-of-Pigs1/Articles/2017/10/New-Zealands-pig-industry-Surviving-through-isolation-200451E/>>.

41 JH Cho and IH Kim “Effect of stocking density on pig production” (2011) 10 African Journal of Biotechnology at 13688.

26. Kim *et al* considered optimal space allowance for pigs at specific growth stages based on body weight that would maximise performance and reduce stress and the incidence of inflammatory responses in pigs.⁴² The following table outlines what the authors recommended as compared to the spatial allowances provided for using MPI's calculator:

Body Weight (kg)	Space Allowance (m ² per pig) – Kim <i>et al</i> .	Space allowance (m ² per pig) – MPI calculator
11 – 25	0.24	0.14 – 0.26
25 – 45	0.44	0.26 – 0.38
45 – 65	0.64	0.38 – 0.49
65 – 85	0.78	0.49 – 0.59
85 – 115	0.80	0.59 – 0.72

27. The spatial allowances in New Zealand are lower than what is recommended in Kim *et al* in four out of the five weight ranges identified above.
28. Fu *et al* tested pigs with a weight range of 75.2kg +/- 2.7kg at stocking densities of 0.8m² per pig, 1.2m² per pig and 1.6m² per pig. They found that the optimal stocking density is 1.2m² per pig.⁴³ At this stocking density, pigs had less lesions on the ears, front, middle and hind-quarters; spent less time participating in negative social behaviour; had less manure on their bodies; and had a more normal body surface temperature when compared to pigs at a stocking density of 0.8m² per pig. Total scores of lesions on the body increased as stocking density intensified, suggesting that 1.6m² per pig would be a more appropriate stocking density. However, pigs showed more positive social behaviours at a stocking density of 1.2 m² in this study and this, alongside optimal building utilisation, led the authors to consider this the most appropriate stocking density.
29. Regardless, this spatial allowance is well above what is provided for in the New Zealand Code, with the stocking density of 1.2m² per pig equating to a factor of 0.066 to be used in the equation outlined above – this is more than double the factor used at Minimum Standard 6(c) of 0.03 and exceeds even the recommended best practice of 0.047.⁴⁴
30. Other studies have recommended even higher spatial allowances in the range of 2.0m² to 2.4m² per animal, as well as the use of barriers in pens and full-body length feeding stalls in pens to minimise aggression.⁴⁵ Weaver and Morris canvassed a number of these studies:⁴⁶

Sow performance has been shown to improve steadily as the space allocation for pigs (at an initial weight of 55.5 kg) was increased to 1.20m² (Brumm, 1996). The growth rate of adult pigs improved when space allowance increased to 1.80m² (ibid.). Weng *et al* (1998), monitored injury, aggression, and time spent foraging when 6 sows were kept in a pen with a space allocation of

42 KH Kim, KS Kim, JE Kim, DW Kim, KH Seol, SH Lee, BJ Chae and YH Kim "The effect of optimal space allowance on growth performance and physiological responses of pigs at different stages of growth" (2017) 11 Animal 478 to 485.

43 L Fu, H Li, T Liang, B Zhou, Q Chu, AP Schinckel, X Yang, R Zhao, P Li and R Huang "Stocking density affects welfare indicators of growing pigs of different group sizes after regrouping" (2016) 174 Animal Applied Behaviour Science 42 to 50.

44 At 43.

45 Niamh E O'Connell "Housing the Fattening Pig" in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 192.

46 Sean Weaver and Michael Morris "Science, pigs, and politics: a New Zealand perspective on the phase-out of sow stalls" (2004) 17 Journal of Agricultural and Environmental Ethics 51 at 56.

2.0, 2.4, 3.6 and 4.8 m² per adult pig. Based on results from the study, the authors recommended a space requirement of between 2.4, and 3.6m² per sow.

31. There are numerous welfare risks associated with not providing pigs with sufficient space. As Hemsworth *et al* stated:⁴⁷

Although group housing facilitates social living, group housing of gestating sows raises different welfare considerations to stall housing, such as high levels of aggression, injuries and stress for several days after mixing at least, as well as subordinate sows being underfed due to competition at feeding (Barnett *et al* 2003).

32. Increased space enables pigs to more easily escape aggressors.⁴⁸ In contrast, as stocking density increases, the percentage of negative social behaviour increases,⁴⁹ as do body lesions⁵⁰ and manure on the body (suggesting that pigs are no longer able to separate lying and defecating areas).⁵¹ High stocking densities impact on growth performance due to pigs finding it more challenging to gain access to the feeder, and potentially due to psychological stress.⁵² Insufficient space leads to higher stress responses (e.g. higher plasma cortisol responses); increased incidences of tail biting and other aggressive behaviour; increased skin lesions as a result of aggressive behaviour; and reduced humoral immune responses.⁵³

33. The NAWAC report on the Code of Welfare (Pigs) 2010 recognised differences in public opinion regarding the amount of space required for pigs, analysed scientific data regarding space requirements, and considered the financial implications of increasing space requirements for grower pigs.⁵⁴ NAWAC then acknowledged that pigs do require more space than what is provided for in practice.⁵⁵

34. The report continued:⁵⁶

NAWAC believes more space is required to provide for all pigs movement and social needs, and has therefore included a recommended best practice and other statements within the Code encouraging farmers to provide more space. In addition, above 21 °C, pigs require more space to be able to lose heat and maintain their body temperature. In warmer environments pigs choose to lie further away from conspecifics and display less huddling behaviour in an attempt to remain cool. Therefore at higher temperatures, pigs require additional space to enable them to thermoregulate effectively (Huynh *et al.*, 2005). Therefore, the formula for pigs to be able to lie fully recumbent (Area (m²) per pig = 0.047 x live weight^{0.67} (kg) has been included as a

47 PH Hemsworth, DJ Mellor, GM Cronin and AJ Tilbrook "Scientific Assessment of Animal Welfare" (2015) 63 New Zealand Veterinary Journal 24 at 26.

48 Niamh E O'Connell "Housing the Fattening Pig" in Marchant-Forde, Jeremy N. (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 192.

49 SA Schmolke, YZZ Li, HW Gonyou, "Effects of group size on social behavior following regrouping of growing-finishing pigs" (2004) 88 Journal Applied Animal Behaviour Science 27 to 38.

50 HM Vermeer, KH de Greef, HWJ Houwers "Space allowance and pen size affect welfare indicators and performance of growing pigs under Comfort Class conditions" (2014) 159 Livestock Sci. 79 to 86; and SP Turner, M Ewen, JA Rooke, SA Edwards "The effect of space allowance on performance, aggression and immune competence of growing pigs housed on straw deep-litter at different group sizes" (2000) 66 Livestock Product. Sci. 47 to 55.

51 L Fu, H Li, T Liang, B Zhou, Q Chu, AP Schinckel, X Yang, R Zhao, P Li and R Huang "Stocking density affects welfare indicators of growing pigs of different group sizes after regrouping" (2016) 174 Animal Applied Behaviour Science 42 to 50 at 49.

52 Niamh E O'Connell "Housing the Fattening Pig" in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 193.

53 Niamh E O'Connell "Housing the Fattening Pig" in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 193 and 194.

54 Being a "4.5% increase in price and a 4.8% decrease in the quantity of pig meat produced." See National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 9.

55 Code of Welfare (Pigs) 2018 at 12.

56 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 9.

recommended best practice. In addition providing more space is included as one of the measures to reduce overheating of pigs, in the housing temperature section.

35. NAWAC also recognised in its report that pigs are highly motivated to explore and engage in other behaviours such as rooting and foraging but that these behaviours are frustrated in many of today's farming systems.⁵⁷
36. The NAWAC report also recognised that insufficient space in regards to group housed sows leads to aggression and injury among pigs.⁵⁸
37. Despite recognising that pigs require more space than what the minimum standards provide for, and the dangers associated with a lack of space, NAWAC refrained from amending the minimum standards. Instead, it has included more generous space allowances in the recommended best practice section of the Code and in the general information section of Minimum Standard 6.⁵⁹ These more generous provisions are not mandatory. NAWAC stated that its decision was in part due to a lack of information available at the time regarding the space requirements for group-housed sows.⁶⁰
38. However, research both prior and subsequent to NAWAC's report shows that more space is necessary to meet the welfare needs of pigs and NAWAC has clearly recognised that more space needs to be provided. This Minimum Standard is thus in need of review.
39. We note that, in reviewing this aspect of the Code, NAWAC will also need to provide for pigs to be genetically selected such that they can thrive in more extensive systems. For example, Lay and Marchant-Forde have stated that:⁶¹

Characteristics that enable sows to live in single housing will not serve them well if they are to be kept in groups. For instance, a sow in a single stall need not compete for feed or protect herself from aggression. In a group housing system, these traits will likely be very important for her survival. To ensure optimum welfare of swine, further selection criteria will need to be addressed that specifically focus on welfare.

40. Any amendments to Minimum Standard 6 should address this issue.

Aggression

41. For the avoidance of doubt, we note that aggression between pigs that are not familiar with each other is not unusual. It is part of their behavioural repertoire but does not constitute a behavioural need in the same way as we talk about behavioural needs such as nest-building.

57 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 19.

58 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 9:
However, scientific evidence has shown that insufficient space in group housed sows increases the consequences of aggressive behaviour at mixing and induces chronically raised cortisol levels (Barnett et al., 2001) as well as causing a higher incidence of skin lesions particularly on the feet and legs. These injuries can be inflicted by contact with pen fittings or flooring, or non-agonistic interactions between individuals such as gilts stepping on each other (Harris et al., 2006).

59 Code of Welfare (Pigs) 2018 at 13 – 14. "Total space requirements to meet movement and social needs may have to be increased in some situations, depending on the interaction of a number of factors characterising the housing and management system, including feeding strategies, group size, age, breed, temperature, insulation, ventilation, pen shape, flooring, lighting and other husbandry factors. The same factors apply to space requirements for group housed sows, noting that the smaller the size of the group the more space per sow is required. Increased space allowance and provision of hide areas (visual barriers) for group housed sows reduces the amount and effects of aggression."

60 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 9.

61 Don C Lay, Jr and Jeremy N Marchant-Forde "Future Perspectives of the Welfare of Pigs" in Jeremy N. Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 340.

42. For example, one aspect of determining behavioural need is whether the animals experience a negative welfare state in the absence of the behaviour, and for aggression this is not the case. There is an excellent review by Verdon and Rault that discusses this and talks about the importance of sows being able to display avoidance behaviour to limit aggressive encounters and the importance of providing enough space to display this and engage in non-competitive feeding.⁶²
43. We know that aggressive interactions are exacerbated by limited resources such as space and food. If there is not enough food and not an appropriate way of feeding the animals fighting will occur. The other important aspect that can impact on sow welfare is the issue of riding/mounting that occurs post-weaning when sows come onto heat. There is a risk to animal welfare, especially if older and heavier animals are mixed with lower parity animals on poor flooring that can cause slipping and does not provide good support.
44. However dynamic mixing of this sort is poor practice and there are practical ways of mixing sows at weaning that avoid the use of mating stalls, provide enough space to allow for avoidance behaviour (which is very important for the most submissive and often most vulnerable animals) and reduce aggression, provide ad libitum feeding and protected feeding areas and provide protection from riding or mounting behaviour via appropriate size-matching of individuals and appropriate flooring.
45. For example, regarding space, work in Australia recommends more space for mixing and then sows can tolerate lower space recommendations (but no lower than 2.0m² per sow as a critical lower threshold) once the dominance order has been established, as long as feeding stations allow non- competitive feeding.⁶³ NFACC's review of the scientific literature is also useful as well as the Prairie Swine Research Centre's website dedicated to group housing solutions for gestating sows.⁶⁴

Shelter

46. Minimum Standard No. 5(a) (Shelter for Pigs Outdoors) outlines that when pigs are farmed outdoors, they must have access at all times to shelter that is adequately ventilated and provides protection from extremes of heat and cold.⁶⁵ Minimum Standard No. 5(b) further outlines that pigs must have access at all times to "*a dry area that is large enough to allow the pigs to stand up, turn around and lie down in a natural position.*"⁶⁶
47. These standards are reinforced by regulation 24 of the Regulations, which provides that pigs must have access to shelter and dry lying areas. The regulation further outlines that pigs must have access to a structure they can access at any time which is dry and ventilated (but not draughty); protects them from extreme heat and cold; that is big enough for them to stand up, lie down, and turn around in easily; and that does not allow droppings or urine to accumulate.⁶⁷
48. However, the Code does not address what happens if there is continuously bad weather and pigs are forced to use the shelter often, meaning there is little space to move around in – which could contribute to aggression and subsequent injury in pigs.

62 M Verdon, and J-L Rault "Aggression in group housed sows and fattening pigs", in M Spinka (ed) (2018, Woodhead Publishing Series in Food Science, Technology and Nutrition: Advances in Pig Welfare, United Kingdom), 235 to 251.

63 Ibid.

64 <<https://www.airieswine.co/portfolio-item/group-sow-housing/>>.

65 Code of Welfare (Pigs) 2018, Minimum Standard No. 5(a) at 11.

66 Code of Welfare (Pig) 2018, Minimum Standard No. 5(b) at 11.

67 Animal Welfare (Care and Procedures) Regulations 2018, regulation 24.

49. Further, MPI has stated that stocking densities for pigs kept outdoors will be established by local Government regulations and “*depend on the nature of the land and rainfall.*”⁶⁸ It is unclear whether such regulations have been promulgated and where to find them. This lack of clarity is problematic, especially given the scale of New Zealand’s outdoor pig breeding sector, which “*makes up around 40 per cent of the industry.*”⁶⁹

Behavioural Needs

Innate Pig Behaviours

50. Domestication of the pig from its ancestor (the wild boar) has changed many of the physical attributes of the pig. For example, pigs are larger, leaner with less hair. Sows have more teats, produce more piglets and those piglets grow faster.
51. However, we know that behaviour has changed very little. We know this from observing domesticated pigs under semi-natural or natural conditions. A wild boar, for example, spends most of the day engaged in foraging activities.⁷⁰ Active periods are typically in the morning and afternoon, with rest periods around midday. Similar bimodal patterns of activity are seen in domestic pigs, and when domestic pigs are observed under semi-natural conditions 75% of their active time is spent foraging, which includes behaviours such as rooting, grazing and exploring substrates with their snout (Stolba and Wood-Gush, 1989).⁷¹
52. Pigs have evolved as opportunistic omnivores and the behaviours required to find and forage for food involve use of the oral-naso organs (i.e. the snout and mouth). Whilst rooting with the snout is the preferred method of foraging, studies have shown that when pigs are nose-ringed (a ring put through their nose to prevent rooting behaviour and therefore over-poaching of land) they still perform the same level of foraging activity but adjust to sniff, chew and manipulate substrates.⁷²
53. These foraging behaviours have not been bred out of the domestic pig and are considered an important element of their behavioural expression. The motivation behind these behaviours include extrinsic exploration/appetitive behaviour (to find food) and intrinsic exploration to gather general information on their surroundings. Curiosity and boredom are types of intrinsic exploration. Irrespective of the type of explorative behaviour performed, the pig will make use of the same behavioural elements, i.e. rooting, sniffing, and chewing. Exploratory behaviour may serve different purposes depending upon the type of motivation.
54. Famous experiments conducted in the 1980s released typical domestic sows into the wild to determine if behaviour had changed through domestication, and much of the evidence regarding natural behaviours and their persistence in domestic pigs, stems from this work.⁷³

68 Code of Welfare (Pigs) 2018 at 12.

69 NZPork “New Zealand Pork Industry Board Annual Report 2018” at 3.

70 H Fradrich (1974) A Comparison of Behaviour in the Suidae. New Series, vol. 24 IUCN, Merges, 133 to 143.

71 A Stolba, and DGM Wood-Gush (1989) “The behaviour of pigs in a semi-natural environment” *Animal Science*, 48(2), 419 to 425.

72 M Studnitz., MB Jensen, and LJ Pedersen (2007) “Why do pigs root and in what will they root?: A review on the exploratory behaviour of pigs in relation to environmental enrichment” *Applied animal behaviour science*, 107(3-4), 183 to 197.

73 P Jensen (1986) “Observations on the maternal behaviour of free-ranging domestic pigs” *Applied Animal Behaviour Science* 16, 131 to 142; P Jensen P and I Redbo (1987) “Behaviour during nest leaving in free-ranging domestic pigs” *Applied Animal Behaviour Science* 18, 355 to 362; P Jensen P and B Recen (1989) “When to wean -- Observations from free-ranging domestic pigs” *Applied Animal Behaviour Science* 23, 49 to 60; P Jensen “Behaviour of pigs” *The ethology of domestic animals* (2002, CABI Publishing, Wallingford, UK) 159 to 172; A Stolba and DGM Wood-Gush (1981) “The assessment of behavioural needs of pigs under free-range and confined conditions” *Applied Animal Ethology* 7, 388 to 389; A Stolba and DGM Wood-Gush (1984) “The identification of behavioural key features and their incorporation into a housing design for pigs” *Annales De Recherches Veterinaires*

55. In summary, pigs have a wide range of behavioural needs, with commentators having identified a number of findings from studies of pig cognition, emotion, and behaviour which suggest that pigs possess complex ethological traits similar, but not identical, to dogs and chimpanzees.⁷⁴

Play

56. Just like dogs and primates, pigs are playful animals and regularly engage in complex social and object play. Studies have shown that pigs shake or carry objects such as balls or sticks, hop, jump or pivot to entertain themselves, and engage in play fighting or chasing.⁷⁵ Play has been shown to be important in social affiliation, with play enabling pigs to develop social bonds (e.g. through social nosing)⁷⁶ and with pigs reared in enriched environments being “*more socio-cognitively developed than their counterparts raised in standard farrowing crates (Martin et al., 2014).*”⁷⁷

57. As well as satisfying the behavioural need of exploration which is deeply ingrained in pigs, play is also crucial for healthy development, with insufficient opportunity to perform this need resulting in behavioural abnormalities,⁷⁸ including tail-biting;⁷⁹ re-direction of exploratory behaviours to pen fixtures or pen mates⁸⁰ and ear-biting.⁸¹ Morino and Colvin stated:⁸²

... pigs make more optimistic choices (have a positive bias) when in enriched environments than in others, indicating that they find stimulation rewarding and pleasurable (Douglas, Bateson, Walsh, Bedue, & Edwards, 2012). Therefore, opportunities for play and exploration impact emotional development in pigs as well.

58. Play also indicates a favourable environment “*because animals tend to reduce play when they are experiencing challenges and even abolish play when their fitness is under threat.*”⁸³

15 (2), 287 to 299; and A Stolba, and DGM Wood-Gush (1989) "The behaviour of pigs in a semi-natural environment" *Animal Science*, 48(2), 419 to 425.

74 Lori Morino and Christina Colvin "Thinking Pigs: A Comparative Review of Cognition, Emotion and Personality in *Sus domesticus*" (2015) 28 *International Journal of Comparative Psychology* 1 at 15.

75 At 8.

76 Alistair Lawrence, Ruth Newberry and Marek Spinka "Positive Welfare: What does it add to the debate over pig welfare?" in Marek Spinka (ed) *Advances in Pig Welfare* (Woodhead Publishing, Duxford, 2018) 415 at 428.

77 Lori Morino and Christina Colvin "Thinking Pigs: A Comparative Review of Cognition, Emotion and Personality in *Sus domesticus*" (2015) 28 *International Journal of Comparative Psychology* 1 at 8.

78 At 8; citing Pedersen *et al.*, 2014; Studnitz *et al.*, 2007; and Telkanranta *et al.*, 2014.

79 LJ Pedersen, MS Herskin, B Forkman, U Halekoh, KM Kristensen, and MB Jensen "How much is enough? The amount of straw necessary to satisfy pigs' need to perform exploratory behavior" (2014) 160 *Applied Animal Behavior Science* 46 to 55.

80 M Studnitz, MB Jensen LJ Pedersen "Why do pigs root and in what will they root? A review on the exploratory behavior of pigs in relation to environmental enrichment." (2007) 107 *Applied Animal Behavior Science* 183 to 197.

81 H Telkanranta, MBM Bracke and A Valros "Fresh wood reduced tail and ear biting and increases exploratory behavior in finishing pigs." (2014) 161 *Applied Animal Behavior Science* 51 to 59.

82 Lori Morino and Christina Colvin "Thinking Pigs: A Comparative Review of Cognition, Emotion and Personality in *Sus domesticus*" (2015) 28 *International Journal of Comparative Psychology* 1 at 8.

83 Alistair Lawrence, Ruth Newberry and Marek Spinka "Positive Welfare: What does it add to the debate over pig welfare?" in Marek Spinka (ed) *Advances in Pig Welfare* (Woodhead Publishing, Duxford, 2018) 415 at 425 citing Held and Spinka (2011):
For instance, negative environmental conditions such as bad weather; abrupt separation from a sow at weaning; the sound of adult alarm barks; small space accompanied with slatted-flooring and high levels of ammonia concentrations led to less play. In contrast, positive environmental conditions led to greater instances of play – these conditions included straw-bedded farrowing pens or free-farrowing pens and straw-bedded pens after weaning (as opposed to slatted flooring); piglets being able to remain with their mother rather than being fostered; low levels of ammonia and the enrichment of housing with straw, bark and tree branches.

Rooting and Foraging

59. Rooting and foraging are similarly important behaviours:⁸⁴

Evidence suggests that the rooting instinct in pigs is distinct from the feeding instinct. Even pigs who were well fed on commercial rations liked to spend about 20% of daylight hours searching for food when kept in a semi-natural enclosure... The provision of rooting material such as straw has been observed to reduce stereotypical behaviour... and can reduce aggressive actions such as tail biting... Preference tests have also shown that pigs prefer pens with straw or other bedding material to concrete pens, for thermal and physical comfort... and for rooting and foraging.

60. Pigs spend up to 75% of their time engaging in foraging-type behaviours when kept in a semi-natural enclosure, by exploring their environment with their snout.⁸⁵ The inability to exhibit rooting and foraging behaviours can lead to re-direction of their energies towards other pigs and oral behaviours such as tail-biting and ear-chewing, with such behaviours reduced when substrates such as straw are provided.⁸⁶ Similarly, pigs may redirect rooting and foraging behaviour towards pen fittings and may belly-nose other pigs or exhibit aggression towards them when housed in barren environments.⁸⁷ Such antagonistic interactions between pigs in barren systems often result in an increased incidence of lameness and skin damage.⁸⁸
61. Research also suggests that barren environments contribute to apathy and chronic stress in pigs, with pigs in such environments exhibiting low levels of activity and experiencing impairment of cognitive function, increased fearfulness and negative maternal behaviour, which can also lead to increased harmful behaviour between offspring.⁸⁹

Environmental Enrichment

62. It has been noted that:⁹⁰

... preference tests have indicated that pigs value indestructible materials like many of those listed above much less than they value straw. They [also] prefer peat, compost, green branches and various wood chips, all of which are valued above straw (Pedersen *et al.*, 2005; Studnitz *et al.*, 2007).

63. Similarly, it has been observed that over time these toys may lose their capacity to stimulate pigs, with one study suggesting that “*in order to be effective, enriching devices should be functionally relevant to the animal*”⁹¹ by being, for example, ingestible, odorous, chewable, deformable and destructible.⁹²

84 Sean Weaver and Michael Morris “Science, pigs, and politics: a New Zealand perspective on the phase-out of sow stalls” (2004) 17 *Journal of Agricultural and Environmental Ethics* 51 at 55.

85 Richard B D'Eath and Simon P Turner “The Natural Behaviour of the Pig” in Jeremy N Marchant-Forde (ed) (Springer, USA, 2009) at 36 and 37.

86 Richard B D'Eath and Simon P Turner “The Natural Behaviour of the Pig” in Jeremy N Marchant-Forde (ed) (Springer, USA, 2009) at 36 and 37.

87 Niamh E O'Connell “Housing the Fattening Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 197.

88 Jeremy N Marchant-Forde “Welfare of Dry Sows” in *The Welfare of Pigs* (Springer, USA, 2009) at 119.

89 Niamh E O'Connell “Housing the Fattening Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 197.

90 Andrew Knight “Uncaging New Zealand's Sows: Scrutinising Farrowing Crates” (SAFE, 6 June 2018) at 29.

91 Niamh E. O'Connell “Housing the Fattening Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 197 and 198.

92 Niamh E O'Connell “Housing the Fattening Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 197 and 198.

64. Baxter *et al* recommended the use of “*earth-like materials such as peat, mushroom compost... and more complex materials such as branches*”,⁹³ which have been shown to be preferred over straw. Another alternative is the provision of a round bale, as in many Swedish deep-bedded systems “*which pigs can distribute themselves over time, and which also serves the dual purpose of forming a visual barrier behind which [pigs] can hide to escape aggression.*”⁹⁴
65. Baxter *et al* noted that most “*enrichment experiments indicate that it is the novel aspect of the enrichment that stimulates exploratory behaviour*”,⁹⁵ meaning that variety in what is provided may also be necessary.
66. Wallowing (lying in mud or water) may “*play an important social role*”⁹⁶ for pigs, in addition to providing pigs with a substance with which to remove parasites; to cool efficiently; and to provide protection from the sun. Additionally, the provision of bedding improves the physical comfort of pigs and pigs have been shown to prefer environments with bedding than without.⁹⁷ However, the minimum standards do not require pigs to be able to wallow, nor do they require the provision of bedding (although it is encouraged elsewhere in the Code).⁹⁸

Other Issues

67. As previously discussed, adequate space is a fundamental part of pig welfare. Sufficient space also needs to be provided to ensure that the behaviours listed above can be adequately expressed. However, at present there is no requirement in the Code to provide pigs with access to the outdoors – where they might better exhibit behaviours such as exploration, foraging, rooting and play.
68. Compassion in World Farming considers that “*Outdoor systems with huts for shelter and farrowing have the highest welfare potential of all [systems]*”,⁹⁹ as such systems enable pigs to express the full range of their behavioural needs at the same time as providing sufficient shelter.
69. The practice of having pigs in solitary confinement is another issue contrary to the behavioural needs of pigs.

The Code

70. NZALA considers that the Code must be revised to address all of the above concerns relating to the behavioural needs of pigs.
71. The Code does contain some references to foraging and play. For example, it is a recommended best practice at Minimum Standard No. 2 (Feed) that adult and growing pigs

93 EM Baxter, AB Lawrence, and SA Edwards “Alternative farrowing systems: design criteria for farrowing systems based on the biological needs of sows and piglets” (2011) 5 *Animal* 580 to 600 at 592.

94 Jeremy N Marchant-Forde “Welfare of Dry Sows” in *The Welfare of Pigs* (Springer, USA, 2009) at 110.

95 EM Baxter, AB Lawrence, and SA Edwards “Alternative farrowing systems: design criteria for farrowing systems based on the biological needs of sows and piglets” (2011) 5 *Animal* 580 to 600 at 592.

96 Ministry for Primary Industries *Welfare Pulse* (Issue 10, March 2012) at 20 citing ‘Wallowing in Pigs’, Bracke, M.B.M. (In press). *Applied Animal Behaviour Science*.

97 Niamh E O’Connell “Housing the Fattening Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 197.

98 Code of Welfare (Pigs) 2018, Example Indicators for Minimum Standard No. 5 at 11: “Bedding material is provided to assist pigs to maintain body temperature in cold weather”; Example Indicators for Minimum Standard No. 7 (Temperature) at 14: “Bedding is provided for piglets in unheated creep areas”; and Minimum Standard No. 14 (Managing Dry Sows), Recommended Best Practice (a): “Sows should be provided with additional space, a solid floor and bedding during the first days of group formation.”

99 Dr Dale Arey and Phil Brooke “Animal Welfare Aspects of Good Agricultural Practice: pig production” (Compassion in World Farming, 2006) at 31.

should be given enough bulky or high fibre feed to satisfy both hunger and foraging needs.¹⁰⁰ Furthermore, a recommended best practice at Minimum Standard No. 9 (Behaviour) is that rooting material such as straw, or other material that can be manipulated, be provided.¹⁰¹

72. In its report to the Code NAWAC recognised the benefits of providing such material to “*increase the physical and thermal comfort of pigs and to enable them to express behaviours such as rooting and exploration.*”¹⁰² However NAWAC also considered that it is not always possible to provide these due to drainage issues, which was the reason for the reference to rooting material as a recommended best practice at Minimum Standard No. 9 (Behaviour), rather than as a minimum standard.

73. In addition to the provision of manipulable material only being recommended rather than required, compliance with the recommended best practice to provide manipulable material such as straw is also in question, with industry having clearly indicated to NAWAC that nesting material for pigs “*is not used, and the strong message from industry... was ‘don’t go there’.*”¹⁰³

74. The requirement to facilitate the behavioural needs of pigs is provided by Minimum Standard No. 9 (Behaviour), which states:¹⁰⁴

Pigs must be managed in a manner that provides them sufficient opportunities to express and satisfy their normal behaviours. These include but are not limited to feeding, drinking, sleeping, dunging and urination, vocalisation, thermoregulation, and social contact.

75. Minimum Standard 9 includes example indicators, including the indication of no more than 15% of pigs having “*skin lesions, bites and scratches from fighting at any one time.*”¹⁰⁵

76. However the Standard does not provide for other normal behaviours such as play, foraging, rooting, exploration or wallowing,¹⁰⁶ despite the recognition in NAWAC’s 2010 report to the Code that the:¹⁰⁷

... behavioural repertoire of a pig includes standing, lying in various positions, walking to resources even at times when all other pigs are lying, exploration... and interacting socially including avoidance if attacked.

77. The Code provides as a recommended best practice at Minimum Standard No. 9 (Behaviour) the provision of environmental enrichment such as “*toys*”, including a length of hanging chain, rock, tyre, buoy or “*foodball*”.¹⁰⁸ However, no specific mention is made of play and the need to facilitate play behaviours. The potential for such toys to fulfil pigs’ instincts to play and explore is also limited.

100 Code of Welfare (Pigs) 2018, Minimum Standard No. 2, Recommended Best Practice (b) at 9.

101 Code of Welfare (Pigs) 2018, Minimum Standard No. 9, Recommended Best Practice (a) at 16

102 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 11.

103 National Animal Welfare Advisory Committee Minute “General Meeting” (17 February 2016) at [O 4].

104 Code of Welfare (Pigs) 2018, Minimum Standard No. 9 at 16.

105 Code of Welfare (Pigs) 2018 at 16.

106 Alistair Lawrence, Ruth Newberry and Marek Spinka “Positive Welfare: What does it add to the debate over pig welfare?” in Marek Spinka (ed) *Advances in Pig Welfare* (Woodhead Publishing, Duxford, 2018) 415 at 432:

exploration, foraging, play, nesting and maternal-offspring interactions [as] largely synonymous with positive welfare (Bracke and Hoposter, 2006; Spinka, 2006).

107 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 10.

108 Code of Welfare (Pigs) 2018, Minimum Standard No. 9, Recommended Best Practice (g)(i) at 17.

Weaning

78. Minimum Standard 15 (Weaning) provides that “*Weaning must be managed in a way that avoids undue stress on the sow and piglets and minimises negative impacts on their health and welfare.*”¹⁰⁹ The example indicator for this standard indicates that age at weaning should be greater than 21 days (three weeks), with recommended best practice being 28 days (four weeks).¹¹⁰ In contrast, in domestic pigs:¹¹¹
- ... the completion of weaning has been variously estimated to occur by 14–17 weeks (Jensen, 1986), 15–19 weeks (Jensen and Recen, 1989) or 8–14 weeks (Newberry and Wood-Gush, 1985).
79. Weaning piglets too early may lead to distress, including increased vocalisation, increased sitting inactive and changes in physiological stress indicators such as increased cortisol concentrations, increased growth hormone concentrations and increased neutrophil/lymphocyte ratio.¹¹² Early weaning may also have long-lasting impacts on the central nervous system of piglets, in particular the serotonin system, which may lead to decreased activity and heightened anxiety and fearfulness.¹¹³
80. Early weaning even at three or four weeks (as compared to six weeks) can lead to a greater incidence of piglets belly-nosing other pigs, a behaviour which has been “*hypothesized as being related to suckling motivation and redirected feeding attempts*”¹¹⁴ (although such behaviour can be reduced through facilitating enriched environments for pigs, in particular providing enrichment devices that satisfy nosing behaviour).¹¹⁵ Where pigs are separated from the dam and the rest of the social group, this may also impact on behavioural development with the piglet being deprived of opportunities for social learning.¹¹⁶
81. NZALA considers that, in light of the above, example indicators for appropriate weaning ages should be increased.

Elective Husbandry Procedures

82. There are a number of elective husbandry procedures in relation to pigs which raise animal welfare concerns that should be addressed. These include tail docking; clipping and grinding of pigs’ teeth; use of nose rings, clips or wires; identification procedures; tusk trimming of boars; and castration.

Tail Docking

83. Minimum Standard No. 16(ba) (Elective Husbandry Procedures) refers to the docking of pigs’ tails and states that pigs must be given pain relief at the time of the procedure.¹¹⁷ This is reiterated in regulation 52 of the Regulations.

109 Code of Welfare (Pigs) 2018, Minimum Standard No. 15 at 23.

110 Code of Welfare (Pigs) 2018 at 23.

111 Richard B D’Eath and Simon P Turner “The Natural Behaviour of the Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 34.

112 Richard B D’Eath and Simon P Turner “The Natural Behaviour of the Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 33.

113 Suzanne Held, Jonathan J Cooper and Michael T Mendl “Advances in the Study of Cognition, Behavioural Priorities and Emotions” in Marchant-Forde, Jeremy N. (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 66 and 67.

114 Anna K Johnson and and Jeremy N Marchant-Forde “Welfare of Pigs in the Farrowing Environment” in *The Welfare of Pigs* (Springer, USA, 2009) at 170.

115 Ibid.

116 Richard B D’Eath and Simon P Turner “The Natural Behaviour of the Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 34.

117 Code of Welfare (Pigs) 2018, Minimum Standard No. 16 (ba) at 24.

84. This practice was established to address pigs biting each other's tails, although the Code recognises that this practice does not address the underlying causes of tail biting,¹¹⁸ being the intensive environments in which pigs are farmed. As James has observed:¹¹⁹

Other methods of managing tail biting include the provision of straw, more food and additional space. This statement indicates that the underlying cause of tail biting in pigs is the nature of the environment provided. The introduction of a method such as tail docking to reduce biting, rather than address the underlying causes by providing an enriched environment, does not meet the spirit or intent of providing for the behavioural needs of animals as required in the Act, nor appropriately take into account current scientific knowledge.

85. NAWAC's report to the Code did recognise that providing for enrichment in the environment could minimise the incidence of tail biting, and that tail docking "*is likely to be acutely painful when performed and docking may also cause long lasting pain due to the formation of neuromas.*"¹²⁰ However, there is no provision in the Code that requires or recommends the use of environmental enrichment as an alternative to tail docking.
86. Commentators have also stated that it would be preferable to restrict tail docking to day-old piglets, given they have not fully developed the capacity to feel pain in the same way as older pigs.¹²¹

Clipping and Grinding Teeth

87. Minimum Standard 16(c) (Elective Husbandry Procedures) allows farmers to clip or grind the front teeth of pigs under the age of five days without pain relief.¹²² NAWAC has claimed that it is necessary to grind or clip needle teeth in piglets to prevent laceration of the sows' udder and damage to litter mates.¹²³ However, Gillian Coumbe QC has argued that such procedures are only necessary because of the "*cramped conditions in which the animals live*",¹²⁴ causing piglets to act out in this way.
88. NAWAC has conceded that there is "*debate about the necessity of teeth clipping in outdoor systems*",¹²⁵ and that because pigs housed outdoors are not as used to humans, performing this procedure could lead to a disruption in maternal behaviour "*which could have more serious consequences than leaving teeth unclipped.*"¹²⁶
89. NAWAC also discussed research which found that grinding teeth causes less tooth cracking than clipping, but it refrained from requiring teeth to be ground rather than clipped, unless they are needle teeth, and even then, only as a recommended best practice.¹²⁷
90. The Code makes no reference to how teeth clipping in outdoor systems should be approached, or the use of environmental enrichment to prevent the need for teeth clipping.

118 Code of Welfare (Pigs) 2018 at 25.

119 Vanessa James "Recognising animal sentience: Including minimum standards for opportunities to display normal patterns of behaviour in codes of welfare in New Zealand" (LLM Research Paper, Victoria University of Wellington, 2016) at 22.

120 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 34.

121 Suzanne Held, Jonathan J. Cooper and Michael T. Mendl "Advances in the Study of Cognition, Behavioural Priorities and Emotions" in Marchant-Forde, Jeremy N. (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 50 to 51.

122 Code of Welfare (Pigs) 2018, Minimum Standard No. 16(c) at 24.

123 Code of Welfare (Pigs) 2018 at 25.

124 Gillian Coumbe "Beyond Charlotte's Web - the blight of factory farming: An argument for law reform" (paper presented to Auckland Women Lawyers' Association seminar, Auckland, March 2015) at 2.

125 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 33.

126 Ibid.

127 At 34.

Use of Nose Rings, Clips or Wires

91. The Code allows for the use of nose rings, clips or wires.¹²⁸ This is to reduce damage to pasture, as the “rings make it painful for the pigs to press their snout against the ground, in addition to preventing pigs rooting and finding food.”¹²⁹
92. NAWAC recognised in its report on the pigs Code, that the “act of fixing the rings will also cause significant pain to the pigs.”¹³⁰ Such practices are also problematic because, as Lori and Colvin explained:¹³¹
- The highest density of tactile receptors is found in the pig's snout (Kruska, 1988), as they use their snouts to engage in highly manipulative behaviours such as rooting, carrying and pushing, and social interactions (Stolba & Wood- Gush, 1989).
93. Despite this, there is no requirement in the Code to give pigs pain relief while fixing nose rings, clips or wires. The Code provides only that they must be placed “through the cartilage at the top of the snout or in the tissue separating the nostrils”¹³² and “not at the bottom of the snout where they would cause additional discomfort for the pig as it pushes its snout against the ground.”¹³³
94. This practice also prevents pigs from rooting, which is an important natural behaviour.

Identification Procedures

95. The Code provides that where it is “necessary for permanent identification, the ears may be notched, tagged, punched or tattooed. Alternatively, the body may be tattooed, or an electronic identification system used.”¹³⁴ There is no requirement that pain relief be administered before or while undertaking these procedures.

Tusk Trimming

96. Tusk trimming in boars may be an additional issue, this practice being permitted under the Code.¹³⁵
97. Fulbini and Ducharme recommend taking care when performing this procedure because the pulp cavity of the tusk may extend to *or above* the level of the gums and when the tusk is cut too short, the pulp can be exposed, leading to painful pulpitis and potential apical infection.¹³⁶ Bovey *et al* found that the pulp chamber in boars was exposed approximately 50% of the time and almost half of the 102 tusks examined had moderate to severe gum inflammation.¹³⁷
98. This occurred where tusks were trimmed within 2mm of the gums (per the current industry practice in Canada). The Code recommends that “tusks should be severed above the level of the gums without causing damage to other tissues”,¹³⁸ however it does not specify that this should be 2mm above the gum line as this overseas study suggests.

128 Code of Welfare (Pigs) 2018, Minimum Standard No. 16(d) at 24.

129 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 35.

130 *Ibid.*

131 Lori Morino and Christina Colvin “Thinking Pigs: A Comparative Review of Cognition, Emotion and Personality in *Sus domesticus*” (2015) 28 *International Journal of Comparative Psychology* 1 at 2.

132 Code of Welfare (Pigs) 2018, Minimum Standard No. 16(d) at 24.

133 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 35.

134 Code of Welfare (Pigs) 2018 at 25.

135 Code of Welfare (Pigs) 2018, Recommended Best Practice (g) at 24.

136 Susan L. Fubini, Norm G. Ducharme *Farm Animal Surgery* (2nd edn, Elsevier Inc, Missouri, 2019) at 137.

137 K Bovey, P Lawlis, J DeLay and T Widowski *Innervation and condition of mature boar tusks at slaughter* (Department of Animal and Poultry Science, University of Guelph, Ontario, Canada: 2008).

138 Code of Welfare (Pigs) 2018 at 24, Recommended Best Practice (g) at 24.

Castration

99. Regulation 55 manages the castration of pigs.¹³⁹ The regulation provides that pigs must be given pain relief at the time of this procedure. However, this is in contrast with other countries referenced by NAWAC in their report such as Denmark, where castration is only allowed on pigs two to seven days old.¹⁴⁰
100. MPI has also referred to a study, which found that nitrous oxide may reduce the pain of castration in piglets, with piglets displaying less huddling behaviour and more tail-wagging than control piglets (potentially indicating a reduction in pain post-surgery).¹⁴¹ The use of nitrous oxide in relation to this procedure should be further investigated.

Use of Electric Prodders and Goads

101. Regulation 48 of the Regulations permits the use of an electric prodder on pigs that weigh over 150 kg.¹⁴² It states that the prodder may be used only on the muscled areas of the animal's hindquarters or forequarters, and requires that the animal must have sufficient room to move away from the prodder.
102. The use of such instruments may not be appropriate as they can cause acute stress and pain in animals. Faucitano *et al* refer to numerous studies showing that the use of electric prodders provokes a negative physiological and behavioural response in pigs:¹⁴³
- ... in terms of higher incidence of backing-up, round turns, slipping, falling, jumping, jamming and high-pitched vocalisations... and greater heart rates and blood cortisol and lactate concentrations.
103. The authors referred to an additional study stating that electric prodding should not be used more than twice and for less than 1 second each on a pig during handling.¹⁴⁴ The Humane Slaughter Association (2016) similarly recommends that electric prodders should be applied for a maximum of one second; that multiple applications should be adequately spaced; and that shocks must not be used repeatedly if the animal fails to respond.¹⁴⁵
104. Such limitations are not incorporated into regulation 48 or the Code. In contrast, the Code of Welfare (Dairy Cattle) 2019 includes as a recommended best practice that electric prodders should not be applied for more than one second at any one time and if the desired effect is not achieved after four or five attempts, its use should be discontinued.¹⁴⁶ The regulation and/or the Code should be amended to include this as a mandatory limitation.

139 Animal Welfare (Care and Procedures) Regulations 2018, reg 55.

140 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 33.

141 JL Rault, and DC Lay, (2011) *Journal of Animal Science* 89, 3318 to 3325; cited in Ministry for Primary Industries *Welfare Pulse* (Issue 10, March 2012) at 20.

142 Animal Welfare (Care and Procedures) Regulations 2018, regs 48(1)(b) and (c).

143 Luigi Faucitano and Se'bastien Goumon "Transport of pigs to slaughter and associated handling" in Maria Spinka (ed) *Advances in Pig Welfare* (Elsevier, UK, 2018) 268.

144 Luigi Faucitano and Se'bastien Goumon "Transport of pigs to slaughter and associated handling" in Maria Spinka (ed) *Advances in Pig Welfare* (Elsevier, UK, 2018) 268; citing MJ Ritter, M Ellis, CM Murphy, BA Peterson, A Rojo, 2008b "Effects of handling intensity, distance moved, and transport floor space on the stress responses of market weight pigs" *J. Anim. Sci.* 86, at 43.

145 Humane Slaughter Association "Humane Handling of Livestock" (2016).

146 Code of Welfare (Dairy Cattle) 2019, Minimum Standard No 10 (Stock Handling), Recommended Best Practice (d) at 20.

105. Regulation 49 further provides that a person must not “*strike or prod an animal with a goad in the udder, anus, genitals or eyes.*”¹⁴⁷ This regulation applies to goads used to make an animal move, but does not include an electric prodder. Grandin also recommended against the use of such prodders on the ears and nose,¹⁴⁸ however prodding these sensitive areas is not prohibited under regulation 49 or elsewhere.

Ventilation

106. The standard for air quality provided by Minimum Standard No. 8(b) (Air Quality) allows relatively high levels of ammonia at 25ppm.¹⁴⁹ NZALA considers that this should be reduced.
107. Parker *et al* found that atmospheric ammonia at 20 ppm led to pigs being more aggressive in the early stages of exposure to treatment conditions, as ammonia interfered with social interactions due to the “*disrupted transmission of olfactory... cues.*”¹⁵⁰ In this way excessive ammonia levels can be particularly problematic because, as Morino and Colvin observed:¹⁵¹

Olfaction is the pig’s keenest sense. Thus, they learn olfactory discriminations more easily than discriminations in other modalities (Croney, 1999). As opportunistic omnivores, they rely heavily on odors and flavors to find appropriate food items when foraging (Croney, Adams, Washington, & Stricklin, 2003). Furthermore, their sensitivity in the olfactory domain is not limited to foraging for food, but is used heavily in the social domain in a wide range of contexts, including discriminating social identity (Mendl, Randle, & Pope, 2002, sexual state (Signoret, Baldwin, Fraser, & Hafez, 1975) and the emotional state of other pigs in aggressive encounters (McGlone, 1990), as well as in creating dominance hierarchies (Mendl, Randle, & Pope, 2002).

108. Parker *et al* reported that pigs from ammoniated rooms “*had lower salivary cortisol and larger adrenal glands than pigs from non-ammoniated rooms, suggesting a generalised stress response to 20 ppm ammonia.*”¹⁵² Further:¹⁵³

... pigs kept in ~20 ppm ammonia were initially less playful (non-social) than in lower concentrations, suggesting a depression in energetic activities indicative of stress or possibly a shift in energetic behavioural activity away from play to aggression.

109. Jones *et al* found that when given the choice, pigs prefer areas with fresh air or low levels of ammonia (e.g. 10ppm) as compared to areas with 20ppm or 40ppm. Pigs in this study spent significantly more time sitting, foraging, feeding and standing in low ammonia environments.¹⁵⁴

147 Animal Welfare (Care and Procedures) Regulations 2018, regulation 49.

148 T Grandin “Good Management Practices for Animal Handling and Stunning” (1990) and in “AMI Meat Institute Foundation: Good Management Practices for Animal Handling and Stunning (2nd Edition) <<https://www.grandin.com/ami.audit.guidelines.html>>.

149 Code of Welfare (Pigs) 2018, Minimum Standard No. 8(b) at 15.

150 MO Parker, EA O’Connor, MA McLeman, TG Demmers, JC Lowe, RC Owen, EL Davey, CM Wathes, SM Abeyesinghe “The impact of chronic environmental stressors on growing pigs, *Sus scrofa* (Part 2): social behaviour” (2010) 4:11 *Animal* 1910 to 1921 at 1910 and 1911.

151 Lori Morino and Christina Colvin “Thinking Pigs: A Comparative Review of Cognition, Emotion and Personality in *Sus domestica*” (2015) 28 *International Journal of Comparative Psychology* 1 at 2 and 3.

152 MO Parker, EA O’Connor, MA McLeman, TG Demmers, JC Lowe, RC Owen, EL Davey, CM Wathes, SM Abeyesinghe “The impact of chronic environmental stressors on growing pigs, *Sus scrofa* (Part 2): social behaviour” (2010) 4:11 *Animal* 1910 to 1921 at 1919.

153 *Ibid.*

154 J Jones, L Burgess, A Webster and C Wathes, “Behavioural responses of pigs to atmospheric ammonia in a chronic choice test” (1996) 63 *British Society of Animal Science* 437 to 445; JB Jones, CM Wathes and AJF Webster “Operant responses of pigs to atmospheric ammonia” (1998) 58 *Applied Animal Behaviour Science* 35 to 47; and CM Wathes, JB Jones, HH Kristensen, EKM Jones and AJF Webster “Aversion of pigs and domestic fowl to atmospheric ammonia” (2002) 45 *Transactions of the Asabe* 1605 to 1610.

110. Richardson recommended that ammonia in the environment be less than 10ppm, in part because ammonia at 20ppm “*can damage the bacteria-catching cilia in the windpipe of a pig. This increases the risk of infection, as bacteria-laden dust particles are not filtered out.*”¹⁵⁵

Lighting

111. Minimum Standard No. 6(f) (Housing and Equipment) allows pigs to be kept in total darkness for 15 hours a day, with a low artificial light of only 20 lux being required for the other 9 hours of the day.¹⁵⁶ This is in contrast to the EU, where minimum illumination levels in pig facilities are required to be 40 lux during the light period.¹⁵⁷
112. A study by Zonderland *et al* found that pigs rely primarily on olfactory and auditory cues, with increased illumination level having little impact on pigs’ ability to identify visual cues as compared to object size.¹⁵⁸ Similarly, Taylor *et al* found that an illuminance of 40 lux is “*neither aversive nor strongly preferred by the pigs.*”¹⁵⁹
113. However, M Parker *et al* found that pigs kept in rooms with low light levels of 40 lux did show “*higher incidences of aggression in the early stages of exposure to the treatment conditions*”,¹⁶⁰ postulating that this was because pigs were less able to discriminate visually between familiar and unfamiliar pigs.
114. There are no minimum standards or recommended best practice regarding the provision of natural light for pigs. Alexander *et al* found that one hour of sun exposure a day increases vitamin D sufficiency in growing pigs.¹⁶¹ Providing natural light to pigs should therefore be considered as at least a recommended practice.

Mixing of Pigs

115. The Code recognises that “*Mixing of sows can result in fighting as the sows establish a hierarchy.*”¹⁶² Similarly, “*Pigs are hierarchical animals and will seek to establish a social structure which may result in aggression, particularly when mixing unfamiliar pigs.*”¹⁶³
116. The Code provides, as a recommended best practice, that “*Every effort should be made to minimise mixing of unfamiliar pigs*”;¹⁶⁴ that mixing of unacquainted boars should not occur;¹⁶⁵ that “*mixing of unfamiliar pigs on the transport vehicle should be avoided*”;¹⁶⁶ and that inspections should increase when mixing of pigs has occurred.¹⁶⁷ The general information section to Minimum Standard No. 9 (Behaviour) identifies further techniques to minimise

155 John Richardson “In pursuit of growth... some tips to help you” (2001) 2 *Pig Farming*.

156 Gillian Coumbe “Beyond Charlotte’s Web - the blight of factory farming: An argument for law reform” (paper presented to Auckland Women Lawyers’ Association seminar, Auckland, March 2015) at 2. <<http://www.gilliancoumbe.co.nz/wp-content/uploads/2015/03/Gillian-Coumbe-QC-paper-Beyond-Charlottes-Web.-The-Blight-of-Factory-Farming.-An-Argument-for-Reform.pdf>>.

157 Directive 2008/120/EC – minimum standards for the protection of pigs [2008] OJ L 47.

158 J Zonderland, L Cornelissen, M Wolthuis-Fillerup, H Spoolder “Visual acuity of pigs at different light intensities” (2008) 111 *Applied Animal Behaviour Science* 28 to 37.

159 N Taylor, N Prescott, G Perry, C Le Sueur, and C Wathes, “Preference of growing pigs for illuminance” (2005) 96 *Applied Animal Behaviour Science* at 19.

160 MO Parker, EA O’Connor, MA McLeman, TG Demmers, JC Lowe, RC Owen, EL Davey, CM Wathes, SM Abeyesinghe “The impact of chronic environmental stressors on growing pigs, *Sus scrofa* (Part 2): social behaviour” (2010) 4:11 *Animal* 1910 to 1921 at 1910.

161 BM Alexander, BC Ingold, JL Young, FR Fernsterseifer, PJ Wechsler, KJ Austin, DE Larson-Meyer “Sunlight exposure increases vitamin D sufficiency in growing pigs fed a diet formulated to exceed requirements” (2017) 59 *Domestic Animal Endocrinology* 37 at 37.

162 Code of Welfare (Pigs) 2018 at 19.

163 Code of Welfare (Pigs) 2018 at 16.

164 Code of Welfare (Pigs) 2018, Minimum Standard No 9 (Behaviour), Recommended Best Practice (f) at 17.

165 Code of Welfare (Pigs) 2018, Minimum Standard No 12, Recommended Best Practice (b) at 21.

166 Code of Welfare (Pigs) 2018, Minimum Standard No 17, Recommended Best Practice (c) at 25.

167 Code of Welfare (Pigs) 2018, Minimum Standard No 18, Recommended Best Practice (a) at 27.

aggression when mixing unfamiliar pigs.¹⁶⁸

117. Mixing unfamiliar pigs can be highly problematic, resulting in serious fighting that can be exhausting, stressful, and result in physical injury. This is particularly so where there is prolonged chasing and bullying of a pig if it has nowhere to hide.¹⁶⁹ The stress induced from such mixing can result in a negative impact on maternal behaviour, with gilts born to sows that were mixed during pregnancy expressing:¹⁷⁰

... more abnormal behaviours compared to daughters of control non-stressed sows (Jarvis et al., 2006). These daughters of stressed sows were more restless at parturition, more reactive to their piglets, and exhibited a greater tendency towards biting at their piglets compared to the daughters of control sows.

118. However, none of the provisions in the Code that address mixing of pigs are mandatory minimum standards, and this is problematic in light of how stressful mixing can be for pigs.
119. There are also a number of other factors that can reduce aggression during mixing, including increased space; the provision of enriching devices; the use of barriers; and socialising pigs prior to regrouping at weaning.¹⁷¹ However, adopting such approaches is not addressed in the Code. This should be remedied.

Genetic Selection

120. Following Minimum Standard No. 9, recommended best practice (c) advises that genetic selection “*should be encouraged as a means to promote behavioural traits that minimise welfare problems in pigs.*”¹⁷² However, no guidance is provided as to how this might be achieved.
121. Additionally, while the Code recognises that pigs are “*genetically bred for fast lean growth rates*”,¹⁷³ there is little guidance in the Code on the use of genetic selection for maximal productivity (e.g. high body weights, feed conversion ratios, and litter sizes) and the consequent welfare impacts of this on pigs and piglets.

168 Code of Welfare (Pigs) 2018, Minimum Standard No 9 (Behaviour), ‘General Information’ at 17. These techniques include introducing pigs into a pen that has feed on the floor; introducing all pigs into a new pen at the same time; using group sizes of more than 50 pigs and using a pen with room for pigs to move away or where baffles such as bales of straw are provided behind which they can hide.

169 “The Welfare of Pigs”, The Natural Behaviour of the Pig, Richard B D’Eath and Simon P Turner “The Natural Behaviour of the Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) at 37.

170 KL Chidgey, PCH Morel, KJ Stafford, IW Barugh “The performance and behaviour of gilts and their piglets is influenced by whether they were born and reared in farrowing crates or farrowing pens” (2016) 193 *Livestock Science*, 51 to 57 at 51 citing S Jarvis, C Moinard, SK Robson, E Baxter, E Ormandy, AJ Douglas, JR Seckl, JA Russell, AB Lawrence “Programming the offspring of the pig by prenatal social stress: neuroendocrine activity and behaviour” (2006) 49 *Horm. Behav* 68 to 80.

171 Niamh E O’Connell “Housing the Fattening Pig” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) 189 at 201; and Jeremy N Marchant-Forde “Welfare of Dry Sows” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) 95 at 114. Studies have also shown that if piglets are mixed during lactation, their welfare is improved at weaning with “*reduced aggression compared to previously unmixed control piglets and better post-weaning growth rates... [as well as] fewer skin lesions on co-mingled pigs... improved social skills [and improved weight gain]*”. See Anna K Johnson and Jeremy N Marchant-Forde “Welfare of Pigs in the Farrowing Environment” in Jeremy N Marchant-Forde (ed) *The Welfare of Pigs* (Springer, USA, 2009) 141 at 168.

172 Code of Welfare (Pigs) 2018, Minimum Standard No.9, Recommended Best Practice (c) at 16.

173 Code of Welfare (Pigs) 2018 at 9.

122. Genetic selection has typically focused on high productivity, leading to “*litters of 12-13 piglets in sows that weigh a staggering 260 kg on average (Calderón et al., 2014), and in some cases, considerably more.*”¹⁷⁴ The NAWAC report on the Code considered the potential implications of this, including the need to provide for different levels of feeding to account for accelerated growth:¹⁷⁵

Rauw *et al* (1998) argued that domesticated animals have been bred to be hungry – selection for faster growth and larger animals perhaps altering, even damaging, the brain’s satiety mechanisms leading to a failure to diminish the hunger drive. Hunger and biological performance and optimal sow welfare may therefore require different levels of feeding.

123. NAWAC has observed that rapid weight gain as a result of selective breeding for high productivity “*can result in leg weakness.*”¹⁷⁶ In 2014, NAWAC noted that “*bigger pigs are being bred that are kept in crates built a long time ago that are now too small.*”¹⁷⁷

124. NAWAC has also recognised the welfare issues associated with selective breeding for high productivity and its impacts on piglet survivability:¹⁷⁸

Selective breeding has a major part to play. Litter size is a major factor in survivability. Piglet size is going up at 1.5 piglets per year, and teat number by only 1/4 per year. Further, more piglets means more frail piglets. The industry is against change in regards to genetics which are controlled by breeding companies based overseas, but if NZ industry never says anything, how will it change? The genetic manipulation is an ethical issue that is creating a welfare problem.

125. Conversely, pigs may be genetically selected so as to improve their welfare. In its 2016 report on farrowing, NAWAC identified genetic selection as a means of reducing the need for farrowing crates and stated that the industry should work to maximise piglet survival through breeding for non-crushing sows (who spend more time making nose-to-nose contact with their piglets before lying down and react more quickly to piglet distress calls); breeding for good physiological sows (optimal uterine environment, maternal behaviour, lactational output); and breeding more robust piglets that are less susceptible to being crushed.¹⁷⁹ Finally, NAWAC’s report to the Code of Welfare (Pigs) 2010 recognised that genetically selecting sows that are adaptable to the farrowing crate environment may have an impact on maternal behaviour.¹⁸⁰

126. However, none of these issues are addressed in the Code and it is uncertain whether, and to what extent, the industry has heeded NAWAC’s advice

Welfare Assurance System

127. Overall this Part is highly vague and uncertain, and we consider it should impose at least some minimum standards for welfare assurance. Some, if not all of the Recommended Best Practice should be required as minimum standards.

174 Andrew Knight “Uncaging New Zealand’s Sows: Scrutinising Farrowing Crates” (SAFE, 6 June 2018) at 2.

175 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 6.

176 National Animal Welfare Advisory Committee *NAWAC Opinion on animal welfare issues associated with selective breeding* (Ministry for Primary Industries, March 2017) at 13.

177 National Animal Welfare Advisory Committee Minute “General Meeting” (05 November 2014) at [C 3].

178 National Animal Welfare Advisory Committee Minute “General Meeting” (5 August 2015) at [C 6].

179 National Animal Welfare Advisory Committee *Review of the Use of Farrowing Crates for Pigs in NZ* (March 2016) at 4.

180 National Animal Welfare Advisory Committee *Animal Welfare (Pigs) Code of Welfare 2010 Report* at 15.

128. Recommended Best Practice (c) states:

The quality assurance system should provide for all incidents resulting in significant sickness, injury or death of animals to be investigated and documented.

129. We suggest that if there is a situation where more than one pig has died (in what seems similar circumstances) then the quality assurance system should state that the report must be forwarded to the appropriate body, such as MPI, to explain what happened and how this can be avoided in the future.

130. Recommended Best Practice (c) goes on to state:

Where the results of an investigation may have implications for current industry management practices, a report outlining the incident and implications should be forwarded to the appropriate industry body for consideration.

131. We consider that it would be helpful to have further guidance, or examples of, what is meant by "*implications for current industry management practices*".

Alternatives to Farrowing Crates

132. NZALA acknowledges that farrowing crates are to be phased out within five years. This section of our feedback provides some discussion on alternative systems that warrant consideration NAWAC.

133. Studies have found that alternative systems are viable in terms of facilitating sows' behavioural expression whilst minimising piglet mortality.

134. Baxter *et al* found that designed pen systems were the best alternative to farrowing crates in terms of balancing welfare needs and economic considerations.¹⁸¹ An alternative pen called PigSAFE (Piglet and Sow Alternative Farrowing Environment) has been tested in at least three studies, which showed that piglet mortality occurred at similar levels to the farrowing crate environment.¹⁸²

181 EM Baxter, AB Lawrence and SA Edwards "Alternative farrowing accommodation: welfare and economic aspects of existing farrowing and lactation systems for pigs" (2012) 6:1 Animal 96 to 117.

182 SA Edwards, M Brett, S Ison, M Jack, YM Seddon, EM Baxter "Design principles and practical evaluation of the PigSAFE free farrowing pen" (Proceedings of the Fourth European Symposium on Porcine Health Management, Bruges, April 2012) at 113; SA Edwards, M Brett, JH Guy and EM Baxter "Practical evaluation of an indoor free farrowing system: the PigSAFE pen" (Proceedings of the 62nd Annual Meeting of the European Federation of Animal Science, Stavanger, Norway, August-September 2011) at 17; and Rebecca Morrison and Emma Baxter "Developing Commercially – Viable Confinement-Free Farrowing and Lactation Systems; Project 1A-105" (Final report prepared for the Co-operative Research Centre for High Integrity Australian Pork, July 2013).

135. There are also clear behavioural benefits in such systems, with sows being able to move around and perform maternal behaviours such as nest building. Further, Chidgey *et al* found that “[behavioural] *displays of sows in farrowing crates are limited, whereas pen-based alternatives to farrowing crates enable a greater range of behavioural expression, including interacting more with piglets.*”¹⁸³ The findings in this study were summarised by NAWAC in 2017 as follows:¹⁸⁴

... sows in pens performed more nursing vocalisations, more behaviour directed towards other sows and rooted the floor more than sows in crates, and were also more active once loose, spending more time standing, rooting the floor and performing more piglet-directed behaviours (investigation, touch and vocalisation towards piglets). Sows held in farrowing pens, once loose, expressed a greater repertoire of behaviour compared to sows in crates, including enhanced sow-piglet interactions.

136. Loose-housing may also be a legitimate option. Recent research from Sweden shows that loose housing of sows can provide for the needs of both sows and piglets.¹⁸⁵ This research compared results between loose pens and temporary crating pens where the sow was confined during farrowing and for three days afterwards. It found that:¹⁸⁶

... piglet survival was a complex and multifactorial issue concluding that aspects of management, sow attributes (e.g. age, size and health), litter size, as well as housing interact to contribute to survivability.

137. The study found a clear link between a reduction in mortality rate and smaller litter sizes (see Figure 1), as well as increased survival in litters born to pigs under the age of one year in loose farrowing systems (with piglets born to intermediate or older sows experiencing more crushing in loose farrowing systems as compared to temporary crating).

138. There was a small increase in mortality associated with loose farrowing, compared to temporary crating, “*on average this was around 0.4 piglets per litter and was not consistent across every parity.*” However, the authors recognised that different studies have reached contradictory findings on mortality rates, resulting from different farrowing environments.¹⁸⁷ The study also found that there was an “*increase in farrowing problems... recorded for sows temporarily confined at farrowing.*”¹⁸⁸

183 KL Chidgey, PCH Morel, KJ Stafford, IW Barugh “Sow and piglet behavioral associations in farrowing pens with temporary crating and in farrowing crates” (2017) 20 *Journal of Veterinary Behavior* 91 to 101 at 91.

184 Ministry for Primary Industries *Welfare Pulse* (Issue 23, November 2017) citing Chidgey *et al* (2016) *Applied Animal Behaviour Science* 176: 12 to 18 at 15.

185 A Olsson, J Botermans, J England “Piglet mortality – A parallel comparison between loose-housed and temporarily confined farrowing sows in the same herd” (2018) 68 *Acta Agriculturae Scandinavica, Section A — Animal Science*, 52 to 62.

186 A Olsson, J Botermans, J England “Piglet mortality – A parallel comparison between loose-housed and temporarily confined farrowing sows in the same herd” (2018) 68 *Acta Agriculturae Scandinavica, Section A — Animal Science*, 52 to 62.

187 Andrew Knight “Uncaging New Zealand’s Sows: Scrutinising Farrowing Crates” (SAFE, 6 June 2018) at 20.

188 A Olsson, J Botermans, J England “Piglet mortality – A parallel comparison between loose-housed and temporarily confined farrowing sows in the same herd” (2018) 68 *Acta Agriculturae Scandinavica, Section A — Animal Science*, 52 to 62.

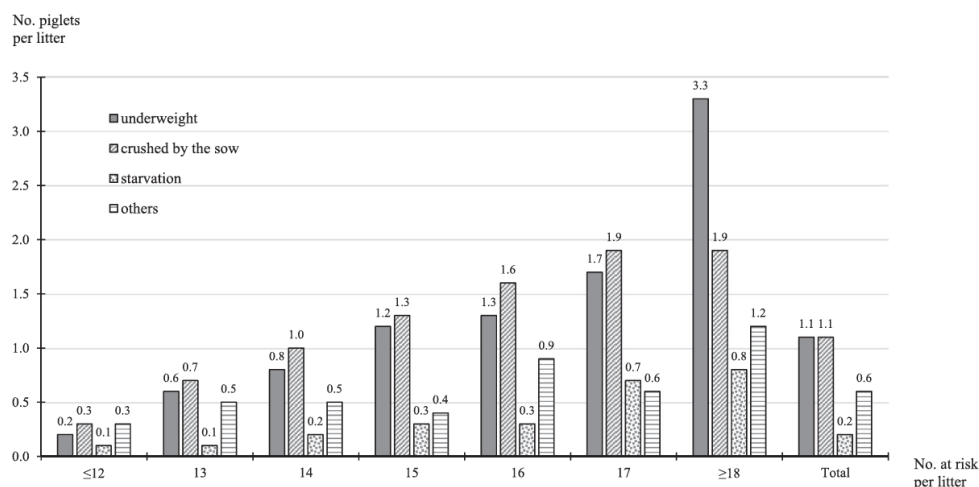


Figure 1: Number of dead piglets per litter within different litter sizes and with specified causes of death. Reproduced from Olsson, Botermans & England (2019)¹⁸⁹

139. We note that, at paragraphs 95 to 108 of her first affidavit filed in the High Court proceedings between NZALA and SAFE, and the Attorney General, Minister of Agriculture and NAWAC (CIV-2019-485-43), Emma Baxter helpfully details a number of alternatives to farrowing crates. At paragraphs 112 to 117, she discusses advantages of alternative systems. NZALA considers that these passages, and the research referred to within them, should be referred to by NAWAC as it proceeds with phasing out farrowing crates.

Conclusion

140. Having provided the above feedback, we look forward to continuing to work with NAWAC as it progresses its reviews of the Code for Pigs, and the rest of the Codes of welfare.
141. NZALA is particularly keen to help with consideration and addressing issues of potential inconsistency with the Act.
142. We are happy to provide further comments on any of the above, answer any questions, or discuss next steps in the review process.

Yours faithfully

The New Zealand Animal Law Association

189 Ibid.