

Program Description
Animal Care and Use Program

College of Veterinary Medicine(CVM)

North Carolina State University

1060 William Moore Drive
Raleigh, NC 27607

12/01/20

For
AAALAC-International

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Program Description

Instructions for Completing and Submitting the Program Description for the Institutional Animal Care and Use Program

Section 1. Introduction

- A. State the name of the program unit and, if applicable, its parent organization. List all organizations (schools, centers, etc.) included within the program unit.

College of Veterinary Medicine (CVM) at North Carolina State University (NCSU). The following units comprise the accredited institution:

- B. Give a brief overview of the institution, its purpose and how the animal care and use program relates to the mission of the institution.

The main campus of the CVM is located on a 182-acre site in west Raleigh. It was established in 1978 and has approximately 400 DVM students, 60 graduate students and 60 residents and interns. Advance training includes thesis-based masters and PhD degrees. The college also provides postdoctoral training and opportunities for visiting scientists. The goal of the animal care and use program is to humanely provide animal resources to support the teaching and research programs of the College as well as provide collaboration opportunities with other colleges within the university and promote industry. The CVM is committed to assuring the well-being and judicious use of experimental animals to promote animal health.

- C. Note that [AAALAC International's three primary standards](#) are the *Guide for the Care and Use of Laboratory Animals (Guide)*, NRC, 2011; the *Guide for the Care and Use of Agricultural Animals in Research and Teaching (Ag Guide)*, FASS, 2010, and the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes, Council of Europe (ETS 123). Other regulations and guidelines used (U.S. Department of Agriculture (USDA), Public Health Service (PHS) Policy, Good Laboratory Practice (GLP), Canadian Council on Animal Care (CCAC), etc.) may also apply. Describe which of the three primary standards and other regulations and guidelines are used as standards for the institutional animal care and use program and how they are applied. For example, an academic institution in the United States with an Office of Laboratory Animal Welfare (OLAW) Assurance may use the standards of the *Guide* and PHS Policy for all animals, the Animal Welfare Act regulations for covered species, and the *Ag Guide* for agricultural animals used in agricultural research and teaching (see also *Guide*, pp. 32-33). In the European Union, the standards applied might be the *Guide*, ETS 123, Directive 2010/63, and any country-specific regulations.

The CVM animal units use the *Guide for the Care and Use of Laboratory Animals 8th edition* and the *Public Health Service Policy on the Humane Care and Use of Laboratory Animals* for all animals that are covered under those guidelines; the Animal Welfare Act (Title 7,

Chapter 54) and the Animal Welfare Regulations (CFR, Title 9, Chapter 1, subchapter A parts 1-4) for covered species; and the *Guide for the Care and Use of Agricultural Animals in Research and Teaching*, 3rd edition for agricultural research and teaching.

- D. Describe the organization and include an accurate, current, and detailed organizational chart or charts (see **Appendix 4**) detailing the lines of authority from the Institutional Official to the Attending Veterinarian, the Institutional Animal Care and Use Committee/Oversight Body (IACUC/OB), and the personnel providing animal care. Please include the title, name (Note: For individuals whose information is publically available, provide the titles and names; for individuals whose information is not publically available, you may provide titles only.), and degree (if applicable) of each individual at the level of supervisor or above. Names of animal care staff below the title of supervisor need not be included, but the titles and number of animal care personnel under each supervisor should be included. If animal care responsibility is administratively decentralized, including the management of satellite housing areas/locations, the organizational chart or charts must include all animal care programs, indicating the relationship between each administrative unit and personnel, the Attending Veterinarian, and the Institutional Official.

The University Attending Veterinarian (Dr. Gabriel McKeon, DVM, DACLAM) reports to the CVM associate Dean of Research (Kathryn Meurs, DVM, PhD, DACVIM); and also reports all aspects of the animal care and use program directly to the Institutional Official (Richard Best), the Director of Sponsored Programs.

The University Attending Veterinarian (UAV) has direct supervisory responsibility for the [REDACTED] at the CVM. In this capacity, the UAV reports to the associate Dean of Research (Dr. Kathryn Meurs). The [REDACTED] Facilities Manager ([REDACTED]) and Veterinary Services (VS) Manager ([REDACTED]) report directly to the UAV. [REDACTED] employs two unit supervisors and a Training Coordinator, which report directly to the Facility Manager, and maintain a staff of 12.75 FTE Animal Care Technicians (ACTs). VS employs 3 FTE Veterinary Assistants that report to the VS Supervisor. The [REDACTED] office employs 1 FTE office administrator and a 0.75 FTE office assistant, which report the UAV.

Additionally, the UAV is responsible for the overall animal care program for each non-[REDACTED] unit via communication with designated faculty coordinators and/or Unit Attending Veterinarians who are trained specifically for wellness oversight of the animals within their respective units as follows.

The administrative activities of the [REDACTED] ([REDACTED]) are managed through the [REDACTED] serving as Director and faculty coordinator and [REDACTED] as Unit Manager. [REDACTED] Employs 6 FTE Animal Care supervisors.

The faculty coordinator for the [REDACTED]

[REDACTED] The facility is managed by [REDACTED] who reports to [REDACTED] and supervises 1 FTE Animal Care Technician and 1 FTE laboratory technician

The faculty coordinator [REDACTED] for the [REDACTED] unit is [REDACTED] who oversees 1 PTE Animal Care Technician, manages the unit.

[REDACTED] the Unit Attending Veterinarian, and [REDACTED] serves as the Facility Manager.

[REDACTED] serve as the Clinical Veterinarian, and Unit Attending Veterinarian, respectively, for the [REDACTED]

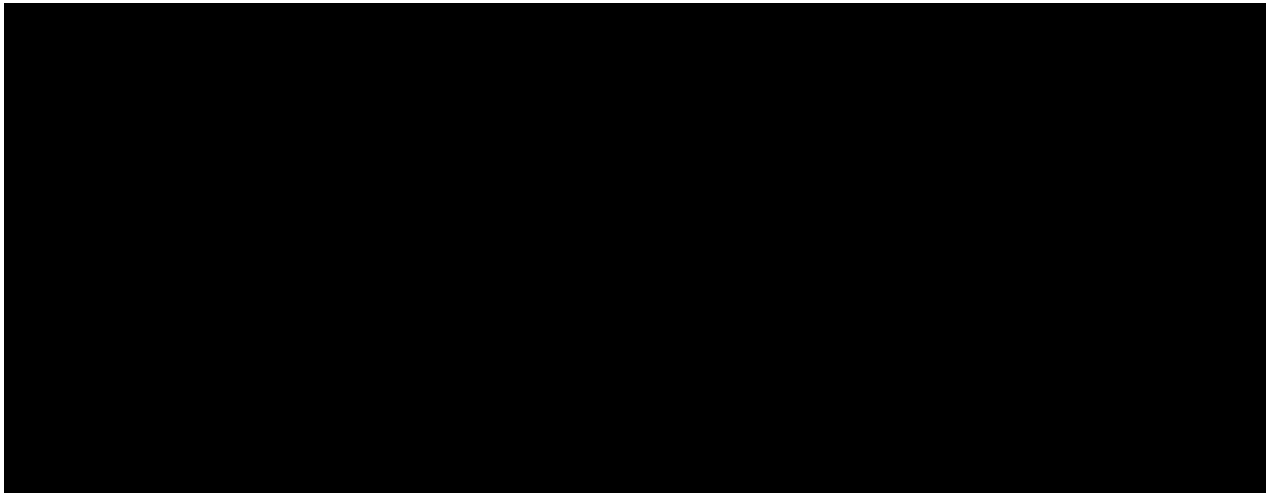
- E. Identify the key institutional representatives (including, but not limited to, the Institutional Official; IACUC/OB Chairperson; Attending Veterinarian; animal program manager; individual(s) providing biosafety, chemical hazard, and radiation safety oversight; etc.); and individuals anticipated to participate in the site visit.

Dr. Paul Lunn, Dean, CVM
 Dr. Kathryn Meurs, Associate Dean of Research and Graduate Programs, CVM
 Dr. William Flowers, NCSU IACUC Chairperson, Faculty Liaison, SEU
 Ms. Jennifer Dew, IACUC Regulatory Compliance Director
 Ms. Paula Delong, IACUC Regulatory Compliance Coordinator
 Ms. Candace Morales, IACUC Regulatory Compliance Coordinator
 Dr. Gabriel McKeon, University Attending Veterinarian
 Mr. Ken Kretchman, Director, Environmental Health and Public Safety
 Mr. Darren Trembl, Biosafety Officer
 Ms. Amy Orders, Radiation Safety
 Ms. Kim Sebastiani, Industrial Hygienist

- [REDACTED]
- F. Briefly describe the major types of research, testing, and teaching programs involving animals and note the approximate number of principal investigators and protocols involving the use of animals. As mentioned in the [instructions](#), please complete **Appendix 5** (Animal Usage) or provide the information requested in a similar format as an Appendix.

Research programs at the CVM comprise over 100 faculty representing more than 25 disciplines working with more than 20 species. The research programs include more than 65 graduate students and over 80 research technicians working in over 100 laboratories. Around 88 CVM PIs have 300 IACUC-approved animal use protocols.

[REDACTED]

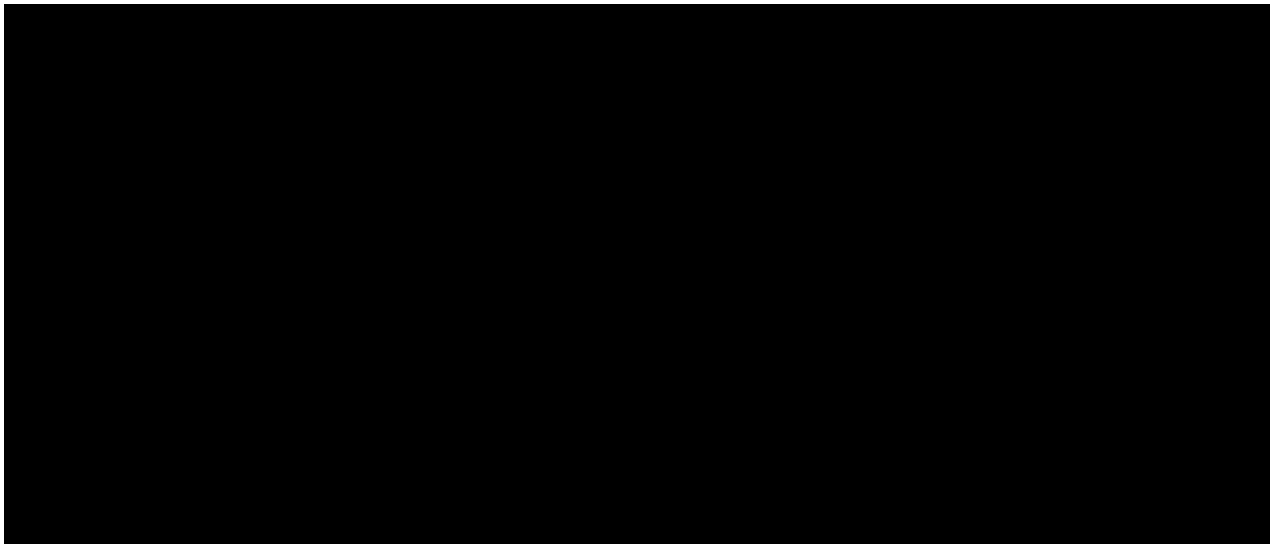


G. Note the source(s) of research funding (grants, contracts, etc.) involving the use of animals.

The College's research activities are supported by a variety of means. The state of North Carolina provides base support for the research programs, and partially subsidizes the operating budgets of [REDACTED] [REDACTED] [REDACTED] [REDACTED] and [REDACTED]. Most research activity is funded through competitive grants from agencies such as the National Institutes of Health and the United States Department of Agriculture and through grants, contracts or memoranda of agreement with companies, foundations, commodity organizations and other agencies.

H. List other units (divisions, institutes, areas, departments, colleges, etc.) of your organization that house and/or use animals that are not included in this Description. If any of these are contiguous, physically or operationally (e.g., same IACUC/OB, same animal care staff), with the applicant unit, describe the association. Explain why such units are not part of this program application.

Note: Questions regarding this section should be forwarded to the AAALAC Office.



The NCSU IACUC reviews all protocols involving procedures conducted by NCSU faculty and staff, and inspects the corresponding animal-holding facilities.

- I. Contract Facilities: If the institution contracts for animal care facilities or services for animals owned by the institution, the contractor and its AAALAC International accreditation status must be identified. If a contractor's animal care and use program is not accredited by AAALAC International, a brief description, following this Program Description outline, of the relevant contractor's programs and facilities must be provided. In addition, the species and approximate average number of animals housed in the contract facilities and the approximate distance between the institution's animal facility and the contract facility must be noted. Incorporation of the contractor program into the site visit schedule will be discussed with institutional representatives. If the institution does not contract for animal care facilities or services, so note.

None

- J. Note other relevant background that will assist reviewers of this report.

n/a

Section 2. Description

I. Animal Care and Use Program

A. Program Management

1. Program Management Responsibility [**Guide, pp. 13-15**]

a. **The Institutional Official** [*Guide pp. 13-14*]

Describe how program needs are clearly and regularly communicated to the Institutional Official by the Attending Veterinarian, IACUC/OB, and others associated with the program.

The UAV Gabriel McKeon, DVM, DACLAM, is responsible for the standards of care for all animals owned by NCSU. As UAV, he reports all animal care and use issues to the Institutional Official, Director of Sponsored Program, Richard Best.

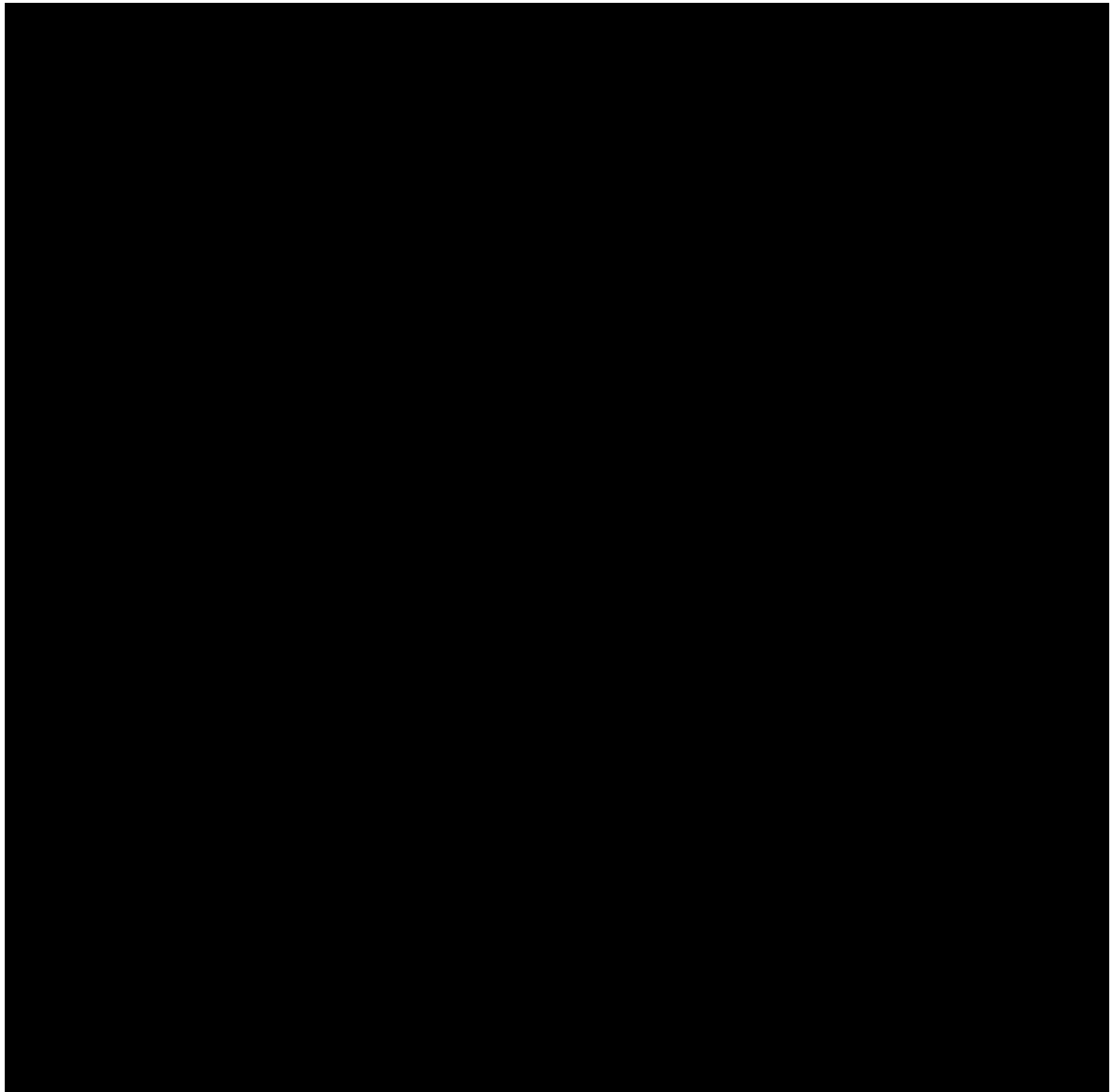
The NCSU IACUC reviews the Institution's program for humane care and use of animals at least once every six months, using the Guide as a basis for evaluation. Utilizing OLAW's sample Semiannual Program and Facility Review Checklist, the IACUC Chair appoints subcommittees for each area of evaluation. Subcommittees evaluate each program area as assigned, complete the relevant section of the checklist, including written comments or explanations as appropriate, and present their findings at a convened quorum of the IACUC on a semiannual basis.

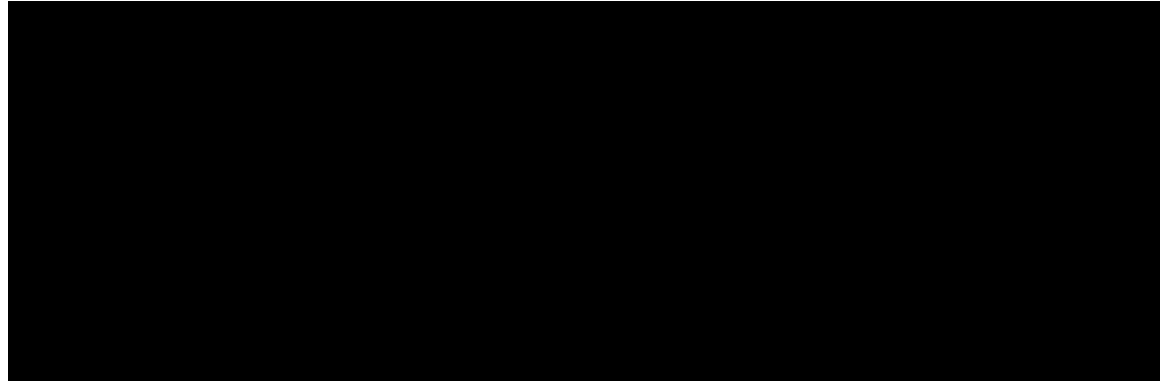
All animal facilities are inspected at least once every six months. A designated group of facilities is scheduled for inspection each month. The IACUC Compliance Coordinator schedules all inspections, ensuring that at least two voting members of the IACUC participate in each inspection. All IACUC members, as well as representatives from Environmental Health and Safety, are invited via email to join all scheduled semiannual inspections. The Compliance Coordinator works with facility representatives (typically the facility manager or director) to schedule inspections. Inspection teams refer to the Sample Semiannual Program and Facility Review Checklist provided by OLAW as a guide for conducting inspections, using the Guide and the Ag Guide as the basis for evaluations.

IACUC-approved semiannual program reviews and animal facility inspection reports are directed to the IO, along with any minority reports from the committee. Any reports of possible noncompliance or animal welfare issues are reported directly to the IO by the IACUC Chair and UAV.

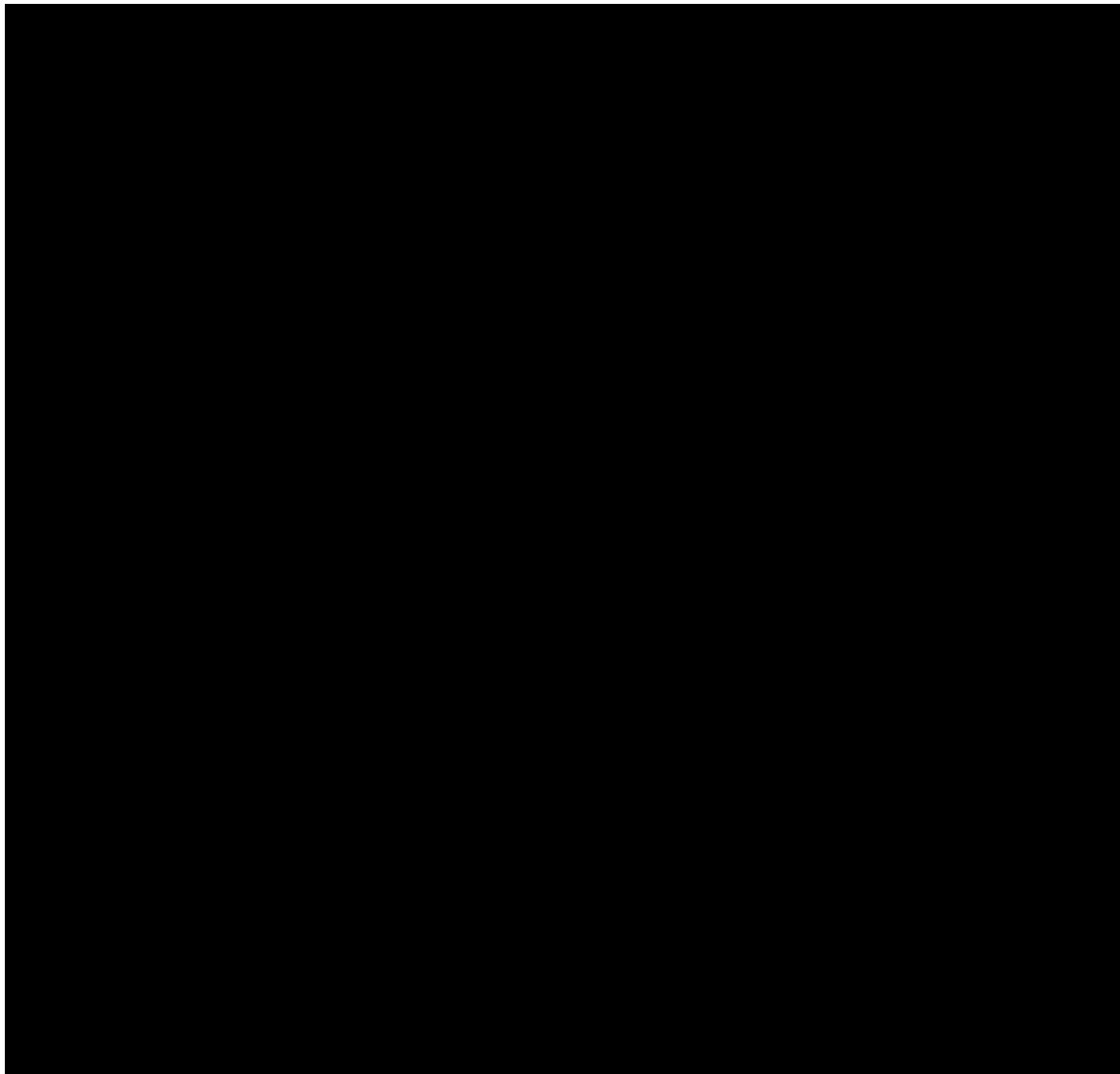
b. Role of the Attending Veterinarian [Guide, p. 14]

- i. Describe the institutional arrangement for providing adequate veterinary care. Although individual name(s) and qualifications will be described below, identify by title the veterinarian(s) responsible for the veterinary care program, including:
- a list of responsibilities
 - a description of the veterinarian's involvement in monitoring the care and use of laboratory animals
 - the percentage of time devoted to supporting the animal care and use program of the institution if full-time; or the frequency and duration of visits if employed part-time or as a consultant.
- Note:* If preferred, this information may be provided in a Table or additional Appendix.





- ii. List others (e.g., Principal Investigators, veterinarians serving as Principal Investigators, veterinary faculty/staff, technical staff, farm managers) who have a *direct role in the provision of veterinary care* and describe their responsibilities. The Organizational Chart(s) provided in **Appendix 4** must depict the reporting relationship between these individuals and the Attending Veterinarian.
Note: If preferred, this information may be provided in a Table or additional Appendix.



[REDACTED]

In some instances, clinical care of animals may be provided by Principal Investigators if they are veterinarians on faculty at NCSU. Arrangements are made between the PI and [REDACTED] and, in each case, close communication is maintained. There are written IACUC guidelines for both anesthesia/surgery/postop care and medical record keeping that must be followed in each case.

c. Interinstitutional Collaborations [Guide, p. 15]

Describe processes for assigning animal care and use responsibility, animal ownership and IACUC/OB oversight responsibilities at off-site locations for interinstitutional collaborations.

If study animals are owned by NCSU, and the study funded through NCSU, the NCSU IACUC requires the submission of an AVAU and verification of the additional IACUC review at the collaborating institution. If study animals are owned by a collaborating PHS assured institution and the study funded through the collaborating institution, NCSU IACUC requires documentation of IACUC review and approval by collaborating institution. If a PHS assurance is not on file for the collaborating institution, NCSU IACUC review is required, along with an inter-institutional assurance for PHS funded projects.

2. Personnel Management

a. Training, Education, and Continuing Educational Opportunities

Describe *how* the IACUC/OB provides *oversight* and *evaluates the effectiveness* of training programs and the assessment of personnel competencies. Describe how training is documented.

Note: Do not include details about the training program, which should be described in the following sections.

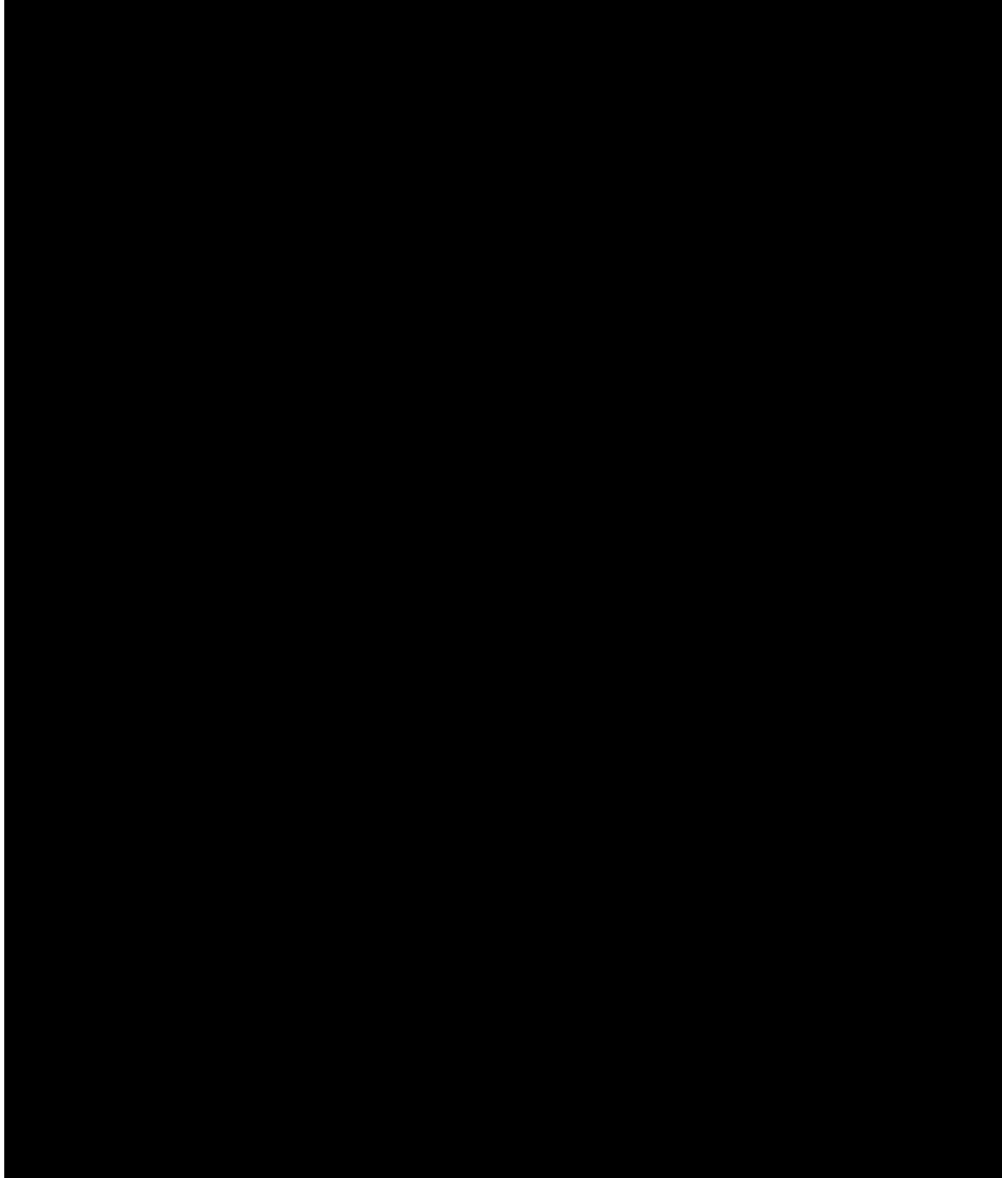
Information about relevant experience and training of all personnel who will have responsibility for animal experimental manipulations is required on applications for vertebrate animal use (AVAU). In addition, the IACUC requires that the PI provide assurances that they, and personnel under their supervision, will be appropriately trained and qualified. PIs are encouraged to maintain training records for each person under their supervision. PIs must complete the AALAS Learning Library tutorial at least every three years. All NCSU personnel who work unsupervised with experimental animals must complete the tutorial prior to initiating animal work and at least every three years thereafter. The Office of Sponsored Programs and Regulatory Compliance maintains a database to document faculty, staff, and student completion of the NCSU Animal Subjects Tutorial. The IACUC Compliance Coordinator maintains the NCSU account with the AALAS Learning Library (ALL) in order to issue log in information to faculty and staff completing the ALL tutorials, and to maintain documentation of tutorial completions. The IACUC reviews the overall

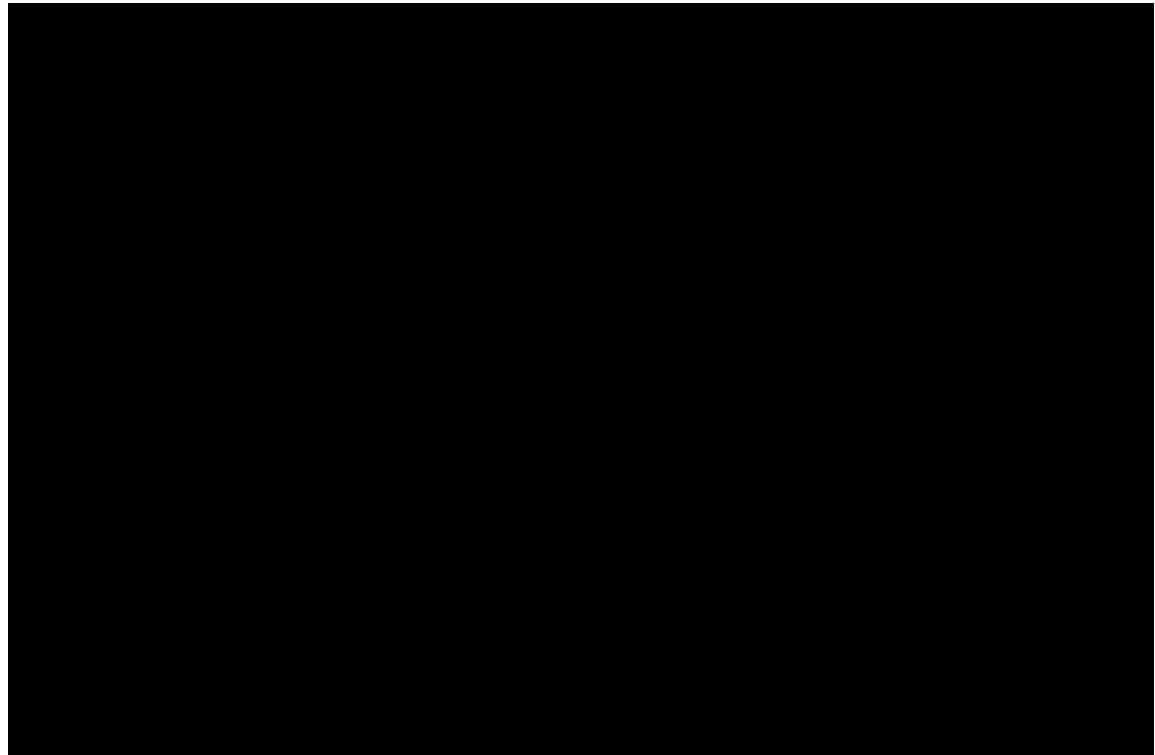
institutional program for establishing qualifications of research personnel and animal care staff during its semiannual review of the animal care program.

i. Veterinary and Other Professional Staff [*Guide*, pp. 15-16]

For the Attending Veterinarian and other individuals having a direct role in providing veterinary medical care (veterinarians, other professional staff listed above, private practitioners, etc.), provide: name, credentials (including degrees), and a description of their qualifications, training, and continuing education opportunities.

Note: Please do not provide curriculum vitae of personnel; if preferred, this information may be presented in a Table or additional Appendix.





ii. Animal Care Personnel [*Guide*, p. 16]

1) Indicate the number of animal care personnel.

██████ is staffed with twelve full-time permanent laboratory animal technician positions, one part-time permanent laboratory animal technician and three full-time permanent medical support technicians. Of the fifteen full-time staff all have prior animal handling experience in a variety of capacities including private practice, agriculture, academic research settings, wildlife rehab centers, and industry. ██████ also participates in a work study program, students may assist with daily upon completion of training and demonstration of competency.

██████ is staffed with six full time animal care staff and fifteen part time student employees.

██████████ will be staffed with one full time animal care technician

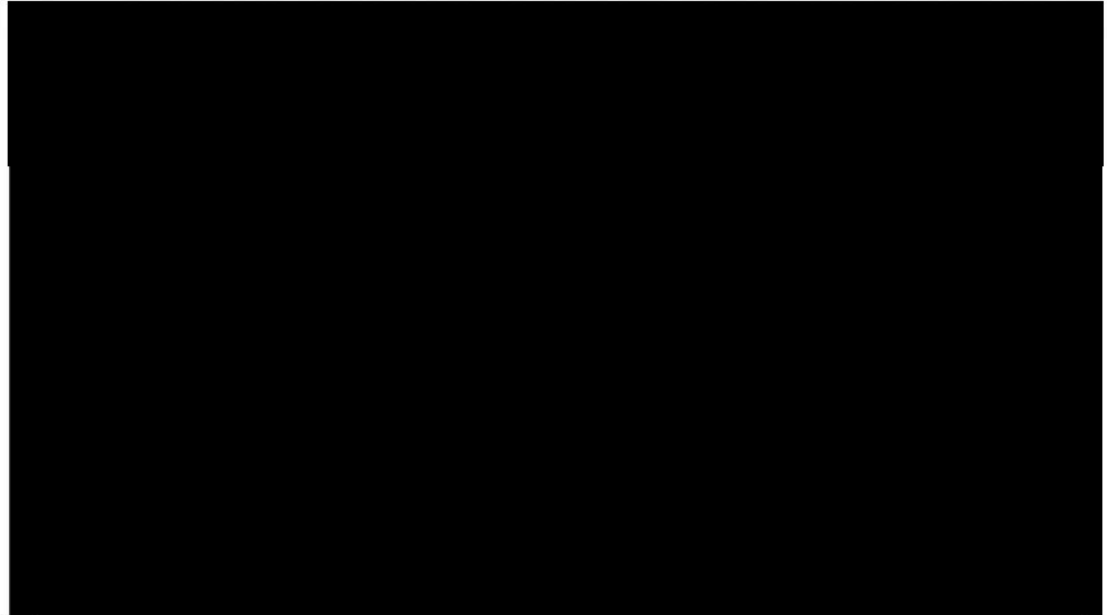
██████ is staffed with two full time staff members, one of which is dedicated to animal husbandry and care and one of which is dedicated to laboratory diagnostics.

██████████ is staffed with one full time and one part time animal care technicians, and participates in the work-study program.

████████ is staffed with six staff members.

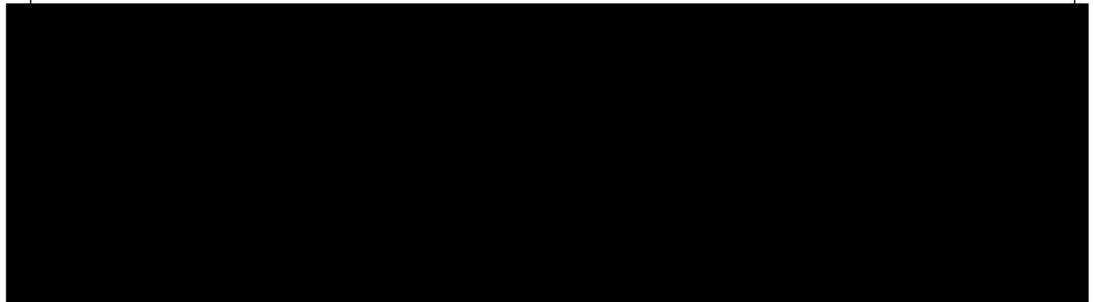
- 2) Summarize their training, certification level and type, experience, and continuing education opportunities provided.

Note: If preferred, this information may be provided in a Table or additional Appendix.



New [REDACTED] staff undergo a detailed orientation that includes policies and procedures, SOPs, and occupational health and safety. All staff completes the IACUC training and are encouraged to progress through the AALAS certification levels. Training for specific animal handling procedures are done on an individual basis by the training technician or supervisor. When available, regionally and nationally broadcasted webinars (such as those administered by OLAW) and wet labs.

[REDACTED] staff are trained in all species thru hands on training and SOP manuals. There is an Excel checklist that they are required to complete with in the first two weeks of employment. If there is any certifications an employee is interested in obtaining and it is beneficial to their job description, they are encouraged to attend the course. Employees are encouraged to take courses that NCSU offers that benefit their jobs.



iii. The Research Team [Guide, pp. 16-17; 115-116; 122; 124]

- 1) Describe the *general mechanisms* by which the institution or IACUC/OB ensures that research personnel have the necessary knowledge and expertise in the animal procedures proposed and the species used.

The NCSU IACUC is responsible for assessing personnel qualifications as part of the AVAU review process. Information about relevant experience and training of all personnel who have responsibility for animal experimental manipulations is required on all applications for vertebrate animal use (AVAU). In addition, the IACUC requires that the PI provide assurance that they, and personnel under their supervision, will be appropriately trained and qualified. PIs are encouraged to maintain training records for each person under their supervision. All PIs are required to complete the tutorial “Working with the IACUC” in the AALAS Learning Library. All personnel who work with live vertebrate animals without direct supervision must complete the NCSU Animal Subjects Tutorial. In instances where faculty, research staff, or students need instruction on how to carry out specific techniques with animals, training is offered on a one-on-one basis by qualified [REDACTED] veterinarians or staff.

- a) Briefly describe the content of any required training.

The AALAS Learning Library provides extensive online self-guided modules on animal welfare regulatory compliance as well as information relative to technical training needed for working laboratory animals. The NCSU Animal Subjects Tutorial provides a summary of basic information

relative to the use of live vertebrate animals in research and teaching at NCSU, including information about federal regulations and oversight, as well as institutional policies.

- b) Describe the timing of training requirements relative to the commencement of work.

All required training must be completed before the start of any unsupervised, hands on animal work.

- c) Describe continuing education opportunities offered.

The IACUC office is available to assist investigators and staff in identifying and accessing training opportunities within the NCSU community as well as AALAS Learning Library. There are many NCSU faculty and staff who have skills in experimental animal procedures and are often involved in training other investigators or lab personnel. [REDACTED] division of the College of Veterinary Medicine has a collection of training materials available for viewing, and veterinarians and technicians who are capable of providing training in many general experimental animal procedures. [REDACTED] also has a Training Coordinator who documents training for [REDACTED] husbandry staff. Staff meetings within [REDACTED] provides educational courses on the research being performed within the college or handling/sampling techniques of species housed in the facility.

- 2) Describe the process (es) to ensure surgical and related procedures are performed by qualified and trained personnel, including:
- who determines that personnel are qualified and trained for surgical procedures
 - the roles that the Attending Veterinarian and IACUC/OB have in this determination [*Guide*, pp. 115-116]

Qualifications of personnel are reviewed by the IACUC as part of AVAU review, and basic information on surgery is part of the basic IACUC training required for all personnel who work unsupervised. In addition, the PI, in the IACUC AVAU, makes assurances that procedures will be performed only by trained or experienced personnel. A large majority of the experimental surgery

- 3) Describe the training and experience required to perform anesthesia. [*Guide*, p. 122]

The NCSU IACUC requires documented assurances by the PI, in the AVAU, that procedures will be performed only by trained or experienced personnel. Anesthetic support is often provided by [REDACTED] staff, where Veterinary Service staff members are specifically trained for anesthetic support. Most of the anesthetic procedures are performed by DVM investigators or technicians under their supervision.

For rodent anesthesia users a basic training must be done with the Veterinary Services group and documented before being allowed to use equipment.

- 4) Describe how the proficiency of personnel conducting euthanasia is ensured (especially physical methods of euthanasia). [Guide, p. 124]

Qualifications of personnel are reviewed by the IACUC as part of the AVAU review, and basic information on euthanasia is part of the IACUC training required for all personnel who work unsupervised. In addition, the PI, in the IACUC AVAU, assures that procedures will be performed only by trained or experienced personnel.

b. Occupational Health and Safety of Personnel [Guide, pp. 17-23]

i. Institutional Oversight [Guide, pp. 17-19]

- 1) List the institutional entities (units, departments, personnel, *etc.*) that are involved in the planning, oversight, and operation of the institutional occupational health and safety program related to animal care and use (e.g., office(s) of environmental health, institutional health services or clinics (*including contracted health services*), industrial hygienists, Institutional Biosafety Committee(s) and/or Officer(s), Radiation Safety Committee(s) and/or Officer(s).
- Include a brief description of their responsibilities and qualifications.
 - If contracted services are used, also include their location (e.g., remote offices to which personnel must report).

Planning and oversight of the NCSU Environmental, Health and Safety programs begins with the Chancellor for the University. They extend authority for these programs through the Vice Chancellor of Finance and Business, to the Associate Vice Chancellor of Environmental Health and Public Safety (David Rainer) to the Director of the Environmental Health and Safety (EH&S – Ken Kretchman) at the department level.

EH&S guides the process for defining the roles and responsibilities for all personnel within the University working with Deans, Directors and Department Heads. EH&S utilizes safety committees with campus

representation at all levels, to review, develop and institute policies, practices and procedures. The campus institutional committees include the following:

Biosafety (Darren Treml, MPH – Biosafety Office; Anthony Curtis- EHS Professional)

Hazardous Materials (Ron Howell – Occupational Health Manager; Kim Sebastiani – Industrial Hygienist)

Radiation Safety (Amy Orders Ed.D., RT(R) – Radiation Safety Officer/Assistant Director; Lora Moyle- Assistant Radiation Safety Officer)

Members of the institutional health and safety committees are drawn from safety committees in 15 departments on campus as well as key administrators and technical resource personnel.

Operational health and safety requirements are defined on the EH&S website, in the individual department's Manager's safety orientation checklist for new employees, Safety Plans for work areas handling hazardous materials and equipment and in the Supervisor Safety Self-assessment review (performed annually). While each department is responsible for performing their required health and safety activities, EH&S provides inspection, training and technical support as oversight for those activities across the campus.

- 2) Describe methods to identify work-related hazards and the processes used to evaluate the significance of those hazards in the context of duties and tasks. Describe both common approaches and differences, if applicable, for categories of personnel such as, but not limited to, researchers, veterinarians, husbandry staff, cage-washing staff, students, housekeeping, physical plant staff, security personnel, IACUC/OB members (including non-affiliated members), contractors, visitors, etc. [Guide, pp. 18-19; see also Chapters 2 and 3 in Occupational Health and Safety in the Care and Use of Research Animals, NRC 1997.].

NCSU has established administrative procedures for the reduction and prevention of on the job accidents and illnesses and for the protection of the environment. The Environmental Health and Safety (EH&S) administers and implements the occupational health and safety policies and procedures promulgated by EH&S and by University health and safety committees. The EH&S is staffed by professionals in radiation safety, industrial hygiene, occupational safety, biosafety and environmental management. EH&S activities include providing assistance to members of the University community in evaluating and minimizing risks, the proper disposal of hazardous materials, and the maintenance and analysis of records and documentation for regulatory agencies. The EH&S maintains a comprehensive web site with links to the various components of the University's program.

A key component of the NCSU safety program is the annual filing of a Laboratory Safety Plan, by the responsible PI, that describes the specific hazards present in that laboratory. The safety plan is reviewed by EH&S on an annual basis.

EH&S reviews animal use research protocols when hazardous materials are anticipated including chemical, biological, and radiological hazards. The principal investigators assess the hazards and determine suitable control measures for both the researchers and the animal caretakers. EH&S and management reviews the adequacy of these control measures.

The preferred method of controlling occupational exposures to chemical, biological, and radiological hazards at NCSU facilities is through the use of appropriate engineering controls. In many cases, assuring that the engineering controls (particularly ventilation systems) are working properly establishing exposure control when equipment is used correctly. When engineering controls cannot be used and personnel exposures are anticipated, exposure assessments are performed by the appropriate EH&S specialist. Assessments may be performed at a department's request, as a result of an EH&S inspection or a review of a safety plan.

3) Describe methods and frequency of reassessing work-related hazards.

All safety plans require annual resubmission and are reviewed by EHS. Similarly, IACUC protocols and their related RMHC forms, Biological use authorization forms, and radiation safety plans require renewal at least every three years for de novo review. If PI's wish to add any new hazardous chemicals, biological agents, or radiological hazards, an amendment must be submitted to EHS using the relevant forms.

4) Describe institutional programs or methods used to track and evaluate safety-related workplace incidents, including injuries, exposures, accidents, etc. Include the frequency of such assessments. [Guide, pp. 18-19]

Campus safety policy requires that all work place injuries and illnesses are reported to management, using the standardized reporting forms, who in turn reports them HR and Environmental Health & Safety Department (EH&S). EH&S oversees accident follow-up inspections, corrective actions and reporting for OSHA record keeping and Worker's Compensation.

Everyone in the University is encouraged to report unsafe conditions and equipment to their departmental management and to EH&S. If an individual is uncomfortable reporting issues directly, they can use the EH&S hotline to report issues anonymously.

ii. Standard Working Conditions and Baseline Precautions

The following section pertains to the Occupational Health and Safety Program for all personnel associated with the animal care and use program. Specific information regarding the use of hazardous agents is included in **subsection iii** below.

1) Medical Evaluation and Preventive Medicine for Personnel [Guide, pp. 22-23] *Note:* Include blank forms used for individual health assessment as **Appendix 6.**

- a) Describe who (e.g., personnel assigned to job/task categories in I.A.2.b.i.2) above) receives personal medical evaluation as a component of individual risk assessment. Describe who are **not** included and/or exempted from personal medical evaluation. *Note:* Do not include the names of personnel.

Personnel included are those involved in the direct care of vertebrate animals and their living quarters, and those individuals who have direct contact with animals (live or dead); their viable tissues, body fluids or wastes. The OHSP includes all:

- full time, part time, and temporary personnel, involved in animal care in NCSU units that house animals for research and teaching research, investigators and their technical staff
- instructors involved with animal related work
- faculty and staff in the [REDACTED] [REDACTED] who have animal contact
- other personnel who may reasonably be expected to come in contact with vertebrate animals (live or dead), their viable tissues, body fluids or wastes (some personnel in facilities management, security, custodial services).

Participants are organized into categories that reflect the specific surveillance needs of the individuals based on real or potential occupational exposure to specific species of animals.

- Category 1 Personnel are those with only one-time contact with animals (or tissues, etc.) or those whose contact is limited to directly supervised activities in teaching labs.
- Category 2 Personnel are those working in animal husbandry, or having contact more than one time with animals (or tissues, etc.)

- b) Describe provisions for allowing an individual to decline participation in all or parts of the medical evaluation and preventive medicine programs (if applicable). Provide an estimate (percentage) of personnel associated with the animal care and use program that have declined participation in the medical evaluation program.

If an employee wishes to decline participation in a portion of the entire health assessment program the supervisor needs to be informed. The supervisor must consult with the occupational medicine provider in circumstances where an employee refuses to complete Part B of the questionnaire or refuses to comply with provider's recommendations. Declining participation in a required element may result in exclusion from certain positions or work activities. The current estimated percentage of declined participation, or non-compliance with occupational medicine provider's recommendations, in any part of the medical evaluation program (e.g. vaccine, etc.) is 9%.

c) Describe provisions for assuring confidentiality of medical information.

Occupational Medicine (OM) personnel follow HIPAA guidelines. The office of OM utilizes proprietary medical records software that uses randomization of patients and grants designated staff limited access to these records as outlined by their assigned role. Any requests for information from the IACUC or other programmatic units regarding whether personnel are cleared for their assigned protocol roles are communicated with the minimal information needed and does not disclose any protected health information.

d) Describe safety considerations for individuals with incidental exposure to animal care and use (e.g., contractors, personnel working in open laboratories).

All individuals entering the building for contract work are briefed on potential risks and protocols for entering areas where animal work will occur prior to any work being started. This is in coordination with the area facilities director, the animal facility manager, and the project lead. This generally includes a discussion of what the exposure risks are and what biosecurity concerns exist in any given area. All contractors are instructed to arrange for animal care staff-supervised entry into any primary animal holding room.

Staff that share open laboratory space are grouped according to research emphasis area. This includes similar shared laboratory equipment and, by extension, related laboratory work. All new hires within these labs are informed of potential animal work in these shared spaces. Areas where biohazardous materials are present are clearly labeled with door signage and limited access and occur within the confines of appropriate engineering controls. Higher risk activities are assigned to areas with less regular foot traffic to limit potential exposure.

e) Describe general features of the medical evaluation and preventive medicine programs, within the context of work duties, including:

- pre-employment/pre-assignment health evaluation,
- medical evaluations (including periodicity),
- diagnostic tests (e.g., for tuberculosis),
- precautions for working with potentially hazardous species (e.g., nonhuman primates, sheep, venomous species)
- immunization programs, and
- procedures for communicating health related issues.

The assessment of risk will be determined by frequency of contact, intensity of exposure, hazards associated with the animals being handled, hazardous properties of agents used in research, the susceptibility of individual employees, the hazard-control measures available, and the occupational history of individual employees. Baseline risk assessment will involve occupational health specialists and, depending on personnel category, may include completion of job duties and medical questionnaires, interview with an occupational health specialist, and a physical examination.

- Category 1 Personnel must receive specific instruction on the health risks associated with their animal contact. They will not routinely fill out a questionnaire or visit the contract medical provide.
- Category 2 Personnel fill out a "Vertebrate Animal Contact Medical Questionnaire" for initial enrollment into the program. The supervisor is responsible for ensuring that the questionnaire is completed and appropriate sections are sent to Student Health Services. A medical provider will review the questionnaire; any follow-up discussion with the employee, or medical examination, will be at the discretion of the medical provider.

In addition to the above baseline evaluation, all personnel will receive regular training and/or notification of health risks associated with animal contact, including the importance of medical follow-up if problems (e.g., allergy) arise.

All personnel working with animals should receive tetanus vaccination every 10 years, and those who have contact with random source or wild mammals, or mammals kept outdoors, should receive rabies vaccination. Additional special procedures/vaccinations may be necessary for certain projects such as work with non-human primates. The supervisor is responsible for notifying employees of vaccination requirements and ensuring that vaccinations are received according to occupational physician's recommendations.

- f) Describe any other entities that provide medical services (e.g., emergency care, after-hours care, special medical evaluation, contracted services). Include a brief description of their credentials and/or qualifications, and how these entities remain knowledgeable

about animal- or institution-related hazards and risks.

Anyone who experiences a serious injury or illness on campus must call 911. University Police and Fire Safety will provide first responder emergency medical care and transport services as necessary. NCSU policy provides supervisors with a Medical Treatment Form for non-emergency accidents that occur during work hours. This form provides a current list of authorized urgent care medical providers. The supervisor provides the form to the injured worker that is taken to the medical provider to be filled out. Non-emergency injuries that occur after hours or at locations remote from Raleigh facilities should be directed to the nearest urgent care center using a separate form for treatment documentation. Duke University's Division of Occupational and Environmental Medicine provides consultative services and specialized exams not provided at the Campus Student Health Services.

2) Personnel Training Regarding Occupational Health and Safety [Guide, p. 20]

Describe general educational program(s) to inform personnel about:

- allergies,
- zoonoses,
- personal hygiene,
- physical injuries in animal facilities (e.g., noisy areas, large quantities of chemicals such as disinfectants, ergonomics) or species used (e.g., nonhuman primates, agricultural animals),
- other considerations regarding occupational health and safety.

Include in the description a summary of the topics covered, including:

- Entities responsible for providing the training
- Frequency of training or refresher training

Note: Do not include special or agent-specific training for personnel exposed to experiment-related hazardous agents; this will be provided in **Section iii.3** below.

In accordance with University policy, all new [REDACTED] employees receive basic safety training from the training coordinator as part of their job orientation; this training is documented on a standardized checklist. Information specific to animal contact is part of the IACUC training required of all personnel who work without direct supervision.

Orientation of new [REDACTED] employees includes reading of [REDACTED] SOPs and occupational health training. This covers the components of the occupational health program; including discussion of personal hygiene, reporting of illness and injury, potential for zoonotic disease and allergy, and the medical surveillance program. Employees are also given access to the unit's safety plans.

In [REDACTED] all [REDACTED] employees are required to read the unit SOPs upon hire and as updated. Staff are encouraged to attend continuing education programs and laboratory sessions to learn more about disease control and prevention. There is a checklist that each new employee is required to complete which includes safety in each unit as well as safety on all equipment. Each new employee trains with each unit manager on unit specific and University policies. Each new staff member is trained on how to safely use any [REDACTED] power equipment. Staff are instructed to work in pairs when moving animals.

At [REDACTED] employees will be required to read unit SOPs upon hire and as updated. Staff are encouraged to attend continuing education programs and laboratory sessions to learn more about disease control and prevention. Training logs will be maintained for all staff members for unit specific and University policies.

At [REDACTED] in accordance with University policy, all new employees receive safety training from their supervisor as part of their job orientation. Orientation of new [REDACTED] employees includes introduction to [REDACTED] SOPs and the safety plan, and all new hires receive occupational health and safety training at the NCSU campus.

In [REDACTED] the unit manager reviews all hazards for the unit for workplace hazards, hygiene and other occupational hazards upon hiring and refreshers as needed.

At [REDACTED] staff goes through the required NCSU EHS training program for animal contact and PI trains on specific safety training for unit and species housed within.

Academic training and experience qualify faculty and research staff involved in hazardous agent use. PIs and other supervisors are responsible for training their employees who work with hazardous agents. In locations where hazardous agents are used or stored, this training will be outlined in the Laboratory Safety Plan produced for that area, as required by the Environmental Health and Safety Center. (All EH&S policies and procedures are described on the EH&S web site.) All employees must have ready access to the Safety Plan, which is reviewed at least annually by the EH&S.

In-depth training about the specific hazards of the individual's workplace is provided by the supervisor; supervisor's responsibilities are defined on the EH&S web site. The University provides training on protection from radiation hazards, biohazards, and chemical hazards, and completion of a campus-wide radiation safety course is required before investigators are allowed to order radioactive substances; some on-line training is available.

3) Personal Hygiene [Guide, p. 20; Ag Guide pp. 4-5]

- a) List routine personal protective equipment and work clothing provided and/or required for animal care personnel, research and technical staff, farm employees, etc.

█████ personnel are provided in house scrubs and research staff can rent dedicated facility scrubs through CPL. █████ also provides safety shoes, raincoats, jackets, and rubber boots as needed. Project specific PPE is provided as indicated for projects and information in each case is posted on the animal room door or inside of airlock.

In █████ coveralls, shirts, boots and gloves are provided for █████ employees. Boot brushes and disinfectants are used to clean boots. Disposable gloves and sleeves are always available for use as needed.

In █████ reusable lab coats, disposable gloves and when preparing & spraying full mask respirator.

At █████ will have dedicated work clothes and shoes. Gloves provided as needed for a project.

At █████ personnel are provided with both disposable and reusable protective clothing (coveralls, lab coats, etc) when necessary. Coveralls, smocks, rain gear, helmets, eye protection and rubber boots are provided for use in special situations. Special attention is paid to clothing worn in quarantine barns.

At █████ waders/wet suit/dry suit, eye protection and PFD are used for any field work; scrub tops, and gloves for working in the facility with water proof coveralls, boots and eye protection added for necropsy work. Some species worked with require special gloves or eye protection when handling.

- b) Describe arrangements for laundering work clothing.

All units launder their own uniforms except for the █████ Unit, which uses a commercial laundering service.

- c) Describe provisions and expected practices for washing hands, showering, and changing clothes, including instances where work clothes may be worn outside the animal facility.

In [REDACTED] showers are located in the [REDACTED] men's and women's locker rooms. Most [REDACTED] animal holding and procedure rooms have sinks for hand washing. Uniforms are not worn off NCSU property.

In [REDACTED] staff can shower in the shower room attached to the [REDACTED] or in the main building. The change facilities for the [REDACTED] staff are the locker room adjacent to the office. There are multiple sinks with soap and towels and each staff member is instructed to wash their hands after any animal contact, including DVM students and visitors.

At [REDACTED] has a staff shower in the [REDACTED] for employees and multiple sinks around the facility for handwashing as needed.

At [REDACTED] soap is located at all wash stations.

In [REDACTED] area there is a bathroom located in facility and a sink in the autoclave room for hand washing. If showers are needed, staff has access to [REDACTED] locker rooms.

[REDACTED] has multiple hand-washing facilities throughout the building. Hand-washing is to be done before and after animal handling regardless of PPE used. Locker rooms with showers are available for employees to change in.

- d) Describe policies regarding eating, drinking, and smoking in animal facilities.

Eating and drinking in NCSU animal housing areas is only allowed in office spaces or designated break rooms. In accordance with campus policy and State law, smoking is not allowed anywhere inside or within twenty feet of buildings on the NCSU campus.

4) Standard Personnel Protection [Guide, pp. 21-22]

- a) Describe facility design features, equipment and procedures employed to reduce potential for physical injury inherent to animal facilities (e.g., noisy areas, large quantities of chemicals such as disinfectants, ergonomics) or species used (e.g., nonhuman primates, agricultural animals).

In all areas, several design features are used to reduce potential for physical injury. Where possible (████ and █████ floors are covered in a textured epoxy to minimize slipping on wet floors. Carts of various sizes are available for staff to use for movement of supplies and animals around the facility. Employees are enrolled in the Health and Safety hearing protection control program through EHS as required by their medical surveillance program determined needs. Hearing protection is offered around █████ and is required for species known to be high risk (e.g.dogs and pigs). Masks are provided throughout the facility for those who need them due to allergies and staff is fit tested annually for N95 masks used in the facilities. Steel-toed slip resistant safety shoes are purchased for employees to wear in the facility where heavy equipment work applies. Cage change stations are used in █████ rodent rooms to minimize exposure and dump stations in cage wash. If large quantities of chemicals need to be stored, they are located in rooms outside of the common areas and have secondary containment devices. Current and approved laboratory safety plans are reviewed annually by EHS and made readily available to all staff along with MSDS for chemicals used in the facility. Proper animal handling is taught and reviewed for staff prior to working with each species.

- b)** Describe likely sources of allergens and facility design features, equipment, and procedures employed to reduce the potential for developing Laboratory Animal Allergies (LAA).

Rabbit and rodent urine are both a likely allergen source, so an absorbent low dust litter is used for housing these animals to absorb the urine. Animal dander is another source so the use of dump stations, change hoods, N95 during high risk procedures (rodent cage dumping) are standard practice in █████

- c)** Describe likely sources of zoonoses and facility design features, equipment, and procedures employed to reduce potential exposure to zoonoses.

All mammals have potential to carry rabies, because of this, █████ sources vendors that can provide current rabies vaccinations for their animals and the CVM provides employees pre-exposure rabies vaccines at start of employment. ABSL-2 experiments can involve zoonotic diseases, so the IACUC and IBC committees must approve all such studies prior to the using animals. The PPE for these experiments are clearly posted prior to room entry and staff is informed of all infectious exposure routes prior to working in any room. Additionally, all rooms provide basic PPE to ensure that no staff are exposed to potential zoonoses.

- d) Describe the procedures for the maintenance of protective equipment and how its function is periodically assessed.

Dump stations, change hoods, and biosafety cabinets undergo annual certification by contracted professionals. Filters, where present, are checked quarterly by husbandry management, and disinfection of equipment by husbandry staff occurs at regular intervals according to unit SOPs. PPE is checked for damage before use and if able to be reused in an animal room replaced at least weekly. Shoes are replaced at least annually for staff. EHS performs periodic safety inspections of the facilities.

e) Respiratory Protection

- i) Describe situations where respiratory protective equipment is available or required, such as cage washing facilities, feedmills, etc.

Specific projects where inhalation hazards are present within [REDACTED] require N95 respirators such as hazardous chemical usage in animals (related to the RMHC form) and biohazardous materials that pose an inhalation risk (related to the BUA form). If staff mix volatile chemicals, a fume hood or N95 respirator (depending on the RMHC) is used and if a biological hazard needs manipulation, a biological safety cabinet is used.

The [REDACTED] unit uses full mask respirators when using peracetic acid to sterilize items for use in isolators. Staff goes through Occupational Health and EHS for screening and testing.

Any other units where projects requiring respiratory protection would undergo evaluation by EHS prior to approval of the animal study by the IACUC (via the RMHC or BUA forms).

- ii) Describe programs of medical clearance, fit-testing, and training in the proper use and maintenance of respirators.

N95 or full mask respirator fit testing occurs annually for those deemed required. Industrial hygienists administer fit testing after a medical surveillance form is filled out and a physician reviews the risks.

- iii) Describe how such respiratory protective equipment is selected and its function periodically assessed.

N95 or full mask respirators are selected based on recommendations from EH&S staff. Hygienists assess respirator function annually during periodic fit testing.

f) Heavy Equipment and Motorized Vehicles

- i) Provide a general list of the types of cage-processing equipment used, such as rack/cage washers, tunnel washers, robotics, and bulk autoclaves. Describe training programs, informational signage, and other program policies designed to ensure personnel safety when working with such equipment.

Note: Details of specific equipment installed in animal facility(ies) are to be provided in **Appendix 15** (Facilities and Equipment for Sanitizing Materials).

██████ has four rack washers, and three bulk autoclaves in the facility. Staff is not allowed to operate equipment without prior training. Emergency stop features are labeled inside the equipment (for washers whose date of manufacture was prior to this requirement, extra training prior to usage is provided for staff and reviewed annually). Heat resistant gloves are kept by units for unloading after cycles.

██████████ has a large autoclave, staff must be trained prior to use. Directions are posted near unit and heat resistant gloves are used for unloading unit.

- ii) List other heavy equipment such as scrapers, tractors, and farm machinery (manufacturer name, model numbers, etc. are not necessary). Describe training programs, informational signage, and other program policies designed to ensure personnel safety when working with such equipment.

Note: If preferred, this information may be provided in a Table or additional Appendix.

In ████████ there is a hydraulic lift is at both ██████████ loading docks, a forklift is shared between ████████ and ████████ a truck fitted with a lift gate, a truck fitted with a gooseneck ball for towing the stock trailer, and one UTV vehicle. The University requires a valid driver's license for anyone operating motor vehicles. Staff is giving in house training on the lifts, UTV vehicles and state vehicles. Staff must be signed off by facility manager after demonstrating competency to drive stock trailer. To operate forklift staff must have current training certificate from an outside-qualified trainer. There are two hoists located in procedure rooms that are certified annually and staff must complete safety training prior to use.

In ████████ there is a tractor with a feed mill attachment, a second tractor with a hay prong, a third tractor with the front end bucket, fourth with

manure spreader and a hay prong, a small front end loader and three small ATV vehicles. As new employees, [REDACTED] staff receive training from experienced permanent employees on safe operation of heavy farm equipment. Each employee must be signed off on a unit checklist and read the SOP for Equipment safety. Tractors have standard informational and caution signage.

[REDACTED] and [REDACTED] have hoists that are certified annually with staff certifications also done during that time.

- iii) If motorized vehicles are used for animal transport, describe how the driver is protected from exposure to hazards such as allergens or zoonoses and decontamination methods employed. Also describe instances where vehicles may be shared between animal and passenger transport.

[REDACTED] staff wear designated PPE to transport animals to or from [REDACTED]. When transporting animals inside the vehicle, secondary containment is used without bedding (e.g transport cart, pen, cage, etc.). Vehicles and secondary containers are disinfected after each use. If picking up cadavers from a shelter, shelter staff will have cadavers bagged and sprayed with disinfectant prepared for staff to pick up. Vehicle tires must be disinfected prior to entering [REDACTED] gate if travel has been to a shelter or non-NCSU farm.

In [REDACTED] when animals are being transported to/from remote locations, animals are transported in a designated trailer. The driver either does not exit the vehicle, or dons plastic boot covers and disposable gloves prior to exiting the vehicle. The driver stays with the transport vehicle and does not enter the facility. As they re-enter the vehicle the driver must remove boot covers and gloves and apply hand sanitizer. The vehicle is disinfected prior to returning to [REDACTED]. There are no instances where vehicles cabins are shared between animals and people.

If [REDACTED] needs to transport animals it coordinates with the designated unit to which the animal will transport.

At [REDACTED] aquatic animals are transported in portable contained marine aquaria that are taken in the bed of a truck, on a trailer, or inside the back of a panel van. The container holding the animals provides isolation of the animals and their environment from the persons transporting them.

- g) Describe safety procedures for using medical gases and volatile anesthetics, including how waste anesthetic gases are scavenged.

Medical oxygen is used from an in-house [REDACTED] source, or stored in commercially available compressed gas cylinders secured to a wall or anesthetic machine apparatus. The certified (annually) anesthetic vaporizer delivers a controlled amount of volatile anesthetic gas and the circuit scavenges anesthetic waste using either in-house vacuum hoses, or designated scavenging canisters that are weighed periodically and disposed of according to manufacturer's recommendations. Carbon Dioxide tanks are fitted with regulator valves and users must be trained prior to use.

iii. Animal Experimentation Involving Hazards [*Guide*, pp. 20-21]

- 1) List, according to each of the categories noted below, hazardous or potentially hazardous agents currently approved to be used in animals that are or will be maintained for more than a few hours following exposure. If the hazardous agent cannot be listed by name for security/proprietary reasons, identify it by the general category of agent and level of hazard. *Note:* If preferred, this information may be provided in a Table or additional Appendix.
- a) Biological agents, *noting hazard level* (CDC Biohazard Level, Directive 93/88 EEC, CDC or USDA/DHHS Select Agent, etc.). Examples may include bacteria, viruses, viral vectors, parasites, human-origin tissues, etc.

| | |
|--|-----------|
| Adeno-associated viral vector | CDC BSL1 |
| Bartonella spp. | CDC BSL2 |
| Campylobacter spp. | CDC BSL2 |
| Chlamydia trachomatis | CDC BSL2 |
| Clostridium bolteae | CDC BSL2 |
| Clostridium difficile | CDC BSL2 |
| Dirofilaria spp. | CDC BSL1 |
| Edwardsiella tarda | CDC BSL2 |
| Ehrlichia spp. | CDC BSL2 |
| Enterococcus spp. | CDC BSL2 |
| Escherichia spp. | CDC BSL2 |
| Hepaciviruses | CDC BSL2 |
| Human tissue and/or derived cell lines | CDC BSL2 |
| Lentiviral vector | CDC BSL2 |
| Marek's virus | CDC BSL1 |
| Mycoplasma spp. | CDC BSL1 |
| Pasteurella multocida | CDC BSL2 |
| Reovirus | CDC BSL2 |
| Retroviral vector | CDC BSL2 |
| Rickettsia spp. | CDC BSL2 |
| Salmonella sp. | CDC BSL2 |
| Streptococcus spp. | CDC BSL2 |
| Staphylococcus aureus | CDC BSL2 |
| Staphylococcus pseudointermedius | CDC BSL2 |
| Trichostrongylus colubriformis | CDC BSL1 |
| Zika Virus | CDC BSL2+ |

- b)** Chemical agents, *noting general category* of hazard (toxicant, toxin, irritant, carcinogen, etc.). Examples may include streptozotocin, BrdU, anti-neoplastic drugs, formalin, etc.

| Chemical Agent | Hazard Category | Chemical Agent | Hazard Category |
|-------------------|-----------------|---------------------|-----------------|
| Sofobuvir | Irritant | Pepducin PZ235i | Irritant |
| Doxorubicin | Carcinogen | Ribavirin | Toxicant |
| TSLP | Unk | Clodronate liposome | Irritant |
| SD1008 | Unk | Niclosamide | Unk |
| Serotonin | Unk | Bradykinin | Unk |
| Histamine | Unk | Prostaglandin E2 | Unk |
| ATP | Unk | Neuromedin b | Unk |
| 4-methylhistamine | Irritant | BIO 11006 | Unk |
| Histamine | Toxicant | Pyridylethylamine | Irritant |
| Substance P | Irritant | Endothelin 1 | Irritant |

| | | | |
|-------------------------------------|--|---|--------------------------------------|
| Interleukin 31 | Irritant | Leukotriene B4 | Irritant |
| Clozapine-N-oxide | Irritant | Dexdetomidine | Irritant |
| Capsaicin | Toxicant, Irritant | Doxycycline | Irritant |
| Astressin (2)B | Irritant | Antalarmin | Irritant |
| Toluene diisocyanate | Irritant | BMX010 | Irritant |
| Human Neuromedin B | Irritant | Vivo- morpholinophosphorodia midate | Irritant |
| BMX001 | Irritant | Caprylic Acid | Irritant |
| AZD 1480 | Irritant | Peppermint | Irritant |
| Geraniol | Irritant | Hisatmine trifluoromethyl toluidide | Irritant |
| Phenytoin | Toxicant | Diphenylmethoxyaceti c acid | Toxicant |
| Diphenhydramine | Toxicant | Alkylamide YM8-85 | Irritant |
| Alkylamide A15 | Irritant | House dust mites | Irritant |
| ALkylamide YM8-86 | Irritant | VT-1161 | Toxicant |
| Periostin | Irritant | CP-Dox | Toxicant |
| 17 beta-estradiol | Carcinogen | ANPOmega- conotoxin-GVIA | Irritant |
| Paclitaxel | Teratogen | Cis-platin | Carcinog en |
| Paclitaxel | Teratogen | Rhopressa | Toxin |
| | | PVA | Combusti ble |
| PolyPBA | Toxin | Betacarotene | Irritant |
| | | Oxaliplatin | Irritant |
| Ganciclovir | Teratogen | Tamoxifen | Carcinog en |
| 5-fluorouracil | Toxin | | |
| Calcein5-fluorouracil | NoneToxin | Carbon tetrachloride | Toxic, Carcinog en |
| Cyclosporin | Carcinogen | 3-Azidopropionic acid | Toxic, Irritant |
| ABD-CP-DOX | Irritant, Carcinogen | Azidoacetic acid NHS ester | Unk |
| Fluorescein | Irritant | | |
| GemcitabineAzido- PEG4-NHS ester | Irritant, Toxin, TeratogenNo ne | Gemcitabine | Irritant, Toxin, Teratoge n |
| FDC Blue 1Cy7- DBCO | IrritantNone | Methylene Blue | Irritant |

| | | | |
|---|-------------------|--|----------|
| BetacaroteneFDC Blue 1 | IrritantIrritant | Flavin mononucleotide | Irritant |
| Riboflavin | Irritant | Tetracycline | Irritant |
| FlorfenicolRiboflavin | TeratogenIrritant | Flunixin | |
| SulfamethazineFlorfenicol | Teratogen | Enrofloxacin | |
| TylosinSulfamethazine | | Vivo-morpholino phosphorodiamidate oligomers | |
| Toluene diisocyanateTylosin | | Morpholino Pip9b2 peptide conjugate | |
| Morpholino SP8 cyclic peptide conjugateToluene diisocyanate | | Anti-dinitrophenyl IgE | |
| DNP HASMorpholino SP8 cyclic peptide conjugate | | Oxazolone | |
| Compound 48/80DNP HAS | | CXCL9 | |
| BrdUCompound 48/80 | Teratogen | hCG | |
| PMSGBrdU | Teratogen | PG-600 | |
| EstrumatePMSG | | Tetrazine-sNHS | |
| Synthetic doxorubicinEstrumate | | Cell membrane vesicle | |
| CyclophosphamideSynthetic doxorubicin | | BNP | |
| Omega-conotoxin-GVIAcyclophosphamide | | Imiquimod | |

c) Physical agents (radiation, UV light, magnetic fields, lasers, noise, etc.).

| |
|--|
| Animal Rooms that are louder than 85 decibels |
| Radiograph machine ([REDACTED] portable machine, [REDACTED]) |
| Radiator ([REDACTED]) |
| CT scanner ([REDACTED]) |
| MRI ([REDACTED]) |
| XRAD Irradiation Unit ([REDACTED]) |
| Fluoroscopy Lab ([REDACTED]) |

2) **Experiment-Related Hazard Use** [Guide, pp. 18-19; See also Chapters 2 and 3 in *Occupational Health and Safety in the Care and Use of Research*

Animals, NRC 1997].

Note: Written policies and standard operating procedures (SOPs) governing experimentation with hazardous biological, chemical, and physical agents should be available during the site visit.

- a) Describe the process used to identify and evaluate experimental hazards. Describe or identify the institutional entity(ies) responsible for ensuring appropriate safety review prior to study initiation.

PIs submitting an IACUC protocol using hazardous chemicals must submit a Research Materials Hazards Classification (**RMHC**) form that is reviewed by EH&S and the facility manager of the unit it will be used at to ensure proper precautions are in place for environmental controls, door signage, personnel practices, and PPE. Likewise, all PIs submitting an IACUC protocol using biohazardous agents, human/primate-derived biologics, recombinant DNA, select toxins, or disease-carrying vectors must submit a Biological Use Authorization (**BUA**) form to the Institutional Biosafety Committee for prior review. IACUC will withhold protocol approval until the relevant form has been reviewed and approved by the respective committee. Any radiological agents used for animal research must be described in a radiation safety plan submitted by the PI to the radiation safety office, who will review the plan and ensure that the proper safeguards are in place prior to initiating any work. The IACUC office will similarly withhold approval of an animal use protocol involving these physical hazards until the radiation safety officer has notified the PI of approval.

- b) Describe how risks of these hazards are assessed and how procedures are developed to manage the risks. Identify the institutional entities responsible for reviewing and implementing appropriate safety or containment procedures.

EH&S industrial hygienists, the biosafety officer, and/or the radiation safety officer assess hazards and identify risks for any given chemical, biological, or physical hazard on a case by case basis using each entity's form (RMHC, BUA, and Radiation Safety Plan). Precautions are dictated by each risk identified during review of the forms and are communicated to the research staff.

- c) Describe the handling, storage, method and frequency of disposal, and final disposal location for hazardous wastes, including infectious, toxic, radioactive carcasses, bedding, cages, medical sharps, and glass.

Biological waste generated in an animal room goes in a biohazard labeled trash receptacle. Waste from the animal housing room is emptied regularly from the primary container; double bagged, and the outer surfaces disinfected.

Once disinfected, the bags are either loaded directly into an incineration bin that is then moved to an approved medical waste truck, or the bags are autoclaved and placed in dedicated biohazard trash bins per the instructions on the BUA. Bedding containing biological waste is either dumped into designated biological waste bins for incineration, or cages are bagged as outlined above and autoclaved prior to bedding disposal.

Hazardous chemical waste is stored and labeled as such in a dedicated waste bin that is outlined in the RMHC form. EHS comes to collect hazardous chemicals on an as needed basis via the online disposal request system.

Radioactive waste is collected in an appropriately shielded container with a labeled radioactive waste disposal tag (PI, radionuclide, date, activity, etc). The radiation safety officer is contacted for collection as needed for pickup via an online disposal request system.

All medical sharps are placed in designated sharps containers and disposed of in designated collection bins located in various areas throughout the campus. For sharps contaminated with radioactive or biohazardous agents, the sharps container is labeled accordingly and disposed in the same manner as the other trash for that agent.

d) Describe aspects of the medical evaluation and preventive health program specifically for personnel potentially exposed to hazardous agents.

The assessment of risk will be determined by frequency of contact, intensity of exposure, hazards associated with the animals being handled, hazardous properties of agents used in research, the susceptibility of individual employees, the hazard-control measures available, and the occupational history of individual employees. Baseline risk assessment will involve occupational health specialists and, depending on personnel category, may include completion of job duties and medical questionnaires, interview with an occupational health specialist, and a physical examination.

- Category 1 Personnel must receive specific instruction on the health risks associated with their animal contact. They will not routinely fill out a questionnaire or visit the contract medical provide.

- Category 2 Personnel fill out a "Vertebrate Animal Contact Medical Questionnaire" for initial enrollment into the program. The supervisor is responsible for ensuring that the questionnaire is completed and appropriate sections are sent to Student Health Services. A medical provider will review the questionnaire; any follow-up discussion with the employee, or medical examination, will be at the discretion of the medical provider.

In addition to the above baseline evaluation, all personnel will receive regular training and/or notification of health risks associated with animal contact,

including the importance of medical follow-up if problems (e.g., allergy) arise.

All personnel working with animals should receive tetanus vaccination every 10 years, and those who have contact with random source or wild mammals, or mammals kept outdoors, should receive rabies vaccination. Additional special procedures/vaccinations may be necessary for certain projects on a case by case basis. Each supervisor is responsible for notifying employees of vaccination requirements and ensure hazards are listed correctly for Occ Health.

3) Hazardous Agent Training for Personnel [Guide, p. 20]

Describe special qualifications and training of staff involved with the use of hazardous agents in animals.

All staff that work in rooms where hazards are used must read the SOP related to the species care for that agent prior to each study with regard to special precautions as they are outlined within each BUA, RMHC, and/or radiation safety plan. [REDACTED] staff is trained in basic principles of biocontainment and MSDS sheets are readily available for all hazardous chemicals present in the room. Any room housing animals exposed to a hazard has signage posted with the hazard, PI, laboratory contact info, Special precautions, and any other relevant information related to the agent(s).

4) Facilities, Equipment and Monitoring [Guide, pp. 19-20]

- a) Describe locations, rooms, or facilities used to house animals exposed to hazardous agents. Identify each facility according to the hazard(s) and containment levels (if appropriate).

Note: If preferred, information may be provided in a Table or additional Appendix.

Most rooms in [REDACTED] can be converted to house animals exposed to hazardous agents. Room pressures are changed to negative pressures relative to surrounding areas to contain hazard into the primary housing environment. Rooms have a designated clean area for donning of PPE that is stored in a designated area adjacent to entrance into the housing area. Rodent hazard rooms have a biosafety cabinet or fume hood, depending on the hazard present. [REDACTED]

[REDACTED] The hazard containment facilities are not restricted for use with animals exposed to hazardous agents, i.e., they may be used to house conventional animals. On occasion, any of the animal rooms may be used to house animals exposed to hazardous agents. Permission for such use comes from [REDACTED] management and is based on the degree of hazard(s) involved and the safety precautions that can be implemented. These approvals must also go

through EH&S formally as part of the **Biological Use Authorization (BUA)** protocol to be evaluated for any biological hazards that could harm staff. Proper handling for each agent is evaluated by the Institutional Biosafety Committee (IBC) on a case-by-case basis. Additionally, each IACUC protocol that involves the use of hazardous chemical substances requires submission of a **Research Materials Hazard Classification (RMHC)** form to be reviewed and approved by EHS, outlining safety precautions related to the materials.

Hazardous studies done in the [REDACTED] are run in isolators according to the specifications of the **BUA**. Because isolators and equipment used within are sterilized and tested before use in another study there are not dedicated hazardous isolators.

[REDACTED] are not used for studies involving the hazards described above [REDACTED] has been approved by USDA/APHIS as a site for quarantine of imported horses for detection of contagious equine metritis infection.

- b) Describe circumstances and conditions where animals are housed in rooms outside of dedicated containment facilities (i.e., in standard animal holding rooms). Include practices and procedures used to ensure hazard containment.

Animals can be brought to [REDACTED] for procedures after exposure to a hazardous agent. In these circumstances, transport carts used to move animals are wrapped with a disposal absorbent drape material in a manner to prevent body fluids from coming out of the cart and the procedure room in [REDACTED] is turned to the appropriate room pressure the day before procedure. There is a designated clean area prior to entry for donning of PPE into the room, and PPE is disposed of in the procedure room upon exit. If needed, a footbath is provided outside of the room to decontaminate shoes before entering common hallway. All trash in room is bagged and disposed of according to EH&S recommendations.

- c) Describe special equipment related to hazard containment; include methods, frequency, and entity(ies) responsible for assessing proper function of such equipment.

An outside company to ensure proper function certifies hoods used for hazard containment annually. Autoclaves have preventative maintenance performed quarterly by an outside company.

- d) Describe the husbandry practices in place to ensure personnel safety, including any additional personnel protective equipment used when work assignment involves hazardous agents.

Any extra PPE required to work with any hazardous agent is outlined on the housing room door. Safety SOPs are developed with the researchers and EH&S by [REDACTED] management on specific cautions required when working with a particular agent in a particular species. Staff is trained on rooms, after documentation of SOP understanding, prior to agent being administered.

e) Incidental Animal Contact and Patient Areas

- i) List and describe facilities that may be used for both animal- and human-based research or patient areas, including the policies and procedures for human patient protection, facility decontamination, animal transport through common corridors or elevators, and other personnel protection procedures.

The CVM has no areas used for both animal and human-based research areas.

- ii) Describe any *other* circumstances in which animals or caging equipment are transported in common use corridors or elevators (e.g., have the potential to come in contact with individuals not associated with the animal care and use program), and measures taken to mitigate risks associated with such use.

If animals are transported from the animal facility to procedures spaces either on rolling carts or in animal transport carts. The transportation cart is covered during transit in public areas. All efforts are made to transport animals through low-traffic areas or during hours that are expected to have minimal impact on foot traffic patterns (e.g. early in the morning or late afternoon).

B. Program Oversight

1. The Role of the IACUC/OB [Guide, pp. 24-40]

a. IACUC/OB Composition and Function [Guide, pp. 17; 24-25]

Please provide a Committee roster, indicating names, degrees, membership role, and affiliation (e.g., Department/Division) as **Appendix 7**.

- i. Describe Committee membership appointment procedures.

The IACUC Administrator, University Attending Veterinarian and IACUC Chair consult with the Institutional Official regarding recruitment of new IACUC members as well as participation of current members concerning potential for continuing appointment to the Committee. The Institutional Official appoints all IACUC members

- ii. Describe frequency of Committee meetings. Note that **Appendix 8** should contain the last two IACUC/OB meeting minutes.

The IACUC convenes on the third Thursday of each calendar month unless there are no new items for discussion. Additional meetings are scheduled as necessary based on emergent issues.

- iii. Describe the orientation, training, and continuing education opportunities for IACUC/OB members. [*Guide*, p. 17]

New members are provided copies of relevant regulations, guidelines, and IACUC policies. The IACUC Regulatory Compliance Administrator, Compliance Coordinator, IACUC Chair, and University Attending Veterinarian provide orientation to IACUC policies and procedures. New members also complete relevant tutorials within the AALAS Learning Library. Attendance at outside meetings (i.e. IACUC 101, SCAW conferences, NABR and PRIMR meetings, etc.) dealing with IACUC functions and responsibilities is encouraged and supported.

b. Protocol Review [*Guide*, pp. 25-27]

A blank copy of your institution's protocol review form should be provided as **Appendix 9**. Also include forms used for annual renewal, modifications, amendments, etc., as applicable.

- i. Describe the process for reviewing and approving animal use. Include descriptions of how:
- the IACUC/OB weighs the potential adverse effects of the study against the potential benefits that may result from the use ("harm-benefit analysis"),
 - protocols that have the potential to cause pain or distress to animals are reviewed and alternative methodologies reviewed,
 - veterinary input is provided, and
 - the use of animals and experimental group sizes are justified.

Note: Make sure you address each of the items above.

The IACUC office staff evaluate new applications for vertebrate animal use (AVAU) and any amendment requests to approved protocols for completeness. All listed personnel are reviewed for compliance with training requirements and

enrollment in the institution's Occupational Health and Safety Program for Personnel with Animal Contact.

Pre-Review: Vet Review/ IACUC Member Pre-review

To facilitate the PI's submission of the protocol or amendment, the IACUC Office first assigns a veterinary and IACUC member pre-reviewer to perform an additional level of pre-review prior to distribution to the larger committee by designated member review or Full committee review. The veterinary reviewer will conduct their review with regard to veterinary issues. The veterinarian will usually be a current IACUC member; however, other veterinary reviewers may be utilized as consultants. The IACUC member who conducts the pre-review will also serve as the designated reviewer to provide final approval if full committee review is not requested. Initial contact with the PI for any review should occur within 5 working days of receipt of the review assignment.

Designated Member Review

The NC State IACUC conducts committee reviews of all non-Category E protocols under the Designated Member Review process

Non-Category E protocols:

- If the pre-reviewers are satisfied that the application requires no further revision, they will recommend that the protocol or amendment be sent to all other members of the committee for Designated Member Review notification
- Members are notified by email that they have three (3) working days to review the submission and any member of the IACUC may request full committee review of those research projects.
- If full committee review is not requested, at least one member of the IACUC, designated by the Chairperson and qualified to conduct the review, shall review those research projects and have the authority to approve, require modifications in (to secure approval) or request full committee review of those research projects.
- At any time during the Designated Member Review period, committee members may forward comments with requests for minor revisions (i.e. revisions that would not require discussion at a convened quorum). Any modifications required for approval are sent to the PI or their designee to address and return to the IACUC members for final review and approval by the designated member.
- EXPEDITED REVIEWS: At times, the IACUC Office, in consultation with the IACUC Chair, will approve investigator requests for expedited review. The procedures are the same as above, with one exception. The committee will be allowed a shorter time to respond during Designated Member Review (1-4 working days), subject to determination by the Chair (or in their stead, the First or Second Vice Chair) and the IACUC Director (or in their stead, an IACUC Coordinator).
- If Full Committee Review (discussion at a meeting) is requested during any part of the review process by the reviewers, the IACUC office is notified of the concerns raised, the PI is notified and the item is placed on the agenda for discussion at the next meeting.

Full Committee Review

Category E protocols:

- The IACUC Office should advise the PI that, in accordance with NC State IACUC guidelines, all protocols and amendments involving Category E animal use must be presented for discussion at a convened quorum (Full Committee Review). The IACUC Office will inform PIs that revisions to the protocol or amendment should be completed at least one week prior to the scheduled meeting, to allow all members adequate time to review the protocol or amendment. Otherwise, the protocol or amendment will be considered at a future convened quorum.
- Amendments to approved Category E protocols will only require discussion at a convened quorum if additional Category E animal use procedures are proposed.
- When the pre-reviewers are satisfied that the protocol or amendment requires no further revision, they will recommend that the item be placed on the agenda for the next meeting.
- Protocols and amendments involving Category E animal use, those for which the vet reviewer or Designated Member Reviewer have requested discussion at the next meeting, and any other protocols that have been flagged for discussion by any voting member of the committee during Designated Member Review are placed on the agenda for discussion at the next meeting.

Outcomes of Full Committee Review:

- Item approved as submitted: Once a new protocol or amendment is approved, the IACUC staff notifies the PI. A copy of the approved protocol or amendment is forwarded to the animal facility identified in the protocol as the location/site of the animal use. The University Attending Veterinarian is copied on all approval notices.
- Requested modifications to secure approval: In such situation, the IACUC may take the following actions:
 - If all members of the IACUC are present at a meeting, the committee may vote to require modifications to secure approval and have the revised research protocol reviewed and approved by designated member review, or returned for FCR at a convened meeting.
 - If all members of the IACUC are not present at a meeting, the committee may use DMR subsequent to FCR according to the following stipulation:
 - All IACUC members agree in advance in writing that the quorum of members present at a convened meeting may decide by unanimous vote to use DMR subsequent to FCR when modification is needed to secure approval. However, any member of the IACUC may, at any time, request to see the revised protocol and/or request FCR of the protocol. The approval date is the date that the designated member(s) approve the protocol.

- **Withhold approval:** If a protocol application or amendment is not approved during Full Committee Review, the IACUC Office contacts the investigator in writing regarding the IACUC's decision. The communication includes the IACUC's decision and informs the applicant regarding recommended modifications required to secure IACUC approval. The investigator may respond either in writing or in person at a convened quorum of the IACUC.

Members have access to the protocol application where the PI has described any potential pain or distress to the animals resulting from the proposed procedures along with monitoring and endpoints for removal from study and the alternative search is described. The use of animals and experimental group size justification is provided as a part of the animal care and use information.

PIs describe the scientific objectives of their proposed research and for category E protocols where potential unrelieved pain or distress is described, the IACUC discusses if the potential benefits to human or animal health as described along with mitigating factors such as humane endpoints, scoring methods and other interventions as described warrants approval of the protocol.

- ii. Describe the process for reviewing and approving amendments, modifications, and revised protocols. If applicable, include a description/definition of "major" vs. "minor" amendments.
Note: If preferred, this information may be provided in a Table or additional Appendix.

Amendments are submitted and incorporated into the protocol as a new version using our online processing system (infoed). Personnel amendments are submitted using a separate form in the online system and are handled administratively. A change in PI is considered a significant change. Amendments are reviewed by the IACUC Office who decide if the changes are significant (as defined by written IACUC guidelines). Our IACUC guidelines rely on OLAW guidance related to what qualifies for Veterinary Verification and Consultation (VVC) process. Significant changes are handled as with a new submission, as described for protocol review (above).

c. **Special Considerations for IACUC/OB Review** [*Guide*, pp. 5; 27-33]

i. **Experimental and Humane Endpoints** [*Guide*, pp. 27-28]

- 1) Describe the IACUC/OB's review of "humane endpoints," i.e., alternatives to experimental endpoints to prevent or in response to unrelieved animal pain and distress.

The IACUC reviews each protocol on a case-by-case basis with regard to humane endpoints, utilizing scientific member expertise and knowledge along with evaluation of proposed use by the University Attending Veterinarian.

(<https://drive.google.com/file/d/10NTruO1gQOIhjRjUvHfVF6d5MTGxONxs/view>).

- Investigators must provide a scientific justification for studies in which humane endpoints are not available. The IACUC considers these requests on a case-by-case basis and examines the scientific justification provided. IACUC recommendations to minimize potential pain and distress may include requirements for increased frequency of post procedure monitoring, clearly defined and appropriate disease scoring demarcating when to euthanize an animal, and/or pilot studies using small numbers of animals when the precise effects of a procedure may be unknown.

- staff are trained to recognize signs of signs of pain and distress in all species housed on the premises. Additionally, laboratory personnel are identified on each specific protocol with the PI's assurance that all personnel working with the described species are appropriately trained. Clinical veterinary staff are readily available for additional training when deemed necessary for laboratory personnel and periodic training of animal care staff is carried out using both presentation and hands-on formats.

The full time employees in the [REDACTED] are the main personnel that are responsible for the monitoring the animals in their units. The unit managers are familiar with the behaviors of the animals in all units and are qualified to monitor animals for any signs of pain and distress. The [REDACTED] are trained to monitor the animals for any health related issues. [REDACTED]

ii. Unexpected Outcomes that Affect Animal Well-being [Guide, pp. 28-29]

Describe how unexpected outcomes of experimental procedures (e.g., unexpected morbidity or mortality, unanticipated phenotypes in genetically-modified animals) are identified, interpreted, and reported to the IACUC/OB.

Unexpected outcomes are reported to the IACUC Chair or university attending veterinarian directly by an investigator or research technician. Animal facility veterinary staff or management may also report unanticipated outcomes directly to the IACUC Chair or the University Attending Veterinarian.

iii. Physical Restraint [Guide, pp. 29-30]

Note: This section is to include only those protocols that require prolonged restraint. Brief restraint for the purpose of performing routine clinical or experimental procedures need not be described.

- 1) Briefly describe the policies for the use of physical restraint procedures or devices. Include, if applicable, the IACUC/OB definition of “prolonged.”

Restraint of more than one hour must be described in the AVAU, including acclimation, methods to minimize the number of animals requiring restraint, and the method and duration of restraint. Restraint involving longer periods of time are reviewed on a case-by-case basis and follow recommendations established by the Guide and AWA/AWR where applicable.

- 2) Describe animal restraint devices that are used or have been used within the last three years. For each device, briefly describe
 - the duration of confinement
 - acclimation procedures
 - monitoring procedures
 - criteria for removing animals that do not adapt or acclimate, and
 - provision of veterinary care for animals with adverse clinical consequences.

Note: If preferred, this information may be provided in a Table or additional Appendix.

Slings, plastic restrainers, livestock chutes, stocks, snares, gestation crates and metabolic cages represent some of the restraint devices used. Periods of confinement are described in IACUC approved protocols. All animals are acclimated to each device in incrementally increasing interval until the maximum restraint time is achieved. All animals placed in restraint are

monitored continually while restrained with the exception of metabolic cages and gestation crates. Animals in these are monitored at least twice daily. Any animals demonstrating adverse reactions are reported to veterinary staff so they may evaluate the animals. If animals do not acclimate to the confinement (rare given these procedures), they are removed from the study.

iv. Multiple Survival Surgical Procedures [*Guide*, p. 30]

Note: One survival surgical procedure followed by a non-survival procedure is not included in this category.

- 1) Describe the IACUC/OB's expectations regarding multiple survival surgery (major or minor) on a single animal.

Multiple major survival surgical procedures on individual animals must be scientifically justified in the AVAU and approved by the IACUC. Animals undergoing more than one minor survival surgical procedure are evaluated on a case by case basis and use limitations are considered based on number of procedures, invasiveness, and expected long term effect on overall well-being.

- 2) Summarize the types of protocols currently approved that involve multiple major survival surgical procedures

Note: If preferred, this information may be provided in a Table or additional Appendix.

18-016: Mice It will be necessary for some animals to undergo both gonadectomy and intracranial surgery or, in certain cases, 2 separate intracranial surgeries. Gonadectomy removes circulating sex hormones, while intracranial surgery allows manipulation of brain function. As our experiments seek to elucidate the impact of circulating sex hormones in brain maturation, function, and control of behavior, it will be scientifically necessary for some animals to undergo both gonadectomy and intracranial surgery. For certain anatomical tracing studies, two stereotaxic injections into the same coordinates will be necessary for temporal control of viral vector expression (i.e. Lucas et al., 2016).

18-130: Dogs Each dog will undergo two biopsy procedures and one LITT treatment. The second biopsy procedure is required to assess the immune response to the LITT procedure, which is a major goal of this project.

18-162: Frogs No bullfrog will have more than one procedure in the same year. These bullfrogs are maintained for multiple years. The next time the class is offered the bullfrogs will have the procedure performed again. The class is offered every other year. For the second celiotomy procedure, frogs will not undergo liver biopsy, rather the coelom will be opened and visualized to determine how these animals recover post-operatively from biopsy procedures. This will provide valuable and potentially publishable information regarding welfare issues related to these procedures in clinical practice. The maximum number of celiotomy procedures performed on an

individual frog is 2 over the course of 2 years and the maximum number of liver biopsies per frog will be 1.

19-106: Dogs If dogs are not neutered, they will be neutered prior to the hip arthrotomy surgery.

20-109: Dog Liver lobectomy. A second surgery to remove treated liver lobe to allow for potential adoption of animal.

20-155: Pigs To validate the model, we need to perform two surgical procedures on some of the pigs. An initial embryo transfer procedure will be performed to place transgenic embryos into the uterus of a recipient and, 35-85 days later, a second surgery will be performed to access the uterus and inject the developing fetuses with viruses encoding gene-editing enzymes. At present, we do not have an alternative for this additional surgical procedure. Ideally, we would carry out the embryo transfer non-surgically, but non-surgical embryo transfer in swine is highly inefficient with less than 10% success compared to normal rates. Such a low efficiency for success with transgenic embryos, combined with the use of clones, will not allow us to establish a pregnancy. Even with surgical embryo transfer, we can only get 4-6 piglets per 100 cloned embryos transferred. Similarly, other than direct access to the fetus, there are no known methods to introduce viruses into developing pig fetuses.

20-341: Pigs For one of our aims we need to perform two surgical procedures on some of the pigs. An initial embryo transfer procedure will be performed to place transgenic embryos into the uterus of a recipient, and, approximately 40 days later, a second surgery to access the uterus and inject the developing fetuses with our test cells will be performed. At present, we do not have an alternative for this additional surgical procedure. Ideally, we would carry out the embryo transfer non-surgically but non-surgical embryo transfer in swine is highly inefficient with less than 10% success compared to normal rates. Such a low efficiency for success with transgenic embryos, combined with the use of clones, will not allow us to establish a pregnancy. Even now with surgical transfer we can only get 4-6 piglets per 100 cloned embryos transferred. Similarly, other than direct access to the fetus, there are no known methods of successful engraftment of cells into developing pig fetuses.

v. Food and Fluid Regulation [*Guide*, pp. 30-31]. *Note:* This does not include pre-surgical fast.

Summarize the types of protocols that require food and/or fluid regulation or restriction, including:

- justification
- species involved
- length and type of food/fluid regulation
- animal health monitoring procedures and frequency (e.g., body weight, blood urea nitrogen, urine/fecal output, food/fluid consumption)
- methods of ensuring adequate nutrition and hydration during the regulated period

Note: If preferred, this information may be provided in a Table or additional Appendix.

17-154: mouse 4 hour fast in mice before gavage.

18-030: Dog Dogs will be fasted ≤ 16 hrs. prior to test drug administration to help minimize any possible gastrointestinal side effects from the drug. (This is a rare, but reported side effect of some of the drugs planned for these studies)

18-054: Turtles/ bullfrogs/ toads Fasting: <40 Eastern box turtles will have food withheld for < 7 days during the study period. This species of turtle routinely fasts for multiple months during the winter brumation (hibernation), so adverse effects are not expected for this relatively short period of fasting in this species during non-hibernating seasons. The turtles will be kept at a regular light schedule (12 hours light, 12 hours dark). Their environment at the time of the study will not encourage hibernation.

<25 bullfrogs and potentially <16 marine toads will have food withheld on the morning of procedures for a total fast time not to exceed 5 days during the study period. The amphibians are typically fed two to three times a week, so adverse effects are not expected for this relatively short fasting period.

18-112: Gerbils The occasional mouse and all gerbils will be fasted (removal of food, bedding and enrichment) overnight, no more than 18 hours, prior to necropsy of the GI tract.

18-154: Pigs Due to the formulation of the compound dosed, it is necessary to withhold water & feed before the capsule is administered to match the human clinical trials. The morning dosage of the medication is supposed to be given on an empty stomach (remove feed in the evening 12 hours prior to dosing), chased with 60ml water & returned to water immediately following dosing, then returned to feed 4h after the dose

19-059: Dog Dogs will be fasted ≤ 16 hrs prior to test drug administration to help minimize any possible gastrointestinal side effects from the drug (this is a rare, but reported side effect of these drugs).

19-070: Mouse 30-40% food restriction: Every Other Day (EOD) diet: Mice on the EOD diet will be given access to food ad libitum (AL) for 24 hours, fasted for the next 24 hours, and then given diet AL for the next 24 hours and so on. This results in AL access to food every other day. Also, thus, the EOD model does not require special diet. Mice on EOD diet will be maintained on this schedule for 20 weeks and then euthanized prior to tissue collection. The mice undergoing EOD feeding experiments will experience about 15% reduction in body weight. This is a dietary and nutritional study to better understand the role of calorie restriction on intestinal stem cell and nervous system biology. Previous studies and our previous experience have shown that EOD feeding is acceptable with no mortalities. These mice will be monitored daily. Body weight will be measured and monitored every other day to evaluate weight loss. If they have a loss of mobility or become non-responsive or if a mouse loses more than 15% body weight, they will be euthanized and removed from the study.

60% Calorie Restriction (60CR) We will use this model in order to understand the impact of severe calorie restriction - mirroring food restriction in patients with anorexia nervosa -

on gastrointestinal functions. Preliminary studies done at UNC by our collaborator show that 60CR for 9 days (end point of our study) does not induce any mortality or sign of distress/pain despite weight loss up to 30%.

19-548: Dog Dogs will be fasted ≤ 16 hrs prior to test drug administration to help minimize any possible gastrointestinal side effects from the drug.

20-312: Dog Dogs will be fasted periodically during the study period (overnight) prior to drug administration for pharmacokinetic purposes and prior to capsule endoscopy, but no dog should be fasted for more than ~ 12 -18 hours and all dogs will receive their food twice daily.

vi. **Use of Non-Pharmaceutical-Grade Drugs and Other Substances** [Guide, p. 31]

Describe the IACUC/OB's expectations regarding the justification for using non-pharmaceutical-grade drugs or other substances, if applicable.

NCSU Policy on Use of Non-pharmaceutical-grade compounds in live vertebrate animals

Updated December 2019

Pharmaceutical Grade – A compound that is approved by the Food and Drug Administration or for which a chemical purity standard has been established by U.S. Pharmacopeia (USP), British Pharmacopeia (BP), National Formulary (NF), and for which such standard is stated on the label. These standards are used by manufacturers to help ensure the products are of the appropriate chemical purity and quality, in the appropriate solution or compound, to ensure stability, safety, and efficacy. A certificate of analysis is usually available upon request.

Non-pharmaceutical Grade – Any drug that does not meet the above criteria. These compounds may have higher levels of impurities and can introduce unwanted variables or toxic effects. An example would be chemicals that are obtained through SIGMA. If a powder will be used and is scientifically justified, a description of sterile preparation for parenteral administration should be included in your Application for Vertebrate Animal Use (AVAU) protocol.

Investigators are expected by regulatory authorities to use pharmaceutical grade compounds whenever possible. Non-pharmaceutical-grade chemical compounds should only be used in live vertebrate animals after specific review and approval by the Institutional Animal Care and Use Committee (IACUC) for reasons such as scientific necessity or non-availability of an acceptable veterinary or human pharmaceutical-grade product. Cost savings alone is not an adequate justification for using non-pharmaceutical-grade compounds in live vertebrate animals.

Compound Use Categorization

Clinical Use – Compounds used for the clinical treatment of animals and to prevent, reduce or eliminate animal pain or distress. Investigators are expected to use pharmaceutical-grade medications whenever they are available, even in acute procedures.

Research Use – Compounds used to accomplish the scientific aims of the study. If available and suitable, pharmaceutical-grade compounds are preferred; when non-pharmaceutical-grade preparations are used, the IACUC will expect investigators to include the rationale in their IACUC application and meet the following criteria:

- Use must be compliant with applicable national or regional regulatory guidelines and requirements and the requirements of relevant funding agencies;
- A scientific justification must be provided in the application;
- A pharmaceutical-grade compound is not available in the appropriate concentration or formulation or the appropriate vehicle control is unavailable
- The compound is required to generate data that are part of an ongoing study or that are comparable to previous work;
- The chemical properties of the compound are appropriate for the study and the route of administration (e.g., the purity, grade, stability in and out of solution, solution vehicle properties, pH, osmolality, and compatibility of the solvent and other components of final preparation). In some cases the reagent-grade of the compound may be as pure or purer than the pharmaceutical-grade; and
- The method of preparation, labeling (i.e., preparation and use-by dates), administration and storage of formulations should be appropriately considered with the aim of maintaining their stability and quality (i.e., to prevent inadvertent co-administration of infectious agents or contaminants).

Dilutions and Combinations

Oftentimes, administering anesthetics, analgesics or other drugs to very large or very small animals may necessitate dilution or adulteration of drugs that will cause the drugs to be classified as non-pharmaceutical-grade compounds. The NC State IACUC recognizes that such compounds may be preferable in certain circumstances and approves the use of the following agents without scientific justification for routine anesthesia, analgesia or euthanasia:

- Anesthetic cocktails utilizing pharmaceutical grade compounds such as:
 - Tiletamine/ketamine/xylazine combination for large swine
 - Rodent “cocktails” that contain mixtures of ketamine, xylazine/dexmedetomidine, and/or acepromazine
 - Other cocktail combinations that are considered standard veterinary practice and listed as a combination on your approved IACUC protocol.
 - Cocktail combinations consistent with standard veterinary care used for veterinary care procedures
- Dilution of the analgesics such as:
 - Carprofen, buprenorphine, and meloxicam or other analgesics with USP-grade saline or water prior to administration to small rodents
 - Dilution of sodium pentobarbital euthanasia solutions with USP-grade saline or water prior to administration to small rodents
 - Other dilutions consistent with standard veterinary care

In all of the above instances, the adulteration of such substances must be performed sterilely and in accordance with appropriate dosages as dictated by standard of care. Once adulterated, the expiration date must be clearly indicated and must account for stability in the altered conditions. As a rule of thumb, the adulterated drug must not be used after three months of initial dilution or sooner if indicated by the unadulterated formulation.

The waiver of the scientific justification requirement is applicable only if the diluted or adulterated pharmaceutical is pharmaceutical grade. If any component of the adulterated or diluted product is not pharmaceutical grade, scientific justification is necessary for use of that product.

vii. Field Investigations [*Guide*, p. 32]

Describe any additional considerations used by the IACUC/OB when reviewing field investigations of animals (non-domesticated vertebrate species), if applicable.

All field studies are reviewed in the same manner as any other study, utilizing the same AVAU. Pre-review will involve a member of the committee with relevant expertise. If no such member is available, the IACUC Regulatory Compliance Administrator consults with the IACUC Chair regarding selection of a consulting reviewer with relevant expertise.

viii. Animal Reuse [*Guide*, p. 5]

- 1) Describe institutional policies regarding, and oversight of, animal reuse (i.e., on multiple teaching or research protocols).

Animals may be transferred from one IACUC-approved protocol to another if described in the animal source and disposition section of the protocols. In some cases, these animals are transferred to protocols involving long term studies, while in other instances, animals are transferred briefly onto other studies for training, minor procedures, such as blood draws, or terminal procedures. The attending veterinarian maintains several active protocols, one of which is a personnel training protocol. In all instances, the ROM and AV review requests for such transfers.

- 2) Briefly describe the types of activities currently approved that involve the reuse of individual animals.

Note: A list of specific protocols involving reuse of animals should be available during the site visit.

Some animal reuse occurs under the umbrella of the AV's training protocol. These instances involve short term, generally terminal procedures designed to train staff on proper techniques for surgery, anesthesia, blood draws, injections, and/or euthanasia. Many dogs (so called "stock dogs") are used repeatedly for teaching laboratories and/or pharmacokinetic studies. In each instance, the dogs

reside on the AV's holding protocol and a request is made for dogs needed for a given teaching lab or PK study. Teaching labs typically last for 2-3 months, with animals being used up to 2 times per week. Once complete, the animal is placed back on the holding protocol. Stock dogs are deemed eligible for adoption beginning at 2 years or research/teaching service with the majority of those being adopted out by 3 years and rare exceptions staying longer depending on adoption interest. Other animal reuse is handled on a case-by-case basis and may include any horses transferred for blood donations or minor, non-invasive procedures similar to dogs, or any species may be transferred for terminal use on another investigator's IACUC-approved protocol.

- 3) Describe other instances where the final disposition of animals following study does not involve euthanasia, including adoption, re-homing, rehabilitation, etc.

Note: A list of specific protocols involving reuse of animals should be available during the site visit.

Many research protocols allow for adoption of animals as a means of disposition. Animals that cannot be adopted are those that are genetically modified, considered an invasive species, or those be sold for food or fiber. Animals at [REDACTED] are sold off site unless otherwise specified for euthanasia in the research protocols.

2. Post-Approval Monitoring [Guide, pp. 33-34]

- a. Describe mechanisms for IACUC/OB review of ongoing studies and periodic proposal/protocol reviews (e.g., annual, biennial, triennial, or other frequency).

The NCSU IACUC Post Approval Monitoring Program includes the review of procedures, where they are performed, and by whom during the semi-annual facility/lab inspections. CVM staff are expected to report all animal abnormalities and the IACUC-approved protocol is checked as part of the work-up of clinical cases; PIs are contacted if apparent discrepancies are noted. Similarly, the approved protocol is typically reviewed when a PI submits a project request form.

Since all protocols are approved for a one year period, the PI must submit a renewal annually. The renewal form includes information on the pain/distress category and number of animals used, any unexpected occurrences or results, and whether the PI expects any changes in the protocol over the next year. Protocols nearing expiration are monitored by the IACUC office, and several notices are sent to the PI before expiration; the ROM is copied on those notices.

In addition to the above, each animal housing unit, or PI, must have in place a system for tracking all animals covered by a current, IACUC-approved protocol, and that labs

have not exceeded approved animal numbers. Approved protocols are sent to the ROM for each unit by the IACUC Office, and protocol numbers are posted in the facility.

- b. Describe the process and frequency with which the IACUC/OB reviews the program of animal care and use.

The animal care and use programs is reviewed at least every 6 months by the IACUC and a copy of the program review with signatures of the committee members is sent to the IO after each review. The latest semiannual report is in the Appendix.

- c. Describe the process and frequency with which the IACUC/OB conducts facility and laboratory inspections.
- Describe the rationale or criteria used for exempting or varying the frequency of reviewing satellite holding facilities and/or animal use areas.
 - If contract facilities or contractor-provided personnel are used, describe procedures used by the IACUC/OB to review such programs and facilities.
- Note:* A copy of the last report of these reviews should be included as **Appendix 10**.

The IACUC conducts semiannual facility and laboratory inspections for all areas where animals are held or where procedures are conducted on live animals. No contract facilities or contractor provided personnel are currently used.

- d. If applicable, summarize deficiencies noted during external regulatory inspections within the past three years (e.g., funding agencies, government, or other regulatory agencies) and describe institutional responses to those deficiencies.
- Note:* Copies of all such inspection reports (if available) should be available for review by the site visitors.

No deficiencies found

- e. Describe any other monitoring mechanisms or procedures used to facilitate ongoing protocol assessment and compliance, if applicable.

Protocol compliance is an institutional responsibility, and all personnel involved in caring for or performing procedures under individual, approved protocols are required to report any incidence of non-compliance to the IACUC, IACUC Chair and/or the UAV. During the IACUC's semi-annual facility/lab inspections, the previous inspection reports are reviewed for deficiencies, corrections and plans for correction to determine if corrections have been made in a timely manner, whether plans for correction timelines are being adhered to and for repeat occurrences of deficiencies.

3. Investigating and Reporting Animal Welfare Concerns [Guide, pp. 23-24]

Describe institutional methods for reporting and investigating animal welfare concerns.

Methods for reporting and investigating follow the policy that follows.

NCSU IACUC Policy on Animal Welfare Concerns and Noncompliance Situations

1.0 Evaluation of Animal Care and Use Concerns

To help ensure that animals used in research and teaching activities receive humane care, use, and treatment in accordance with the highest ethical standards, laws, regulations, and policies, the Institutional Animal Care and Use Committee (IACUC) must review and, if warranted, address any animal-related concerns raised by the public, students, or institutional employees. This document establishes procedures to ensure that concerns are communicated to the IACUC. The Committee must review each concern in a timely and systematic manner and, when necessary, take prompt, appropriate corrective actions. The following sections outline the policies and procedures for reporting and evaluating animal welfare concerns and noncompliance situations at North Carolina State University.

Any suspected concerns of noncompliance related to animal care and use with regard to animal housing and use facilities, husbandry, animal use protocols, management, or security should be reported.

1.1 Methods for Reporting

To facilitate reporting, there are a number of avenues available to communicate concerns about animal care and use at North Carolina State University, or to report instances of suspected noncompliance with laws, rules, regulations, and policies. The phone numbers of contact persons including the IACUC Chair, University Attending Veterinarian, and the IACUC Administrator are posted:

- 1) in or near the entrance to animal holding, procedure, and treatment facilities and
- 2) on the NCSU IACUC website

It is helpful for the Institutional Animal Care and Use Committee to have as much information as possible in order to conduct a thorough investigation. All complaints or concerns registered will be documented and investigated as thoroughly as possible. Reports may be made anonymously and, to the extent that it is possible, the University will preserve the anonymity of individuals reporting the complaint or concerns, as well as the anonymity of anyone against whom allegations are directed.

The USDA Animal Welfare Regulations and North Carolina law provide specific protection for employees, IACUC members, or laboratory personnel against discrimination or other reprisals for reporting violations of the Animal Welfare Act.

1.2 IACUC Procedures for the Investigation of Animal Care and Use Concerns

1.2.1 Initial Evaluation and Actions The first step in the process of the evaluation of animal care and use concerns is to forward any allegation(s) to the IACUC Chair.

Potential situations and initial actions include:

- 1) Conditions outside those described in IACUC-approved protocols that reportedly jeopardize the health or well-being of animals will be evaluated immediately. To cope promptly with such situations, the University Attending Veterinarian is authorized to halt procedures which place animals in immediate danger until the IACUC can be convened and consider the matter formally,
- 2) Situations that may involve potential criminal activity or human safety should be reported promptly to the institution's law enforcement or occupational health and safety officials.
- 3) Allegations of other ongoing policy or procedural matters may not require such same-day attention, but should not be deferred merely as a matter of convenience. Emergency meetings may be necessary in these cases to ensure prompt consideration of concerns.

Whether the initial action required an immediate response, mandatory cessation of activities, or is ongoing in nature, upon receipt of a concern, the IACUC Chair will appoint the subcommittee to expeditiously conduct an initial evaluation of the concern and impose a completion date for the initial evaluation. After initial review of the complaint, a report will be made to the IACUC to determine whether the complaint requires:

- 1) Further investigation and immediate action;
- 2) Further investigation, but no immediate action; or
- 3) No action.

The IACUC Office must notify affected individuals or other institutional or non-institutional offices at this time (i.e. principal investigator, animal facility administration, department head, associate dean and dean, as applicable).

The IACUC Chair should immediately notify the Institutional Official (IO) if any of the following actions have been taken to protect animal or human welfare:

- 1) Veterinary medical intervention;
- 2) Suspension of a research activity; and/or
- 3) Notification of appropriate safety, occupational health, or other officials.

In accordance with this Institution's Animal Welfare Assurance Statement, if an activity is suspended by the IACUC, and if the activity is supported in any way by the Public Health Services (PHS), the IACUC, through the IO, must promptly notify the Office of Laboratory Animal Welfare (OLAW) and any federal agency funding the research. Prompt reporting guidance can be found at <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-05-034.html>. If the suspended activity involves the use of USDA-regulated species,

the suspension must also be reported to the Animal and Plant Health Inspection Service (APHIS).

1.2. Investigation

If the IACUC determines that further investigation is required, the Chair, or another individual or the subcommittee appointed by the Chair, will conduct the investigation and report back to the IACUC. Members of the investigating subcommittee will be chosen to avoid actual or perceived conflicts of interest.

The IACUC Chair will charge the designated person or group with the IACUC's requirements for information gathering and impose a completion date. The assigned completion date will depend on the IACUC's determination of whether immediate remedial action may be required.

The nature of the information required will vary depending on the circumstances, but often involves:

- 1) Interviewing complainants (if known), any persons against whom allegations were directed, and pertinent program officials;
- 2) Observing the animals and their housing and experimental environment; and
- 3) Reviewing any pertinent records, (e.g., animal health records, protocol, and other documents).

The designated investigator(s) will provide a report to the IACUC, which includes:

- 1) The reported concern(s);
- 2) The results of interviews;
- 3) The condition of animals and their housing and experimental environment;
- 4) The results of records and other document reviews;
- 5) Any supporting documentation such as correspondence, reports, and animal records;
- 6) Conclusions regarding the substance of the concerns in relation to the requirements of the Animal Welfare Regulations, the PHS Policy, the Guide, the institutional policies and procedures;
- 7) If the complaint is related to an injury or illness, a statement on the condition of the individual(s), the circumstances related to the injury or illness, and the prognosis; and
- 8) Recommended actions, if appropriate

1.2.3. Outcomes and Final Actions

Upon receipt and evaluation of the report, the IACUC may;

- 1) Request further information

- 2) Find that there was no evidence to support the concern or complaint,
- 3) Find that the concern or complaint was not sustained, but a) related aspects of the animal care and use program requires further review or b) Other institutional programs may require review, or
- 4) Find that the concern or complaint was valid.

Following the final action(s) of the IACUC, the IACUC Chair will advise the person(s) who reported the concern that the investigation of the concern has concluded. All individuals previously notified (i.e. principal investigator, animal facility administration, department head, associate dean and dean, as applicable) shall also be notified of the outcome in separate correspondence in order to maintain the reporter's anonymity.

1.3 Noncompliance with IACUC Protocol, Policies, Procedures, or Decisions

Noncompliance may be verified following a complaint and investigation, as outlined in the previous sections, or also could be determined due to protocol noncompliance. Protocol noncompliance indicates that procedures or policies approved by the IACUC are not being followed.

When faced with protocol noncompliance, the IACUC's first step, if possible, will be to find a way to bring the protocol into compliance.

If allegations of animal mistreatment or protocol noncompliance are verified, the IACUC may apply sanctions.

1.4 Consequences of Noncompliance with IACUC Protocol, Policies, Procedures, or Decisions

If, in the opinion of the IACUC, sanctions are not appropriate, they need not be applied. A clearly minor and unintentional misinterpretation of an IACUC policy which has created no problem for an animal is an example of where a verified allegation of protocol noncompliance might lead to an explanation, not a sanction.

A. Actions of the IACUC that may be taken to resolve non-compliance matters include:

- 1) Implementing institutional actions (explained, in Section B) to prevent recurrence;
- 2) Notifying relevant support departments impacted by the violations;
- 3) Notifying the Institutional Official and University Attending Veterinarian of its actions;
- 4) Notifying funding or regulatory agencies, as required; and
- 5) Notifying the complainant, any persons against whom allegations were directed, and pertinent program officials (appropriate supervisory and management staff, the public affairs office, institutional attorneys, etc.) of the non-compliance and directives to resolve.

B. Some of the institutional actions that may be used to resolve and prevent future non-compliance and to revitalize the animal care and use compliance environment are:

- 1) Require counseling in the proper use and care of animal subjects;
- 2) Require specific training aimed at preventing future incidents of protocol non-compliance;
- 3) Issue letters of admonishment outlining corrective actions, including but not limited to temporary or permanent revocation of rights to use animals in research, testing or training projects;
- 4) Monitoring by the IACUC (or designee(s)) of research, testing, or training that involves the care and use of animals;
- 5) Testing, or training that involves animals, pending compliance with specific IACUC-mandated conditions;
- 6) Recommending to the Institutional Official that additional institutional sanctions be imposed (e.g., reassignment, termination of employment).

1.4.1 Suspension of Animal Activities - The IACUC is empowered to suspend a project if it finds violations of the PHS Policy

(<http://grants.nih.gov/grants/olaw/references/phspol.htm>), Assurance, or Animal Welfare Regulations

(http://www.aphis.usda.gov/animal_welfare/downloads/Animal%20Care%20Blue%20Book%20-%202013%20-%20FINAL.pdf). Suspension may occur only after review of the matter at a convened meeting of a quorum of the IACUC, and with the suspension vote of a majority of the quorum present. Further, the IACUC must inform the Institutional Official regarding the reasons for the suspension, the actions taken and any further recommended administrative actions. The Institutional Official will take the appropriate corrective action and promptly report the action and the circumstances surrounding the suspension to the federal Office of Laboratory Animal Welfare (OLAW), per the conditions of NCSU's Animal Welfare Assurance Statement.

1.4.2 Reporting Noncompliance, Guide Deviations, and Suspensions

Circumstances that must be reported to OLAW by the Institutional Official, without delay, are: serious or continuing noncompliance with the PHS Policy; serious deviations from the Guide for the Care and Use of Laboratory Animals (constituting violation of PHS Policy and noncompliance with our Assurance); and IACUC suspensions.

Examples of reportable situations can be found at <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-05-034.html>

4. Disaster Planning and Emergency Preparedness [Guide p. 35]

Briefly describe the plan for responding to a disaster potentially impacting the animal care and use program:

- Identify those institutional components and personnel which would participate in the response.

- Briefly describe provisions for addressing animal needs and minimizing impact to animal welfare.

Note: A copy of disaster plan(s) impacting the animal care and use program must be available for review by the site visitors.

A copy of the currently approved disaster plan is available at all times to all staff for each unit. Plans are updated annually by management and annual review sessions are held at staff meetings to ensure all staff are aware of disaster preparedness SOPs. Plans cover emergency contingencies and clearly delineate staff roles during such emergencies (e.g. operating vehicles, transporting animals to safety, providing palatable food, water, and ancillary ventilation). The goal of the disaster plans are to deliver appropriate animal care with limited resources and, if needed, provide humane euthanasia should the nature of the disaster preclude safe animal movement or the sustained provision of food and water.

II. Animal Environment, Housing and Management

Note: Complete each section including, where applicable, procedures performed in farm settings, field studies, aquatic environments, etc.

A. Animal Environment

Note: Facility-specific details regarding mechanical system construction and operation is requested in Section IV.B.5. and **Appendix 11**; current (measured ***within the last 12 months***), detailed (by room) performance data must also be provided as indicated in **Appendix 11**.

1. Temperature and Humidity [*Guide*, pp. 43-45]

- a. Describe the methods and frequencies of assessing, monitoring, and documenting that animal room or housing area temperature and humidity is appropriate for each species.

Note: If preferred, this information may be provided in a Table or additional Appendix.

████ indoor facilities (including █████ area) are designed to provide temperatures that meet standards in the *Guide*. Humidity control is available for █████ and █████.

High and low temperature and humidity are checked by digital units in each room, and recorded daily on the Room Maintenance sheet. Temperatures outside recommended ranges are reported to the supervisor. Room Maintenance sheets are reviewed by the Unit Supervisor, and scanned into a digital archive for at least five years. In the █████, there is monitoring built into the HVAC systems which sends out alerts on room temps and system failures. In the █████, the Edstrom Watchdog system provides alarms for power failure and animal rooms outside of pre-set limits for temperature and humidity. Alarm calls go to the designated staff for both █████ and facilities.

██████ poultry may be kept in a commercial type barn that relies on auxiliary ventilation and a cool cell unit to control temperatures. High/low temperatures are also monitored in these areas daily.

██████ pasture animals are exposed to ambient temperature and humidity but all have shade either via trees or in the form of shelters for protection from extreme heat and inclement weather.

In the ██████ temperatures and humidity are partially regulated in the ██████ by automatic controls to operate fans, window curtains, and heaters. These environments are designed to maintain a comfortable environment for the animals. The ██████ uses curtains, fans and heaters to maintain environmental temperatures and ventilation. The pasture animals are exposed to ambient temperature and humidity but all have shade either via trees or in the form of shelters for protection from extreme heat and inclement weather.

At ██████ barns have heat for when needed and pastured animals have shade either by trees or shelters.

At ██████ barns are heated via gas space heaters as needed and temperature is monitored by thermostat. No air conditioning is used in barns; fans are used as needed.

- b. List, by species, set-points and daily fluctuations considered acceptable for animal holding room temperature and relative humidity.

Note: If preferred, this information may be provided in a Table or additional Appendix. [Guide, pp. 44 and 139-140]

Humidity range for all rooms is 30%-70%

Aquatic: 65-74°F

Budgett frogs/Marine toads/Poultry rooms: 70-85°F

Cat/Dog: 64-84°F

Exotic bird cage large: 70-81°F

Ferret: 55-70°F

Guinea Pig: 68-79°F

Pasture animals: not recorded

Pigeon/Swine/Inside Livestock: 61-81°F

Rabbit: 61-72°F

Rodent: 68-74°F

Xenopus: 70-74°F

Zebrafish: 78-82°F

- c. Temperature set-points in animal housing rooms and/or environmental conditions are often outside of the species-specific thermoneutral zone. Describe the process for enabling behavioral thermoregulation (e.g., nesting material, shelter,

etc.) or other means used to ensure that animals can control their thermoregulatory environment. Include a description of IACUC/OB approved exceptions, if applicable. [Guide, p. 43]

Temperature set points for indoor-housed animals are within *Guide* recommendations for all species. In outdoor (pasture) settings, animals have shelters that provide a shaded area. All rodent cages are also provided with nesting materials and neonatal animals are given heat lamps to create a temperature gradient within the pen.

In [REDACTED] stalled animals are provided approved bedding in the stalls and supplemental heat source if needed.

2. Ventilation and Air Quality [Guide, pp. 45-47]

- a. Describe the methods and frequencies of assessing, monitoring, and documenting the animal room ventilation rates and pressure gradients (with respect to adjacent areas).

Note: If preferred, this information may be provided in a Table or additional Appendix.

Air turnover and relative air pressures are formally monitored at least every three years. In the [REDACTED] the Edstrom Watchdog system monitors relative pressures of animal rooms, and the building automation system monitors actual air supply and exhaust. Pressures can be monitored via smoke detection system when needed to be verified for an experiment.

- b. Describe ventilation aspects of any special primary enclosures using forced ventilation.

Ventilated cage rack systems are commonly used for housing of mice. These units are commercially produced by Allentown Caging Equipment, Tecniplast and Thoren. All ventilated racks are powered through emergency backed-up electrical circuits.

[REDACTED] unit in [REDACTED] conducts experiments using closed-system isolators comprised of flexible film vinyl. Air intake to the isolator is achieved by passing air through several wrapped layers of sterilized .002 micron filter paper encased in flexible film vinyl via a motorized blower. Air is circulated throughout the isolator and allowed to exhaust passively (no mechanical blower involved) through an identical filter setup on the opposite side of the isolator. Isolators are powered through emergency backed up electrical circuits.

The Plas-lab and glove port isolators used in poultry work at [REDACTED] have HEPA filtration into the isolators powered by motorizes blowers. Air circulates throughout the isolator and allowed to exhaust through another HEPA filter before entering the exterior (outside) exhaust.

- c. If any supply air used in a room or primary enclosure is [recycled](#), describe the percent and source of the air and how gaseous and particulate contaminants are removed.

Not applicable

3. Life Support Systems for Aquatic Species [Guide, pp. 84-87]

- a. Provide a general description of institutional requirements for enclosures using water as the primary environmental medium for a species (e.g., aquatics).

Aquatic environments housing research animals must provide a stable environment that supports the animals' physiologic needs and allow for conspecific interaction, where appropriate. Automated or manual processes must be in place to provide appropriate food, water quality parameters, and removal of excrement and food waste. Primary enclosure must be made of nontoxic materials and enable direct observation of the animals with minimal disturbance. Any materials surrounding the primary enclosure should be free from rust or corrosion.

- b. Provide a general description of overall system(s) design, housing densities, and water treatment, maintenance, and quality assurance that are used to ensure species appropriateness.

Note: Facility-specific tank design and parameter monitoring frequencies should be summarized in **Appendix 12** (Aquatic Systems Summary).

In the [REDACTED], each system has a continuous water flow with a bio-filter in the sump. Animal density in the systems is based upon parameters established in the IACUC approved protocols the studies fall under. Water for each system is processed through multiple filters (coarse and fine), UV lights and a carbon bed. Maintenance on the systems is conducted per manufacturer's guidelines as needed. Water quality parameters are recorded and water treatments applied as appropriate for the species being housed.

Numerous native fish and invertebrate species are routinely held in the other aquatic barns. Individual tank design is markedly variable based on the individual needs of the species selected for study. Tanks vary in volume, shape, light-penetration, temperature water flow and type of filtration. Individual aquaria vary in size from 1-800 gallons. Some aquaria are rectangular, round or oval shaped and made of rubber, fiberglass or plastic. Based on the experiment being conducted, biofiltration may be provided to individual tanks or provided by water passage through larger scale biofilters appropriate for the size of tank, number and size of fish being used for the studies. City water is used as a water source. Water is treated with sodium thiosulfate and held in large plastic or fiberglass storage tanks for a minimum of 24 hours before use. Frequency of water changes are set to maintain water quality, and additional treatments for ammonia are made when water changes or biofiltration cannot be used when

dictated by experimental design considerations. Fish are monitored for behavioral changes, changes in feeding and visual signs of illness. Air provided via central air lines is distributed to many aquaria based on the species studied and the experimental design.

In frog rooms, tanks vary from large opaque plastic tubs to polycarbonate that vary in volume, shape and light-penetration. Tanks vary in size from 1-10 gallons. City water is the water source and is held in plastic containers, treated with dechlorinating product at least 24 hours prior to use, and must be chlorine free before use. Frequency of water changes are used to maintain water quality, which is tested at least once weekly. Frogs are monitored for behavioral changes, changes in feeding and visual signs of illness. Frogs are able to surface to breathe so airlines are not needed.

At [REDACTED] fish are held in groups in 950-liter round tanks where water quality is monitored periodically adjusting parameters as relevant to each species housed.

4. Noise and Vibration [Guide, pp. 49-50]

Describe facility design features and other methods used to control, reduce, or prevent excessive noise and vibration in the animal facility.

To the extent possible, dogs and pigs are separated from species or projects that might be sensitive to noise. Radios are used in some large animal rooms as part of environmental enrichment. Some of the renovated buildings have sound dampening devices in the exhaust system ductwork.

B. Animal Housing (all terrestrial, flighted, and aquatic species)

1. Primary Enclosures

Note: A description of primary enclosures used (e.g., cages (conventional, individually-ventilated cage systems (IVCS), etc.), pens, stalls, pastures, aviaries, tanks) should be included in **Appendix 13**.

- a. Describe considerations, performance criteria and guiding documents (e.g. *Guide*, *Ag Guide*, ETS 123 and/or other applicable standards) used by the IACUC/OB to verify adequacy of space provided for all research animals, including traditional laboratory animal species, agricultural animals, aquatic species, and wildlife when reviewing biomedical, field and agricultural research studies.

All terrestrial animals are housed under conditions that meet or exceed the standards set forth by the *Guide for the Care and Use of Laboratory Animals* or *Ag Guide*. All animals are observed daily to ensure that all exhibit species-typical behavior. Primary enclosures are observed daily to ensure that no areas within a cage are excessively soiled (examples: large litters, leaking water bottles, etc.) and any that are excessively dirty are spot-cleaned.

All aquatic species environments are checked daily to ensure systems are functioning properly and perform animal health checks. Water quality is checked regularly to ensure environmental metabolic breakdown products are minimized and values are consistent with recommendations.

All flighted species are housed in cages appropriate for the species and are cleaned daily of excrement.

- b. Describe space [exceptions](#) to the guiding documents (*Guide*, *Ag Guide*, ETS 123, and/or applicable standards), indicating the references, considerations and performance criteria used (e.g., by the IACUC/OB) to verify adequacy of space provided for all animal species covered by the program. [*Guide*, pp. 55-63]

Protocol 19-080: reduced space for post-surgical housing and farrowing; farrowing crates are industry standard to protect piglets from crush injuries.

All animals are observed by the AV and semiannually by the IACUC to ensure that they have the ability to turn around, sit, stand, lay down, and perform natural postural adjustments (such as rearing on hind limbs, swimming or walking around, an ability to nest away from the natural latrine, etc.)

2. Environmental Enrichment, Social, and Behavioral Management [*Guide*, pp. 52-55; 63-65: *Ag Guide*, Chapter 4]

a. Environmental Enrichment

- i. Describe the structural elements of the environment of primary enclosures that may enhance the well-being of animals housed (e.g., resting boards, privacy areas, shelves/perches, swings, hammocks).

Ferrets are housed in a manner that allows for hammocks to be placed in their enclosures for sleeping and playing. Rabbits and Guinea pigs are given huts to provide them a hide area within the cage, foraging boxes and visual contact when able. Rodents are provided with either nesting material and/or hide box. Dogs are provided with beds elevated slightly from the ground and visual contact when able. Psittacine and passerine birds are provided with perches and flight cages; reptiles and amphibians are provided with hides and/or basking perches. For animals that must be housed individually, pens are situated so that the animals will still maintain visual, auditory, and olfactory contact with conspecifics.

Horses at [REDACTED] and [REDACTED] are provided open pasture space for grazing fenced in with safe woven wire and a 3-sided shed with free choice hay within the shed.

[REDACTED] provides hay racks in barns for animals to forage for hay and house where animals can have visual and auditory contact with conspecifics as the preferred

default. Species approved food and hay in appropriate receptacles and species appropriate toys when items can be safely provided.

- ii. Describe nonstructural provisions to encourage animals to exhibit species typical activity patterns (e.g., exercise, gnawing, access to pens, opportunity for exploration, control over environment, foraging, denning, burrowing, nesting materials, toys/manipulanda, browsing, grazing, rooting, climbing).

████ All species except zebrafish are provided some sort of species-specific environmental enrichment, which are sanitized or disposed of when soiled. Enrichment devices such as toys are rotated periodically to increase novelty, except for aquatics. In general, rodents are provided nesting and chewing materials; dogs, rabbits, and pigs are provided with chew toys; livestock are provided with rooting and pushing toys; and aquatic species are provided with hides.

Horses and ruminants at █████ █████ and █████ are provided constant opportunity to meander through ample browsing and grazing pasture.

Swine at █████ are provided with limited hanging toys so long as it does not interfere with study goals.

The █████ provides nesting material to allow nest building behavior.

b. Social Environment [Guide, p. 64]

- i. Describe institutional expectations or strategies for [social housing](#) of animals.

Social housing is the default housing condition for all animals unless the research requires individual housing for scientifically justified reasons, incompatible animals, or antisocial species.

- ii. Describe exceptions to these expectations (e.g., veterinary care, social incompatibility) and other typical justification approved by the IACUC/OB for housing animals individually.

Aggressive behavior, medical related conditions, species that are typically solitary species, carnivorous species and research (scientific) considerations are the only accepted reasons for non-group housing of social animals. Such scientific considerations may include infectious disease studies where isolation of animals is necessary for maintaining the continuity of the study, ophthalmologic studies where increased risk of eye injury may conflict with scientific goals (rabbits), residence of animals within metabolic cages for precise measurement of excretions, or if procedural-related implants or devices require separation to prevent interference with scientific goals.

- iii. Describe steps taken with isolated or individually housed animals to compensate for the absence of other animals (interaction with humans, environmental enrichment, etc.).

These animals are provided additional enrichment and human interactions.

c. Enrichment, Social and Behavioral Management Program Review [*Guide*, pp. 58, 69]

Describe how enrichment programs and exceptions to social housing of social species are regularly reviewed to ensure that they are beneficial to animal well-being and consistent with the goals of animal use.

The enrichment program is reviewed every three years by the UAV to ensure that new developments are appropriately utilized. Likewise, the social management program is reviewed every at least every three years, to ensure every effort is made to house social species in pairs or groups. In the event that an animal displays overt aggression or demonstrates adverse health consequences related to social housing, that animal is housed individually. In other instances where animals are housed individually, such as primary enclosure space limitations or other protocol-justified or veterinary reasons, opportunities for regular exercise with conspecifics are provided unless contraindicated. When such behavioral or protocol-related issues preclude social play with conspecifics, regular, positive human interaction is provided and documented on the room door. If there is an indication that the human interaction is detrimental to the animal's well-being, this is discontinued and documented in the animal's record. In such instances, the record is reviewed by the attending veterinarian once every 30 days (this occurs rarely to never).

d. Procedural Habituation and Training of Animals [*Guide*, pp. 64-65]

Describe how animals are habituated to routine husbandry or experimental procedures, when possible, to assist animals to better cope with their environment by reducing stress associated with novel procedures or people.

All animals are provided at least a 72 hour acclimation period prior to usage unless an exception has been IACUC approved. During acclimation, the animals may be introduced to aspects of the procedure (such as the restraint method for gradually increasing periods), people, or environment that they will be involved with for a given approved study. In rare instances (e.g. collection of terminal rodent tissues for in vitro work), the acclimation period is waived provided that the only procedure performed on the live animal is euthanasia.

e. Sheltered or Outdoor Housing [*Guide*, pp. 54-55]

- i. Describe the environment (e.g., barn, corral, pasture, field enclosure, flight cage, pond, or island).

█████ has use of three pastures for livestock that are fenced with a combination of conventional and electric wire mounted on wooden fence posts. Within each of the three pastures is a shelter to provide shade and refuge from weather extremes.

In the █████ animals are pastured in compatible groups, except for the swine and poultry. The poultry building is on dirt floor bedded with shavings. Both swine and the poultry buildings have fans, supplemental heat, and outside curtains controlled by automatic environmental controls. The swine unit keeps pigs in groups, except for sows in the farrowing stalls, or during advanced gestation when sows are penned individually to prevent injuries. Additionally, red wolves are located in 6 large enclosed pens in a separate area of the █████ Fencing is 8-ft tall chain link with a secondary 8-ft chain link barrier surrounding all of the pens mounted with barbed wire.

At █████ stalls are a minimum of 12'X12' with automatic waterers, rubber mats and pine shavings for floor padding. Horses are pastured in at least groups of two unless they are under quarantine. Pastures are fenced with conventional wire on wooden posts and contain wooden shelters within, as well as trees for shelter from the elements.

At █████ has six pastures for animals to be housed in compatible groups, there are housing stall in the barn with the ability for fans when needed. Both stalls and pastures have automatic watering systems.

- ii. Describe methods used to protect animals from weather extremes, predators, and escape (windbreaks, shelters, shaded areas, areas with forced ventilation, heat radiating structures, access to conditioned spaces, etc.).

Windbreaks, shelters, naturally shaded areas, and areas with forced mechanical ventilation are available. Electric fences are used to deter predator attacks in livestock pastures. █████ uses guardian dogs to protect sheep flocks.

- iii. Describe protective or escape mechanisms for submissive animals, how access to food and water is assured, provisions for enrichment, and efforts to group compatible animals.

Pastured horses at █████ and █████ are fed in individual feeders to prevent food aggression. Some animals are fed in sheltered areas to be able to eat without being bullied by other animals on pasture. The animals are always placed with conspecifics of the same size and age to prevent attacks on submissive animals.

In the █████ cattle are disbudded to prevent injuries and excessively dominant behavior. All animals have a constant supply of drinking water supplied by automatic waterers. Poultry and swine at █████ have automated feed and water delivery systems. All other animals are hand fed once or twice daily as needed.

■■■■ animals are group pastured and this provides exercise and social interaction except for pigs and poultry. The poultry house is one open pen (5400 square feet) for all the birds with hanging enrichment to help reduce feather picking.

At the ■■■■ water is provided by automatic drinkers (with heaters), and food is hand fed, twice daily. Pasture shelters are provided to offer potential escape from aggressive animals.

f. Naturalistic Environments [*Guide*, p. 55]

- i. Describe types of naturalistic environments (forests, islands) and how animals are monitored for animal well-being (e.g., overall health, protection from predation).

The ■■■■ has six large, outdoor pens in a heavily wooded area. Wolves are observed daily for appetite and appearance; if in their “dens,” they will generally come out at feeding time.

- ii. Describe how food, water, and shelter are provided.

Food and water are provided in stainless steel receptacles adjacent to the pen enclosure fence. Animals are fed daily and watered twice daily. There are several areas where the wolves can hide within each shelter. These hides are composed of natural wood material and provide a safe area for the animals to be protected from the elements and to hide from view.

- iii. Describe how animals are captured.

When necessary, wolves are corralled into their den using experienced personnel, which has a lift-up roof. The wolf is then restrained with a Y-stick and injected by hand or pole syringe with a balanced combination of drugs to provide anesthesia. Occasionally a wolf may have to be netted and then anesthetized. Animals can also be moved from enclosure to enclosure through a series of blinds eliminating the need for capture.

C. Animal Facility Management

1. Husbandry

- a. Food [*Guide*, pp. 65-67]
i. **List type and source of food stuffs.**

In ■■■■ commercially prepared feed appropriate for each species and life stage is used. Canned food is used as needed for some dogs, and pigs. Livestock and long term transgenic swine receive hay purchased from commercial sources. Rabbits and

Guinea Pigs receive autoclaved hay as a supplement. Some livestock species are on pasture, having access to trace-mineralized salt.

Current feed used in [REDACTED] Exotic avian species are fed Roudybush Maintenance Crumbles (Amazon). Neonatal swine and cattle are provided a commercial milk formula (Tractor Supply; Liqui-Wean Milk Specialties Company) or lab obtained colostrum. Carnivorous frog species are fed live feeder prey (Dubiaroach.com, Reptilefood.com, Uncle Jerry's), or frozen thawed prey (Rodentpro.com, Amazon) with Calcium Gluconate supplementation (Tractor Supply). Xenopus are fed frog brittle (Nasco). Zebrafish are fed a commercial diet (Skretting) appropriate for their life stage. Small ruminants are given either study specific diets (Mule City) or commercial (Purina). Horses are fed commercial made diet for metabolic needs (Purina, Triple Crown, Envision)) and they can be supplemented with if needed (Probios, Ugard, Accel). Poultry are feed a University milled diet or a commercial chicken food (Purina). Rodents are fed a commercial pelleted diet (Purina Labdiet ;Tekland). Rabbits are fed pelleted diet from Purina Labdiet and Guinea pigs are fed a commercial Vitamin C enriched pelleted diet from Mazuri. Fish are fed an appropriate pelleted diet based on type of fish (Foster and Smith). Ferrets are fed Marshall Commercial diet.

[REDACTED] animals are provided nutritionist approved diets milled by approved vendors for that species and required diet.

[REDACTED] horses are fed a commercial pelleted feed and coastal Bermuda hay free choice grown locally.

[REDACTED] uses commercial prepared diets appropriate for the life stage of the animal and round bales as needed.

[REDACTED] unit steam sterilizes autoclavable rodent feed from Purina Labdiet (Lab Animal Supply).

Marine animals held at [REDACTED] are fed an appropriate commercially available diet that depends on the species housed.

ii. Describe feed storage facilities, noting temperature, relative humidity, and vermin control measures, and container (e.g., bag) handling practices, for each of the following:

- vendors (if more than one source, describe each)
- centralized or bulk food storage facilities if applicable
- animal facility or [REDACTED] feed storage rooms
- storage containers within animal holding rooms

For [REDACTED] and [REDACTED] Lab Animal Supply keeps feed at 65 F or, in some cases, 45 F. Both Lab Animal Supply and Twin Oaks Feed routinely place traps for

insects and rodents. Both vendors move pallets of feed/bedding to sweep and clean all surfaces of the storage area, and rotate supplies to ensure that outdated products are not delivered. Other vendors are not visited. Feed used in [REDACTED] is stored at room temperature or refrigerated if required. Feed room is maintained at a range of 64-72 F and pallets are used to store feed off the ground and away from walls. Broken bags are discarded, and room is swept daily. Feed storage rooms have secure, well-sealed doors. Hay and shavings are stored elevated on pallets. Worms are kept refrigerated and feeder rodents are frozen until use. Food stored in [REDACTED] animal rooms are in covered and labelled plastic bins that are changed monthly to ensure cleanliness. Smaller portions may be stored in covered containers of smaller size.

[REDACTED] and [REDACTED] staff do not inspect the vendor storage facilities they use; however, these commercial feed companies are inspected by the NC Department of Agriculture and can sell feed only as labeled. Open bagged feed is stored in containers and used first for rotation and bagged food is on pallets. Bulk grains are stored in commercial feed bins. Hay is stored under shelters to protect from weather.

Purina Mills Co. provides [REDACTED] feed. The feed is manufactured the day it is delivered. The vendor does not store the feed. At [REDACTED] hay is stored in a three-sided metal hay barn with natural ventilation. Oldest hay is used first to assure freshness. Pelleted feed is stored in a grain silo and delivered to feed buckets via an auger into the feed room. Bagged grains are stored in original bags and dated upon delivery. Open bags are kept in metal cans with lids. Baits are used in areas for vermin control. Thermostatically controlled ventilation fans are used to control temperatures in the feed barn. At [REDACTED] a half day's ration of hay is placed in hay nets in the stalls. Feed is stored in metal containers with lids. Food for [REDACTED] is stored as needed depending on the species housed. Fresh feed for carnivorous species is stored frozen and thawed for use as needed. Pelleted or flake diets are stored per manufacturer's instructions in designated food areas or in the animal housing room in a sealed container.

- iii. Describe special food preparation areas, such as feedmills and locations where special diets are formulated, if applicable. Include in the description sanitation and personnel safety practices (noting that respiratory protection is described in Section 2.I.A.2.b. ii. Standard Working Conditions and Baseline Precautions above).

In the [REDACTED] dairy rations are mixed in the [REDACTED] feed mill to add cottonseed, with the grains put into mill under the feed mill shed. Personnel operating the feed mill wears ear plugs and N95 masks are available.

In [REDACTED] frozen food (if used) is thawed in the animal room and given directly to the animals.

iv. Describe how food is provided to various species (*ad libitum*, limited amounts, types of feeders).

In [REDACTED] rodents, birds, and poultry are generally fed *ad libitum* with other species meal-fed in quantities adjusted to maintain good body condition. Livestock is provided *ad libitum* hay. Animals are fed in species appropriate food receptacles with most feeders made from stainless steel. Rubber bowls and plastic buckets are used for some animals. Animals in stalls, hay is mainly provided in hay bags. Animals on pasture are fed hay in a hay holder or spread on the ground for some cases.

The [REDACTED] poultry are fed *ad libitum*. All other animals are fed once or twice daily to supplement pasture and round bale hay.

At [REDACTED] horses are fed grain in individual buckets spaced apart adequately to insure that all have the opportunity to eat. Hay is fed to pasture horses via a round bale feeder that is located under a shelter to protect it from the elements.

[REDACTED] horses are *ad lib* water and forage and grain is put into feed pans/buckets for animals that are supplemented.

In [REDACTED] animals are fed *ad libitum* from stainless steel hoppers.

At [REDACTED] animals are fed by directly adding feed to the water at intervals based on nutritional requirements – generally once to several times weekly for most aquatic species.

v. Describe special food quality control procedures including procedures for rotating stock, monitoring milling dates, nutritional quality, bio load, chemical contaminants, etc.

In [REDACTED] facility staff make certain the stock is rotated and labeled with the date of receipt and expiration to ensure feed is used within the timeframe set by manufacturers. Feed is visually inspected daily when in use, but is not routinely monitored for nutritional quality, bio-load, chemical contaminants, etc.

NCSU animal nutritionist develops the dairy ration to ensure the feed meets the nutritional value for the animals. Bagged food has a manufacturer expiration date and oldest bags are on top to ensure it is used first. All storage bins are cleaned between bags and have a sign off chart for monitoring. All species have designated color coded food scoops and buckets to prevent cross contamination

At [REDACTED] facility staff make certain the stock is rotated by date of receipt and expiration to ensure feed is used within the timeframe set by manufacturers.

Feed is visually inspected daily when in use, but is not routinely monitored for nutritional quality, bio-load, chemical contaminants, etc.

At the [REDACTED] the date-code scheme is posted in each feed storage area, and supervisors check to make certain the stock has been rotated. Feed that is not dated by the manufacturer is dated by our technicians with the date of receipt. Technicians are instructed not to use any feed that is over 6 months old. Hay is purchased in bulk. Each load of hay is inspected for mold and insects before unloading. Hay analysis is done periodically to determine total digestible ingredients. When a new shipment is received, hay from the previous shipment is moved to the front of the barn and fed before the new shipment.

[REDACTED] food is stacked with the previous delivery to the left of the current delivery, and staff checks feed when preparing for autoclaving.

Food at [REDACTED] is stocked only for ongoing studies and disposed of once the study is complete to prevent outdated feeds and minimize the risk of contamination.

b. Drinking Water [Guide, pp. 67-68]

- i. Describe the water source, treatment or purification process, and how it is provided to the animals (e.g., bowls, bottles with sipper tubes, automatic watering, troughs, ponds, streams).

City of Raleigh water is used for most [REDACTED] and all [REDACTED] animals without additional treatment or purification. In [REDACTED] Lixit-type automated watering is used for dogs, small ruminants, poultry, some rodents and swine. Water buckets are used for stalled animals, ferrets and dogs. Some poultry and pigeons are watered with static bells. [REDACTED] pastures have automatic fountain type waterers. Rodents, not on automatic watering, guinea pigs, ferrets and rabbits receive water in bottles. Cockatiels are provided through water bottles and bowls. Animals in the [REDACTED] receive chlorinated, RO water through an automated system (Edstrom) as well as from conventional water bottles.

[REDACTED] unit rodents receive City of Raleigh water autoclaved in large bottles.

[REDACTED] water is provided by the city of Raleigh. In the poultry unit, turkeys and broilers are watered using nipple automatic drinkers. Housed pigs are provided water using automated stainless steel nipple type drinkers. All pastured animals are provided water via frost free automated drinkers in each pasture location. When animals are stalled inside, automatic cup drinkers provide water to individual or groups of animals. Calves in hutches are provided fresh water in buckets twice daily.

██████████ is on city of Raleigh water for their animals via frost free automated drinkers in each pasture location. When animals are stalled inside, automatic cup drinkers provide water to individual or groups of animals.

Water at ██████ is provided by well. Water has been tested and requires no purification for horses. Pastures are equipped with automatic waterers. Some stalls are equipped with automatic drinkers. Stalls without automatic drinkers are equipped with 5 gallon buckets for watering horses.

Water used in aquatic areas is supplied from city (Raleigh) water, treated in several holding reservoirs with sodium thiosulfate at a concentration of 40 ppm to remove chlorine and allowed to aerate for 24 hours to remove excess ammonia. Treated water is piped through water lines to individual tanks.

ii. Describe methods of quality control, including monitoring for contaminants.

In ██████, only RO water is used for provision of drinking water to animals housed therein. It is tested weekly to ensure that the chlorine level is maintained at 3 ppm. Additionally, RO filters are changed periodically according to manufacturer's instructions. City of Raleigh water is used throughout the remainder of the animal housing areas for drinking water and is considered safe for human consumption. All contaminant monitoring is provided by the city in the annual report.

Well water at ██████ is tested annually for contaminants by the manager using a county testing lab.

iii. If automatic water delivery systems are used, describe how they are maintained and sanitized.

Automated watering systems are used and lines are checked daily for proper function, hosing is replaced as needed and units are disinfected as part of scheduled room disinfection. Automatic horse watering systems are wiped down regularly and inspected daily for proper operation. IVC racks are flushed as they are sent through cage wash quarterly.

At ██████ automatic waterers are cleaned manually weekly with disinfectant and a brush. They are cleaned immediately after rotation of animals. They are also checked visually each day for proper operation.

For ██████ and ██████████ automatic watering systems are checked at least daily for proper function and cleaned as needed.

c. Bedding and Nesting Materials [Guide, pp. 68-69]

i. Describe type(s) and how used for various species.

In [REDACTED] commercially prepared, heat-treated, ground corn cobs with nesting material mixed in (Enrich-o-cob) or without (Bed-o-Cob) are used as direct bedding for most laboratory rodents, one study uses Betachip bedding. Yesterday's News is used for rabbit, cats and ferret litter pans. Steam sterilized Alpha-dri + is used for [REDACTED] unit rodents. Pine wood shavings (WJP) are used as bedding for stalled animals and poultry in pens. Aspen shavings are used for direct contact guinea pig housing. Rubber stall mats are sometimes used for livestock species needing to be stalled without shavings. Indirect bedding includes corrugated sheets of paper (Techboard) under ferret, guinea pigs, cockatiels, and lagomorph cages.

[REDACTED] for the horses and small ruminants there is a shaving base for, with stalls cleaned minimally once daily. Straw is put in the shed for the beef cows during the winter and is cleaned out twice weekly. For the poultry house shavings are used and is composted out between flocks. Calf stalls and housing have straw placed inside and are cleaned out daily and then striped and disinfected between calves.

At [REDACTED] and [REDACTED] rubber mats along with wood shavings are used for bedding horses in stalls.

ii. Describe bulk bedding storage facilities, if applicable, including vermin control measures.

Bagged bedding and tech board for [REDACTED] and [REDACTED] are stored on pallets in the feed storage rooms in either the [REDACTED] Vermin control, as described later for the animal facilities, is applied to these rooms.

Straw used in [REDACTED] are stored in an enclosed building with campus maintained vermin traps. Pine shavings are delivered in bulk, and put directly into poultry houses.

[REDACTED] stores bagged shavings on pallets in the barn with live traps for rodents.

Shavings at [REDACTED] are stored in an open-sided metal building

iii. Describe quality control procedures, including monitoring for contaminants.

All bedding is visually inspected upon arrival and when placed in animal housing areas, with any damaged bags being disposed.

d. Miscellaneous Animal Care and Use Equipment

- i. Describe motorized vehicles and other equipment (e.g., trailers) used for transporting animals, noting the type and how the cargo compartment is environmentally controlled, if applicable.

██████ has a heated/air-conditioned van for the transport of smaller animals, animals are placed in transport cages that are sanitized between uses. There are also two pickup trucks, and animals are placed in carriers or transport cart before being placed in the trucks. ██████ has one stock trailer (no climate control) pulled by a pickup truck for transporting livestock.

██████ animals are transported in an aluminum livestock trailer when moved from one location to another. Small individual livestock can be transported in an aluminum transport crate secured in the bed of the pick up truck.

Horses at ██████ and ██████ are transported via truck and horse trailer when necessary.

Aquatic species at ██████ are transported using truck beds, small trailers, or cargo vans using portable contained aquaria with aerated water.

- ii. Describe other animal care related equipment used in the animal care program (specialized equipment for exercise or enrichment, high pressure sprayers, vacuum cleaners, tractors, trailers, spreaders, etc.).

Other equipment in ██████ includes: two shop vac type vacuum cleaners, numerous Vesta foamers, one propane powered steam cleaner, numerous mobile transport cages, one livestock transport cart, nine animal transfer stations, two bedding dump stations, and one UTV for transport between buildings.

The ██████ unit has two air compressors used for spraying acid into ports prior to and after supply cylinders are attached and two generators in the event of a power emergency

At ██████ a small tractor and manure spreaders are used to dispose of manure.

e. Sanitation [Guide, pp. 69-73]

i. Bedding/Substrate Change

- 1) Describe frequency of contact and non-contact bedding change for each species and enclosure type (solid-bottom or suspended) or pen.

██████

Rodents in solid bottom cages: 1-2 times/week, or once every 2 weeks in ventilated cages

Rabbits: litter in pans are changed 1 times per week(if provided) or tech board is changed twice weekly

Cats & Ferrets: litter in pans are changed daily

Caged (exotic) birds: floors are swept or hosed daily

Poultry: between studies for majority; long-term colonies biweekly

Stalled Livestock: cleaned daily

Guinea Pig: shavings and tech board changed weekly

Birds on shavings: bedding changed between production flocks;

Calves, sheep, and goats in pens with straw bedding: changed as needed to keep pens clean and dry.

Horse Stalls: bedding for horse stalls is picked clean twice daily, stripped weekly and all new bedding is put in.

Shavings are removed and replaced between each horse when using enclosed pens for housing horses. Pens are picked clean daily.

unit: Rodents have bedding changed weekly and isolators are cleaned between studies.

- 2) Describe any IACUC/OB approved [exceptions](#) to frequencies recommended in the *Guide* or applicable regulations and the criteria used to justify those exceptions.

Floor litter for some poultry studies is not changed/removed until conclusion of the experiment, to reduce concern for infectious disease transmission and interest in approximating commercial conditions. Similarly, litter in poultry isolators is changed only after study conclusion.

- 3) Note the location where soiled bedding is removed from the cages/enclosures and where clean bedding is placed into the cages/enclosures.

Soiled rodent bedding in [REDACTED] is removed from solid bottom cages on the dirty side of the cage washing room, and is dumped inside a HEPA-filtered bedding disposal system to minimize the generation of aerosols. Clean bedding is placed into cages in the clean rodent storage room. Soiled tech board and shavings are removed in the animal housing room and placed in trash liners or dump carts for disposal.

In [REDACTED] soiled bedding is placed in paper waste bags stored in each isolator to be removed the next time the isolator is opened.

In [REDACTED] and [REDACTED] soiled bedding is removed in the primary enclosure and new bedding is replaced in the primary enclosure itself.

ii. Cleaning and Disinfection of the Micro- and Macro-Environments

Note: A description of the washing/sanitizing frequency, methods, and equipment used should be included in **Appendix 14** (Cleaning and Disinfection of the Micro- and Macro-Environment) and **Appendix 15** (Facilities and Equipment for Sanitizing Materials).

- 1) Describe any IACUC/OB approved [exceptions](#) to the *Guide* (or applicable regulations) recommended sanitation intervals.

In some animal studies (e.g. chickens on shavings), primary enclosures are not sanitized until the conclusion of the study, as discussed above.

2) Assessing the Effectiveness of Sanitation and Mechanical Washer Function

- a) Describe how the effectiveness of sanitation procedures is monitored (e.g., water temperature monitoring, microbiological monitoring, visual inspections).

[REDACTED] cage washing machines are designed so they will not start washing until the temperature in the wash tank reaches 180° F. Cage washing temperatures are monitored by inspection of the visual temperature readout and temperature indication tapes. 180° F color-change temperature indicators are run with the first load each day. Items are visually inspected for cleanliness as being unloaded from wash rack.

Other units use visual inspection for monitoring their sanitation of stalls and pens.

- b) Describe preventive maintenance programs for mechanical washers.

Mechanical washers are on service contracts with preventative maintenance being performed every 3 months.

f. Conventional Waste Disposal [Guide, pp. 73-74]

Describe the handling, storage, method and frequency of disposal, and final disposal location for each of the following:

- i. Soiled bedding and refuse.

In [REDACTED] and [REDACTED] noninfectious trash (including office trash) and animal bedding is disposed of via standard dumpsters and taken at least twice a week to the landfill for disposal. Autoclaved biohazard bags are disposed of in dedicated dumpsters. Hazardous waste that is not autoclaved prior to disposal is bagged and sent for incineration by a contracted company. For direct contact pens, nonhazardous animal feces are scooped and bagged, and placed in dumpster, and urine waste is washed down the drain into the sanitary sewer system of the City of Raleigh. Stalled bedding is taken to a compactor managed by a commercial waste disposal company

[REDACTED] spreads the residue from the livestock waste on pastures, while poultry bedding is composted and stall bedding is taken to a compactor managed by a commercial waste disposal company.

[REDACTED] composts non-infectious manure prior to spreading and if any animal is under treatment for an infectious disease that manure is disposed of at the CVM

[REDACTED] spreads the residue from the bedding and animal waste on pastures after it has been composted.

ii. Animal carcasses.

The cold storage area of the [REDACTED] facility holds animal carcasses for pathological evaluation and/or disposal via a contractor for [REDACTED]. Rodent and aquatic carcasses are stored in a dedicated refrigerator until disposal.

[REDACTED] seals carcasses in fecal cups until the next waste removal for that isolator and then carcasses are disposed in [REDACTED]

At [REDACTED] a rendering company picks up animal carcasses.

g. Pest Control [Guide, p. 74]

- i. Describe the program for monitoring and controlling pests (insects, rodents, predators, etc.). Include a description of:
- monitoring devices and the frequency with which devices are checked
 - control agent(s) used and where applied, and
 - who oversees the program, monitors devices, and/or applies the agent(s).

Wild rodents are monitored by visual inspection for rodent droppings or damage and by placing traps both inside and outside of barns for [REDACTED] Cockroach and ant activity is monitored and controlled by University pest control spraying outside of buildings and common areas.

The [REDACTED] uses the services of the NCSU pest control division to monitor and maintain any rodent traps around facility, mainly Poultry and Swine units. Livestock and food animal safe traps are used and are checked on a routine schedule.

[REDACTED] contracts its vermin control program to a private company in the area.

[REDACTED] vermin control program includes traps placed throughout the facility as well periodic perimeter treatment by NCSU facilities staff for vermin control.

- ii. Describe the use of natural predators (e.g., barn cats) or guard animals (e.g., dogs, donkeys) used for pest and predator control, if applicable.

[REDACTED] employees several cats, kept current on vaccines and flea prevention, to keep rodent populations under control on property. These cats are brought in for annual vaccines and physicals through the [REDACTED] [REDACTED] also has two dogs that serve as guard animals for the sheep herd.

- iii. Note how animal users are informed of pesticide use and how animal users may opt out of such use in specific areas.

Any researcher opting out of chemical use may do so and other non-chemical methods (live traps, sticky insect traps, etc.) will be applied.

h. Weekend and Holiday Animal Care [Guide, pp. 74-75]

- i. Describe procedures for providing weekend and holiday care. Indicate who (regular animal care staff, students, part-time staff, etc.) provides and oversees care and what procedures are performed.

In [REDACTED] dedicated weekend animal care staff and holidays are on a sign up basis by animal care staff. Weekend and holiday workers monitor the status of all animals and animal room environments, and provide feeding, watering and cleaning to all animals. [REDACTED] Unit Supervisors rotate for 24/7 on-call duty that includes receiving alarm calls for facility problems and provide technician back-up on weekends.

[REDACTED] has a part-time employee who comes in and checks animals on the weekend/holidays and notifies unit manager of any issues. [REDACTED] is usually contracted for inclement weather.

[REDACTED] employs veterinary students to rotate weekend and holiday duty days for animal care. A [REDACTED] staff member is available by cell phone if the need arises. The director is on call nights, weekends and holidays for emergencies. Emergencies can also be handled by [REDACTED] Field Service Emergency clinicians if needed.

████████ weekend feeding is done by a staff member. Medical treatments are performed by the veterinary residents, a registered veterinary technician or laboratory technician under the supervision of the PI or ██████ Manager. Full time employees feed on the holidays on a rotation basis.

████████ uses student workers that report to manager for weekends and holidays. The director is on call nights, weekends and holidays for emergencies. Emergencies can also be handled by ██████ Field Service Emergency clinicians if needed.

ii. Indicate qualifications of weekend/holiday staff if not regular staff.

Weekend/holiday staff are the same as regular staff for all units.

iii. Describe procedures for contacting responsible animal care and/or veterinary personnel in case of an emergency.

████████: Veterinary assistants rotate weekends and holidays and spend a set amount of time triaging any health reports for that day. Additionally, one of the ██████ veterinarians is assigned on-call duty for every day of the year including weekends and holidays. If an animal health issue is identified, the on-call veterinarian is contacted to determine the appropriate course of action. There is an emergency phone list posted providing contact numbers for ██████ personnel, and the emergency ██████ number for contacting the on-call ██████ veterinarian directly. Emergency veterinary medical service from the ████████████████████ is also available on a 24 hr. basis.

At ████████████████████ the staff person on duty either moves animals needing veterinary care to the ██████ or has one of the ██████ field service veterinarians care for the animal(s). The director and/or AV approves all animal movement and treatment of ██████ animals.

At ██████, in case of an animal emergency, the animal caretaker calls the on-site veterinary resident who will evaluate the case. The manager is then called by the animal caretaker and informed of the situation. If medical care is needed, the facility director/veterinarian and principle investigator are contacted immediately via phone. The director will provide instruction as to the after care of all animals following emergencies.

In ████████████████████ the unit manager is the first contact and if unavailable the ██████ veterinarian is contacted.

2. Population Management [Guide, pp. 75-77]

a. Identification

Describe animal identification methods for each species (e.g., microchips, cage/tank cards, collars, leg bands, tattoo, ear tags, brands).

In [REDACTED] animal enclosures display a cage card containing a unique identification number for each animal. All dogs, horses and cats are identified with a USDA-approved subcutaneously-implanted transponder and/or by tattoo. All ruminants are identified with an ear tag, tattoo, documented appearance (color, coat, etc.). All pigs are identified with ear tags or ear notches. Other animals may be individually identified as required by their use. Ear notches, ear tags, tail tattoos, or colored stains are used as needed by investigators for rodents. Wing or leg bands for birds.

In [REDACTED] cattle are tagged, tattooed in the ear and freeze branded for beef cattle. Dairy cattle are registered Holsteins using 2 forms of permanent tags- RFID and National FAIR ID tags for permanent identification. The horses are identified by color markings and freeze brand tattoos. Sheep and goats are identified by ear tags and tattoos. The adult pigs are identified by ear tags.

At [REDACTED] and [REDACTED] individually identifies its horses via descriptions of their physical characteristics, brands, and tags, but each animal also has its own number. Individual records are kept on each horse on site.

In the [REDACTED] unit animals are identified by Isolator name and cage number and then in the access database animals are assigned individual identification.

b. Breeding, Genetics, and Nomenclature

- i. Describe the program for advising investigators on the selection of animals based on genetic characteristics.

Most investigators are aware of their needs with respect to the genetic attributes of research animals prior to their submission of an IACUC AVAU. [REDACTED] veterinarians and the University Attending Veterinarian are available for advice regarding these considerations, and often raise questions directly with PIs during IACUC review of the AVAU.

- ii. Describe the program for advising investigators on using standardized nomenclature to ensure proper reporting of the identification of the research animals with regard to both the strain and substrain or the genetic background of all animals used in a study.

There is no formal program ensuring that standardized nomenclature used for describing animals, except that investigators are asked to use standardized nomenclature when ordering animals. Questions arising during the animal ordering process often involve veterinary staff consultation.

- iii. Describe genetic management techniques used to assess and maintain genetic variability and authenticity of breeding colonies, including recordkeeping practices (*Guide*, pp. 75-76).

Any breeding colonies present within CVM facilities are managed by the individual PI and associated laboratory personnel. Breeding strategies vary by research project goals. Any records related to breeding colonies are maintained by laboratory personnel.

- iv. For newly generated genotypes, describe how animals are monitored to detect phenotypes that may negatively impact health and well-being. Note that the methods used to report unexpected phenotypes to the IACUC/OB should be described in section 2.1.B.1.c.ii, "Unexpected Outcomes that Affect Animal Well-Being."

All animals are monitored daily for abnormal behaviors or conditions. Any animal exhibiting such is reported to veterinary services to be triaged and evaluated. If a new phenotype is found to be the cause of abnormal behavior or condition this is reported to the University Attending Veterinarian and the PI. Additionally, veterinary reviewers will point out to the committee instances where known detrimental phenotypes involving unique strains may arise during IACUC review.

III. **Veterinary Care** [*Guide*, pp. 105-132]

Note: Complete each section, including, where applicable, procedures performed in farm settings, field studies, aquatic environments, etc.

A. **Animal Procurement and Transportation** [*Guide*, pp. 106-109; *Ag Guide*, pp. 8; 45; 50-57]

1. **Animal Procurement**

Describe the method for evaluating the quality of animals supplied to the institution (from commercial vendors, other institutions, etc.).

All animals in [REDACTED] facilities are purchased or received after submission and approval of an animal requisition and IACUC protocol/amendment. Additionally, an [REDACTED] veterinarian approves all new vendors/sources, including non-commercial institutions. Vendor approval is based primarily on their quality control program and available health surveillance data. Non-commercial institutions are evaluated on a case-by-case basis by [REDACTED] veterinary staff, and quarantine procedures (more below) are adjusted based on available data from the colony of origin. Depending on the relevant health history, testing for non-commercial vendors may be done upon arrival or prior to release from quarantine.

In some instances, there is approval for wild caught animals. In such cases, modified and/or enhanced quarantine and testing procedures may be employed. This may include enhanced PPE, more extensive or specialized disease surveillance, and/or spatial separation from other species. All such decisions are based on input from EH&S, veterinary staff, and additional resources (e.g. wildlife biologists) as appropriate for the species.

Some sources of poultry and livestock are evaluated and selected based on recommendations from faculty who provide CVM-related herd health services to producers. Vendor approval in other cases (e.g., non-NCSU farms) may include questionnaires that request information about preventative health programs on the farm or in the facility, how new breeding stock is acquired, disease outbreaks, and transportation vehicles. In some cases (e.g., fish, frogs, poultry), animal source is dictated by experimental needs. In these cases, [REDACTED] veterinary staff work with the research team to ensure that health status is considered and/or that animals will be appropriately quarantined or treated on arrival.

New fish receive a health screen that typically involves some of the fish in the new shipment being swabbed and/or biopsied for the presence of external gill or skin parasites. While not all fish are biopsied, all fish receive at least a gross physical examination before or shortly after placement in the tank. New animals are quarantined until test results are back before the start of a study (see below under quarantine).

The [REDACTED] herds and flocks are primarily closed herds, the exceptions being the swine and poultry herd stocks. Swine may be periodically imported from the NCSU swine herd on [REDACTED] or from a commercial herd depending on the needs of [REDACTED]. The broiler chicks and turkey poults are delivered to the poultry barn from a commercial hatchery and managed as “all- in, all- out” flocks. Any outside animals brought in are tested and quarantined prior to any contact with [REDACTED] animals and must be approved for entry by the Faculty Liaison for the Unit.

At [REDACTED] a general physical exam is performed by a CVM veterinarian on each horse donated to the facility. Based on the examination findings, each horse is placed in category A, B or C; Category A being a healthy horse or with minor health problems and C being a horse in poor health or in pain (please note, this is not related to USDA pain categories used for research classification). This category system determines how long the animal is kept at the facility and whether or not euthanasia is necessary.

Horses at [REDACTED] are from University herds only.

In [REDACTED] new animals are rarely brought into the facility and those that are come from [REDACTED] via sterile shipper in an IACUC inspected vehicle. They are received into their own isolator via sterile technique and undergo the weekly fecal sampling as the rest of the animals in this unit.

2. Transportation of Animals

Describe how animals are transported between outside sources and the institution and within the institution, including loading, unloading, level of biosecurity, immune status and specific pathogen status (consider all species, including aquatic and semi-aquatic species).

The vendor delivers most rodents and all cats, dogs, and rabbits directly to [REDACTED] in climate-controlled vehicles. A climate controlled [REDACTED] vehicle is used when animals are picked up at the airport. Livestock are moved in stock trailers, or climate controlled vehicles when temperature control is important (e.g., moving young pigs). [REDACTED] vehicles are sanitized each time they are used for animal transport. Wild caught animals are transferred from their natural habitat to [REDACTED] facilities in appropriately sized transport crates within climate-controlled vehicles.

Animal transportation related to the research is described in the IACUC protocol; this may be by the research staff or contracted through [REDACTED]. In general, rodents are kept in microisolator cages and hand carried, or placed on carts, for transportation within the facility itself. Rabbits and cats are hand-carried in plastic airline carriers. Pigs, calves, rabbits, and dogs are moved in stainless steel, wheeled transport cages, or dogs in some cases may be leashed and led. Horses, small ruminants and cattle are haltered and led.

Dogs and cats occasionally move to the [REDACTED] for either experimental procedures or veterinary care. These situations are handled on a case-by-case basis, with veterinary staff determining appropriate biosecurity precautions both within the hospital and upon return to [REDACTED].

Rodent movement within [REDACTED] is dictated by health status. Rodents in [REDACTED] building cannot leave and return to the facility, and rodents may not move from the [REDACTED] facility. Occasionally, rodents may move from [REDACTED] to the [REDACTED] and rodents from [REDACTED] may be brought back and forth to [REDACTED] for surgeries or other procedures (the latter excludes the [REDACTED] rodent barrier area). Rodents can also be moved from [REDACTED] or [REDACTED]. Fish and frogs are moved in containers containing system water, and may return to the facility. Dogs, cats, swine and rabbits may be transported to imaging in the [REDACTED] and brought back for shortened quarantine status. Animals brought to the imaging facilities are moved in species appropriate transport crates, via the most minimal traffic route available.

[REDACTED] poultry and [REDACTED] swine are delivered by truck by the companies that supply these animals. [REDACTED] poultry are all-in/all-out with a complete barn disinfect between groups of animals. Any newly arrived swine are held in a separate area for the unit designated quarantine period, after which they are introduced to the breeding pool.

Donors of horses provide transportation to the [REDACTED]. Horses to be transported within the institution are done so by NCSU-owned trucks and trailers by trained employees of the university. [REDACTED] horses are from other University farms and are moved by that unit.

B. Preventive Medicine

1. Animal Biosecurity [Guide, pp. 109-110]

- a. Describe methods used to monitor for known or unknown infectious agents. Note that if sentinel animals are used, specific information regarding that program is to be provided below.

Methods used to monitor for infectious disease agents are described under quarantine and preventative medicine procedures. Sentinel mice are used for mouse pathogen screening in mice, and gerbils. Rats are swabbed directly for PCR analysis. All rodent samples are sent to a commercial laboratory for rodent pathogen testing. All other species are observed for clinical signs of disease and tested for pathogens if deemed clinically appropriate.

- b. Describe methods used to control, contain, or eliminate infectious agents.

Personnel are trained in biosecurity methods and concepts, including recognizing and reporting animal health abnormalities, the use of PPE to reduce risk of cross contamination between animal rooms, following posted room order and PPE entry requirements, clean/dirty areas of cage wash, and implications of keeping personal pets and having other contact with animals outside the workplace. According to institutional policy (as in the IACUC protocol form), biologics administered to rodents must be tested for rodent pathogens. Efforts to eliminate infectious agents are taken on a case-by-case basis and the veterinarian consults with investigators and husbandry staff with regard to potential treatment or depopulation options.

2. Quarantine and Stabilization [Guide, pp. 110-111]

- a. Describe the initial animal evaluation procedures for each species.

Upon arrival, all [REDACTED] animals are observed for physical and behavioral abnormalities by the receiving animal technician. In addition, a veterinary staff member examines all USDA-regulated species on arrival, and reviews health reports that accompany orders (e.g., from commercial rodent vendors). A new arrival sheet green sheet is submitted by the husbandry staff to the Veterinary Services to alert staff of new animals in house. If any questions or problems are noticed they are written on this form.

[REDACTED] receive very few new animals except for poultry, swine, and occasionally breeding bulls, rams, and bucks. Newly hatched poultry are received from commercial sources, and are handled on an all-in all-out system annually. Any new swine breeding stock are obtained from a single SPF source and held in a separate area for observation for clinical abnormalities prior to release for breeding. Newly received bulls, rams and bucks are placed in separate lots, and blood tested prior to introduction into their

respective [REDACTED] herds. Any newborn animals are examined by facility staff and abnormalities are reported directly to the unit attending veterinarian.

Horses are donated to the [REDACTED] by the general public and educational institutions. Upon receipt of these horses, they receive a physical examination, antiparasiticide therapy; are vaccinated and tested for Equine Infectious Anemia and a CBC performed. They are held in 10 day quarantine until determined free of communicable disease.

For aquatic species, new arrivals are inspected on arrival and treated as necessary based on the source facility health status. New fish and frogs are routinely quarantined in separate holding tanks within the same room in these housing areas. For zebrafish, a small number of animals may be sent for necropsy during the quarantine period in order to more thoroughly evaluate for the presence of subclinical disease. Swabs of key anatomical points for that species are taken and sent for screening.

- b. Describe quarantine facilities and procedures for each species. For each species, indicate whether these practices are used for purpose-bred animals, random-source animals, or both.

In [REDACTED] purpose-bred rabbits, dogs, and cats do not have specific quarantine facilities. In general, each shipment of animals is placed in a dedicated room for up to two weeks and quarantine procedures are followed. If this is not possible, new animals may be placed in a room with animals from the same source. The health history of purpose bred dogs and cats is reviewed by Veterinary Services staff members who determine need for additional vaccines/treatments outside of the vendor's preventative health program.

Rodents from approved commercial vendors are acclimated for one 72 hours before release for experimental use. There are specific quarantine rooms in the [REDACTED] used for incoming rodents from unapproved or conditionally approved vendors. Quarantine duration varies depending on source health reports, but is usually at least 7 days.

Aquatic species are quarantined in separate tanks, although not generally in a separate room. Husbandry items are assigned a specific tank based off of the "tank order" established based on date of arrival, nature of the protocol, and/or source. Aquatic species are sampled and tested for diseases relevant for the species while on quarantine.

Any [REDACTED] breeding animals for the swine unit are quarantined away from other swine in the unit until the disease testing is completed, usually 30-60 days. The [REDACTED] carries out quarantine for newly arrived swine in either a separate building [REDACTED] only introduces new swine on a limited basis as needed for evolving trends in swine management genetics and the needs of investigators.

EHS quarantines horses for at least 10 days prior to release for ongoing studies subsequent to the above outlined testing.

- c. Describe the required/recommended stabilization period for each species.

In [REDACTED] dogs, cats, and rodents are kept in quarantine for up to two weeks. For other species, researchers are advised to allow at least three days, and preferably one week, for animals to recover from shipment and to adjust to their new surroundings before use. In some cases, animals are used immediately upon arrival for terminal procedures.

3. Separation by Health Status and Species [Guide, pp. 111-112]

- a. Describe the program for the separation of animals by species, source, and health status. If the animals in different status are not maintained separately, describe circumstances in which mixing occurs and explain the rationale for mixing.

In general, [REDACTED] houses animals separately based in species (dedicated rooms for any given species). Within-species separation is generally maintained based on animal source (e.g. rabbits from different sources are housed in separate rooms) or animal health status (mice from non-commercial vendors that have suspected pathogens will generally be housed on a separate rack in a quarantine room away from other mice). The primary exception to the latter scenarios is rodents that have undergone quarantine and subsequent testing (if needed) may be housed within the same primary housing room even when from different vendors.

[REDACTED] separates species by either facility (based up species) or pasture (based upon compatible groups within a species).

- b. Describe situations where multiple species may be housed in the same room, area, or enclosure.

[REDACTED] rodents of different species (e.g., rats, mice, guinea pigs) are housed in the same room when used in multi-species rodent teaching labs, or when research labs are performing identical procedures on two different species, the species share similar pathogen status, are behaviorally compatible, and we have not noted any negative impact on the health or behavior of these animals

Rodents from different sources may be mixed if they are kept in separate cages and the impact on overall colony health is not jeopardized (i.e., similar health status).

For projects involving chemical hazards or biohazardous materials, grouping different rodent species does occur (e.g. *Rattus*, *Mus*). Housing animals with the same biohazard risk level together serves to enhance personnel safety by consolidating the

██████ will occasionally house different species together as a means of predator deterrent (alpacas or llamas with sheep) or in instances where long term residents have formed strong bonds (a horse and a goat).

There are no specific rooms in [REDACTED] set aside for housing sick animals, but if a room is available that provides better isolation, animals can be moved to it with veterinary approval. If contagious disease breaks out in an animal room, precautions are taken to prevent spread to other rooms. Measures include; adjustments in room order, wearing of protective apparel, limited entry of personnel, and enhanced sanitation. Operation rooms and a small animal recovery room are available in [REDACTED] for emergent health issues beyond the scope of housing areas within [REDACTED]. Another option includes the use of services available at the [REDACTED] [REDACTED]

In [REDACTED] aquatic areas, when multiple animals within a tank or recirculating system show signs of disease, treatment is provided to all fish as a cohort within an entire recirculating system. If signs of disease are only seen in a single individual, that individual is removed from the tank or recirculating system and placed in an individual tank for treatment. Depending on the study conducted, individual animals that develop clinical signs of disease may be removed during the quarantine/study period and euthanized in order to perform further diagnostics

██████████ and ██████████ isolates sick animals in a pen or small lot or uses the ██████████ facilities when needed.

Sick horses at [REDACTED] are isolated if the sickness is transmissible. If necessary, the horse is stalled. If stalling is not necessary, then they are kept in a small pasture away from physical contact with other horses. Seriously ill horses are euthanized under direction of the unit attending veterinarian and university attending veterinarian.

a. Describe the procedure(s) for daily observation of animals for illness or abnormal behavior, including:

- the observers' training for this responsibility
- method(s) for reporting observations (written or verbal)
- method(s) for ensuring that reported cases are appropriately managed in a timely manner.

In [REDACTED] the animal care technician is responsible for daily observation for illness and abnormal behavior. Technicians receive instruction on recognition of disease in animals through training, SOPs, and continuing education opportunities. Abnormalities are reported by completing a Veterinary Service Report form (green sheet), which goes into a drop box at the office of the [REDACTED] veterinary staff. The veterinarian is contacted immediately if there is a serious problem (or if the observation occurs late in the day), but otherwise checks the drop box throughout the day. The [REDACTED] veterinary assistant reviews veterinary service reports on the day of submission, in order to determine the need for examination by the veterinarian. Veterinary Services staff (veterinary assistants, technicians, and veterinarians) meet at rounds daily on most weekdays to discuss daily procedures and ongoing cases, and also convene weekly to review the week's activities and weekend treatments.

On weekends/holidays, the animal care technician submits an animal health report for non-emergent situations to be evaluated by the veterinary services staff scheduled on-call for the day. The case will be triaged before contacting the on-call veterinarian if necessary. In cases of animal emergencies, the on-call veterinarian is contacted directly by the animal care technician.

[REDACTED] staff members trained by experienced personnel inspect and inventory all animals on a daily basis and more frequently if required, such as impending delivery of young. Any abnormalities are documented and the director and unit attending veterinarian are contacted for needed interventions.

At [REDACTED] and [REDACTED] horses are fed twice daily and at this time they are observed for any injuries, sickness or abnormal behavior. If found, it is immediately reported to the Manager, who will evaluate the animal and decide what action is necessary to correct the situation in consultation with the unit attending veterinarian.

[REDACTED] unit does daily monitoring of animals and records checks and other relevant information on the clipboard associated with that isolator. Any abnormalities are reported to unit manager via telephone.

b. Describe methods of communication between the animal care staff and veterinary staff and the researcher(s) regarding ill animals.

In [REDACTED] communication with research staff is made by Veterinary Services on the day a Veterinary Service Request form is received; by direct contact, telephone, or email.

Other units that have medical issues similarly will call or email any researcher about any medical issues with animals.

- c. Describe the preventive medicine and health management/monitoring programs (e.g., physical examination, TB testing, vaccination, hoof/nail trimming, teeth cleaning/floating, vendor surveillance, use of sentinel animals) for each species.

Dogs, cats, rabbits, and horses are weighed monthly and monthly grooming schedule that includes nail trimming. Dogs, cats and horses have annual preventive medicine procedures that include complete physical examinations, fecal examination for endoparasites (dogs and horses only), vaccinations, and blood work. Dogs receive annual dental prophylaxis, and monthly heartworm preventative. Horses have hooves trimmed at least once every 6 weeks. Long-term swine have hooves checked and/or trimmed during a scheduled sedation event. Older dogs and cats have scheduled examinations more frequently (typically every six months). Horses are tested for EIA once annually and teeth are floated as needed up to twice per year. Other are rarely maintained long enough to justify preventive medicine procedures beyond those used on arrival and are managed on a case-by-case basis.

In [REDACTED] a sentinel animal program is used to monitor the health status of rats, gerbils and mice. Specific pathogen free animals from reputable vendors are purchased for use as sentinel animals, quarantined for 1 week, and then placed in colony rooms where they are exposed to dirty bedding from cages of principal animals. One cage of sentinels is assigned to monitor up to one side of a static micro-isolator rack or individually ventilated cage rack; testing is performed every 4 months and serum from these animals is tested for a panel of murine pathogens. The presence of ecto- and endoparasites and bacterial pathogens is determined by PCR analysis.

[REDACTED] animals are screened regularly for tuberculosis, Brucellosis, EIA, Bovine leukemia and other livestock diseases. All [REDACTED] animals are routinely vaccinated to protect against diseases and treated for parasites on a regular schedule as outlined in the [REDACTED] SOPs.

At [REDACTED] and [REDACTED] animals are on regular vaccination, deworming, and hoof management schedules. They are tested for EIA annually and dental work is ordered when needed. The Preventative Medicine Program is outlined in the SOPs.

[REDACTED] pulls fecals from random cages from each isolator every time supplies are brought out and culture for growth.

2. Emergency Care [Guide, p. 114]

- a. Describe the procedures to ensure that emergency veterinary care is continuously available for animals during and outside of regular work hours, including access to drugs or other therapeutics and equipment.

An on-call veterinarian is available at all times (24hrs/day, 7 days/week). Each [REDACTED] veterinarian carries a cell phone, and contact numbers are posted in facilities and on the

unit's shared hard drive. A veterinary assistant is available in the facility for 2 hours each weekend or holiday in the afternoon. There is also an [REDACTED] emergency phone line with contact information for the on-call veterinarian (and supervisor) outside of regular business hours.

[REDACTED] uses [REDACTED] for any emergency veterinary care needed.

[REDACTED] and [REDACTED] have designated unit attending veterinarians available for 24/7 emergency animal care and can provide any needed interventions or therapeutics.

- b. Describe the authority of the Attending Veterinarian or his/her designee relative to the emergency treatment of animals in the program.

The UAV and the Unit Attending Veterinarian have the authority to access all areas that house or use animals to inspect or treat animals in emergency situations. Attempts are made to contact the PI for animals that are on study to get their approval for a plan of treatment or possible euthanasia of the affected animal(s). If the PI or their designee is not available, the attending veterinarian or [REDACTED] veterinarian may determine the best course of treatment that is in keeping with the objectives of the approved protocol, including euthanasia. All communications and treatments are noted in the animal's medical record, treatment sheets, room log, study notebook or other appropriate documentation.

3. Clinical Record Keeping [Guide, p. 115]

- a. Describe the procedure for maintaining medical records and documenting treatment of ill animals including: clinical laboratory findings, diagnoses, treatments, medical progress records, etc. Identify the species for which individual records are maintained and where such records are kept.

In [REDACTED] USDA-covered species are given individual records upon arrival, while other species have group records until a health abnormality is noted. Any observations of health or behavioral abnormalities lead to completion of a Veterinary Services Request form (green sheet), which includes laboratory findings, diagnosis, treatments, and medical progression/resolution as appropriate to the case. For regulated species, the form is added to the individual record, including all prior clinical presentations, preventive medicine procedures, and anesthesia/postoperative recovery records. Also in the record, are Animal Observation forms (ordered by the veterinarian to track daily observation of feed and water intake, eliminations, etc.) and the Treatment Order sheets (documents completion of prescribed treatments). The Veterinary Assistant communicates with research staff as needed to obtain records of treatments delivered by the research team. (PIs are expected to keep [REDACTED] Veterinary Services apprised of any such treatments).

Medical records are reviewed by an [REDACTED] veterinarian and maintained in the medical records room by the veterinary assistant. Records are used routinely by Veterinary Services staff and are accessible to the University Attending Veterinarian, the IACUC, and USDA.

[REDACTED] maintains daily log books for medical interventions. Routine treatments of animals including vaccination, deworming, etc., are recorded on individual records for each animal by the facility manager. A treatment sheet for sick animals is maintained in the central office until treatment completion and then that information is transferred to the individual's permanent record. Hospitalizations are recorded on the individual record with full treatment and/or surgical report, lab findings, etc. filed. All species records are currently kept as hard copies, with the exception of swine, which have records placed on computer using a software program.

At [REDACTED] and [REDACTED] hard copy of all medical interventions for each horse is placed in the horse's individual file folder. These file folders are maintained in a filing cabinet in the reception office. There are two forms used to track treatments and medications: Postoperative/Postanesthetic Monitoring & Record Keeping, and Treatment & Drug Administration Record. Blank copies of these forms are put into each horse's record the day the horse is received to be used by veterinary staff and animal care personnel.

[REDACTED] maintains information on sheets kept attached to each isolator for the active month and then they are archived in a file cabinet.

[REDACTED] maintains records of any medical or experimental treatments while studies are ongoing which are available for IACUC review upon request. Generally, these are group records unless single animals are separated for individual treatments.

- b. Identify individual(s) (titles, not necessarily names) responsible for maintaining such records and identify where the records are maintained and who, including the IACUC/OB has access to the records.

[REDACTED] The veterinary assistant files and maintains the animal health records.
[REDACTED] The facility manager files and maintains the health records.
[REDACTED] (when carried out by lab): the PI and laboratory staff maintain health records related to IACUC-approved manipulations.
[REDACTED] manager maintains all animal health records.
The unit veterinarians/university attending veterinarian as well as the IACUC has access to all health records on an as needed basis.

- c. Describe the role of the Attending Veterinarian in recordkeeping.

The Attending Veterinarian maintains direct oversight of all [REDACTED] maintained health records. Additionally, the AV inspects all other unit and lab health records during semiannual IACUC inspections.

4. Diagnostic Resources. Describe available diagnostic methods used in the program including:

a. In-house diagnostic laboratory capabilities.

The full range of clinical laboratory, necropsy, histopathology, and radiology facilities and equipment of the [REDACTED] are available for use by all CVM units including [REDACTED]. Routine laboratory diagnostics such as fecal flotation, hematocrit evaluation, and diff-quick staining of skin/ear slides can be performed in [REDACTED]. Radiograph and ultrasound equipment are available for use in the [REDACTED].

Satellite diagnostic laboratories at [REDACTED] are capable of performing CBC's, equine infectious anemia (EIA) testing, parasitology, bacteriology, and select hormonal assays.

b. Commercially provided diagnostic laboratory services.

[REDACTED] uses Idexx-RADIL and Charles River Laboratories routinely for rodent and lagomorph health monitoring, and as needed for follow up of clinical cases. These labs have capability for essentially all diagnostic needs relative to these species. Scheduled diagnostics as part of the preventive health programs for other species can be batched and sent to a commercial diagnostic lab (ANTECH Diagnostics).

[REDACTED] and [REDACTED] use Rollins Animal Disease Laboratory and other recognized disease testing laboratories when appropriate for some swine, sheep and goat disease testing.

Outside reference laboratories are also available for special needs. For example, EIA and brucellosis testing for [REDACTED] housed animals is performed at the state veterinary diagnostic laboratory (Rollins), while commercial laboratories are used for Q fever tests.

State and national laboratories are used when testing imported horses housed at [REDACTED] for Contagious Equine Metritis (CEM).

c. Necropsy facilities and histopathology capabilities.

In [REDACTED], animals are usually submitted to the [REDACTED], where [REDACTED] faculty pathologists and residents perform gross necropsies. Tissue processing is done in the [REDACTED] veterinary staff or researchers in [REDACTED] may also necropsy animals, primarily rodents and non-mammalian species.

The [REDACTED] also use the [REDACTED] laboratory services, as needed.

d. Radiology and other imaging capabilities.

Routine radiology needs for [REDACTED] are met by the X-ray machine in the [REDACTED]. A mobile ultrasound unit is also available for use in the [REDACTED]. Radiology resources in the [REDACTED] including ultrasound and advanced imaging, are also available.

5. Drug Storage and Control

a. Describe the purchase and storage of controlled and non-controlled drugs.

[REDACTED] maintains a limited pharmacy. Commonly used non-controlled drugs are in a small locked cabinet [REDACTED]. Drugs are labeled with a color sticker denoting the year of expiration. The month of expiration and day of expiration are written on the sticker where applicable. Color tags are also placed on each item to specify when they should be re-ordered to avoid not having an item in-stock. Stock medications and vaccines that require refrigeration are maintained behind a locked door in [REDACTED]. Medications that require refrigeration and are in use for a current treatment are stored in the small refrigerator in [REDACTED]. In addition, the [REDACTED] maintains a large inventory that can be accessed for non-controlled items.

[REDACTED] maintains drugs needed for anesthesia and surgical support. Upon receipt, a sticker is placed denoting the expiration date of the box/bottle. The bottles are then stored [REDACTED]. When a drug expires, it is transferred to a [REDACTED] staff member who marks the drug as expired, moves it to a selected location for this purpose, and arranges for removal by the approved disposal agency.

[REDACTED] manages controlled drugs under the DEA clinical registration of a designated [REDACTED] veterinarian. Orders are placed according to DEA regulations and when the order arrives, it is checked against the original ordering paperwork as well as the packing slip/invoice, and each box/bottle is numbered with a unique identification number. A sticker is placed denoting the expiration of the box/bottle. Stocks of controlled drugs are kept in accordance with DEA regulations in a double-locked safe in [REDACTED]. Working inventory of controlled substances are kept in double-locked wall safes designed for this purpose in [REDACTED]. There are also small wall safes in several procedure rooms which are used as needed for specific projects or treatments. When a drug expires, it is transferred with the individual sheet to the [REDACTED], which is also double-locked and wall mounted [REDACTED]. As needed, a certified controlled drug disposal company is contacted for shipment of these expired substances for proper recorded disposal.

PIs may purchase controlled drugs through their specific departmental representative and also may purchase and use non-controlled substances for their labs and the storage and purchase of these items is not regulated by [REDACTED]

[REDACTED] all vaccines and other drugs used on animals are properly stored in cupboards or refrigerators. Neither unit stores any controlled drugs.

[REDACTED] controlled substances are stored in a locked cabinet in [REDACTED]. The door to this room is kept locked at all times. Non-controlled substances are kept in the general pharmacy. The pharmacy room door is kept locked when not in use.

[REDACTED] procures drugs through the CVM pharmacy and they are stored in a double-lock box [REDACTED] that is locked when unoccupied. Individuals with access have signed the standard DHHS form, and these are on file.

b. Describe record keeping procedures for controlled substances.

When a controlled drug is received the invoice is retained by veterinary services. A separate and current record is maintained by [REDACTED] within the main safe for each drug form, and is used to record receipt and transfer to other locations. A separate and current record is kept for each unit which describes the disposition of the contents. This paper also identifies the building and room number of the working safe it was transferred to, as well as the date the unit is considered empty and the date and initials of the person turning in the sheets for filing/logging purposes. Once a unit is empty, the sheets are logged and filed. If a unit becomes expired before use, the sheet is transferred with the drug to the expired safe until shipment is made to EXP for disposal.

A biennial inventory is maintained in [REDACTED]. Any damaged, defective, expired, or impure substances are included in this inventory until they are disposed of. Physical records of this inventory are maintained and a pdf version is saved in the inventory section of the [REDACTED] shared drive. As an additional back-up and for ease of tracking, an electronic inventory is maintained on the shared network drive.

At the [REDACTED] as required by the DEA a controlled substance log is maintained. Notation is made in the individual animal's health records of any controlled substance administration. Notation is also made in the controlled substance log. The unit attending veterinarian initials both entries. The controlled substance log is kept in a locked filing cabinet in a separate location from the substance.

At [REDACTED] there is a dispensing log when we take controlled substances to the [REDACTED] or on other field services trips, in accordance with guidance from DHHS in conjunction with a log kept with each vial. All of these are kept on file after completion.

D. Surgery [Guide, pp. 115-123]

1. Pre-Surgical Planning [Guide, p. 116]

Describe the process(es) used to ensure adequate pre-surgical planning, including: identifying personnel; locating equipment, supplies, veterinary involvement for selecting analgesic and anesthetic agents and facilities; planning; and pre- and post-operative care.

Pre-surgical planning is accomplished in part through the IACUC protocol review process and consultations between research staff and [REDACTED] veterinarians; all protocols receive veterinary review, by the University Attending Veterinarian or designated [REDACTED] veterinarian who is also an appointed member to the IACUC. In this review, particular attention is paid to the description of surgical procedures, anesthesia, and pre- and post-procedural care. Personnel participating in anesthesia and surgery are named in the protocol, and qualifications assessed as part of the IACUC review process. Almost all non-rodent experimental surgery in the [REDACTED] is conducted in [REDACTED] under the supervision of [REDACTED] supervisor or other [REDACTED] technicians. A request for use of a surgical room is submitted by the PI to [REDACTED]. In most cases, particularly for new studies, a planning meeting is convened with the PI, [REDACTED] staff and [REDACTED] staff to discuss procedures, equipment logistics, animal transport logistics, and patient care prior to and following an anesthetic/surgical procedure/study.

2. Surgical Facilities [Guide, pp. 116-117, 144-145]

List building name(s) and room number(s) or other locations (coded, if confidential) where surgical procedures are performed. For each, describe:

- the type of species (including rodents, fish, agricultural species, etc.)
- nature of procedure(s) (major/minor/emergency, survival and non-survival, etc.)
- the amount of use [heavy (daily), moderate (weekly), or light]
- major surgical support equipment available (gas anesthesia machines, respirators, surgical lights, etc.)
- facilities for aseptic surgery, surgical support, animal preparation, surgeon's scrub, operating room, and postoperative recovery
- construction features of the operating room(s), including interior surfaces, ventilation, lighting, and fixed equipment used to support surgical procedures and other means of enhancing contamination control

Note: If preferred, the information requested in this section may be provided in Table.

[REDACTED]:
 [REDACTED] – major survival/emergency/minor – light to moderate use
 [REDACTED] – major survival/emergency/minor – light to moderate use
 [REDACTED] – major survival/emergency/minor – light to moderate use
 [REDACTED] – major survival/emergency/minor – light use
 [REDACTED] minor procedures in large animals; rodent surgery – heavy use

Almost all survival surgery on non-rodent mammalian species is performed in [REDACTED] as described above; [REDACTED] also supports some rodent and non-mammalian surgery. Species used in small animal surgeries are primarily dogs, cats, pigs (less than 60 kg), rabbits, and rodents. All operatories are equipped with dedicated areas for patient preparation and recovery as well as surgeon prep and freely movable surgical lights. Anesthetic machines are readily available for volatile anesthetic delivery (isoflurane, sevoflurane) and in-house oxygen and vacuum scavenge valves are available in all procedure spaces. All facilities are constructed using impervious surfaces on wall and ceilings covered with sanitizable latex paint and non-slip epoxy flooring.

[REDACTED] surgical procedures – heavy use. Counter space is available to separate patient preparation and surgery area. Handwashing sinks are available for surgeon preparation. Hot bead sterilizers are available for re-sterilization of instrument tips between animals. Construction as described above for [REDACTED] space. Volatile anesthetic delivery circuits are available and supplied by [REDACTED] using condensed oxygen cylinders equipped with F-air anesthetic scavenging canisters.

[REDACTED] minor surgery is performed in the treatment room on standing equine and bovine patients by board-certified large animal surgeons (light use). Injectable anesthesia is generally used in this area. Handwashing sinks are available. The procedure space is constructed with masonry walls covered with sanitizable latex paint and floors are concrete.

[REDACTED] is equipped with a surgical suite for livestock (less than 200 kg – moderate use). Volatile anesthetic delivery circuits are brought to this area from [REDACTED] and oxygen is provided via compressed cylinders. Additionally, surgeons are provided with a dedicated surgical scrub area and a table-top autoclave is available for instrument preparation. Construction was implemented using impervious surfaces on wall and ceilings covered with sanitizable latex paint and non-slip epoxy flooring.

[REDACTED] minor surgery is performed in the recovery room and on standing patients in the treatment room of the main building (light use). Injectable anesthesia is generally used in this area. Handwashing sinks are available. The procedure space is constructed with masonry walls covered with sanitizable latex paint and floors are concrete.

[REDACTED] does not have any dedicated surgical space but PIs can perform surgical procedures within the procedure spaces at the facility. Generally, only minor survival

surgical procedures are performed using immersion, injectable and/or local anesthesia and the designated areas see light usage.

3. Surgical Procedures [Guide, pp. 117-118]

- a. Describe the criteria used to differentiate major from minor survival surgery, including classification for certain procedures (e.g., laparoscopic technique).

The criteria used to differentiate major from minor surgery are those in the most current edition of the Guide (2011). Major survival surgery is that which penetrates and exposes a body cavity, produces substantial impairment of physical or physiological functions, or involves extensive tissue dissection or transection, such as ovariectomies and intrauterine fetal injections. Minor survival surgery does not expose a body cavity and causes little to no physical impairment; including skin suturing, blood collection, cannulation of peripheral vessels, and biopsy of superficial lymph nodes.

- b. How is non-survival surgery defined?

Non-survival surgery is defined, as in the most current edition of the *Guide* (2011), where an animal is euthanized before recovery from anesthesia. Minimum standards are followed as described such as clipping surgical site when appropriate, surgeon wearing gloves, and use of clean instruments and surgical area.

4. Aseptic Technique [Guide, pp. 118-119]

- a. Describe procedures, equipment, and protective clothing used for aseptic surgery. Include patient and surgeon preparation.

The NCSU IACUC “Guidelines for major survival surgery performed on animals used in research, teaching, or testing” sets a minimal standard for patient and surgeon preparation (<http://research.ncsu.edu/sparcs/compliance/iacuc/>)

All personnel entering a small animal operating room or scrubbing a patient for aseptic surgery are required to wear clean scrub suits, caps, masks and shoe covers. Lab coats or dedicated scrubs are donned during patient preparation in the small animal prep room along with gloves. Large animals are prepped in a dedicated induction recovery room adjacent to the large animal OR. Shoe covers, gloves, and lab coats or dedicated scrubs are required until the animal is hoisted into the OR, at which point caps and masks are additionally required.

Preparatory scrub jars are autoclaved. Exam gloves are worn when retrieving scrub materials out of jars. One gloved hand is used for retrieving gauze, and one gloved hand for scrubbing the patient. Once the patient is induced in the preparation area, the incision site is clipped and the skin scrubbed using an appropriate surgical skin scrub technique. A “sterile” scrub is performed in the OR using prepackaged sterile prep packs. Upon completion of a procedure, remaining scrub gauze is discarded.

The surgeon removes all jewelry, dons appropriate PPE, and scrubs his/her hands and arms with a disposable, pre-soaped surgical scrub brush utilizing proper scrub procedures. Gowning and gloving follows proper aseptic procedure.

Minor surgical procedures in [REDACTED] are performed in designated areas. Surgical preparation and surgery can be performed within the same room if designated a minor procedure. Attire and PPE requirements are dictated by the nature of the procedure, but include gloves and lab coat or dedicated scrubs at a minimum. For minor procedures, patient and surgeon preparation is the same as a major procedure; however, a sterile scrub may not be performed.

Terminal surgical procedures in [REDACTED] are handled the same as those carried out in procedure rooms and operating rooms. Equipment must be clean, but are not required to be sterile for terminal procedures. Expired pre-sterilized materials may be used during surgical non-recovery procedures. Scrub jars are created in the same manner regardless of endpoint. Exam gloves are worn and a short scrub may be performed after the fur is clipped to create an unobstructed incision site.

All animals at [REDACTED] requiring major surgery for clinical purposes are referred to the [REDACTED]. Only minor surgeries (wound repair, and

castrations) are conducted on-site, using standard aseptic procedures. Experimental surgery is limited to minor procedures and agricultural studies or teaching protocols.

Surgeries within [REDACTED] are performed without antiseptic preparation of the patients due to the necessity to maintain proper epithelial barriers of most fish and amphibians. Sterile gauze is used to prep incision sites and sterile, autoclaved instruments are used for procedures. Surgeons don sterile gloves for all invasive surgeries.

- b. Describe methods used to sterilize instruments and protective clothing, including a description of approved [liquid sterilants](#) and instrument exposure time(s) required for each, if applicable.

In [REDACTED] instruments are cleaned with water and chlorhexidine and/or soaked in an enzymatic cleaner, ultrasonicated, lubricated and dried prior to packing and sterilization. All packs and other non-disposable supplies are sterilized in a steam autoclave. Instrument packs are double-wrapped with paper sterilization wrap (dated), taped with autoclave tape, and contain a SteriGage™ steam chemical integrator. Individual instruments are packaged in clear self-sealing autoclave pouches with steam indicator dots on them. If the pouch does not include an indicator dot, a SteriGage™ steam chemical integrator will be included inside with the instrument. After drying post-sterilization, all items are placed in individual plastic dust covers and sealed. The autoclave is cleaned as needed with Chamberbrite™ powdered autoclave cleaner. All disposable products (including sterile surgical attire) are purchased pre-packaged and gamma irradiated or ethylene oxide sterilized.

Individual instruments may also be sterilized using a steam cycle of 15 minutes at 250°F with a SteriGage™ steam chemical integrator strip.

In [REDACTED] for serial rodent surgeries, properly cleaned and dried instrument tips can be re-sterilized by inserting the tip into a glass bead sterilizer heated to approximately 250°C for 10-15 seconds. Instruments are allowed to cool prior to using them again. Only the tips of the instruments are considered sterile. For the first surgery in a series, sterile, autoclaved instruments are used as described above.

[REDACTED] has two Market Forge steam sterilizers. Instruments are cleaned then double wrapped and taped with TimeMed time sterile indicator tape. Instruments are autoclaved for 1 hour. The tape indicates proper temperature and exposure. All surgical gloves are pre-packaged sterile and are disposable.

Major survival procedures are not performed in [REDACTED]. For minor procedures, sterile packaged instruments are used that are obtained from the college's central supply as needed following standard SOP's. Clean gloves and standard personal protective equipment are worn as appropriate for each procedure.

Instruments used at [REDACTED] are wrapped in sealed clear plastic autoclave packages and sterilized in the investigators' labs using an autoclave with indicator tape to verify each cycle has reached the necessary temperature.

c. Describe methods for instrument re-sterilization between serial surgeries.

For all non-rodent surgeries and some rodent surgeries, only pre-autoclaved instruments are used for each animal. If a new animal is undergoing another procedure in sequence, a new autoclaved instrument pack is used. For many rodent serial surgical procedures, a "tips only" approach is used. Briefly, instruments are grossly cleaned to ensure they are free of organic debris using a disinfectant spray. Once clean, the tips of the instrument are placed in a hot bead sterilizer following manufacturer's instructions (generally 15-30 seconds). Instruments are then removed and the sterile tips are placed in the designated sterile field to cool before commencing with the next surgery.

d. Indicate how effectiveness of sterilization is monitored.

SteriGage™ indicators are placed inside packs so that once opened, the color change will indicate a "passing" test for each pack. Additionally, autoclave indicator tape is used on the exterior of all packs for quick visualization prior to opening to ensure that adequate temperature has been reached.

e. Describe surgical support functions provided by the program to investigators.

[REDACTED] offers technical staff for anesthetic support for all species utilized within the college. This encompasses all aspects of the procedure including sedation, catheterization, induction, intraoperative monitoring and support (IV fluids, pulse oxymetry, ECG, blood pressure, end tidal CO₂, etc.) and recovery. All monitoring is documented on standardized forms provided by [REDACTED]. Additionally, extra surgical expertise is available from [REDACTED]. For procedures performed [REDACTED] technical support outlined above is still available. Training may be requested in the above procedures as well by [REDACTED] staff.

5. Intraoperative Monitoring [Guide, p. 119]

Describe monitoring and recording requirements for each species, including the type of record(s) maintained. Also note monitoring of anesthesia during non-survival procedures.

The following are excerpts from The NCSU IACUC Guideline ("Intra- and Postoperative Monitoring and Required record keeping for Surgery and Anesthesia") which sets a minimal standard for monitoring anesthesia and record keeping:

“...The types and frequency of monitoring will vary with both the species and the nature/length of the anesthesia/surgery; monitoring should assess circulation (e.g., heart rate and character (pulse pressure), ECG, blood pressure); oxygenation (e.g., mucous membrane color, pulse oximetry); ventilation (e.g., respiratory rate and character, capnography); and body temperature. (See suggestions by the American College of Veterinary Anesthesiologists: <http://acvaa.org> See “Small Animal Monitoring Guidelines”).

Recovery surgery/anesthesia records must include at least the following:

- Procedure date
- Animal identification
- Surgeon and PI name(s)
- Brief description of the procedure
- Time of anesthetic induction and termination
- All drugs administered, including dose, time, and route of administration

In addition, recovery surgery/anesthesia records must include documentation of monitoring appropriate to the procedure:

- At a minimum (e.g., for minor and minimally invasive surgeries), temperature, heart and respiratory rates should be recorded immediately before and at the conclusion of the procedure.
- For invasive procedures lasting more than 30 minutes, results of intraoperative monitoring (minimally heart rate, respiratory rate, body temperature and depth of anesthesia) should be recorded every 15 minutes.

Rodents and non-mammalian species guidelines excerpts:

- Animals must be monitored for adequate depth of anesthesia, e.g., by pedal reflex.
- Physiological monitoring is difficult to quantitate, and is typically accomplished by subjective analysis of the animal’s respiratory rate and character, and mucous membrane or skin color (when possible).
- Following anesthesia/surgery, animals must be observed until conscious and making gross purposeful movements.

In general, group records are adequate for rodents and non-mammals undergoing the same procedure on the same day. Records should be retained in the animal housing room, or in an accessible location, to facilitate postoperative observation and care.

Anesthesia/surgery/postoperative records for rodents and non- mammalian vertebrates must include at least the following:

- Procedure date
- Animal identification(s)
- Surgeon and PI name(s)
- Brief description of the procedure
- Time of anesthetic induction and termination (if group record, for first and last animal, respectively)
- All drugs administered, including dose, time (for last animal), and route of administration

- Intraoperative monitoring results, if applicable
- Any abnormalities
- Documented (with time) observation on the day of surgery, that animals have regained consciousness and are ambulatory

For terminal procedures, the Standard recommendations by the IACUC above apply; however, they may be less stringent depending on the nature and duration of the procedure and are described within the protocol.

6. Postoperative Care [*Guide*, pp. 119-120]

Describe the postoperative care program, including who is responsible for overseeing and providing the care, types of records maintained (e.g., perioperative), where the records are maintained, etc.

The following are excerpts from The NCSU IACUC Guideline (“Intra- and Postoperative Monitoring and Required record keeping for Surgery and Anesthesia”) which sets a minimal standard for postoperative care:

Immediately following surgery/anesthesia, animals should be placed in a clean, quiet environment where they can be observed closely by appropriately trained personnel while they recover from anesthesia. Animals recovering from anesthesia must be closely attended, at least until they regain the righting reflex (ability to maintain sternal recumbency). All food and water bowls and any other physical hazards should be removed from the cage/pen where the animal is recovering from anesthesia. Monitoring of the animal must continue at appropriate intervals (as described in the IACUC-approved animal use protocol) throughout the postoperative period, which extends until the removal of sutures and the observation that incisions are essentially healed.

The postoperative/postanesthetic record should be attached to the surgery/anesthesia record and must include the findings, with date/time and initials or signature of person performing the examination, of each physical examination during the postoperative period.

The PI is responsible for surgical procedures outlined within each protocol and maintains records related to peri-operative care. All records are available for review by the IACUC and for procedures occurring within [REDACTED] copies are maintained within the individual animals’ records.

E. Pain and Distress [*Guide*, pp. 120-121]

1. Describe how and by whom pain and distress are assessed.

Animals are observed at least daily by animal care staff for any evidence of pain and distress. Animals that have undergone potentially painful or distressful procedures have clearly outlined provisions for increased frequency of health checks by laboratory

personnel, especially in the immediate post-operative period when analgesics are administered. This may include a visual assessment, pre-determined pain or distress scoring within the protocol, body condition scoring, and/or other protocol-specific assessments.

2. Describe training programs for personnel responsible for monitoring animal well-being, including species-specific behavioral manifestations as indicators of pain and distress.

The IACUC requires that the PI provide assurance that they, and personnel under their supervision, will be appropriately trained and qualified for any procedures described in that protocol. PIs are encouraged to maintain training records for each person under their supervision. In instances where faculty, research staff, or students need instruction on how to carry out specific techniques with animals, training is offered on a one-on-one basis by qualified [REDACTED] veterinarians or staff.

F. Anesthesia and Analgesia [Guide, pp. 121-123]

1. List the agents used for each species.

Note: If preferred, this information may be provided in Table or additional Appendix.

Amphibians: MS-222

Cats: ketamine, dexmedetomidine, ketamine, isoflurane, midazolam, buprenorphine, proparacaine

Cattle: xylazine, detomidine, isoflurane, lidocaine, flunixin meglumine, bupivacaine

Chickens: isoflurane, butorphanol

Dogs: dexmedetomidine, fentanyl, buprenorphine, butorphanol, propofol, ketamine, isoflurane, sevoflurane, lidocaine, acepromazine, midazolam, carprofen, meloxicam, tramadol, gabapentin, bupivacaine

Fish: MS-222

Guinea Pigs: ketamine, xylazine, dexmedetomidine, meloxicam, carprofen

Horses: ketamine, xylazine, detomidine, guaifenesin, isoflurane, lidocaine, acepromazine, butorphanol, phenylbutazone, diazepam, midazolam, bupivacaine, flunixin meglumine

Lagomorphs: ketamine, xylazine, dexmedetomidine, isoflurane, bupivacaine, acepromazine, buprenorphine, meloxicam, lidocaine

Reptiles: Isoflurane, ketamine, dexmedetomidine, propofol, lidocaine, ketoprofen

Rodents: ketamine, xylazine, dexmedetomidine, isoflurane, buprenorphine, meloxicam, carprofen, acepromazine

Swine: ketamine, xylazine, dexmedetomidine, Telazol, propofol, isoflurane, lidocaine, fentanyl, buprenorphine, carprofen, tramadol, meloxicam

2. Describe how the veterinarian provides guidance and advice to researchers concerning choice and use of anesthetics, analgesics or other pain moderating methods.

Proposed anesthetic and analgesic protocols are included in the IACUC AVAU; these are pre-reviewed by the attending and [REDACTED] clinical veterinarian. Many of these experiments are performed in domestic species, by veterinarian PIs who are familiar, through education and experience, with species-specific anesthesia and pain control. The CVM has board certified veterinary anesthesiologists available for consultation on use of anesthetics and analgesics for all species. There are other CVM faculty members with specialized experience in non-mammalian species, who are often contacted for their expertise.

3. Describe the monitoring of the effectiveness of analgesics, including who does the monitoring. Include in the description any non-pharmacologic means used to diminish pain and distress.

Use of anesthetics and analgesics in the [REDACTED] is monitored by [REDACTED]. As described above, each animal is monitored postoperatively by trained [REDACTED] along with trained personnel listed on the IACUC protocol until fully recovered and returned to their home cage/run. Post-procedural monitoring relies also on daily observations by [REDACTED] technical staff and research personnel listed on the IACUC protocol, who are trained to recognize animal abnormalities and report them to [REDACTED] veterinary staff and the PI, respectively. Each procedure has outlined monitoring plans within the protocol that are specific for a given procedure. Most CVM PIs are veterinarians with training and experience in the species with which they work.

Nonpharmacologic methods include keeping postoperative animals in a warm, quiet environment; providing frequent supportive human contact (where appropriate for the species); personnel training in recognition of pain and distress, and proper handling techniques; environmental and social enrichment in housing spaces. Often, additional nutritional support is provided for patients such as Diet gel for rodents, Carnivore care or Herbivore care to the appropriate species, electrolyte supplement drinks for larger mammals, and fiber treats for smaller mammals undergoing intensive procedures (rabbits, guinea pigs) are provided post-operatively.

4. Describe how the veterinarian(s) and the IACUC/OB evaluate the proposed use of neuromuscular blocking agent to ensure the well-being of the animal.

Requests for the use of neuromuscular blocking agents (NMBAs) require scientific justification in an approved IACUC-reviewed protocol. NMBAs are rarely used in NCSU research projects. An experienced anesthetist, observation of anesthetic monitoring values, and surgeon observations are all used to monitor the effectiveness and proper use of these agents. Use of NMBAs is discouraged by veterinary reviewers unless essential to the goals of the research.

5. Describe policies and practices for maintaining and ensuring function of equipment used for anesthesia.

In [REDACTED], anesthesia machines, along with the selected breathing circuits are visually inspected and manually pressure checked to ensure functionality prior to every use. For the

anesthesia machine, this process includes the ability to hold 30 mmHg of pressure as well as the functioning of the O₂ flush valve, flowmeter, O₂ source, and pop-off valve. Ventilators are allowed run for several minutes while connected to a rebreathing circuit and bag to ensure function of the pop-off valve function, directional valves, and to check for leaks prior to use. Anesthesia and ventilation machines are certified on annually by a contract vendor and routine maintenance performed per their instructions.

Sodasorb is changed as needed when in use and dates and initials are recorded on the canister. All breathing circuits are disinfected after each use. Endotracheal tube cuffs are inflated prior to use to check for leaks. Endotracheal tubes and laryngoscopes are disinfected after each use.

If used, F/air canisters are first weighed to ensure adequate scavenging of waste anesthesia gases and are discontinued after 50g of weigh has accumulated, or after 8 consecutive hours of use.

Monitoring values during the procedure guide the anesthetist in diagnosing equipment problems. If a problem is detected, the [REDACTED] supervisor, [REDACTED] veterinarian, or [REDACTED] Anesthesiologist is notified to help troubleshoot the issue

G. Euthanasia [Guide, pp. 123-124]

1. Describe approved methods of euthanasia, including humane slaughter (for additional guidance, see pertinent [AAALAC Reference Resources](#)). Include:
 - consideration of species, age, condition (e.g., gestational period, or neonatal) and
 - location(s) for the conduct of the procedure.

Note: If preferred, this information may be provided in Table or additional Appendix.

NCSU IACUC standards for euthanasia follow the AVMA Guidelines for the Euthanasia of Animals. Methods of euthanasia are described in the IACUC protocol, and any deviation from those guidelines must be justified scientifically in the approved protocol.

[REDACTED] has developed SOPs for standard euthanasia methods as follows:

- **All species:** pentobarbital euthanasia solution given IV, usually following sedation for non-rodent mammals; exsanguination following surgical plane of anesthesia.
- **Rodents:** CO₂ via compressed gas cylinders; guinea pigs are sedated/ anesthetized prior to CO₂; neonatal rats or mice are decapitated with (5-7 days) or without (<5 days) prior CO₂ narcosis. Rodent CO₂ chambers are not pre-filled but gradually filled at a 10-30% volume displacement rate. Chambers are of sufficient size to allow for normal postural movements and cleaned after each use. Whenever possible rodents are euthanized in their home cages in [REDACTED] procedures room or with IACUC approval in laboratories (rodents) to prevent undue stress. Additional

methods include anesthetic overdose followed by tissue harvest or pentobarbital overdose.

- **Chickens, turkeys:** euthanasia solution IV; CO2 euthanasia, cervical dislocation
- **Frogs:** buffered MS-222, Benzocaine gel, or IP or dorsal lymph sac injection of pentobarbital euthanasia solution
- **Fish:** buffered MS-222, eugenol

2. Describe policies and practices for maintaining and ensuring function of equipment used for euthanasia.

CO2 tanks reading less than 500 psi are replaced with new tanks. Flow is maintained via a flow meter. Scissors are available in each procedure room for decapitation of pinky mice and are replaced annually. Charts are listed by each [REDACTED] CO2 euthanasia station displaying the proper filling rate of displacement based on cage size (mouse cage vs. rat cage). In most cases, rodents are euthanized in their home cage or clean cage with clear sides, allowing full view of the animal at all times. Any labs with IACUC approval for decapitation must provide documentation of guillotine or scissor blade maintenance.

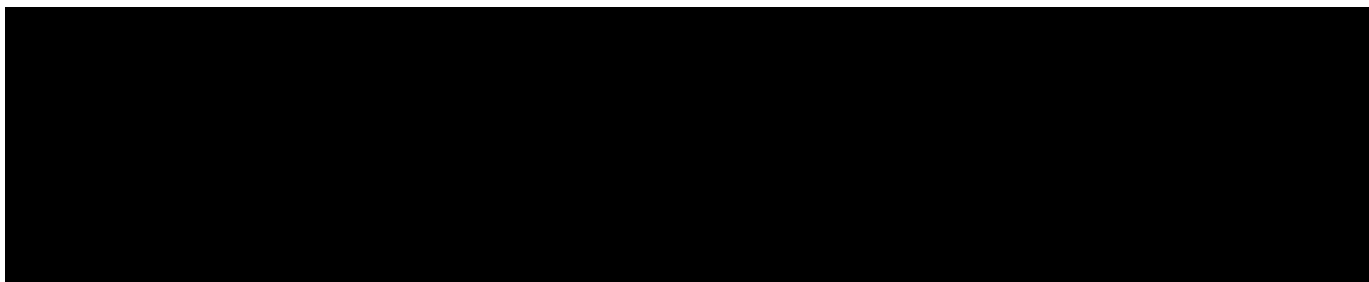
3. Describe the methods used to confirm death of an animal.

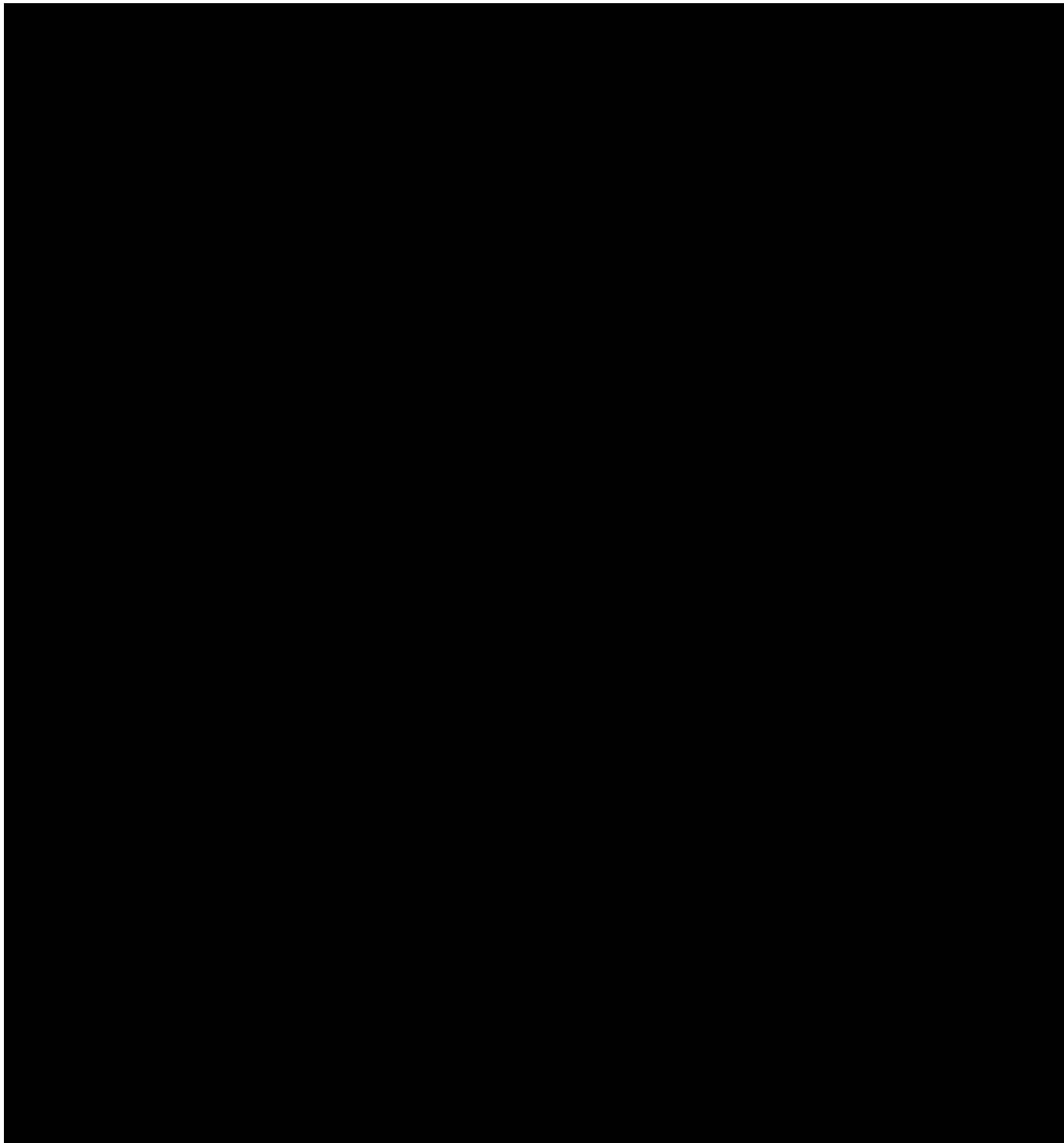
Method of confirmation is specified in the IACUC protocol and [REDACTED] SOPs. Options include confirmation of a lack of vital signs; bilateral thoracotomy; and cervical dislocation. Other methods must be described in the approved IACUC protocol. Non-mammalian species may require decapitation and/or (double) pithing.

IV. Physical Plant [Guide, pp. 133-155]

A. Facilities Overview

Provide a brief introduction to the animal housing and use facilities. Note that this overview should augment the information provided in **Appendix 2** (Summary of Animal Housing and Support Sites), which includes area, average daily census, and person responsible for each site. Please use consistent terminology for the buildings/areas/sites described in the Location section of the Appendix. Please do not repeat information, but supplement the descriptions provided elsewhere to assist the reviewers understanding of the interaction between facilities, special housing locations, and separate procedural areas.





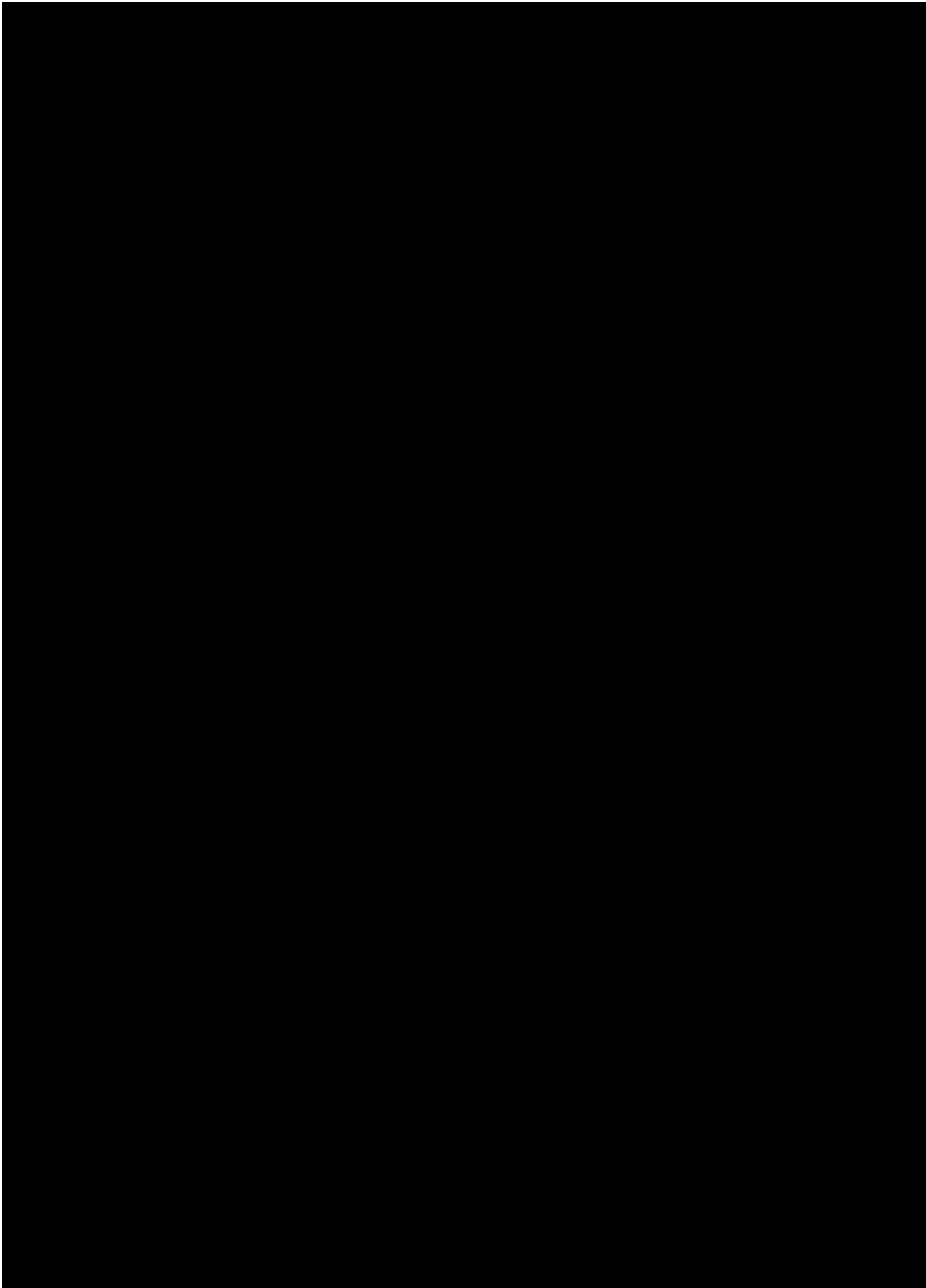
B. Centralized (Centrally-Managed) Animal Facility(ies)

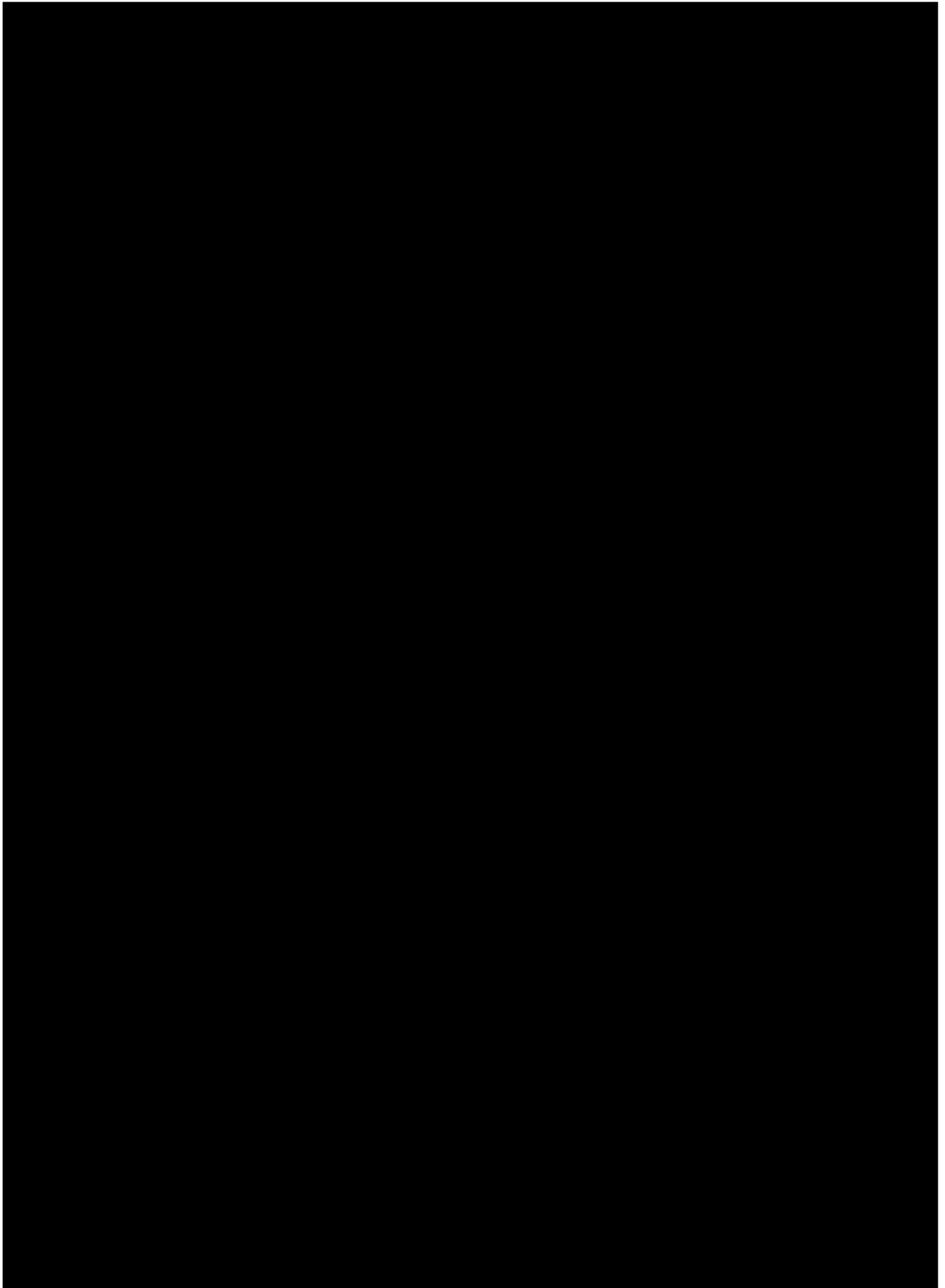
In this section, describe each centralized or centrally-managed animal housing and use facility. Include in **Appendix 3** the floor plans of each on 8.5" x 11" or A4 paper. Ensure that the drawings are legible and the use of each room is indicated (animal housing, procedure room, clean cage storage, hazardous waste storage, etc.). Note that a separate section for describing "satellite housing areas" is included below.

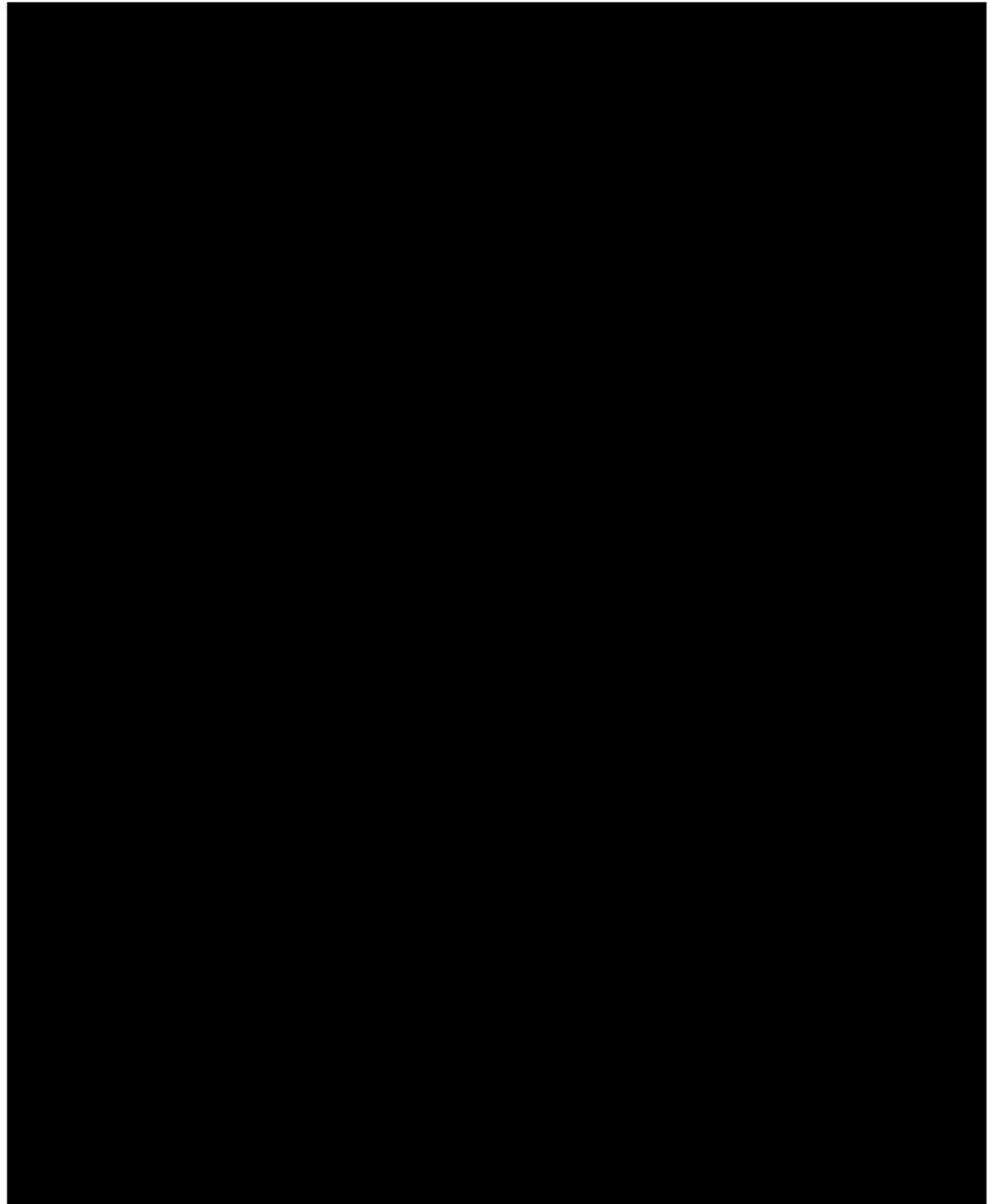
Separately describe **each** Location or Animal Facility, addressing each of the features outlined below (1-8). A complete description of each must be provided; however,

common features among locations or facilities may be indicated as such and do not need to be repeated.

1. General arrangement of the animal facilities (conventional, clean/dirty corridor, etc.).
2. Physical relationship of the animal facilities to the research laboratories where animals may be used.
3. Types of available animal housing spaces used, such as conventional, barrier, isolation/quarantine, hazard containment (infectious, radioactive, chemical), “animal cubicles” or facilities specifically designed for housing certain species such as ponds, pastures, feedlots, etc.
4. Finishes used throughout the animal facility for floors, walls, ceilings, doors, alleyways, gates, etc. (note any areas that are not easily sanitized and describe how these are maintained).
5. Engineering features (design, layout, special HVAC systems, noting exhaust air treatment, if applicable) used in hazardous agent containment.
6. Security features, such as control of entry, perimeter fences, gates, entryways, cameras, guards; identify and describe exceptions for individual facilities or areas incorporating fewer or additional security features than the general features described.
7. Consideration for facilities with exterior windows, if applicable, including management of environmental conditions (i.e., temperature and photoperiod control) and potential security risks.
8. Storage areas for flammable or hazardous agents and materials (e.g., disinfectants, cage-washing chemicals, pesticides, fuel).







C. Satellite Animal Housing Facilities

In addition to the Appendices summarizing Heating, Ventilation, and Air-Conditioning (**Appendix 11**) and Lighting Systems (**Appendix 16**), summarize animal housing areas that are not centrally-managed or maintained in (**Appendix 17**), “Satellite Animal

Housing Areas.”

1. Describe the criteria used to determine/define a “Satellite Animal Housing Area,” which may include remote housing facilities or laboratories temporarily or consistently housing animals.

Mares housed at the [REDACTED] ([REDACTED]) are on occasion leased out to farms in and around North Carolina. These mares provide surrogacy services for clients requesting foals. The mares remain owned by NCSU and are returned subsequent to foaling and weaning. All farms that lease a mare and house that mare on site are considered satellite facilities.

2. Describe the process used by the IACUC/OB to authorize, provide oversight of, and ensure compliance with *Guide* standards for the housing of animals outside of centrally-maintained facilities. Include a description of Attending Veterinarian access and physical security.

The above referenced mares are leased to clients for the duration of their pregnancy and subsequent weaning of the resulting foal. A detailed lease agreement is signed and administrated by the NCSU large animal hospital. This details the terms related to animal transfer and return to NCSU. All animal care is provided by the NCSU large animal hospital until such time that the animal is transferred to the farm. At this point, all veterinary care is provided either by that same NCSU staff or, in cases where distance precludes this, a qualified veterinarian local to the farm.

Upon lease of the animal, a designated subcommittee – appointed by the IACUC – will perform an on-site farm evaluation using the “Farm evaluation Checklist” provided by the committee to ensure that the standards of the *Guide for Care and Use of Agricultural Animals in Research and Teaching* are upheld. This evaluation will occur no later than one month after pregnancy of the mare is confirmed. The inspection team will include the attending veterinarian and one of the faculty veterinarians involved in the mare veterinary care. If any significant findings at the farm threaten the health and well-being of the mare, the animal will be removed from the farm and the lease terminated.

At a minimum, all NCSU-owned mares will have access to 24-hour veterinary care, and a housing environment that meets or exceeds the standards outlined in the *Ag Guide*. Upon weaning of the foal, the mares are returned to the [REDACTED] and housed per standard SOPs.

D. Emergency Power and Life Support Systems

Note: Complete a Heating, Ventilation, and Air-Conditioning (HVAC) Summary (**Appendix 11**) and Lighting Summary (**Appendix 16**) for each Location described in the Summary of Animal Housing and Support Sites (**Appendix 2**).

1. **Power** [*Guide*, p. 141]

For each Location, Centralized Animal Facility, and Satellite Housing Facility, provide a brief description of the following:

- Availability of [emergency power](#) and if so, what electrical services and equipment are maintained in the event the primary power source fails.
- History of power failures, noting frequency, duration, and, if emergency power was not available, steps taken to ensure the comfort and well-being of the animals present and the temperature extremes reached in animal rooms during the failure.

There is emergency power back-up for all of the [REDACTED] in the form of large diesel generators. This emergency power backs up most electrical systems barring existing chillers. Emergency power in the [REDACTED] supports [REDACTED] HVAC, door controls, and lighting. The generators are tested monthly by NCSU facilities personnel and self-test weekly.

At [REDACTED] and [REDACTED] emergency power is provided by a 100K diesel generator. In the event of a primary power source failure, the generator is set up to provide all needs for electricity for complete animal support.

There is emergency power back up for [REDACTED] in the form of large diesel generators. This emergency power backs up most electrical systems.

There have been less than four power outages since the last site visit and they lasted only a couple of hours. In all but one instance generators turned on maintaining support systems, one single instance (a brown out that didn't take the power low enough to trigger the generator but did cause most of the CVM to not fully function) the generators were manually turned on by facilities.

- 2. Other System Malfunctions.** If not previously reported, describe animal losses or health problems resulting from power, HVAC, or other life support system (e.g., individually ventilated cages) failures, and mechanisms for reporting such incidences. [AAALAC International Rules of Accreditation](#) (Section 2.f).

There have been no animal losses due to power, HVAC, or other life support system failures.

E. Other Facilities [Guide, pp. 144, 150]

1. Other Animal Use Facilities [Guide, pp. 146-150]

Describe other facilities such as imaging, irradiation, and core/shared behavioral laboratories or rooms. Include a description of decontamination and methods for preventing cross-contamination in multi-species facilities.

The imaging room [REDACTED] is disinfected similar to [REDACTED] procedure rooms in that the space is disinfected after use.

All common-use equipment such as the IVIS imager, XRAD, euthanasia chambers, and rodent behavior testing equipment is disinfected by spraying all surfaces with approved [REDACTED] disinfectant after each user is finished.

Equipment used to take animals to other parts [REDACTED] such as radiology or dentistry, is disinfected before and after use by [REDACTED] per hospital SOPs using approved disinfectant for that area and equipment. Upon return, the [REDACTED] animals are placed on a temporary quarantine to minimize the risk to in-house colony animals to potential pathogen spread from client-owned animals.

2. Other Animal Program Support Facilities

Describe other facilities providing animal care and use support, such as feedmills, diagnostic laboratories, abattoirs, etc.

None present

Appendix 1: Glossary of Abbreviations and Acronyms

Please provide a Table defining abbreviations and acronyms used in this Program Description.

| Abbreviation/Acronym | Definition |
|----------------------|------------|
| | |

Appendix 2: Summary of Animal Housing and Support Sites

Briefly summarize in the following Table the animal facility or facilities, noting the number of areas in which animals are housed (buildings, floors, farms, etc.), the total square footage/metres (or acreage) for animal care and use, and the total square footage/metres (or acreage) for necessary support of the animal care and use program covered by this Description (water treatment plant/area if housing aquatic or amphibian species, cagewashing facilities, service corridors, etc. and additional areas to be considered are enumerated in the *Guide*). If more than one facility/site, note the approximate distance (yards/miles or meters/kilometers) to each facility from a reference point such as from the largest animal facility. A campus/site map (with a distance scale) may be included as an additional Appendix (Appendix 2.1) to provide this information. See [Instructions](#), [Addendum A - Animal Facility Square Footage/Meters Compilation Form](#) for guidance in calculating the size of your animal care and use program.

| Animal Housing and Support Sites | | | | | | |
|---|--|---|--|---|--|--------------------------------|
| Location (building, site, farm name, etc. ^a) | Distance from main facility ^b | Approx. ft ² , m ² , or acreage for animal housing | Approx. ft ² , m ² , or acreage for support or procedures | Species housed | Approx. Daily Animal Census by species | Person in charge of site |
| | | 37,017 sq ft Total in [REDACTED] (plus 5 acres) | 33,210 sq ft Total in [REDACTED] | n/a | n/a | |
| | | 3275 sq ft | 6501 sq ft | Amphibian, Feline, Rabbit, Rodent | 164 | |
| | | 2954 sq ft | 603 sq ft | Poultry, Canine | 191 | |
| | | - | 3816 sq ft | N/A | N/A | |
| | | 1285 sq ft | 3235 sq ft | Chickens, Cattle, Goats, Horses, Sheep, Swine | 32 | |
| | | 4376 sq ft | 562 sq ft | Canine, Sheep, Swine | 16 | |
| | | 5070 sq ft | 738 sq ft | Amphibians, Cattle, Chickens, Rodent, Swine | 48 | |

Appendix 2: Summary of Animal Housing and Support Sites

| Animal Housing and Support Sites | | | | | | |
|---|--|---|--|-----------------------------------|--|--------------------------------|
| Location (building, site, farm name, etc. ^a) | Distance from main facility ^b | Approx. ft ² , m ² , or acreage for animal housing | Approx. ft ² , m ² , or acreage for support or procedures | Species housed | Approx. Daily Animal Census by species | Person in charge of site |
| | | 2746 sq ft | 2873 sq ft | Poultry, Rodent, Swine | 254 | |
| | | 3345 sq ft | 2354 sq ft | Avian, Goats, Poultry, Rodents | 37 | |
| | | 994 sq ft | - | Swine | 3 | |
| | | 2074 sq ft | - | Fish, Mollusk | 30 | |
| | | 1442 sq ft | - | Amphibian, Fish | 65 | |
| | | - | 868 sq ft | Poultry | N/A | |
| | | - | 928 sq ft | N/A | N/A | |
| | | - | 704 sq ft | N/A | N/A | |
| | | 1085 sq ft | 273 sq ft | Canine | 12 | |
| | | 1280 sq ft | 9720 sq ft | Amphibian, Fish, Rodent | 2453 | |
| | | | | Rodent | 20 | |
| | | 5 acres | - | Equine | 5 | |
| | | 12,834 sq ft Total [REDACTED] (plus 83 acres) | 20,780 sq ft Total [REDACTED] (plus 10 acres) | | | |
| | | - | 8694 sq ft | Equine for labs only | 10-20 for only 2- 4 hours during labs | |

Appendix 2: Summary of Animal Housing and Support Sites

| Animal Housing and Support Sites | | | | | | |
|---|--|---|--|---|--|--------------------------------|
| Location (building, site, farm name, etc. ^a) | Distance from main facility ^b | Approx. ft ² , m ² , or acreage for animal housing | Approx. ft ² , m ² , or acreage for support or procedures | Species housed | Approx. Daily Animal Census by species | Person in charge of site |
| | | - | 8694 sq ft | Dairy cattle for feeding only | 25 dairy cattle for feeding only | |
| | | 3093 sq ft | 1866 sq ft | Goats/sheep | 10 to 15 for 3 months for lambing and kidding | |
| | | 6000 sq ft | 248 sq ft | Chickens (Spring) Turkeys (Fall) | 4,000 chickens 2,000 Turkeys | |
| | | - | 1050 sq ft | N/A | N/A | |
| | | 1583 sq ft | 144 sq ft | Swine | 20 to 30 | |
| | | 1314 sq ft | - | Swine | 50 | |
| | | 844 sq ft | 84 sq ft | Swine (Adult) Swine (young) | 4 to 5 for 21 days 40 nursery pigs | |
| | | 83 acres | 10 acres | Equine Beef cattle Dairy cattle Goats Sheep | 73 37 53 20 20 | |
| | | 2,740 sq ft (plus 30 acres) | 7,689m sq ft | | | |
| | | - | 4900 sq ft | N/A | N/A | |

Appendix 2: Summary of Animal Housing and Support Sites

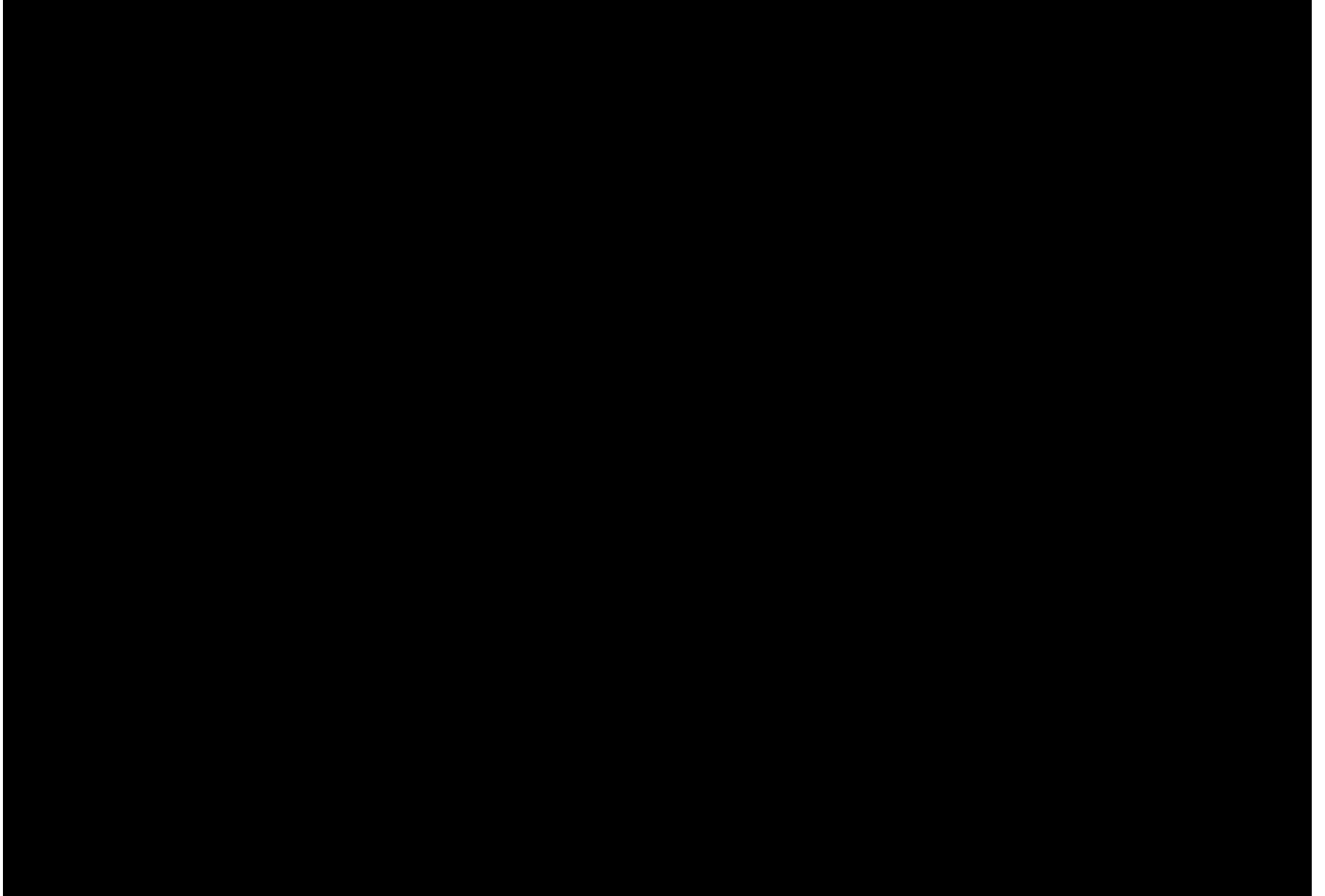
| Animal Housing and Support Sites | | | | | | |
|---|--|---|--|----------------|--|--------------------------------|
| Location (building, site, farm name, etc. ^a) | Distance from main facility ^b | Approx. ft ² , m ² , or acreage for animal housing | Approx. ft ² , m ² , or acreage for support or procedures | Species housed | Approx. Daily Animal Census by species | Person in charge of site |
| | | 1620 sq ft | - | Equine | 1 | |
| | | 400 sq ft | 1069 sq ft | Equine | 4 | |
| | | 720 sq ft | - | Equine | 2 | |
| | | - | 480 sq ft | N/A | N/A | |
| | | - | 520 sq ft | N/A | N/A | |
| | | - | 720 sq ft | N/A | N/A | |
| | | 30 acres | - | Equine | 40 | |
| | | | | Equine | 40 | |
| | | 840 sq ft | - | Marine animals | | |

| | | | |
|--|---|---------------------|--|
| Totals: | 21,154 sq ft | 28,488 sq ft | |
| Total animal housing and support space: | | | |
| | (please specify ft² or m²) | | |

^aPlease state name and/or use acronyms described in **Appendix 1** for building names, if not coded for confidentiality.

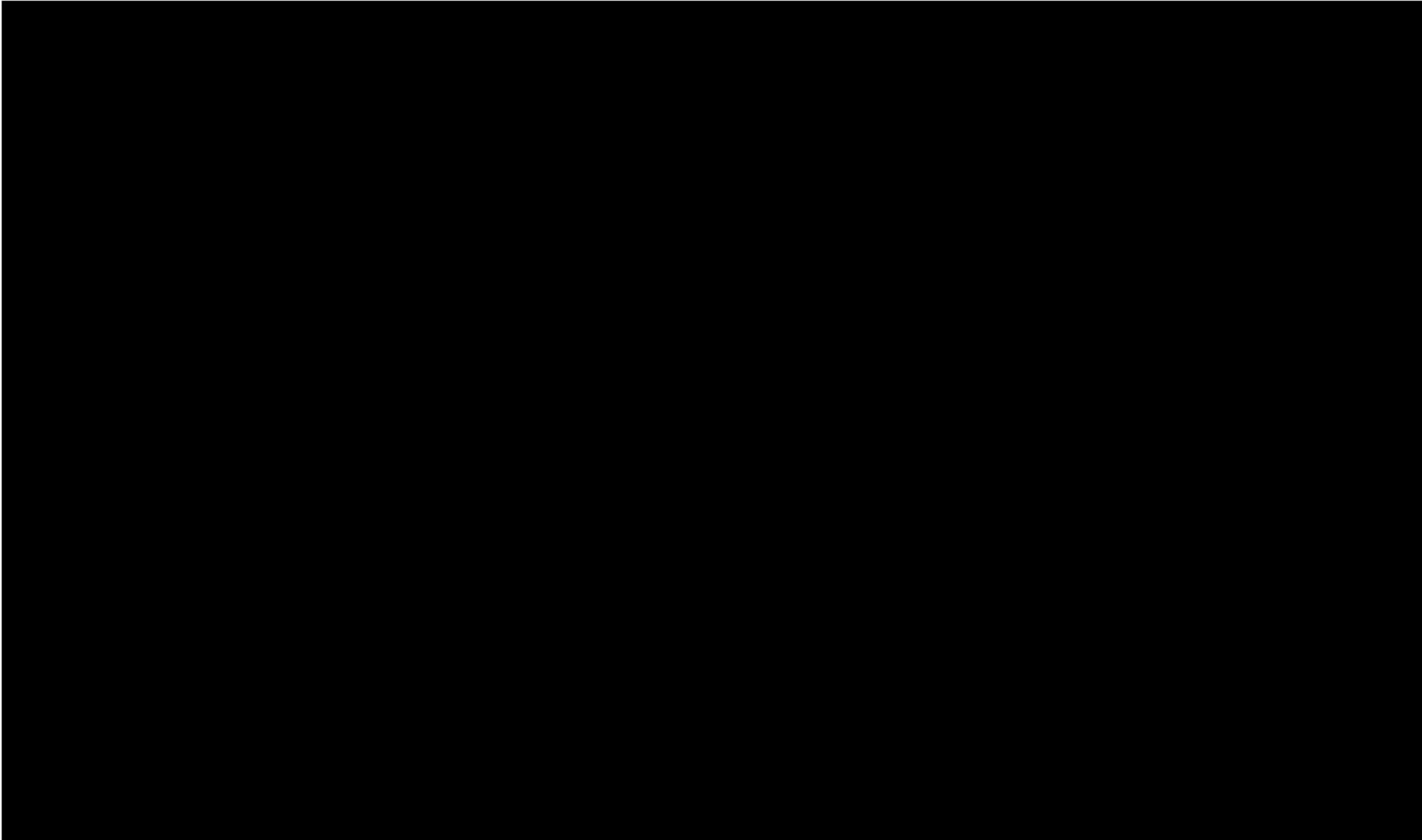
^bCampus or site map(s) may also be provided in lieu of this information.

Appendix 3: Line Drawings

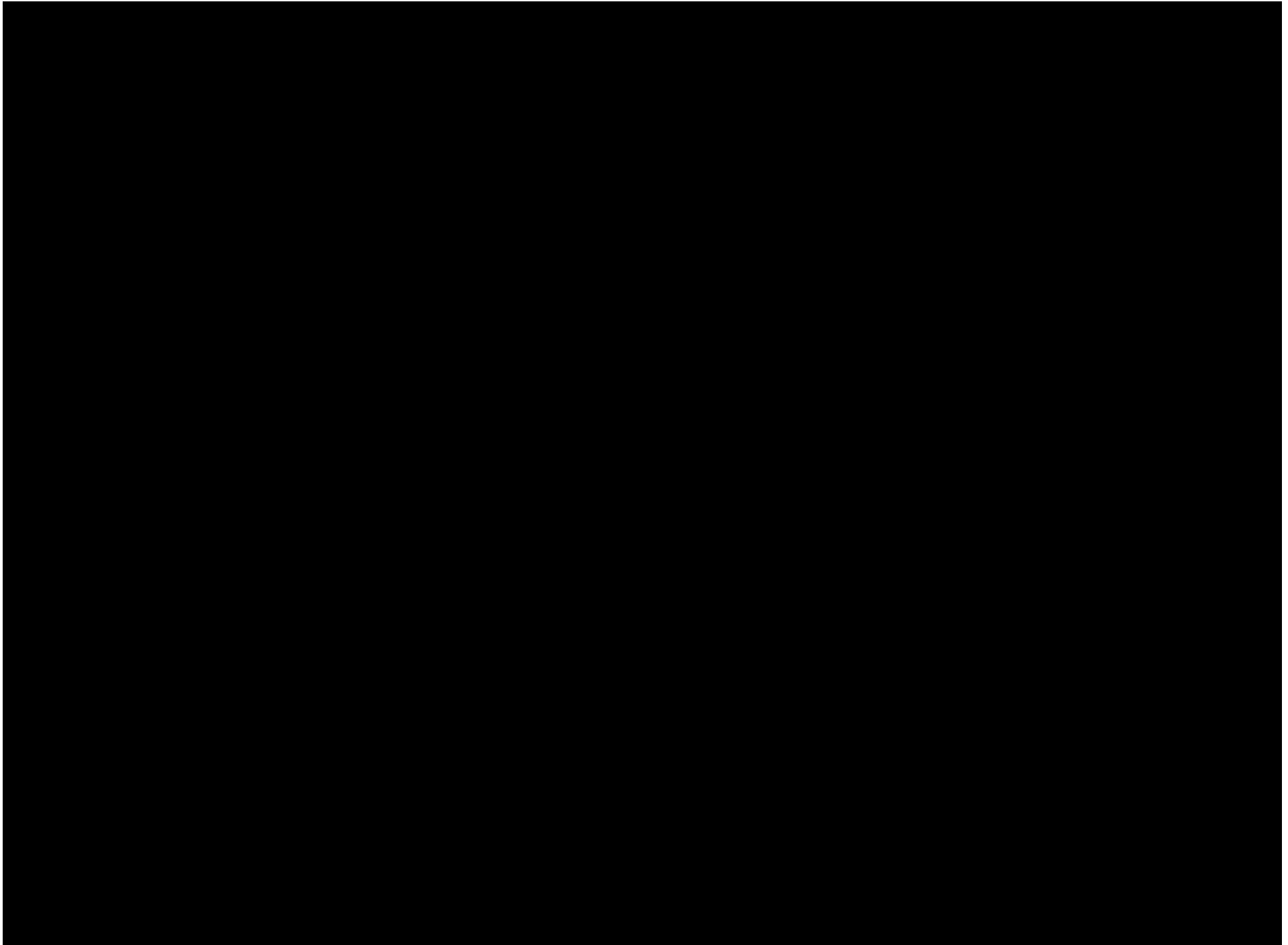


Appendix 3: Line Drawings

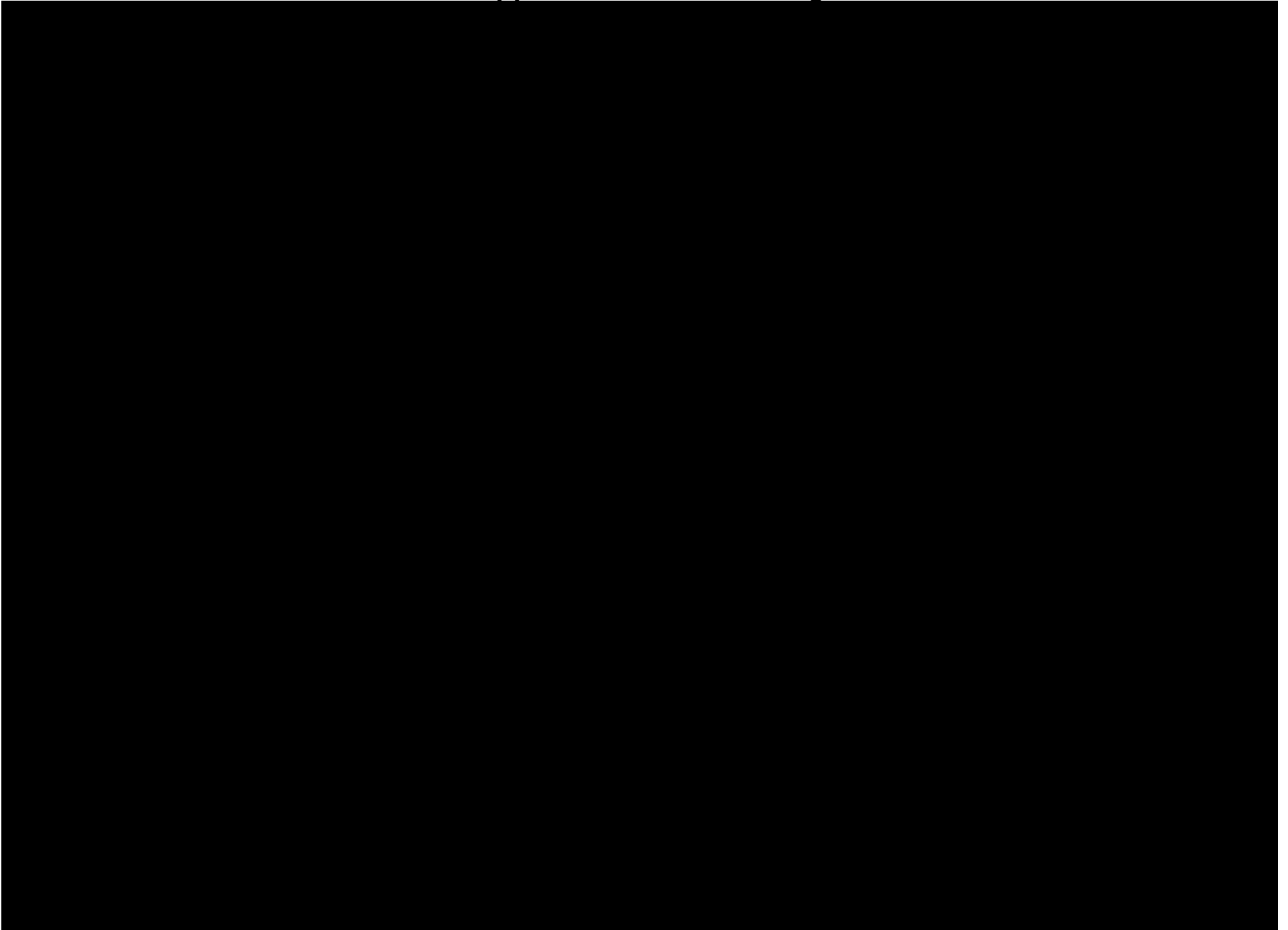
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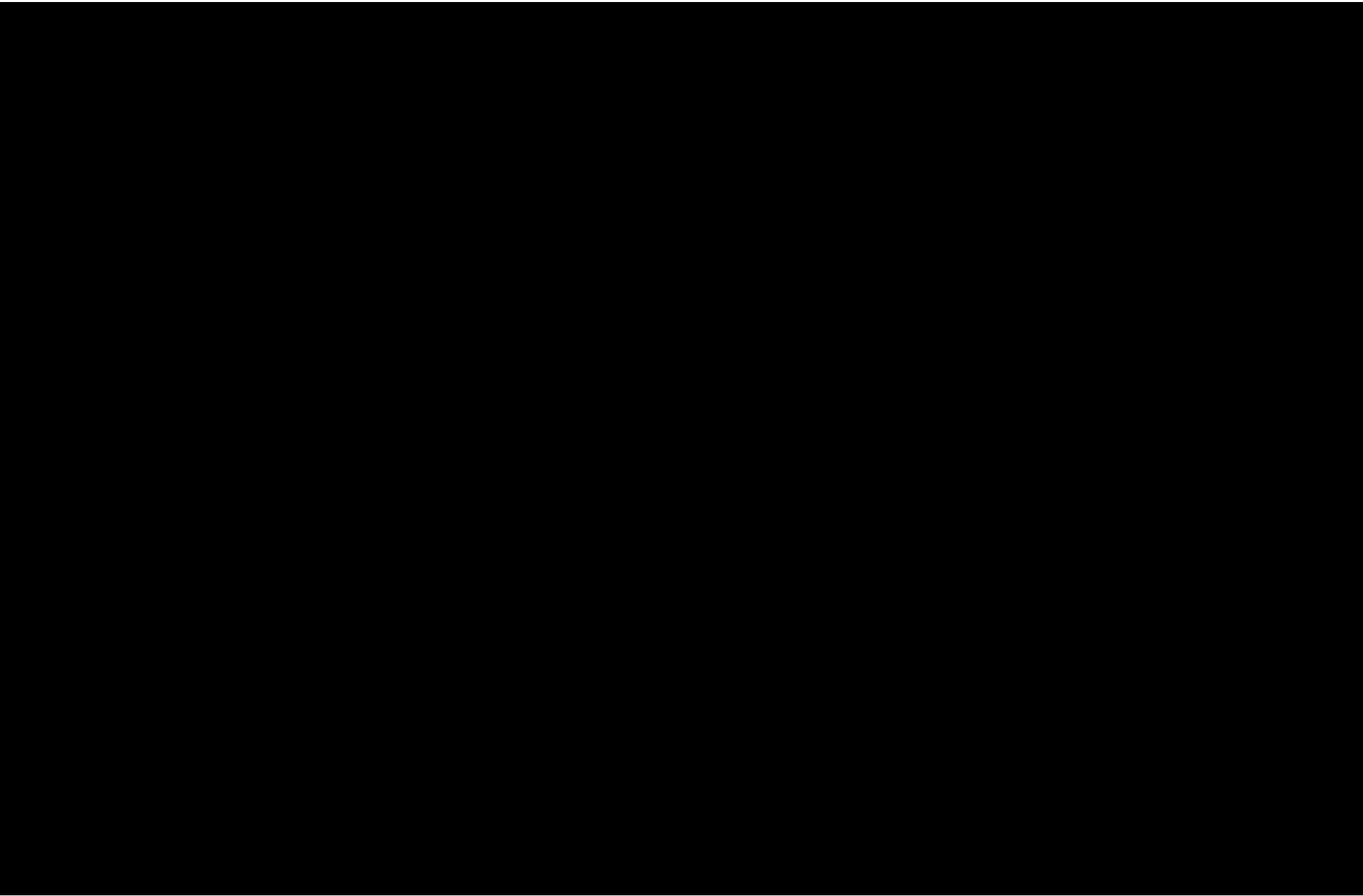


Appendix 3: Line Drawings

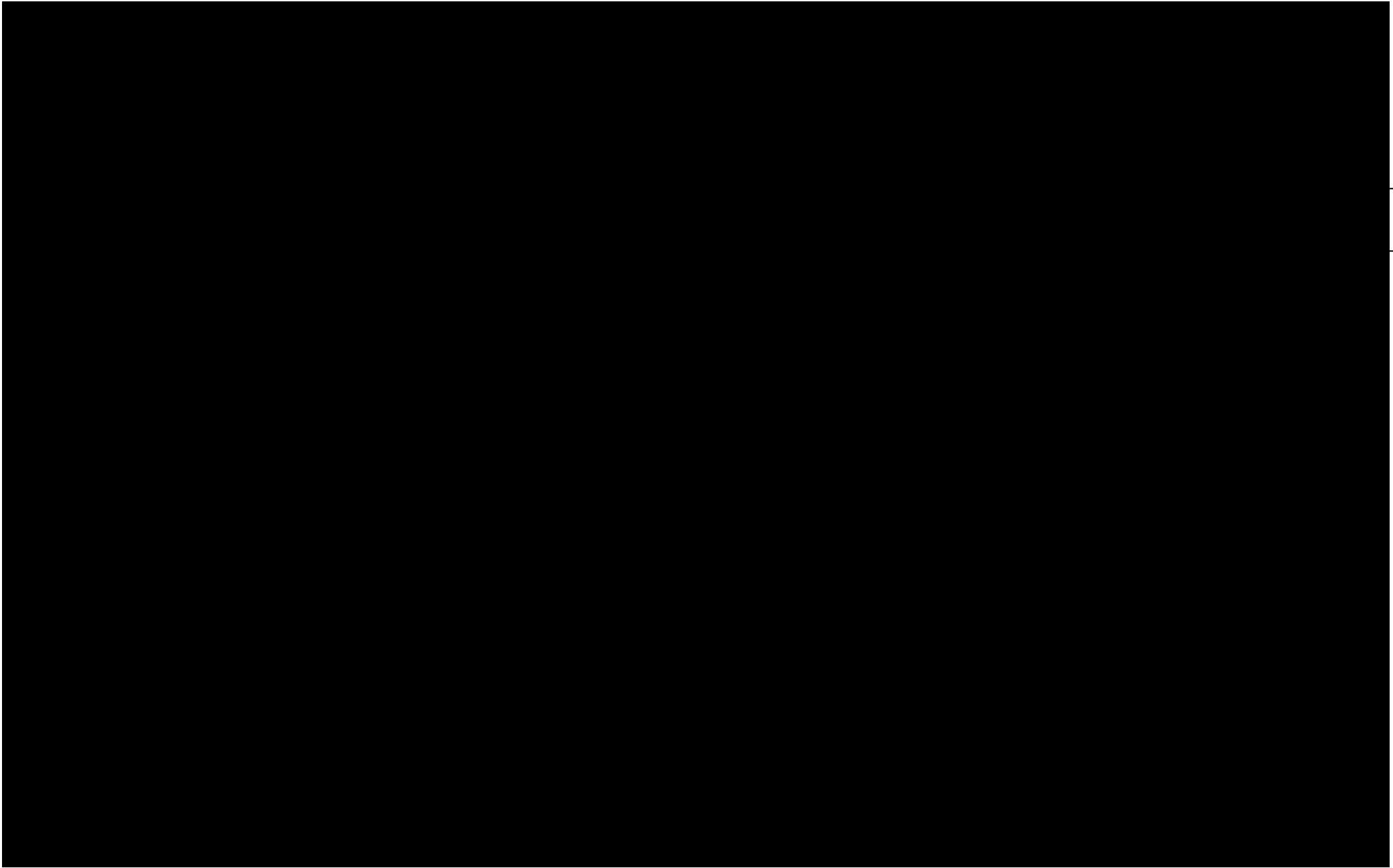


Appendix 3: Line Drawings

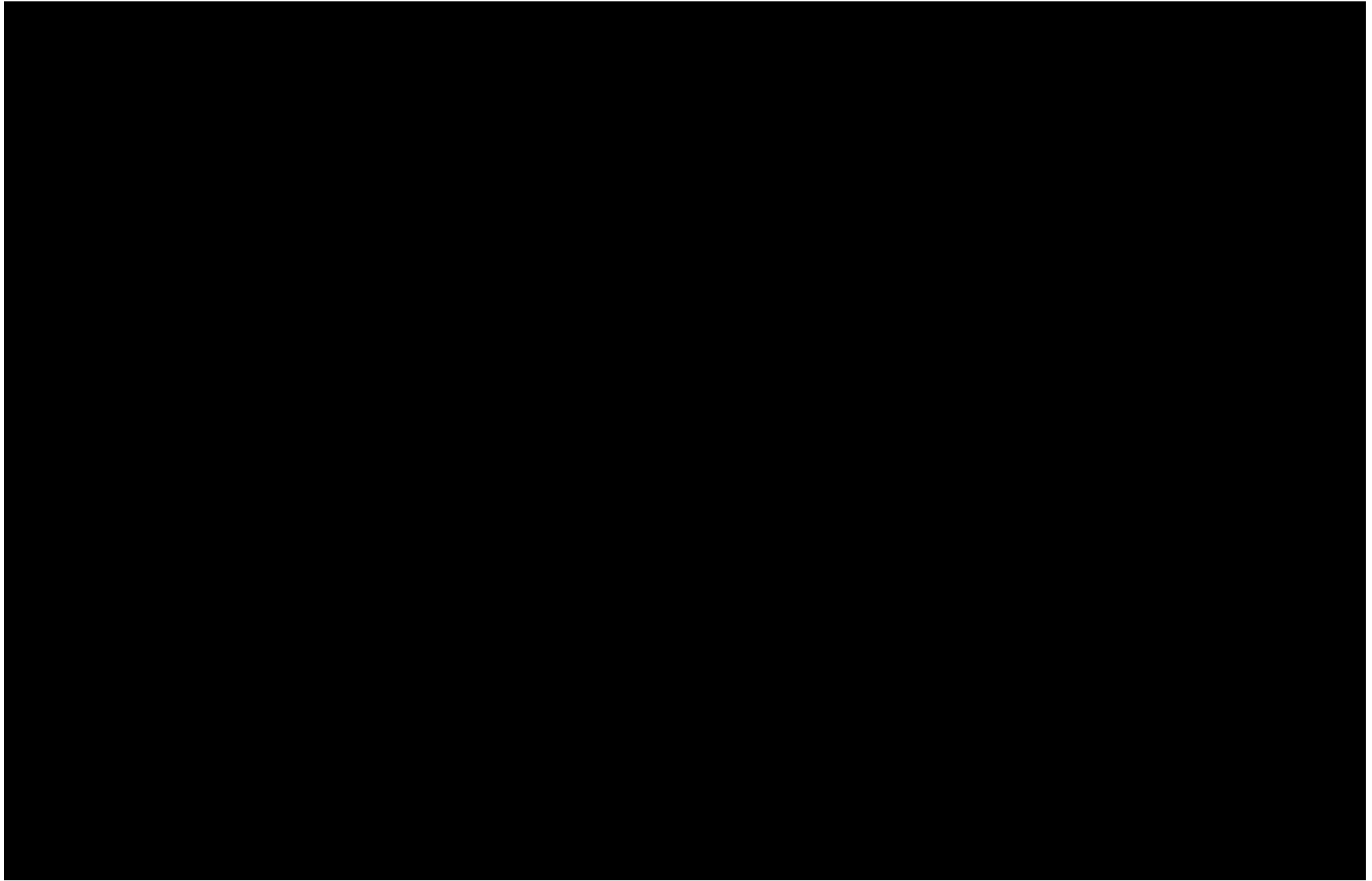




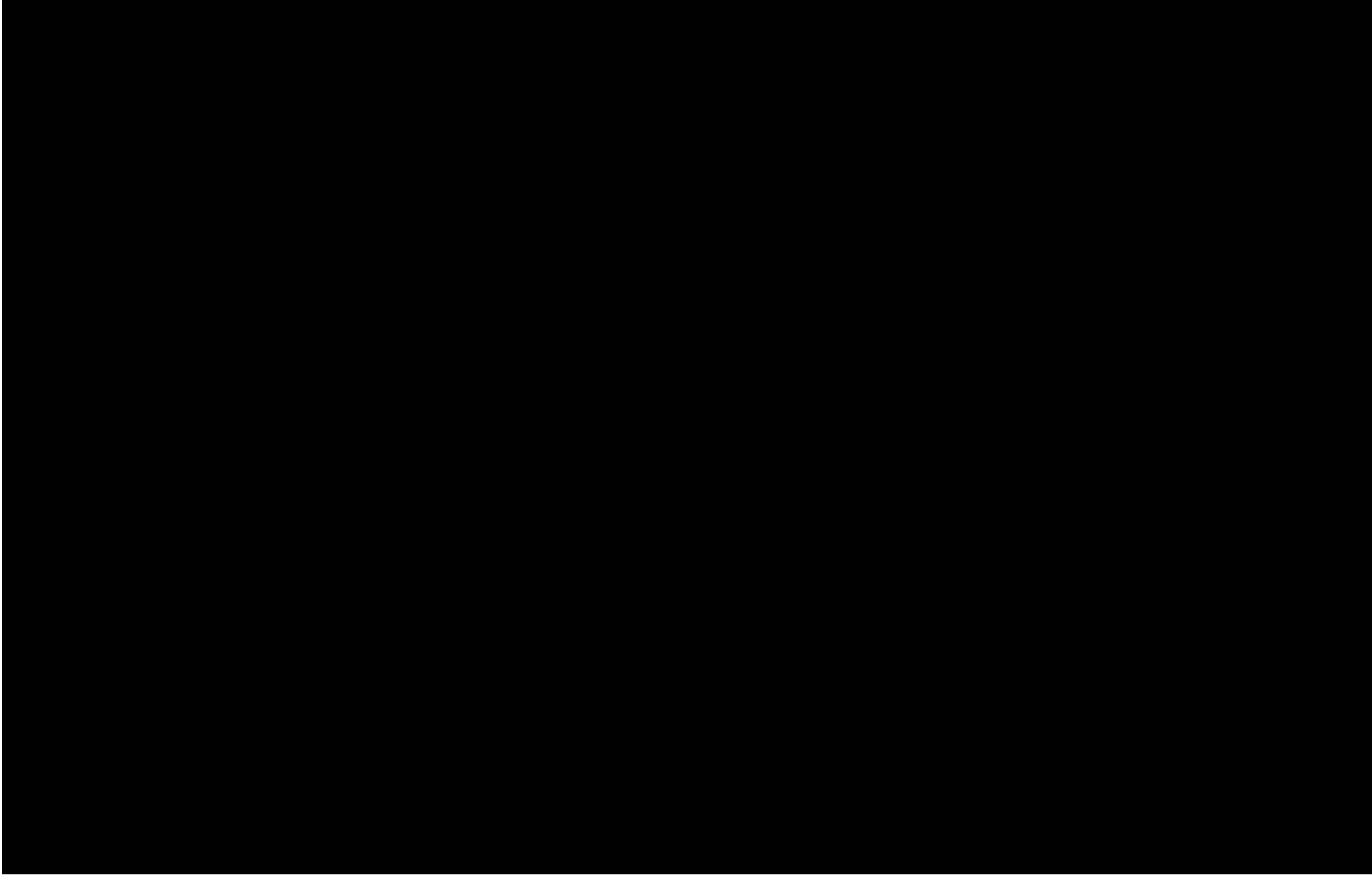
Appendix 3: Line Drawings



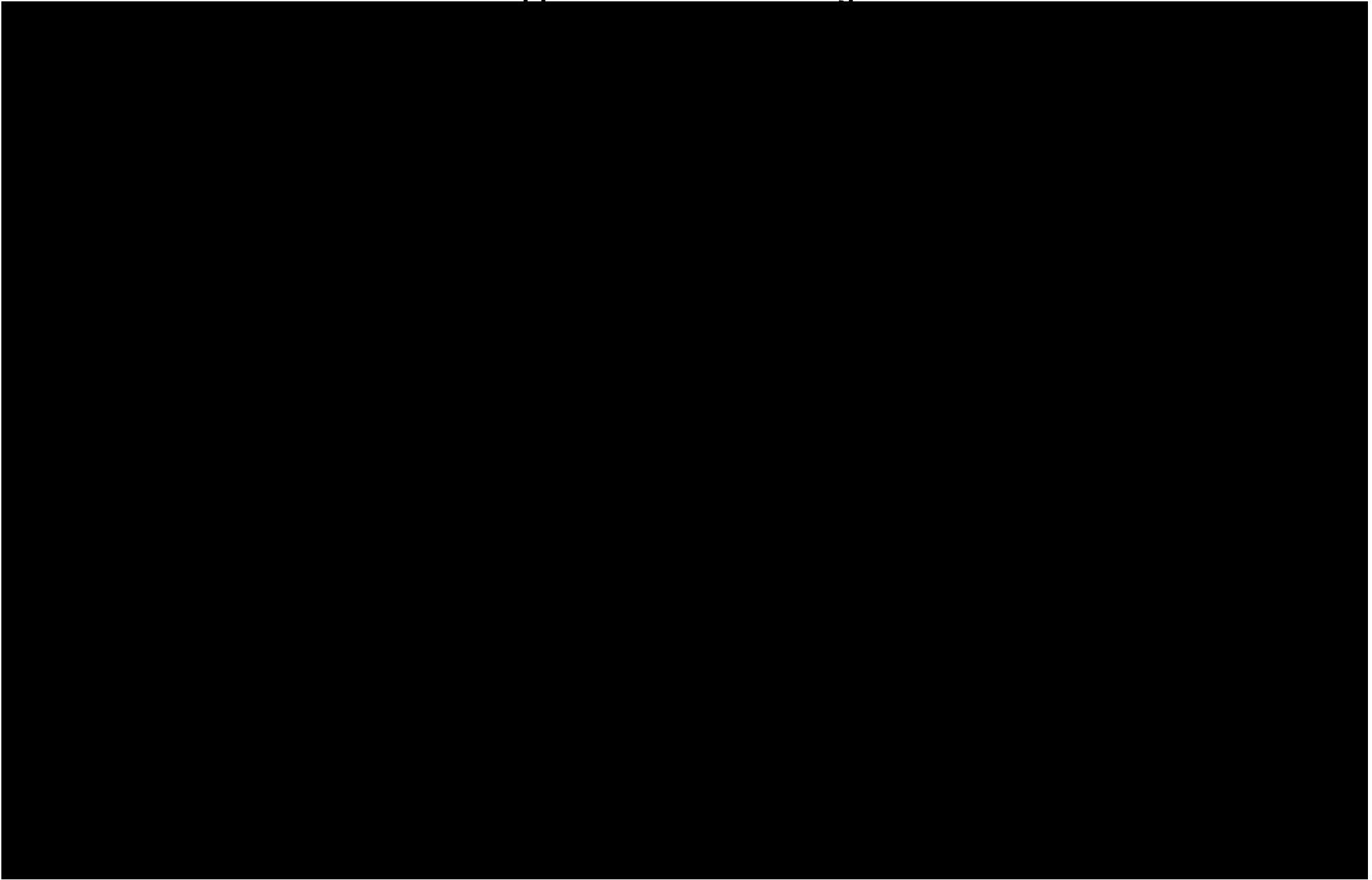
Appendix 3: Line Drawings



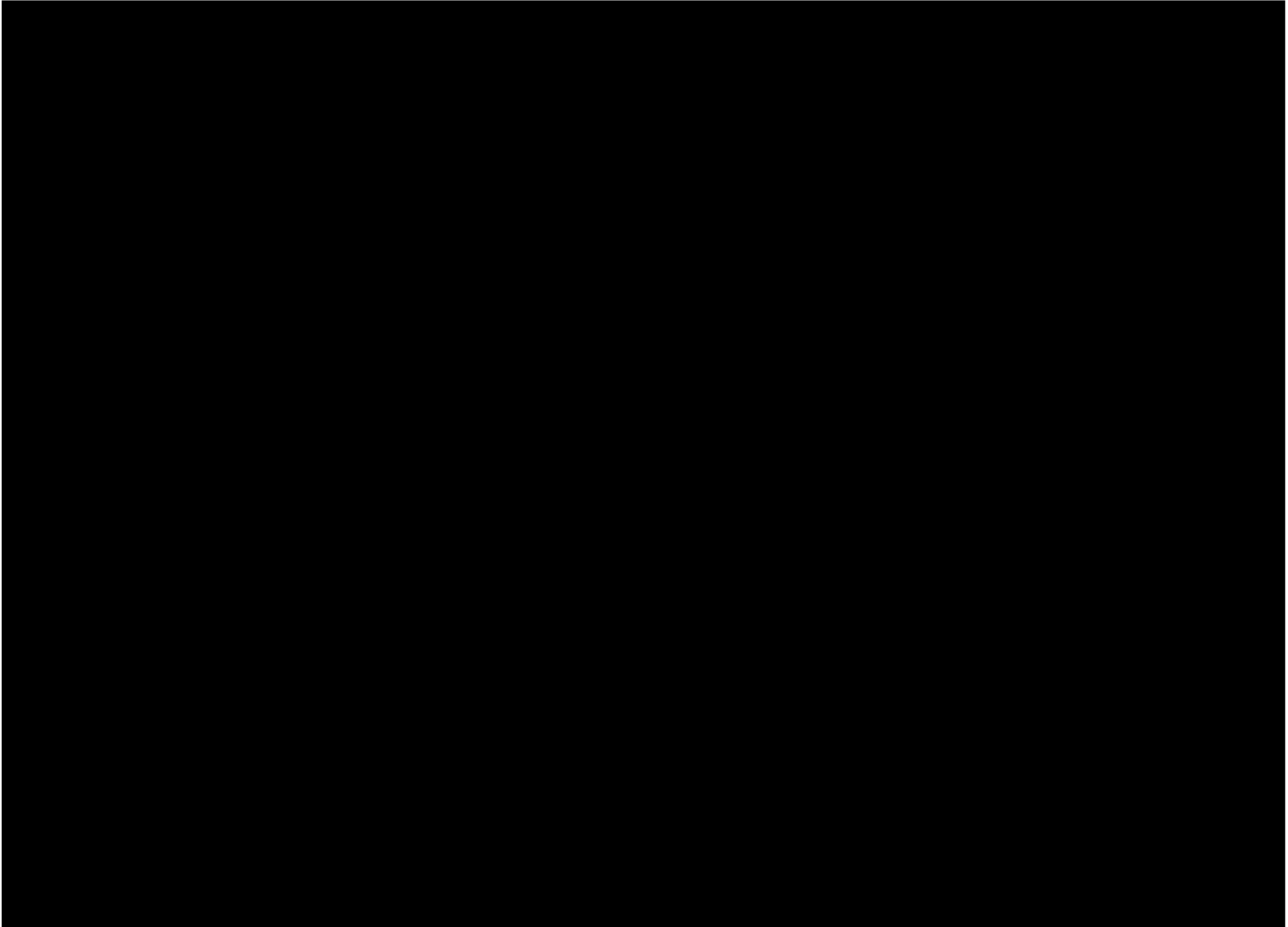
Appendix 3: Line Drawings



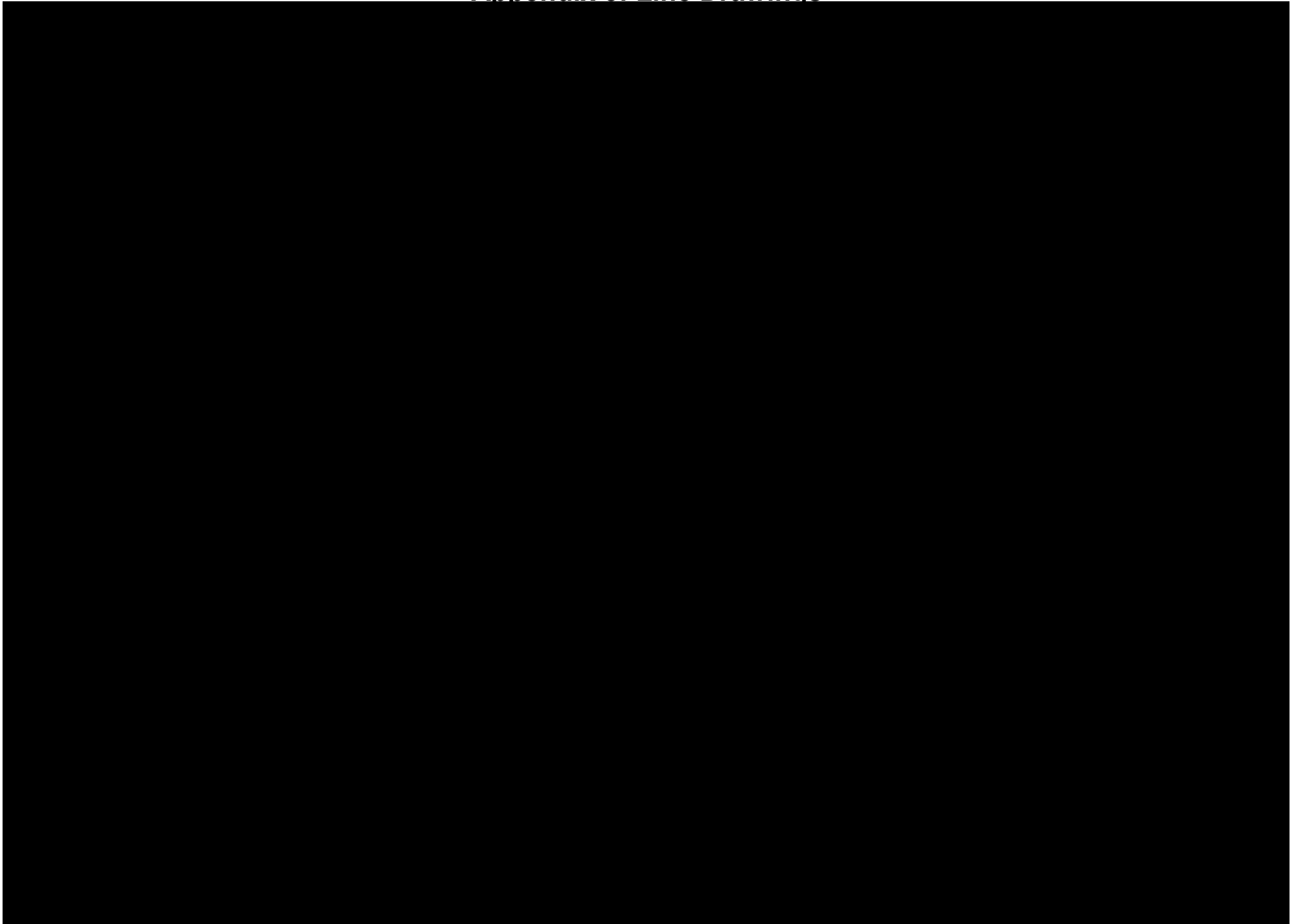
Appendix 3: Line Drawings



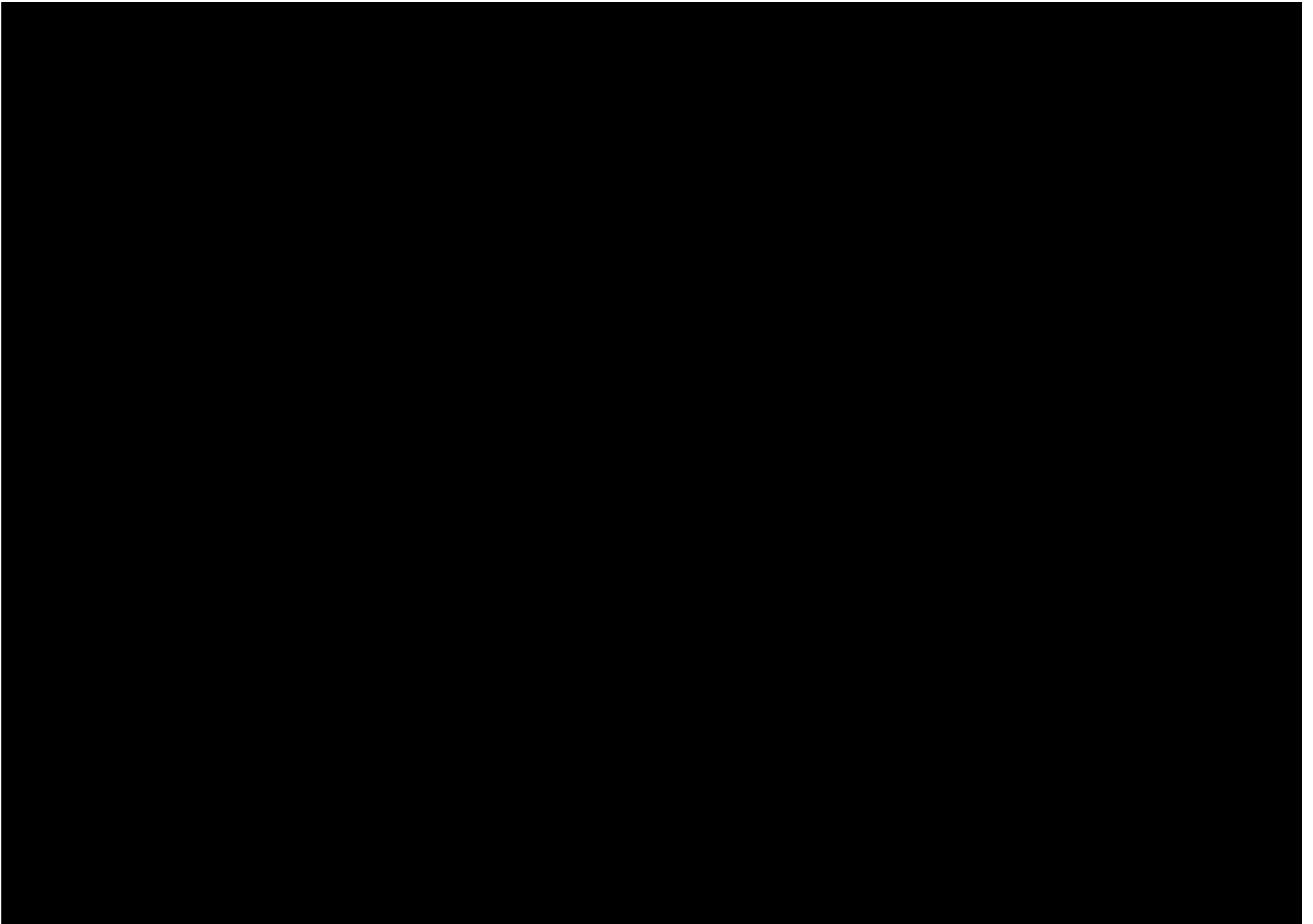
Appendix 3: Line Drawings



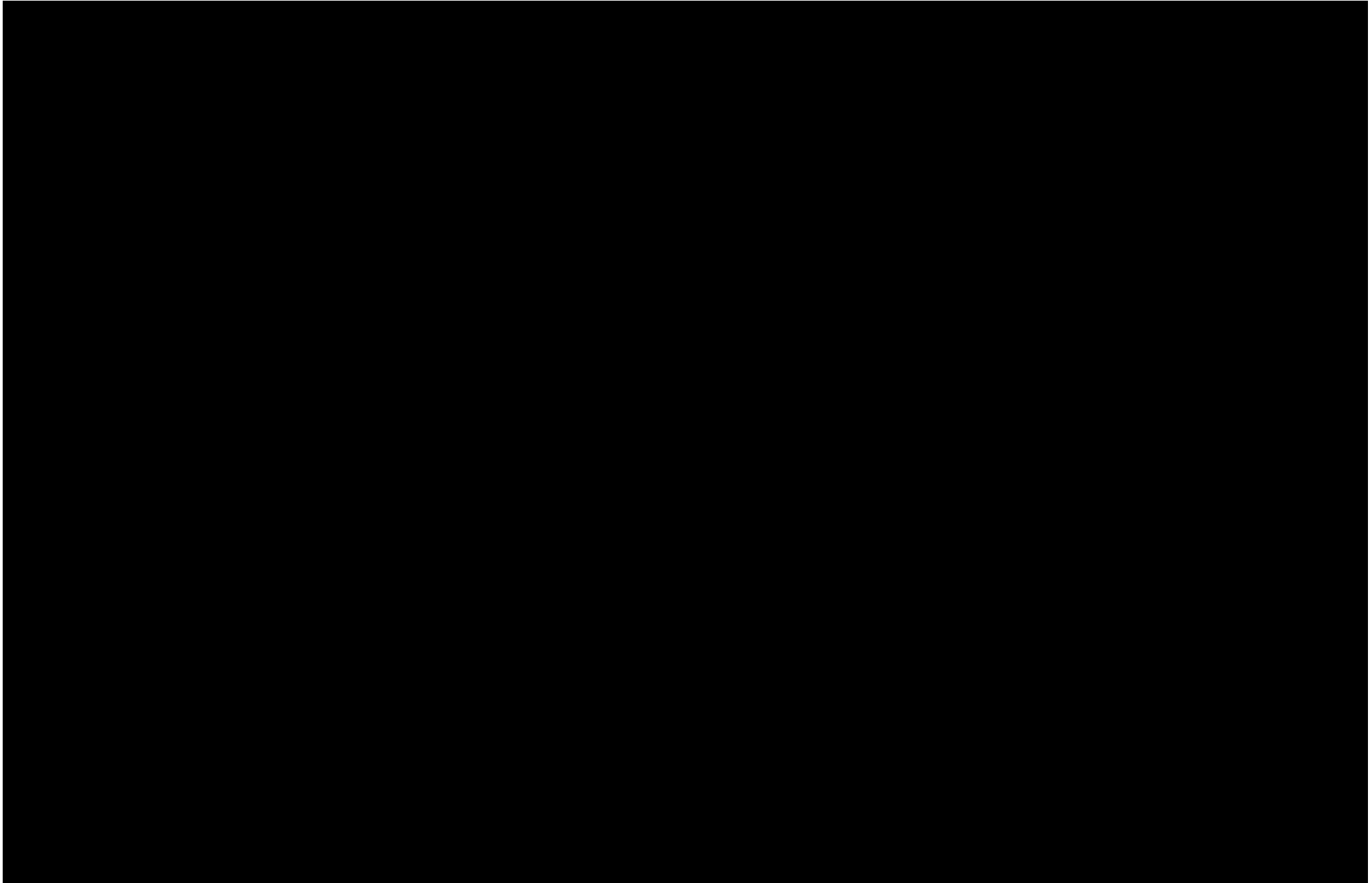
Appendix 3: Line Drawings



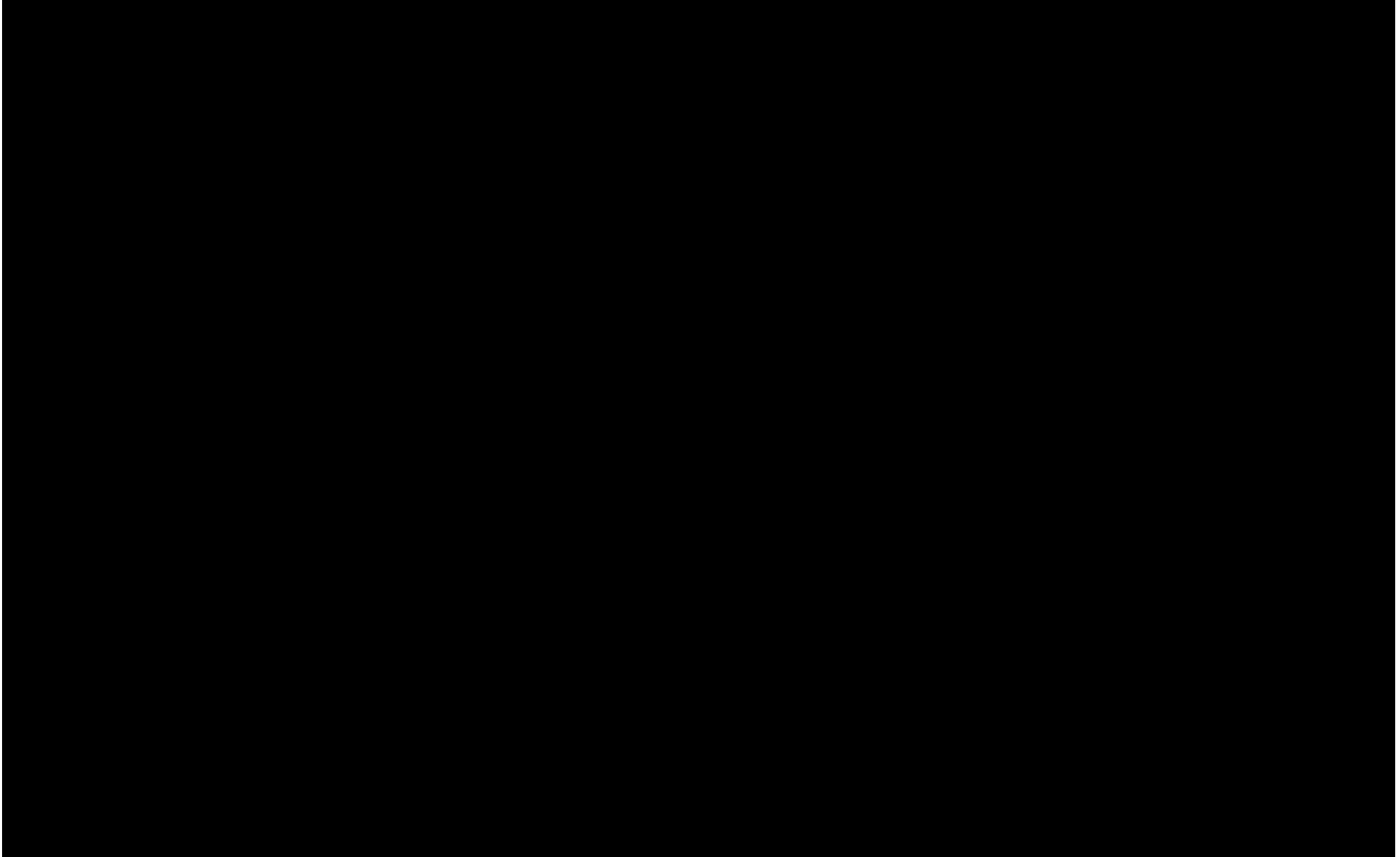
Appendix 3: Line Drawings



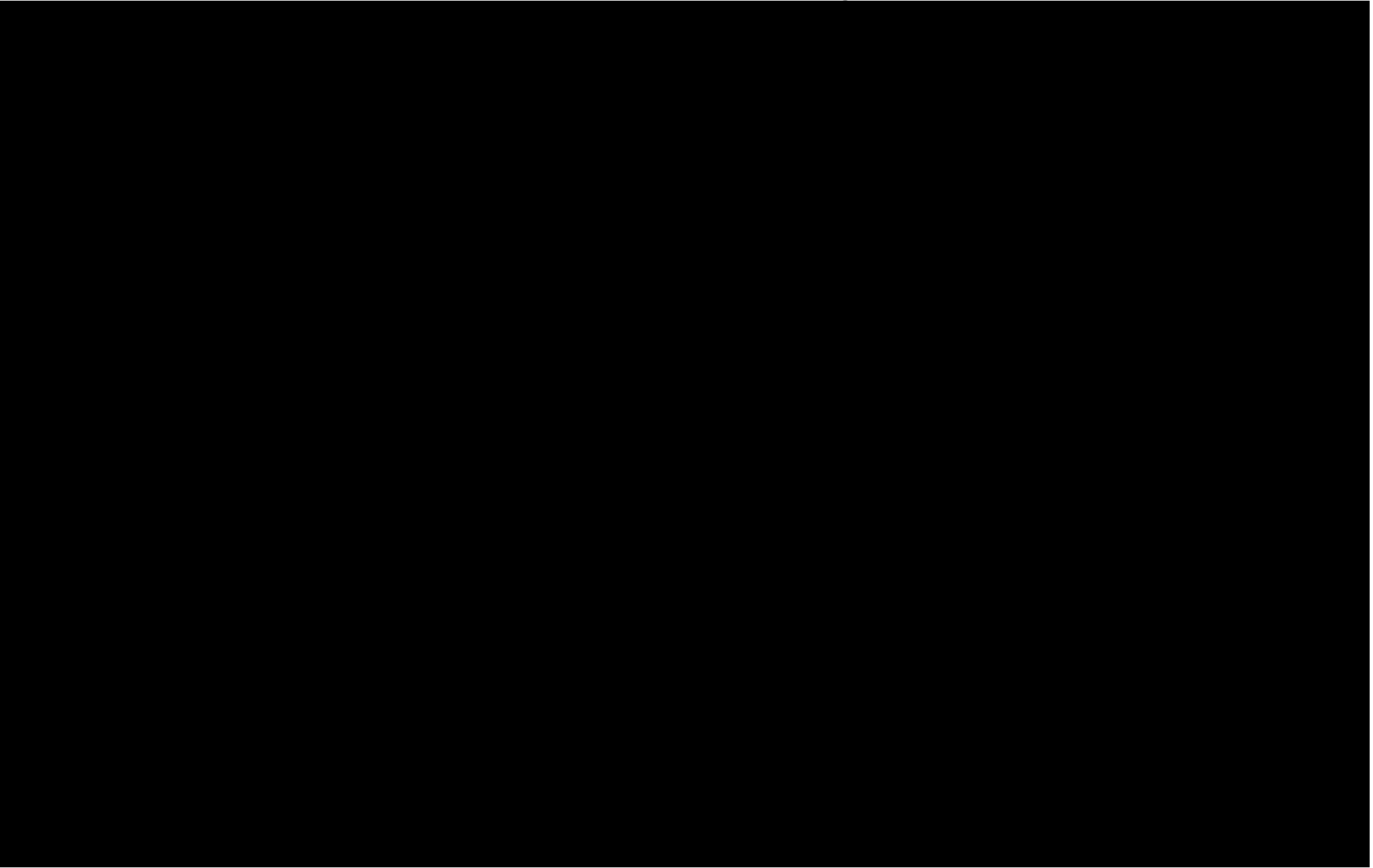
Appendix 3: Line Drawings



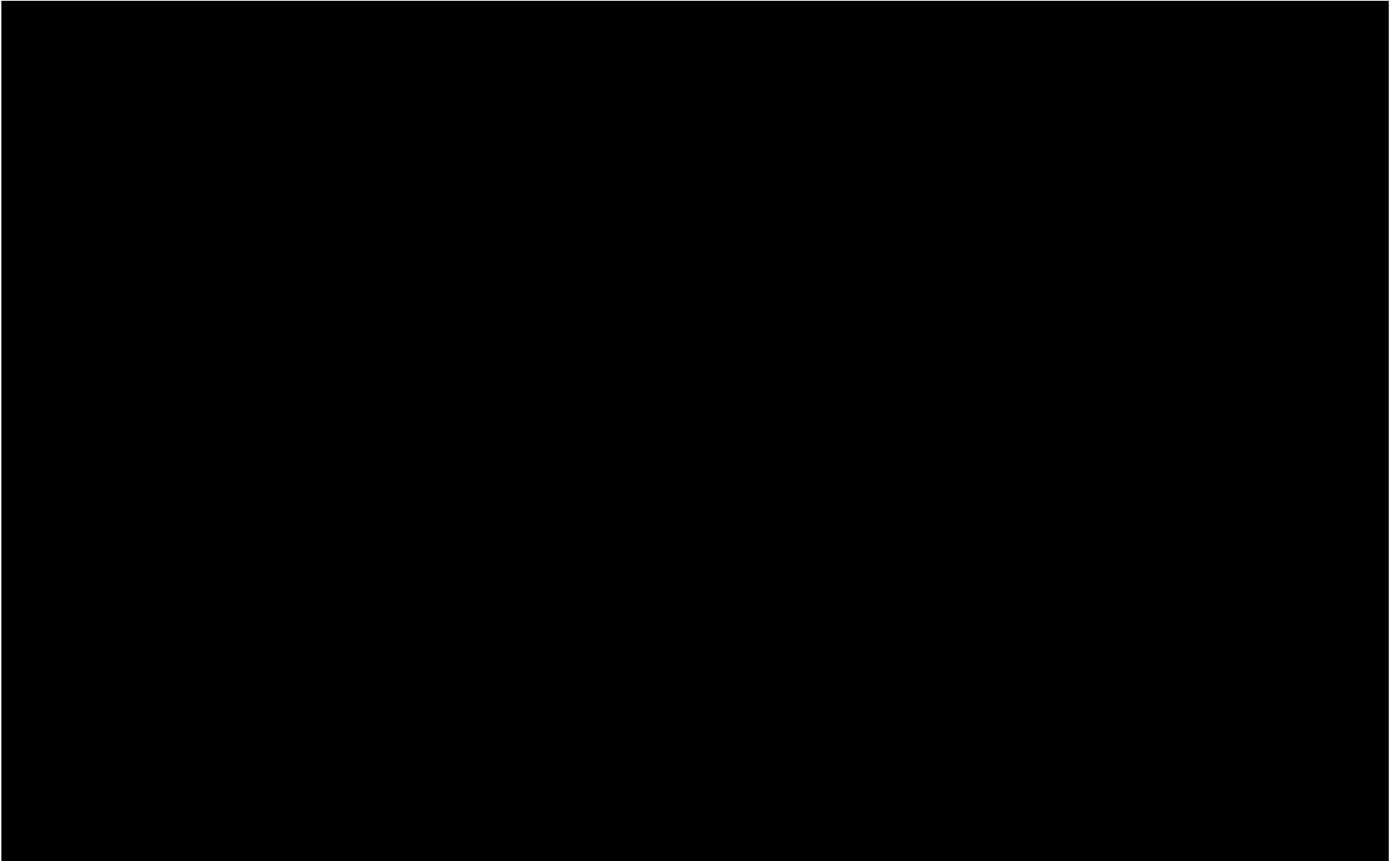
Appendix 3: Line Drawings



Appendix 3: Line Drawings

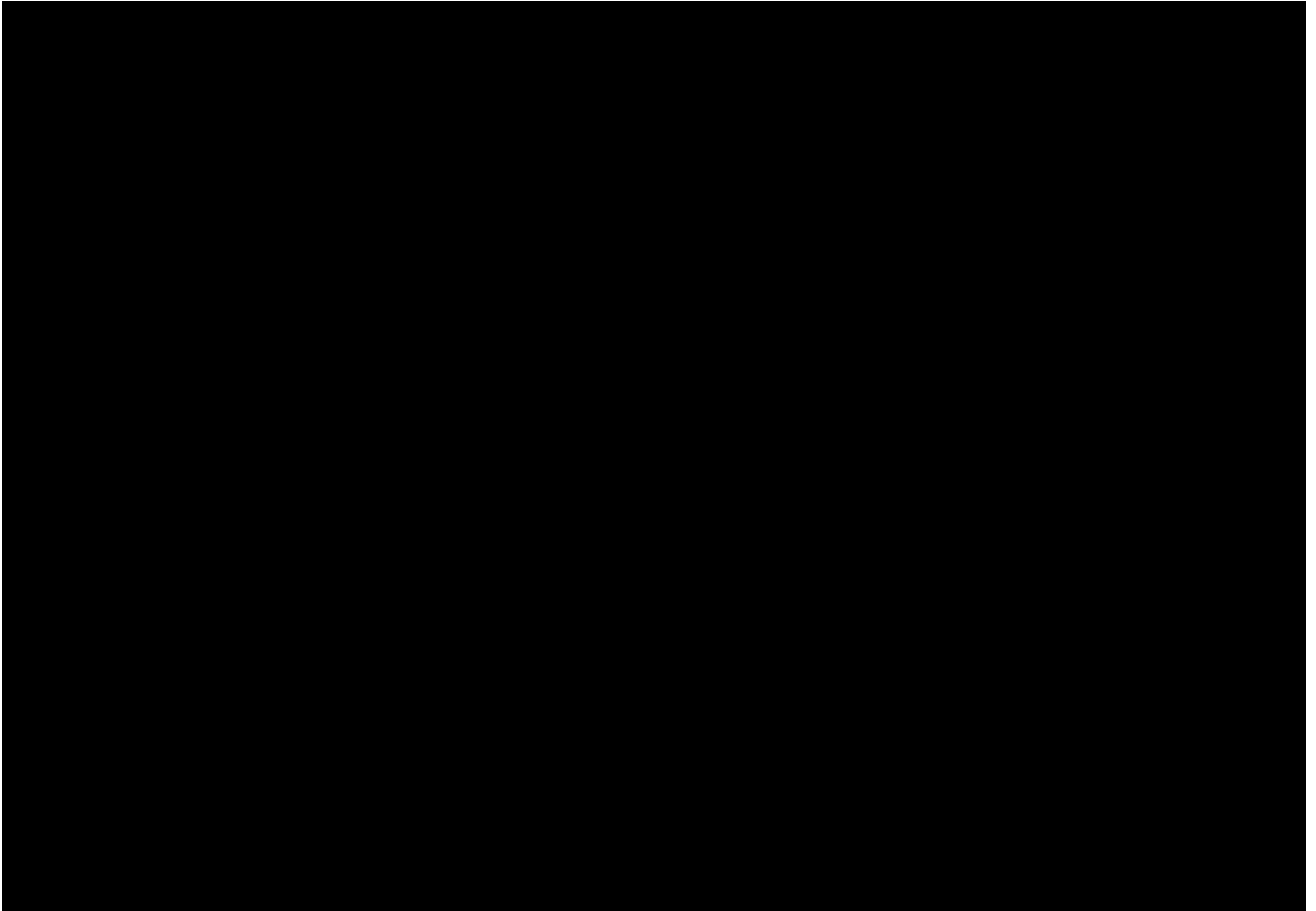


Appendix 3: Line Drawings

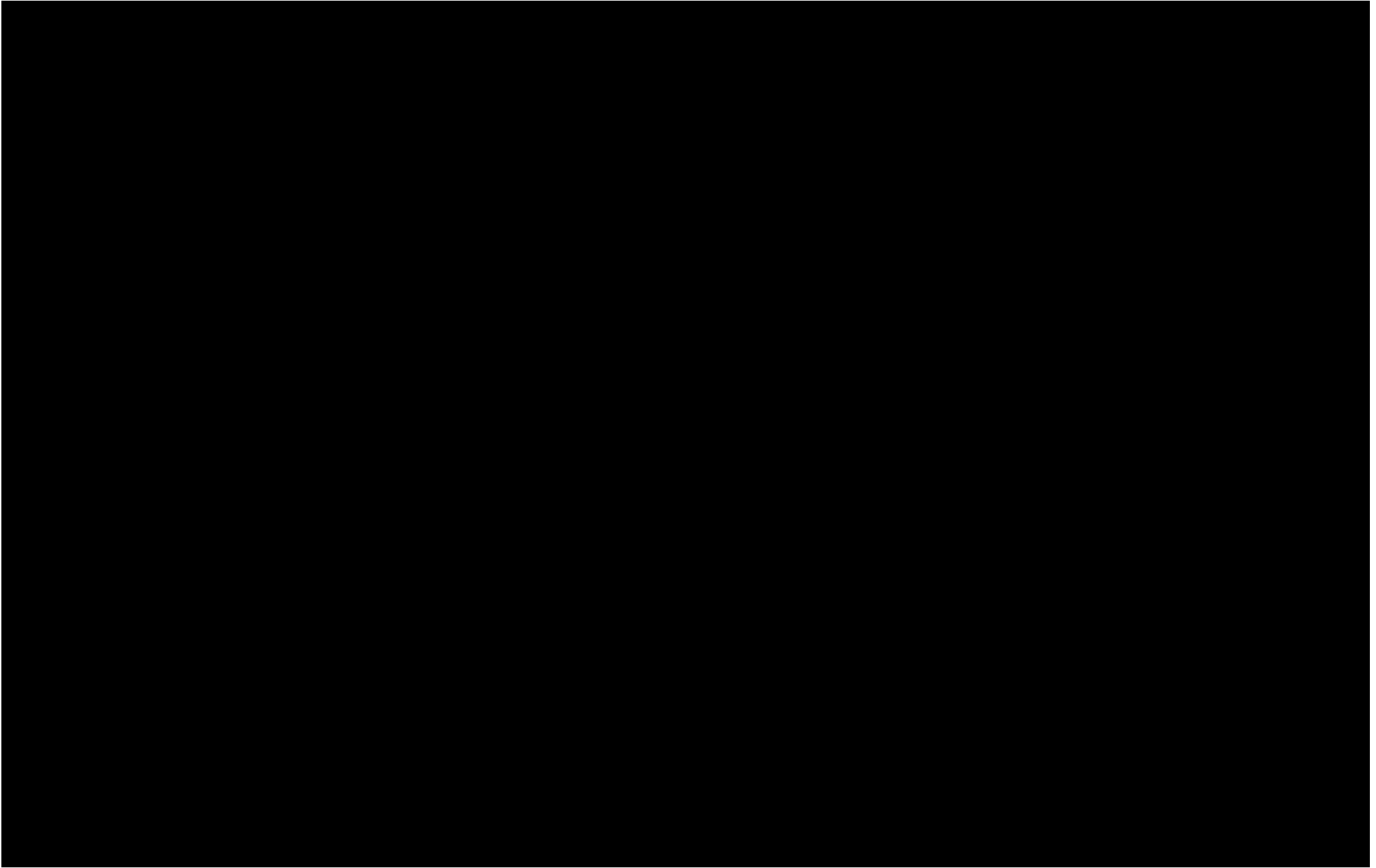


Appendix 3: Line Drawings

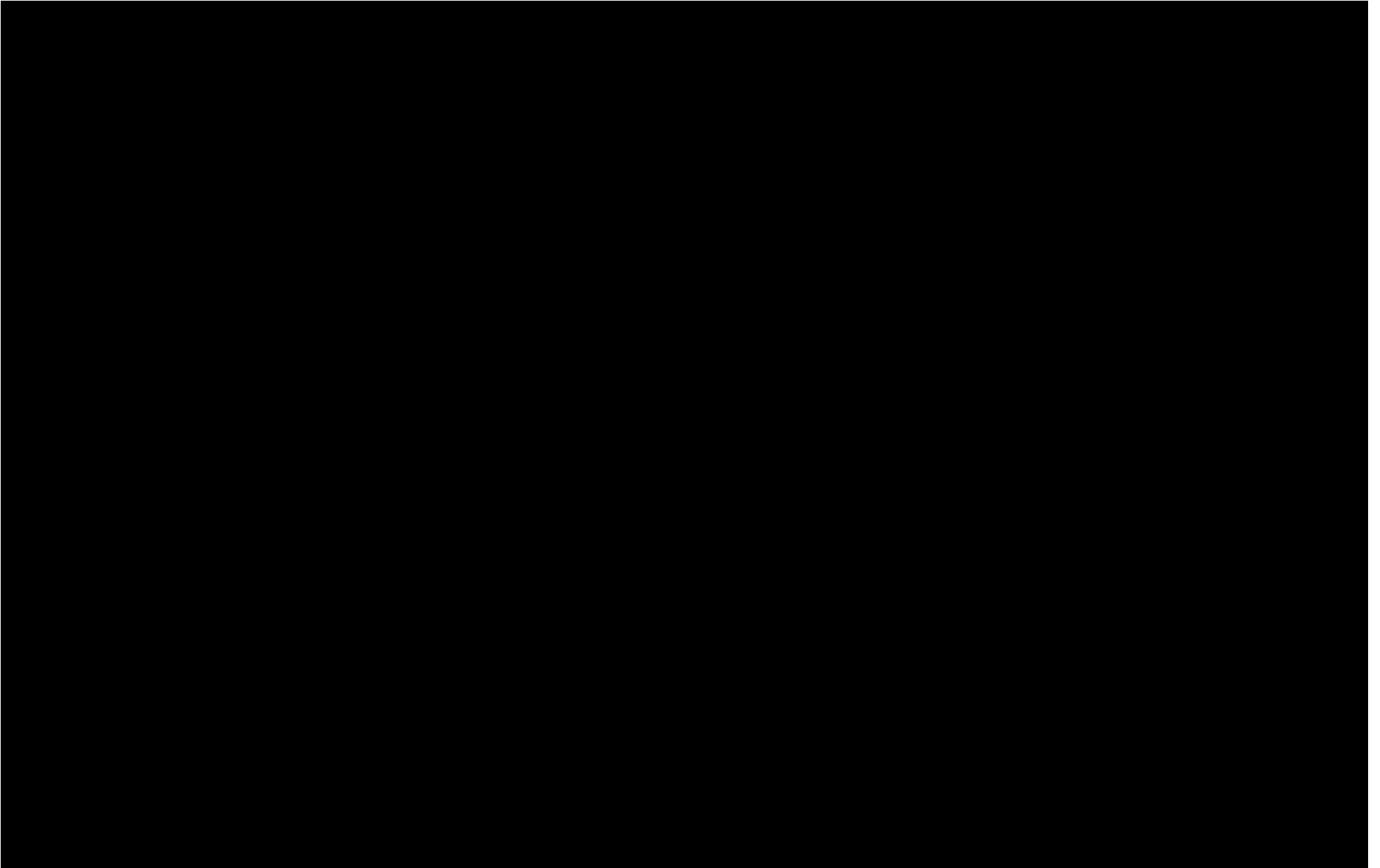
Appendix 3: Line Drawings



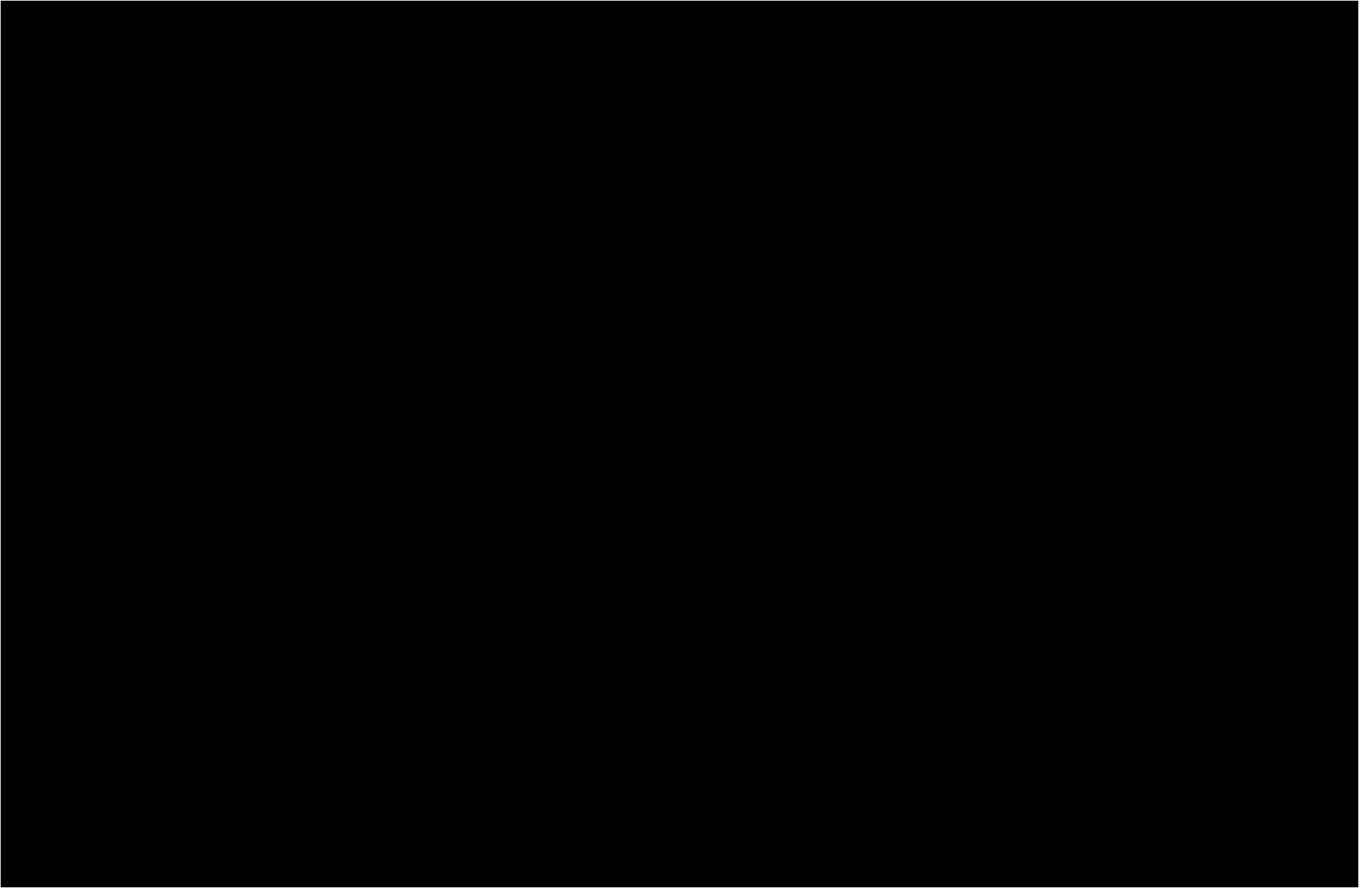
Appendix 3: Line Drawings



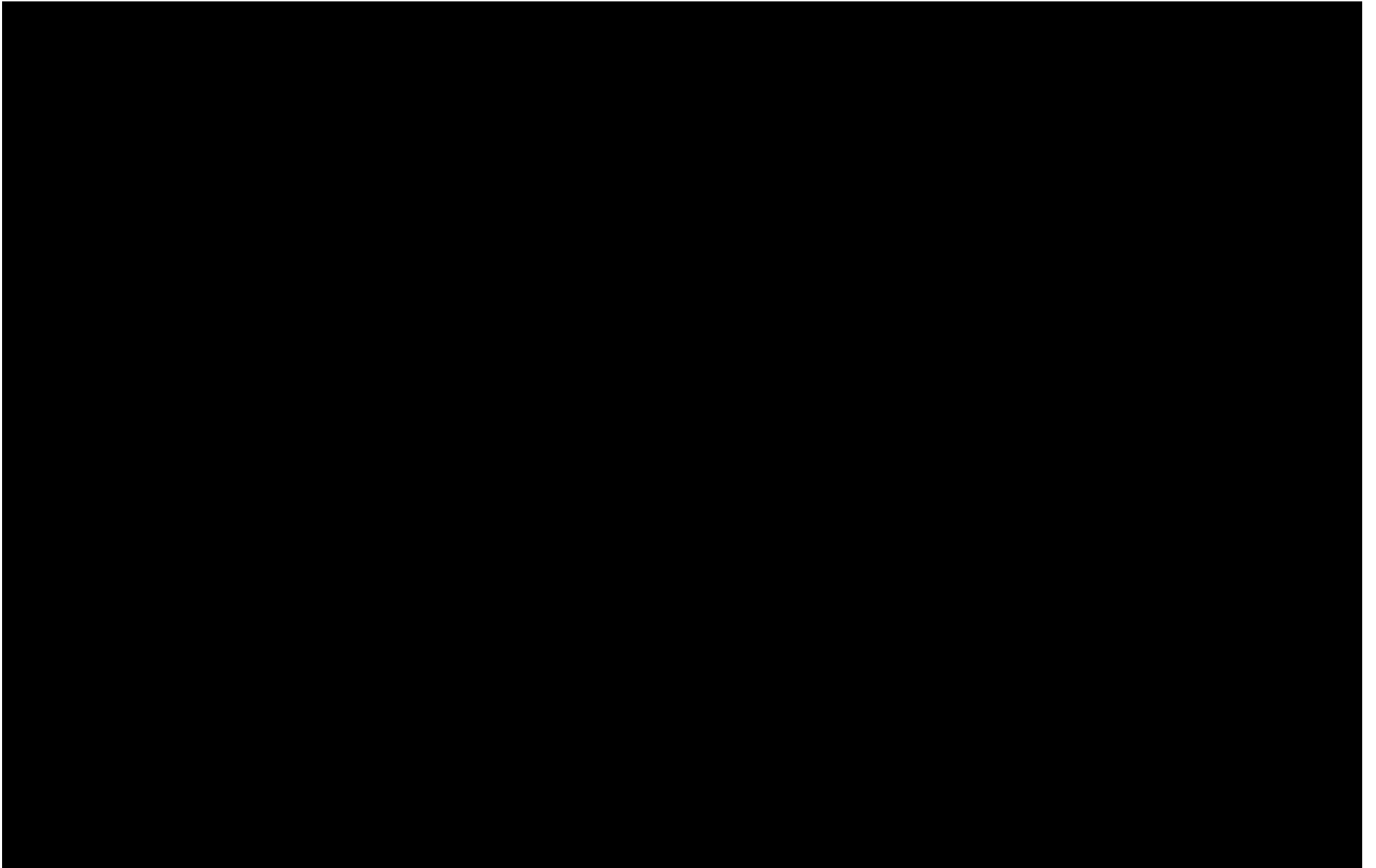
Appendix 3: Line Drawings



Appendix 3: Line Drawings



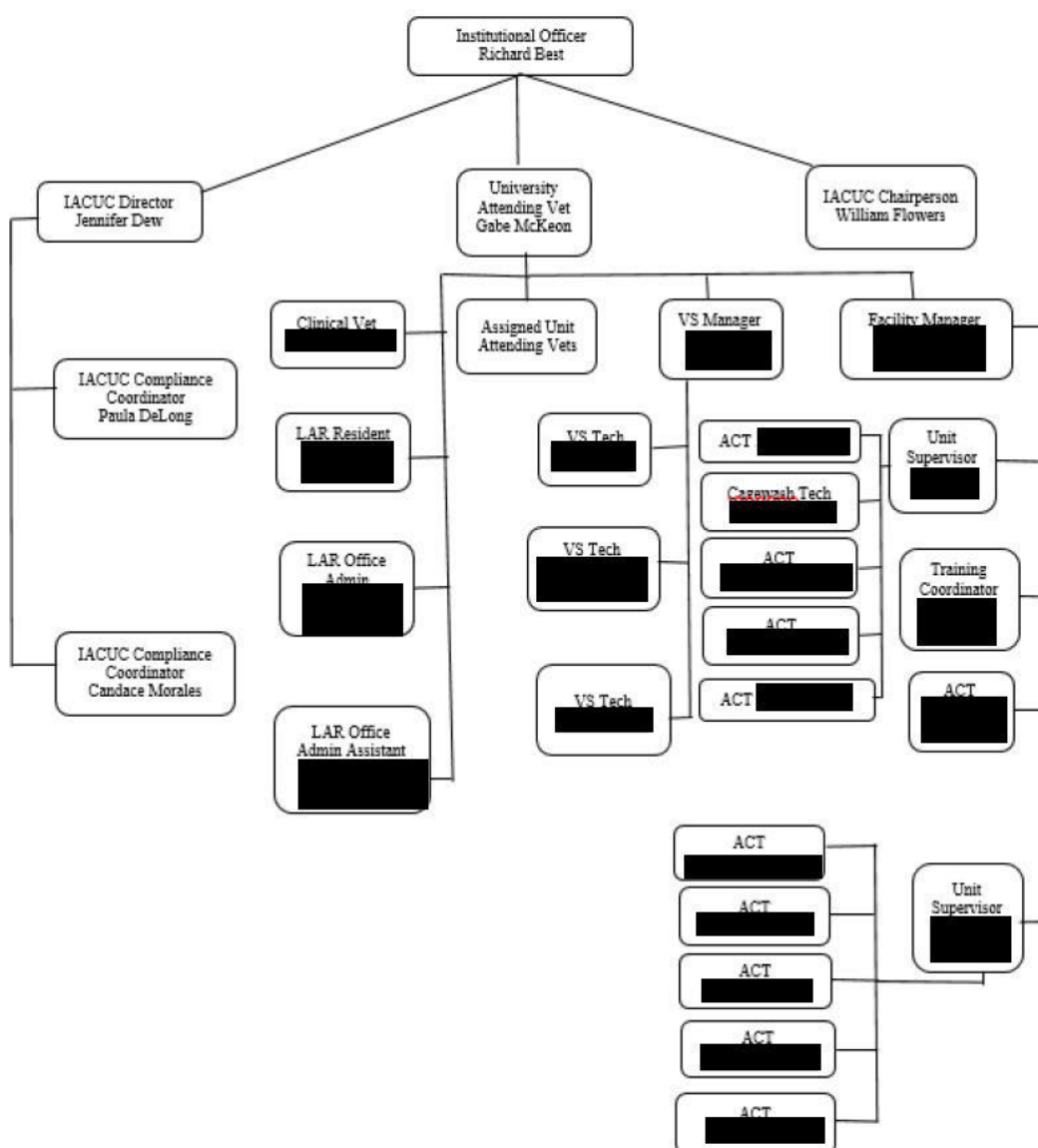
Appendix 3: Line Drawings



Appendix 4: Organizational Chart

Provide an accurate, current, and detailed organization chart or charts that detail the lines of authority from the Institutional Official to the Attending Veterinarian, the IACUC/OB, and personnel providing animal care. If applicable, include personnel responsible for managing satellite housing areas/locations and depict the reporting relationship between the Attending Veterinarian and other(s) having a direct role in providing veterinary care.

Organizational Chart November 2020



Appendix 5: Animal Usage

In order to assist the site visitors in their evaluation of the animal care and use program, please provide the information requested below. Information should be provided for all animals approved for use in research, teaching or testing, including those which may be used or housed in laboratories outside the animal care facility. Of particular interest is information on those animals which are used in research projects involving recovery surgical procedures, behavioral or other testing requiring chairing or other forms of restraint, or exposure to potentially hazardous materials. An alternate format is acceptable as long as the information requested is provided.

| Project/Project Title | IACUC/O B Number | Principal Investigator | Species | Total Number of Animals Approved | Pain & Distress Category (1) | Special Considerations (use checkmark if applicable) | | | | | |
|--|------------------|------------------------|--|----------------------------------|------------------------------|--|---------|---------|--------|---------|---------|
| | | | | | | SS (2) | MSS (3) | FFR (4) | PR (5) | HAU (6) | NCA (7) |
| Biological Sample Collection from Zoological Species - Blanket | 18-015-O | | Various (field study) | 600 | C | | | | | | |
| College of Vet Medicine Open House & Poultry Club Educational Chicks | 18-021-T | | Chicken | 100 | C | | | | | | |
| The Role of the Intestinal Microbiota in Gastrointestinal Biology and Inflammation | 18-026-B | | Mouse | 2616/330 | C/E | | | | | X | |
| Red Wolf Conservation | 18-029-O | | Wolf | 16 | D | | | | | | |
| Blanket Proposal: Pharmacokinetic analysis of analgesic medications in dogs. | 18-030-O | | Dog | 9 | C | | | X | | | |
| Pharmacology and Effects of Therapeutic Drugs in Birds - Blanket Protocol | 18-046-O | | Bird (client owned/ wild caught) | 1495 | C | | | | | | |
| Pilot Study to Evaluate DNA Damage Response Inhibitors in a Rodent Model of Cancer | 18-048-B | | Mouse | 64 | D | | | | | X | |
| Non-experimental Maintenance of a Herd of Breeding Mares (Pony) | 18-086-O | | Horse (client owned/ university owned) | 65 | C | | | | | | |
| VMB 921: Veterinary Comparative Anatomy | 18-103-O | | Horse/cattle/ goat/ pig | 18/18/33/6 | C | | | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | | |
|---|----------|--|---|-------------------|---------|---|---|--|--|---|---|
| Advanced Herpetological Medicine Selective VMC 991-112 | 18-162-T | | Frog | 44 | D | X | X | | | | |
| Swine Industry Classes - VMP 904 | 18-167-T | | pig | 255 | C | | | | | | |
| Stem cell mediated repair of ischemic-injured porcine intestine | 19-019-B | | Pig | 92 | D | X | | | | X | |
| Feline Blood Donor Colony | 19-022-O | | Cat | 20 | C | | | | | | |
| Propagation of Freshwater Mussels | 19-025-O | | Fish | 2050 | C | | | | | | |
| Ahead of the curve: mechanisms of left-right asymmetric stomach morphogenesis | 19-027-B | | Frog | 432961 | C | | | | | X | |
| Post-natal development of enteric glial cell-epithelial interactions in repair of ischemic-injured intestine | 19-032-B | | Pig | 9/ 138 | C/ D | | | | | | |
| Role of Fish and Mussel Co-Culture to Enhance the Microbial Health of Juvenile Freshwater Mussels Raised in Vitro | 19-033-O | | Fish | 22 | C | | | | | | |
| Assessment of blood parameters for prognostic indicators in the survivability of North Carolina native wild injured turtles Pilot Study | 19-036-O | | Turtle | 500 | C | | | | | | |
| HEALTH MAINTENANCE AND PRODUCTION I, II, AND III (VMP916 FALL/SPRING, VMP936 FALL/SPRING, VMP956 FALL | 19-052-T | | Cattle, pig, goat, sheep, turkey, chicken horse | 22,833/ 2874 | C/ D | | | | | | |
| Swine Colony Management | 19-080-A | | Pig | 101/ 2 | C/ D | X | | | | X | |
| Evaluation of a Potentiator of Antibiotic Treatment- Pilot Study | 19-081-A | | Goats | 24 | D | | | | | X | |
| Assessing immune function in zebrafish | 19-504 | | Fish | 10800/6000/ 51996 | C/ D/ E | | | | | X | X |

Appendix 5: Animal Usage

| | | | | | | | | | | | | |
|--|--------|--|---------------------------------------|----------------|---------|---|--|--|--|--|--|--|
| | | | | | | | | | | | | |
| Non-Experimental Maintenance/Holding and disposition of Research and Teaching Animals | 19-515 | | Various | Various | B/C/D | X | | | | | | |
| Investigation of the MARCKS protein as a potential therapeutic target in Equine Asthma Syndrome | 19-520 | | Horse (client and university owned) | 150 | D | | | | | | | |
| VMC 937: Introduction to Physical Exam Skills, VMB 911 Anatomy I and VMC 927 Introduction to Companion Animal Behavior | 19-531 | | Cat/ Dog (client or university owned) | 38/ 40/ 51 | C/ C/ D | | | | | | | |
| Advanced Fish Medicine Selective (VMC 991) And Aquatic Animal Medicine rotation (VMC 987) | 19-572 | | Fish | 238 | D | | | | | | | |
| Pilot Study: Investigation of potassium chloride for euthanasia of anesthetized marine toads (Rhinella marina) and Cuban tree frogs (Osteopilus septentrionalis) | 19-576 | | Frog/ Toad | 40 | C | | | | | | | |
| Clinical Studies Core | 19-586 | | Cat/ dog/ Horse | 700/ 4500/ 400 | C | | | | | | | |
| Surgical training in zoological medicine (Ferret Physical Examination and Surgery Labs), VMC 991-19 | 19-587 | | Ferret | 50 | D | X | | | | | | |
| Avian Teaching Laboratories | 19-588 | | Cockatiels/ Pigeon | 50/ 50 | C | | | | | | | |
| CVM Rumen Palpation & Motility Teaching Lab | 19-626 | | Cattle | 6 | C | | | | | | | |
| Equine blood product and tissue collection for in-vitro experiments | 19-628 | | Horse | 12 | D | | | | | | | |
| Quantitative Sensory Testing (QST) and Nociceptive Withdrawal Reflex (NWR) testing in | 19-657 | | Cat/ dog | 80/ 60 | D | | | | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | |
|--|--------|-----------------------|-------------|-------|---|--|--|--|---|--|
| cats and dogs: Blanket Protocol | | | | | | | | | | |
| Bovine Rumenotomy and Abdominal Exploratory | 19-687 | Cattle | 6 | D | X | | | | | |
| Department of Population Health & Pathobiology Ruminant Clinical Teaching Courses: VMP 970, 972, 974, 987 and 991 | 19-733 | Ruminants | 618/ 160 | C/D | | | | | | |
| VMC-943 Laboratory Animal and Zoological Species Health and Disease I | 19-769 | Amphibian/fish/ snake | 120/ 75/ 75 | C | | | | | | |
| Clinical Cardiology and Critical Care Skills Laboratory | 19-788 | Dog | 30 | C | | | | | | |
| Teaching Protocol: Liver Biopsies in Cattle | 19-805 | Cattle | 24 | D | X | | | | | |
| Blanket Protocol for: Cellular and molecular mechanisms of pain caused by acute radiation injuries | 19-810 | Mouse | 96/36/376 | C/D/E | | | | | X | |
| Effect of anti-allergic and anti-itch interventions in allergen-sensitized maltese-beagle atopic dogs (Blanket Protocol Application) | 19-825 | Dog | 8 | D | X | | | | | |
| Handling and Biomethodology of Laboratory Animals - Personnel Training | 19-826 | Various | Various | C/D | | | | | | |
| Clinical Theriogenology VMC 940/941/904 courses and laboratory; activities for student chapters of the AAEP and SFT | 19-827 | Dog/ Horse | 65/ 83 | C/D | | | | | | |
| Health Monitoring Program for Laboratory Animals | 19-831 | Mouse | 600/ 150 | C | | | | | | |
| Evaluation of Marek's disease vaccine protection (vaccine trials)- Blanket Protocol | 20-127 | Chicken | 1914/ 486 | C/E | | | | | X | |

Appendix 5: Animal Usage

| | | | | | | | | | | |
|---|----------|---|------------------------------|-----|---|--|--|--|---|--|
| Galapagos Marine Iguana Sampling | 20-157 | Iguana | 350 | C | | | | | | |
| Equine Course, Laboratory, Clinical, and Outreach Teaching in association with Various VMC courses | 20-164 | Horse | 369/ 186 | C/D | X | | | | | |
| Sea turtle blood collection - blanket | 20-166 | Turtle | 750 | C | | | | | | |
| Raising Sentinel Chickens | 20-184 | Chicken | 1320 | C | | | | | | |
| Perfect Pet Program: Introduction to Soft Tissue Surgery, VMC932, Introduction to Clinical Practice, VMC957, and Primary Care Clinical Rotation VMC 939, VMC-988 Exotic Animal Medicine clinical rotation | 20-212 | Cat/ Dog/ Rabbit | C90/ C1300/ D10/ D2600/ R150 | C/D | X | | | | | |
| VMC -953 Laboratory Animal and Zoological Species Health and Disease II | 20-276 | Ferret/ Guinea Pig/ Rabbit/ Rat | 45 each | C | | | | | | |
| Acupuncture teaching laboratories in partnership with Chi Institute | 20-304 | Dog/ horse (client or university owned) | 40/ 72 | C | | | | | | |
| Test Mares for CEM Quarantine | 20-309 | Horse | 6 | D | X | | | | | |
| VMC 961 Laboratory - Orthopedic and Ophthalmic Examination | 20-350 | Dog | 42 | C | | | | | | |
| K9 DOWN! Are you prepared? Immediate care of the injured dog for emergency and military personnel | 20-386 | Dog | 84 | C | | | | | | |
| Blanket Protocol: XRAD320XL Cabinet Irradiator | 20-412 | Mouse | 100/100 | C/D | | | | | X | |
| Sample Collection for Investigators | 20-454 | Various | 171 | C | | | | | | |
| Bone marrow-derived mesenchymal stem cell | 17-149-O | Horse | | D | | | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | |
|---|----------|--|---|-----------|---------------|---|---|---|---|--|
| therapy in equine inflammatory ocular surface disease | | | 18 | | | | | | X | |
| Deciphering immunosuppression and immunological memory in PRRSV infections | 17-166-A | | Pig | 188 | C | | | | X | |
| Cardiovascular medical device testing in large animal models-Pilot Study | 17-183-B | | Pig | 20 | D | X | | | | |
| Hematology and biochemistry panel reference interval determination for fish- Pilot Study | 18-009-O | | Fish | 340 | C | | | | | |
| Neurobiological Mechanisms Underlying Sex Differences in Mental Illness | 18-016-O | | Mouse | 400/10410 | C/E | X | X | | X | |
| Determination of Antibiotic Drug Concentrations at Target Sites in Cattle | 18-020-A | | Cattle | 62 | D | | | | X | |
| A Mouse Model of Clostridium difficile Infection | 18-034-B | | Mouse | 3000 | C | | | | X | |
| Use of microneedle patch to promote hair growth | 18-047-B | | Mouse | 99 | D | | | | | |
| Colored light study in companion and wild birds | 18-049-O | | Birds (various)-client and university owned | 1445 | C | | | | | |
| Reovirus infection in a mouse model | 18-051-B | | Mouse | 1220 | C | | | | X | |
| Remote Detection and Interpretation of Postural Signals, Olfactory Discrimination, and Vital Signs of Canines | 18-053-O | | Dog (client and university owned) | 280 | C | | | | | |
| Radiographic Anatomy and Barium Sulfate Contrast Study of the Gastrointestinal Tract of Eastern Box Turtles (Terrapene carolina carolina) | 18-054-O | | Turtle/ frog/ toad | 40/24/15 | C | | | X | | |
| A pilot study to assess the impact of cancer treatment-associated pain on tumor behavior | 18-061-B | | Mouse | C/D / E | 100/ 487/ 506 | | | | X | |

Appendix 5: Animal Usage

| | | | | | | | | | | | |
|--|----------|--|-----------------------------------|------------------------|---------|---|--|---|--|---|--|
| Mesenchymal stem cell immunogenicity in an in vivo murine inflammatory model | 18-075-B | | Mouse | C/E | 328/159 | | | | | X | |
| Development of a Pig Model of Eosinophilic Esophagitis | 18-084-B | | Pig | 53 | D | | | | | | |
| Magnetic Resonance Imaging (MRI) PROTOCOL DEVELOPMENT (1.5 Tesla & 3 Tesla) | 18-094-O | | Cat/ dog | 3/20 | C | | | | | | |
| Ocular tolerability and immune response to corneal intrastromal AAV gene therapy in rabbits | 18-096-B | | Rabbit | 85 | D | X | | | | X | |
| Dissecting lung innate immune responses against PRRSV and SIV infection using functional genomics | 18-098-B | | Pig | 62 | C | | | | | | |
| Generation of primary keratinocytes and mouse skin cell lines for grafting protocols | 18-102-B | | Mouse | 1020/750 | C/D | | | | | X | |
| Longitudinal Study of Neuro-Aging in Dogs-Pilot Study | 18-109-O | | Dog | 1000/50 (client owned) | C/D | | | | | | |
| Use of rodent models to test novel antiparasitic drugs | 18-112-B | | Gerbil/ Mouse | 1554/ 1728 | D | | | X | | X | |
| Neurobiology of Affective Aggression | 18-114-B | | Mouse | 500/ 1500/ 1500 | C/D/E | X | | | | X | |
| Equine Pulmonary Function Testing for In Vivo Studies - Pilot Study | 18-124-B | | Horse | 12 | C | | | | | | |
| Establishing laser ablation as a treatment for canine glioma and modeling the human condition: A pilot study | 18-130-B | | Dog (university and client owned) | 8 | D | X | | | | | |
| Testing of proprietary oxazolidinones for the treatment of orthopedic based biofilm infections | 18-131-B | | Mouse | 73 | D | X | | | | X | |

Appendix 5: Animal Usage

| | | | | | | | | | | |
|---|----------|------------|----------------|-------|---|--|---|--|---|---|
| using an in vivo mouse model - Pilot Study | | | | | | | | | | |
| Nanoparticle therapy for murine mammary carcinoma | 18-136-B | Mouse | 85 | D | | | | | | X |
| Evaluation of dexamethasone for the treatment of experimental autoimmune uveitis (EAU) in the rat and mouse - a pilot study | 18-139-B | Mouse/ Rat | 40/111 | D | | | | | X | |
| Mechanisms of cytokinesis and delamination in the cerebral cortices | 18-140-B | Mouse | 29275/ 19075 | C/D | X | | | | X | |
| Euthanasia of koi fish with potassium chloride (KCl) via three routes of administration -Pilot Study | 18-141-O | Fish | 126 | C | | | | | | |
| Mechanisms and Function of Paneth Cell Expansion After Doxorubicin-Induced Damage | 18-146-O | Mouse | 2400/ 53/ 1978 | C/D/E | | | | | X | |
| Euthanasia of goldfish using MS-222 or propofol delivered using a fish anesthesia delivery system- Pilot Study | 18-152-O | Fish | 33 | C | | | | | | |
| Concentrations of Larazotide in the gastrointestinal tract of juvenile pigs - A Pilot Study | 18-154-B | Pig | 7 | D | X | | X | | | |
| Porcine Reproductive and Respiratory Syndrome (PRRS)v2 trials | 18-160-A | Pig | 240 | C | | | | | X | |
| Direct linkage of dietary components with microbial metabolizers in intestinal microbiota: toward the design of microbiota targeted diets-Pilot Study | 18-165-B | Mouse | 176 | C | | | | | X | |
| Pilot study to investigate the diagnostic and prognostic value of plasma cell free DNA (cfDNA) for horses with colic | 18-168-O | horse | 166 | C | | | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | |
|---|----------|--------------------|----------|-----|---|---|--|--|---|--|
| Pharmacokinetics and pharmacodynamics of intravenous alfaxalone in the green sea turtle (Chelonia mydas) | 18-169-O | Turtle | 6 | C | | | | | | |
| Development of an animal model of Bartonellosis: Bartonella spp. infection in ferrets- A pilot study | 18-175-B | Ferret | 16 | E | | | | | X | |
| Pilot Study: Using a Mouse Model to Develop Strategies for the Prevention of Radiation-induced Heart Disease | 18-177-B | Mouse | 70 | C | | | | | X | |
| EVALUATION OF I-STAT AND VETSCAN TO MEASURE BLOOD BIOCHEMISTRY PARAMETERS IN POULTRY | 19-001-A | Chicken/ Turkey | 180/ 150 | C | | | | | | |
| Flea-borne disease and the microbiome of fleas from free-roaming cats in North Carolina | 19-003 | Cat | 150 | C | | | | | | |
| The Role of Gastrin in Esophageal Submucosal Gland Ductal Acinar Metaplasia | 19-011-B | Pig | 65 | D | X | | | | | |
| Evaluating the effects of 0290 on the procedural pain associated with intra-articular injection of 4975 | 19-012-O | Rat | 120 | E | | | | | X | |
| Animal Models of Posterior Uveitis | 19-014-B | Rabbit/ Rat | 7/60 | D | X | | | | X | |
| Functional Tissue Engineering for Cartilage repair | 19-016-B | Dog | 22 | D | X | X | | | | |
| Pilot study to investigate the correlation between cell free DNA and NETosis in an ex vivo model of equine inflammation | 19-018-O | Horse | 10 | C | | | | | | |
| Novel tissue clearing and imaging technologies for | | | | C/D | | | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | | |
|---|----------|--|------------|----------------|-------|---|--|---|--|---|--|
| characterizing the biodistribution and treatment benefits of biologics with sub-micrometer resolution | 19-035-O | | Mouse | 125/ 1742 | | | | | | X | |
| Ultrasonographic evaluation of the effects of intravenous dexmedetomidine and morphine on the gallbladder wall appearance: a pilot study | 19-038-O | | Dog | 10 | C | | | | | | |
| Effects of Storage Method on Intestinal Allograft Immune Profile and Viability | 19-043-B | | Pig | 53 | D | X | | | | | |
| Understanding the neural mechanism of pruriception and nociception | 19-047-B | | Mouse | 2800/ 264/ 400 | C/D/E | X | | | | X | |
| The effects of combined carprofen and omeprazole administration on carprofen pharmacokinetics and gastrointestinal permeability in dogs. | 19-048-O | | Dog | 8 | C | | | | | | |
| AAV-mediated immune tolerance to prevent cornea transplant rejection in rabbits | 19-050-B | | Rabbit | 142 | D | X | | | | X | |
| Anti-tumor Protein and Drug Delivery Using Polymeric Nanoparticles | 19-055-B | | Mouse/ rat | 1026/ 10 | D | X | | | | X | |
| Evaluation of full thickness porcine skin wound healing after application of electroceutical dressings - a pilot study | | | pig | 8 | D | X | | | | X | |
| Measurement of antimicrobial drug concentrations in plasma of dogs after administration of oral, intravenous, or subcutaneous formulations - pilot studies. | 19-059-O | | Dog | 9 | C | | | X | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | | |
|--|----------|--|------------------------|-----------------|---------|---|--|---|--|---|--|
| Large animal model to study wound healing in injured tissue – a pilot study | 19-061-B | | Pig | 15 | D | X | | | | X | |
| Pharmacokinetics, Hemolysis, and Toxicity Studies in Rodents | 19-067-B | | Mouse/ rat | 47/ 24 | D | | | | | | |
| Pharmacokinetics in Chelonians. Blanket Protocol | 19-068-O | | Turtle (wild injured) | 225 | D | | | | | | |
| Regulation of Intestinal Stem Cells by the Enteric Nervous System in Health and Diseases. | 19-070-B | | Mouse | 3719/ 731/ 3680 | C/D/E | X | | X | | X | |
| Laparoscopy to determine sex ratios and validate sex identification methods in sea turtles. | 19-071-O | | Fish/ turtle | 50/ 100 | B/D | X | | | | | |
| Gut health in poultry: Developing alternatives to antibiotics and boosting mucosal immunity | 19-077-A | | chicken | 300/ 1170/ 130 | C/ D/ E | | | | | X | |
| Evaluation of corneal clouding in feline mucopolysaccharidosis type VI MPS Vi- Pilot Study | 19-078-B | | Cat | 12 | D | X | | | | X | |
| Administration of opioid antagonists and ampakines to reverse opioid overdose in dogs, as a model for testing reversal agents for human use- Pilot Study | 19-548 | | Dog | 9 | C | | | X | | | |
| The role of P53 in Elephant Tumors (Pilot Study) | 19-512 | | Elephant (field study) | 300 | C | | | | | | |
| Regulation of macrophage function by biochemical and mechanical cues | 19-513 | | Mouse | 156 | C | | | | | | |
| Physiologic effects and analgesic efficacy of prolonged lidocaine immersion of goldfish (Carassius auratus)-Pilot Study | 19-514 | | Fish | 53 | D | | | | | | |
| Spectral Doppler Ultrasounographic | 19-564 | | | | C | | | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | | |
|---|--------|--|---|--------|-----|---|--|--|--|---|--|
| Assessment of the Splenic Vein and Portal Vein using Dexmedetomidine as a Model for Portal Hypertension | | | Dog (client or university owned) | 22 | | | | | | | |
| Timely On-Farm Euthanasia Of Cattle: Exploring Caretaker Decision Making And Training Methods | 19-601 | | Cattle | 88 | B | | | | | | |
| Pharmacokinetics of flunixin meglumine in marine toads (<i>Rhinella marina</i>) and Cuban treefrogs (<i>Osteopilus septentrionalis</i>) using intramuscular and transdermal routes. | 19-614 | | Frog/ toad (zoo owned) | 40/40 | D | | | | | | |
| Mechanisms of Canine Platelet Activation and Clot Formation | 19-623 | | Dog | 35 | C | | | | | | |
| Impact of Age and Early Injury on Acute or Chronically Painful Conditions during Adulthood | 19-634 | | Mouse/ Rat | 29/423 | C/E | X | | | | X | |
| Use of 3-D bladder ultrasound device in hospitalized dogs- Pilot Study | 19-656 | | Dog (client owned and university owned) | 100/5 | C | | | | | | |
| Pilot Study: Safety and feasibility of cardiovascular medical device testing in dogs | 19-671 | | Dog | 10 | D | X | | | | | |
| Comparison of Platelet Function Between Canine Fresh Whole Blood, Cold Stored Whole Blood, and Platelet Concentrate-- A Pilot Study | 19-697 | | Dog | 7 | C | | | | | | |
| Effects of various larazotide analogs on | 19-699 | | Pig | 26 | D | | | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | |
|---|--------|--|------------|----------|---|---|--|--|---|--|
| repair of intestinal ischemia in pigs. | | | | | | | | | | |
| Evaluation of Intracardiac Euthanasia Methods in Snakes | 19-702 | | Snake | 20 | C | | | | | |
| Optimizing functional MRI techniques for canine epilepsy studies (pilot study) | 19-710 | | Dog | 8 | D | | | | | |
| Peripheral vascular responsiveness to pimobendan as assessed by duplex Doppler ultrasonography in dogs with congestive heart failure due to mitral regurgitation. | 19-712 | | Dog | 20 | C | | | | | |
| Determining blood reference intervals for diagnostic testing in cats and dogs. | 19-728 | | Cat/ dog | 45/45 | C | | | | | |
| The pig: A novel large animal model of allergic eosinophilic esophagitis | 19-729 | | pig | 48 | D | | | | | |
| Evaluation of blood lactate in response to handling stress in sea turtles and a comparison of two point-of-care analyzers | 19-746 | | turtle | 32 | C | | | | | |
| Models of Bone Diseases to Study Regenerative Potential of Stem Cells and Biomaterials | 19-764 | | Mouse/ rat | 100/ 100 | D | X | | | X | |
| Emergency and surgical procedures laboratory | 19-766 | | Dog | 10 | D | X | | | | |
| Pilot study to Determine Pharmacokinetics and Pharmacodynamics of high-dose, subcutaneous buprenorphine in domestic ferrets. | 19-767 | | Ferret | 14 | D | X | | | | |

Appendix 5: Animal Usage

| | | | | | | | | | | |
|--|--------|------------|-----------------------------|-------|---|---|--|--|---|--|
| Energy Supplementation of Sows During Farrowing - A Pilot Project | 19-768 | Pig | 20 | C | | | | | | |
| Regulation of Equine Leukocyte Activation and Function | 19-779 | Horse | 30 | C | | | | | | |
| Studying lung cancer model through 3D-imaging | 19-794 | Mouse | 80 | D | | | | | X | |
| Validation of behaviors for the assessment of post-castration pain in piglets | 19-796 | Pig | 65 | C | | | | | | |
| Models of Lung Diseases to Study the Regenerative Potential of Stem Cells and Biomaterial | 19-806 | Mouse/ rat | Rat 50/150 Mouse 386/706 | C/E | | | | | X | |
| Regenerative Potential of Stem Cells and Biomaterials for Treating Cardiovascular Diseases | 19-811 | Mouse/ rat | M 2800/ R304/ R4220 | D/C/D | X | | | | X | |
| Pilot Study for for testing mini-infusion device in dogs for medication delivery. | 19-814 | Dog | 16 | C | | | | | | |
| Models of Aging to Study the Regenerative Potential of Stem Cells and Bio-materials | 19-818 | Mouse | 40 | C | | | | | X | |
| Models of Cancer to Study the Regenerative Potential of Stem Cells and Biomaterial (Pilot Study) | 19-822 | Mouse | 298 | D | | | | | X | |
| Targeting the MARCKS protein to combat hay dust-induced asthma in horses | 20-108 | Horse | 10 | D | | | | | | |
| Preclinical Safety and Efficacy Study of Electro Thermal Therapy in a Canine Animal Model | 20-109 | Dog/ pig | 64/ 3 | D | X | X | | | X | |
| Investigation of Bovine Leukocyte Functional | 20-115 | Cattle | 20 | C | | | | | | |

Appendix 5: Animal Usage

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|--|--------|---------------------|---------|-----|---|---|--|---|--|
| Interactions with Salmonella in vitro | | | | | | | | | |
| Neuronal networks that integrate reproduction and energy homeostasis Neurokinin B and alpha-MSH in ovine puberty | 20-129 | Sheep | 80 | D | X | X | | | |
| Cardiac regeneration therapies in pig models of heart diseases | 20-137 | Pig | 65 | D | X | | | X | |
| Comparison of VIBE, PETRA and UTE MRI sequences with standard T2W, PD, and T1W MRI sequences and CT for evaluation of the canine skull- A Pilot Study. | 20-141 | Dog | 10 | C | | | | X | |
| Pilot study: Generating a gene editing reporter large animal model | 20-155 | pig | 288/ 44 | C/D | X | X | | X | |
| Correlational study on atmospheric particulate matter and inflammatory markers of asthma syndrome in pastured horses | 20-163 | Horse | 32 | D | | | | | |
| Models of Reproduction Injury to Study the Regenerative Potential of Stem Cells and Biomaterials in Rats | 20-165 | Rat | 490/ 90 | C/D | X | | | X | |
| Use of reproductive biotechnologies in bovine | 20-174 | Cattle | 44 | D | | | | | |
| Effect of Live IBD vaccine on early Vaxxitek protection against challenge | 20-181 | Chicken | 345 | C | | | | X | |
| Activation of the Renin-Angiotensin-Aldosterone System in Horses with Mitral or Aortic Valve Regurgitation | 20-187 | Horse | 90 | C | | | | | |
| Fecal sampling of sheep, goats and cattle for the | 20-193 | Cattle, goat, sheep | 200 | C | | | | X | |

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| | | | | | | | | | |
|---|--------|----------------------|-----------------|-------|---|--|--|---|--|
| detection of foodborne pathogens- Pilot Study | | | | | | | | | |
| Pharmacokinetics of Medications in Swine after Intravenous, Intramuscular, Subcutaneous, Intranasal, Topical, Intradermal and Oral Administration | 20-195 | Pig | 273 | D | | | | | |
| Pilot Study: Models of Joint injury to Study Regenerative Potential of Stem Cells and Biomaterials | 20-197 | Rat | 164 | E | X | | | X | |
| Effect of Skeletal Maturity on Biomarkers for Post-traumatic Osteoarthritis (OA) after ACL Injury: Pilot Study | 20-205 | Pig | 3 | D | X | | | | |
| Evaluation of oral Omeprazole in dogs: A pilot study | 20-207 | Dog | 7 | C | | | | | |
| Pilot Study: Safety of Intravenous Lipids in Sheep | 20-209 | Sheep | 12 | D | | | | | |
| Evaluating the health impacts of hybridization between invasive Red-eared slider turtles and native Yellow-bellied slider turtles in North Carolina Pilot Study | 20-211 | Turtle (field study) | 180 | D | X | | | | |
| Ultrasound Enhanced Platelet-like Particle Therapy for Accelerated Wound Repair | 20-215 | Mouse | 282 | D | X | | | | |
| Improved methods for epidermal grafting using a pig model | 20-226 | Pig | 17 | D | X | | | X | |
| Validation of Novel Targets for OA Treatment; Control of VEGF Dual Signaling with Intra- | 20-230 | Dog/ mouse/ rat | 269/ 1680/ 1680 | D/E/E | X | | | X | |

Appendix 5: Animal Usage

| | | | | | | | | | |
|---|--------|--|-----------------------------------|---------|-----|---|---|---|---|
| articular Slow Release Pazopanib | | | | | | | | | |
| Pilot Study for for testing the performance of the Smart Pill system in dogs to predict oral absorption of medications. | 20-232 | | Dog | 8 | C | | | | |
| Characterization of a chronic model of retinal neovascularization (RNV) in rabbits | 20-237 | | Rabbit | 20 | D | X | | | |
| Improved large animal model for the study of adult stem cells | 20-244 | | Pig | 252/ 18 | C/D | X | | | X |
| Edema disease vaccine trials | 20-246 | | Pig | 48/40 | C/E | | | | X |
| Transplant of epithelial organoids: a pilot study | 20-247 | | Mouse | 36 | D | X | | | X |
| Sex and Age Dependent Effects of Loss of ACL Function During Growth (surgical study associated with protocol 20-219) | 20-278 | | Pigs | 76 | D | X | | | |
| The effects of combined carprofen and omeprazole administration on gastrointestinal injury in dogs with osteoarthritis. | 20-312 | | dog | 9 | C | | | X | |
| Effect of Skeletal Maturity on Biomarkers for Post-traumatic OA after ACL Injury and Reconstruction: Pilot Study | 20-313 | | Pigs | 4 | D | X | | | X |
| Transgenesis and Xenotransplantation | 20-341 | | Pig | 24/ 74 | C/D | X | X | | X |
| Treating Hypoxia via Tumorally Directed Oxygen for Improving Radiation Therapy | 20-354 | | Dog (university and client owned) | 64 | D | X | | | X |
| Silencing the Canine SOD1 Gene in Dog Central Nervous System | 20-365 | | Dog | 12 | D | | | | X |

Appendix 5: Animal Usage

| | | | | | | | | | | | | |
|---|--------|--|-----------------|-------------|-----|---|--|--|--|--|---|--|
| for Treatment of Degenerative Myelopathy- Pilot Study | | | | | | | | | | | | |
| Evaluation of turkey coccidia vaccine (pilot study) | 20-378 | | Turkey | 250 | C | | | | | | | |
| Novel use of ultrafiltration probes to sample the tendon environment post-injury (pilot study) | 20-389 | | Horse | 8 | D | X | | | | | | |
| Biomaterials for CAR T therapy | 20-395 | | Mouse | 588 | D | X | | | | | X | |
| Development of Resources and Assays for Hamster and Ferret B-cell and T-cell Repertoire Analysis to Support the SARS-CoV-2/COVID-19 Research Response: A Pilot Study | 20-420 | | Ferret/ Hamster | 5/9 | D | | | | | | | |
| Comparison of the efficacy and safety of dual antithrombotic therapy with low-dose rivaroxaban plus clopidogrel compared to single agent therapy in healthy dogs: a pilot study | 20-432 | | Dog | 12 | C | | | | | | | |
| Effect of pre-existing antibodies on corneal gene therapy | 20-433 | | Rabbit | 18 | D | X | | | | | X | |
| Pathogenesis and Control of Enterococcus cecorum | 20-437 | | Chickens | 10980/ 3370 | C/D | | | | | | X | |

(1) If applicable, please provide a description / definition of any pain/distress classification used within this Appendix in the space below. If pain/distress categories are not used, leave blank.

(2) Survival Surgery (SS)

(3) Multiple Survival Surgery (MSS)

(4) Food or Fluid Regulation (FFR)

(5) Prolonged Restraint (PR)

(6) Hazardous Agent Use (HAU)

(7) Non-Centralized Housing and/or Procedural Areas (NCA), i.e., use of live animals in any facility, room, or area that is not directly maintained or managed by the animal resources program, such as investigator laboratories, department-managed areas, teaching laboratories, etc.

Pain/Distress Classification Description/Definition, if applicable:

Appendix 5: Animal Usage

Category C

Animal use activities that involve no more than momentary or slight pain or distress (no greater than an injection) where there is no need for use of pain-relieving drugs.

Category D

Animal use activities that involve accompanying pain or distress to the animals and for which appropriate anesthetics, analgesics, tranquilizing drugs and/or humane endpoints are used to avoid pain, distress or discomfort.

Category E

Animal use activities that involve accompanying pain or distress to the animals and for which appropriate anesthetic, analgesic, tranquilizing drugs or other methods for relieving pain or distress are not used.

In the Table below, provide an approximate annual usage for all species:

| Animal Type or Species | Approximate Annual Use |
|------------------------|------------------------|
| Mouse | 4925 |
| Frog | 123 |
| Dog | 197 |
| Pigeon | 19 |
| Horse | 147 |
| Swine | 376 |
| Poultry | 7856 |
| Rabbit | 29 |
| Ferret | 28 |
| Gerbil | 210 |

| Animal Type or Species | Approximate Annual Use |
|------------------------|------------------------|
| Rat | 907 |
| Snake | 19 |
| Cat | 2 |
| Cockatiel | 18 |
| Cattle | 96 |
| Sheep | 70 |
| Fish | 291 |
| Guinea Pig | 10 |
| Goat | 56 |
| | |

Appendix 6: Personnel Medical Evaluation Form

NCSU Vertebrate Animal Contact Questionnaire
NCSU Student Health Services
Occupational Health Surveillance Program
Campus Box 7304, Raleigh NC 27695
919-513-0277, FAX: 919-513-1379

Part A

All Fields Required

| | | | |
|--------------------------|------------|---|--|
| Name (Last, First, M.I.) | | PeopleSoft ID No. (See HR Rep. For No.) | Date of Birth |
| Home Address (Street) | | City (Home) | State (Home) |
| Home Phone | | Today's Date | Sex: Male <input type="checkbox"/> Female <input type="checkbox"/> |
| Job Title: | Wk. Phone: | E-mail: | |
| PI/Supervisor | | Student <input type="checkbox"/> Yes <input type="checkbox"/> No Dates Enrolled | |
| Department | College | Volunteer <input type="checkbox"/> Yes <input type="checkbox"/> No | |

Please Note: Part A (sections I through IV) are to be completed by employee and supervisor. Part B (sections V through IX) are confidential and to be completed by employee. Mail **entire** completed form (sections I through IX) to Student Health Services (SHS). SHS is responsible for receiving and reviewing questionnaires. The questionnaire may also be sent to Duke Occupational Medicine should special circumstances dictate. **Only Student Health Services and Duke Occupational Medicine will have access to the information in this questionnaire.** Send completed questionnaire in a **sealed** envelope to:

Occupational Medicine Program
Student Health Services, Box 7304, Raleigh, N.C. 27695-7304.

This form must be re-submitted if there is a change in health status, exposure or job changes, as described on the Animal Contact website. Please (✓) this box if re-submitting form: ☐

I. Animal Use/Exposure

Check boxes if statement is applicable to your status (*check all that apply*) and explain in the space provided:

- ☐ I am no longer active on an approved animal use protocol.
- ☐ I am on an approved animal use protocol, but will not be handling animals.
- ☐ I am not directly contacting animals but will be working in areas where animals are housed, such as cleaning or maintenance duties, and may be in contact with animal blood or tissue.
Please explain: _____
- ☐ I will be working in animal pathogens/disease areas (Biosafety Level 2).
Please explain: _____
- ☐ I am involved with veterinary care or animal husbandry.
Please explain: _____
- ☐ I am working with human specimens (cells, body fluids, etc., in conjunction with animal studies).
Please explain: _____
- ☐ I handle animals as part of a research/teaching assignment.
Please explain: _____
- ☐ I work with animal carcasses, tissues, or specimens (not formalin-fixed or sterilized).
Please explain: _____
- ☐ I handle animals as part of a volunteer service.
Please explain: _____
- ☐ None of the above. Please explain: _____

1

II. Which Animals, Tissues and/or Body Fluids Could You Contact or Be Exposed To? (Living or deceased that are not formalin-fixed or sterilized). (Check all that apply).

Indicate Estimated Contact Hours per Week:

Actual Contact Hours per Week

- ☐ Domesticated (lab) small mammals: _____
_____ mice _____ rats _____ rabbits _____ guinea pig
_____ other, specify: _____
- ☐ Domesticated dogs _____ cats _____
- ☐ Domesticated livestock. Specify: _____
- ☐ Rabies-vaccinated NCSU research livestock only _____
_____ Other, specify: _____
- ☐ Non-human primates. Specify: _____
- ☐ Wild rodents, and small mammals. Specify: _____
- ☐ Big game wildlife (deer, elk, mountain lions, bears, wolves)
Specify: _____
- ☐ Non-mammalian vertebrate animals (reptiles, amphibians, birds, fish)
Specify: _____

Are the animals listed above used for research or are they patients:

- ☐ Animals are used for research
- ☐ Animals are patients

III. Biological and Physical Health Hazards

Provide the following for each agent you are exposed to in conjunction with animal studies:

1. Infectious Agents/Recombinant DNA : Yes ☐ No ☐ If yes, please specify _____ IBC Approved? Y | N
2. Loud noises: Yes ☐ No ☐
e.g. dog and pig housing areas _____

IV. Personal Protective Equipment

1. When working with animals or animal materials/tissues do you wear the following ?

(Check all that apply)

- _____ Gloves _____ Goggles/glasses
- _____ Gown _____ Face shield
- _____ Fit-tested elastomeric respirator _____ Hearing Protection
- _____ specify type: _____
- _____ Rated dust mask (e.g. N-95 type)
_____ specify type: _____

2. If you are wearing a respirator (half, full face or N95 mask) have you received training and fit testing?
Yes or No _____ If yes, date _____

3. If you are required to wear hearing protection (i.e. enrolled in a Hearing Conservation Program), is your hearing checked annually? Yes or No _____ If yes, date _____

Supervisor(s) Signature _____

Date _____

2

Appendix 6: Personnel Medical Evaluation Form

Vertebrate Animal Contact Medical Questionnaire

Part B

Please Note: Sections V through IX are confidential and are to be completed by the Employee. If you would like to talk with a physician concerning any of these questions, you may contact Student Health Services, at 919-513-0277.

V. Immunization and Infectious Disease History

You must supply most recent year for immunization and titers. You must supply proof of previous rabies series and/or titers. Have you ever had or do you now have any of the following immunizations or diseases? If answer is yes you must supply a date. If answer is no check 'no' column. Incomplete forms will be returned.

| | I have immunization for | | | I have had the following disease | | |
|--------------|-------------------------|---------------------|----|----------------------------------|---------------|----|
| | Yes | Last Year Immunized | No | Yes | Year Infected | No |
| Tetanus | | | | | | |
| Rabies | (Series of 3) | | | | | |
| Rabies Titer | | | | | | |
| Hepatitis A | (Series of 2) | | | | | |
| Hepatitis B | (Series of 3) | | | | | |

1. Tuberculosis Surveillance

Tuberculin skin test Yes ☐ No ☐ Most recent year: _____ Results: Positive ☐ Negative ☐

- a. If TB test was positive, did you receive medical treatment? Yes ☐ No ☐
b. Have you had active tuberculosis? Yes ☐ No ☐
If yes, list year and description of treatment: _____
c. Have you ever lived in countries other than the United States? Yes ☐ No ☐
If yes, list countries: _____
d. Have you received the tuberculosis vaccine Bacillus Calmette Guérin (BCG) vaccination? Yes ☐ No ☐
e. If you have received BCG, have you had a tuberculin skin test since the vaccination? Yes ☐ No ☐
If yes, year of skin test: _____
f. Date of last chest x-ray: _____
g. Reason x-ray was taken: _____

2. Have you ever received a rabies vaccination after a rabies exposure or suspected rabies exposure? Yes ☐ No ☐

3. Have you ever been diagnosed with an infectious, viral, bacterial or parasitic illness that had been confirmed to have come from an animal and was associated with your research/studies/work at NCSU or elsewhere? Yes ☐ No ☐
If yes, please explain: _____

4. Have you ever suspected that you have acquired an illness from an animal, animal materials/tissue at NCSU or elsewhere, but were unable to confirm this? Yes ☐ No ☐
If yes, please explain: _____

VI. Medical History

What are your ongoing medical problems? Use an additional sheet of paper if necessary.

- ☐ Pneumonia ☐ Recurrent Bronchitis ☐ Tuberculosis
☐ Heart Disease ☐ Rheumatic Fever ☐ Heart Murmur/ Valve Disease
☐ Diabetes ☐ Kidney Disease ☐ Liver Disease
☐ Cancer ☐ Gastrointestinal Disorder ☐ Loss of Consciousness
☐ Seizures ☐ Arthritis ☐ Chronic Back or Joint Pain
☐ Cystic Fibrosis ☐ Emphysema/Chronic Lung Condition
• None of the above

Have you been told by a physician that you have an immune compromising medical condition or are you taking medications that impair your immune system (steroids, immunosuppressive drugs, or chemotherapy)? Yes ☐ No ☐

If yes, please explain: _____

Are you currently taking any other medications? Yes ☐ No ☐
If yes, please list below: _____

VII. Allergies/Asthma

1. Are you allergic to any animal(s)? Yes ☐ No ☐
If yes, list the animals that caused your allergy symptoms: _____
2. Do you have any other known allergies? Yes ☐ No ☐
If yes, please describe: _____
3. List symptoms that occur when you are suffering from your allergies: _____
4. List treatment that you receive to relieve your allergies: _____
5. Have you been treated for asthma? Yes ☐ No ☐
If yes, please list:
a. the cause(s) of your asthma: _____
b. the number of asthma attacks per month: _____
c. the medications you take for your asthma: _____
6. Do you have skin problems related to work (e.g. reactions to latex gloves, dry cracked skin, rashes)? Yes ☐ No ☐ If yes, describe: _____
7. Do you experience shortness of breath at work? Yes ☐ No ☐
8. Is there a family history of hay fever, asthma, allergic skin problems or eczema? Yes ☐ No ☐
If yes, please explain _____
9. Outside of work, do you have any exposure to animals? Yes ☐ No ☐
If yes, please explain _____

Please use this space to explain or make comments:

Appendix 6: Personnel Medical Evaluation Form

VIII. For Individuals Working with Sheep

1. Do you have a history of valvular disease (heart murmurs) or congenital heart disease? Yes ☐ No ☐
If yes, date of diagnosis: _____
Type of disease: _____
Treatment: _____
2. Do you now have or have you ever had Q-fever? Yes ☐ No ☐

IX. Pregnancy

1. Are you pregnant, suspect you are pregnant or contemplating pregnancy? Yes ☐ No ☐
2. Do you have work related questions concerning pregnancy that you would like to discuss with an Occupational Medicine Physician? Yes ☐ No ☐
You should refer to the Reproductive Health Protection program on the EHSC website as well http://www.ncsu.edu/ehs/www99/right/handsMan/worker/REPRO_HEALTH_PROG.pdf.

X. Additional Questions and Concerns

- Do you wish to talk to a medical provider concerning laboratory/client animal hazards regarding this questionnaire? Yes ☐ No ☐

Employee Signature

Date

Reviewer _____
Signature _____ Date _____
Revised July 2011

See Privacy Protection Policy on the next page.

Vertebrate Animal Contact Medical Questionnaire

Privacy Protection Policy

I hereby authorize the use and/or disclosure of my individually identifiable health information as described below. I understand that the purpose of my visit is for the purpose of creating protected health information for disclosure to my employer, North Carolina State University. Should I refuse to sign this authorization, the examination requested will not be conducted, and certain tasks cannot be performed because they require a medical examination. If this task is an essential job duty, lack of performance may result in termination of my employment. I further understand that if the person(s) or organization authorized to receive the information is not a health plan or health care provider, the released information could be re-disclosed and would no longer be protected by federal privacy regulations.

1. Personal health information to be disclosed to other health providers: All medical information obtained as a result of the examination identified above.
2. Health Providers (or class of persons) or organization authorized to provide the information: Student Health Services, Duke Occupational Medicine, and _____ (write in name of health care provider if not listed above or N/A for not applicable).
3. Purpose of the requested disclosure: Summarized information to be disclosed by the health provider to those listed in item #4 below is to determine if the employee has a health condition which may interfere with his/her job performance and to comply with OSHA regulations.
4. Person(s) or organization authorized to receive summarized information: My supervisor, safety manager and the industrial hygiene section or Environmental Health and Safety occupational medicine program will receive only summarized information as described in item 3 above.
5. I understand that I have a right to revoke this authorization at any time. My revocation must be in writing in a letter provided to the Student Health Services. I am aware that my revocation is not effective to the extent that the persons I have authorized to use and/or disclose my protected health information have acted in reliance upon this authorization.
6. I understand that I will get a copy of this form after I sign it.
7. I have been provided with a copy of NC State University's Notice of Privacy Practice prior to signing this authorization. A copy of the Privacy Practice is located also on the EHSC's Medical Surveillance web page at: <http://www.fis.ncsu.edu/health/docs/privacy.pdf>.
8. This authorization expires in one year.

Signature of Employee

Date

Appendix 6: Personnel Medical Evaluation Form

VACCINE OR TITER DECLINATION (MANDATORY)

I, _____, understand that due to my occupational exposure to potentially infectious materials I may be at risk of acquiring the _____ infection. I have been given the opportunity to be vaccinated or have a titer drawn for _____, at no charge to myself. However, I decline the _____ at this time. I understand that by declining this vaccine or titer, I continue to be at risk of acquiring _____ a serious disease. If in the future I continue to have occupational exposure to potentially infectious materials and I want to be vaccinated or have a titer drawn, I can receive the vaccination series or titer at no charge to me. During a pandemic event of _____, I will wear a N-95 mask while working.

Signature

Date

Appendix 7: IACUC/OB Membership Roster

Please provide a Committee roster, indicating names, degrees, membership role, and affiliation (e.g., Department/Division).

| IACUC Roster | | | |
|---------------------------|-------------------------------|--|---|
| Name of Member/ Code** | Degree/ Credentials | Position Title*** | PHS Policy Membership Requirements**** |
| 1 | Ph.D. | Professor, Poultry Science | S |
| 2 | LATG | IACUC Compliance Coordinator | NS |
| 3 | Ph.D. | Assoc. Professor, Forestry and Environmental Resources | S |
| 4 | B.A., M.A. | Retired Human Resources Manager | NA, NS |
| 6 | Ph.D | Professor, Molecular Biomedical Sciences, First Vice Chair | S |
| 7 [REDACTED] | DVM, DACLAM | Clinical Veterinarian, [REDACTED] | V |
| 8 Gabriel McKeon | DVM, DACLAM | University Attending Veterinarian | V |
| 9 | MPH, LATG | IACUC Coordinator | NS |
| 10 | BS, CPIA | IACUC Director, Second Vice Chair | S |
| 11 | B.A., MTS, MDiv. | Retired Minister | NA, NS |
| 12 | Ph.D. | Professor, Animal Science | S |
| 13 | V.M.D., M.S. Ph.D., DACVIM | Professor, Clinical Sciences | S |
| 14 | Ph.D. | Assoc. Professor, Population Health and Pathobiology | S |

Appendix 8: IACUC/OB Minutes

Please provide the latest two Minutes of the IACUC/OB meetings.

1

NCSU IACUC Meeting
Thursday, September 17, 2020
Meeting held Via Zoom Online Meeting Platform
1:00 p.m.

Present: K. Anderson, D. Sloop, R. Elder, J. Dew, P. DeLong, G. McKeon, W. Flowers, J. Gadsby, N. George, C. Morales, S. Suter, S. Tonkonogy

Others: M. Jung, T. Olagbaju

Absent: C. DePerno, P. Siciliano

Call to Order at 1:00 pm

Review minutes of the July 16, 2020 meeting

The minutes of the July 16, 2020 monthly meeting were reviewed. A motion was made and seconded to approve the minutes as submitted. The motion to approve the minutes was approved unanimously.

General Report and Updates from Dr. McKeon

The USDA accepted the two animal concern reports presented at the July IACUC meeting. Nothing further is needed at this time and the USDA will contact the NCSU AV if further information is needed.

The USDA will conduct a virtual records inspection this year. The IACUC office is working to compile records in an accessible and secure format for inspection.

An EthicsPoint report was received regarding an individual working with animals in the [REDACTED] that was not listed on the IACUC approved protocol. The PI submitted an amendment to add the person which has been approved. Leadership at the facility has taken initiative in educating the PI to prevent re-occurrence, and no further action is needed at this time by the IACUC.

After reviewing AAALAC FAQ's following inspections, the AV and the IACUC Director have determined that multiple species housed in the same room should be considered an exception to standards. Several papers appear to indicate that this housing set up may influence animal behavior. The question was raised if this should be an exception described in each protocol for which it applies, or if it should be an IACUC policy. It was decided that the IACUC Director and clinical veterinarians will explore how to best address the housing situations and report back to the committee at the next meeting.

A PI conducting an agricultural study at the [REDACTED] reported that several pigs died as a result of a common swine disease, as determined by veterinary necropsy. The pigs came from a source outside the university. The pigs are being treated appropriately and biosecurity practices are being followed to prevent transmission to other units.

2

Update on [REDACTED] from IACUC chair: Following the last inspection, the IACUC chair requested SOPs from PI's regarding use of the unit, including cleaning procedures and a plan for when frequent rain prevents regular flushing into the lagoon. The PI's that use the unit will send these SOP's to the unit manager, who will send the SOPs to the IACUC.

IACUC office updates

Semiannual inspections update

The IACUC office is continuing with in person and Zoom inspections following university social distancing guidelines. Members are encouraged to participate if they are available for inspections.

AAALAC visit-College of Sciences

The site visit is scheduled for late October, the week of the 26th. A lunch "Zoom" date will be set up with the site visitors, and members are encouraged to attend if possible. The IACUC office will update committee members as more information becomes available.

Draft policies discussion:

The IACUC Director suggested that the IACUC formulate some policies to guide Principal Investigators in certain areas, for example blood collection or aquatic species care. The member veterinarians agreed with this idea but requested that any policies on drug formularies be avoided since these guidelines change frequently. Members agreed that guidelines may be beneficial but suggested avoiding calling anything a "policy" as these tend to involve stricter enforcement and may be interpreted as administrative burden to researchers. The question of which areas to focus on first was discussed, and which research groups would benefit the most from additional guidance. The IACUC Director will continue to work on identifying areas which may benefit from written guidelines and bring any new guidelines to the committee for review and discussion.

Member Training Discussion:

In follow up to previous program review suggestion to incorporate more training into the IACUC meetings, additional opportunities are being explored. Videos shared by the CVM investigators providing an overview or their work will be shared on a routine basis, IACUC members and investigators will be encouraged to share their science with the committee, and reference articles will be shared for group discussion.

For the September meeting the committee reviewed the following ILAR article for discussion "Everything You Need to Know About Satisfying IACUC Protocol Requirements"

Members felt that the following areas are well covered by the committee: Blanket protocols, numbers justification, and pain category classification.

Appendix 8: IACUC/OB Minutes

Topics/ areas that could be improved in protocol review and the program: Description of study in non-scientific terms, key words used in literature searches, and providing more post-approval monitoring.

Members agreed the above paper may be beneficial to post online as guidance to researchers when drafting their protocols.

Meeting adjourned at 2:41 pm.

Recorded and submitted by Candace Morales, IACUC Compliance Coordinator
and Jennifer Dew, IACUC Director

Appendix 8: IACUC/OB Minutes

1

NCSU IACUC Meeting
Thursday, October 15, 2020
Meeting held Via Zoom Online Meeting Platform
1:00 p.m.

Present: R. Elder, J. Dew, P. DeLong, G. McKeon, W. Flowers, N. George, C. Morales, S. Tonkonogy, J. Gadsby (left at 2:05pm)

Others: M. Jung, T. Olagbaju, K. Kretchman, A. Jindal, E. Pedone

Absent: C. DePerno, P. Siciliano, K. Anderson, D. Sloop, S. Suter

Call to Order at 1:00 pm

Review minutes of the September 17, 2020 meeting

The minutes of the September monthly meeting were reviewed. A motion was made and seconded to approve the minutes as submitted. The motion to approve the minutes was approved unanimously.

Protocol Review

20-246-A

Summary: This study focuses on the development of a vaccine for gut edema in pigs. Gut edema is caused by bacterial imbalances due to sudden diet changes, most often after birth or weaning. The primary reviewer stated that the clinical signs of disease are variable, and range from severe to mild depending on the case. The reason this is a category E protocol is because one group will be vaccinated and the control group will receive no vaccination. Because the pigs will receive no vaccine, there is the potential for category E use. The vaccine is approved for use in Europe, and one reviewer noted that in order to receive FDA approval in the U.S., an untreated control group would be needed for the study.

Discussion: The following items were discussed and need to be addressed in the protocol

- Update the animal number justification with the primary reviewer's suggested wording
- Confirm if the BUA approved for the toxin?
- For the toxin IV administration in the control group, please include that there is previous experience dosing this agent to include a timeframe for seeing clinical issues associated with the substance and extra details to describe when the 3 times a day monitoring is conducted. Is there a window of time where monitoring should be increased?
- Pain/ distress question 3, please update the first bullet to say at the discretion of the clinical veterinarian (with approval from the study director) to be consistent with the end paragraph.
- Health and safety question 11, please address this question from the BUA, the current answer doesn't answer the question.

2

- Clarify who on the protocol will perform the injections and their experience with performing the injections

Action: Modifications required for approval with subsequent DMR review

20-451-B

Summary: This protocol involves the pain mechanisms associated with radiation treatment. In the long term, this research is poised to reveal potential targets to prevent or treat acute orofacial radiation associated pain. Category E use is necessary to study these pain mechanisms.

Discussion: The following items were discussed and need to be addressed in the protocol

- Animal care and use page, question 2, please describe the diptheria toxin ablation procedure and when it is performed
- BUA is needed for the diptheria use, please work with EHS to obtain approval. Also, please clarify work restrictions for staff for the cisplatin use.
- For the animals listed in category B, if any of those animals are genotyped or euthanized, they should be moved to category C
- Tail tip for genotyping should be <21 days for no anesthesia and use anesthesia for over 21 days. It currently states 25 days, please update.
- Blood collection: Please clarify methods and volumes taken

Action: Modifications required for approval with subsequent DMR review.

20-390-B

Summary: This protocol focuses on the association between circadian rhythms and skin cancer incidence. Mice will be exposed to UV lights at different intervals and light cycles will be manipulated to achieve the research goals. The study is considered category E due to inflammation expected from sunburn, which is expected following UV exposure and is necessary to achieve the research objectives.

Discussion: The following items were discussed and need to be addressed in the protocol

- Include strain of mouse to be used
- Add description of altered light cycles to be used
- Refine clinical monitoring and state the total size if multiple tumors develop.
- Check with EHS to ensure no safety precautions required for UV light use.

Action: Modifications required for approval with subsequent DMR review

Appendix 8: IACUC/OB Minutes

General Report and Updates from the Attending Veterinarian

Self-report IACUC protocol 20-137-B: An emailed report was received from a PI stating an expired medical catheter was used for a surgery involving a biomedical pig. The lab conducts heart surgery and requires multiple sizes of balloon catheters due to the variability in length of the vessels in the pig model. The size required for this animal was in sterile packaging but past the expiration date listed by the manufacturer. During the surgery there were other complications and the procedure was non survival.

As information shared by the AV, in a previous surgery the prior month, a similar situation arose and the AV in consultation with the IACUC director allowed a catheter past the expiration date by one month to be used. That surgery went as expected and the pig is doing well post operatively with no issues.

The IACUC had a long deliberation on what guidance should be given to PIs regarding the use of expired catheters. The NIH guidance on this topic was shared as a part of the discussion. It was decided more information is needed to determine how the IACUC would like to proceed and to gather information from manufacturers on how long items may be considered sterile and what is expected patency of the device (no loss of integrity of the plastic) after the listed expiration date. The topic will be discussed further at the November IACUC meeting.

Self-report IACUC protocol 17-156-B: A PI conducting a study with intrathecal injections in pigs reported that several pigs were euthanized while still under anesthesia due to neurological signs. The PI is waiting to determine the cause of the event and will file an adverse incident report to the IACUC once they have more details.

IACUC office updates

AAALAC visit-College of Sciences

The site visit is scheduled for October 27-28, 2020. The IACUC zoom lunch is scheduled for October 27th at 11:30.

SOP discussion:

The committee discussed how to handle inclusion of SOPs on farm/ag unit protocols. SOPs for animal husbandry and veterinary care are maintained at the units. The IACUC reviews the SOPs during semiannual inspections. The committee discussed several options and decided to continue with monitoring the SOPs at the semiannual inspections and for the coming visits to notify the facility managers to ensure the SOP books are up to date and provided for the inspections for review. When SOPs are mentioned in an IACUC protocols it should state that "SOPs are maintained onsite and viewed during inspections."

NCDA facilities inspections:

The IACUC reviewed the current list of all the NCDA facilities and the corresponding IACUC protocols. Sites that have IACUC protocols covering animals that do not belong to NC State in facilities that are not NC State are treated as commercial farms and are not

not inspected by the IACUC. Sites with NC State animals or paid personnel or with PHS funded studies are inspected by the NC State IACUC.

Discuss [REDACTED] Inspections:

These are [REDACTED] protocols that the IACUC approved visiting on a two year rotation with self-evaluations conducted in between. Due to COVID restrictions, the IACUC agreed that a zoom inspection will be conducted for the fall 2020 visit and in person inspection will be scheduled for 2021.

Discuss vet logs at [REDACTED]

We discussed the current process for recording/ noting that the AV or a designee visits the site for a health related reason. There should be a log maintained at each site and a contact list with the clinical veterinarian for that site.

Reminder: Program review is going to be conducted at the November 19th meeting.

Member Training Discussion:

Training was tabled to the November meeting.

Meeting adjourned at 3:07pm.

Recorded and submitted by Candace Morales, IACUC Compliance Coordinator
and Jennifer Dew, IACUC Director

Appendix 9: Blank IACUC/OB Protocol Form

| | |
|---|-------------------------|
| NC STATE | |
| Annual Protocol Renewal Form | |
| IACUC #: Submission #: Protocol Title: | PI Name: TBD Status: |
| Instructions | |
| <p>System Note: NC State's two-factor authentication system has a 60-minute timeout. If you have not interacted with RED for 1 hour or more, be sure to close all system windows before you attempt to log in again.</p> <p>IMPORTANT: THE IACUC REQUIRES ANNUAL RENEWAL/REVIEW OF APPROVED ANIMAL USE PROTOCOLS.</p> <p><i>Failure to return this form in a timely manner to allow for committee review before the expiration date means that you are required to submit a new, full application form in order to obtain IACUC approval to continue your work with animals.</i></p> <p>THERE ARE NO EXCEPTIONS.</p> <p>Complete this form and submit it to the IACUC Office at least 7 working days prior to the date of expiration. The expiration date is included in the Expiration Notice you received from the IACUC Office.</p> <p>IACUC Office contact information:</p> <p>Email Address: iacuc_office@ncsu.edu</p> <p>Phone #: (919) 515-9532</p> <p>* <input type="checkbox"/> Confirm that you have read and understand these instructions</p> | |

| | | | | |
|---|-------------|-----------------|----------------|----------------|
| General Information | | | | |
| IACUC STAFF USE ONLY: | | | | |
| APPROVED: | EXPIRATION: | ANNUAL RENEWAL: | REVIEW STATUS: | RESEARCH TYPE: |
| | | | | |
| * IACUC Protocol #: | | | | |
| * Submission #: | | | | |
| <p>If this is your SECOND YEAR renewal, the information shown below is saved from LAST YEAR. You <u>must</u> update all sections for the CURRENT year before you SUBMIT for review.</p> <p>* Title:</p> <p>* PI (or Instructor) Name:</p> <p>If you are trying to end your protocol, please create and submit a Final Animal Usage submission.</p> <p>* Animal Use: Please provide an accounting of your animal usage during the most recent year of IACUC approval in the chart below</p> <p>If the species on your protocol are changing, you will need to complete and submit an Amendment instead of this Annual Renewal.</p> <p>* Procedures: Did complications arise that fell outside of the parameter of the protocol (e.g. surpassing pain and distress endpoints, numerous found dead animals, unexpected outcomes that adversely affected animal welfare)? Please note: Death or morbidity as described/expected in the approved protocol does not need to be reported.</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>* Are you aware of NCSU's Occupational Health and Safety Program for Personnel with Animal Contact?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>* Have you, your personnel, and students completed the Vertebrate Animal Medical Contact Questionnaire and submitted it to Student Health Services?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>* Have you or personnel from your lab experienced a change in exposure risk (i.e. Biological, Chemical or Physical) or change in medical condition in the past year?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> | | | | |

Appendix 9: Blank IACUC/OB Protocol Form

NOTE: In addition to compliance with the Occupational Health and Safety Program, any unsupervised personnel or student must have completed the Animal Care and Use Training before beginning work (<https://research.ncsu.edu/sparce/compliance/iacuc/iacuc-training/>).

* Do you anticipate any changes in the project protocol (animal numbers, personnel, procedures, etc.)?

See [Review Procedures for Significant Changes in Approved AVAU](#)

☐ Yes ☐ No

* 4. As the PI or Instructor, I certify that the above information is correct, and that all principal investigator assurances stated in the original approval apply to these proposed changes. NOTE: If a designated staff member submits this form on behalf of the PI, we require that the staff copy the PI on the email during submission of this document. Check this box

☐

NC State University
Animal Care + Use (IACUC)
P: (919) 515-7507
Email - iacuc_office@ncsu.edu

<https://research.ncsu.edu/>

Appendix 9: Blank IACUC/OB Protocol Form

NC STATE

Application for Vertebrate Animal Use

IACUC #: 20-316
Submission #: 20-316-01
Protocol Title: New Protocol Created

PI Name: Paula R DeLong
Status:

General Information

IACUC STAFF USE ONLY:

APPROVED: EXPIRATION: ANNUAL RENEWAL: REVIEW STATUS: RESEARCH TYPE:

System Note: NC State's two-factor authentication system has a 60-minute timeout. If you have not interacted with RED for 1 hour or more, be sure to close all system windows before you attempt to log in again.

* IACUC ID#: 20-316 Submission #: 20-316-01

* Title of Project:
New Protocol Created

* After hours emergency contact #:

Are you applying for or have you received any funding for animal use activity under this protocol? If no, select 'Not applicable'. If yes, select the source of the funding.

Approvals/Renewal

- Approval is renewable annually for up to an additional two years.
- The IACUC office will notify you of the pending expiration date.
- Continuation of the approved animal usage beyond three years requires completion of a new application/protocol form and complete IACUC review.

Protocol Amendments

Any changes to this approved protocol require the submission of a protocol amendment. Do not implement changes prior to IACUC review and approval.

Grant proposals

Submit a copy with your grant/proposal application to appropriate University departmental or college research offices.

or send a copy directly to the review group or project officer in the Funding Agency for your project.

Animal Welfare Assurance

This institution has an Animal Welfare Assurance on file with OLAW (#D16-00214).

Required attachments

You will be prompted to upload all applicable documents on the "Attachments" tab at the end of the application.

Necessary documents may include:

- Research Hazardous Classification Form
- Biological Use Authorization
- Client Consent Form
- Flowcharts (Optional)
- Images Related to Study Design
- Images Related to Study Design
- Syllabus
- Wildlife Permits

Appendix 9: Blank IACUC/OB Protocol Form

In this section:

Enter ONLY PERSONNEL WHO WILL BE ALLOWED TO EDIT THIS PROTOCOL, including submission, amendments, etc. throughout the review process.

These usually include:

- Principal Investigator/Instructor
- Co-PIs
- Lab managers
- Additional protocol personnel will be entered in the next sections.

Instructions for entering student personnel:

- If the student is NOT a PI, Co-PI, or lab manager, enter them in the Outside Personnel section.
- IF the student IS A CO-PI on this protocol:
 1. Use the "Add Personnel icon" below to search for the student's name in the HR database.
 2. If the name appears, select the correct name, and assign the Co-PI role on this page.
 3. If the student researcher is not in the database, add them on the Outside Personnel page and indicate that they are a Co-PI

Primary Contact Information

Personnel - Review(Add Personnel - Review)

Personnel - Review

Name

DeLong, Paula R

Email pdelong@ncsu.edu

Phone

Department 060801-Research-College Support

Primary Investigator

Role

☒

* Will this person have contact with live vertebrate animals and/or their tissues?

☐ Yes ☒ No

* Describe animal-related experience and training, for proposed procedures, in sufficient detail to document for the IACUC and outside auditing agencies (i.e. USDA, OLAW, AAALAC, etc.) that individuals are qualified; listing of degrees is not sufficient.

* Provide specific information about procedures to be performed by these individuals, especially euthanasia, and if applicable, anesthesia and/or surgery.

Additional NC State Personnel

IN THIS SECTION:

Enter any other NON-STUDENT NCSU PERSONNEL (must have unity ID/NCSU email address) who will be working on the protocol. NOTE: These people will not have editing OR viewing rights to the protocol. If they need to see the protocol, you will need to provide them a copy.

These personnel usually include:

- Co-investigators
- Instructors (other than the Primary Investigator/Instructor)
- Laboratory technicians
- Teaching assistants
- Facility managers
- NOTE: For purposes of Animal Care & Use protocols, students are listed as "Outside Personnel" on the next page.

* Do you have additional NC State Personnel on this protocol?

☒ Yes ☐ No

Please provide the following information on the additional NC State personnel that will be a part of this study:

| | |
|--|--|
| * Personnel Name | |
| * Role | |
| Email | |
| * Will this person have contact with live vertebrate animals and/or their tissues? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| * Describe animal-related experience and training, for proposed procedures, in sufficient detail to document for the IACUC and outside auditing agencies (i.e. USDA, OLAW, AAALAC, etc.) that individuals are qualified; listing of degrees is not sufficient. | |
| * Provide specific information about procedures to be performed by these individuals, especially euthanasia, and if applicable, anesthesia and/or surgery. | |

Appendix 9: Blank IACUC/OB Protocol Form

Other Personnel

IN THIS SECTION:

Use this section to enter any Non-paid NCSU personnel (students) or other non-NCSU personnel (collaborators) who will be working on this protocol. NOTE: PERSONNEL ENTERED IN THIS SECTION WILL NOT HAVE VIEWING OR EDITING RIGHTS TO THIS PROTOCOL. If they need to see the protocol, you will need to provide them a copy

Examples of personnel to include:

- Students (Graduate or Undergraduate)
- Collaborators (from other academic institutions or industry)
- Volunteers
- Private-practice veterinarians
- Any others

* Do you have any other personnel on this protocol?

☒ Yes ☐ No

Other Personnel

| | |
|--|--|
| * Name | |
| * Animal Care and Use Related Experience | |
| * Role in this project | |
| * Procedures to be performed | |
| * Email | |
| For non-NCSU personnel: Upload a memo on the Attachments page from the home institution stating that personnel are covered under their Occupational Health and Safety Program. DO NOT include any Personal vaccine or medical records. Please contact EHS at env-health-occ-health@ncsu.edu if you have any questions. | |
| Will this person have contact with live vertebrate animals and/or their tissues? | <input type="checkbox"/> Yes <input type="checkbox"/> No |

Animal Housing

* 1. Is use of an NCSU animal housing facility or farm unit required?

☐ Yes ☒ No

* a. If you will not be using an NCSU animal housing facility or farm unit, please explain why not (i.e. **wildlife field studies, client owned**). For wildlife field studies, give location(s). Be specific. Also, provide documentation of appropriate federal, state or local permits for conduct of the study at the site(s).

b. Documentation and Permits

| | |
|-------------------------|--|
| Description of Document | |
| Document Upload | |

* 2. Will live animals undergo procedures (i.e. tissue collection, euthanasia, etc) or be maintained in any PI managed lab(s)?

☒ Yes ☐ No

a. Please identify the PI Managed Location(s) below:

b. Will the animal(s) be housed in this location(s) for less than or more than 12 hours?

* 3. Do you plan to use or maintain animals at a non-NCSU site (i.e. outside of a campus animal housing facility)?

☒ Yes ☐ No

a. Please identify the non-NCSU location here:

4. For animals transported away from the animal facility to an investigator's laboratory, to another NCSU site, or to any off-campus site, describe containment of animals and method of transport. The IACUC is required to inspect such vehicles prior to their use for transporting animals.

Appendix 9: Blank IACUC/OB Protocol Form

Animal Care and Use

- * 1. Describe in non-scientific terms the purpose and importance of this animal use activity.
- * 2. Describe the proposed animal use in non-scientific terms. Include all manipulations and procedures. This description should provide an understanding of what happens to an animal from the time of acquisition to the endpoint of the activity. If planning surgery, list the surgical procedure here:
- * 3. What is the rationale for using animals for this activity? Is it possible to accomplish your objectives without using animals?
- * 4. Describe the appropriateness of the species:

5. Species Table

Provide the following information for all animals. List no animal more than once; [see Pain and distress category for more information](#).

NOTE: For breeding colonies, herds or flocks, project/count any animals euthanized, sampled for phenotyping or testing in the Category C level of pain and/or distress.

*For wildlife field studies involving capture methods, anticipated non-target (by catch) species should also be indicated by species or in aggregate as "miscellaneous."

| | |
|--------------------------------------|--|
| * Species (common name) | |
| * Age or weight range | |
| * Source | |
| * Pain and/or distress category | |
| * Total number requested for 3 years | |

a. Additional Information (strain/vendor/species):

- * 6. Is this a 3 year rewrite of an approved protocol?
☒ Yes ☐ No

* a. Please enter the previous protocol number.

* b. Animal Use: Please provide an accounting of your animal usage during the final year of IACUC approval in the chart below.

| | |
|------------------|--|
| Species | |
| Category | |
| Total # Approved | |
| Total # Used | |

- * c. Did any unanticipated events (i.e. unexpected clinical signs, unexpected animal deaths) occur that have not already been reported to the IACUC or University Attending Veterinarian:
☐ Yes ☐ No

* d. Justify the reason to continue the research.

- * e. Is this a renewal of a pilot study?
☐ Yes ☐ No

- * 7. How did you determine the number of animals for use in this study or activity?
- Include details of numbers of animals per group for control groups and treatment groups.
 - Using the specifics of your experimental plan (or demonstration or course syllabus, as applicable), demonstrate how the numbers of animals required to achieve your scientific (or teaching) objectives for this project.
 - Add 10% additional animals for potential experimental failure.
 - You may provide information in the form of a table or flow chart.
 - If this is a research or testing protocol, you are required to include results of a power analysis used to determine the total number of animals you will require.
 - For guidance, please see information provided at these sites:
 - http://research.ncsu.edu/sparcos-docs/iacuc/power_analysis.pdf
 - http://www.3rs-reduction.co.uk/html/6_power_and_sample_size.html

8. Optional: Flow Chart Upload (Please note: Combine multiple flow charts into one document before attaching)

- * 9. Will **invasive** samples be collected from live animals? Please identify the samples as blood/urine/feces/tissue /other.
☒ Yes ☐ No

- * 10. **Exceptions to standards:** Describe and **justify** any exceptions to federal regulations or standards (USDA Animal Welfare Regulations, *The Guide for the Care and Use of Laboratory Animals*, *The Guide for the Care and Use of Agricultural Animals in Research*). Give the species of animal and total number:

Altered light cycles~
Exceptions from the exercise plan for dogs~
Food or water restriction~
Individual housing of animals usually maintained in social housing~
Multiple major survival surgeries~
Not meeting space requirements~
Physical restraint (more than one continuous hour)~
Use of paralytic agents

Describe here:

Describe prolonged physical restraint methods. How will potential distress be minimized (e.g. sedation, acclimation/training)?

11. Do you plan to use **non-pharmaceutical grade** experimental compounds or anesthetics/ analgesics compounds in animals?
☒ Yes ☐ No

a. *Please note – the use of [non-pharmaceutical grade compounds](#) must be justified scientifically below.

- * 12. Does this protocol involve surgical procedures?
☒ Yes ☐ No

Appendix 9: Blank IACUC/OB Protocol Form

Invasive sample collection from live animals

* 1. Invasive sample collection from live animals (identify the samples as blood/urine/feces/tissue/other)

| | |
|------------------------------|--|
| Species | |
| Sample | |
| Site(s) of sample collection | |
| Method(s) | |
| Volume(s) | |
| Frequency of collection | |

2. Note: As a general guideline for blood collection in animals, we recommend a one-week recovery period when removing 7.5% of circulating blood volume and a two-week recovery period when removing 10% of the circulating blood volume. Source: "A Good Practice Guide to the Administration of Substances and Removal of Blood, Including Routes and Volumes." Journal of Applied Toxicology. 21, 15-23 (2001).

Provide details for any sample collection procedures that may not be clear from the table in the "Invasive sample collection from live animals" section.

Potential Pain and Distress

Use the section to discuss all procedures or conditions possibly accompanied by pain, distress, or discomfort. Include discussion of infectious or spontaneous disease studies (including potential detrimental phenotypes, if applicable).

* 1. List any procedure or condition with potential for pain, distress, or discomfort, and give the species and number of animals affected. Describe the clinical signs or abnormalities that are expected or possible.

* 2. Describe the monitoring plan for pain and distress, including frequency and duration of checking for health or behavioral abnormalities. Identify the personnel responsible for monitoring the animals.

* 3. Describe minimization of pain, distress, and discomfort and Criteria for Removal from study. Include description of palliative interventions, and the specific criteria/humane endpoints used to remove an animal from use prior to the planned conclusion of the study, for euthanasia, if applicable. For each criteria, define a specified duration or endpoint (Examples of criteria/endpoints include not eating for >24 hours, loss of >15% of normal body weight, self-mutilation, non-weight bearing for >24 hours, etc. In some cases, it may be appropriate to euthanize animals at the first sign of clinical abnormality).

* 4. If death is intended to serve as an experimental endpoint (i.e., if animals must be allowed to die from an experimental condition or procedure), provide scientific justification.

* 5. Are painful and distressful procedures or conditions relieved with anesthesia, analgesia, tranquilization, or other therapies?
Yes ☒ No ☐

* a. If painful or distressful procedures or conditions will NOT be relieved with anesthesia, analgesia, tranquilization, other palliative therapies or humane endpoints (i.e. any category E animals listed in the table in the Animal Care and use Section), provide scientific justification. Include citation(s) to published studies if applicable.

* b. For each species, list ALL procedure(s), surgeries, or condition(s), including use of anesthesia, analgesia, tranquilization or other palliative therapies used. Provide drug, dose, route, frequency of administration, and anticipated duration of therapeutic effect. Include all medications, such as pre- and post-anesthetics, antibiotics, paralytics, anesthesia for restraint only, etc.

| | |
|--|--|
| Species | |
| Procedure or condition | |
| Agent, Dosage, Route, Frequency, and Duration | |
| Monitoring procedures | |
| Recovery procedures | |
| Post-op/post-procedural pain-relieving therapies | |

* 6. Describe trapping or other capture methods used in wildlife field studies, unless discussed in the Animal Care and Use Section. Explain/describe minimization of pain, distress, and discomfort.

Appendix 9: Blank IACUC/OB Protocol Form

Surgery

Surgery and postoperative monitoring and records must be in accordance with IACUC guidelines. Refer to the [Intra- and Postoperative Monitoring and Required Record Keeping for Surgery and Anesthesia](#) and [Guidelines for major survival surgery performed on animals used in research, teaching, or testing](#). Contact the [University Attending Veterinarian](#) for additional information. Identify individuals participating in surgical prep, surgery and post-operative care.

Surgical Procedures

| | |
|--|--|
| * Species | |
| * Surgical Procedure/ location room # | |
| * Survival or non-survival | |
| * Describe this surgical procedure. Include description of pre-surgical preparation and method of closure, if applicable. | |
| * Describe in detail the postoperative care, including any specialized care, i.e. bandage changes, and suture/staple removal, daily wound care. (Describe use of analgesics) | |

Euthanasia/Disposition

1. Provide the following information for all planned/experimental euthanasia of animals. Complete the Euthanasia/Disposition Section if euthanasia is not included in these planned animal use activities.

PLEASE NOTE: If this is a wildlife field study, please provide a contingency plan for the humane euthanasia of any animals found to be seriously injured or morbidly ill at time of capture. Complete the table below, and explain disposition of animals and contingencies for euthanasia in the Euthanasia/Disposition Section.

| | |
|---------------|--|
| Species | |
| Method/agent | |
| Dosage, route | |

2. Describe confirmation of death (Secondary Method):

- Bilateral thoracotomy ☐
 Cervical dislocation (<200g) or decapitation after administration of euthanasia agent (drug, carbon dioxide, etc.) ☐
 Confirmation of a lack of vital signs (heart rate, respirations, etc.) ☐
 Other ☐

3. If applicable, justify methods that vary from the [American Veterinary Medical Association Guidelines on Euthanasia](#). Physical methods such as decapitation and cervical dislocation also require scientific justification if used as a sole means of euthanasia.

4. Is this a client-owned animal that will be returned to its owner?

☐ Yes ☒ No

5. For University owned animals, if not euthanized as part of your protocol, what will become of these animals? More information available regarding the NCSU animal disposition policy at [NCSU Animal Disposition Policy](#).

Appendix 9: Blank IACUC/OB Protocol Form

Health and Safety Information

- * 1. Do you have a safety plan for storage and use of chemical substances approved by NCSU Environmental Health and Safety?

Note: Items submitted for IBC Approval should not be included in the IACUC Research Materials Hazard Classification form.

For guidance on IBC forms and requirements, refer to the chapter "Procedures Governing the Use of Biohazardous Agents" in the [Biosafety Manual](#).

BIOLOGICAL SAFETY

Answer the following questions to determine the need for Institutional Biosafety Committee (IBC) approval.

Does this animal protocol involve:

- * 2. Introduction of rDNA by any means into animals including, but not limited to, transfer of genetically engineered cells (transfected by any means), cells that come from a transgenic animal, or using viral vectors? Recombinant DNA (rDNA) is the joining of naturally occurring or synthetic DNA sequences (insert) to host DNA such that the resulting joined sequences are capable of replicating in a host cell (vector).

Apply for IBC Approval. IACUC will withhold approval of this application until completion of IBC approval.

- a. Provide the date of IBC approval and the BUA # (if new agent is covered by a BUA amendment, please include that information. Attach the current BUA on the Attachments page).
- b. If yes, please add agent in text box. Details of use of pathogenic agent should be included in the animal care and use proposed animal use section.

- * 3. Creation, use, or crossbreeding of transgenic or knockout animals except for breeding one line of transgenic or knockout rodents for colony maintenance?

- * 4. Use of organisms or viruses known to be pathogenic to humans, plants or animals? (e.g., parasites, viruses, bacteria, fungi, prions, rickettsia) or biological materials that may contain these microorganisms?

- * 5. Use of CDC/USDA regulated [Select Agents or Toxins \(human, animal, or plant\)](#).

- * 6. Use of human or other primate tissues, blood or body fluids or materials derived from them, including established cell lines (e.g. HeLa, HEK 293, etc.).

- * 7. Transplantable tumors

Definition: Tumor cell lines or other biologics that originate in rodents, passage through rodents or maintained with rodent serum may support the transmission of rodent diseases in target animals. These diseases can be a serious threat to rodent colony health. We require testing of any biologics that qualify in this category prior to use. Contact a laboratory animal veterinarian for the facility where you propose to house animals to initiate a plan of action in advance of your animal work. Direct your inquiries to [CVM-LAR](#) or [CoS BRF/Tox](#). For other administrative units housing rodents, direct inquiries to the [University Attending Veterinarian](#).

☒ Yes ☐ No

- * a. List cell type and tumor dosage injected:

- * 8. Use of disease carrying vectors (such as arthropods) or other biologically active agents (e.g., toxins, venoms) that may cause disease in humans or cause significant impact if released to the environment?

RADIATION SAFETY

- * 9. Does this animal protocol involve use of radioisotopes/radiation producing devices, including X-ray or CT scan?
☒ Yes ☐ No

- * a. If yes, please add agent/ device in text box. Details of use of agent should be included in the animal care and use proposed animal use section.

- * b. You require Radiation Safety Approval. Have you obtained this approval?

Note: Items submitted for Radiation Safety Approval should not be included in the IACUC Research Materials Hazard Classification form.

CHEMICAL SAFETY

- * 10. Will you administer chemicals, pharmaceuticals (drugs), nanomaterials, food additives or other items (including implants or devices) in animals?
☒ Yes ☐ No

a. Guidance: If you selected "Yes" above, you are required to include the [IACUC Research Materials Hazard Classification](#) (RMHC) form as an attachment along with the AVAU. The RMHC form is NOT required for the routine use of medications for veterinary care (routine anesthesia, pain management, vaccinations, etc.) Follow instructions on the Classification form. If you have questions about the Research Materials Hazard Classification form, please call Environmental Health and Safety at 919-515-8862

NOTE: Describe dietary manipulations in detail in the Animal Care and Use section, and the Potential Pain and Distress section, if applicable.

- * **Experimental Substance Administration:** Please ONLY list any experimental substances that you plan to use for live animals.

| | |
|-----------------|--|
| * Substance | |
| * Route | |
| * Dose | |
| * Concentration | |

Appendix 9: Blank IACUC/OB Protocol Form

| | |
|-----------------------|--|
| * Maximum Volume/Site | |
| * Frequency | |

ANIMAL FACILITY HAZARD AWARENESS

11. Briefly summarize from your approved BUA or RMHC any special handling precautions required for staff working directly with animals/caging/ bedding exposed to any agents listed on this page:

Consideration of Alternatives

Please complete this page for Category D/E procedures, otherwise, please mark N/A.

1. "Alternative" refers to methods, models, and approaches that:

- a) Result in the reduction of the number of animals used
- b) Incorporate refinements of procedures which result in the lessening of pain or distress to animals
- c) Provide for the replacement of animals with non-whole animal systems or the replacement of one animal species with another, particularly if the substituted species is non-mammalian or invertebrate.

There must be a written narrative description of the methods and sources consulted to determine the availability of alternatives (reduction, refinements, or replacement). USDA and OLAW suggest the best way to satisfy this requirement is by completion of a literature search.

Sources: [NCSU Libraries Research Assistance](#), BIOSIS Previews, MEDLINE, Current Research Information System, PubMed, Agricola, Current Contents, NORINA, the Animal Welfare Information Center (AWIC) operated by the National Agricultural Library, professional journals and other sources unique to specific fields of study.

For further guidance, please see [AWIC](#).

Please respond to items a-d regarding your literature search for alternatives:

- * a. Identify databases searched. Use a minimum of two databases.
- * b. Indicate the range of dates searched within the database(s) (i.e. 1900-2009, or 1987-present)
- * c. Keywords should include those likely to yield information on alternatives to the potentially painful or distressful procedures or conditions that are part of this protocol. As such, one of the keywords included in your search terms should be either "alternative" or "alternatives."
List keywords used:
- * d. Provide the most recent date (month/day/year) that you performed a full search. The search should be completed within three months prior to submission.

2. Identify other sources (consultants, conferences, etc.)

- * 3. Summarize how the above methods and sources identified and described above have helped you identify alternatives to potentially painful or distressful procedures, or determine that alternatives are either not available, or not appropriate for this protocol.

Appendix 9: Blank IACUC/OB Protocol Form

Attachments

RESEARCH HAZARDOUS MATERIALS CLASSIFICATION FORM (RHMC FORM)

- This form is required if you will be administering substances of any type to animals during your planned activity.
- The purpose of this form is to allow Environmental Health and Safety personnel to evaluate the substance and the proposed personal protective equipment to be used by your staff and the staff in the facility where your animal subjects will be housed.
- This form is not required for drugs that are to be used for routine veterinary care purposes (i.e. pain medications, anesthetics, sedatives, etc. commonly used during procedures).

Upload RHMC Form

Upload here:

Upload RHMC Form

BIOLOGICAL USE AUTHORIZATION FORM (BUA)

- If you have a Biological Use Authorization (BUA) form that has been reviewed and approved by the Institutional Biosafety Committee (IBC), please upload it here.

Upload BUA Form

Upload here:

Upload BUA Form

CLIENT CONSENT FORM

- Required if client-owned animals are being used.

Client Consent form, click "Add New" to add multiple forms:

Upload here:

Upload Consent Form

FLOWCHARTS/IMAGES (OPTIONAL)

- You may attach any flowcharts or diagrams that help to explain your study design or experimental plan.
- You may also attach any standard operating procedures for special care of your animal subjects.

Upload Flowchart/Image File

SYLLABUS

- Required for all teaching protocols.
- Reviewers will compare your syllabi to the protocol to make sure it is congruent with your request.

Upload Syllabus

WILDLIFE PERMITS

- Required for any protocols using wild animals under field conditions or protocols where animals will be captured and brought into an animal facility.

Upload Wildlife Permits

OCCUPATIONAL HEALTH MEMO - NON-NCSU PERSONNEL

- Upload a memo from the home institution stating that personnel are covered under their Occupational Health and Safety Program. DO NOT include any Personal vaccine or medical records. Please contact EHS at env-health-occ-health@ncsu.edu if you have any questions.

Upload Occupational Safety Memo

Appendix 9: Blank IACUC/OB Protocol Form

Certification

SUBMISSION OF THIS PROTOCOL CERTIFIES THAT THE PRINCIPAL INVESTIGATOR UNDERSTANDS AND AGREES TO THE FOLLOWING:

I understand and agree to follow:

- NC State University policies for the care and use of animals
- the provisions of the [ILAR Guide for the Care and Use of Laboratory Animals](#)
- the [Federation of Animal Science Societies Guide for the Use of Agricultural Animals in Research and Teaching](#)
- all federal, state, and local laws and regulations governing the use of animals in research

I understand and certify that:

- emergency veterinary care will be administered to animals showing evidence of pain or illness, in addition to routine veterinary care
- all manipulations involving live animals will be performed under her/his supervision or that of another qualified individual listed on this protocol

I understand and certify that all personnel having direct animal contact, including the investigator:

- will participate in the Occupational Health and Safety Program
- have been trained in humane and scientifically acceptable procedures in animal handling, administration of anesthetics, analgesics, and euthanasia to be used in this project, and have completed the [required regulatory compliance training](#);
- OR are under the direct (in-lab) supervision of an individual who is aware of University policies and federal regulations via completion of the required regulatory compliance training

I understand and certify that:

- this proposed animal use does not unnecessarily duplicate previous activities

I certify that:

- I will obtain approval from the IACUC before initiating any changes in this study, including changes in personnel or location of animal use
- I will notify the IACUC and the attending veterinarian regarding any unexpected study results that adversely affect the animals, including any unanticipated pain or distress, morbidity or mortality.

I certify that:

- I will personally discuss project details with the supervisory staff for animal care personnel to ensure that personnel not under the direct supervision of the investigator:
 - understand the potential exposures and mutually agree upon the required protective measures when handling the animals, their feed/water and their wastes (including carcasses, if applicable).
 - are aware of, and understand existing SOPs or IACUC Research Materials Hazard Classification Forms supplementing this Application for Vertebrate Animal Use (AVAU) document required protective equipment and measures by specific substance name.

CHECK HERE TO CERTIFY YOUR COMPLIANCE WITH THE STATEMENTS ABOVE:

* ☐ I have read, understand, and will comply with the above assurance statements.

NC State University
Animal Care + Use (IACUC)
P: (919) 515-7507
Email - iacuc_office@ncsu.edu

<https://research.ncsu.edu/>

Appendix 9: Blank IACUC/OB Protocol Form

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- OR are under the direct (in-lab) supervision of an individual who is aware of University policies and federal regulations via completion of the required regulatory compliance training

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- this proposed animal use does not unnecessarily duplicate previous activities

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I certify that:

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 - understand the potential exposures and mutually agree upon the required protective measures when handling the animals, their feed/water and their wastes (including carcasses, if applicable).
 - are aware of, and understand existing SOPs or IACUC Research Materials Hazard Classification Forms supplementing this Application for Vertebrate Animal Use (AVAU) document required protective equipment and measures by specific substance name.

CHECK HERE TO CERTIFY YOUR COMPLIANCE WITH THE STATEMENTS ABOVE:

* ☐ I have read, understand, and will comply with the above assurance statements.

NC State University
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P: (919) 515-7507
Email - iacuc_office@ncsu.edu

<https://research.ncsu.edu/>

Appendix 9: Blank IACUC/OB Protocol Form

Protocol Personnel Amendment Form



Institutional Animal Care and Use Committee Protocol Amendment Form to Add/Change Personnel

Handwritten forms are not accepted.

Use this form to make a personnel change to an approved animal care and use protocol. Return completed form to NCSU IACUC Office, <mailto:iacuc@ncsu.edu>. If you have questions, please contact the IACUC office via phone at 919.515.7507 or 919.515.9532.

Protocol Number:

Click or tap here to enter text.

Protocol Title:

Click or tap here to enter text.

Principal Investigator: Click or tap here to enter text.

Phone #: Click or tap here to enter text.

Email address: Click or tap here to enter text.

INSTRUCTIONS FOR IDENTIFYING PERSONNEL:

IN THE TABLE BELOW

- 1) Name and each individual's unity ID – this is the ID they use to log in to their NCSU email account; for example, John Smith's unity ID might be "jsmith142." For individuals external to NCSU, provide an email address for contact. See "NOTE" below.
- 2) Describe animal-related experience and training, for proposed procedures, in sufficient detail to document for the IACUC and outside auditing agencies (i.e. USDA, OLAW, AAALAC, etc.) that individuals are qualified; listing of degrees is not sufficient.
- 3) Indicate their roles in the project, i.e. the function of individuals. For example, indicate their role as "Principal Investigator," "Researcher," "Technician" or "Graduate Student Researcher."
- 4) Provide specific information about procedures to be performed by these

individuals, especially euthanasia, and if applicable, anesthesia and/or surgery.

NOTE: If including personnel not employed by or enrolled as students at NCSU, please provide an email address for each external individual so that the IACUC Office may contact them about completion of the required animal welfare regulatory compliance training and/or enrollment in the Occupational Health and Safety Program for Personnel with Animal Contact.

| Name | NCSU Position Title | Animal Care and Use Related Experience (see guidance in item 2 above) | Roles in this project (see guidance in item 3 above) | Procedures to be performed (see guidance in item 4 above) |
|------|---------------------|---|--|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Appendix 9: Blank IACUC/OB Protocol Form

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

Please review the original protocol and any previously approved amendments. NOTE: If a designated staff member submits this form on behalf of the PI, we require that the staff copy the PI on the email during submission of this document. Confirm that all principal investigator assurances apply to proposed change(s) by checking this box: ☐

Date submitted: Click or tap to enter a date.

IACUC OFFICE USE ONLY

IACUC Office Action:

☐ The changes proposed are not significant and do not require further IACUC review. The changes may be implemented and this form is included in the record for this protocol. <https://research.ncsu.edu/sparcs/compliance/iacuc/iacuc-sops/administrative-review-procedures/>

☐ CHANGE IN PRINCIPAL INVESTIGATOR ONLY - The changes proposed have received NCSU IACUC review, per guidelines for review procedures for significant changes <https://research.ncsu.edu/sparcs/compliance/iacuc/iacuc-sops/iacuc-prd-rev/>

Date of approval by NCSU IACUC OFFICE:

Click or tap to enter a date.

Appendix 10: IACUC/OB Periodic Report

Signatures: NCSU IACUC's semiannual evaluation of the Animal Care and Use Program was completed by a convened quorum on May 21, 2020 and the final report approved and verified by email review and confirmation- see attached. All current voting members of the committee have had an opportunity to review this semiannual program report to the Institutional Official.

Printed Names of Voting Members of the IACUC

Signatures

| | |
|--|--|
| Kenneth Anderson see email | |
| Paula DeLong see email | |
| Christopher DePerno | |
| Robert Elder see email | |
| William Flowers see email | |
| John Gadsby see email | |
| Nneka George see email | |
| Gabriel McKeon see email | |
| Candace Morales see email | |
| Jennifer Dew see email | |
| Paul Siciliano | |
| David Sloop see email | |
| Steven Suter see email | |
| Susan Tonkonogy see email | |

Kenneth Anderson 6/18/2020

to me

Jennifer

At the IACUC meeting on May 21, 2020, the committee reviewed the Semiannual Program Review Checklist.

The semi annual report to the IO is attached for your review. If you request discussion at the next IACUC meeting, please reply by Wednesday, 6/17.

Please reply to this email by 6/17 and check the appropriate statements below to indicate your approval of the report and whether or not you wish to express a minority opinion. Your reply email will become your official "signature" on the report, which will be submitted to the Institutional Official.

☒ I confirm that I approve the Program review as discussed at the IACUC meeting on May 21, 2020 and I approve the attached Semi Annual report to the IO.

Any IACUC member may express a minority opinion (an opinion that differs from the majority) during the Semiannual Program Review. The minority opinion may address any aspect of the institution's Animal Care and Use Program that was discussed during the Semiannual Program Review. There were no minority views expressed during the meeting. However, please confirm below that you have no minority opinion or, if you do, please describe it below.

☒ I have no minority opinion to express — or —

☐ I have the following minority opinion to express (describe below)

Ken

Kenneth E. Anderson, Ph.D.
Professor, Poultry Extension Specialist
Director, North Carolina Layer Performance and Management Program
Prestage Dept. of Poultry Science
North Carolina State University
2711 Founders Drive
Box 7608
Raleigh, NC 27695-7608
Office: 919-515-5527
Fax: 919-515-7070
E-mail: ken_anderson@ncsu.edu

Gabriel McKeon 6/18/2020

to me

Hi Jennifer,

I have read the semiannual report and checklist and I have no minority opinion to express. Looks good to me.

Thanks,

G

—
Gabriel McKeon, DVM, DACLAM
University Attending Veterinarian
NCSU, LAR
919-513-6638 (office)
<http://lpo.ncsu.edu/iac-resources>

Appendix 10: IACUC/OB Periodic Report

William Flowers

Mon, Jun 15, 2:27 PM (3 days ago)

to me

At the IACUC meeting on May 21, 2020, the committee reviewed the Semiannual Program Review Checklist. The semi annual report to the IO is attached for your review. If you request discussion at the next IACUC meeting, please reply by Wednesday, 6/17.

Please reply to this email [by 6/17](#) and check the appropriate statements below to indicate your approval of the report and whether or not you wish to express a minority opinion. Your reply email will become your official "signature" on the report, which will be submitted to the Institutional Official.

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☐ I have no minority opinion to express — or —

☐ I have the following minority opinion to express (describe below)

9:04 AM (4 hours ago)

John Gadsby 6/18/2020

to jgadsby, me

On Jun 15, 2020, at 11:44 AM, Jennifer Dew <jadew@ncsu.edu> wrote:

At the IACUC meeting on May 21, 2020, the committee reviewed the Semiannual Program Review Checklist. The semi annual report to the IO is attached for your review. If you request discussion at the next IACUC meeting, please reply by Wednesday, 6/17.

Please reply to this email [by 6/17](#) and check the appropriate statements below to indicate your approval of the report and whether or not you wish to express a minority opinion. Your reply email will become your official "signature" on the report, which will be submitted to the Institutional Official.

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☐ I have no minority opinion to express — or —

☐ I have the following minority opinion to express (describe below)

John Gadsby, Ph.D.
Professor of Physiology.
Department of Molecular Biomedical Sciences
North Carolina State University
College of Veterinary Medicine
1060 William Moore Drive
Raleigh, NC 27607
[email: jgadsby@ncsu.edu](mailto:jgadsby@ncsu.edu)
919-513-6268 (O)
919-801-8815 (C)
919-513-6464 (Fax)

Candace Morales

Mon, Jun 15, 3:20 PM (3 days ago)

to me

See below. Thank you!

On Mon, Jun 15, 2020 at 11:44 AM Jennifer Dew <jadew@ncsu.edu> wrote:

At the IACUC meeting on May 21, 2020, the committee reviewed the Semiannual Program Review Checklist. The semi annual report to the IO is attached for your review. If you request discussion at the next IACUC meeting, please reply by Wednesday, 6/17.

Please reply to this email [by 6/17](#) and check the appropriate statements below to indicate your approval of the report and whether or not you wish to express a minority opinion. Your reply email will become your official "signature" on the report, which will be submitted to the Institutional Official.

☒ I confirm that I approve the Program review as discussed at the IACUC meeting on May 21, 2020 and I approve the attached Semi Annual report to the IO.

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☐ I have no minority opinion to express — or —

—
Candace Cooler Morales, MPH, RLATG
IACUC Compliance Coordinator
IACUC Office
North Carolina State University
Raleigh, NC
Phone: (919) 515-3991

Appendix 10: IACUC/OB Periodic Report

Robert Elder

Tue, Jun 16, 10:47
AM (2 days ago)

to me

On Jun 15, 2020, at 11:44 AM, Jennifer Dew <jadew@ncsu.edu> wrote:

At the IACUC meeting on May 21, 2020, the committee reviewed the Semiannual Program Review Checklist. The semi annual report to the IO is attached for your review. If you request discussion at the next IACUC meeting, please reply by Wednesday, 6/17.

Please reply to this email [by 6/17](#) and check the appropriate statements below to indicate your approval of the report and whether or not you wish to express a minority opinion. Your reply email will become your official "signature" on the report, which will be submitted to the Institutional Official.

☒X_ I confirm that I approve the Program review as discussed at the IACUC meeting on May 21, 2020 and I approve the attached Semi Annual report to the IO.

Any IACUC member may express a minority opinion (an opinion that differs from the majority) during the Semiannual Program Review. The minority opinion may address any aspect of the institution's Animal Care and Use Program that was discussed during the Semiannual Program Review. There were no minority views expressed during the meeting. However, please confirm below that you have no minority opinion or, if you do, please describe it below.

☐_ I have no minority opinion to express — or —

☐_ I have the following minority opinion to express (describe below)

Susan Tonkonogy

Wed, Jun 17, 10:04
AM (1 day ago)

to IACUC, me

☒X_ I confirm that I approve the Program review as discussed at the IACUC meeting on May 21, 2020 and I approve the attached Semi Annual report to the IO.

☒X_ I have no minority opinion to express

Sue Tonkonogy

Nneka George

Wed, Jun 17, 12:10
PM (1 day ago)

to me

XX_ I confirm that I approve the Program review as discussed at the IACUC meeting on May 21, 2020 and I approve the attached Semi Annual report to the IO.

Nneka George, DVM, DACLAM
University Clinical Veterinarian
Laboratory Animal Resources
North Carolina State University
College of Veterinary Medicine
<http://zo.ncsu.edu/lar-resources>
nngorge@ncsu.edu
919-513-2365

David Sloop

Jun 17, 2020, 6:30
AM (1 day ago)

to me

Jennifer,
I put an A to indicate my approval and that I have no minority report.
Thanks for your leadership.
Be safe!
Gratefully,
David Sloop

Sent from my iPad

On Jun 15, 2020, at 11:44 AM, Jennifer Dew <jadew@ncsu.edu> wrote:

At the IACUC meeting on May 21, 2020, the committee reviewed the Semiannual Program Review Checklist. The semi annual report to the IO is attached for your review. If you request discussion at the next IACUC meeting, please reply by Wednesday, 6/17.

Please reply to this email [by 6/17](#) and check the appropriate statements below to indicate your approval of the report and whether or not you wish to express a minority opinion. Your reply email will become your official "signature" on the report, which will be submitted to the Institutional Official.

☐_A_ I confirm that I approve the Program review as discussed at the IACUC meeting on May 21, 2020 and I approve the attached Semi Annual report to the IO.

Any IACUC member may express a minority opinion (an opinion that differs from the majority) during the Semiannual Program Review. The minority opinion may address any aspect of the institution's Animal Care and Use Program that was discussed during the Semiannual Program Review. There were no minority views expressed during the meeting. However, please confirm below that you have no minority opinion or, if you do, please describe it below.

☐_A_ I have no minority opinion to express — or —

☐_ I have the following minority opinion to express (describe below)

Paula DeLong

Wed, Jun 17, 10:08
AM (1 day ago)

to me

☒X_ I confirm that I approve the Program review as discussed at the IACUC meeting on May 21, 2020 and I approve the attached Semi Annual report to the IO.

☒X_ I have no minority opinion to express

Thank you,
Paula DeLong

Appendix 10: IACUC/OB Periodic Report

Steven Suter

Wed, Jun 17, 11:34 AM (1 day ago)

to me

I approve and have no minority opinion.

S

On Mon, Jun 15, 2020 at 11:44 AM Jennifer Dew <jadew@ncsu.edu> wrote:

Steven Suter VMD MS PhD ACVIM (Oncology)
Professor-Medical Oncology
Medical Director, Canine Adhesions & Bone Marrow Transplant Unit
Director, Canine/Feline Molecular Oncology Diagnostic Laboratory
North Carolina State University College of Veterinary Medicine
Department of Clinical Sciences
1051 William Moore Drive, CVM Research #308
Raleigh, NC 27607
Phone: 919.515.0813

Jennifer Dew <jadew@ncsu.edu>

Wed, Jun 17, 3:38 PM (22 hours ago)

to me

I approve the attached report, JAD 6/17/2020

At the IACUC meeting on May 21, 2020, the committee reviewed the Semiannual Program Review Checklist. The semi annual report to the IO is attached for your review. If you request discussion at the next IACUC meeting, please reply by Wednesday, 6/17.

Please reply to this email [by 6/17](#) and check the appropriate statements below to indicate your approval of the report and whether or not you wish to express a minority opinion. Your reply email will become your official "signature" on the report, which will be submitted to the Institutional Official.

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☒ I have no minority opinion to express — or —

☐ I have the following minority opinion to express (describe below)



Office of Research, Innovation
and Economic Development
Sponsored Programs and
Regulatory Compliance Services
research.ncsu.edu/sparco/

Campus Box 7514
2701 Sullivan Dr. Suite 240
Raleigh, NC 27695-7514
P: 919.515-2444, F: 919-515-7721
E: spe@ncsu.edu

Memorandum to: Richard Best, Director of Compliance, Institutional Official
From: Institutional Animal Care and Use Committee
Subject: Semiannual Report of the Animal Care and Use Program Review
Date: June 15, 2020

This report summarizes the IACUC's results of its most recent program review and facility inspection, as required by the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals ([Policy](#)), Section [IV.B.1-3](#), the *Guide for the Care and Use of Laboratory Animals* ([Guide](#)), and the Animal Welfare Act ([AWA](#)) regulations, as applicable. Submission of semiannual reports to the Institutional Official is a condition of this institution's Animal Welfare Assurance with the NIH Office of Laboratory Animal Welfare (OLAW).

I. Description of the Nature and Extent of the Institution's Adherence to the PHS Policy, the *Guide* or the *Ag Guide*, and the AWA

Departures from the PHS Policy, the *Guide*, and the AWA.

Select A or B:

- ☐ A. There were no departures during this reporting period.
☒ B. The departures have been reviewed and approved by the IACUC.

| ID# | Standard | Species | IACUC-Approved Exception |
|--------|---------------------------------------|---------|--|
| 19-016 | Guide pg 59 | Dog | Housed in cages with lowered lids to prevent hip injury in post-surgical model |
| 17-138 | | | |
| 20-155 | 9CFR Ch.1. Pt.2, Subpt. F. Sec. 3.128 | Pig | Post-surgical housing and subsequent Farrowing housing used does not meet space requirements |
| 20-244 | 9CFR Ch.1. Pt.2, Subpt. F. Sec. 3.128 | Pig | Farrowing housing used does not meet space requirements |
| 18-014 | | | |
| 19-070 | Guide pg 51 | Mice | Housed on wire flooring while dosed with chemotherapeutics up to 12 weeks. |
| 20-195 | 9CFR Ch.1. Pt.2, Subpt. F. Sec. 3.128 | Pig | Individual housing in metabolism cages that does not meet space requirement is required to maintain catheter and interstitial probes, or to collect urine. |

II. Deficiencies in the Institution's Animal Care and Use Program Animal Care and Use Program Review Date(s): May 21, 2020

Select A or B:

Semiannual Program Review Report to IO
06.18.2020
JAD

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Appendix 10: IACUC/OB Periodic Report

☒ A. There were no deficiencies in the program during this reporting period.^a

☐ B. The following deficiencies have been identified:

Areas Discussed:

1. Institutional Policies and Responsibilities

There is a new IACUC webpage and a link will be sent out to all IACUC members. The IACUC has reviewed and approved 6 updated or new policies since the last program review. Committee membership was discussed with the possibility of adding alternates. It was also mentioned that it would be helpful to recruit new members for colleges that are not currently represented. This will be explored further.

2. Institutional Policies and Responsibilities (Veterinary Care)

There has been no feedback on the changes to the CO2 flow rate. All appears to be going smoothly so far, and the IACUC can ask lab members during the next facility inspection. There was in depth discussion around lab members performing surgery and how to assess training of individuals. This is mostly for rodent species as larger surgeries are performed by CVMT staff. There have been no observed issues noted to date, the IACUC proactively is exploring this topic as more labs are requesting research involving surgery models in rodents that have not historically performed surgery.

There is not currently adequate training resources to implement a formal program. The plan is to perform post approval monitoring by qualified members or consultants and offer online surgery training courses through the AALAS learning library and reevaluate at the next program review.

3. Institutional Policies and Responsibilities (Training, Occupational Health & Safety)

The IACUC members discussed training ideas for future meetings. All members encourage the idea of training on new scientific areas to facilitate review for nonscientific reviewers. The OHS review plan for the college of veterinary medicine has been drafted and HR will implement those changes. The response to the COVID pandemic has slowed this process but it is still moving forward.

III. Deficiencies in the Institution's Animal Facilities

Animal Facility/Lab Inspection Date(s): Multiple dates: January 8, 9, 22; February 3, 5, 7; March 2, 4, 6; and April 22, 28.

☐ A. There were no deficiencies in the animal facilities during this reporting period.

☒ B. The following deficiencies were noted in animal facilities during this reporting period. Also included are approved plans and schedules for correction approved during this reporting period for deficiencies noted during the previous reporting period.

See attached

Minority Views

Select A or B:

☒ A. No minority views were submitted or expressed.

☐ B. The following minority views were expressed:

IV. Status of AAALAC Accreditation

The College of Veterinary Medicine is accredited.

The College of Sciences is accredited.

Plan and Schedule for Correction of Deficiencies

| Facility | Date of Inspection | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | Deficiency Confirmed Corrected by IACUC (date and by whom) |
|---|--------------------|--------------------|--|---|--|
| | 11/13/2019 | | | | |
| Deficiency(ies) are described below: | | Minor/ Significant | -Replacement -Renovation or Repair -Modification of Policies or SOPs -Other | Proposed Scheduled Date(s) of Corrective Action (Start/Finish) | |
| There was signs of the beginning of paint peeling on wall by entrance door in [redacted] the lab manager indicated it is on their list to have repainted. This should be done to ensure impervious surface for proper sanitation in this procedure room area. | | M | Sand and repaint area of wall in D028 where paint is peeling | Repainted on By Facilities Department on December 19 th 2019 The area was sanded down to remove the areas of peeling paint and was then repainted over to match the surrounding wall. | Corrections to be confirmed at next scheduled inspection |
| | | | | | |
| | | | | | |

Appendix 10: IACUC/OB Periodic Report

Plan and Schedule for Correction of Deficiencies

| Facility | | | | |
|--|---------------------------|--|---|---|
| Date of Inspection | | | | |
| 11/13/2019 | | | | |
| DEFICIENCY | M/S | ACTION DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | |
| <i>Deficiency(ies) are described below</i> | <i>Minor/ Significant</i> | <i>-Replacement -Renovation or Repair -Modification of Policies or SOPs -Other</i> | <i>Proposed Scheduled Date(s) of Corrective Action (Start/Finish)</i> | <i>Deficiency Confirmed Corrected by IACUC (date and by whom)</i> |
| Please euthanize tadpoles according to the methods described in the approved IACUC protocol and ensure death prior to leaving tadpoles unattended. | M | We are now adding 10 ml of 5% Tricaine to our 1 liter waste beaker to ensure that any embryos transferred to that beaker will be euthanized. | This change has now been implemented and will be done in an ongoing manner. 12/5/2019 | Corrections to be confirmed at next scheduled inspection. |
| | | | | |
| | | | | |

Plan and Schedule for Correction of Deficiencies

| Facility | | | | |
|--|---------------------------|--|---|---|
| Date of Inspection | | | | |
| March 2, 2020 | | | | |
| DEFICIENCY | M/S | ACTION DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | |
| <i>Deficiency(ies) are described below</i> | <i>Minor/ Significant</i> | <i>-Replacement -Renovation or Repair -Modification of Policies or SOPs -Other</i> | <i>Proposed Scheduled Date(s) of Corrective Action (Start/Finish)</i> | <i>Deficiency Confirmed Corrected by IACUC (date and by whom)</i> |
| There was still no record of ammonia testing for either of the animal rooms in this building. It is recommended that ammonia level testing be performed at least once weekly and documented on the log sheet to ensure the levels are within acceptable range. | M | A digital ammonia meter will be purchased and maintained at the [redacted]. Will add ammonia observation to the daily observation sheet. | April 1, 2020 | Corrections to be confirmed at next scheduled inspection. |
| | | | | |
| | | | | |

Appendix 10: IACUC/OB Periodic Report

Plan and Schedule for Correction of Deficiencies

| Facility | | Date of Inspection | |
|---|---------------------------|--|--|
| | | March 2, 2020 | |
| DEFICIENCY | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION |
| <i>Deficiency(ies) are described below</i> | <i>Minor/ Significant</i> | <i>-Replacement -Renovation or Repair -Modification of Policies or SOPs -Other</i> | <i>Proposed Scheduled Date(s) of Corrective Action (Start-Finish)</i> <i>Deficiency Confirmed Corrected by IACUC (date and by whom)</i> |
| <p>1) Peeling paint was evident on the metal entry doors, ceiling, and walls.</p> <p>2) Exposed electrical wiring for the exhaust fan and box fans need to be enclosed as these can cause a hazard for people and animals in the room.</p> <p>3) Mouse droppings evident throughout the building.</p> | M | <p>1) [REDACTED] scheduled for renovations this Summer. Interior walls will have FRP board added to them, ceilings are being replaced with FRP boards, and doors will be sanded and repainted.</p> <p>2) A junction box will be added to this room to store the wiring from the fan timer.</p> <p>3) Weekly CEU mouse baiting will be confirmed. We will also speak with monthly external pest control vendor for additional extermination methods or see if he needs to increase inspections/baiting 2x per month.</p> <p>This house no longer has birds in it. Birds will not be placed into this house again until after renovations occur.</p> | <p>We will provide an update to the IACUC on the status of work orders following return to normal work after the COVID-19 restrictions (estimated June 2020). There are no animals currently housed in the impacted areas noted and we have no formal plans of any study placing in the near future.</p> <p>Corrections to be confirmed at next scheduled inspection</p> |

Plan and Schedule for Correction of Deficiencies

| Facility | | Date of Inspection | |
|---|---------------------------|--|--|
| | | 2/2/2020 | |
| DEFICIENCY | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION |
| <i>Deficiency(ies) are described below</i> | <i>Minor/ Significant</i> | <i>-Replacement -Renovation or Repair -Modification of Policies or SOPs -Other</i> | <i>Proposed Scheduled Date(s) of Corrective Action (Start-Finish)</i> <i>Deficiency Confirmed Corrected by IACUC (date and by whom)</i> |
| <p>The pens where pigs are housed have an excessive accumulation of waste. Due to recent wet conditions, farm management explained that pen cleaning frequency was limited to once per week due to concerns that the facility's lagoon may overflow with more frequent cleaning. Inspectors suggest that if pigs continue to be housed at the current density and the farm is unable to clean pens, that alternative cleaning methods be used such as manually scraping the pens. The facility may find it beneficial to develop facility SOP's to address how pens will be cleaned when climate conditions prevent the use of large amounts of water. Per the Ag guide: "A plan should be followed to ensure that the animals are kept reasonably dry and clean and are provided with comfortable, healthful surroundings. Good sanitation is essential in intensive animal facilities."</p> | M | <p>Right currently attempting to create specific animal housing SOP. In discussion with UIC personnel for definition in SOP that allow animals to be housed in reasonably dry, clean, healthful surroundings per the guide and [REDACTED]</p> <p>-SOP will address animal density and total number of animals housed during a term</p> <p>-SOP will address minimum cleaning levels for each situation to wastewater levels in lagoon.</p> | <p>5/1/2020</p> <p>Corrections to be confirmed @ next scheduled inspection</p> |
| <p>As this is an older facility, signs of rusting pen flooring and feeder mount poles are evident. The unit has been unable to replace</p> | M | <p>Agmt agrees to replace rusted panels over time in "down time" between studies (unusual period)</p> | |

Appendix 10: IACUC/OB Periodic Report

| | | | |
|---|--|----------|---|
| pen fencing due to pens being in continuous use for studies but plans to replace panels in March when the current study is completed. This comment was made previously on the inspection report from February, 2019 and noted on the August 2019 Self Evaluation checklist. | Agent unable to do this but consent of previous study (in dry form) was made. Agent will begin replacing 1 room (5 panels) per treatment period. Agent will replace 5 panels in 1 room by 3/1/2020 | 5/1/2020 | Corrections to be confirmed @ next scheduled inspection |
|---|--|----------|---|

Plan and Schedule for Correction of Deficiencies

| Facility | | | | |
|---|--------------------|--|--|--|
| Date of Inspection | March 2, 2020 | | | |
| DEFICIENCY | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | |
| Deficiency(ies) are described below | Minor/ Significant | -Replacement -Renovation or Repair -Modification of Policies or SOPs -Other | Proposed Scheduled Date(s) of Corrective Action (Start/Finish) | Deficiency Confirmed Corrected by IACUC (date and by whom) |
| The roof is damaged in many places with metal roofing material missing and/or flapping in the wind. Additionally, the wood truss in one section is damaged. A gate has been put up so that animals cannot be access this section to prevent possible injury to them. There are small holes in the roofing throughout this building. This roof needs to be repaired or replaced to prevent potential injury to animals and personnel working in the area. A plan is in place to be completed by Spring 2021. | M | The plan is moving, but slowly. Animals will be removed from the building and relocated to another building. Pens with water and feed access will be built to meet the needs of calves. The retro-fits have slowed due to COVID-19 but will likely finish early summer. Demolition is expected soon after. | We will provide an update to the IACUC on the status of work orders following return to normal work after the COVID-19 restrictions (estimated June 2020). | Corrections to be confirmed at next scheduled inspection |

Plan and Schedule for Correction of Deficiencies

| Facility | | | | |
|--|--------------------|--|--|--|
| Date of Inspection | 11/5/2019 | | | |
| DEFICIENCY | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | |
| Deficiency(ies) are described below | Minor/ Significant | -Replacement -Renovation or Repair -Modification of Policies or SOPs -Other | Proposed Scheduled Date(s) of Corrective Action (Start/Finish) | Deficiency Confirmed Corrected by IACUC (date and by whom) |
| A small space heater was found in this space sent to the fish tanks, and the electrical cords were connected to an outlet near the floor. Please note that a space heater in an aquatic room is a safety hazard. Please remove the space heater from the room immediately and address any concerns regarding temperature regulation in this room with facility management. | M | is the primary for this room. The basement rooms of the building run cool, while we have consulted maintenance about this it has been difficult for them to regulate room temperatures of basement rooms with exterior walls. To date space heaters have been the only mechanism that correct for this difficulty in temperature especially on cold winter days. If we do not have to rooms at appropriate temperatures we will be sacrificing animal health and well being. We can however ensure that space heaters are off the floor and away from any source of water. | 12/01/2019 | Corrections to be confirmed at next scheduled inspection |
| The eyewash in this area had not been flushed since December 2016. Please flush and document the eyewash check weekly per the facility manager's SOP. This comment was made during the last IACUC inspection on May 2, 2019. | M | We will initiate a routine weekly eye wash flush with a adjacent chart for documenting. | 01/06/2020 | Corrections to be confirmed at next scheduled inspection |
| pH calibration solutions were out of date as were multiple other chemical solutions in this area. Please discard to maintain good housekeeping practices and to ensure the pH meter is properly calibrated to measure pH levels in the fish tanks | M | All old pH solutions and stock media have been removed or replaced | 12/01/2019 | Corrections to be confirmed at next scheduled inspection |

accurately. This comment was made during the last IACUC inspection on May 2, 2019.

Appendix 10: IACUC/OB Periodic Report

Plan and Schedule for Correction of Deficiencies

| Facility: | | | | |
|---|---------------------------|--|---|---|
| Date of Inspection: | 2/7/2020 | | | |
| DEFICIENCY | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | Deficiency Confirmed |
| <i>Deficiency(ies) are described below:</i> | <i>Minor/ Significant</i> | <i>-Replacement -Renovation or Repair -Modification of Policies or SOPs -Other</i> | <i>Proposed Scheduled Date(s) of Corrective Action (Start/Finish)</i> | <i>Deficiency Confirmed Corrected by IACUC (date and by whom)</i> |
| Work has recently begun involving Pacific blue tang fish. This is not currently described on an approved IACUC protocol. Please submit an amendment or protocol to cover the research being performed in these fish. A comment was made at the previous IACUC inspection on February 4, 2019 stating that all research animals should be covered by an approved IACUC protocol. | M | Amendment of protocol 19-065-0 | In progress: 3/23/20 eta completion | Amendment approved 4/27/2020 |
| Training records were discussed. All students that come into contact with fish and/or perform daily health checks should have documentation to demonstrate that they were appropriately trained. This comment was made at the previous IACUC inspection on February 8, 2018, and was also discussed during the inspection on February 4, 2019. | M | All personnel are trained, this was confusion between the old protocol and new | 3/16/20 | Corrections to be confirmed at next scheduled inspection |

| | | | | |
|---|---|---|---------|--|
| Daily logs and records were discussed. Inspectors spoke with the facility manager about consistently documenting daily health checks, temperature recordings, and feeding to include weekend checks by graduate students. These records were discussed during previous IACUC inspections on February 8, 2018, and February 4, 2019. | M | Logs are kept in one location instead of several confusing clipboards | 3/16/20 | Corrections to be confirmed at next scheduled inspection |
|---|---|---|---------|--|

Plan and Schedule for Correction of Deficiencies

| Facility: | | | | |
|--|---------------------------|---|---|---|
| Date of Inspection: | 1/22/2020 | | | |
| DEFICIENCY | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | Deficiency Confirmed |
| <i>Deficiency(ies) are described below:</i> | <i>Minor/ Significant</i> | <i>-Replacement -Renovation or Repair -Modification of Policies or SOPs -Other</i> | <i>Proposed Scheduled Date(s) of Corrective Action (Start/Finish)</i> | <i>Deficiency Confirmed Corrected by IACUC (date and by whom)</i> |
| Bucket of racid feedstuff needs to be discarded. | M | The racid fat was disposed of by PI that day | 1/22/20 Corrected | Corrections to be confirmed at next scheduled inspection |
| Feed barrels need to be labeled with Name and Date (milled date or expiration date). | | Feed was disposed of on 1/23/20 | 1/23/20 Corrected | |
| Bags of feed should be stored properly in a manner that ensures proper sanitation of the area in which they are stored. The bags should also be stacked away from the wall. | | Feed was moved and restocked to be in accordance with feed handling protocol | 1/23/20 Corrected | |
| Peeling wall paint needs to be repaired and repainted to ensure impervious areas for proper sanitation. | | | | |
| Ceiling tiles throughout the hallways on each floor has soiled tiles that need to be replaced. The manager noted that some of the tiles have to be replaced routinely after a hard rain. This is due to the roof leaking and/or condensation that leaks down floor to floor soiling the ceiling tiles. | M | Work order with Facilities was in process of being completed for the hallways when inspection was conducted. Ceiling tile replacement was completed and have been replaced and the roof has been checked for leaks. | 2/6/20 Completed | Corrections to be confirmed at next scheduled inspection |

| | | | | |
|--|---|--|---|--|
| Multiple floor tiles in the hallways are cracked and some tiles are not adhered to the concrete at all. | M | Submitting work request for facilities | 2/18/20 | Corrections to be confirmed at next scheduled inspection |
| Peeling paint on walls and crack in concrete floor. The surfaces need to be impervious for proper sanitation. | M | Work order for painting specific room in the bird wing has been submitted. Facilities has made initial visit and we are waiting for the cost estimate. | TBD by facilities; PI will provide an update to the IACUC on the status of work orders following return to normal work after the COVID-19 restrictions (estimated June 2020). No animals are currently housed in this room. | Corrections to be confirmed at next scheduled inspection |
| This room is used for hatching eggs but has large buckets of chemicals kept in room. These chemicals should be stored in a proper area away from the hatching eggs and/or animals. | M | Chemicals have been moved to the storage room | 1/23/20 Corrected | Corrections to be confirmed at next scheduled inspection |

Appendix 10: IACUC/OB Periodic Report

| | | | | |
|--|---|--|---|---|
| Peeling paint was noted on walls in this area due to humidity that needs to be repainted. There is a humidifier being used to try to guard against peeling paint issue. The lab manager emailed the IACUC office to let them know the area has been painted 3 times over the last 11 year but it doesn't help due to the humidity issues and poor construction for the building. | M | Humidifiers are used to reduce the humidity in the teaching labs. Most birds utilized in these spaces for course laboratories are euthanized prior to being exposed to this space. | TBD by facilities and funding. PS will provide an update to the IACUC on the status of work orders following return to normal work after the COVID-19 restrictions (estimated June 2020). No testing is currently conducted in this room. | Corrections to be confirmed at next scheduled inspection. |
|--|---|--|---|---|

Plan and Schedule for Correction of Deficiencies

| Facility | | | | |
|--|-------------------|--|---|--|
| Date of Inspection | 1/8/2020 | | | |
| DEFICIENCY | M/S | ACTION/DESCRIPTION OF PLAN TO CORRECT | SCHEDULE FOR CORRECTION | |
| Deficiency(ies) are described below | Minor/Significant | -Replacement -Renovation or Repair -Modification of Policies or SOPs -Other | Proposed Scheduled Date(s) of Corrective Action (Start/Finish) | Deficiency Confirmed Corrected by IACUC (date and by whom) |
| <p>The comment about the anesthesia machine and isoflurane use noted below from a previous semiannual inspection is not resolved:</p> <p>The anesthesia machine's vaporizer used to deliver isoflurane anesthetic gas to patients needs to be calibrated as there was no calibration data noted. The entire unit including the nose cone needs to be properly cleaned and sanitized before each use. There was no canister attached to the unit for scavenging the gas. The hose, that should be attached to a canister to scavenge the gas, was just lying on the floor and led to just lying freely inside of the fume hood in the PT's lab. Unless the EHS personnel have approved this, this does not prevent exposure of the gas to personnel during use of the anesthesia and isoflurane in use.</p> | M | <p>We have engaged an experienced technician in the Animal Science Department [redacted] to schedule certification. She is coordinating with CVM staff [redacted] for this certification.</p> <p>Surgery table is not located adjacent to fume hood and a short 1" x 3/8 hose runs directly into fumehood. We will have the system evaluated by EHS.</p> | <p>Request initiated 2/20/20. Scheduled certification on 4/15/2020.</p> <p>2/20/20 surgical table relocated and vented. Initial inspection by EHE (Moloch Fohim) was conducted on 3/4/2020. Gas levels will be measured by EHS at next scheduled surgery, before by 8/1/2020.</p> | Corrections to be confirmed at next scheduled inspection. |

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Summarize the heating, ventilation and air conditioning (HVAC) systems for each animal facility, **including all satellite facilities**. Include **all animal holding rooms** (including satellite holding rooms), surgical facilities, procedure rooms, and support spaces integral to animal facilities (e.g., cage wash, cage and feed storage areas, necropsy, treatment).

Location/Building/Facility: [REDACTED]

In the text box below, provide a general description of the mechanical systems used to provide temperature, humidity and air pressure control. Include details such as:

- the source(s) of air and air recirculation rates if other than 100% fresh air
- treatment of air (filters, absorbers, etc.)
- design features such as centralized chilled water, re-heat coils (steam or hot water), individual room vs. zonal temperature and relative humidity control, the use of variable air volume (VAV) systems and other key features of HVAC systems affecting performance
- features that minimize the potential for adverse consequences to animal well-being (such as re-heat coils that fail closed or that are equipped with high-temperature cut-off systems), and
- how room temperature, ventilation, and critical air pressures are monitored and maintained in the event of a system or component failure, including notifying appropriate personnel in the event of a significant failure that occurs outside of regular working hours and/or other management systems used to respond to alerts or failures.

Has a large dedicated air handler for supply air which uses steam, heated hot water and chilled water from the campus central utilities plant. The air handler has multiple fans and coils as a redundant system even if one component failed. It uses 100% outside air which dehumidified, humidified, heated or cooled as required prior to distribution through metal ductwork to the vivarium. The air handler has HEPA filters on the discharge side and is on emergency generator back up. Two large, 100% redundant exhaust fans on the roof with high velocity discharge stacks handle exhaust from [REDACTED]. A terminal unit with hot water reheat coil and steam humidifier controls supply air to each holding room. The exhaust and supply air volumes are controlled to maintain air exchanges and either positive or negative pressurization as needed.

Location/Building/Facility: [REDACTED]

Is served by a large central air handler which uses steam-heated hot water and chilled water from the campus central utilities plant. The air handler uses 100% outside air, which is then heated, cooled, humidified or dehumidified as required prior to distribution through metal ductwork throughout the facility. Each holding area is served by a terminal unit with hot water reheat coil and a terminal unit on the exhaust. Exhaust air from the facility is generated by a large exhaust fan in the main mechanical room. The terminal air units are designed to provide temperature control, positive or negative pressurization and air exchanges. Alarms are

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

provided to text and e-mail staff via the campus network in the event of temperature control or other HVAC issues. The necropsy area is served by a dedicated large exhaust fan with high velocity exhaust stacks through the roof.

Location/Building/Facility: [REDACTED]

Is served by a large central air handler which uses steam-heated hot water and chilled water from the campus central utilities plant. The air handler uses 100% outside air, which is then heated, cooled, humidified or dehumidified as required prior to distribution through metal ductwork throughout the facility. Each holding area is served by a terminal unit with hot water reheat coil and a terminal unit on the exhaust. Exhaust air from the facility is generated by a large exhaust fan in the main mechanical room. The terminal air units are designed to provide temperature control, positive or negative pressurization and air exchanges

Location/Building/Facility: [REDACTED]

[REDACTED] is served by a single air handler installed in a ground floor mechanical and uses 100% outside air. Terminal units with hot water reheat are used to zone the building into different control areas such as the treatment area, central stalls, and isolation stalls. An exhaust fan mounted in the attic provides exhaust for the building. This air handler is provided with steam, chilled water and heating hot water from the campus central utilities plant. Alarms are provided to text and e-mail staff via the campus network in the event of temperature control or other HVAC issues.

Location/Building/Facility: [REDACTED]

HVAC system has two redundant air handlers using 100% outside air and two redundant exhaust fans with high velocity discharge stacks. Each handler is provided with chilled water, steam and heated hot water from the campus central utility plant. Each animal room is served by terminal units with hot water reheat coils to control space temperature, pressurization, and air exchanges. Each animal room has a terminal unit on the exhaust side which coordinates air flow requirements and pressurization with the supply terminal unit. Alarms are provided to text and e-mail staff via the campus network in the event of temperature control or other HVAC issues.

Location/Building/Facility: [REDACTED]

[REDACTED] uses central air handlers with 100% outside air that is served by steam and chilled water from the campus central utilities plant. [REDACTED] also served by an exhaust fan and HEPA filter bank located in the main mechanical room. Room temperature is controlled by steam reheat coils located in the supply ductwork to each room. Supply and exhaust volumes from each room are manually balanced. Alarms are provided to text and e-mail staff via the campus network in the event of temperature control or other HVAC issues.

Location/Building/Facility: [REDACTED]

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

Uses central air handlers with 100% outside air and is served by steam and chilled water from the campus central utilities plant. [REDACTED] is also served by an exhaust fan and HEPA filter bank located either in the main mechanical room. Room temperature is controlled by steam reheat coils located in the supply ductwork to each room. Supply and exhaust volumes from each room are manually balanced. Alarms are provided to text and e-mail staff via the campus network in the event of temperature control or other HVAC issues. Each of the four environmental chambers has an outdoor DX condenser and indoor evaporator that are electronically controlled to maintain preprogrammed temperature profiles. Fresh air, taken from the main [REDACTED] air handler which preprocesses 100% outside air, is further processed by desiccant wheel dehumidifiers before being introduced into the chambers to defrosting cycles in the cooling units when operating at low temperatures. Relief air is exhausted through [REDACTED] central HEPA filtered exhaust system through the roof.

Location/Building/Facility: [REDACTED]

[REDACTED] central air handlers with 100% outside air and is served by steam and chilled water from the campus central utilities plant. The [REDACTED] is also served by an exhaust fan and HEPA filter bank located either in the attic or in the main mechanical room. Room temperature is controlled by steam reheat coils located in the supply ductwork to each room. Supply and exhaust volumes from each room are manually balanced. Alarms are provided to text and e-mail staff via the campus network in the event of temperature control or other HVAC issues.

Location/Building/Facility: [REDACTED]

Uses a central, 100% outside air HVAC system including dedicated air handler and exhaust fan. It has an air cooled condenser with associated cooling coils and has a two large heaters for heating.

Location/Building/Facility: [REDACTED]

Uses a central, 100% outside air HVAC system including dedicated air handler and exhaust fan. It has an air cooled condenser with associated cooling coils and has a dedicated boiler for heating. Alarms are provided to staff via phone call from the Sensaphone system in the event of temperature control or other HVAC issues.

Location/Building/Facility: [REDACTED]

During warm months, two large supply fan pulls air across water curtains located on both ends of the west wall of the building. The cooling unit employs an evaporative system for conditioning of the building. Water flowing over media banks evaporates, thereby cooling the air also flowing through the media banks. The system is 100% outside air. During cool months, a wall-mounted electrical heater directs warm air into the housing space. Humidity and air pressure are not regulated.

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

| | |
|--|--|
| Location/Building/Facility: [REDACTED] | |
| Is heated by gas and cooled by a central unit using a mix of outside and return air. Air is filtered by standard pleat filters and there is no humidity control. | |
| Location/Building/Facility: [REDACTED] | |
| Is heated by gas and cooled by a central unit using a mix of outside and return air. Air is filtered by standard pleat filters and there is no humidity control. | |
| Location/Building/Facility: [REDACTED] | |
| Has a large dedicated air handler for supply air which uses steam, heated hot water and chilled water from the campus central utilities plant. The air handler has multiple fans and coils as a redundant system even if one component failed. It uses 100% outside air which dehumidified, humidified, heated or cooled as required prior to distribution through metal ductwork to the vivarium. The air handler has HEPA filters on the discharge side and is on emergency generator back up. A terminal unit with hot water reheat coil and steam humidifier controls supply air to each holding room. The exhaust and supply air volumes are controlled to maintain air exchanges and either positive or negative pressurization as needed. | |
| Location/Building/Facility: [REDACTED] | |
| [REDACTED] the main facility is heated by a central propane powered standard boiler system. Cooling is provided through the same duct system. Air flow is controlled by section dampers. Humidity and air pressure are not regulated. [REDACTED] heated with gas powered space heaters with direct air flow. | |

Table below, provide room-specific information requested. For each room within this location, indicate use, including the species for animal housing rooms. *Measurement of air exchange rates and verification of relative pressure within animal housing rooms measurements may be left at the discretion of the institution.* Information may be provided in another format, providing all requested data is included. **[Note: Please remove the examples provided in the Table below.]**

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

| Room No. | Specific Use | Temperature Set-Point (define units) | Electronic / Emergency Monitoring of Temperatures (Y/N) | Alert/Alarm Temperature Ranges (if applicable; define units) | Humidity Control (Y/N) | Relative Pressure | Air Exchange Rate (per hour) | Date Verified / Measured |
|----------|-----------------|---|---|--|------------------------------|----------------------|---------------------------------------|--------------------------------|
| | | (settings to be verified) | | | | | (values to be measured) | |
| | Toads | 78°F | Y | 73-83°F | Y | + | 15 | 11-11-20 |
| | Rodents | 69°F | Y | 64-74°F | Y | + | 15 | 11-11-20 |
| | Rodents | 72°F | Y | 67-77°F | Y | + | 15 | 11-11-20 |
| | Rodent Testing | 69°F | Y | 64-84°F | Y | + | 15 | 11-11-20 |
| | Cats | 70°F | Y | 64-84°F | Y | + | 15 | 11-11-20 |
| | Rabbits | 70°F | Y | 65-75°F | Y | + | 13 | 11-11-20 |
| | Dogs | 70°F | Y | 64-84°F | Y | + | 10 | 11-11-20 |
| | Clean Cage Wash | 71°F | Y | 66-76°F | Y | + | 15 | 11-11-20 |
| | Dirty Cage Wash | 70°F | Y | 65-75°F | Y | + | 15 | 11-11-20 |
| | Rodent Storage | 68°F | Y | 63-73°F | Y | + | 15 | 11-11-20 |
| | Rabbits | 74°F | Y | 69-79°F | Y | + | 10 | 11-11-20 |
| | Poultry | 79°F | Y | 74-84°F | Y | + | 15 | 11-11-20 |
| | Dogs | 70°F | Y | 64-84°F | Y | + | 15 | 11-11-20 |
| | Horses | 70°F | Y | 61-81°F | Y | + | 15 | 11-30-20 |
| | Poultry | 70°F | Y | 61-81°F | Y | + | 14 | 11-30-20 |
| | Poultry | 70°F | Y | 61-81°F | Y | + | 14 | 11-30-20 |

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

| Room No. | Specific Use | Temperature Set-Point (define units) | Electronic / Emergency Monitoring of Temperatures (Y/N) | Alert/Alarm Temperature Ranges (if applicable; define units) | Humidity Control (Y/N) | Relative Pressure | Air Exchange Rate (per hour) | Date Verified / Measured |
|----------|--------------|---|---|--|------------------------------|----------------------|---------------------------------------|--------------------------------|
| | | (settings to be verified) | | | | | (values to be measured) | |
| | Storage | 72°F | Y | 62-90°F | Y | + | 12 | 11-13-20 |
| | Dog | 70°F | Y | 61-84°F | Y | + | 13 | 11-13-20 |
| | Pig | 70°F | Y | 61-81°F | Y | + | 13 | 11-13-20 |
| | Food Storage | 70°F | Y | 61-81°F | Y | + | 12 | 11-13-20 |
| | Pig | 70°F | Y | 61-81°F | Y | - | 12 | 11-13-20 |
| | Pig | 70°F | Y | 61-81°F | Y | - | 12 | 11-13-20 |
| | Pig | 70°F | Y | 61-81°F | Y | - | 12 | 11-13-20 |
| | Pig | 70°F | Y | 61-81°F | Y | + | 12 | 11-25-20 |
| | Frogs | 70°F | Y | 68-74°F | N | + | 14 | 11-25-20 |
| | Pigs | 70°F | Y | 61-81°F | N | + | 15 | 11-25-20 |
| | Chickens | Varies | Y | 70-80°F | N | - | 13 | 11-25-20 |
| | Chickens | Varies | Y | 70-80°F | N | - | 14 | 11-25-20 |
| | Chickens | Varies | Y | 70-80°F | N | - | 15 | 11-25-20 |
| | Chickens | Varies | Y | 70-80°F | N | - | 12 | 11-25-20 |
| | Chickens | Varies | Y | 70-80°F | N | - | 14 | 11-25-20 |
| | Rodents | 70°F | Y | 68-74°F | N | - | 15 | 11-25-20 |

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

| Room No. | Specific Use | Temperature Set-Point (define units) | Electronic / Emergency Monitoring of Temperatures (Y/N) | Alert/Alarm Temperature Ranges (if applicable; define units) | Humidity Control (Y/N) | Relative Pressure | Air Exchange Rate (per hour) | Date Verified / Measured |
|----------|-----------------------|---|---|--|------------------------------|----------------------|---------------------------------------|--------------------------------|
| | | (settings to be verified) | | | | | (values to be measured) | |
| | Gnotobiotic | 70°F | Y | 68-74°F | N | + | 12 | 11-25-20 |
| | Dirty Cage Wash | 70°F | Y | 60-90°F | N | + | 10 | 11-25-20 |
| | Clean Cage Wash | 70°F | Y | 60-90°F | N | + | 11 | 11-25-20 |
| | Cockatiels | 70°F | Y | 65-85°F | N | + | 10 | 11-25-20 |
| | Pigeons | 70°F | Y | 60-90°F | N | + | 12 | 11-25-20 |
| | Poultry Isolators | 70°F | Y | 65-80°F | N | - | 10 | 11-25-20 |
| | Dogs | 70°F | Y | 61-84°F | N | + | 10 | 11-25-20 |
| | Pig | 70°F | Y | 61-81°F | N | + | 10 | 11-30-20 |
| | Aquatics | 70°F | Y | 61-81°F | N | + | 10 | 11-30-20 |
| | Aquatics | 70°F | Y | 61-81°F | N | + | 10 | 11-30-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | - | 14 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 25 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 14 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 20 | 11-13-20 |
| | Rodent Procedure Room | 70°F | Y | 68-74°F | Y | + | 41 | 11-13-20 |
| | Xenopus | 71°F | Y | 63-76°F | Y | + | 17 | 11-13-20 |

Appendix 11: Heating, Ventilation and Air Conditioning (HVAC) System Summary

| Room No. | Specific Use | Temperature Set-Point (define units) | Electronic / Emergency Monitoring of Temperatures (Y/N) | Alert/Alarm Temperature Ranges (if applicable; define units) | Humidity Control (Y/N) | Relative Pressure | Air Exchange Rate (per hour) | Date Verified / Measured |
|----------|-----------------------|---|--|---|---------------------------|-------------------|---------------------------------|--------------------------|
| | | (settings to be verified) | | | | | (values to be measured) | |
| | Behavior Testing Room | 70°F | Y | 68-74°F | Y | + | 18 | 11-13-20 |
| | Clean Cage Wash | 68°F | Y | 60-72°F | Y | + | 15 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 14 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 13 | 11-13-20 |
| | Dirty Cage Wash | 68°F | Y | 60-72°F | Y | + | 10 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 15 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 21 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | - | 15 | 11-13-20 |
| | Rodents | 70°F | Y | 68-74°F | Y | + | 21 | 11-30-20 |

Appendix 12: Aquatic Systems Summary – Part I

Please summarize water management and monitoring information programs for each animal facility, including all satellite facilities, rooms, enclosures. The following key will assist you in completing the form:

- (1) List location of aquaria, including outdoor enclosures (ponds or outdoor tanks). If indoors, list building and room number. Note that all species housed at the same location and maintained via the same design and monitoring may be listed in the same row.
- (2) Please indicate if embryonic (E), larval (L), juvenile (J) or Adult (A)
- (3) Group tanks (ponds, outdoor tanks, multiple aquaria) are arranged as arrays with shared water supply; individual aquaria have exclusive water handling systems.
- (4) Indicate water type, e.g., fresh, brackish, or marine.
- (5) Indicate water pre-treatment, e.g., dechlorination, rough filters.
- (6) Indicate water circulation, e.g., static, re-circulated, constant flow, or some combination of these. If applicable, indicate water exchange frequency and amount (percentage).
- (7) Provide a key word for filtration employed, e.g., biological, chemical, mechanical, and type (e.g., mechanical-bead filter). A diagram may be provided showing the flow of water, filtration, source of “make-up” water and amount replaced daily.

Part I

| Location (1) | Species (2) | System Design | | | | | |
|-----------------|---------------------|------------------------------|-------------------|----------------------|---|------------------------------|--|
| | | Group / Individual (3) | Water Type (4) | Pre-treatment (5) | Circulation (6) | Filtration (7) | Disinfect ion (e.g., UV, ozone) |
| | Fish (A) | Group | Fresh | Dechlorination | Static | Biological | n/a |
| | Frog (A) | Group | Fresh | Dechlorination | Static | n/a | n/a |
| | Lepidobatrachus (A) | Individual | Fresh | Dechlorination | Mechanical | Biological/Carbon | n/a |
| | Zebrafish (E,L,J,A) | Group | RO(Fresh) | Filtration | Recirculated 5-10% replacement rate | Biological/Carbon/Mechanical | UV |
| | Xenopus (A) | Group | RO(Fresh) | Filtration | Recirculating 5-10% replacement rate & Static | Biological/Carbon/Mechanical | UV |
| | Mussels (J,A) | Group | Fresh | Dechlorination | Recirculated | Biological/Carbon/Mechanical | UV |

Appendix 12: Aquatic Systems Summary – Part I

Note: Records of equipment maintenance (filter changes, UV bulb changes, probe changes, calibrations, *etc.*) should be available for review.

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 12: Aquatic Systems Summary – Part II

The following key will assist you in completing this form:

- (1) In these columns, please indicate monitoring frequency, e.g. daily, weekly, monthly or other point sampling frequency; continuous/real time, or none, if applicable. Also indicate method of control (heaters versus room HVAC, hand versus auto dosing, etc.).
- (2) Indicate other parameters and their monitoring frequency, e.g., alkalinity, total hardness, conductivity, chlorine/chloramine.

Part II

| Monitoring | | | | | | | | | |
|---|---------------|--------------|----|-----------------|-----------------|-----------------|-----------------------------|-----------------------------|-------------------------------------|
| Indicate in the boxes below the frequency of monitoring and method of control for the following parameters. (1) | | | | | | | | | |
| Location (from Part I) | Temperature | Salinity | pH | NH ₄ | NO ₂ | NO ₃ | Dissolved O ₂ | Total Dissolved Gases | Other. Please List (2): |
| | Daily(HVAC) | As needed | W | W | W | - | n/a | n/a | Bulk tank chlorine- after treatment |
| | Daily(Heater) | - | W | W | W | - | n/a | n/a | Bulk tank chlorine- after treatment |
| | Daily(HVAC) | - | W | W | W | - | n/a | n/a | Bulk tank chlorine- after treatment |
| | Daily(Heater) | W | W | W | W | - | n/a | n/a | RO water-weekly |
| | Daily(HVAC) | - | D | D | D | - | n/a | n/a | Carbon water-daily |

Note: This information may be provided in another format, provided that all requested data is included.

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 13: Primary Enclosures and Animal Space Provisions

Please complete the Table below considering performance criteria and guiding documents (e.g., Guide, Ag Guide, ETS 123 and/or other applicable standards) used by the IACUC/OB to establish adequacy of space provided for all research animals including traditional laboratory species, agricultural animals, aquatic species, and wildlife when reviewing biomedical, field, and agricultural research studies.

| Species | Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.) | Maximum Number Animals / Enclosure | Guiding Document Used to determine the Institution's Space Standards (Guide, Ag Guide, ETS 123, Other) | Enclosure Composition & Description** |
|----------------------|---|------------------------------------|--|---|
| Calves, Sheep, Goats | 10'x10' or 12'x12' | Up to 2 | Guide | Stalls-concrete floor, masonry walls |
| Calves | 4'x4'x8.5' | Single | Guide | Concrete floor, galvanized fencing |
| Cats | 3' x 8' x 6' | Up to 3 | Guide | Floor pen w/resting boards; plastic and plastic coated wire |
| Cats | 10.5' x 10.5' x 8.5' | Up to 7 | Guide | Concrete floor w/resting boards, masonry walls with plastic panels with plastic coated wire |
| Chickens | 13' x 11' x 9-12' | Up to 70 | Guide | Concrete floor with masonry walls, plastic mesh fencing |
| Chickens | 29" x 32" x 21" | Up to 5 | Guide | Glove-port Isolation Cage, SS or Plas-lab plastic |
| Chickens | 3'x3'x8.5' | Up to 20 | Ag Guide | PVC piping, with plastic coated plastic, concrete floor |

Appendix 13: Primary Enclosures and Animal Space Provisions

| Species | Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.) | Maximum Number Animals / Enclosure | Guiding Document Used to determine the Institution's Space Standards (Guide, Ag Guide, ETS 123, Other) | Enclosure Composition & Description** |
|-------------------------------|---|---|--|--|
| Cockatiels | 9' x 3' x 6' | Up to 12 | Zoological Association of America | Floor pen; plastic and plastic coated wire |
| Dogs | 5' x 5'; 5' x 8' | Up to 2 | Guide | Runs, SS with plastic coated expanded metal flooring |
| Dogs | Varies; 3-5' x 6-12' | Up to 6 | Guide | Floor runs, Galvanized chain link-some with SS isolation panels- others epoxy painted masonry units-3 with aluminum panels |
| Ferrets, Guinea Pigs, Rabbits | 28" x 28" x 17" | 1 ferret, Up to 2 Guinea pigs, 1 rabbit | Guide | Cage 6/unit, plastic and stainless steel |
| Ferrets | 3' x 8' x 6' | Up to 14 ferrets | Guide | Concrete floor w/hammocks, masonry walls with plastic panels with plastic coated wire |
| Fish | 75 gallon | Up to 20 | Association of Zoos and Aquariums | Tank, plastic |
| Fish/turtle | 125 gallon | Up to 40 | Association of Zoos and Aquariums | Tank, fiberglass |

Appendix 13: Primary Enclosures and Animal Space Provisions

| Species | Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.) | Maximum Number Animals / Enclosure | Guiding Document Used to determine the Institution's Space Standards (Guide, Ag Guide, ETS 123, Other) | Enclosure Composition & Description** |
|---------------|--|------------------------------------|---|---------------------------------------|
| Fish Frogs | 200 gallon | Up to 200 fish, Up to 25 frogs | Association of Zoos and Aquariums | Pool, fiberglass |
| Fish | 400 gallon | Up to 200 | Association of Zoos and Aquariums | Pool, fiberglass |
| Fish | 1 L 9 L | Up to 2 Up to 10 | Guide | Tank, plastic (Aquatic Habitat) |
| Fish | 300 gallon | Up to 200 | Association of Zoos and Aquariums | Pool, fiberglass or polyethylene |
| Frogs | 39" x 16" x 21" | 1 | Association of Zoos and Aquariums | Plastic habitat |
| Frogs | 75 L | Up to 15 | Guide | Tank, plastic |
| Horses | 10' x 10' or 12' x 12' | 1 horse, Up to 2 ponies | Guide | Stalls-concrete, masonry |

Appendix 13: Primary Enclosures and Animal Space Provisions

| Species | Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.) | Maximum Number Animals / Enclosure | Guiding Document Used to determine the Institution's Space Standards (Guide, Ag Guide, ETS 123, Other) | Enclosure Composition & Description** |
|----------------------------------|---|---------------------------------------|--|--|
| Mice | 12" x 9" x 6" | Up to 4 adult mice | Guide | Micro-isolator shoe box cage with SS wire bar (on or off IVC racks) |
| Pigeons | 18' x 11' x 8.5' | Up to 25 | Guide | Concrete floor, masonry walls with plastic panels with plastic coated wire |
| Rats | 19" x 10" x 8" | Up to 2 | Guide | Micro-isolator polycarbonate with SS wire bar |
| Rats | 12"x12"x7" | Up to 2 | Guide | Micro-isolator polycarbonate with SS wire bar |
| Swine | 5' x 7-8' | Up to 6 | Guide | Elevated pen, galvanized with plastic coated expanded metal floor |
| Swine Goats | 13' x 11' x 12' | Up to 2 swine, Up to 4 goats | Guide | Concrete floor, masonry walls |
| Poultry - [REDACTED] | 140' x 40' | 2000 turkeys 5000 broiler chickens | Ag. Guide | Wood construction with curtain sides, clay dirt floor |
| Swine Gestation [REDACTED] | 72' x 26' | 45 sows and boars | Ag. Guide | Concrete block wall, concrete slat floor |

Appendix 13: Primary Enclosures and Animal Space Provisions

| Species | Dimensions of Enclosure (cage, pen, tank*, corral, paddock, etc.) | Maximum Number Animals / Enclosure | Guiding Document Used to determine the Institution's Space Standards (Guide, Ag Guide, ETS 123, Other) | Enclosure Composition & Description** |
|------------------------------|--|------------------------------------|---|--|
| Swine Farrowing - [REDACTED] | 42' x 12' | 7 sows with litters | Ag. Guide | Concrete slat floor, aluminum sides |
| Swine Nursery - [REDACTED] | 39' x 10' | 40-60 weanling pigs | Ag. Guide | Raised wire floor coated aluminum sides |
| Swine Finishing - [REDACTED] | 75' x 24' | 40-60 finishers | Ag. Guide | Concrete slat floor, concrete walls with plastic coated wood |
| Swine [REDACTED] | 6' x 8' | 5-7 finishers | Guide | Concrete slat floor, aluminum sides |
| Horses pasture | 0.5-5 acres | Up to 7 horses | Ag Guide | Open pasture with grass and dirt, 3-sided shelters provided |

*For aquatic species, provide tank volume.

**Include descriptors such as open-topped, static microisolator, individually-ventilated cage systems (IVCS).

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

Please describe the cleaning and disinfection methods in the Table below. Note the washing/sanitizing frequency and method for each of the following:

| Area | Washing/Sanitizing Method (mechanical washer, hand washing, high-pressure sprayers, etc.) | Washing/Sanitizing Frequency | Chemical(s) Used* | Other Comments (e.g., autoclaved) |
|--|--|--|----------------------------|--|
| Micro-environment | | | | |
| Solid-bottom cages (static) | Mechanical washer | Weekly | Clout | Twice a week if three or more mice in cage, Autoclaved as needed |
| Solid-bottom cages (IVC) | Mechanical washer | Biweekly | Clout | Spot changed as needed, Autoclaved as needed |
| Suspended wire-bottom or slotted floor cages | Mechanical washer | Monthly | Clout, Acid | |
| Cage lids | Mechanical washer | Monthly | Clout | |
| Filter tops | Mechanical washer | Monthly | Clout | Changed when damaged or still soiled after cagewash |
| Cage racks and shelves | Mechanical washer | Quarterly | Clout | Wiped down weekly |
| Cage pans under suspended cages | Mechanical washer | Monthly | Clout, Acid | |
| Play pens, floor pens, stalls, etc. | Hand washing | Biweekly | Hydrogen Peroxide | |
| Corrals for primates or outdoor paddocks for livestock | Bowls, halters, toys-Mechanical washer Toys, watering system-Hand washed | Bowls/toys-weekly Halters/watering system-monthly | Clout Laundry Detergent | Mowed and scraped as needed, stalls mucked weekly |

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

| Area | Washing/Sanitizing Method (mechanical washer, hand washing, high-pressure sprayers, etc.) | Washing/Sanitizing Frequency | Chemical(s) Used* | Other Comments (e.g., autoclaved) |
|--|--|------------------------------|-------------------|--------------------------------------|
| Aquatic, amphibian, and reptile tanks and enclosures | Mechanical Hand washing | Monthly | None | |
| Feeders | Mechanical washer | Weekly | Clout | |
| Watering devices | Mechanical washer Hand washing | Weekly | Clout | |
| Exercise devices and manipulanda used in environmental enrichment programs, etc. | Mechanical washer | Weekly | Clout | |
| Transport cages | Mechanical washer | After usage | Clout | |
| Operant conditioning & recording chambers, mechanical restraint devices (chairs, slings, etc.) | Mechanical washer Hand wash | After usage | Clout | |
| Euthanasia chambers | Mechanical washer | After usage | Clout | |
| Macro-Environment | | | | |
| Animal Housing Rooms: | | | | |
| Floors | Hand wash | Biweekly | Hydrogen Peroxide | |

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

| Area | Washing/Sanitizing Method (mechanical washer, hand washing, high-pressure sprayers, etc.) | Washing/Sanitizing Frequency | Chemical(s) Used* | Other Comments (e.g., autoclaved) |
|--|--|------------------------------|--|--------------------------------------|
| Walls | Hand washing | Biweekly | Hydrogen Peroxide | |
| Ceilings | Hand washing | Monthly | Hydrogen Peroxide | |
| Ducts/Pipes | Hand washing | Biweekly | Hydrogen Peroxide | |
| Fixtures | Hand washing | Monthly | Hydrogen Peroxide | |
| Corridors: | | | | |
| Floors | Autoscrubber | Monthly | Hydrogen Peroxide | |
| Walls | Hand washing | As needed | Hydrogen Peroxide | |
| Ceilings | Hand washing | As needed | Hydrogen Peroxide | |
| Ducts/Pipes | Hand washing | As needed | Hydrogen Peroxide | |
| Fixtures | Hand washing | As needed | Hydrogen Peroxide | |
| Support Areas (e.g., surgery, procedure rooms, etc.); complete for each area: | | | | |
| Floors | Hand washing | After usage | Didecyl Dimethyl Ammonium Chloride n-Alkyl Dimethyl Ammonium Chloride | |
| Walls | Hand washing | Quarterly | Didecyl Dimethyl Ammonium Chloride n-Alkyl Dimethyl Ammonium Chloride | |

Appendix 14: Cleaning and Disinfection of the Micro- and Macro-Environment

| Area | Washing/Sanitizing Method (mechanical washer, hand washing, high-pressure sprayers, etc.) | Washing/Sanitizing Frequency | Chemical(s) Used* | Other Comments (e.g., autoclaved) |
|---|--|------------------------------|--|---|
| Ceilings | Hand washing | Quarterly | Didecyl Dimethyl Ammonium Chloride n-Alkyl Dimethyl Ammonium Chloride | |
| Ducts/Pipes | Hand washing | Quarterly | Didecyl Dimethyl Ammonium Chloride n-Alkyl Dimethyl Ammonium Chloride | |
| Fixtures | Handwashing | Quarterly | Didecyl Dimethyl Ammonium Chloride n-Alkyl Dimethyl Ammonium Chloride | |
| Implements (note whether or not shared): | | | | |
| Mops | Mechanical washer | After usage | Laundry detergent | Shared |
| Mop buckets | Mechanical washer | After usage | Clout | Shared |
| Aquaria nets | Hand washing | As need | Bleach | Shared for frogs Not shared for fish |
| Other | | | | |
| Other: | | | | |
| Vehicle(s) | Hand washing | After moving animals | Hydrogen Peroxide | |
| Other transport equipment (list) | Carts, Flatbeds, Trash Barrels Carriers | After usage or monthly | Clout | |

*Please provide chemical, not trade name.

Appendix 15: Facilities and Equipment for Sanitizing Materials

In the Tables below, summarize the facilities and equipment used to sanitize animal related equipment (tunnel washer, bottle washer, rack washer, bulk autoclave, hand-washing area, bedding dispensing unit, *etc.*). Note that some descriptions may be combined if all share identical features (e.g., all rack washers).

[**Note:** Please remove the examples provided in the Table below.]

| Building | Room No. | Equipment Type | Safety Feature(s) | Methods of Monitoring Effectiveness |
|----------|----------|------------------------|--|--|
| | | Rack washer | Emergency “off” button; labeled exit door, de-energizing cord on both sides, instructional signage | Guarantee 180-degree hot water rinse; temperature-sensitive tape used daily |
| | | Small rack washer | Emergency “off” button; instructional signage | Guarantee 180-degree hot water rinse; temperature-sensitive tape used daily |
| | | Bulk autoclave | Emergency “off” button | Sterigage and autoclave indicator tape |
| | | Table top autoclave | Emergency “off” button | Autoclave indicator tape, sterigage indicator |
| | | Table top autoclave | | Autoclave indicator tape |
| | | Pass through autoclave | Emergency “off” switch | Autoclave indicator tape |
| | | Bulk autoclave | Emergency “off” button | Autoclave indicator tape, sterigage indicator, <i>Bacillus</i> ampule, DART test |
| | | Rack washer | Labeled exit door, instructional signage | Guarantee 180-degree hot water rinse; temperature-sensitive tape used daily |
| | | Rack washers | Labeled exit door, de-energizing cord on instructional signage | Guarantee 180-degree hot water rinse; temperature-sensitive tape used daily |
| | | Bulk autoclave | Emergency “off” button; lock-out key | Sterigage and autoclave indicator tape |

[Create additional rows by pressing TAB in the bottom-right box.]

Appendix 16: Lighting Summary

Using the Table below, summarize the lighting system(s) for the animal housing facility(ies). For each species or holding room type, list light intensity (range), construction features (e.g., water resistance), photoperiod (light:dark) and control (e.g., automatic versus manual, phasing). For systems automatically controlling photoperiod, describe override mechanisms (including alarms, if applicable).

Location: [REDACTED]

[Note: Please remove the examples provided in the Table below.]

| Room Type ^(a) | Light Intensity Range | Lighting Fixture Construction Features ^(b) | Photo-period (hrs) ^(c) | Photoperiod and Lighting Control | Override Mechanisms (if applicable) |
|--------------------------|-----------------------|---|-----------------------------------|--|--|
| | 250-350 lux | Surface mounted, water resistant | 12:12 | Automatic via building management system | Manual mechanical timer set at 30 minutes; recorded as “alarm” in building management system |
| | 250-400 lux | Surface mounted, water resistant | 12:12 | Automatic via wall-mounted timer box | Mechanical on/off switch |
| | 250-350 lux | Surface mounted, water resistant | 12:12 | Automatic via wall-mounted timer box | Mechanical on/off switch |
| | 225-325 lux | Surface mounted, water resistant | 12:12 | Automatic via wall-mounted timer box | Mechanical on/off switch |
| | 275-400 lux | Surface mounted, water resistant | 12:12 | Automatic via wall-mounted timer box | Mechanical on/off switch |
| | 300-400 lux | Surface mounted, water resistant | 12:12 | Automatic via wall-mounted timer box | Mechanical on/off switch |
| | 250-300 lux | Surface mounted, water resistant | 12:12 | Automatic via wall-mounted timer box | Mechanical on/off switch |
| | 300-475 lux | Recessed, water resistant; arm-mounted, water resistant | NA | N/A, manual switch | N/A |

Appendix 16: Lighting Summary

| Room Type ^(a) | Light Intensity Range | Lighting Fixture Construction Features ^(b) | Photo-period (hrs) ^(c) | Photoperiod and Lighting Control | Override Mechanisms (if applicable) |
|--------------------------|-----------------------|---|-----------------------------------|----------------------------------|-------------------------------------|
| | Not measured | Recessed, water resistant; arm-mounted, water resistant | NA | N/A, manual switch | N/A |
| | Not measured | Recessed, water proof | NA | N/A, manual switch | N/A |

[Create additional rows by pressing TAB in the bottom-right box.]

^(a) A list of each room is not needed; group or cluster rooms by species or function

^(b) Include such features as water resistance, red lighting, *etc.*

^(c) Note if light cycle inverted/reversed.

Repeat Location and Table as necessary for each location, including satellite housing locations.

Appendix 17: Satellite Housing Facilities

Note: In the Program Description Section 2. IV. (Physical Plant), item C., describe the criteria used to determine a “Satellite Animal Holding Area.” In the Table below, summarize these animal housing areas. Note that each of these must also be included in the Heating, Ventilation, and Air Conditioning (HVAC) Summary (**Appendix 11**) and Lighting Systems Summary (**Appendix 16**).

| Building | Room(s) | Person Responsible | Species Used | Approximate Area (ft ² or m ²) Devoted to Housing | Maximum Period of Stay | Purpose / Rationale / Justification | Construction Features and Finishes |
|----------|---------|--------------------|--------------|--|------------------------|-------------------------------------|------------------------------------|
| N/A | | | | | | | |
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