



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

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RESEARCH AND ECONOMIC DEVELOPMENT

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1 CO6 RR029912-01
PI: William L. Roper, MD, MPH

Ms. Leake:

When the National Institutes of Health awarded the University of North Carolina at Chapel Hill a construction grant earlier this year to expand our Bingham Facility, it was an impressive endorsement of the quality of the University's genetic research on hemophilia, muscular dystrophy and cardiovascular disease. Let me reassure you that you have made a wise investment.

Not only will this expansion enable the University to consolidate two remote and crowded facilities in one new and more spacious location designed especially for large animal research, it will also bring jobs and revenue to the local economy – an important goal of economic stimulus funding. It is as vital to the University's interests as it is to those of the NIH that we complete this expansion as expeditiously and responsibly as possible.

The federal government has made a valuable investment in the Bingham Facility. It is understandable that you want to be certain you have chosen wisely. When you hear reports of "wastewater issues," it is your responsibility to find out more information. Thank you for the opportunity to tell you more about how the University is addressing recent wastewater problems at the Bingham Facility.

Part of the University's long-range plans for the Bingham Facility included the 2008 installation of a wastewater treatment system to replace the one from the 1970s with a system with the capacity to handle the waste that an expanded facility would generate. The system used a biological treatment process to reduce biodegradable wastes and nutrients and ultraviolet light to disinfect the wastewater. This highly treated wastewater was then discharged into synthetically lined ponds, where it was held until weather and soil conditions allowed it to be spray irrigated.

This wastewater treatment system began to experience a series of problems in late 2009, including a leak from the largest holding pond that allowed some of the highly treated wastewater to reach a tributary of Collins Creek, which runs through the property. Because of the problems, the University has shut down the wastewater treatment system on the site and is hauling the facility's wastewater directly to the Orange Water and Sewer Authority (OWASA), the public wastewater treatment agency serving Chapel Hill and Carrboro. (The Bingham Facility is in rural Orange County, outside of OWASA's service area, which is why we had to construct our own wastewater treatment system.) The incidents resulted in two notices of violation from the N.C. Department of Environment and Natural Resources (DENR), which regulates the wastewater treatment system. The violations were for the method of discharge, not

because any contamination of the soil, groundwater or creek occurred. The University is working with DENR to ensure compliance with all applicable regulations.

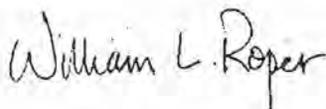
Although these incidents have been painfully embarrassing to the institution, they have also taught us some valuable lessons. One is that, when you have so many different units with varying interests operating at an off-campus location, you need a strong leader with extraordinary communications skills at the top of a well-established chain-of-command to make operations run smoothly. In February 2010, Chancellor Holden Thorp appointed Dr. Robert Lowman, associate vice chancellor for research and research professor of psychology, to oversee the Bingham Facility. Dr. Lowman and his team are in the midst of a thorough re-examination of the whole facility, including the way the buildings are constructed, its energy sources and an integrated water approach. Making as little impact as possible on the environment and on the facility's neighbors is one of their prime considerations.

Another lesson was the value of vigilant oversight of construction projects. Because of problems experienced with both the design and construction of the previous wastewater treatment system, the University has hired a new design engineering firm specializing in sustainable design to develop an overall integrated approach to water and wastewater on the site. This engineering firm works directly for the University. Based on their comprehensive analysis of all water sources, soils and wetlands, they are designing an entirely new wastewater treatment system. They are overseeing the construction and will be on-site fulltime through the start-up of operations. UNC will request permission to hire a separate Construction Manager at Risk to oversee construction of the buildings on the site, and we have also assigned one of the very best construction engineers on our staff to the project.

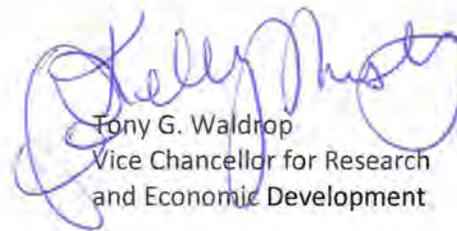
Finally, we have learned the importance of communicating clearly and frequently to all those with a stake in the Bingham Facility, especially its neighbors and a wide range of governmental regulators. For many years, we operated very quietly at Bingham, largely to avoid publicity that might attract the interest of animal rights activists and other protesters. But this caution led to an unintended sense of secrecy that hampered relationships with our neighbors and even among our own staff. The recent change in leadership has opened the doors of communication to a healthy exchange of ideas and opinions both within and outside the University.

The detailed responses to your specific questions follow, but in general the answer to the concerns you raise is that yes, we have had wastewater issues at Bingham and in addressing those problems, we are in the process of designing and constructing an even stronger, more sustainable project than originally envisioned.

Sincerely,



William L. Roper, MD, MPH
Dean, UNC School of Medicine
Vice Chancellor for Medical Affairs
CEO, UNC Health Care System



Tony G. Waldrop
Vice Chancellor for Research
and Economic Development

Question #1:

How long will it take to fix the currently inoperable wastewater system or design a new wastewater system? How will that impact the proposed timeline for the construction of the facilities funded by 1 C06 RR029912-01 – PI: Roper?

Response:

The University does not plan to repair the currently inoperable wastewater treatment systems at the Bingham Facility because it would not be a responsible use of our limited time and resources. The design and construction of those systems – which include large, synthetically lined holding ponds – also are not in keeping with the new, fully integrated approach to water use, treatment and reuse that will guide future expansion at the Bingham Facility.

The University hired McKim & Creed, a nationally recognized engineering and design firm that specializes in sustainable design, to develop a reliable, total water management strategy for the site that is both sustainable and environmentally sound. This system will be designed to treat wastewater to the level of reclaimed water, thus alleviating any concerns about possible contamination of the site, groundwater and nearby creek. We will also be able to reuse this reclaimed water in cooling towers and to flush toilets, wash down swine facilities and irrigate the landscape, thus conserving drinking water. Based on their extensive experience in designing and implementing similar systems, McKim & Creed has set a schedule that has this new system starting up by August 30, 2012, which will not impact the timeline for the construction of the NIH-funded facilities.

Question #2 :

What is the status of the permits for the wastewater treatment facilities? Has the Department of Environmental and Natural Resources (DENR) revoked any permits or required new permits to be filed for the current wastewater facilities? Will these permits delay the construction proposed in this grant?

Response:

Even though we are no longer using the current wastewater treatment systems at the Bingham Facility, the University still has an active permit from DENR for the wastewater treatment system that served the original building on the site, Bingham Building #1. The second wastewater treatment system, which served Bingham Building #2, operated under “deemed permitted” status from DENR, a status that was revoked in February 2010 because of the problems with leaks in pipes and in the large holding pond.

DENR offered the University the opportunity to repair the deemed permitted system and bring it into compliance as part of the existing permit. However, as explained in the previous response, the University opted to shut down both systems voluntarily and obtain a pump and haul permit to handle the wastewater at the site in the short term while we develop a long-term, integrated water approach.

DENR has not revoked any permits, and the agency is aware of our long-term plans. We are submitting regular reports to DENR on our progress and soliciting input from the agency as we proceed. Because of this close coordination, we do not anticipate that the permitting process for the new system will delay the construction proposed in this grant.

Question #3:

Have the issues/citations from DENR been resolved? If so, what was the resolution? If not, when does the University of North Carolina Chapel Hill anticipate resolution of these issues?

Response:

The University has received three Notices of Violation from DENR related to the Bingham Facility and is responding as required. The first violation was for an unpermitted discharge into Collins Creek, which runs across the property, because of a leak in the large holding pond. As soon as the leak was confirmed, the University set up a sump pump to catch the leaking water from the underdrain and return it to the pond. That sump pump is still in place, even though the wastewater treatment system has been shut down and the pond contains only rainwater.

The second violation was for an unpermitted discharge because of broken piping in the spray field, which has since been repaired, even though the spray-irrigation system is no longer being used.

The third violation was for small impacts on wetlands on the site that occurred during the 2008 construction of the current wastewater treatment system because the wetlands had not been previously identified and mapped. After mapping the wetlands for the current project, we reported these impacts to the U.S. Army Corps of Engineers (ACOE) and to DENR, which resulted in the notice of violation.

The University is reporting regularly to DENR on our progress toward resolving these issues. We expect to resolve the wetlands issue in the near future by restoring the impacted wetland areas or by receiving permission after the fact. When the new wastewater treatment system goes into operation in August 2012, that will resolve any remaining issues related to the current inoperable system.

Question #4:

What is the distribution of waste between the two current wastewater systems? Is one solely for animal water and the other solely for "domestic" waste, or is there co-mingling of waste in either wastewater treatment facility?

Response:

The original conceptual design of wastewater at the Bingham Facility was to have two different wastewater systems, one for domestic waste and one for animal waste. However, in reality, wastewater generated within Bingham Building #1 flowed to what was called the "domestic" or "permitted" system, whereas wastewater generated inside Bingham Building #2 flowed to the "animal" or "deemed

permitted" system. All the wastewater generated was treated to the same tertiary treatment level required by the DENR permit.

Currently, neither wastewater treatment system is being used, and the University has a pump and haul permit to handle wastewater on the site in the short term. To accomplish this, a temporary pipe connection was made to collect all wastewater flow from all buildings and store it in the existing influent equalization basin. The contents are periodically pumped out by a licensed septage hauler and trucked to the Orange Water and Sewer Authority (OWASA) Mason Farm Wastewater Treatment Facility in Chapel Hill. This arrangement will be continued until the construction of the new treatment system, which will treat all wastewater from the site (both animal and domestic) to the level of reclaimed water for nonpotable water reuse on the site.

Question #5:

Has the University of North Carolina Chapel Hill evaluated the facilities for any other wastewater/water treatment issues? If so, please indicate the findings.

Response:

The University and McKim & Creed have completed a comprehensive engineering assessment of the entire existing water/wastewater infrastructure at the site. Based on those findings, the University is proposing a variety of upgrades, improvements and equipment replacements along with the proposed new integrated total water management improvements. The design has not been finalized, but may include the following:

1. Upgraded gravity sewer collection to serve the expanded campus.
2. Influent wastewater lift station.
3. New mechanical fine screening process with residual washing, compaction and bagging processes.
4. New dual-train biological nutrient removal process.
5. New 10 micron cloth disk filtration process.
6. New 0.05 micron microfiltration process.
7. New effluent polishing process (granular activated carbon adsorption)
8. New dual barrier disinfection process
9. New fire protection storage, pumping and distribution system.
10. Reclaimed water service connections to each building to provide flushwater for toilets, animal wash-down water, and landscape irrigation.
11. Reclaimed water service connection to the proposed new Central Energy Plant to provide cooling tower makeup.
12. Wet weather reclaimed water equalization basin to store effluent during wet weather conditions.
13. New 20-acre reclaimed water irrigation system.
14. New groundwater well to provide a reliable, redundant backup to the one existing potable water well supply currently located onsite.

The potable water supply, iron/manganese treatment process, filtration system and disinfection systems have been found to be in good condition. A redundant groundwater well, new potable water storage tank, booster pumps, hydropneumatic pressure maintenance system, and new looped potable water distribution system are recommended improvements that will be included as part of the project.

Question #6:

Do any wetlands exist on the construction site proposed in 1 C06 RR029912-01 – PI: Roper? If so, please indicate how this will affect the construction and construction timeline for the proposed buildings for this grant.

Response:

The final design of the project will minimize, to the maximum extent practicable, impacts to wetlands and streams. Final design for the project has not been completed, however no discussions have included construction of buildings directly on or near wetlands. Wetlands and streams at the site have been accurately mapped (although this mapping occurred after the 2008 construction, and the University has received a Notice of Violation from DENR and a Notification of Unauthorized Activity from the ACOE for the impacts the University discovered). The buildings are planned for the upland sites suitable for construction. If impacts cannot be completely avoided, the University will apply for the appropriate permits from DENR and the ACOE. We do not expect obtaining these permits to delay construction on any components in the grant.

Question #7:

Have there been any changes in the plans for construction in order to make the buildings/facilities more environmentally sustainable? If so, please describe them. How would these plans affect the timing of the construction approved in 1 C06 RR029912-01 – PI: Roper?

Response:

Yes, there have been a variety of changes in the plans for construction in order to make the buildings/facilities more environmentally sustainable. Most notably, these include the following:

1. The University proposes to construct a site-wide reclaimed water distribution system that will be used for toilet flushing in each building, swine facility washdown water, landscape irrigation, makeup water for the centralized cooling facility, and for fire protection and building sprinkler systems. This change will have the benefit of reducing the demand for potable water, which must be supplied by the on-site drilled well water supply. The reclaimed water system will also greatly reduce the volume of highly treated reclaimed water that must be land-applied via spray irrigation.
2. The University is considering constructing a centralized energy facility in lieu of individual air handlers, boilers, chilled water systems, and emergency power systems for each of the six buildings on-site. The centralized energy systems may provide a more sustainable solution and more-efficiently utilize energy, water and financial resources. This system would use natural gas

and allow the University to eliminate the current dependency on propane, which is more expensive and less sustainable.

3. The new reclaimed water system and the central energy facility are anticipated to be completed before the completion of the construction approved in 1 C06 RR029912-01 – PI: Roper.

Question #8:

How will the University of North Carolina Chapel Hill ensure that similar issues do not occur at this site due to construction and/or the additional animals to be housed once construction is complete?

Response:

The problems identified with the existing wastewater treatment and spray irrigation system are deeply regrettable, but they have taught us valuable lessons and have led to major changes in how the Bingham Facility operates.

On February 17, 2010, Chancellor Holden Thorp directed Dr. Robert Lowman, associate vice chancellor for research and research professor of psychology, to take control of managing the facility and its operations. This appointment established a specific decision maker at the top of a well-established chain of command for the facility, which did not previously exist. Dr. Lowman has extensive experience in managing complex research projects. He meets regularly with representatives of University Senior Management, School of Medicine, Division of Laboratory Animal Medicine, Facilities Planning and Construction, Campus Services and Facilities Services as well as various technical experts, researchers and staff members to ensure successful coordination of all activities at the Bingham Facility.

The University has also replaced the designer of the previous system with McKim & Creed, who will be working directly for us to implement an integrated water approach. They are studying all water sources and uses, defining an integrated approach to water supply and disposal, designing all the new systems - water, wastewater, reclaimed water and potable water. They will prepare all the construction documents, coordinate with DENR and oversee the construction of the system. Their field notes will be submitted to DENR as part of the permit process, and the firm will sign off on the construction.

To address your concerns, McKim & Creed has worked carefully and thoroughly with researchers and Laboratory Animal Medicine representatives to ensure that the new design will be able to handle the wastewater generated by the maximum number of animals identified in the facility's master plan. They have also analyzed the wastestreams of the existing facilities that will be consolidated at Bingham and incorporated that information into the new design.

In addition, McKim & Creed's work will be peer-reviewed by doctorate-level experts from CDM, an internationally recognized firm specializing in water treatment, reclamation and reuse. These experts will review how the new system design will handle emerging contaminants and disinfection as well as how the wastewater will be reclaimed and reused.

New standard operating procedures are being proposed not only for water and wastewater operations staff, but also for facility staff who will conduct research at the site as well as the animal handling and

maintenance staff to make them aware of the impact that chemicals, cleaning agents, sterilizers, etc., have on biological treatment processes. The water and wastewater system operators will receive full training before the system is turned over to the University. They will have an opportunity to participate in the design review, construction, startup and commissioning of the new systems.

As for the NIH-funded expansion, the University is in the process of hiring a construction manager at risk to oversee construction of the buildings on the site, which we didn't use on the previous project. In addition, both the N.C. State Construction Office and one of the very best construction engineers on our Construction Management staff will be involved in the oversight of construction activities and coordination.