NJIT
New Jersey's Science & Technology University

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Andrew P. Christ, PE
Vice President for Real Estate Development and Capital Operations

June 8, 2018

Mr. Gary Centifonti
Director
Consumer Environmental and Occupational Health Service
State of New Jersey
Department of Health
PO Box 369
Trenton, New Jersey 08625-0369

RE: UPA Number 1339667

Dear Mr. Centifonti,

New Jersey Institute of Technology is in receipt of your letter dated May 21, 2018 regarding issues and concerns in Tiernan Hall on our Newark, NJ campus. NJIT has complied with the posting requirements by posting the letter on the front page of our campus wide intranet, the Highlander Pipeline, posting at the NJIT Human Resource office in the location of other mandatory postings, and providing copies of the letter to the heads of the various collective bargaining units at the University. We take the concerns of our employees seriously and immediately opened an investigation into the issues and concerns raised in the notice.

Our Office of Environmental Health and Safety prepared the attached report after a thorough investigation of the facility, our maintenance and repair processes, and the construction and demolition activities going on within or near Tiernan Hall. The report outlines continuing efforts to mitigate issues and concerns, further investigate noted areas of concern, and/or items where no further action is required. We believe the investigation was performed swiftly and thoroughly allowing NJIT to mitigate short term concerns and plan for longer-term items.

Tiernan Hall was constructed in 1966 as part of a four building expansion to the then Newark College of Engineering campus. As a public research University, we steward the condition of our buildings and reinvest regularly. From 2014 through 2020, NJIT will invest over $100M in capital renewal and replacement projects to "reset the clock" on the aging facilities, providing a safe and comfortable environment for teaching, learning, and research. Tiernan Hall has been the beneficiary of some of this renewal with new LED lighting in corridors and stairwells, new floor and ceiling tiles in the public areas, renovation of several research and teaching laboratories, and renovation of one of the two lecture halls in the facility. In the near term, Tiernan Hall will also have life extending repairs made to the roof, the two building elevators will be modernized, and local control of the constant volume HVAC system will be provided in several areas.

In 2015, NJIT submitted an application to the New Jersey State Higher Education Capital Facilities Program for the full renovation of Tiernan Hall, a nearly $70M project. This was a competitive grant application program and, unfortunately, the project was not selected for funding. All NJ State institutions of higher education are hopeful that the next bond program will be enacted soon and we anticipate submitting Tiernan Hall as a candidate for full renovation again. Until that time, our capital renewal and replacement budget will be prioritized amongst the over 3 million square feet of campus buildings to continue the steady renewal of all facilities in need.

NJIT takes the health and safety of our students, faculty, and staff seriously. Our Environmental Health and Safety staff provides thousands of hours of training in the handling of chemicals and generated waste, performs audits of laboratories to ensure compliance with appropriate regulations, and responds to issues and concerns from our students, faculty, and staff. They work seamlessly with our Facilities Services staff to assist in mitigation of issues, generating work orders to rectify items noted, and follow up to ensure they have been satisfactorily completed. This group is an advocate for the health and safety of the NJIT Campus Community.

In closing, please know that both the EHS and Facilities Services team are within the Real Estate Development and Capital Operations Division of NJIT. We all work tirelessly to steward our resources and improve conditions for our students, faculty, and staff. Improvements to our campus over the past several years include over $300M in new buildings to go along with the $100M in capital renewal and replacement. We regularly assess our progress, understand the needs of our community, and allocate the limited resources where they provide the largest benefit. Like all other State facilities, colleges, and universities, our campus has deferred maintenance, but we have a cohesive and consistent plan and support from our Board of Trustees and Senior Administration to provide the necessary resources over time. We would certainly like to make all of the needed repairs immediately and with no impact to the campus community, however, that is unrealistic.

Please reach out to me with further issues, concerns, or questions related to this issue.

Regards,

Andrew P. Christ, PE
Vice President
Real Estate Development and Capital Operations

CC: Holly Stern, Vice President, Legal Affairs and General Counsel
Mitchell Gayer, Director, Environmental Health and Safety

Attachment

PEOSH Notice of Health Hazards, Tiernan Hall

On May 29, 2018 NJIT received a letter from the NJ Department of Health, Environmental and Occupational Health Service indicating that the Public Employees Occupational Safety and Health (PEOSH) program received a notice of health hazards related to Tiernan Hall. Tiernan Hall is an academic building located on the NJIT campus in the University Heights section of Newark NJ.

Tiernan Hall was part of a four building expansion of the NJIT campus completed in 1966. Currently, Tiernan Hall houses several research departments including Chemical and Material Engineering, Chemistry and Environmental Science, and the Department of Physics. Departmental space is typically allocated to departmental administrative offices, research laboratories, and instructional laboratories. Additionally, Tiernan Hall includes 2 large lecture halls, numerous classrooms, several chemical stock rooms, as well as meeting rooms for several clubs and student organizations.

The text below has separated the various components of the notice of health hazards so each item may be addressed individually. Over the last several years, NJIT has embarked on a program of renovation and infrastructure improvements to Tiernan Hall that will be described below.

Several cancer deaths have occurred in recent years of employees who have been in the building for years:

- NJ is a heavily industrialized state with Newark, NJ's largest city, having an acknowledged industrial history and legacy pollution. Cancer rates in NJ are currently ranked 45th out of 50 (meaning that only 5 states in the US have cancer rates higher than NJ), well above the national rate[1]. NJ's cancer rates are well above the national average for most forms of cancer monitored by the federal Centers for Disease Control and Prevention and the National Cancer Institute[1]. More recent NJ Department of Health data indicate that since 2012, cancer rates in the state of NJ have been decreasing[2].
- Establishing a relationship between potential workplace environmental exposures and subsequent disease requires painstaking research, investigation, and data analysis. NJIT believes that the complainant's statement regarding cancer cases originating in Tiernan Hall is anecdotal at best, based on rumor, and without any basis in fact. No data is available to support this claim.

Persistent leaks resulting in mold and corrosion:

- In 2016 NJIT has instituted an on-line work order data base to track physical plant maintenance issues across campus. A preliminary review of all work orders entered for Tiernan Hall since January 15th 2016 (the date the current work order data base was established) to May 30, 2016 was conducted to evaluate occupant concerns for items related to the current complaint. Table 1 (page 4) describes the initial review of work orders submitted by occupants of Tiernan Hall.
- Similarly, NJIT will evaluate e-mails and calls to the Environmental Health and Safety (EHS) office describing complaints associated with leaks, mold, and corrosion, etc. during the same time period. Table 2 (page 7) describes an initial review of phone calls and e-mails to the EHS department submitted by occupants of Tiernan Hall.
- In 2014 NJIT retained Roof Maintenance System to conduct an evaluation of the roofs of all NJIT buildings and generate a Qualitative Roof Analysis Report. This report found that the roof of Tiernan Hall had another 5 to 7 years of service life remaining.

Air vents are poor and we are breathing in cigarettes, chemicals, fertilizer, dust, as well as debris from a building being torn down nearby:

- Similar to above, NJIT will evaluate work orders, calls, and e-mails to the EHS department. Table 2 describes an initial review of phone calls and e-mails to the EHS department submitted by occupants of Tiernan Hall.

- The NJIT EHS Department conducted basic air IAQ measurements in accordance with relevant NJ DOL standards throughout Tiernan Hall.
- Parameters to be evaluated include carbon dioxide, temperature, and relative humidity. Moisture content readings of sheet rock, carpet, and ceiling tiles will be evaluated if warranted. The results of the IAQ measurements are described in table 3 (page 8).
- NJIT will continue to enforce the University's No-Smoking policy restricting smoking from within 25 feet from entrances and exits of all university buildings.
- NJIT has established a procedure to coordinate landscaping activities with building engineers to effectively close building air intakes during landscaping activities to prevent entrainment of equipment exhaust as well as odors associated with mulch to enter Tiernan Hall.
- The demolition of the Fleisher Athletic Center is being managed by a professional Construction Management Company – Cambridge Construction Management. Prior to the start of demolition, an environmental assessment of the structure was completed by a qualified environmental consulting company with all samples analyzed according to EPA methods by an accredited laboratory. Following the assessment, all known hazardous materials were removed from the building by a licensed professional contractor under the supervision of a licensed independent consultant.
- Continuous area air monitoring is being done at several locations around the building by an independent consultant (Omega Environmental) during all times of demolition for dust and particulates. Additionally, personal air monitoring of demolition contractor employees performed by demolition contractor (Northstar) for silica.
- In order to control dust generation at the site, the active demolition area is constantly being wet down with a 2-inch fire hose and sometimes a large misting device (Dust Boss – dust suppression articulating wet fan) as needed. Figure 1 (page 14) depicts the large misting device in use to control dust at the demolition site. Additionally, materials to be demolished are pre-soaked. Also, weather conditions may alter work schedule. For instance in times of high wind, only steel may be off-loaded to prevent generation of dust if other types of materials were handled.
- The permits for the demolition were received as part of the overall Wellness and Events Center building permits. Proof of rodent control was provided and all utilities to the building were cut and capped prior to the start of demolition including water, sewer, gas, and electric.
- A detailed Site Specific Health and Safety Plan has been submitted demolition contractor, Northstar Demolition, and was approved by the construction managers prior to the initiation of the demolition project.

<u>Old decrepit building</u>:

- NJIT has made significant improvements in building finishes as well as numerous upgrades to building infrastructure. Over the last several years, NJIT has replaced reheat coils, thermostats, floor tiles, ceiling tiles, and lighting fixtures throughout Tiernan Hall. Additionally, NJIT has painted dozens of classrooms and hallways and laboratories. NJIT has also renovated numerous research and instructional laboratories in Tiernan Hall with additional upgrades planned for the coming fiscal year.

<u>Housing chemicals in sub-standard ways</u>:

- NJIT has made significant improvements over the last several years in improving chemical hygiene practices in NJIT research and instructional laboratories as well as departmental chemical storage facilities. Similarly, NJIT has made significant improvements in chemical waste management practices. These program improvements have been initiated campus-wide and are not limited to Tiernan Hall.
- NJIT has instituted programs to test, measure, and monitor fume hoods and biological safety cabinets campus-wide and to initiate repairs when needed. Several outside contractors have been retained by NJIT and are dedicated to this purpose.

- Over the past several years NJIT has made improvements to laboratory safety training programs throughout the university. These training programs have focused on NJ Worker and Community Right to Know, Occupational Exposure to Hazardous Chemicals in Laboratories, Regulated Waste Management, and Emergency Response.
- Additional training programs have been initiated for biological safety, radiation safety, and laser safety on an as needed basis.
- NJIT has endeavored to train laboratory staff, student researchers, and faculty in appropriate chemical storage, handling, and disposal procedures.

Poor air quality, insufficient air conditioning, hot offices, classrooms and labs:

- As previously described, the NJIT EHS Department conducted basic air IAQ measurements in accordance with relevant NJ DOL standards throughout Tiernan Hall. Parameters to be evaluated include carbon dioxide, temperature, and relative humidity. Moisture content readings of sheet rock, carpet, and ceiling tiles will be evaluated if warranted. The initial results of the IAQ measurements are described in table 3 (page 8).

Summary:

In response to the notice of health hazard received from the NJ DOH regarding Tiernan Hall, NJIT conducted a review of the work order data base as well as calls and e-mail received by the Environmental Health and Safety (EHS) department for items related to the current complaint regarding Tiernan Hall. Additionally the NJIT EHS Department conducted basic IAQ and moisture measurements throughout Tiernan Hall. Preliminary results from the above-described activities have yielded the following areas for improvements:

- Evaluate relevant areas of the Tiernan roof and quickly make necessary repairs as needed.
- Coordinate landscaping activities consistently with NJIT HVAC department so that affected air intake louvers may be closed to prevent infiltration of power equipment exhaust during landscaping activities in the areas surrounding Tiernan Hall.
- Continue to enforce NJIT's no smoking policy within 25-feet from building entrances to prevent potential cigarette smoke into occupied buildings. Post signs and conduct Public Safety patrols as needed.
- Evaluate each potential area of concern listed at the bottom of table 1 (page 6) for subsequent physical plant upgrades and improvement required to mitigate potential concerns.
    - Initial actions taken are described on page 6.
- Evaluate each potential area of concern listed at the bottom of table 3 (page 13) for subsequent physical plant upgrades and improvement required to mitigate potential concerns.
    - Fourth floor carpeting to be commercially cleaned as needed following scheduled roof repairs.

1) US Cancer Statistics Working Group. United States Cancer Statistics: 1999-2014 Incidence and Mortality Web-based Report. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2017.
2) Cancer Incidence and Mortality in New Jersey, 2010 to 2014. Annual Report. A Publication of the New Jersey Cancer Registry. Cancer Epidemiology Services. New Jersey Department of Health. Trenton, NJ. June, 2017.

Table 1
Review of Work Orders Submitted for Tiernan Hall
January 15, 2016 to May 30, 2018

- From January 15, 2016 to May 30, 2018 there were 29,114 maintenance work orders submitted for all of NJIT.
- Of those, 1,254 pertained to Tiernan Hall
    - Of those, 667 were assigned to the following crafts who are involved in the repair and mitigation of the types of building issues described in the health hazard notification: HVAC, Plumber, Carpenter, Custodial, Roofing, and EHS
        - Of those, 240 pertained to items mentioned in the health hazard notification, such as: temperature (hot or cold), water leaks, ceiling tiles, HVAC, mold, dust, air conditioning, ventilation, cigarette odor, fertilizer odor, chemical odor, sick person, and/or corrosion. Please note that leaky faucets (unless resulting in flooding) and all restroom work orders were excluded.
            - Of the 240 work orders potentially associated with the health hazard notification 36 were associated with temperature
                - Of the 36 temperature related work orders
                    - 15 were related to area too hot
                    - 19 were related to area too cold
                    - 2 were general inquiries about temperature adjustment
                - Of the 36 temperature related work orders
                    - 3 originated on the first floor
                    - 13 originated on the second floor
                    - 10 originated on the third floor
                    - 10 originated on the fourth floor
                    - 0 originated in the basement
                - Repeat areas
                    - Room 323-C submitted 7 temperature related work orders
                    - Rooms 403 and 202 submitted 3 temperature related work orders each
            - Of the 240 work orders potentially associated with the health hazard notification 21 were associated with ceiling tiles
                - Of the 21 ceiling tile related work orders
                    - 19 were related to stained or sagging ceiling tiles
                    - 2 were related to active water leaks (1 roof leak/1 pipe leak)
                - Of the 21 ceiling tile related work orders
                    - 2 originated in the basement
                    - 7 originated on the first floor
                    - 1 originated on the second floor
                    - 5 originated on the third floor
                    - 6 originated on the fourth floor
                - Repeat areas
                    - Room 151 submitted 2 ceiling tile related work orders
                    - Room 150-E submitted 2 ceiling tile related work orders
                    - Room 423-C submitted 4 ceiling tile related work orders
                    - Building Hallways submitted 7 ceiling tile related work orders fairly equally distributed among floors
            - Of the 240 work orders potentially associated with the health hazard notification 13 were associated with ventilation complaints
                - Of the 13 ventilation related work orders

        - 2 originated in the basement
        - 4 originated on the first floor
        - 2 originated on the second floor
        - 5 originated on the third floor
        - 0 originated on the fourth floor
    - Repeat areas:
        - Room 380 submitted 4 ventilation related work orders all describing no fresh air
- Of the 240 work orders potentially associated with the health hazard notification 12 were associated with air conditioning complaints
    - Of the 12 air conditioning related work orders
        - 0 originated in the basement
        - 4 originated on the first floor
        - 2 originated on the second floor
        - 1 originated on the third floor
        - 5 originated on the fourth floor
    - Repeat areas:
        - Room 101 submitted 2 air conditioning related work orders
        - Room 202 submitted 2 air conditioning related work orders
        - Room 423-C submitted 2 air conditioning related work orders
        - Room 463 submitted 2 air conditioning related work orders
- Of the 240 work orders potentially associated with the health hazard notification 9 were associated with chemical or sewer odor complaints
    - Of the 9 chemical odor complaints related work orders
        - 2 originated in the basement
        - 0 originated on the first floor
        - 3 originated on the second floor
        - 2 originated on the third floor
        - 2 originated on the fourth floor
    - Repeat areas:
        - Room B015 submitted 2 chemical odor complaints related work orders
- Of the 240 work orders potentially associated with the health hazard notification 7 were associated with water leaks complaints
    - Of the 7 water leak related work orders
        - 0 originated in the basement
        - 0 originated on the first floor
        - 1 originated on the second floor
        - 1 originated on the third floor
        - 5 originated on the fourth floor
    - Repeat areas:
        - Room 407 submitted 2 water leak related work orders
        - Room 408 submitted 2 water leak related work orders
- Of the 240 work orders potentially associated with the health hazard notification 5 were associated with mold complaints
    - Of the 5 mold related work orders 2 originated on the first floor from rooms 103 and 150E
    - Of the 5 mold related work orders 3 originated on the first floor, all from room 463
    - Repeat areas:
        - Room 463 submitted 3 mold related work orders

- Of the 240 work orders potentially associated with the health hazard notification 3 were associated with chemical related complaints
    - Of the 3 chemical related work orders
        - 1 originated on the third floor
        - 2 originated from the basement
    - Repeat areas:
        - Room B015 submitted 2 chemical related work orders
- Of the 240 work orders potentially associated with the health hazard notification 2 were associated with cigarette smoke or fertilizer odor complaints
    - Of the 2 cigarette smoke or fertilizer related work orders
        - 2 originated on the fourth floor
    - Repeat areas:
        - Room 463 submitted 2 cigarette smoke or fertilizer odor complaint related work orders
- Of the 240 work orders potentially associated with the health hazard notification 2 were associated with a person being sick
    - Of the 2 person being sick related work orders
        - 2 originated on the third floor
    - Repeat areas:
        - Room 321-C submitted 2 person being sick related work orders
- Of the 240 work orders potentially associated with the health hazard notification 1 was associated with dust complaints
    - Of the 1 dust related work orders 1 originated on the fourth floor from room 423-C
- Of the 240 work orders potentially associated with the health hazard notification 1 was associated with corrosion
    - Of the 1 corrosion related work order 1 originated in the basement from room B006

- Repeat Areas of Potential Concern (more than 3 work orders submitted for a specific location):
    - Room 323-C submitted 7 temperature related work orders
    - Room 423-C submitted 4 ceiling tile related work orders
    - Room 380 submitted 4 ventilation related work orders all describing no fresh air
    - Room 463 submitted 3 mold related work orders
    - Room 321-C submitted 2 person being sick related work orders (included in area of concern due to nature of the work order)
- Actions Taken:
    - Eight electric re-heat coils and individual thermostats installed in rooms 321, 322, and 323 to allow for better local control of temperature. These rooms are not individual rooms but rather each is a suite of rooms.
    - Additional locations, repeat areas listed above, being evaluated for similar installations to alleviate temperature-related building issues.
    - Followed up with worker in 321-C – worker feeling hot and tired at the end of the work day due to high temperatures during seasonal change. Worker now has ability to control temperature locally.
    - Roof area above room 463 scheduled for significant repair. Will follow up with moisture abatement activities, e.g., carpet cleaning, ceiling tile replacement, as needed following roof repair.

Table 2
Review of Telephone Calls and E-mail to EHS Regarding Tiernan Hall
January 15, 2016 to May 30, 2018

Telephone calls and e-mails to the EHS Department for the above referenced time period were fairly evenly distributed between the three principal departments housed in Tiernan Hall: Department of Physics; Chemical and Material Engineering; and Chemistry and Environmental Science

Department	Main Areas of Concern	Resolution
Physics	Water leaks (roof), 4th floor, departmental offices. Odor complaints related to landscaping activities (mulch application, leaf blower exhaust) and cigarette smoke. Water leaks (plumbing), odor complaints basement labs (015). Fume hood function – various locations.	Sent EHS representative to evaluate. Measurements taken as needed. Work order or e-mail submitted for evaluation and/or repairs. Tiernan roof scheduled for repair, other issues resolved. Fume hood issues repaired by in-house mechanics or external vendors if needed.
Chemical and Material Engineering	Water leak (ground infiltration), basement chemical storage room (016). Water leak (plumbing) in lab (206). Odor complaints from various occupants, typically related to construction activities in adjacent building (FMH). Water leak, ceiling tile replacement in department chair's office. Fume hood function – various locations.	Sent EHS representative to evaluate. Discussed with construction managers-related to new building constructed adjacent to Tiernan. Tiernan basement water leaks resolved with completion of adjacent building, grading and exterior drainage, and subsequent exterior water proofing activities. Stained or damaged ceiling tiles replaced as needed. Work order or e-mail submitted for evaluation and/or programmed repairs. Water leaks (plumbing) repaired. Fume hood issues repaired by in-house mechanics or external vendors if needed.
Chemistry and Environmental Science	Peeling paint/mildew teaching lab (209). Fume hood function – various locations. Ventilated workstation function – teaching lab (204).	Sent EHS representative to evaluate. Measurements taken as needed. Work order or e-mail submitted for evaluation and/or repairs. Lab 209 repainted and ventilation improved. Work orders completed. Fume hood issues repaired by in-house mechanics or external vendors if needed.

Table 3
IAQ Monitoring Results – Tiernan Hall
(May 31, 2018-June 1, 2018)

Floor	Room #	CO2 (ppm)	Temperature[1] (°C)	Rel. Humidity[2] (%)	Moisture Content Ceiling (%)	Moisture Content Wall (%)	Moisture Content (Carpet)
Basement	15A	323	21.8	65.7			
Basement	7B	272	21.7	72.5			
Basement	B-10	320	22.6	63			
Basement	B-10	274	23.2	75.7			
Basement	B-15	316	21.7	74.7			
Basement	B-1A	302	22.1	58			
Basement	B-3	302	21.8	57.8			
Basement	B-6	301	22.3	78			
Basement	Stair 2	291	22.7	72.6	0.152		
Basement	Stair 3	292	21.2	74.6	0.146		
Basement	Lecture Hall 1	306	22	74.9			
1	104	428	23	70			10.7%
1	105	286	21.1	80.4			
1	107	294	21	61.4			
1	109	298	22.6	75			
1	150	323	23.2	58.8			20.1%
1	151	306	23	60.8			15.0%
1	Stair 1	269	23.5	71.8	13.1%		
1	Stair 2	317	22.8	71.3	12.0%		
1	Stair 3	323	22.5	76.8	14.7%		
1	Stair 4	355	23.5	68.8	17.3%		
2	201	309	20	72.3			
2	202	319	20.3	81.9	11.41%	14.50%	15.60%
2	203	296	18.5	82			
2	204	303	18.4	76.4			
2	205	314	20.1	72.4			
2	207	310	20.4	90.4			
2	208	302	20.1	84.1			
2	209	321	20.6	64.6			
2	210	300	18.9	76.4			
2	211	302	20.9	83.4			
2	212	293	20.7	87.4			
2	251	403	24.5	54.9			8.80%
2	252	417	24.7	62			8.40%
2	253	872	25.1	64.4			
2	255	458	24.5	60.4		12.50%	9.30%
2	256	454	25.4	61.1			8.80%

Floor	Room #	CO2 (ppm)	Temperature[1] (°C)	Rel. Humidity[2] (%)	Moisture Content Ceiling (%)	Moisture Content Wall (%)	Moisture Content (Carpet)
2	258	453	24.9	54.9			
2	258	492	25	63.1			9.10%
2	260	807	24.6	64.1			9.70%
2	261	427	24.5	62.6			7.90%
2	262	457	25.2	62			8.50%
2	263	401	23.2	69.5			
2	264	449	24.8	65.97		12.30%	8.80%
2	265	408	21.5	76.4		11.60%	9.70%
2	266	468	24	67.7			9.70%
2	268	419	23.7	67.4			9.20%
2	270	401	23.5	69.5			10.50%
2	272	387	22.5	71.4			9.30%
2	272	386	23.9	64.4			9.90%
2	274	391	24.1	67.9			10.30%
2	280	342	23.9	67.5			9.80%
2	282	347	24.2	67.1			10.40%
2	284	623	24.9	61			8.30%
2	284	386	24.1	67			11.20%
2	286	401	24	67.5			7.80%
2	206 IN	306	21.8	82			
2	206 Out	323	21.9	79.9			
2	276A	436	24.1	67.7			10.10%
2	276B	367	24	70.2			9.90%
2	2nd Floor Corridor	29	19.8	78	99.90%		
3	301	538	21.5	55			
3	303	463	20.1	64			
3	304	460	20	61.3			
3	305	471	21.3	64.1			
3	306	520	21.3	60.8			
3	307	464	21.3	67.7			
3	308	470	21	69.8			
3	309	523	21.1	69.1			
3	310	467	20.8	68.5			
3	311	568	22.2	63			
3	312	530	22.3	64.8			
3	313	545	22.5	61.6			
3	314	504	22	70			
3	315	482	19.7	68.5			

Floor	Room #	CO2 (ppm)	Temperature[1] (°C)	Rel. Humidity[2] (%)	Moisture Content Ceiling (%)	Moisture Content Wall (%)	Moisture Content (Carpet)
3	316	478	19.6	69.1			
3	317	508	19.8	68.9			
3	319	475	20.2	68.2			
3	320	456	20.8	72.1		13.70%	
3	323	305	18.6	57		12.40%	
3	324	429	20.1	75.1		12.00%	
3	350	531	22	64.1		11.50%	
3	351	351	22.8	65.8		11.40%	
3	352	540	22.8	64		9.70%	
3	353	400	23.1	65.8		8.80%	
3	354	740	23.2	63.6		9.20%	
3	356	354	23.3	60.8		7.60%	
3	358	351	22.1	61.1		11.00%	
3	360	347	23	61.8		11.80%	
3	362	334	23	69.7		11.80%	
3	364	382	22.5	69.4		12.80%	
3	365	368	23.2	64.2		12.10%	
3	366	347	22.3	65.2		12.10%	
3	368	332	22.4	64.3		11.90%	
3	370	340	22.5	65.1		12.30%	
3	371	376	24.3	65		9.30%	
3	372	540	22	67		10.10%	
3	374	533	22.3	66.2		12.70%	
3	376	520	22.5	66.3		12.80%	
3	378	512	23	64.9		13.30%	
3	380	531	23.1	64.3		11.90%	
3	382	580	23	64.3		13.60%	
3	384	528	22.8	64.1		13.40%	
3	385	406	22.8	65.1			
3	386	513	22.6	64.6		10.10%	
3	387	930	22.7	66		13.00%	
3	388	546	22.8	62.7		12.40%	
3	394	386	23.5	63		6.60%	
3	302A	466	21.5	65		10.80%	
3	302B	501	20.9	63.1			
3	318	490	19.8	66.6		13.90%	
3	321A	439	22	49.5		11.60%	

Floor	Room #	CO2 (ppm)	Temperature[1] (°C)	Rel. Humidity[2] (%)	Moisture Content Ceiling (%)	Moisture Content Wall (%)	Moisture Content (Carpet)
3	321B	304	20	52.8		13.90%	
3	321C	306	20.2	59.6		12.80%	
3	321D	200	20.6	59.2		12.70%	
3	322A+B	273	20.2	52.3		12.20%	
3	322C	270	20.2	58		11.90%	
3	323A	274	18.8	64.5		14.50%	
3	323B	280	18.9	63.7		15.70%	
3	323C	305	19	57		14.40%	
3	323D	298	21.3	53.3		8.30%	
3	357/359	327	23	65.1		12.40%	
3	361/363	376	23.1	65.5		11.00%	
3	Corridor - opening to offices	520	20.5	70.5	12.40%		
3	Stair 1	523	22	69.6	11.60%		
3	Stair 2	484	20.9	64.4		12.30%	
3	Stair 3	545	21.1	61.8	11.50%		
3	Stair 4	650	21	58.8	11.00%		
4	402	382	24	62.7		15.3%	22.0%
4	403	382	23.3	63.36			10.8%
4	403	368	22.8				16.5%
4	404	317	23.2	67.4		0.1%	12.2%
4	410	334	21.8	71.2			
4	412	312	22.8	70.5			
4	413	307	22.8	68.4			
4	414	304	22.8	67.8			
4	416	321	21.8	85.6			
4	417	345	21.9	85.4			
4	418	334	21.6	80			
4	419	520	22.8	71.2			
4	421	329	22.9	68.6			
4	422	306	22.8	67.6			
4	423	330	21.5	74.5		12.5%	
4	450	344	23.1	64.2			
4	452	371	23.3	63.4			
4	453	344	23.3	64.4		14.0%	17.7%
4	454	345	23.4	64.1			
4	455	346	23.3	63.7		15.0%	8.0%
4	456	346	23.3	63.8			

Floor	Room #	CO2 (ppm)	Temperature[1] (°C)	Rel. Humidity[2] (%)	Moisture Content Ceiling (%)	Moisture Content Wall (%)	Moisture Content (Carpet)
4	457	350	23	63.9		15.7%	8.0%
4	458	344	23.2	64.6			
4	459	382	22.9	68.9			
4	460						
4	461	579	23.8	66.6			
4	462	345	23.4	64			
4	463	440	22.3	71			32.0%
4	464	342	23.6	64.9			15.0%
4	466	321	23.4	64.3			
4	468						
4	470						
4	472	333	23.1	66.5			14.0%
4	474	448	23.1	68.9	9.7%		
4	476	317	23	68.3			
4	478						
4	480	333	23.1	67.8			
4	481	323	22.9	65.9		4.1%	8.3%
4	482	349	23.2	63.2			
4	483	324	23	64.9			8.3%
4	484	344	23.2	65.1			
4	401-T1	371	23.8	63.9			
4	401-T2	303	24	63.6		10.6%	
4	406T	353	23.1	64.8			
4	408T	319	21.7	70.8			
4	409T	327	22.7	67.4			
4	411A	317	22.8	68			11.0%
4	411B						
4	423A	328	20.7	74.5			33.1%
4	423B	311	21.2	71.9		17.4%	42.0%
4	423C	329	20.6	75.7		20.5%	63.5%
4	423D	347	21.7	73.7		16.5%	9.8%
4	423E	340	21.1	73.8		19.0%	23.9%
4	423F	353	21.5	72.5	15.10%	19.4%	52.8%
4	463A	370	22.8	69			
4	499G	387	23.8	65.3			
4	4th Floor Corridor	388	23.5	71.1			

Notes:

1. Temperatures measured in Tiernan Hall ranged from the lowest 18.4 °C (65.12 °F) to the highest 25.4 °C (77.72 °F). All temperature readings were within the ranges specified in NJAC 12:100-13.3(a)4 and all CO2 measurements were below 1000 ppm as specified in NJAC 12:100-13.3(a)3.

2. Outdoor relative humidity (%RH) ranged from 81% to 90% on May 31st and 74% to 100% on June 1st, the days the measurements described above were taken.

Potential Areas of Concern							
Floor	Room #	Co2	Temperature (°C)	Rel. Humidity (%)	Moisture Content Ceiling (%)	Moisture Content Wall (%)	Moisture Content (Carpet)
					MC Over 30% in Ceiling Tiles		MC over 30% in Carpeting
4	423A						33.1%
4	423B						42.0%
4	423C						63.5%
4	423F						52.8%
4	463						32.0%
2	2nd Floor Corridor Near 203				99.90%[3]		
4	423A						52

Note: 3. Potentially active leak caused by pipe joint leak – scheduled for repair.

Figure 1. Dust control device in use at demolition site