DEVENS ENTERPRISE COMMISSION
SERVING AS THE DEVENS BOARD OF HEALTH

In the matter of:	)	
	)	
DEVENS RECYCLING CENTER, LLC	)	Site Assignment for
45 Independence Drive,	)	Minor Modification
Devens, Massachusetts 01434	)	
	)	

PRE-FILED DIRECT TESTIMONY OF MICHAEL LANNAN

I, Michael Lannan, being duly sworn, state the following according to my personal knowledge, good faith investigation and belief as being true and submit the same, along with my attached curriculum vitae, as my initial Pre-Filled Direct Testimony in the above matter.

1. I am president at Tech Environmental Inc ("TECH"), an air quality consulting firm that specializes in nuisance evaluations. I hold a Bachelor of Science degree in Chemical Engineering and a Master of Science Environmental Engineering degree from Northeastern University, and I am registered as a professional engineer in the Commonwealth of Massachusetts, as well as Maine.

2. I have over 35 years of professional experience as a consultant, specifically related to air, noise, odor, and dust issues across many industries and sectors including the solid waste industry's transfer stations, landfills, composting facilities, food waste processing facilities, sludge stabilization process, and digestion facilities.

3. In addition to other services, I am a peer reviewer for various public bodies in Massachusetts. In that capacity, I frequently review proposals, including applications, and advise public bodies about regulatory compliance and aspects of the filings.

4. I am currently working on behalf of the Boards of Health or permitting agencies reviewing nuisance concerns for proposed or existing projects in Devens, MA, Uxbridge, MA, West Stockbridge, MA, among others.

5. I am currently working on behalf of private operators of transfer stations in Leominster, MA, Taunton, MA, and Lowell, MA, among others.

6. My most recent site assignment hearing testimony for a proposed transfer station in the City of New Bedford in 2025.

7. I am very familiar with the Devens Enterprise Commission (DEC) and the transfer station. I have been the Project Manager under contract for review of nuisance related issues for the DEC for well over the last decade. In addition, prior to my involvement as the primary reviewer for nuisance related concerns, Tech assisted the original owner of this facility, Devens Recycling, with the initial permitting.

8. I do not have any on-going relationship to the Applicant nor legal interest in the site.

9. I adopt and incorporate by reference my attached findings and curriculum vitae on this matter as if I had testified as written.

CERTIFICATION PURSUANT TO 310 CMR 16.07

Pursuant to 310 CMR 16.07, I, Michael Lannan, certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties both civil and criminal for submitting false information including possible fines and imprisonment.

Signed under the pains and penalties of perjury this 4th day of January, 2026.

Signature:

Name: Michael Lannan

I, Michael Lannan, do hereby depose and say on the basis of personal knowledge that:

1. I am familiar with the facts and circumstances underlying this site assignment application as a result of my ongoing participation on behalf of the Board. I am knowledgeable with 310 CMR 7.00 *et seq*., 310 CMR 16.00 *et seq*., 310 CMR 19.00 *et seq*, and 974 CMR 4.00 *et seq*.

2. This site assignment application was reviewed as a minor modification, per 310 CMR 16.22, as such only items associated with potentially conditioning the minor modification request were reviewed and considered for this modification.

3. In evaluating the minor modification application, the acting Board of Health is required by 310 CMR 16.40(4)(g) to determine that the operation of the Facility with the minor modification would not result in nuisance conditions which would constitute a danger to the public health, safety or the environment taking into consideration noise, litter, vermin, odors, bird hazards to air traffic, and other potential nuisance problems. I have reviewed the potential for nuisances for odor, noise, and nuisance dust, as described herein.

4. The primary modification request is an expansion of operating hours. As is often the case, requests for extended hours are made when existing hours are not conducive to achieving maximum throughput on a consistent basis. Such changes can have both positive and negative consequences for the surrounding area.

5. One potential positive consequence is that peak activity may be reduced by distributing operations over a longer period. However, there is nothing in the minor modification application that demonstrates that peak activity would be reduced or that peak impacts would be lessened.

6. A secondary potential benefit is that spreading activity over longer hours may result in a lower average hourly impact experienced by the surrounding neighborhood. Based on my review, this does appear to be a factor, as the expanded processing hours would allow facility operations to be distributed more evenly throughout the day.

7. The primary negative consequences for the neighborhood are two-fold. First, through no fault of the facility, the existing operating hours have not consistently allowed the facility to achieve its full permitted throughput. As a result, while there have been no odor or noise complaints to date, it is not accurate to state that maintaining the same throughput would necessarily result in no potential increase in nuisance conditions relative to current experience levels.

8. Second, while the facility is permitted for its current throughput and has not generated significant adverse impacts to date, it has done so by operating as a predominantly daytime facility. The proposed expansion would extend operations into early morning, evening, and late evening hours, albeit with reduced activity levels, thereby changing the nature of the facility's operating profile from the perspective of nearby residents.

9. I provided four primary comments to the facility related to the proposed expanded hours and associated noise concerns. Discussions with DEC staff confirmed that there have been minimal sound complaints, with the exception of a limited period during which a garage door was immobile in the open position and out of service. This event was considered as part of my evaluation and testimony.

10. Near the end of the day on December 31, 2025, Tech received a revised sound assessment intended to address the four primary comments and questions raised. One issue addressed concerns additional traffic during the expanded hours. While the overall traffic limit has not increased, as the minor modification does not authorize additional throughput, the sound study assumes an increase in truck activity during the early morning and evening hours, as well as higher expected utilization during existing daytime hours. I did not have the ability to cross-reference the hourly traffic assumptions in the sound report with the final traffic study, which typically presents daily rather than hourly data. For purposes of this testimony, I have assumed that the traffic data used in the sound analysis is consistent with the overall traffic analysis.

11. According to the sound study, approximately 16 additional trucks are expected during the early morning hours and approximately 10 trucks during the evening hours. These increases result in modeled sound increases of 1.3 dBA and 0.4 dBA, respectively. Such increases are marginally perceptible at most and would not constitute an adverse impact. During the existing operating hours of 7:00 AM to 5:00 PM, truck traffic is assumed to increase by 128 trucks over a ten-hour period. While no hourly peak is provided, this increase is minor when compared to existing truck and automobile traffic volumes of 781 trucks and 1,356 passenger vehicles, respectively, resulting in an increase of only 0.5 dBA. Therefore, no adverse sound impact is anticipated from traffic associated with the proposed expanded hours when operating at maximum permitted levels. This conclusion in Item 12 is valid only if the following two conditions are met:

    a. Truck traffic continues to be routed along the preferred route. Based on questions and answers during the review process, the facility has been effective in enforcing use of the preferred route, and this requirement should continue.

    b. The distribution of truck traffic remains consistent with the sound analysis assumptions: an average of approximately 8 trucks per hour between 5:00 AM and 7:00 AM, 29.2 trucks per hour between 7:00 AM and 5:00 PM, and 2.5 trucks per hour between 5:00 PM and 9:00 PM. Stated another way, of the assumed 318 trucks per day, approximately 2.5% occur per hour between 5:00 AM and 7:00 AM, 9.2% per hour between 7:00 AM and 5:00 PM, and 0.8% per hour between 5:00 PM and 9:00 PM. While hourly truck limits were not formally part of this minor modification application, it is reasonable to limit truck deliveries during typical sleeping hours (5:00 AM to 7:00 AM) to no more than 16 trucks per hour, and during evening hours when residents are likely to be outdoors (5:00 PM to 9:00 PM) to no more than 10 trucks per hour. These conditions are more than were assumed in the sound study and would ensure that sound increases during the expanded hours do not exceed 3 dBA and therefore would not result in an adverse impact. If the facility does not like these proposed limits the sound study could be revised to demonstrate compliance at a higher traffic rate during the expanded hours than proposed herein.

12. The sound study also evaluated concerns raised by Tech regarding on-site railcar activity entering and exiting the building outside the currently permitted hours of 7:00 AM to 5:00 PM. Historical rail activity outside these hours has been noted, and the Devens Enterprise Commission has received complaints associated with such activity. However, the relevant question for this review is not whether the activity may be audible, but whether it would rise to the level of air pollution constituting an adverse impact.

13. At Tech's request, the revised sound study examined railcar activity in detail. The assumed sound power levels for the track mobile, backup alarm, and coupling and

decoupling operations are reasonable and conservative. The facility also assumed that normal internal operations would occur while a single railcar door remained open. The modeled sound levels associated with the open rail door were calculated at 65 dBA at the property line (PL8) from that source alone between 9:00 PM and midnight. Modeled sound levels at the nearest receptor were approximately 30 dBA, indicating that rail activity would not be audible on an hourly basis unless ambient sound levels dropped below the minimum measured ambient. Accordingly, with only railcar movement occurring, a single railcar door open, and normal indoor processing underway, the average sound increase would meet the requirement of no adverse impact to health, safety, or the environment. There was a concern raised previously from the DEC that if the facility was required to cease operation when the door was opened for railcar activity it would be hard to enforce. While I agree with that concern, based upon the revised study, it is not needed, so if the conditions is added that simply states that the facility should cease activities where practical, as part of the normal operations when the railcar door is open that should suffice to minimize sound emissions, especially potential tonal sounds.

14. The sound study demonstrates that the facility can operate with doors open during the expanded hours of 5:00 AM to 9:00 PM without creating an adverse impact, provided that the majority of truck deliveries continue. The remaining concern relates to instantaneous, or impulsive, sounds generated during rail activity. DEC regulations define impulsive sound as sound that exceeds ambient levels by more than 10 dBA for a duration of one minute, as measured at any property line. Railcar coupling and decoupling can generate impulsive sound events as railcars engage and separate during normal operations.

15. A prior permit condition required installation of a berm along the rail line to interrupt the line of sight between rail operations and the nearest residential receptors, thereby minimizing sound impacts associated with rail activity. It is unclear why this condition has not been satisfied to date. While it may be argued that the berm has not been necessary under predominantly daytime operations, it is not clear that the intended benefit of this mitigation would be realized under the proposed expanded operating hours. Accordingly, it is recommended that the existing condition be fulfilled prior to allowing railcar movements between 9:00 PM and midnight. If site topography, grading, or other physical constraints make construction of a berm infeasible, a solid sound mitigation wall should be installed to satisfy the intent of the original condition.

16. Given the substantially lower truck volumes during the early morning and evening periods, it is not necessary for all doors to remain open during these expanded times. While I recognize that frequent opening and closing of doors is operationally impractical during intermittent deliveries, the reduced traffic levels during the expanded hours make it feasible and prudent for the facility to limit operations to a maximum of one open door at a time, or up to two doors if a valid operational need is demonstrated. This measure would further reduce the potential for impulsive and tonal sounds that, while potentially compliant with regulatory limits, could be readily audible and disruptive to nearby residents.

17. It is currently unclear whether there is forced airflow through the building louvers on a regular basis, and if so, what the associated flow rates are during various operating conditions. This issue will be evaluated during my site visit on the day of, and prior to, the site assignment hearing. This airflow concern is more significant under the proposed expanded operating hours, as odor potential is greater during early morning and late

evening periods when atmospheric conditions are more likely to be stable or influenced by temperature inversions due to the absence of solar heating.

18. The facility previously committed to maintaining sufficient airflow to ensure negative pressure at door openings. Based on industry experience, maintaining negative pressure at large door openings requires substantial airflow. In some cases, facilities elect to supplement or replace this approach with recirculating particulate and carbon-based odor adsorption systems. I recommend that, if the site visit indicates that airflow is insufficient to maintain negative pressure for effective odor and dust capture, installation of a recirculating particulate and odor filtration system be considered as a condition of approval.

19. The misting system is intended to reduce airborne particulate matter, including both respirable and nuisance dust, and to mitigate odors associated with dust-bound compounds and, to a lesser extent, gaseous odor constituents that can be absorbed into the mist. Under typical conditions, misting systems can reduce odor potential by approximately 50 percent, provided that the system is fully operational. Year-round misting is feasible through the use of heat tracing, insulated piping, and continuous operation, an approach commonly employed at landfills that must operate misting systems throughout the winter to satisfy permit conditions and improve hedonic tone if a masking agent/counteractant is employed as well.

20. The facility provided an older operation and maintenance manual for the dust suppression system dating back to when the facility operated as a construction and demolition transfer station. While the manual notes that the system may be heat-traced for continuous use, it is not clear whether the existing system is configured for year-round operation. This will be evaluated during the site visit immediately prior to the hearing.

21. During discussions regarding MSW packaging during evening and nighttime hours, the necessity of moving railcars into and out of the building between 9:00 PM and midnight was questioned. The facility could alternatively position up to three railcars within the building prior to 9:00 PM and remove them the following day, thereby allowing the doors to remain closed between 9:00 PM and 5:00 AM. This approach would allow for approximately 300 to 350 tons of MSW to be packaged using these three railcars to manage waste remaining on the tipping floor at the end of the day.

22. The facility indicated that operational flexibility to move railcars during the hours of 9 PM to midnight is necessary. Under this operating scenario, it is possible that more than 350 tons of MSW could remain on the tipping floor during the day and at 5:00 PM, particularly given that the sound study assumes only 10 delivery trucks during the evening hours. Ten packer trucks would equate to approximately one railcar of waste, suggesting that waste accumulation would likely occur throughout the day to facilitate nighttime packaging operations.

23. This assessment of odor potential conservatively assumes no nighttime packaging of construction and demolition debris and may not represent a typical operating day; however, it represents a reasonable worst-case evening operational scenario based on the application materials. It is unlikely that the existing misting system was designed to adequately address the expanded waste storage and nighttime packaging proposed under this minor modification. This determination cannot be made conclusively based on the provided O&M manual, as it lacks design drawings identifying the locations of the ten zones, descriptions of zone-specific operation, confirmation of continuous operability, or clarification of which zones are activated for specific waste-handling activities.

24. Accordingly, if the site visit indicates that odor and dust control via misting is inadequate for expanded waste storage and nighttime packaging, I recommend that installation of a recirculating particulate and odor filtration system be considered as a condition of approval. Please note that unlike misting system that often must remain operational 24 hours a day during colder months to limit freeze potential in the system, dry odor and particulate recirculating scrubbing can be used intermittently with or without a heater installed inline.

25. In response to comments from the DEC, the facility agreed to conduct odor monitoring during the initial six months of operation. I recommend that this monitoring period not be defined as the first six months following start-up of the revised hours, but rather as an initial six-month period that includes the months of May through October, in order to capture conditions associated with peak MSW temperatures and the highest potential for odor generation, and during the existing hour and expanded hours. The expanded hours monitoring should occur on days with still and stable meteorological conditions. It is not suggested that monitoring occur regularly unless there are new odor complaints, but that it occur often enough to observe odor potential during the proper weather conditions and expanded hours.

26. Lastly, the revised noise study does not formally propose a mitigation measure that would limit sound at the industrial fenceline to meet the Industrial Performance Standards (IPS) in the event that an abutter was to require compliance with the fenceline limit. The purpose of the industrial fenceline-to-fenceline sound limits is to ensure that adequate "available sound" remains for future industrial growth and that dissimilar industrial uses can coexist side-by-side within designated industrial areas. Given that the adjacent industrial facility already generates elevated sound levels at the shared fenceline, it is unlikely, as a practical matter, that it would assert an inability to operate due to truck deliveries exceeding the fenceline limits from this facility. Furthermore, because sound levels would remain below the applicable industrial ceiling limit under the IPS, it is unlikely that this facility would ever be required to demonstrate compliance with the industrial fenceline limit under normal operating conditions.

27. Nevertheless, DEC policy has consistently required that facilities demonstrate, at least conceptually, that compliance with the industrial fenceline limit is achievable if required in the future. This requirement ensures that the facility understands the potential mitigation measures, the associated deferred costs, and its obligation to implement such measures should circumstances change. This policy was adopted following a prior enforcement case in which a facility was effectively bankrupted after being required to retrofit sound mitigation to meet a fenceline standard that had not been previously evaluated. Because this exercise was not completed as part of the revised noise study, as requested, I recommend that a permit condition be added requiring the facility to either commit to installation of a 20-foot-high solid sound attenuation wall along the eastern and northern industrial fencelines, or to propose an alternative mitigation measure, subject to DEC approval, that demonstrates compliance with the applicable industrial fenceline sound limits, in the minor chance that it is required in the future.

28. Based on my review of the Minor Modification Application, the O&M manual provided separately, and the original and supplemental noise studies, it is my professional opinion that the changes made to the Proposed Activity satisfies the Site Suitability Criteria of 310 CMR 16.40(4)(g) (specifically inclusive of nuisance noise, dust, and odor) and will not result in any threat to the public health, safety or the environment so long as the appropriate limiting conditions are imposed and representative Best Management Practices are implemented.

Michael T. Lannan, P.E.

President

Education

B.S. Chemical Engineering
Northeastern University,
1991

M.S. Environmental
Engineering
Northeastern University,
1993

Certification

Professional Engineer:
Massachusetts
Maine

Affiliations

New England
Environmental Business
Council,
Air Quality Committee
Past Chair

Northeast Biosolids and
Residuals Association,
Board of Directors

Fiberglass Reinforced
Plastics Institute,
Board of Advisors Chair

New England
Environmental Business
Council,
Solid Waste and C & D
Committees

Water Environment
Federation, Air Quality
Committee

New England Water
Environment Association
Residuals Management
Committee

Air and Waste Management
EE-6 Odors Committee,
Past Chair

Air and Waste Management
AE-2 Odors, Solvents, and
Gases Committee

SWANA Air Quality
Committee

Michael T. Lannan is an environmental engineer with over 30 years of experience in air quality and nuisance-related issues. His work includes emissions calculations, source monitoring, air sampling, and resolving nuisance conditions for facility owners, operators, regulators, and communities. He approaches these issues from a science-based perspective, emphasizing real and potential impacts over advocacy.

He has led or contributed to hundreds of projects involving air emissions, odor, dust, and noise, and is known for efficiently identifying key concerns. Mr. Lannan has provided expert studies and testimony for dozens of solid waste facilities across the U.S. and Canada, including in Florida, Georgia, Massachusetts, New York, Maine, Vermont, and Pennsylvania. His testimony has been presented in land court, superior court, and regulatory hearings.

He has contributed to regulatory development, offering testimony to address inconsistent nuisance regulations, and created a neighborhood-based odor monitoring program that supported enforcement actions against improper composting and organic waste storage practices.

Mr. Lannan has trained staff at agencies including Allegheny County Health, Puget Sound Clean Air Agency, NHDES, MassDEP, MaineDEP, Oregon DEQ, and NYSDEC. He also trained federal personnel at a Colorado facility managing mustard gas degradation and helped develop odor thresholds and complaint protocols.

In addition to agency training, he has presented on nuisance science to regulators, operators, consultants, students, and community groups. He has served nearly 20 years on the Board of the Northeast Biosolids and Residuals Association (NEBRA), supporting responsible sludge and residuals management.

He led odor and emissions assessments for the first U.S. cow manure and food waste co-digestion energy facility using European technology and has since supported similar farm-based and food-waste-to-feed projects.

His work includes incremental noise assessments, compliance demonstrations with applicable noise standards, and noise mitigation planning. He has presented noise testimony in multiple proceedings.

Mr. Lannan regularly involves neighbors in odor, noise, dust, and other nuisance monitoring, shares data publicly, and serves as a liaison between communities and facilities to support transparent mitigation.

Mr. Lannan currently serves as a technical reviewer for the Devens Enterprise Commission, evaluating projects for compliance with Industrial Performance Standards. He identifies potential odor, air, noise, and dust concerns to support fast-track permitting and occupancy approvals—typically within 30 days.

Selected Project Experience

South Coast Renewables Transfer Station – Site Assignment Testimony. A controversial solid waste transfer station with associated municipal solid waste sludge drying operations was proposed for inclusion within an industrial park in the City of New Bedford. During an earlier permitting phase, the proponent abandoned the sludge drying component due to significant air quality and odor concerns. As a result, the surrounding neighborhood remained highly skeptical of the remaining solid waste transfer station proposal. Through formal questions and written comments, Mr. Lannan required that the proponent conduct a more rigorous evaluation of potential dust, odor, and noise impacts under a reasonable worst-case operating scenario prior to any recommendation for approval. Mr. Lannan testified as an expert in dust, noise, and odor at the site assignment hearings addressing site suitability. He presented testimony on behalf of the City directly and the neighborhood indirectly, and was cross-examined by counsel for the proponent, a representative of the neighborhood, and the New Bedford Board of Health.

Testimony on Behalf of the Town of Northbridge – Superior Court. Mr. Lannan evaluated odor and environmental impacts from a facility presented as a farm-based composting operation but effectively functioning as an illegal dump. He collaborated with local and MassDEP attorneys to build a detailed technical case. Mr. Lannan testified in Superior Court, and the court ultimately ruled against the operator, ordering the facility shut down and finding the defendant guilty of operating an illegal landfill.

Testimony for Solid Waste Addition to Construction Waste Transfer Station – Site Assignment Hearing. Mr. Lannan provided expert odor control testimony during a Site Assignment hearing for a major modification to a transfer station at the former Devens Air Force Base, a 4,400-acre mixed-use redevelopment spanning three towns. The proposal sought to shift from exclusively C&D waste to a mix including MSW. Tech conducted a site visit, reviewed the application, and recommended odor-related best practices and design improvements. Impressed with Mr. Lannan's expertise, the local board retained him for ongoing air, odor, noise, and dust reviews within the redevelopment area.

Testimony on Behalf of the Town of Northbridge – Land Court. Mr. Lannan testified in Land Court regarding a proposed in-vessel composting facility adjacent to a residential area and co-located with an existing solid waste transfer station. He identified significant odor control design deficiencies and concluded the facility had not demonstrated it could operate without causing a nuisance. He testified that it should not be approved as proposed.

Testimony for Casella Landfill Waste Expansion – Site Assignment Hearings. Mr. Lannan, on behalf of Tech Environmental, served as the air quality and odor expert during quasi-judicial hearings for the Southbridge Landfill site assignment modification. The work included review of existing air data, emissions modeling, health risk analysis, and an independent assessment of landfill cover and gas capture efficiency. His testimony supported Casella's application to accept more MSW, and the Southbridge Board of Health approved the site assignment modification.

Odor Training for Maine Department of Environmental Protection – Solid Waste Division
Mr. Lannan assisted MaineDEP in developing objective odor monitoring protocols in response to legislative requirements, including frequency and intensity scales. He provided initial training to solid waste regulators on odor assessment techniques and recently returned to deliver a refresher and introductory session for new staff. The training was well received, and MaineDEP has committed to offering it every five years moving forward.

Litigation Support for Florida Landfill – Odor Settlement Agreement. Mr. Lannan supported Waste Management's legal team in litigation involving odor concerns from a landfill expansion in southern Florida. A neighboring property owner proposed a stringent odor monitoring program as part of a settlement. Mr. Lannan identified technical flaws in the proposal, including assumptions that all odors in the industrial area originated from the landfill. He recommended revisions to the monitoring approach that addressed the neighbor's concerns while protecting Waste Management's operational flexibility.

Testimony on Behalf of the Town of Concord – Land Court. Mr. Lannan testified in Land Court regarding a proposed development located between two residential neighborhoods and adjacent to the MBTA Commuter and industrial rail lines. The development involved removal of an existing berm that currently provided natural sound attenuation. Mr. Lannan assessed the potential noise impact before and after berm removal and concluded that eliminating this feature could significantly increase noise exposure to nearby homes.

Testimony Preparation for Taunton Recycling Facility – Site Assignment Hearings. Mr. Lannan conducted odor and noise assessments for a proposed recycling facility in Taunton, incorporating input from neighboring residents into his analysis and recommendations. He developed site-specific conditions for odor and noise control that were accepted by the community. As a result, his testimony was not required at the hearing, and the conditions were adopted as part of the project's approval.

Review and Public Involvement – Municipal Landfill Arbitration, St. John's, Newfoundland
Mr. Lannan was retained as an independent expert by the City of St. John's to assess odor emissions from its downtown landfill and develop a strategy to address public concerns. His work included operational recommendations and community outreach measures aimed at building trust and reducing complaints. He presented and defended the comprehensive odor control plan in a highly public and adversarial setting, including televised proceedings.

Landfill Odor Monitoring and Training – Fitchburg, MA. Mr. Lannan assisted Waste Management with odor control at its Fitchburg landfill, located in complex terrain prone

to odor channeling. He identified terrain-related odor pathways and developed an active area management plan to minimize impacts. Additionally, he designed and conducted an odor training program for site operators, which included screening for odor sensitivity and instruction on objective monitoring techniques.

Landfill Odor Assessment – Pine Tree Landfill, Ball Ground, GA. Mr. Lannan conducted an odor assessment for Waste Management's Pine Tree Landfill, where increased landfill elevation had created a visual and odor sensitivity issue for nearby residents. He found operations were generally effective but identified odor channeling through a nearby utility corridor. As a mitigation measure, he recommended switching to a pine-scented masking agent to better align with the local environment—a change that was well received by the community.

Landfill Pretreatment and Expansion Assistance for Advanced Disposal – Moretown, VT. The Moretown landfill was in the process of expanding when they hired Mr. Lannan to complete a facility-wide odor study, an Odor Response Action Plan, state and federal air permitting, and odor and air toxics litigation support.

Nuisance Expert for the Town of Bourne Board of Health. The Integrated Solid Waste Management group as part of the Public Works Department was considering adding a landfill gas and source separated organics (SSO) biogas processing facility and power plant at the existing landfill. Mr. Lannan was hired by the Town Board of Health (BOH) to determine if there were any nuisance fatal flaws with the non-priced proposals. He developed a list of air quality, odor, noise, and dust nuisance concerns that would need to be addressed in any accepted design. Mr. Lannan served as the BOH's technical expert with respect to nuisance concerns during the pending site assignment hearing process.

Air Pollution Control Technology Assessments. Mr. Lannan has completed numerous criteria pollutant air emissions inventories and odor control technology selection processes such as Best Available Control Technology (BACT), Reasonably Achievable Control Technology (RACT), and Maximum Achievable Control Technology (MACT) assessments for both industrial and municipal sources. In each case the best alternative was selected based on the allowable cost considerations.

Northampton Landfill Odor and Risk Study. Mr. Lannan developed an odor and air toxic sampling program for a municipal landfill that had accepted construction and demolition debris fines (C&D fines) for cover material and experienced a significant spike in odor complaints. The residents were concerned that public health was at risk given the elevated odor levels. Air samples were collected from the surface with EPA approved flux chambers and sent to air laboratories for air toxics and reduced sulfur analyses. The sample results were used to calculate an emission flux across the landfill. The emission flux was used in a dispersion model to predict off-site impacts. The sampling program and results were presented to the Board of Health and to skeptical residents in a report and a public meeting format.

Fertilizer Pelletizer Air Emissions Control Assessment. Mr. Lannan developed an air emissions control assessment and permitting strategy for a sludge pelletizing operation in Lawrence, MA. The pellet emissions were high in volatile organic compounds, so thermal destruction was the preferred air pollution control alternative. A regenerative thermal oxidizer was recommended for installation.

C&D Landfill, Athens, GA, Odor, Noise and Light Litigation Support. Mr. Lannan developed a strategy to minimize exposure to a potential lawsuit that has been threaten by a neighbor of the landfill. He has completed a site visit and is in the process of evaluating all potential odorous sites in the area, (there are two other landfills within one-half of a mile from the neighbor also), and finding the maximum areas of odor potential at their existing landfill. Noise and light potential were also evaluated.

Nuisance Litigation Support and Testimony. A landfill in the northeast US was preparing for an odor nuisance lawsuit that was expected as the landfill files for its expansion. Mr. Lannan was retained to examine the current landfill with respect to odor, develop the landfill odor tolerance, demonstrate that the current landfill is not a nuisance and that the future expansion will not cause a nuisance, and to provide testimony during the suit with respect to the findings.

Solid Waste Transfer Station Site Assignment Testimony. A solid waste transfer station wanted to accept municipal solid waste in addition to its daily deliveries of construction-and demolition (C&D) waste. During the facility's site assignment hearings, Mr. Lannan performed odor modeling and presented expert testimony on odor, air toxics, and dust emissions. As a follow-up to the site assignment process, the facility was required to perform third party odor assessments at the transfer station to measure odor at the piles, outside of the building, and along the fenceline. Mr. Lannan supervises quarterly odor assessments at the facility, and has been able to demonstrate the ongoing validity of his testimony.

Moretown Vermont Landfill Odor and Health Assessment. The Moretown landfill was under significant scrutiny for gas mismanagement over a few years. The neighbors were convinced that exposure to the emissions was affecting their health. Mr. Lannan led an in-depth air quality and odor sampling and dispersion modeling study to demonstrate that state health limits were not triggered. Furthermore, he visited a number of the wastewater facilities that were providing biosolids to the landfill to determine which facilities could continue to provide material without exacerbating the situation.

Odor Regulation Development Support and Odor Training for Maine DEP. Mr. Lannan has provided advisory support to the Maine DEP as the agency creates regulations focused on response to solid waste odor concerns. In support of this effort, Mr. Lannan developed and presented a two-day course on odor science and response to solid waste regulators with the Maine DEP. The first day centered around an in-depth exploration of odor science. Various methods for quantifying odor were detailed, and Mr. Lannan led a classroom discussion about monitoring odor and pinpointing odor sources. He also provided individual odor screening for all attendees. The second day of the course took place at two offsite locations -- solid waste facilities under the jurisdiction of Maine DEP. Mr. Lannan presented attendees with bagged samples of standard odorants prepared in advance, and advised attendees on how to judge the character of each sample and how to utilize jar methods to determine odor intensity. This knowledge was then applied in the field at the facilities.

Pine Bluff Landfill Odor Nuisance Study. A Waste Management landfill near Atlanta, GA that was concerned about a potential lawsuit from its neighbors hired Mr. Lannan to complete an odor evaluation of the facility and the potential for odor from the surrounding neighborhood. He was tasked with deciphering the odor background and developing a detailed report documenting the other potential off-site sources. Mr.

Lannan studied the situation and completed a detailed report documenting the location of other potential sources and proximity to neighbors and the landfill. He identified odors and traced them back to their sources based on their individual odor character, topography, and meteorological conditions. Mr. Lannan also examined the landfill's odor potential and the potential for future development to identify the long-term odor nuisance potential for the area, as further suburban expansion occurs in the area.

Landfill Gas Sulfur Removal System. Mr. Lannan developed a sulfur reducing pretreatment system for a landfill that had accepted C&D fines. Until this project, MassDEP had recommended this procedure as part of its MassDEP closure program. He worked closely with the landfill developers and the MassDEP to develop an acceptable sulfur reducing system that could be used in this case, and as needed at other sites at the request of the MassDEP, to pretreat the landfill gas prior to combustion in a simple flare.

Air Quality and Noise Impact Analyses – Raynham, MA Transfer Station. Mr. Lannan conducted air quality, odor, and noise studies for a proposed 1,000 tpd municipal solid waste (MSW) and construction and demolition (C&D) waste transfer station in Raynham, MA, addressing issues expected during Site Assignment hearings. He prepared an emissions inventory including facility operations and truck traffic, showing particulate matter (PM) required detailed evaluation. Using EPA-approved dispersion modeling, Mr. Lannan predicted PM10 and PM2.5 concentrations at sensitive receptors, finding them well within National Ambient Air Quality Standards (NAAQS). Diesel particulate matter (DPM) from construction equipment was modeled and found to comply with EPA reference concentrations.

Odor dispersion modeling indicated the facility was properly sited and would not cause nuisance impacts at residential areas. Noise assessments considered equipment and traffic noise, ensuring compatibility with nearby land uses and supporting potential mitigation. Mr. Lannan’s studies demonstrated the project could comply with air quality, odor, and noise regulations without adversely affecting the community.

Alternative Landfill Gas Mitigation Design. Mr. Lannan developed a biological odor control system for a landfill primarily generating gas from construction waste, which emits significantly less methane than municipal waste. Because traditional flare destruction was not cost-effective for this scenario, his design incorporated an in-ground biofilter, humidification, and landfill gas dilution. This system was planned to be implemented as methane generation from municipal waste declined and construction waste gas production increased.

Employment History

2024 to present	Tech Environmental, Inc., Chelmsford, Massachusetts President
2015 to 2024	Tech Environmental, Inc., Waltham, Massachusetts President
2004 to 2015	Tech Environmental, Inc., Waltham, Massachusetts Vice President, Air Quality and Odor Control Services
2002 to 2004	Tech Environmental, Inc., Waltham, Massachusetts Associate, Air Quality and Odor Control Services
1991 to 2002	Camp Dresser and McKee, Cambridge, Massachusetts Air Quality and Odor Control Engineer, Air Quality Group Services

Papers and Presentations

Lannan, M. T. “Operational Practices for Maintaining Odor Control Systems (Carbon Adsorption).” Presented at the New England Water Environment Association Spring Meeting, May 13, 2025, Portland, ME.

Lannan, M. T. “Are Masking Agents and Counteractants Good Odor Management Technologies?” Presented at the 2023 NYWEA-NEWEA Joint Spring Meeting, June 7, 2023, Saratoga Springs, NY.

Lannan, M. T.; Mears, K., “Are Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Air Pollution?” Presented at Water Environment Federation Odor and Air Pollutants Conference May 18, 2023, Charlotte, NC.

Lannan, M. T. “Odor Control Basics Seminar.” Presented at a North East Biosolids and Residuals Association Lunch and Learn Video Conference Seminar, August 7, 2020, Hope, RI.

Lannan, M. T. “Understanding Olfactory Senses and What We Call Odor.” “Odor Control Basics Seminar. “Presented at a North East Biosolids and Residuals Association Lunch and Learn Video Conference Seminar, June 5, 2020, Hope, RI.

Lannan, M. T.; Mears, K. B., “Lean-Burn Reduces NOx, but is this Benefit a Formaldehyde Concern?” Published in *The Magazine for Environmental Managers*, A&WMA, January 2019.

Mears, K. B.; Lannan, M. T., “Permitting Small Lean-Burn Engines and How to Address Formaldehyde Exposure Concerns.” June A&WMA’s 111th Annual Conference & Exhibition, Charting the Future, Environment, Energy & Health, June 26, 2018, Hartford, CT.

Lannan, M.T.; Mears K.; Jones, T., “Wait, Why Do I need Odor Control at a Farm-Based Digester Project.” Presented at the Water Environment Federation Odor and Air Pollution 2018, May 27, 2018, Portland, OR.

Lannan, M. T., Mears K. B., Jones, T., “The Balance Between Lean Burn Anaerobic Digestion Power Production, Formaldehyde Formation, and Public Health Concerns.” Presented at the Water Environment Federation Odor and Air Pollution 2018, May 26, 2018, Portland, OR.

Lannan, M. T., “Odor Nuisance Management Strategies including Regulatory & Legal Perspectives.” Presented at the American Biogas Council and BioCycle East Coast 17: Odor Management at Anaerobic Digestion Facilities, April 4, 2017, Baltimore, MD.

Lannan, M. T., “Recycling as Food as Animal Feed” Presented at the Water Environment Federation Odor and Air Pollution 2016, March 24, 2016, Milwaukee, WI.

Lannan, M. T.: Riegert, M. R.; Shaw, J., “De-mystifying Mist Elimination.” Presented at the Water Environment Federation Odor and Air Pollution 2016, May 22, 2016, Milwaukee, WI.

Lannan, M. T., “Diverted from Composting to Animal Feed.” Presented to the Northeast Energy and Commerce Association, March 19, 2014, Boston, MA

Lannan, M. T., “What Can I do if a Solids Handling Process Smells?” Invited Speaker at the Georgia Association of Water Professionals 2013 Annual Conference and Expo, July 15, 2013, Savannah, GA.

Lannan, M. T., “Help! My Package WWTP Stinks!”, NEWEA 2013, Spring Meeting, June 4, 2013, Brewster, MA.

Lannan, M. T., “The (Food Waste) Ban is just the Beginning - The Practitioner’s Perspective.” Presented at the NEWEA-NEBRA Biosolids and Residuals Specialty Conference, October 24, 2012, Amherst, MA.

Lannan, M. T., “Dealing with Odor Concerns from Landfills to Cow Manure to Food Waste-to-Energy.” Presented at the Water Environment Federation Odor and Air Pollution 2012, April 16, 2012, Louisville, KY.

Lannan, M. T., “What Do I Do with the Displaced Air? Wastewater Collection System Odor Control Options.” NEWEA & NYWEA Joint Spring Meeting, June 6, 2011, Bolton Landing, NY.

Lannan, M. T. Cloudy with a Chance of Meatball Odors: Odor Control for Food Waste. WASTECON 2010 presented by the Solid Waste Association of North America, August 2010, Boston, MA.

Lannan, M. T., Riegert, M. R. Fundamentals of Odor Workshop. Training session presented to the Allegheny County Health Department (ACHD) Environmental Compliance May 2010, Pittsburgh, PA.

Buske, D. C.; Lannan, M. T.; Wallace, M. C.; Beaton, A. J. “Demystifying Landfill Gas Capture Efficiency.” Solid Waste Association of North American 2009 Landfill Symposium and Planning & Management Conference, June 2009, Savannah, Georgia., and Federation of New York Solid Waste Associations Conference and Trade Show, May 2009, Bolton’s Landing, New York.

Beaton, A. J.; Buske, D. C.; Lannan, M. T. “Part 363: Solid Waste Disposal Facilities – Odor, Public Health and LFG Safety Revisions.” Federation of New York Solid Waste Associations Conference and Trade Show, May 2008, Bolton’s Landing, New York.

Lannan, M. T., Riegert, M. R. March 2008. Fundamentals of Odor Workshop. Training session presented at SWANA’s 31st Annual Landfill Gas Symposium in Houston, Texas.

Lannan, M. T.; Spieler, R. J.; Buske, D. C.; Riegert, M. L.; Roland, A. R. “When is it Necessary to Remove Hydrogen Sulfide from Landfill Gas before Combustion.” Federation of New York Solid Waste Associations Conference and Trade Show, May 2007, Bolton’s Landing, New York.

Lannan, M. T., Arthur, G.L., “Fiberglass Reinforced Plastic Institute: FRP 101 and Laminate Certification” Water Environment Federation / Air and Waste Management Association 2006 Specialty Conference “Odors and Air Emissions”, April 2006, Hartford, Connecticut.

Buske, D. C.; Laurila, J. R.; Riegert, M. L.; Lannan, M. T. “Odor Impacts from Using C&D as Cover.” Federation of New York Solid Waste Associations Conference and Trade Show, May 2005, Bolton’s Landing, New York.

Lannan, M.T., D.C. Buske, and J.R. Laurila, September 2005. Health and Welfare Concerns from Landfill Gas Emissions. Presented at the 2005 Solid Waste Association of North America’s Massachusetts Chapter Meeting, Hyannis, MA.

Buske, D.C., M.T. Lannan and J.R. Laurila, March 2005. The Difference Between Health and Welfare Concerns from Landfill Gas Emissions. Presented at the 2005 Solid Waste Association of North America’s Annual Landfill Gas Symposium, San Diego, CA.

Rezendez, A., J. Occhialini and M. Lannan, April 2004. GOT SULFUR? Analytic Methods in the Odor Detection Range. Proceedings for the Specialty Conference titled “Odors and Air Emissions” of the Water Environment Federation and Air and Waste Management Association, Seattle, WA.

Buske, D.C., J.R. Laurila, M.R. Riegert and M.T. Lannan, April 2004. Landfill Cover Materials, Odor, and Human Health. Proceedings for the Specialty Conference titled “Odors and Air Emissions” of the Water Environment Federation and Air and Waste Management Association, Seattle, WA.

Lannan, M.T. August 2003. Mining, Smelting, Emissions, Dispersion, and Odor Potential. Presented to a confidential mining group near St. Louis, MO.

Lannan, M.T. July 2003. Construction and Demolition (C&D) Fines as Cover Material and Odor Potential. Presented at the Environmental Business Council’s Solid Waste Meeting, Waltham, MA.

Lannan, M.T. June 2003. Construction and Demolition (C&D) Waste and Odor Potential. Presented at the Summer Meeting of the Construction Material Recyclers Association, Westford, MA.

Lannan, M.T. June 2003. Odor Sampling Overview and Panelists. Presented at the 96th Annual Meeting of the Air & Waste Management Association, San Diego, CA.

Lannan, M.T. and D.G. Gaddis, October 2002. Multiple Odor Technology Solutions. Proceedings for the Water Environment Federation 2002 Annual Meeting, Chicago, IL.

Lannan, M.T. April 2002. Cover Processes, Ventilation and Negative Pressure. Presented at the Specialty Conference titled “Odors and Toxic Air Emissions” of the Water Environment Federation, Albuquerque, NM.

Lannan, M.T. April 2000. Biofilter Humidification Options. Presented at the Specialty Conference titled “Control of Odors and VOC Emissions” of the Water Environment Federation, Cincinnati, OH.

Lannan, M.T. and R.J. Gaudes, October 1997. An Interim Odor Prevention and Response Plan for a Wastewater Treatment Facility Under Construction. Proceedings for the Water Environment Federation 1997 Annual Meeting, Chicago, IL.

Lannan, M.T. and R.J. Gaudes, April 1997. Odor Scrubber Oxidant Comparison—Sodium Hypochlorite and Hydrogen Peroxide. Proceedings for the Specialty Conference "Control of Odors and VOC Emissions" of the Water Environment Federation, Houston, TX.

Ferro, A.R. and M.T. Lannan, April 1997. Estimating VOC Emissions from a Combined Sewer Overflow Facility. Proceedings for the Specialty Conference "Control of Odors and VOC Emissions"
of the Water Environment Federation, Houston, TX.

Serjak, E.T., April 1997. Odor Modeling: An Effective Tool for Defining the Problem, Selecting the Solution, and Conversing with the Public. Presented at the Specialty Conference "Control of Odors and VOC Emissions" of the Water Environment Federation, Houston, TX.

Lannan, M.T. and R.J. Gaudes, November 1996. Optimization of Packed Tower Performance at Nashua NH. Proceedings for the Specialty Conference "Odor Control for Municipal Biosolids Management Facility" of the New England Water Environment Association, Westford, MA.

Lannan, M.T., R.G. Simms, C.R. Johnson and E.T. Serjak, October 1996. Odor Sampling, Modeling, and Control Technology Assessment for the Kankakee Metro Wastewater Utility. Proceedings for the Water Environment Federation 1996 Annual Meeting, Dallas, TX.

Easter, C.C., M.T. Lannan and E.A. Joyce, June 1996. Odor Containment and Treatment for Sludge Thickening and Dewatering at the Allegheny County Sanitary Authority Wastewater Treatment Plant. Paper 96-MP21.03 in Proceedings of the 89th Annual Meeting of the Air & Waste Management Association, Nashville, TN.

Wallace, M.C. and R.J. Gaudes, June 1996. A Guide to Odor Emissions Sampling Methods. Presented at the 89th Annual Meeting of the Air & Waste Management Association, Nashville, TN.

Lannan, M.T. and A.R. Ferro, May 1996. Air Toxics and VOC Emission Estimating at from Wastewater Treatment Facilities. Proceedings from the 1996 New England Environmental Expo, Boston, MA.

Lannan, M.T., R.J. Gaudes and N.J. Marchese, June 1995. ALCOSAN: A Case Study for Odor Control Evaluations and Selection. Paper 95-RA111A.04 in Proceedings of the 88th Annual Meeting of the Air & Waste Management Association, San Antonio, TX.

Lannan, M.T. and E.T. Serjak, June 1994. The Sulfur Dioxide Emissions Trading Policy: Can This Market Based Approach Work for Other Pollutants? Paper 94-MP11.04 in Proceedings of the 87th Annual Meeting of the Air & Waste Management Association, Cincinnati, OH.