

617 THERAPEUTIC HEALTH CENTER

— presents to the —

Town of Millis



CANNABIS-RELATED ODOR MITIGATION AT 1073 MAIN STREET

—in—

—USDA PLANT HARDINESS ZONE 1B, ECOREGION 59B, & KOPPEN-GEIGER CLIMATE ZONE Dfb—

A HIGHLY CHARGED, COMPLEX ISSUE
WITH A PRACTICAL, VIABLE SOLUTION

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INTRODUCTION:

Millis town residents have legitimate concerns about the nuisance of odor leaking into the surrounding area as a necessary byproduct of cannabis cultivation. Creating a horticultural environment inside an industrial warehouse requires the thoughtful engineering of climate control and HVAC systems to operate properly and effectively, under demanding and stressful conditions. 617 Therapeutic Health Center understands and shares in the importance of odor mitigation in its efforts to be good representatives of and partners with the community.

Members of the Millis community and respective committees have expressed their concerns regarding odor loud and clear. This paper is intended to demonstrate not only that we share these concerns, but also that we have the experience, the know-how, and the desire to allay these fears by properly identifying the causes, discussing methods and considerations for determining odor mitigation needs, and by implementing an innovative additional step that improves airflow to more effectively corral and break-down cannabis odors to create our *Hybrid-Solution for Odor Prevention and Mitigation*.

This program combines features of both closed and open climate systems, enabling us to utilize and benefit from the best attributes of each. By creating negative air pressure, the critical component of an open system's advantage in controlling how odor is managed, in an otherwise closed-ecosystem facility, allowing for carbon dioxide enrichment and a more manageable and consistent indoor climate, we are able to head off odor problems as prevention, rather than needing to fix something as a correction. With proper calibration, this small change in air pressure, will drastically reduce the chance that cannabis odor from our facility will ever become a nuisance to the community.

Our *Hybrid-Solution for Odor Prevention and Mitigation* vision includes:

- Closed, looped ecosystem to limit exchange of air with outside
- Pressure-lock, decontamination double entryways to cultivation zone
- Intra-garden industrial charcoal scrubbers and with compatible rust and vibration resistant inline fans rated for full function when operating at 80% capacity
- Inter-room custom negative pressure system to draw air away from garden entryways and direct movement toward centralized Air Estuary for decontamination and purification
- Odor destroying UV light exposure
- Post-garden in-line ozone application
- Stress-climate calculated interplay of cooling, co-gen heating, & dehumidification systems
- Redundantly zoned, multiple gas powered chillers
- Hospital-grade back-up generators
- Centralized, independent climate monitoring with pre-defined emergency protocol triggers
- Annual climate control equipment maintenance and system audit



A. AN EXAMINATION OF CANNABIS-RELATED ODOR MITIGATION CAUSE AND EFFECT:

Successful odor containment requires an understanding of what often causes otherwise reasonable mitigation efforts to fail:

1) Inadequate Consideration for the Impact of Local Climate Extremes on Indoor Environmental Controls

Operational capacity, optimal design, and even function, as envisioned by cultivators, cannot be adequately determined without consideration for differences in regional climates. If neglected, then applying a building's design based on the operation of a facility in Colorado could mean an inability to handle the humid days of summer here in Massachusetts. Choosing equipment based on the climate in Mission Bay, SF, could result in diminished cooling capabilities in Millis. Unfortunately, this type of error, which requires equipment rating upgrades to fix, may be a leading cause behind Massachusetts RMDs experiencing odor problems from the outset. When systems are over-stressed, under powered for the facility, or pushed to their limits, odor mitigation is often compromised.

Excess room heat and humidity can over-burden HVAC systems and lead to an inefficient ability to properly contain odor on days where the equipment can't keep up with the demand. Warmer air holds more moisture. Increased moisture in the air enables odor molecules to travel farther, faster. In some cases, calculations used to determine environmental controls either under-accommodated or even neglected to account for:

- a) heat produced by photosynthesis when determining cooling requirements.
- b) the release of water vapor by plants when calculating dehumidification needs.
- c) heat produced by ballasts in addition to the infrared light produced by lamps.
- d) heat produced by dehumidification.
- e) heat produced by CO₂ generation.
- f) heat and humidity produced by an increased presence of warm-bodies.
- g) moisture produced by the storage and distribution of water related to irrigation in hydroponic-based cultivation.



2) Failure to Understand, Install, Use, or Maintain Equipment Correctly

Mis-gauging of capacity ratings for climate regulation, or improper usage of equipment leads to insufficient odor mitigation. Common mistakes include:

- a) Calculating in-line carbon filtration CFM capacity insufficiently for room size.
- b) Over compensating in a stressed system by increasing the speed of air exchange though in-line carbon systems. Resulting capacity is too powerful to properly remove odor as it passes quickly through the system.
- c) Improperly positioning fans to pull air (rather than to push air) through the filtration in closed-system carbon-based scrubbing.
- d) Fan capacity mis-gauged for pulling of air rather than pushing within closed-system.
- e) Closed-system in-room carbon filtration "scrubbing" (push) capacity insufficient due to use of in-line (pull) rating.

Proper maintenance of climate control equipment is critical to a healthy, balanced horticultural eco-system. In a properly run facility, equipment that effectively traps odor molecules before they can escape to create a nuisance in the surrounding environments is an additional critical step in preventing or removing contaminants from infecting the environment. The movement of air through in-line filters or scrubbers alike keeps plants vigorous, and reduces the instances of disease gaining exposure to the garden. Failure to adequately maintain and replace ineffective or expired equipment not only risks the exposure of odor to surrounding environments, but also puts the whole horticultural ecosystem at risk.



3) Inability to Properly Pace or Prioritize Build-out Expenditures

This type of mistake is a grievous one, because it is born of inexperience, poor decision making, or hubris. A stable climate, conducive to optimal growing, has the greatest impact on the success of a facility. Yet sometimes industry newcomers misunderstand how best to prioritize a budget or how to structure a phased build-out approach, and the cost of this inexperience can be very high.

Commercial cultivators need to resist the temptation to be easily lured toward mis-appropriating funds for cosmetically appealing but functionally irrelevant property alterations. Nor should growers risk over-spending on unproven technology if circumstances or compliance requirements don't warrant it.

The sting of poorly prioritized spending often impacts environmental engineering disproportionately. The choice to cut corners can be seen, for example, in choosing to over-reach on the capacity of a phased build-out in lieu of establishing adequate back-up and redundant climate systems. Inexperienced decision-making inevitably leads to delayed, over-budgeted, and poorly functioning facilities. This is what happened in the case of several Massachusetts RMDs whose facilities experienced mold, mildew, and odor problems following long delayed and incredibly over-budget build-outs.



B. ANALYSIS: THE CONUNDRUM OF CANNABIS-SPECIFIC, CLOSED-SYSTEM ENVIRONMENTS AND AIR PRESSURE

Most types of indoor horticulture thrive under simulation of optimal outdoor conditions. What is unique to cannabis cultivation is that the choices made to achieve this delicate balance of climate, light, water, and air has an overweight impact on a building's ability to contain the odor. The way you might design airflow to grow many other types of plants may, perhaps even by design, fail to contain smell without making additional modifications. The reason this is so is due to air pressure.

1) Negative Air Pressure of an Open System Effectively Prevents Odor Nuisance

Traditional indoor cultivation set-ups were most often designed to completely exchange or refresh the air in a room around once every 3 to 5 minutes. This is done in order to replenish depleted carbon dioxide levels that occur naturally in the air, and as all plants require for photosynthesis. In photosynthesis, plants use light energy to combine CO₂ and H₂O to form carbohydrates for storing energy. This type of system is called an *open system*, and the flow of the air, both in to and out of the garden is controlled by using pressure of a fan to pass air through filters both to keep contaminants such as insects, fungus, or bacteria from entering the environment, as well as to prevent odor from escaping.

Negative air pressure is created by pulling air out of the room at a greater capacity than it is entering the room. Thus smell is controlled by directing all airflow to be expelled from the growing environment through a series of in-line, standard industry best practices, including: carbon filtration; ozone generation within exhaust ducting to bind to and breaks down odor molecules; UV light that does the same; and odor neutralizing agents strategically placed by each entryway, the most common point of failure in any system, since air pressure is temporarily disrupted each time a door is opened.

By using negative air pressure, assuming equipment is calibrated and utilized properly, and airflow is calculated correctly, there should be no cannabis odor escaping the garden.



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2) *The Benefits of and Demand for CO₂ Enrichment, and the Emergence of State-Regulated Licensing Schemes, has Led to an Unfortunate and Unacceptable De-prioritization of Odor-Nuisance Mitigation*

As cannabis cultivation has come further into the open coupled with complex state-licensing procedures, one of the primary reasons for vigilantly and diligently attending to odor prevention — for fear of being found out, be it by law enforcement or criminals, has as of late become a threat that some people dismiss as a thing of the past. This belief has led to certain modifications to production methods which some may argue has meant prioritizing yields over privacy, safety, or security.

One of the more common modifications added at the commercial level has been the usage of carbon dioxide enrichment to increase the rate of photosynthesis as a way to improve production efficiencies. While doing this in an open system is possible, it is difficult and expensive to maintain consistent, elevated CO₂ levels in the air over extended periods of time; the air in the room is completely refreshed every few minutes. So commercial cultivators turn instead to *closed systems*. In a closed system, the climate in the garden is maintained by limiting the garden environment to as little exchange with or exposure to outside air as possible. Carbon dioxide is injected into looped climate control airflows, always returning air to the room in which it originated. Since there is no air exchange, the negative air pressure that is used to control odor in open systems is not possible.

Some cultivators also switch to closed systems in order to more easily maintain other climate factors such as temperature and humidity for indoor gardens located in areas where weather conditions can be harsh.

A closed system has the potential additional benefit of reducing risk of garden contamination by foreign microbes. This can be done by creating *positive air pressure* in the room to (in effect) seal off any potential for airborne microbes to enter from the outside.

Choosing this system however is not without consequence. For almost any other type of plant grown in an indoor environment, this is the end of the story. But with cannabis cultivation, an additional step or modification is required in order to address its uniquely odoriferous horticultural problem. Otherwise, no level of cleaning, sterilizing, or "scrubbing" the air alone, within a closed system, will sufficiently prevent odor from finding its way to the far reaches and eventually outside of the facility.



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Human movement in and out of a positive-pressure closed system facility can actually be cause that disrupts the ability to contain smell. Since the controlled air is only moved as a function of climate control, when the day's light cycle turns off on a cool night and the temperature falls below 70 degrees, dehumidification becomes inefficient, the air stagnates, "scrubbing" cannot keep pace with the saturation levels of odor molecules in the air, and the odor will billow out of the building right from the front door, each time it is opened. And even in facilities with neutral air pressure, based on the principle of *diffusion*, where molecules tend to move from areas of higher concentration to lower, the odor molecules present in the air of a closed system facility would race toward door each time someone enters or leaves.

Unfortunately, in the race to open to be first to market, even as sophisticated, modern cultivation facilities have been emerging from the shadows to begin operating publicly, shoulder to shoulder with neighboring businesses, families, and passersby, most commercial cultivation facilities in Massachusetts have not made the effort to innovate or even address continuing odor nuisance concerns until they are forced to. This is why some local cultivation facilities that are otherwise "sealed" nevertheless continue to exude a present and lingering odor as you drive by the front door. And based on physics, it will only get worse as summer approaches.



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3) *A Simple Solution and our Commitment to the Community*

Thanks to extensive knowledge and experience commercially cultivate cannabis in controlled indoors environments under a range of climate extremes, we have been able to employ a surprisingly simple fix to a problem that has confounded both cannabis cultivators and concerned citizens everywhere — taming odor by creating a hybrid ecosystem in order to neutralize its potential to negatively impact our host community.

617 Therapeutic Health Center is committed to implementing this *Hybrid-Solution for Odor Prevention and Mitigation* and vow to quickly and thoroughly resolve any related problems or concerns as they arise.

Subtle physical modifications to the environmental conditions allow us to benefit from the best elements of both closed and open ecosystems. By slightly altering air pressure within a sealed facility we can borrow a key feature of odor prevention utilized in open systems — the ability to contain odor by continually directing the movement of air without regard for whether or not other climate control systems are active. Scrubbing alone isn't enough, there must be constant and consistent, directed airflow.

Development of this combination ecosystem is in-house and based on prior experience under similar utilization. We are not applying someone else theories; our plans draw from over 15 years of commercial cannabis cultivation, including leading or participating in the design, development, and operation of 13 unique industrial facilities across a range of climates. This California-based industry-leading medical marijuana pedigree, motivated by compassion for the sick, an appreciation for cultivation as art, and improved by science, is highly regarded for its adaptability, scalability, and dedication to quality, applied learning, efficiency, and respect for community.

Having this experience, the flexibility to engineer for local climate considerations, and an *all* Massachusetts-native team, we sincerely seek to build a respectful and mutually beneficial, long-term relationship with the Millis community as much as we hope to become a model for success in the cannabis industry. Thus, we present with confidence, our desire and ability to address and resolve concerns that may arise due to our presence, including odor mitigation.



CONCLUSION

The great success stories of the fledgling Massachusetts cannabis industry have yet to be written; but when they are, we believe Millis and 617 Therapeutic Health Center will have a central role setting the standards for excellence and best practices. Faced with a challenge, our team will always choose to innovate to achieve a viable solution and thus surpass expectations set by and for those who fear trying. As a group we aim to set the industry bar for excellence, and elevate ourselves and the town of Millis through our proud partnership. And in doing so, we will demonstrate that our participation in, respect for, and creation of a positive working, and mutually beneficial relationship with the town of Millis, its people, and the surrounding communities is as important to us as is efficiently producing the finest quality cannabis.

Make no mistake... Odor problems attributed to cannabis cultivation are common, but absolutely preventable. And if a professional cannabis cultivation organization claims otherwise, or is dismissive of such concerns as typical or unavoidable, then they either lack the knowledge or the desire to work with the community to solve it.

617 Therapeutic Health Center vows that:

- *By engineering the building at 1073 Main Street with an understanding for cannabis' unique climate control demands;*
- *By properly calculating the impact of local climate extremes on environmental system controls;*
- *By ensuring that our equipment choices are based capacities to contain odor even under sustained conditions that could otherwise push lesser systems to their limits;*
- *By building in back-up systems and redundancies to ensure uninterrupted odor mitigation; and,*
- *By tirelessly innovating with a can-do attitude to fulfill and surpass the expectations we promised the Town of Millis and set for ourselves,...*

We affirm, with confidence, that we will ably prevent cannabis odors from ever becoming a nuisance to our neighbors and community.