

ABC Company

123 Street Healthy Building Audit Report

NOVEMBER 09, 2023

Dear ABC Company,

Foresight Management presents the Healthy Building Audit Report for 123 Street. We used Awair Omni devices to collect real-time data and monitor air quality for a week. The data established an IEQ baseline for your facility and determined if any HVAC system interventions are necessary.

Based on the data, the air quality at 123 Street meets the the WELL v2 Building Standard. Specifically, the levels of CO₂, tVOCs, and PM2.5 are within acceptable limits. However, if there is a desire to improve certain indoor environmental quality metrics (such as CO₂ and tVOC concentration) beyond current performance, demand-controlled ventilation strategies could be deployed. These strategies could effectively enhance air quality, especially during peak occupancy and in response to varied space usage throughout the day.

Our professional opinion is that the data does not support the theory that poor indoor air quality is causing the reported headaches. However, implementing demand-control ventilation systems would certainly align with the community transformation mission and health-forward objectives of ABC COMPANY.

We appreciate the opportunity to assist ABC COMPANY in ensuring the best possible environment for its staff, visitors, and community members. Our team is ready to discuss these recommendations in further detail and assist with the next steps towards implementation.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matthew VanSweden', with a stylized flourish extending to the right.

Matthew VanSweden, LFA

Managing Director

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Healthy Building Audit

Indoor Environmental Quality (IEQ) is a major concern for organizations that are deeply invested in community welfare and development, such as ABC COMPANY. A comprehensive understanding of IEQ is crucial as it encompasses the indoor conditions of a building — air quality, light, noise, and temperature — which directly impact the health and well-being of the occupants. Given ABC COMPANY's dedication to creating a city full of opportunities, vitality, and transformational growth, it is critical to focus on the quality of indoor environments where people live and work.

John Doe, the Facility Manager at 123 Street at the time, shared with the Foresight team that he had received some concerns from building users about potential air quality issues in the basement. Previous moisture issues in the basement, which were resolved, led to John's speculation that poor indoor air quality might be a contributor to the concerns. Rather than jumping to a conclusion and trying to solve a hypothetical problem, the Foresight team, including Matthew VanSweden and Jim Dierks, recommended deploying real-time environmental sensors to collect IEQ data to confirm if there is indeed poor air quality in the basement.

This report presents the findings from a comprehensive week-long assessment of IEQ, utilizing data from our Awair Omni devices. These devices measure an array of IEQ metrics, including temperature, humidity, light, and sound levels, carbon dioxide (CO₂), total volatile organic compounds (tVOCs), and particulate matter (PM_{2.5} and PM₁₀). The devices were strategically placed in three key areas: the back open office, from where complaints about headaches originated; the kitchen; and the garden-level open office area, which is the primary workspace for most ABC COMPANY staff. The focus was on CO₂, tVOCs, and PM_{2.5} levels, directly addressing occupant concerns related to incidences of headaches and aligning with health-focused programming by ABC COMPANY and the NAACP Grand Rapids chapter post-COVID.

Our team utilized the WELL v2 Building Standard as a best-in-class benchmark to evaluate the indoor air quality at ABC COMPANY. This standard is a performance-based system that measures, certifies, and monitors features of the built environment that impact human health and wellness. It sets strict benchmarks for IEQ metrics, including CO₂, tVOCs, and PM_{2.5}, with the goal of creating healthy spaces and promoting well-being. We used the specific thresholds outlined by WELL, which require CO₂ concentrations to be maintained below 900 ppm, tVOCs less than 700 ppm, and PM_{2.5} below 10 micrograms per cubic meter. This ensured that ABC COMPANY's facilities aligned with the highest standards for occupant health and comfort.

INDOOR ENVIRONMENTAL QUALITY METRICS

Indoor air quality is a crucial contributor to healthy IEQ, and it is important to consider because inadequate air circulation, characterized by increased CO₂ levels, can negatively affect cognitive function and cause fatigue, hindering educational and occupational pursuits. Prioritizing air quality is not only about providing comfort, but

it also creates an environment that fosters learning and productivity. Such endeavors are essential in promoting the community development ABC COMPANY aims to achieve.

Volatile Organic Compounds (VOCs) are present in many building materials and office supplies and are harmful to health. High levels of VOCs can lead to a range of negative health effects, from short-term irritation to long-term respiratory conditions. By managing VOC emissions in the workspace, we can create a healthy environment for all employees and community members. This will ensure that environmental conditions do not hinder organizational initiatives and community engagement.

Particulate matter, specifically PM2.5, refers to tiny particles or droplets in the air that are two and a half microns or less in width. Due to their minuscule size, these particles can penetrate the respiratory tract and the bloodstream, causing adverse health effects. Such pollution can significantly impact the respiratory health of staff and visitors and, by extension, affect ABC COMPANY's mission-related activities. By ensuring PM2.5 levels are kept low, ABC COMPANY can safeguard the health of those it serves, supporting its vision for a community conducive to transformative growth and vitality.

Monitoring PM2.5 is crucial to the mission of ABC COMPANY. Exposure to these fine particles can lead to respiratory health problems, such as asthma. Although asthma is a concern across various demographics, it has significant implications for public health during the COVID-19 pandemic, particularly for certain populations.

While this report has centered on CO₂, tVOCs, and PM2.5, it is reassuring to note that other IEQ metrics—lighting, acoustics, and thermal comfort—appear to meet satisfactory standards within ABC COMPANY's facilities, using the WELL Building Standard as a reference point. Although not the focus of the current analysis, maintaining these conditions is conducive to the overall mission of ABC COMPANY, ensuring an environment that fosters well-being and productivity, free from significant health risks. This comprehensive approach to monitoring IEQ supports ABC COMPANY's broader commitment to nurturing a healthful and equitable community space.

Understanding and managing these IEQ factors is not a mere commitment to comfort; it is an investment in the foundational principles of regenerative design. This design philosophy goes beyond sustainability; it is about creating environments that rejuvenate and sustain themselves while promoting social, economic, and environmental health. By integrating IEQ considerations into its operations, ABC COMPANY underlines its dedication to uplifting communities in an environmentally conscious and health-promoting manner.

For ABC COMPANY, IEQ serves as more than a benchmark for environmental stewardship; it is a tangible manifestation of its mission to transform and empower communities. The organization's commitment to IEQ reflects its resolve to address social challenges innovatively and collaboratively while ensuring sustainable and equitable growth. In doing so, ABC COMPANY advances its community-centric objectives and serves as an educational archetype, demonstrating the critical intersection of human health, environmental responsibility, and community development. IEQ becomes a vital educational touchpoint through this lens, showcasing how space design and maintenance can profoundly influence community well-being and progressive change.

CARBON DIOXIDE (CO₂)

The air quality within ABC COMPANY's operational spaces is more than a mere convenience; it reflects its deep-seated values in nurturing community potential and equalizing opportunity. Recognizing that elevated CO₂ levels are linked to diminished cognitive function and increased fatigue, there's a significant overlap with the work environment ABC COMPANY champions. Such environmental factors can severely limit an individual's ability to engage with and benefit from the organization's educational programs and entrepreneurial initiatives.

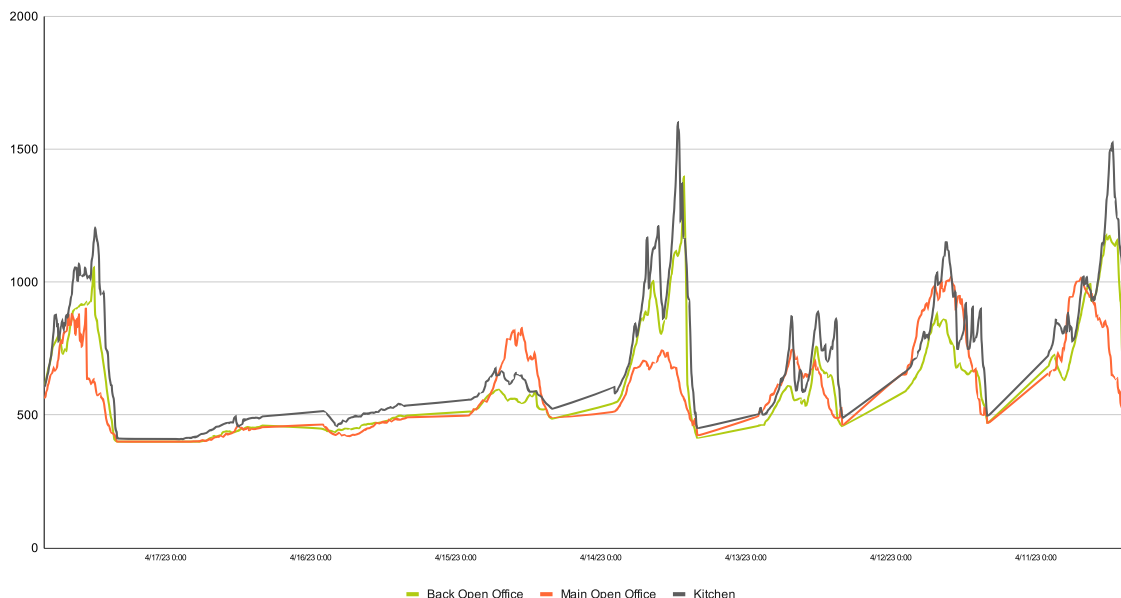
Low CO₂ levels are conducive to better health and indicate efficient energy use and building management—areas in which ABC COMPANY has vested interests. Ensuring these optimal conditions aligns with the organization's indirect advocacy for sustainability and proactive health and safety management. It underscores a commitment to creating spaces that serve their immediate functional purposes and contribute to broader community well-being.

Moreover, the negative implications of high CO₂ levels extend beyond individual discomfort, potentially resulting in a broader impact on the organization's operational effectiveness. Reduced productivity due to poor air quality can lead to slower project turnaround times and less effective program delivery. It could ultimately detract from the organization's reputation as a leader in community revitalization.

In this light, managing CO₂ levels becomes a dual-fold. It is an educational statement on the importance of environmental awareness and control, demonstrating to the wider community the tangible benefits of such vigilance. Simultaneously, it serves as an operational imperative, ensuring staff, volunteers, and community members can contribute to ABC COMPANY's mission to their full potential. This focus on air quality becomes a microcosm of the organization's larger vision—where a commitment to the minutiae of environmental management echoes the broader pursuit of equity, health, and a thriving community.

Carbon Dioxide (CO₂)

parts per million (ppm) per space over time



Insights

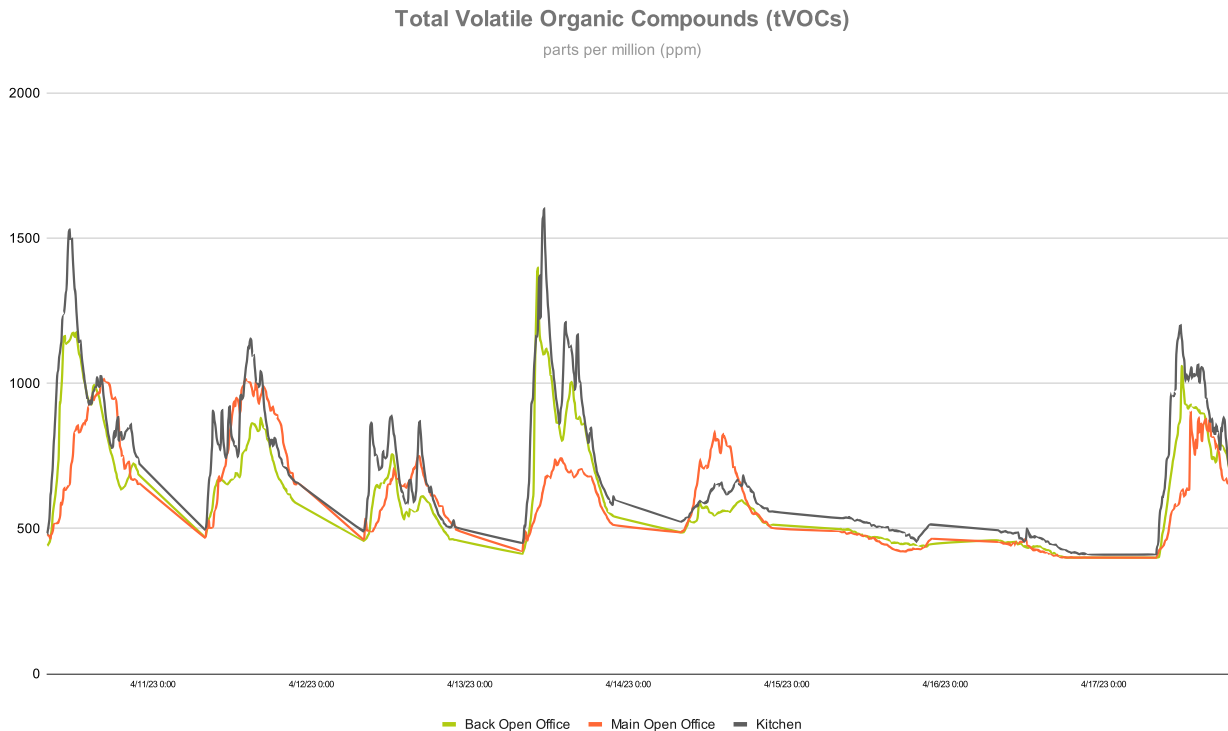
Data from our Awair devices has shown that CO2 concentrations within ABC COMPANY facilities generally adhere to the WELL Building Standard concentrations thresholds, **remaining below the recommended threshold of 900 parts per million (ppm).**

However, observations have noted CO2 spikes in the back-office space during high occupancy. These spikes are noteworthy as they coincide with peak usage times, yet they typically dissipate rapidly, indicating that the existing ventilation system is responsive and effective. **Despite this, there is room for improvement.** Implementing demand-controlled ventilation strategies can further optimize air quality, particularly during these high occupancy periods. **Adjusting ventilation based on occupancy levels could provide a more consistently controlled environment, beneficial for occupant comfort and cognitive function.** The graphic above of CO2 data points illustrates these fluctuations and the subsequent return to baseline levels, offering a visual understanding of air quality dynamics in response to occupancy.

TOTAL VOLATILE ORGANIC COMPOUNDS (TVOCs)

Volatile Organic Compounds (VOCs) are not just pollutants; they are barometers of a building's health and, by extension, the health of its occupants. In the context of ABC COMPANY, where the thrust is on fostering a conducive atmosphere for growth and learning, the management of VOCs is particularly paramount. These compounds, prevalent in everything from office supplies to furniture, can significantly degrade indoor air quality, leading to a spectrum of health concerns. Immediate effects like headaches or eye irritation can sap productivity and hinder the effective delivery of ABC COMPANY's programs. At the same time, prolonged exposure can be detrimental to long-term health outcomes, thus stymieing community progress.

The organization's proactive stance on maintaining low VOC levels speaks volumes about its commitment to creating an environment that supports physical well-being and the mental acuity required for personal and community advancement. By mitigating VOC risks, ABC COMPANY affirms its role in cultivating an environment ripe for innovation, learning, and active community engagement. This focus on air quality is a tangible expression of the organization's broader vision: to engineer spaces that are not only safe and vibrant but also equitable and sustainable—a testament to their resolve to drive forward community transformation.



Insights

Evaluating total volatile organic compounds (tVOCs) in ABC COMPANY's office spaces against the best practice level of 700 ppm, as per the WELL Building Standard, reveals **a positive outlook on air quality management**. The back open office and the main garden level office seldom experienced tVOC levels above the WELL

threshold, **doing so for only 1.8% and 0.2% of the recorded time during typical office hours, respectively.** The kitchen displayed the highest tVOC readings, a logical finding given that food preparation generates VOCs. Despite being the least occupied, **the kitchen's tVOC peaks were short-lived, suggesting that the ventilation systems perform effectively.**

Interestingly, tVOC spikes in the kitchen were mirrored in the back office space, highlighting a significant degree of air exchange between these areas. This could be attributed to their proximity and the potential mixing of air due to the supply systems not using 100% outdoor air. Despite this, tVOC concentrations in the back office space remained below the 700 ppm mark for the most part and returned to lower levels promptly, reaffirming the adequacy of fresh air supply.

The findings suggest that implementing demand-controlled ventilation could further refine the indoor air quality by adjusting airflow in response to tVOC and CO2 levels. While it is our professional opinion that the headaches reported are NOT due to poor indoor air quality, this strategy would certainly improve overall air quality, supporting ABC COMPANY's mission for a healthy and productive environment.

PARTICULATE MATTER (PM2.5)

This section explores the significance of PM2.5 — particulate matter with a diameter of less than 2.5 micrometers — and its relevance to the IEQ at ABC COMPANY. The attention to PM2.5 is rooted in its profound impact on respiratory health. These particles can penetrate the lung's alveolar region and enter the bloodstream, presenting a risk of respiratory diseases, which can be particularly acute among individuals with pre-existing conditions such as asthma.

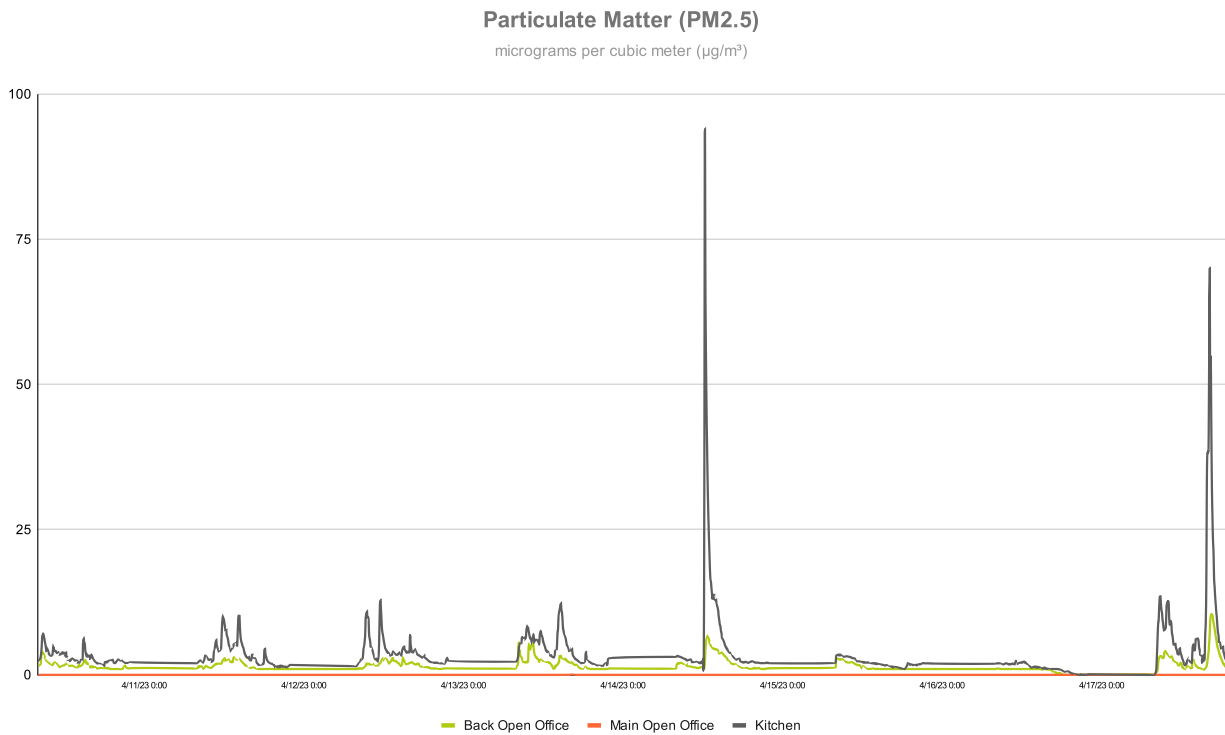
High levels of PM2.5 within ABC COMPANY's spaces would impede the organization's mission in several ways. First, it would affect the health and safety of the community members and staff, potentially increasing health-related absences and reducing overall participation in ABC COMPANY's programs. Such an impact would be more pronounced after the COVID-19 pandemic, where communities have seen disparities in respiratory health outcomes. Ensuring low levels of PM2.5 is a health imperative and a measure of community support and resilience.

Moreover, high PM2.5 levels can lead to decreased cognitive function and productivity, factors essential for learning environments and business operations. Thus, managing these particulate levels is directly connected to the organization's effectiveness in delivering educational and entrepreneurial programs.

Recognizing the capacity of PM2.5 to exacerbate health disparities, ABC COMPANY is poised to use this analysis as a steppingstone for community education on environmental health, furthering its mission to foster a sustainable and vibrant community. The following insights will detail PM2.5's implications for ABC COMPANY and offer recommendations to mitigate exposure, ensuring the organization's facilities remain a beacon of health, innovation, and opportunity.

Insights

The WELL Building Standard's highest achievement for particulate matter (PM2.5) is maintaining levels below 10 micrograms per cubic meter, a benchmark that reflects optimal air quality for health and well-being. Monitoring results show that **the air quality within both open office areas consistently stays within this ideal range, indicating the ventilation system is functioning as intended.**



The only exception to this high standard is the kitchen area, which has surpassed the threshold for PM2.5 but only marginally and infrequently—**less than 1.5% of the total measured time during occupancy.** This rare occurrence suggests that, while the kitchen's air quality is generally excellent, specific high-use instances or activities might contribute to these spikes. Nevertheless, the overall infrequency of these events and the quick return to low PM2.5 levels post-spike underscore a functioning ventilation system.

CONCLUSION

Our comprehensive analysis of specific air quality metrics using Awair Omni devices over a week-long period provided a unique insight into indoor environmental quality (IEQ) at 123 Street. The devices strategically monitored levels of CO₂, tVOCs, and PM_{2.5}, key indicators relevant to both occupant health — with particular attention to metrics that would contribute to the reported headaches — and post-pandemic health safety concerns.

The findings are reassuring: **CO₂ and tVOC levels were observed to be well within the healthy limits recommended by the WELL v2 Building Standard across office spaces.** Notably, the kitchen did show occasionally elevated tVOC levels, likely owing to cooking activities, but these instances were short-lived and infrequent. This indicates that the existing ventilation system is highly effective and able to quickly restore optimal air conditions following transient spikes.

Cross-contamination of tVOCs from the kitchen to the back-office area was detected, which may be attributed to the spaces' proximity and shared air circulation. Despite these findings, **tVOC levels in the back office rarely exceeded the threshold and dissipated swiftly, reinforcing the assessment of a generally well-ventilated environment.**

Our professional opinion, derived from the data, suggests that while the air quality within ABC COMPANY facilities is not the source of the reported headaches, the introduction of demand-controlled ventilation would be a prudent upgrade to the existing infrastructure. Such enhancements would not only preemptively address any potential IEQ-related health issues but also reinforce ABC COMPANY's commitment to providing a safe, comfortable, and productive environment, thereby advancing its transformative community work.

By pursuing these targeted ventilation system improvements, while minor, would set ABC COMPANY up to continue to exemplify best practices in facility management—beyond the pursuit of LEED v4 certification for the upstairs event space, demonstrating a commitment to the health and well-being of its occupants. The implementation of these recommendations will further ABC COMPANY's goal to co-create a regenerative, resilient community space, emphasizing its role in championing public health and mitigating disparities exacerbated by the pandemic. This level of diligence in managing IEQ is timely and aligns with global, national, regional, and local priorities on improved health outcomes, ensuring ABC COMPANY remains at the forefront of creating a health-conscious, inclusive environment.

Meet Your Team



MATTHEW VANSWEDEN, MANAGING DIRECTOR

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Matthew VanSweden has been working in the architectural design industry for nearly two decades. He has been involved in hundreds projects pursuing LEED, WELL, Living Building Challenge, Green Globes, and SITES certifications totaling over ten million square feet. His place-based work has saved his clients over \$50M and redirected almost \$100M into local economies. His architectural design background complements the expertise at Foresight Management where he brings integrative systems thinking, collaboration facilitation, and deep ecological literacy to every project.

JIM DIRKES, RETIRED COMMISSIONING AGENT

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Over Jim's long career, he specialized in helping facility owners and managers to operate their facilities at the highest performance level. He accomplished this by providing them a greater understanding of their building's performance through his energy audit, analysis, and commissioning services. With a goal of dramatically raising the cost effectiveness of both energy analysis and commissioning, he developed cutting edge technology to support the work while having a laser focus on and commitment to a teamwork philosophy which recognizes the important contribution made by all project stakeholders.



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