



## INDOOR AIR QUALITY INVESTIGATIONS

**2 PENN PLAZA  
28 LIBERTY STREET  
80 PINE STREET  
405 WEST 55<sup>TH</sup> STREET  
120 WEST 45<sup>TH</sup> STREET  
1700 BROADWAY  
250 WEST 57<sup>TH</sup> STREET  
112 WEST 34<sup>TH</sup> STREET  
501 SEVENTH AVENUE  
1400 BROADWAY  
1350 BROADWAY  
1 GRAND CENTRAL PLACE  
NEW YORK, NEW YORK**

**Prepared For:**

Mr. Steve Levine  
Atmos Air  
418 Meadow Street  
Fairfield, Connecticut 06824

**Hillmann Project Number: I4-7592**

July 20, 2017

**Your Property. Our Priority.**

**Corporate Office:** 1600 Route 22 East, Suite #107, Union, NJ 07083 (908) 688-7800 or (800) 232-4326 **Engineering Division:** New Jersey  
**Office Locations:** California, Florida, Massachusetts, New York, North Carolina, Pennsylvania, Virginia

[www.HillmannConsulting.com](http://www.HillmannConsulting.com)



July 20, 2017

Mr. Steve Levine  
Atmos Air  
418 Meadow Street  
Fairfield, Connecticut 06824

**RE: Indoor Air Quality Investigations**

2 Penn Plaza  
28 Liberty Street  
80 Pine Street  
405 W. 55<sup>th</sup> Street  
120 West 45<sup>th</sup> Street  
1350, 1400, & 1700 Broadway  
250 W. 57<sup>th</sup> Street  
112 West 34<sup>th</sup> Street  
501 Seventh Avenue  
1 Grand Central Place  
New York, New York  
Hillmann Project Number: I4-7592

Dear Mr. Levine:

Hillmann Consulting, LLC, is pleased to provide the findings of our Indoor Air Quality Investigations of the above referenced locations. This service was performed by a trained industrial hygienist using Environmental Protection Agency (EPA) and National Institute for Occupational Safety and Health (NIOSH) sampling techniques; and in general accordance with applicable industry standards.

This report is for the exclusive use of the entities named on the front cover, and no other party shall have any right to rely on any service provided by Hillmann Consulting, LLC, without prior written consent.

We appreciate the opportunity to provide environmental consulting services. If you have any questions concerning this report, or if we can assist you in any other matter, please contact the undersigned at 908-688-7800.

Very Truly Yours,  
**Hillmann Consulting, LLC**

Rachel Paterno, CMI  
Project Manager

David Song  
Project Manager

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## **1.0 EXECUTIVE SUMMARY**

### **1.1 General**

On July 13<sup>th</sup> and 14<sup>th</sup>, 2017, Ms. Rachel Paterno, CMI of Hillmann Consulting, LLC (Hillmann), conducted Preliminary Indoor Air Quality Investigations at the following locations: 2 Penn Plaza, 28 Liberty Street, 80 Pine Street, 405 W. 55<sup>th</sup> Street, 120 West 45<sup>th</sup> Street, 1350, 1400, & 1700 Broadway, 250 W. 57<sup>th</sup> Street, 112 West 34<sup>th</sup> Street, 501 Seventh Avenue, and 1 Grand Central Place, New York, New York. This was performed at the request of the client (Atmos Air) to determine if ozone levels within spaces receiving purified air from the Atmos Air systems are at acceptable levels. The survey was designed to identify common indoor air contaminants.

Hillmann's site investigator performed a visual inspection for conditions that could negatively impact indoor air quality. The investigator collected direct reading measurements of ozone levels.

### **1.2 Findings**

- Direct reading measurements of ozone were all within the applicable recommended limits and were below outdoor reference levels at all sampled locations within the above-referenced properties.

### **1.3 Conclusions and Recommendations**

Hillmann found no characteristics of the indoor air quality that could be anticipated to cause occupant illness or require immediate remediation.

Hillmann has no other recommendations at this time.

## **2.0 INTRODUCTION**

### **2.1 Purpose/Scope of Work**

On July 13<sup>th</sup> and 14<sup>th</sup>, 2017, Ms. Rachel Paterno, CMI of Hillmann Consulting, LLC (Hillmann), conducted Preliminary Indoor Air Quality Investigations at the following locations: 2 Penn Plaza, 28 Liberty Street, 80 Pine Street, 405 W. 55<sup>th</sup> Street, 120 West 45<sup>th</sup> Street, 1350, 1400, & 1700 Broadway, 250 W. 57<sup>th</sup> Street, 112 West 34<sup>th</sup> Street, 501 Seventh Avenue, and 1 Grand Central Place, New York, New York. This was performed at the request of the client (Atmos Air) to determine if ozone levels within spaces receiving purified air from the Atmos Air systems are at acceptable levels. The survey was designed to identify common indoor air contaminants.

Hillmann's site investigator performed a visual inspection for conditions that could negatively impact indoor air quality. The investigator collected direct reading measurements of ozone levels.

The inspection and sampling were performed by a trained industrial hygienist using Environmental Protection Agency (EPA) and National Institute for Occupational Safety and Health (NIOSH) sampling techniques. Samples were analyzed at an appropriately accredited laboratory. These samples, representative of a narrow time frame, were for screening purposes only and were not intended to represent definitive exposure levels.

### **2.2 List of Abbreviations**

Hillmann may use the following abbreviations and acronyms for common terminology described in our report. Not all abbreviations or acronyms may be applicable to this report:

AIHA	American Industrial Hygiene Association
ACGIH	American Conference of Governmental Industrial Hygienists
ASHRAE	American Society of Heating, Refrigeration and Air-conditioning Engineers
CDC	Centers for Disease Control
EPA	Environmental Protection Agency
NAAQS	National Ambient Air Quality Standard
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
CFU/m <sup>3</sup>	Colony-forming units per cubic meter of air
F/cc	Fibers per cubic centimeter of air
HVAC	Heating, ventilation & air-conditioning
mg/m <sup>3</sup>	Milligrams per cubic meter of air
PEL	Permissible Exposure Limit
pCi/L	Picocuries per liter of air
ppm	Parts per million
TLV	Threshold limit value
TWA	Time weighted average

## **2.3 Sampling Parameters and Methodology**

Hillmann selected the sampling parameters based on consultations with the client (Atmos Air) and our in-house experts. The industrial hygienist employed a sampling scheme that was representative of the average working environment and accounts for the entire subject space. Sampling parameters were based on common indoor air pollutants.

### **2.3.1 Ozone (O<sub>3</sub>)**

Ozone concentrations were quantified using a Gray Wolf Toxic Gas TG-501 Direct Sensing Probe. Ozone is measured in 0.01 ppm increments with a limit of detection of 0.01 ppm.

### 3.0 RESULTS

#### 3.1 Ozone Results Collected on July 13<sup>th</sup>, 2017

Indicated below are the results based upon the following parameters:

Building	Location	Time	O <sub>3</sub> (ppm)
	Target Range		< 0.10
2 Penn Plaza	6 <sup>th</sup> Floor – Open Office Space East	1020	LOD
	6 <sup>th</sup> Floor – Open Office Space West	1021	0.01
28 Liberty	30 <sup>th</sup> Floor – Open Office Space	1100	LOD
80 Pine Street	12 <sup>th</sup> Floor – Open Office Space West	1122	LOD
	12 <sup>th</sup> Floor – Open Office Space East	1124	0.02
Alvin Ailey – 405 W. 55 <sup>th</sup> Street	1 <sup>st</sup> Floor – Lobby	1235	LOD
	3 <sup>rd</sup> Floor – Office Space	1237	LOD
	Lower Level – Women’s Locker Room Area	1241	LOD
Tower 45 – 120 W. 45 <sup>th</sup> Street	1 <sup>st</sup> Floor – Lobby	1305	LOD
	28 <sup>th</sup> Floor – Corridor	1311	LOD
	10 <sup>th</sup> Floor – Outside Suite 1000B	1313	LOD
	6 <sup>th</sup> Floor – Elevator Lobby	1314	LOD
	9 <sup>th</sup> Floor – Outside Freight Elevator	1315	LOD
	Outside	1105	0.19

O<sub>3</sub>      Ozone

LOD      Limit of Detection

### 3.2 Ozone Results Collected on July 14<sup>th</sup>, 2017

Indicated below are the results based upon the following parameters:

Building	Location	Time	O <sub>3</sub> (ppm)
	Target Range		< 0.10
1700 Broadway	2 <sup>nd</sup> Floor Broadway Side	1035	LOD
	4 <sup>th</sup> Floor Open Office	1040	LOD
250 W. 57 <sup>th</sup> Street	6 <sup>th</sup> Floor – Suite 626 Reception	1105	LOD
	3 <sup>rd</sup> Floor – Suite 332 Entryway	1107	LOD
112 W. 34 <sup>th</sup> Street	12 <sup>th</sup> Floor – West Side	1140	LOD
	12 <sup>th</sup> Floor – Open Office Space East	1142	LOD
501 Seventh Avenue	5 <sup>th</sup> Floor – Suite 512	1157	LOD
	2 <sup>nd</sup> Floor – Suite 202 Reception	1200	LOD
1400 Broadway	24 <sup>th</sup> Floor – Corridor Outside Suite 2404	1215	LOD
	17 <sup>th</sup> Floor – Corridor Outside 1706	1217	LOD
	10 <sup>th</sup> Floor – Elevator Lobby	1220	LOD
1350 Broadway	7 <sup>th</sup> Floor – Corridor Outside Suite 700	1237	LOD
	14 <sup>th</sup> Floor – Corridor Outside Service Elevator	1235	LOD
	24 <sup>th</sup> Floor – Corridor Outside Stairwell A	1232	LOD
1 Grand Central Place	8 <sup>th</sup> Floor – Suite 803 – Property Mgmt. Reception	1300	LOD
	6 <sup>th</sup> Floor – Corridor Outside Utility Closet	1305	LOD
	28 <sup>th</sup> Floor – Corridor Outside Suite 2810	1310	LOD



Building	Location	Time	O <sub>3</sub> (ppm)
	Target Range		< 0.10
	21 <sup>st</sup> Floor – Corridor by Mail Slots	1313	LOD
	14 <sup>th</sup> Floor – Corridor Outside Suite 1410	1320	LOD
	14 <sup>th</sup> Floor – Corridor Outside Stair Z	1322	LOD
	Outside	-	0.06

O<sub>3</sub>      Ozone

LOD      Limit of Detection

## **4.0 DISCUSSION**

While on site, Hillmann performed air sampling and observed work conditions.

### **4.01 Ozone (O<sub>3</sub>)**

Ozone is a gas composed of three oxygen atoms. It is created at ground-level by a chemical reaction between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight. It can also be generated during welding and by office equipment such as copiers and laser printers. Motor vehicle exhaust, gasoline vapors, and chemical solvents all emit NO<sub>x</sub> and/or VOCs that may then form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant. Many urban areas tend to have high levels of ozone, but even rural areas are subject to increased ozone levels because wind can carry ozone and the pollutants that form it hundreds of miles away from their original sources.

The OSHA Permissible Exposure Limit (PEL) for Ozone is 0.10 ppm over an 8 hour work day, while the ACGIH Threshold Limit Value (TLV) ranges from 0.05 ppm to 0.10 ppm based on a person's workload.

Measured levels of ozone ranged from below the limit of detection of 0.01 ppm to 0.02 ppm and were below the recommended limits throughout the sampled subject spaces.

## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

Direct reading measurements of ozone were all within the applicable recommended limits and were below outdoor reference levels at all sampled locations within the above-referenced properties.

Hillmann found no characteristics of the indoor air quality that could be anticipated to cause occupant illness or require immediate remediation.

### **5.2 Recommendations**

Hillmann has no other recommendations at this time.

## **6.0 REFERENCES**

- American Conference of Governmental Industrial Hygienists, Guidelines for the Assessment of Bioaerosols in the Indoor Environmental, Cincinnati, Ohio, 1989.
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[http://www.osha.gov/dts/chemicalsampling/data/CH\\_242600.html](http://www.osha.gov/dts/chemicalsampling/data/CH_242600.html)