Report

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Project	Odor Migration Concern
Location	333 East 14th Street, Unit 6A-N, New York, NY 10003

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Introduction

Residents of unit 6A-N at 333 East 14th Street have reported odors and dust migrating into their master bedroom from adjacent areas for several years. Goldman Copeland (GoCo) was contracted to investigate the source of infiltration and recommend corrective actions.

Our survey determined that **air leakage through the demising wall, significant exhaust imbalances, and a lack of make-up air** create persistent negative pressure in unit 6A-N. This condition drives odors and particulates from unit 6B, and the corridor, into 6A-N.

The **only effective and durable solution** is to reconstruct the demising wall with proper barriers, apply advanced sealing, add exhaust to unit 6B, Additionally the building as whole would benefit from implementing a base-building make-up air system (ERV) to establish balanced airflow throughout the building to replace the existing inefficient and problematic corridor exhaust setup.

Analysis

Background

- Unit 6A-N was created by combining former unit 6N (kitchenette and bathroom) with unit 6A (master bedroom and bathroom) during a 2015 renovation.
- The unit shares boundaries with the corridor, elevator shaft, and adjacent unit 6B.
- Complaints are concentrated along the demising wall between 6A-N and 6B, where odors and particulates are most noticeable.

Investigation and Testing

1. Exhaust Airflow

- Unit 6A-N has four exhaust registers (kitchen, bathroom, and two in the master bath).
- Total measured exhaust = 395 CFM.
- Unit 6B has only one bathroom exhaust with 104 CFM.
- This imbalance results in strong airflow into 6A-N from surrounding spaces.

2. Tracer Smoke Test

- Smoke introduced in unit 6B migrated into 6A-N within minutes.
- PM2.5 levels spiked in 6A-N, and a visible haze formed in the bedroom.

- Electrical outlets in the demising wall were opened to observe smoke movement on both sides. On the Apartment 6B side, smoke was drawn into the wall, while on the Apartment 6A-N side, smoke was seen forcefully blowing out from the outlet opening (refer to accompanying videos).

3. Wall Inspection

Borescope inspection revealed no vapor barrier or insulation between the two units—only metal studs and an empty cavity. Debris was present at the bottom of the wall, likely leftover from construction or possibly from a section of the wall breaking off during or after construction. This debris suggests there may be missing portions of the inner wall or other open sections within the cavity. The debris also made it difficult to fully confirm gaps at the wall base; however, smoke infiltration and visible dust trails indicate that gaps are present.

4. Pressure Differentials

- Unit 6B: consistently positive relative to the corridor.
- Unit 6A-N: consistently negative, except when all exhausts were sealed and windows opened. A condition only performed for testing and not typical. Requiring sealing of exhaust openings to accomplish.
- The corridor lacks dedicated make-up air and instead has two exhaust vents. This helps keep 6B positive in relation to the corridor but 6A-N remains negative to the corridor unless the windows are opened.

5. Elevator Shaft Influence

- Because unit 6A-N surrounds the elevator shaft, openings and leakage into the shaft likely further reinforce negative pressure in the unit and would explain why this unit is more negative in pressure in relation to the hall way than 6B even with all exhaust openings shut. This is an issue we have seen before in apartments sharing a wall with an elevator shaft.

Findings

- **Unsealed demising wall** allows air, odors, and particulates to pass freely between units.
- **Severe imbalance in exhaust airflow (6A-N ~4× 6B)** exacerbates pressure differences.

- **No dedicated make-up air system**: Both apartments rely on uncontrolled window infiltration, which is unfiltered and inefficient. With the windows closed, Apartment 6A-N is under significant negative pressure while exhausting nearly 400 CFM.
- **Elevator shaft leakage** further contributes to negative pressure and uncontrolled infiltration into 6A-N

Recommended Corrective Action (Long-Term Solution)

The following integrated measures are required to permanently address the issue in unit 6A-N while also improving building-wide performance:

1. Add Dedicated Kitchen Exhaust for Unit 6B

- Install a new kitchen exhaust serving unit 6B. This exhaust should be ducted to the outside and not recirculating like it is currently. This would not only expell food odors at the source but would also expel fumes from cooking with a gas range, both of which benefit the occupent in 6B as well.
- This additional exhaust will also help lower the pressure imbalance between the two apartments.

2. Full Demolition and Reconstruction of the Demising Wall

- Completely remove the existing wall between unit 6A-N and unit 6B.
- Reseal and rebuild the wall to eliminate all uncontrolled leakage paths.
- Scope of work should include:
  - Detailed sealing of any and all penetrations with fire-rated sealant or gaskets.
  - Installation of a continuous air and vapor barrier.
  - Installation of sound attenuation matt as specified in the detail for 6A-N renovation drawings.
  - Reinstallation of drywall/plaster finishes to restore a durable, sealed separation between units.

3. Apply Sealing Technology (Aeroseal or Equivalent)

- After reconstruction, treat concealed voids and duct interfaces with an aerosol-based sealing product.
- This ensures closure of micro-gaps not visible during wall reconstruction and also mitigates the leakage to the elevator shaft.

- This approach is noninvasive requiring no demolition and has been shown to significantly improve air infiltration/exfiltration issues like this.

4. Provide Controlled Make-Up Air (Base Building Infrastructure Upgrade)

This will require an overall building study which we could provide and look into existing incentives that would assist in completing this work.

- The absence of dedicated make-up air is a core issue affecting unit 6A-N and other apartments in the building.
- Recommend landlord fully evaluate installing a make-up air system such as an Energy Recovery Ventilator (ERV) that supplies filtered and conditioned outdoor air to the corridors, recovering energy from apartment exhaust.
- Benefits:
  - Establishes a balanced pressure profile across the building.
  - Reduces reliance on uncontrolled infiltration through shafts, walls, and windows.
  - Improves indoor air quality and comfort for all tenants.
  - Provides building-wide energy efficiency gains.

  Replacing the AC unit in this apartment with a larger unit capable of bringing in and conditioning a greater amount of outside air may serve as a solution for 6A-N. This would help address immediate ventilation and comfort concerns for this apartment; however, further review of space constraints and power limitations will be required as part of a design feasibility review to determine if this option is practical.

5. Install Controllable Exhaust Dampers in 6A-N

- Add motorized dampers to the kitchen and bathroom exhausts in 6A-N.
- Connect dampers to a local wall switch, allowing residents to operate them like conventional bathroom or kitchen fans.
- Benefits:
  - Reduces continuous negative pressure in the apartment.
  - Lowers heating and cooling loads.
  - Produces significant energy savings while improving comfort.

Conclusion

The investigation confirms that air leakage and pressure imbalances are the root cause of ongoing odor and particulate infiltration into unit 6A-N.

The comprehensive and durable remedy requires:

- Addition of a kitchen exhaust in unit 6B.
- Full demolition and reconstruction of the demising wall with proper air/vapor barriers and insulation,
- Application of aerosol-based sealing to hidden voids,
- Installation of a base-building ERV make-up air system supplying outdoor air to corridors. Replacing the AC unit in this apartment with a larger unit capable of bringing in and conditioning a greater amount of outside air may be a sort term solution specifically for 6A-N
- Addition of motorized dampers to the kitchen and bathroom exhausts in 6A-N, controlled by a local wall switch for resident operation like a standard fan.

These measures will resolve the infiltration problem for 6A-N and improve comfort, indoor air quality, and energy efficiency for the entire building.

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APPENDICES

Appendix A

Exhaust Airflow Measurements

Exhaust Airflow Measurements Airflow Measurements						
Unit	Exhaust	Length (in.)	Width (in.)	Area (sq. ft.)	Velocity (ft/min)	Airflow (cfm)
	Small bathroom toilet	3.5	5.25	0.128	300	38
	Large bathroom toilet	5.5	3.25	0.124	400	50
	Large bathroom shower	9.25	3.25	0.209	350	73
	Kitchen	7.5	10	0.521	450	234
6A-N	Total					**395**
	Bathroom toilet	6	6	0.250	416	104
6B	Total					**104**

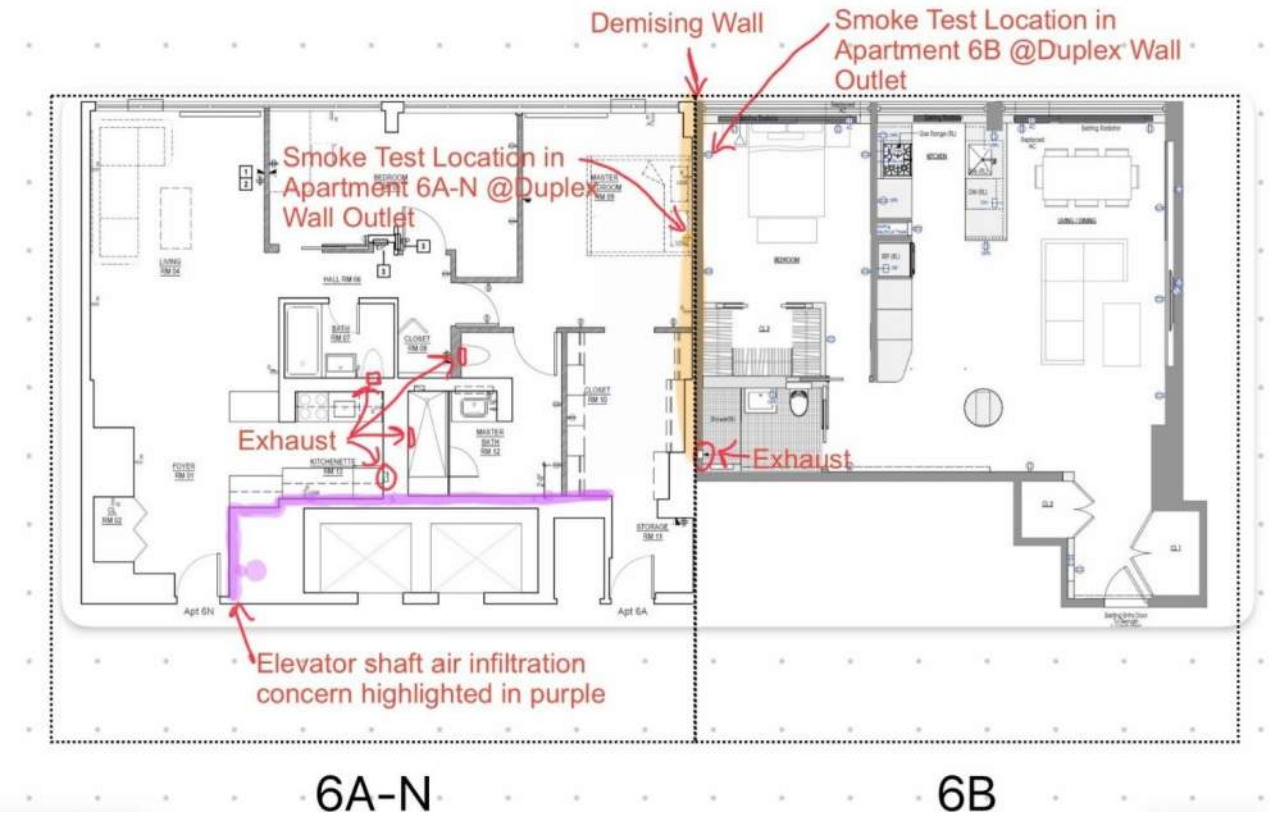
Appendix B

Differential Pressure with Respect to Corridor

Differential pressure with respect to corridor			
Unit	Windows	Conditions	DP (in. wc)
	Open		0.047
6B	Closed		0.052
	Open		0.04
	Closed		-0.0168
	Closed	AC on	-0.016
	Closed	Above conditions + large bathroom exhaust blocked	-0.005
	Closed	Above conditions + small bathroom exhaust blocked	-0.0038
6A-N	Closed	Above conditions + kitchen exhaust blocked	0.0012

Appendix C

Areas of Concern and Testing Locations



Appendix D

Photos

Figure 1Apartment 6B Smoke Exfiltration

Figure 2 Apartment 6A-N Smoke Infiltration

Figure 3- Demising Wall Borescope

Figure 4 Demising Wall Borescope Image