1.0 PROGRAM OVERVIEW

Since 1996, the Chicago Department of Aviation (CDA) has administered the Residential Sound Insulation Program (RSIP) in communities surrounding O’Hare and Midway International Airports. As one of the most extensive programs in the world, it has provided approximately $550 million in airport funds to sound-insulate 21,097 homes in the RSIPs in communities near both airports (Figure 1-1). Specifically, 10,173 homes near Chicago Midway International Airport (Midway) as depicted in Exhibit 1-1 and 10,924 homes near Chicago O’Hare International Airport (O’Hare) as depicted in Exhibit 1-2 have received sound insulation via the RSIPs under the FAA’s guidelines. In 1996, the Midway Noise Compatibility Commission (MNCC) and the O’Hare Noise Compatibility Commission (ONCC) were formed to provide input and oversight to the implementation of noise programs, including the RSIP. Both the MNCC and the ONCC have regularly scheduled meetings to discuss and make policy decisions regarding the RSIP. In addition, there are approximately 3,080 homes that remain eligible (1,650 at Midway and 1,430 at O’Hare).

Figure 1-1
SOUND-INSULATED HOMES

21,097 Homes
$550 Million

1.1 PURPOSE OF THE RSIP

The RSIP is designed to reduce the effects of aircraft noise inside the home. In compliance with Federal Aviation Administration (FAA) Advisory Circular 150/5000-9A, Guidelines for the Sound Insulation of Residences Exposed to Aircraft Operations, the noise reduction goal is as follows:

*The goal of the Program is to achieve a quieter environment and better quality of life within the homes in the highest impacted areas affected by aircraft noise.*

The noise reduction level goals of the RSIP are to reduce aircraft noise levels in residences by at least 5 decibels (dB) and to attain an interior noise level of 45 dB. By properly sound-insulating eligible homes, homeowners not only gain a quieter interior, but often also benefit from long-lasting improvements and increased efficiency in their heating and cooling utilities.
The RSIP is designed and directed by experts experienced in the use of construction techniques that have been tested and shown to be successful in minimizing interior noise.

The CDA RSIP uses a program management and construction management (PM/CM) contract to administer the RSIP and provide oversight of the construction activities in homes. This consultant is selected under City of Chicago (City) procurement policies. The current program management joint venture firm is CMC Partners. Its duties include providing staff for the RSIP call center and all inspections including inspections for odor complaints.

EXHIBIT 1-1
HOMES SOUND-INSULATED AT MIDWAY
1.2 ELIGIBILITY

To be eligible for the RSIP, a home must meet criteria including, but not limited to, the following:

1. Home’s annual day/night average sound level is equal to or greater than 65 decibels (65 DNL) within either the FAA-approved O’Hare Modernization Program (OMP) Build-Out Noise Contour or the Midway 2018 Noise Contour as defined by the FAA’s Record of Decision for the Environmental Impact Statement (2005) and the FAA’s Record of Approval for the Midway Part 150 Study Update (June 2013), respectively, except in cases of block rounding described below;

2. Home must have been constructed before September 30, 2005 for O’Hare or June 20, 2013 for Midway; and

3. Home must be on a block where an individual home is within the 65 DNL noise contour, and in such cases, homes on both sides of the street and up to the next intersection or street change are eligible.

Dwelling units can be in single-family, multi-family, or mixed use buildings. In cases of mixed use buildings, only the residential portion of the building will be sound-insulated. Sequencing of the homes is recommended by the CDA and approved by the ONCC and the MNCC. Homes are only eligible for one round of sound insulation.
1.3 FUNDING

Prior to the FAA-approved OMP Build-Out Noise Contour and Midway 2018 Noise Contour, both Programs were funded entirely by approved airport revenue sources. Currently, the FAA provides 80% of the funding using Airport Improvement Program (AIP) grants, while the City provides the remaining 20% using Passenger Facility Charges. For both sources of funds, applications are submitted and considered in accordance with procedures required by the FAA before being approved.

1.4 TYPES OF INSULATION

Once a home is enrolled in the RSIP, there are several measures that can be deployed in order to reduce aircraft noise impacts inside the home. Each home is evaluated for measures that would offer the most significant benefit and the homeowner typically selects from an option package. The most common sound insulation measures\(^1\) could include but may not be limited to:

- Acoustically-rated windows;
- Solid-core wood entry doors (known as prime doors);
- Replacement of sliding glass doors;
- Solid wood baffle through-wall air conditioner covers;
- Acoustically-rated storm doors; and
- Thermally-glazed windows in non-living spaces.

Windows for the program have to be pre certified to meet the FAA requirements for sound insulation. At least six manufacturers have provided windows through the CDA RSIP program: Sound Solutions, Republic, Harvey, Graham Architectural Products, Renewal by Andersen, and Larson. The program installs the following types of windows: double-hung, slider, casement, awning, hopper, and fixed.

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\(^1\) Work is only performed in dwelling units. Common areas of multi-family buildings such as shared laundry rooms, hallways, entrances, stairwells, etc. are not included in the RSIP.
2.0 ODOROUS WINDOWS

Prior to spring 2017, there were three complaints of odorous windows (two at Midway and one at O'Hare) of odorous windows in the twenty-year history of the programs. All three of these cases were windows provided by Sound Solutions. In spring 2017, residents began to complain of an odor emanating from windows installed under the RSIPs primarily from one manufacturer, Sound Solutions. These inquiries raised concerns for the CDA and the community.

2.1 SOUND SOLUTIONS

Sound Solutions Windows & Doors, LLC, (Sound Solutions) participated in the Midway RSIP and O'Hare RSIP as a manufacturer and general contractor under twenty-eight separate contracts with the City. Sound Solutions also provided windows for residential sound insulation programs in other cities.

2.1.1 SUSPENSION AND CLOSURE

In the summer of 2013, Sound Solutions provided vinyl windows to both general contractors that held contracts for Midway RSIP construction. Sound Solutions windows created quality assurance problems for both general contractors, which resulted in multiple quality deficiency issues including, but not limited to, failure to install storm clips on casement windows, arching of slider window frames, improper fitting of double-hung storm window sashes, window sashes that were scratching storm window frames, painted vinyl components, and other mechanical issues. The CDA addressed all quality deficiency issues in homes prior to the final signoff by the project inspectors and homeowners. In September 2013, the CDA issued a temporary suspension of pre-qualification status to Sound Solutions regarding its vinyl windows. The CDA required Sound Solutions to address its quality control issues and submit a comprehensive quality plan for CDA/RSIP review and approval. By February 2014, Sound Solutions had not demonstrated to the CDA that it had addressed its quality control issues and therefore the CDA suspension remained in place. In June 2014, Sound Solutions closed its window manufacturing facility in Chicago. For Sound Solutions Windows & Doors, LLC, the Illinois Secretary of State website (online database) states “Involuntary Dissolution” on 06/12/2015.

2.1.2 OUTSTANDING WARRANTY ISSUES

As required in the contracts for the RSIP, the window manufacturer provides a ten-year labor and material warranty for all installed windows. At the time Sound Solutions closed its business in June 2014, there were 99,377 windows in warranty at 6,357 homes. Sound Solutions has failed to honor those warranties so the CDA has addressed the warranty service for homeowners who contact the Program Office by issuing field orders to current construction contract holders. These warranty service repairs started in 2014 and are being performed on windows that have safety, security, and water penetration issues. As a result of Sound Solutions not honoring its warranties, the City is pursuing remedies with surety bond companies as provided by the general contractors that held the overall contracts for window replacement. There are Sound Solutions windows in warranty until 2024.
2.2 PRE – 2017 INQUIRIES

A Midway homeowner contacted the RSIP in April 2015 with an inquiry regarding odorous windows installed in 2011. The RSIP staff visited the home on more than one occasion and confirmed an odor in June 2015. The CDA offered to replace all of the windows previously installed by the RSIP, which the homeowner accepted via a written agreement. The CDA completed window replacement in December 2015.

A second Midway homeowner contacted the RSIP in June 2015 with an inquiry regarding odorous windows installed in 2011. The RSIP staff visited the home on three occasions between June 2015 and June 2016 and did not confirm an unusual odor from the windows. Upon visiting the home a fourth time in July 2016, the RSIP staff did confirm an odor from three windows. The CDA offered to replace those windows via a written agreement in October 2016, but the homeowner declined the offer. In August 2017 the CDA made a second offer to replace the three windows via a revised written agreement, and in September 2017 the CDA made another offer to replace all of the windows. To date, the homeowner has declined all CDA offers to replace the odorous windows.

An O'Hare homeowner contacted the RSIP in October 2015 with an inquiry regarding odorous windows installed in 2012. The RSIP visited the home on more than one occasion and confirmed an odor in November 2015. The CDA offered to replace six odorous windows previously installed by the RSIP, which the homeowners accepted via a written agreement. The CDA completed window replacement in June 2016.

At the time these homeowner concerns were raised, the CDA had completed sound insulation of approximately 8,000 homes at Midway and approximately 10,700 homes at O'Hare, therefore the CDA considered these three cases to be anomalies and did not detect a pattern based on three homes out of 18,700.

2.3 2017 INQUIRIES AND CDA ACTIONS

A Midway homeowner contacted the RSIP in March 2017 complaining of an odor coming from windows installed in her home. An inspection was conducted in early April where the odor was not detected. The homeowner was asked to call the Program Office when the odor redeveloped so the RSIP inspector could return to the home to review the odor. The subsequent inspection took place later in April and the odor was confirmed.

In April, the RSIP received phone calls from two additional homeowners on the same block as the home described above complaining of an odor coming from the windows installed in their homes. Inspections were conducted in April and May in these homes, and odor was detected in the first inspection at one home but was not detected in the other home. A second inspection was conducted at the second home in early June and an odor was confirmed. By June 2017, the CDA validated the odor in all three homes. The CDA received permission from one of the three homeowners to replace odorous windows.

In June 2017, the CDA received inquiries regarding window odor from twelve additional homeowners. In order to respond to community concerns, the CDA established an odor inspection protocol. The CDA made a commitment to replace windows in homes with confirmed odor as funds allowed.
In June, a decision was made to hire a testing firm. A firm was retained in mid-July and they recommended laboratory testing in a controlled environment, in order to identify and measure compounds being emitted from the windows. Later, after further concerns were raised by homeowners, a decision was made to also perform in home testing.

At the October 3 City Council of Chicago (City Council) Joint Committee on Aviation and Committee on Finance, Commissioner Evans reported that the CDA was taking a series of steps to identify the problem and a conservative approach to make the highest priority corrections while the problem is identified and the testing program is completed. Further, the CDA committed to provide progress reports and continued to conduct meetings and consultation with members of City Council. As the CDA learned more about the issue, the CDA agreed to continue to update the City Council.

In order to respond to requests from the City Council and the public, the CDA in October 2017 sent a letter to more than 5,000 homeowners who received Sound Solutions windows and were still in warranty as of October 11, 2017, requesting that they call the Program Office to schedule an odor inspection visit. As would be expected, the number of inquiries regarding odor coming from windows increased dramatically, and in response the CDA has implemented a robust customer call center to field questions from residents and to schedule odor inspection appointments.

As of December 15, 2017 the CDA received inquiries from 700 homeowners near Midway and 104 homeowners near O’Hare. When a homeowner calls the Program Office, the RSIP staff schedules an odor inspection. In some instances the homeowner cannot attend the scheduled inspection or was not home at the scheduled time, so the CDA reschedules those inspections. The number of initial phone calls per week was less than 5 in June and July but by November, the weekly number exceeded 25.

The CDA conducted an informal survey of airport RSIP’s around the country regarding vinyl windows. None of the airports contacted had any reports of odorous windows from Sound Solutions or any other manufacturer.²

2.4 ODOR INSPECTIONS

In consultation with Amec Foster Wheeler Environmental & Infrastructure, Inc., the City developed a protocol for conducting odorous window inspections. These inspections are being performed for all homes as requested by the homeowners regardless of when the initial sound insulation work was done in the home and regardless of window manufacturer. These inspection visits are conducted by two RSIP inspectors who review each window in the home to determine if any of the windows are emitting an odor. The inspectors are also reviewing doors to determine if there are any odors coming from any doors. The inspectors also make note of any physical or mechanical defects with the windows. If there are any safety, security, or water penetration issues with these windows, a field order is written to have these warranty repairs made.

The CDA increased the number of staff dedicated to odor inspections so that inspections are conducted in a timely manner. Exhibit 2-1 shows the number of inspections conducted as of December 15, 2017.

² CDA RSIP Survey Results, December 29, 2017
The CDA has conducted 467 odor inspections and has confirmed an odor from windows at 282 of those homes. The windows are within warranty at 192 of those locations and 90 are out of warranty.

2.4.1 Findings of the Odor Inspections

During the inspections, CMC Partners inspectors found that odors are only observed from double-hung and slider windows and those odors have been detected during all types of weather conditions over the past several months. The odor is more noticeable when the outdoor temperature is warm and the sun shines on the windows on the eastern, western, and/or southern sides of the home. In some cases during these warm and sunny conditions, the homeowners have informed us, and the CMC Partners inspectors have observed, that the odor is very noticeable when walking into certain rooms in the home.

The double-hung and slider windows consist of a prime window which has sashes consisting of an insulated glazing unit with two panes of glass and a storm window which has sashes consisting of a single pane of glass. The storm windows are installed in a configuration that covers most of the frame of the prime window. When the prime window and the storm window sashes are all in the closed position, the inspectors have noticed that the odors are building up in the air space between these sashes. Weep holes are located at the bottom of the storm windows, and they are small holes that are required to allow any moisture or humidity that may build up in the air space between the prime window and storm window to escape. Over time, these weep holes may get clogged with dirt or debris and as part of normal homeowner maintenance, this dirt and debris needs to be cleaned out. At this time it is not known if weep hole blockage contributes to the buildup of odors within the air space between the prime
window and storm window or if additional vent holes near the top of the frame could alleviate the odor buildup. Additional research is needed on this issue.

CDA has not confirmed any odors coming from the casement windows. The Sound Solutions casement windows installed as part of the RSIP are configured differently than the double-hung and slider windows. These casement windows include an insulated glazing unit and a single pane storm window, but the storm window is applied to the operable portion of the window and does not cover any part of the window frame, therefore there is no airspace similar to the double-hung and slider windows. There is no air space between the prime window frame and the storm window portion of the casement windows. The air space is located between the storm window and the insulated glazing unit in the operable portion of the window and that air space cannot be accessed from the interior of the home. Since no odors have been confirmed from the casement windows, it is the opinion of the program management, CMC Partners, that the odors are either dissipating into the outdoor atmosphere or there are no odors that are developing3.

For the RSIP program overall, the double-hung and casement windows are the most common window type installed and the other window types are used to a lesser degree. The casement, awning, hopper and fixed windows are not assembled in the same manner as the double-hung and slider windows where there is an air space between the storm window and the prime window frame.

As of December 15, 2017 the CDA received 576 inquiries for Sound Solutions windows and 131 inquiries for Harvey windows. The CDA’s inspectors confirmed an odor from seven homes with Harvey windows. Harvey continues to honor the warranties for its products, it has investigated the odor coming from its windows, and it has confirmed that odor from its windows is typical of plastic windows sold in the marketplace and stated:

“There are no adverse health risks associated with the materials of any Harvey Building Products windows supplied through the RSIP”.4

As depicted in Exhibit 2-2, there are 21,097 sound-insulated homes and 804 total inquiries with 282 of those inquiries having confirmed odorous windows.

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As depicted in Exhibit 2-3, the total homes with confirmed odorous windows is 1.3 percent of the total homes that have been sound-insulated, specifically 2.4 percent of the sound-insulated homes at Midway and 0.3 percent of the sound-insulated homes at O'Hare.
2.5 SUPPLEMENTAL AGREEMENTS FOR REPLACEMENT WINDOWS

To respond to the very serious concerns raised by citizens about potential health effects of window odors, the CDA agreed to replace windows in confirmed cases under warranty until a determination could be made if these odors are associated with adverse health impacts. To be conservative, the City offered to replace all RSIP windows in the home, not just the windows with confirmed odors. To date, the City has offered to replace windows in 87 homes (73 at Midway and 14 at O’Hare). The City committed to utilize approximately one million dollars of CDA contingency funds in the RSIP toward this effort.

In order to proceed with replacement, the CDA needs permission from the homeowner(s) and seeks that permission by execution of an agreement. Upon execution of an agreement, it takes approximately four months to complete window replacement in a home. The RSIP staff works closely with the homeowner(s) to coordinate dates for the replacement of the windows. After shipment of new custom-made windows, the contractor is able to replace the windows in each home within a two-day or three-day time period depending on the number of windows in the home. To date, over fifty Supplemental Agreements to Participate have been executed. Windows were replaced in thirteen homes so far and windows have been ordered for an additional four homes.

2.6 TESTING

The City hired an environmental expert and certified industrial hygienist consulting firm, Amec Foster Wheeler Environmental & Infrastructure, Inc. (Amec), to establish a testing program to examine the windows, determine the root cause of the odor and evaluate whether there are health hazards with the odors. Amec is conducting a comprehensive testing program consistent with industry guidelines to determine the root cause of the odorous windows. The approach includes laboratory testing of the vinyl window material to determine any compounds that could be causing the odors reported by homeowners, as well as indoor air quality (IAQ) testing of a sample set of homes. This testing was designed because many if not all compounds used to manufacture vinyl windows are used in other household products. In order to isolate odors or gases emanating solely from the windows, Amec tested the homes with the odorous windows in place, then again after new windows were installed.

This Group One testing conducted laboratory testing and indoor sampling in nine homes (which was 10 percent of the confirmed cases when testing began). For additional information regarding testing, see Amec’s report, Targeted Indoor Air Quality (IAQ) Evaluations: Replacement Acoustical Window Off-Gassing Sampling and Analysis, Sept.-Dec. 2017.

In addition, the City is proceeding with a Group Two testing by conducting indoor air quality sampling in an additional 16 homes (25 homes in total). The City anticipates conducting the Group Two testing as early as possible in 2018, but no later than August 2018. The City will consult with Amec regarding the best timing for the Group Two testing. In order to reduce the number of variables as much as possible, the City will work with the homeowners, the construction contractor, and Amec to reduce the time between the two in-home tests and to conduct the testing as close as possible to Amec’s optimum testing dates.

AMEC has recommended further assessment of conditions experienced under more extreme temperature conditions and more sampling in regard to assessing formaldehyde influences.
We will consult with them further on which of these are best conducted in laboratory tests, and which can be incorporated into the Group Two in-home tests.

Additional in-home tests (Group Three) will be conducted as a result of the Ordinance passed by City Council.

2.7 BACKGROUND OF VINYL WINDOWS

Vinyl windows are included in the RSIP specifications because other programs around the country were using vinyl windows, and the O'Hare and Midway RSIP were modeled after other existing programs. Aluminum, vinyl, and wood double-pane prime windows have similar acoustic properties and do not meet the RSIP acoustic performance requirements of Sound Transmission Class (“STC”) 40 at O'Hare and STC 44 at Midway as stand-alone products; the acoustic performance requirements are achieved by adding a storm window to the prime window. Vinyl windows used in the RSIP achieve the acoustic performance requirements by adding an aluminum storm window to the vinyl prime window and creating an integral triple-pane window unit. This is not as commonly done with wood windows. Aluminum windows can achieve similar STC ratings with an applied storm window, but they are more commonly used in commercial applications and residential buildings of five or more stories. A key reason for not using aluminum windows in a typical RSIP application in homes is that aluminum windows do not meet the International Energy Conservation Code requirements, adopted by Chicago and other municipalities surrounding O'Hare and Midway, for residential buildings of four or less stories, and most homes that participate in the RSIP are such structures.

Other reasons for using vinyl windows over aluminum or wood windows, besides their favorable acoustic and thermal properties, include:

- Prevalence of vinyl windows among residential window products and low cost
  - “Since the first vinyl windows were introduced to North America in the early 1950s, vinyl has continued to gain market share due to desirable physical properties and design versatility. Vinyl windows offer a unique blend of energy efficiency, ease of maintenance and low cost. Today vinyl windows account for 67 percent of all conventional residential windows sold in the U.S., 27.8 million windows in 2010.”
  - Data from the American Architectural Manufacturers Association (“AAMA”)/Window & Door Manufacturers Association (“WDMA”) U.S. Statistical Review and Forecast

- Strength and protection against air and water infiltration through fusion-welding of window frames and sash corners

- Imperviousness to rot, rust, corrosion, blistering, flaking and infestation by termites or other insects

5 For illustration, see the “Acoustical Guide” published by Saflex, specifically the chapter on Sound Transmission Loss Data, p. 74-80.
6 AAMA TIR-A1-0, p. 26 reiterates this statement: “To achieve STC ratings of 40 or OITC ratings of 30 and above, a dual window configuration with two sets of sash or a prime window with an exterior or interior storm panel is generally required.”
7 Based on thermal performance test report data received by RSIP from manufacturers of aluminum windows that meet the acoustic requirements.
8 AAMA Website, Vinyl Material Council Webpage: https://aamanet.org/pages/vinyl
- Resistance to attacks by fungi and mildew
- Low maintenance
- Easy cleaning
- Durability – the vast majority of vinyl windows installed over the past 25 years are still in use
- Ability to meet building codes for ignitability, flammability, heat release, burning rate, flame spread, and smoke density

### 2.8 FUNDING

The CDA will request the FAA’s approval that replacing confirmed odorous windows (whether or not in warranty) is an eligible use of airport funds. Further, the CDA will request if the scope of work (replacement of windows and other mitigation actions) required to remediate this problem is eligible to receive FAA grant funds. Potential funding sources include the following:

1. **Bond Surety** – In conjunction with the Department of Law, the CDA is pursuing remedy and cost recovery from the bond surety companies. The City will discuss potential remedy options and the implementation of those options with the bond surety companies.

2. **FAA** – In early January the CDA will send a letter to the FAA transmitting our findings to date in order to seek the FAA’s position on whether replacing these windows or other odor mitigating measures are an eligible use of airport revenue. We will also request guidance as to whether these various planned actions are in compliance with the FAA guidelines and are therefore eligible for FAA entitlement and/or discretionary grants. Finally, we will request general information on the availability of funds for this issue.

3. **Airlines** – If eligibility is confirmed but grant funds are not available, the CDA will submit letters requesting MII approval from the airlines at Midway and O’Hare.

4. **Other funding sources (non-airport funds)** – The City is evaluating options for non-airport funds including the City’s Corporate Fund.

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2.9 PUBLIC OUTREACH

The CDA is listening to its community partners and is striving to address this issue with a full commitment toward understanding the cause and implementing solutions to address this issue in a meaningful way. Table 1 lists the meetings that were held publicly to discuss the issue and listen to community concerns:

Table 1
PUBLIC MEETINGS

<table>
<thead>
<tr>
<th>#</th>
<th>MEETING</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Midway Noise Compatibility Commission (MNCC)</td>
<td>July 27, 2017</td>
</tr>
<tr>
<td>2</td>
<td>City Council of Chicago Joint Committee on Aviation and Committee on Finance</td>
<td>August 23, 2017</td>
</tr>
<tr>
<td>3</td>
<td>City Council of Chicago Joint Committee on Aviation and Committee on Finance</td>
<td>October 3, 2017</td>
</tr>
<tr>
<td>4</td>
<td>Midway Noise Compatibility Commission (MNCC)</td>
<td>October 26, 2017</td>
</tr>
<tr>
<td>5</td>
<td>City Council of Chicago Committee on Budget and Government Operations</td>
<td>October 30, 2017</td>
</tr>
<tr>
<td>6</td>
<td>City Council of Chicago Joint Committee on Aviation and Committee on Finance</td>
<td>December 11, 2017</td>
</tr>
</tbody>
</table>
3.0 CDA ACTION ITEMS

The CDA has compiled a summary of completed and pending tasks of actions related to this issue as listed below in Table 2. Additional items will be tasked as data is analyzed and conclusions reached regarding the possible cause of the odors. Our findings to date are consistent with the Illinois Department of Public Health statements in the following ways: we have narrowed the range of possible problem causes in accordance with best practices, confirmed that investigation of indoor air quality problems is not an easy task (due to the large number of variables), noted that formaldehyde is a common constituent of many household items and activities, and that, IDPH recommends increased ventilation.


Based on information regarding the benefits of increased ventilation for all types of VOCs, the CDA will utilize existing consultants and a forensic architect to conduct further evaluations and testing. We will evaluate homes that have previously had a confirmed odor to perform subjective testing (evaluation by nose) to determine how much time it takes to evacuate the odor accumulated within the air space of double-hung windows and then evaluate the time it takes for the odor to re-occur once evacuated. We will use this information to determine if there is an appropriate modification that can be made to the windows to evacuate the trapped gases to the outdoor atmosphere and eliminate the buildup of odor. The modifications may include providing additional ventilation near the top of the window and will consider alternative designs that will also limit the amount of water infiltration and noise infiltration.

A forensic architect (or Amec) will be utilized to perform destructive testing of windows with confirmed odor to isolate the many components of the windows and to try and determine which specific component is causing the odor and which may be releasing small amounts of formaldehyde. The various components of the windows to be isolated include: sealants, adhesives, extruded polyvinyl chloride (PVC) frame, balancer components, insulated glazing unit (IGU) spacer bar, and the IGU spacer bar adhesive. Each of these components will be reviewed in a laboratory in conditions similar to the window installation in a home and tested (objective) for the release of formaldehyde and inspected (subjective) for odors. Upon review of the results of the testing the forensic architect will determine if the component of the window that is causing the release of formaldehyde or odor can be replaced as a potential remedy.

We will work further with Amec to determine if sample odorous windows can be deconstructed in an effort to try to identify the compound causing the odor and further eliminate possible causes of the odor. We will also request Amec to perform further laboratory tests of additional window units with confirmed odors as well as non-odorous vinyl windows.

CDA's practice has been to give homeowners a choice on which type of window is installed. Typically, they choose the same type of window they currently have in their home. For future RSIP installations, including the window replacements for future in home testing, the CDA will provide information on the possibility of accumulated odorous gases in the double hung windows to homeowners, so homeowners can make an informed choice.
## CDA ACTION ITEMS

<table>
<thead>
<tr>
<th>#</th>
<th>CDA ACTION ITEMS</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Establish a Robust Customer Call Center for Residents</td>
<td>Completed</td>
</tr>
<tr>
<td>2</td>
<td>Establish an Odor Inspection Protocol</td>
<td>Completed</td>
</tr>
<tr>
<td>3</td>
<td>Task an Industry Expert to Determine Cause of the Odor and Assess Potential Health Impacts</td>
<td>In-Process</td>
</tr>
<tr>
<td>4</td>
<td>Report First Round of Test Results (9 homes)</td>
<td>December 2017</td>
</tr>
<tr>
<td>5</td>
<td>Request guidance on compliance with FAA guidance for RSIPs and eligibility for FAA entitlement and/or discretionary grants</td>
<td>January 2018</td>
</tr>
<tr>
<td>6</td>
<td>Report on Second Round of Test Results (Additional 16 homes)</td>
<td>As soon as possible, but no later than August 2018</td>
</tr>
<tr>
<td>7</td>
<td>Report on Third Round of Test Results</td>
<td>TBD</td>
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<tr>
<td>8</td>
<td>Letter to more than 5,000 RSIP participants at Midway and O'Hare who received Sound Solutions Windows and are still in warranty</td>
<td>Completed</td>
</tr>
<tr>
<td>9</td>
<td>Increased Staff Size Dedicated to Odor Inspections to Respond More Quickly to Residents (from 1 to 8 full-time staff)</td>
<td>Completed</td>
</tr>
<tr>
<td>10</td>
<td>Maintain Communication with Aldermen Quinn, Zalewski and Burke as well as Congressman Lipinski.</td>
<td>On-Going</td>
</tr>
<tr>
<td>11</td>
<td>Participate in Briefings and Public Forums</td>
<td>2 MNCC Meetings 3 Public Hearings</td>
</tr>
<tr>
<td>12</td>
<td>Weekly Updates to Elected Officials</td>
<td>On-going</td>
</tr>
<tr>
<td>13</td>
<td>Require financial pre-qualifications and bonds from window manufacturers in future RSIP construction contracts</td>
<td>In-Process</td>
</tr>
<tr>
<td>14</td>
<td>Evaluate findings from Amec tests and CMC inspections and prepare detailed plans for additional testing focused on temperature, formaldehyde, and identification of the cause of the odors.</td>
<td>January 2018</td>
</tr>
<tr>
<td>15</td>
<td>Consultations with the Dept. of Law and construction contract bond sureties</td>
<td>In-Process</td>
</tr>
</tbody>
</table>
RSIP VINYL WINDOWS
AIRPORT SURVEY RESULTS SUMMARY

In order to complete the proper amount of due diligence and research, the CDA conducted an informal survey of airport RSIP’s around the country regarding vinyl windows. All seven airports surveyed used vinyl windows as a part of their RSIP. None of the airports contacted had any reports of odorous windows from Sound Solutions or any other manufacturer. Five of the seven airports have used Sound Solutions as a part of their RSIP. Three of the airports were located in consistently warmer climates.

<table>
<thead>
<tr>
<th>#</th>
<th>INSTALL VINYL WINDOWS</th>
<th>RECEIVED ODOR INQUIRIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport 1*</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Airport 2*</td>
<td>YES</td>
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</tr>
<tr>
<td>Airport 3*</td>
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<td>NO</td>
</tr>
<tr>
<td>Airport 4</td>
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<td>NO</td>
</tr>
<tr>
<td>Airport 5</td>
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</tr>
<tr>
<td>Airport 6*</td>
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<td>NO</td>
</tr>
<tr>
<td>Airport 7*</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

* Airport used Sound Solutions windows as a part of its RSIP.
December 29, 2017

Aaron J. Frame
Chicago Department of Aviation
10510 W. Zemke Road
Chicago, IL 60666

Subject: Odor Inspection Observation

Dear Mr. Frame,

Since March 2017 we have been conducting odor inspection visits at the request of homeowners complaining of odors coming from Sound Solutions windows installed as part of the Residential Sound Insulation Program (RSIP). Over this time period we have made some observations during these inspections and I would like to document these observations.

Our inspectors found that odors are only observed from double-hung and slider windows and those odors have been detected during all types of weather conditions over the past several months. The odor is more noticeable when the outdoor temperature is warm and the sun shines on the windows in the east, west, or southern side of the home. In some cases during these warm and sunny conditions, the homeowners have informed us, and we have observed, that the odor is very noticeable when walking into certain rooms in the home.

The double-hung and slider windows consist of a prime window which has sashes consisting of an insulated glazing unit with two panes of glass and a storm window which has sashes consisting of a single pane of glass. The storm windows are installed in a configuration that covers most of the frame of the prime window. When the prime window and the storm window sashes are all in the closed position, the inspectors have noticed that the odors are building up in the air space between these sashes. Weep holes are located at the bottom of the storm windows, which are small holes that are required to allow any moisture or humidity that may build up in the air space between the prime window and storm window to escape. Over time, these weep holes may get clogged with dirt or debris and as part of normal homeowner maintenance, this dirt and debris needs to be cleaned out. At this time it is not known if weep hole blockage contributes to the buildup of odors within the air space between the prime window and storm window.

The Sound Solutions casement windows installed as part of the RSIP are configured differently than the double-hung and slider windows, and our inspectors have not confirmed odors coming from the casement windows. These casement windows include an insulated glazing unit and a single pane storm window, but the storm window is applied to the operable portion of the window and does not cover any part of the window frame, therefore there is no airspace similar to the double-hung and slider windows. There is no air space between the prime window frame and the storm window portion of the casement windows. The air space is located between the storm window and the insulated glazing unit in the operable portion of the window and that air space cannot be accessed from the interior of the home. Since no odors have been confirmed from the casement windows, we believe the odors are either dissipating into the outdoor atmosphere or there are no odors that are developing.
These observations indicate that the odors are developing in the double-hung windows and slider windows and are not developing in casement windows or any other type of treatments installed as part of the RSIP. We continue to conduct odorous window inspections and will keep you informed of any other types of observations or if the observations indicate odors coming from any other treatments installed as part of the RSIP.

Sincerely,

Doug Blanchard
Program Director

DB/jw