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COVID-19 RELATED ENVIRONMENTAL/ENGINEERING PROTOCOLS & A PLAN SERVICES

CUNY-WIDE – ALL FIVE BOROUGHS

PROJECT NO.: CA-CUCF-02-20ENG

SUMMARY REPORT FOR: Baruch College

**COVID-19 RELATED ENVIRONMENTAL/ENGINEERING
PROTOCOLS & IMPLEMENTATION PLAN SERVICES CUNY-
WIDE – ALL FIVE BOROUGHS
PROJECT NO.: CA-CUCF-02-20ENG**

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1. Executive Summary

Ramboll Americas Engineering Solutions (Ramboll) was retained by the City University Construction Fund (CUCF) on behalf of the City University of New York (CUNY) Office of Facilities Planning, Construction and Management (FPCM) to provide as-needed services related to the subject Project, Covid-19 Related Environmental Engineering Protocol & Implementation Plan Services. Ramboll was engaged through an Engineering Design Services Contract that Ramboll holds with CUCF.

Ramboll's role in this assignment was to provide CUNY with advice and consultation. The objective was to define program-level options available to CUNY associated with performance and operation of building ventilation systems in order to reduce the risk of airborne exposure to SARS-CoV-2, the virus that causes COVID-19.

The project's focus was on defining a screening process to allow campuses to prioritize buildings for in-person learning. There were two critical criteria that became the focus of the screening process, building importance for in-person learning and ventilation system performance. From an importance perspective, buildings were assigned by campuses into three tiers; Tier 1: essential buildings, Tier 2: important buildings, Tier 3: buildings that are non-essential for academic activities.

From a performance perspective, campuses ranked the condition of the building ventilation systems into three categories: new, functional, and inadequate. A structured questionnaire was developed by Ramboll for the campus building staff to use for assessing the building HVAC systems against guidelines promulgated by the US Centers for Disease Control and Prevention (CDC), specifically to reduce the risk of airborne transmission of SARS-CoV-2.

The program was implemented using three sequential screening processes: campus self-evaluation, campus interviews, and campus visits. Each step in the process was intended to validate and/or correct the results of the prior process.

The list of specific campus buildings identified as Tier 1 and which appear to comply with a sufficient subset of the CDC guidelines to limit the risk of airborne transmission of the virus are listed in Section 3; these buildings can be used for in-person learning. It must be noted the data represents the status of each building at a moment in time. That status can change based on equipment performance, operational problems, or issues related to routine maintenance.

The assessment identified several common strategies campus managers implemented in advance of the program. These strategies included many of the recommendations in the CDC guidelines and were implemented with direction provided by FPCM. Most campuses reported that they have inspected equipment, replaced filters, increased outside air exchange, and extended the operating time of their ventilation systems. In some instances, campuses had installed supplemental air cleaning equipment, such as portable HEPA filtration units or UVC fixtures, for select locations in buildings. The interviews with campus managers established that all had excellent knowledge of their systems, familiarity with CDC guidelines, and were actively implementing measures to improve ventilation and filtration in their buildings.

2. Scope & Approach

2.1 Background

The scope established that the safety of the CUNY community is the project's highest priority. It stated that the impact of the COVID-19 pandemic had intensified efforts to ensure a safe reopening and reoccupation of the CUNY college campuses and facilities.

2.2 Scope

FPCM engaged Ramboll on an as-needed, as-directed basis, to prepare documents, materials, analyses, and services which included:

- Develop a comprehensive approach and plan particularly with respect to ventilation and filtration issues that related to standards/protocols and guidelines/industry practices pertinent to reducing the risk of airborne transmission of SARS-CoV-2, the virus that causes COVID-19;
- Prepare a ventilation risk-assessment matrix based upon engineering and environmental methodologies;
- Develop building survey checklists for use in conducting facility assessments;
- Collect and report on findings from surveys and field inspections;
- Assist in planning, managing, and developing required reporting;
- Support FPCM with communications to University employees, faculty, and students.

2.3 Approach

The project approach was based on defining a process to allow campuses to identify buildings suitable for in-person learning. The process focused on building ventilation systems and other ventilation measures to determine if they operate in a manner that would reduce the spread of COVID-19 in accordance with CDC guidelines.

A screening process was created to prioritize each building with regard to its necessity for in-person learning. In addition, a condition assessment of the ventilation system was assigned based on recommendations that conform to CDC guidelines. This screening process defines those buildings essential to in-person learning and allows resources to be targeted to where they are needed.

Given that the buildings being reviewed are constantly undergoing improvement and changes, it was understood that the screening process will represent the status of a building at a moment in time. The project included guidance on measures to be considered, guidelines to be referenced, and best practices to be followed. All of these support measures were intended to provide the individual campus's resources to complement and support their existing efforts.

2.4 Management

The project work was performed remotely through video conferencing and review of written materials provided by CUNY. The project did not require Ramboll personnel to perform field work, campus visits, or onsite meetings. Ramboll managed meeting agendas to ensure CUNY's scope of work for this assignment was addressed. As described below, on-site visits were conducted by a third-party FPCM vendor pursuant to a scope of work developed by Ramboll as part of this overall assessment program.

During the execution of the project the scope was refined, and the objectives sharpened. Early in the project it was agreed the primary need was to define a screening process to allow FPCM to identify those buildings critical to each campus for in person learning. Ramboll created and executed a layered approach to screen the CUNY buildings to those essential for return to campus. Once those essential buildings were identified, Ramboll received and documented third party field inspections defining the condition of the buildings.

3. Assessment & Survey

3.1 Assessment Scope

The primary focus of the project was to define a system-wide approach to identify CUNY’s essential buildings and determine if they achieve a sufficient subset of the CDC guidelines to limit the risk of airborne transmission of SARS-CoV-2. In addition to defining the program, the project provided guidance on how the CDC guidelines should be interpreted and implemented as part of a layered approach to mitigating the risk of airborne transmission of the virus.

3.2 Buildings Surveyed

Records provided by FPCM identified all structures and buildings on a campus. When the records were reviewed and non-occupied structures, such as utility tunnels and outdoor spaces, were removed, a final list of occupied structures on a campus was established. A list of the buildings on this campus is shown in Table 1: Campus Buildings.

Table 1: Campus Buildings

Building Name
ADMINISTRATIVE BUILDING
ANNEX
EARLY LEARNING CENTER
INFORMATION & TECHNOLOGY BUILDING
LAWRENCE AND ERIS FIELD BUILDING
NEWMAN VERTICAL CAMPUS
PRESIDENT RESIDENCE
STEVEN NEWMAN HALL
STUDENT CENTER

3.3 Guidance Standards

Ramboll performed its building-level assessment pursuant to guidance issued by the CDC. The CDC guidance was developed to apply to as many different kinds of buildings as possible. Therefore, the guidance specifically notes that “not all interventions will work in all scenarios.” For example, the CDC guidance indicates that filtration on central HVAC systems should be increased to the maximum extent possible without reducing air flow, which depends on the system requirements; the guidelines do not specify a particular type or degree of filtration (i.e., MERV rating). The ventilation and filtration guidelines are also meant to be applied in conjunction with other infection risk mitigation measures, including implementing policies to encourage physical distancing, mask use, and adherence to good hygiene practices.¹

The CDC recommends that facility operators adopt a layered approach to COVID-19 transmission mitigation and suggests that facility operators “consider using some or all of [its list of control measures] tools to improve ventilation”. These control measures and the CDC guidance form the basis of the ventilation assessment planned and conducted by Ramboll.

¹ <https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html>, accessed June 30, 2021

The control measures recommended by CDC provide qualitative measures of ventilation and filtration adequacy. It should be noted that compliance with CDC guidelines does not require testing to any underlying standard. Compliance with the CDC guidelines is a subjective assessment and is left to the experience and judgment of the building operators and professional staff. However, there are a number of quantitative standards that do not conflict guidance from CDC and support the CDC guidelines. For example, standards from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) define ventilation rates and the performance of filters, measures found in the CDC guidelines.

3.4 Screening Questionnaire

Rather than utilizing existing information about building use and condition, it was decided to survey all campuses with a questionnaire tailored to COVID-19-related ventilation issues. The questionnaire included confirming base-building information about age, size, and use, but also included specifics about the type of ventilation system, quantity of air-handling units, outdoor air-exchange systems, and general conditions.

Within the questionnaire there were two critical criteria; one related to the importance of the building to in-person learning, and the other defined the ventilation systems performance.

From an importance perspective, buildings were divided into three tiers. The tiers assist in prioritizing the planned opening of campus buildings based on their conditions determined by the facility operators:

- Tier 1: are essential buildings that must be opened for in-person learning, such as. - buildings that house lecture halls, classrooms, laboratories etc.
- Tier 2: are important buildings that are critical to a certain extent, i.e., buildings that could be partially occupied for academic activities.
- Tier 3: are buildings that are non-essential for academic activities. Non-essential buildings will re-open after pandemic restrictions are withdrawn. These buildings consist of general and administrative offices.

From a performance perspective, campuses identified ventilation systems in three categories based on the functionality and condition of HVAC systems as determined by the facility maintenance and operating staff:

- New: are buildings that have relatively new HVAC systems that are capable of fulfilling the ventilation demand placed by CDC guidelines.
- Functional: are buildings that have HVAC systems that are functional, but will require follow-up verification or minor improvements. Functional category buildings will require thorough evaluation prior to occupancy.
- Inadequate: are buildings that have HVAC systems that do not meet CDC guidelines. These buildings will require thorough evaluation of the HVAC systems and possibly renovations or rehabilitation prior to occupancy.

3.5 Screening Processes

The building assessment consisted of three sequential screening processes. Each process was executed by a separate group. In this manner, the data provided could be validated and verified. The three assessment processes included:

- Campus Self-Assessment
- Campus Interviews / Response Validation
- Campus Visits / Response Validation

3.5.1 Campus Self-Assessment

This initial phase consisted of issuing the Screening Questionnaire to each campus. The questionnaire was customized for each campus and listed all known buildings based on FPCM's list. The campus facilities staff were asked to provide responses to all questions for all buildings. The questionnaire provided the opportunity to identify buildings not listed, or to add building-specific comments.

3.5.2 Campus Interviews / Response Validation

After receiving the completed Screening Questionnaire, Ramboll attended interviews with campus and FPCM staff to learn more about the campus responses, to revise building categories as appropriate, and to hear about any issues campuses had pertaining to building or ventilation-system operation or ventilation measures. The focus of these calls was the Tier 1 buildings, specifically those with HVAC systems identified as New or Functional. The objective of these interviews was to confirm that the correct criteria were applied, to ensure buildings were correctly represented, and to discuss any campus needs related to the Tier 1 buildings.

3.5.3 Campus Visits / Response Validation

After campus interviews were completed, Ramboll and CUNY developed a scope of work for site visits to verify the information obtained through the campus surveys and interviews. The site-visit scope of work included confirming accuracy of the initial information collected from the campuses. If the site visit results suggested the mechanical ventilation systems were not operating properly or adjustments or improvements were necessary, the validation process provided an opportunity to determine what other measures were necessary and feasible to improve the building ventilation systems.

To verify the information provided by campuses and to allow another independent perspective, site visits were conducted independently by the Willdan Group (Willdan). Willdan conducted site visits with campus and central office engineering staff.

4. Assessment Results

4.1 Summary

The assessment program was structured to provide a methodical process that would identify the condition of the ventilation system within essential CUNY buildings. The implementation of the program used three separate screening processes. Based on the overall level of agreement between the results of sequential screening processes that relied on separate groups of consultants, the assessment data were regarded as accurate.

In addition to the information collected through questionnaires, interviews and site visits, the assessment program identified several common strategies implemented by campus managers. These strategies included many of the recommendations in the CDC guidelines and were implemented with direction provided by FPCM.

Most campuses reported having inspected equipment, improved air filtration, increased outside air exchange, and extended system operating times. Conversations with campus managers established that all had excellent knowledge of their systems, familiarity with the CDC guidelines, and were actively implementing measures to improve air quality.

4.2 Available Buildings

The following is a list of specific campus buildings and which appear to comply with a sufficient subset of the CDC guidelines and can be used for in-person learning. These buildings are identified in Table 2: Available Buildings.

Table 2: Available Buildings

Building Name
ADMINISTRATIVE BUILDING
INFORMATION & TECHNOLOGY BUILDING
LAWRENCE AND ERIS FIELD BUILDING
NEWMAN VERTICAL CAMPUS
STEVEN NEWMAN HALL
EARLY LEARNING CENTER
STUDENT CENTER
ANNEX