925 MAIN STREET WEST

HAMILTON, ON

PEDESTRIAN WIND TUNNEL STUDY REPORT

GNOBI #420024

JUNE 9, 2026

PREPARED BY

Kelly Baah, M.Eng., P.Eng.
Director | Principal Engineer
Kelly.baah@gnobiconsulting.com

Gnobi Consulting Inc.
Wind & Microclimate Engineers
D: 519-400-4996
www.gnobiconsulting.com

PREPARED FOR

Mr. David Horwood
dh@efforttrust.ca

Effort Trust c/o
50 King St E,
Hamilton, ON
L8N 1A6

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1. INTRODUCTION

Gnobi Consulting Inc. was retained by Effort Trust to undertake a pedestrian wind tunnel study for the proposed residential development at 925 Main Street West and 150 Longwood Road South in Hamilton, Ontario. A previous assessment of an earlier design iteration was completed in November 2024, with findings documented in a report dated November 20, 2024. Since then, the proposed design has been revised, necessitating a reassessment of pedestrian-level wind conditions for the current scheme.

This report presents the updated assessment, including the study methodology, results, and recommendations for wind mitigation measures, where required.

1.1. Project Overview

The proposed development consists of a mixed-use building comprising two towers (Towers A and B) with heights of 29 and 26 storeys, respectively. The towers are connected by a six-storey podium incorporating outdoor amenity space. A five-storey podium element is proposed to the east of Tower A, with an approximate setback of 12 m. A setback of approximately 3 m is provided along the north elevation of both towers. The site is located at 925 Main Street West and 150 Longwood Road South in Hamilton, Ontario. It occupies an irregularly shaped parcel with a total gross floor area of approximately 33,454 m². The surrounding context is predominantly low-rise, consisting of residential and commercial uses, with two mid-rise residential buildings (approximately 12 storeys) located immediately southwest of the site. Key pedestrian areas considered in this assessment include primary building entrances at grade, amenity spaces at and above grade, and adjacent public sidewalks.

Image 1: Aerial View of the Proposed Site, Source: Google Earth ™.

Image 2A: 3D Rendering of the Proposed Project by KNYMH Inc.

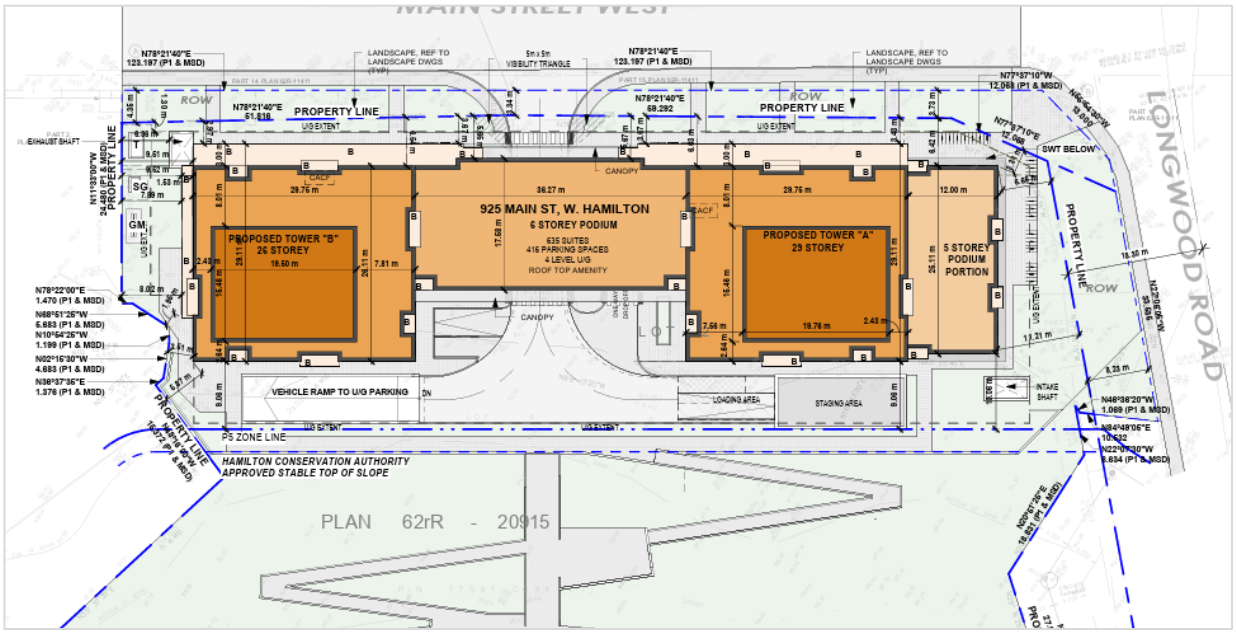


Image 2B: Site Plan by KNYMH Inc.

1.2. Objectives

The primary objective of this study is to assess the wind conditions and their impact on pedestrians at various locations within and around the project site. The analysis focuses on identifying areas of concern and providing mitigation strategies to ensure optimal pedestrian comfort and safety.

1.3. Scope of the Study

The study considers both the existing conditions and the proposed design, taking into account potential future development scenarios in the surrounding area. The site configurations assessed included the following four scenarios:

(1) **Existing Scheme:** Existing site plus existing surrounding buildings (**Image 3A**).

(2) **Proposed Scheme:** the proposed development plus existing surroundings (**Image 3B**).

Image 3A: Wind Tunnel Model of the Site and Existing Surrounding Buildings – November 2024

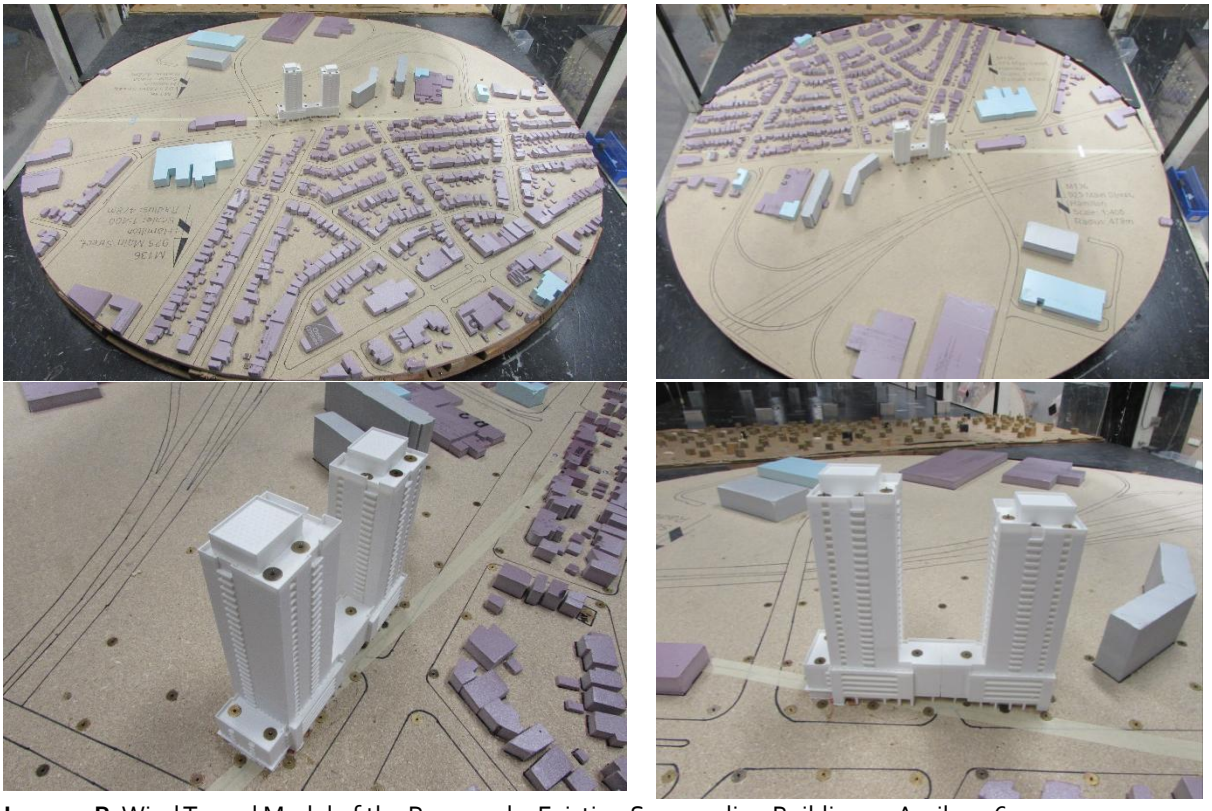


Image 3B: Wind Tunnel Model of the Proposed + Existing Surrounding Buildings – April 2026

2. METHODOLOGY

2.1. Physical Modelling / Wind Tunnel Testing

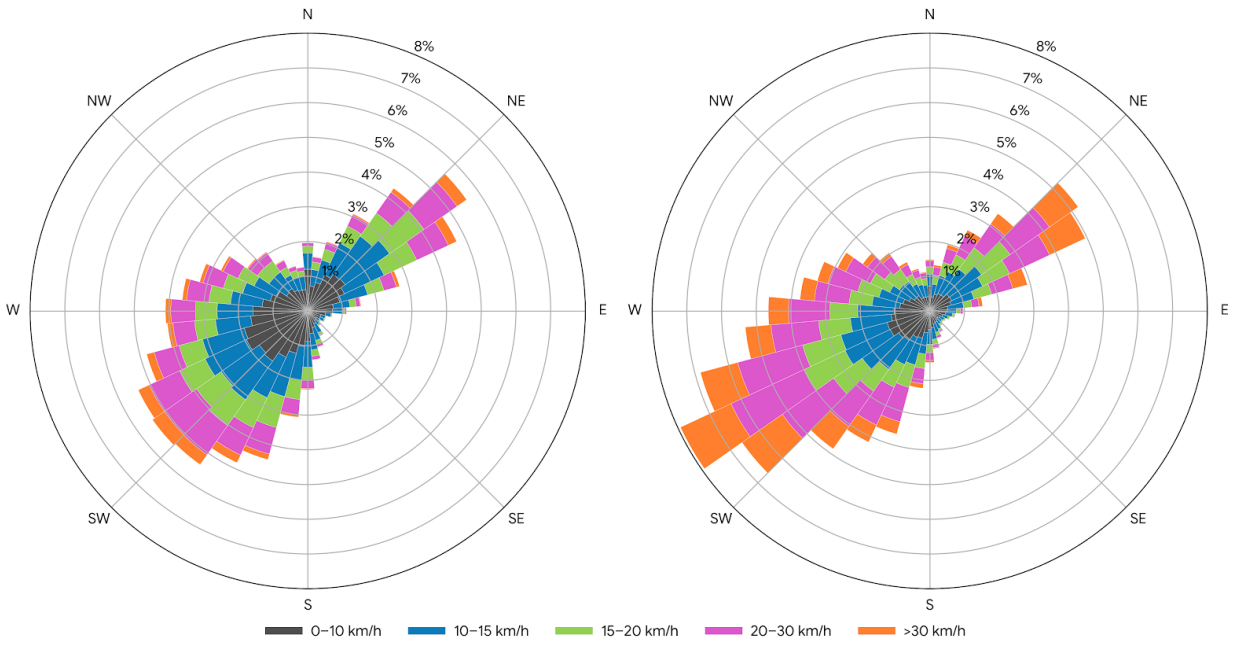
The study methodology involved wind tunnel testing of a 1:400 scale model representing the existing and proposed scheme within a 480-meter radius study area. A total of 78 specially designed omnidirectional wind speed probes were placed at a height of approximately 1.5 meters above the local grade in pedestrian areas of interest on and around the project site.

The wind tunnel tests simulated mean wind speed and gust profiles within the atmospheric boundary layer beyond the modeled area. Wind speed ratios (measured at sensor probes relative to gradient height speeds) were combined with long-term data from a reference meteorological station to predict the magnitude and frequency of wind speeds at various locations across the study area. The tests covered 36 wind directions, assessed in 10-degree increments.

2.2. Meteorological Data Analysis

The local wind climate at the proposed site was evaluated using hourly wind data collected at John C. Munro Hamilton International Airport, situated at a height of 10 meters above ground level, as a point of reference. The wind roses in Image 4 below presents the cumulative probability distribution of wind speeds for the summer (May to October) and winter (November to April) months.

Analysis of the data reveals that winter months are characterized by a higher frequency of strong winds than the summer months. Specifically, wind speeds greater than 20km/hr occur 18% of the time compared to 35% in the winter.



Summer – May to October **Winter – November - April**

Image 4: Wind Data from John C. Munro Hamilton International Airport (1992 – 2022)

2.3. City of Hamilton's Wind Criteria

The City of Hamilton's pedestrian wind comfort and safety performance criteria form the basis of this assessment. These standards are a key component of building design in urban areas, providing guidelines on maximum allowable wind speeds and frequency thresholds that pedestrians can safely and comfortably tolerate during various activities, such as sitting, standing, strolling, or walking. The criteria are based on scientific data, engineering principles, and human experience, considering the intended use of pedestrian spaces within and around the project.

TABLE 1: WIND CRITERIA FOR PEDESTRIAN COMFORT AND SAFETY

COMFORT CATEGORY	GEM* SPEED (km/h)	DESCRIPTION
Sitting	≤ 10	**Calm or light breezes suitable for outdoor restaurant uses, seating areas, and other amenities.**
Standing	≤ 14	**Gentle breezes suitable for main entrances and bus stops where pedestrians are more likely to linger.**
Strolling	≤ 17	**Moderate winds appropriate for window shopping and strolling along a downtown street, or park.**
Walking	≤ 20	**Relatively high speeds that can be tolerated during intentional walking, running and other active movements.**
Uncomfortable	> 20	**Strong winds, considered a nuisance for most activities.**
Notes	1) The required seasonal compliance is 80% of the time for the Sitting, Standing Strolling and Walking categories. The Uncomfortable categorization is applicable if the criteria for Walking are not met. 2) Gust Equivalent[2] Mean (GEM) speed = maximum of either mean speed or gust speed/1.85. 3) Comfort calculations are to be based on wind events recorded between 6:00 and 23:00 daily.	
SAFETY CRITERION	**GUST SPEED (km/h)**	**DESCRIPTION**
Exceeded Y/N? **Yes --** **No --**	**> 90**	**Excessive gust speeds can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.** Note: *Wind safety assessment is to be based on wind events recorded for 24 hours a day.*

To determine suitable wind conditions for pedestrian activities such as sitting, standing, strolling or walking, it is recommended that the associated mean wind speeds be expected for at least 80% of the time (approximately five and half out of seven days). In areas where winds surpass the 20km/h limit for over 20% of the time or surpass the wind safety threshold, wind control measures are typically required to ensure the safety and comfort of individuals.

The wind criteria referenced include two primary categories:

2.3.1. Pedestrian Wind Safety / Hazard

Pedestrian safety is correlated with gust wind speeds that exceed the threshold (90 km/h) capable of negatively impacting a pedestrian's stability and balance. When wind speeds capable of destabilizing an individual, at around 90 km/h, occur more than 0.1% of the time or for a duration of 9 hours per year, the wind conditions can be classified as hazardous.

2.3.2. Pedestrian Wind Comfort

Sitting (≤ 10 km/h): Tranquil breezes desired for passive pedestrian activities such as outdoor dining or seating areas.

Standing (≤ 14 km/h): Suitable for areas where pedestrians are apt to linger such as main building entrances, drop-off areas, parks and bus stops.

Strolling (≤ 17 km/h): Suitable for window shopping and strolling along a downtown street, or park.

Walking (≤ 20 km/h): Relatively high speeds but are considered suitable for active pedestrian activities such as walking, running or cycling.

Uncomfortable (>20km/h): wind speeds exceeding 20km/h more than 20% of the time.

To determine suitable wind conditions for pedestrian activities such as sitting, standing, or walking, it is recommended that the associated mean wind speeds be expected for at least 80% of the time (approximately five and half out of seven days). In areas where winds surpass the 20km/h limit for over 20% of the time or surpass the wind safety threshold, wind control measures are typically required to ensure the safety and comfort of individuals.

3. RESULTS AND DISCUSSION

The report's Appendix section includes Table 1, which provides data on wind speeds measured at various locations under different site configurations: existing and proposed scenarios. The analysis takes into account hazard and comfort criteria, considering both annual (for wind hazard) and seasonal periods (for wind comfort), as well as specific time frames throughout the day. Visual representations of the assessed conditions are presented in Figures 1.1 through 3.2 in the Appendix.

3.1. Existing Wind Conditions

The proposed site is mainly surrounded by a mix of low-rise commercial and residential buildings, with two mid-rise condo buildings (12 storey tall) immediately to the southwest. The existing wind conditions are generally comfortable for sitting or standing during the summer and standing or strolling during the winter, owing to the low-rise nature of the surrounding buildings. In addition, the pedestrian wind safety is predicted to be satisfied in all areas on and around the existing site, indicating that wind conditions are unlikely to pose a hazard to pedestrians.

3.2. Proposed Scheme

3.2.1. Wind Flow around the Proposed Project

Generally, wind flows smoothly over buildings of uniform height. However, taller buildings can disrupt this flow by intercepting and redirecting the wind, leading to effects such as downwashing and corner acceleration. When wind moves around the corners of tall buildings, it can cause localized increases in wind activity known as corner acceleration. Additionally, when two tall buildings are close together, the gap between them can act as a channel, accelerating the wind that passes through. Factors influencing this phenomenon include the height of the proposed buildings, the size of the gap and the alignment of the buildings with one or more prevailing wind directions at the project site. Narrower gaps tend to create stronger wind tunnel effects, while larger distances reduce the potential for channeling. These wind flow mechanisms are often the main factors contributing to uncomfortable and potentially hazardous wind conditions around buildings. The current pedestrian wind tunnel assessment for the proposed project considers typical urban wind patterns, including wind tunneling/channeling, downwashing, and corner acceleration.

At 29 and 26 storeys, the proposed towers are taller than their surroundings and may redirect stronger winds at high elevations down to pedestrian areas at grade. The side-by-side nature of the project is also likely to cause channeling wind flows through the towers as described above.

3.2.2. Proposed Design

The proposed project incorporates several positive design features that are beneficial for achieving favorable wind conditions and should be retained in the final design. These features include:

1. **Strategic Entrance Placement**: Locating the main entrances away from exposed building corners, which are typically more susceptible to accelerated wind speeds.

2. **Residential Entrance Vestibule**: The proposed vestibule at the main residential entrances will provide a sheltered area for pedestrians on particularly windy days.

3. **Canopy and Balcony Extensions**: The second-floor canopy and balcony extending around the northwest corner, along with canopies at the southwest and northeast corners, will help mitigate the impact of accelerating northeasterly and southwesterly winds downwashing from Tower B and northeast winds downwashing from Tower A.

4. **Recessed Design of the Entrances**: The recessed design of the entrances along Main Street are also considered positive and will provide calmer wind conditions at the entrances for pedestrians since the areas of protected and less exposed.

5. **Podium Setbacks**: The proposed 5-storey podium setbacks on the north (3m) and east (12m) facades are effective in reducing the effect of downwashing wind impacts at the ground level.

6. **Wind Screen/Parapets**: The wind screen proposed for the rooftop amenity level will enhance usability by mitigating wind exposure

These features collectively contribute to a wind environment suitable for the intended uses of the site.

3.2.3. Proposed Wind Conditions

The proposed development is expected to provide wind conditions that are appropriate for the intended pedestrian uses across all assessed grade and above-grade areas throughout the year. In general, conditions are anticipated to range from suitable for sitting or standing during the summer to standing, strolling, or walking during the winter. Although wind speeds are higher in winter due to prevailing seasonal patterns, they remain within acceptable ranges for the intended activities.

Wind conditions at the primary residential and commercial entrances are predicted to be suitable for standing or better on an annual basis, which is appropriate for areas where pedestrians may pause or gather. At the proposed amenity spaces, wind conditions are expected to support sitting or standing during the summer months, aligning with their intended passive use.

During the winter, the podium area to the east of Building A is expected to experience conditions suitable for standing. This is largely due to the sheltering effect of Tower A, which reduces exposure to prevailing southwesterly winds. Wind conditions at the Level 6 podium and rooftop amenity areas are anticipated to be somewhat higher, with conditions generally suitable for strolling or walking.

While increased wind speeds are often observed between closely spaced towers, the orientation of the proposed buildings reduces the potential for channeling. The alignment of the towers relative to the prevailing northeast and southwesterly winds helps limit wind acceleration through these areas. In addition, these upper-level amenity spaces are expected to have limited use during winter, and the predicted conditions are not considered problematic.

Overall, the recommended pedestrian wind safety criterion is expected to be met across all grade and above-grade areas of the site. A minor, localized exceedance is identified on the roof of Tower A, where peak gust wind speeds are predicted to exceed the threshold by approximately 2 km/h (92 km/h near Location 74). This exceedance is expected to occur during the winter months, when the area is likely to be used less frequently or unoccupied.

4. CONCLUSION

Gnobi Consulting Inc. was retained to undertake a pedestrian wind tunnel assessment for the proposed mixed-use development at 925 Main Street West and 150 Longwood Road South in Hamilton, Ontario. The assessment was carried out using established wind tunnel testing methods, supported by a detailed review of the local wind climate, the proposed building configuration, and the surrounding context.

Based on the assessment, pedestrian-level wind conditions associated with the proposed development are expected to be suitable for the intended uses across the site throughout the year. Key pedestrian areas, including primary building entrances, amenity spaces at grade and above grade, and adjacent sidewalks, are predicted to meet the applicable comfort criteria on a seasonal basis.

Wind conditions are generally expected to range from suitable for sitting or standing during the summer months to standing, strolling, or walking during the winter. While higher wind speeds are anticipated during the winter season, these conditions remain appropriate for typical pedestrian activities.

The recommended pedestrian wind safety criterion is expected to be satisfied across all assessed areas, with the exception of a minor, localized exceedance at the roof level of Tower A. This exceedance is limited in extent and is expected to occur during the winter months, when use of the area is reduced.

Overall, no significant adverse wind impacts are anticipated as a result of the proposed development.

5. STUDY APPLICABILITY

The assessment presented in this report pertains to the proposed development at 925 Main Street West and 150 Longwood South, Hamilton, ON, and is predicated on the coordination set of architectural drawings by KNYMH Inc. dated November 13, 2025 received February 18, 2026 and an updated set February 20, 2026, received May 21, 2026. **Should there be any substantial modifications to the design, Gnobi Consulting Inc. is available to evaluate their potential impact on the pedestrian wind conditions discussed in this report. It is incumbent upon others to initiate this process by contacting Gnobi Consulting Inc**.

6. REFERENCES

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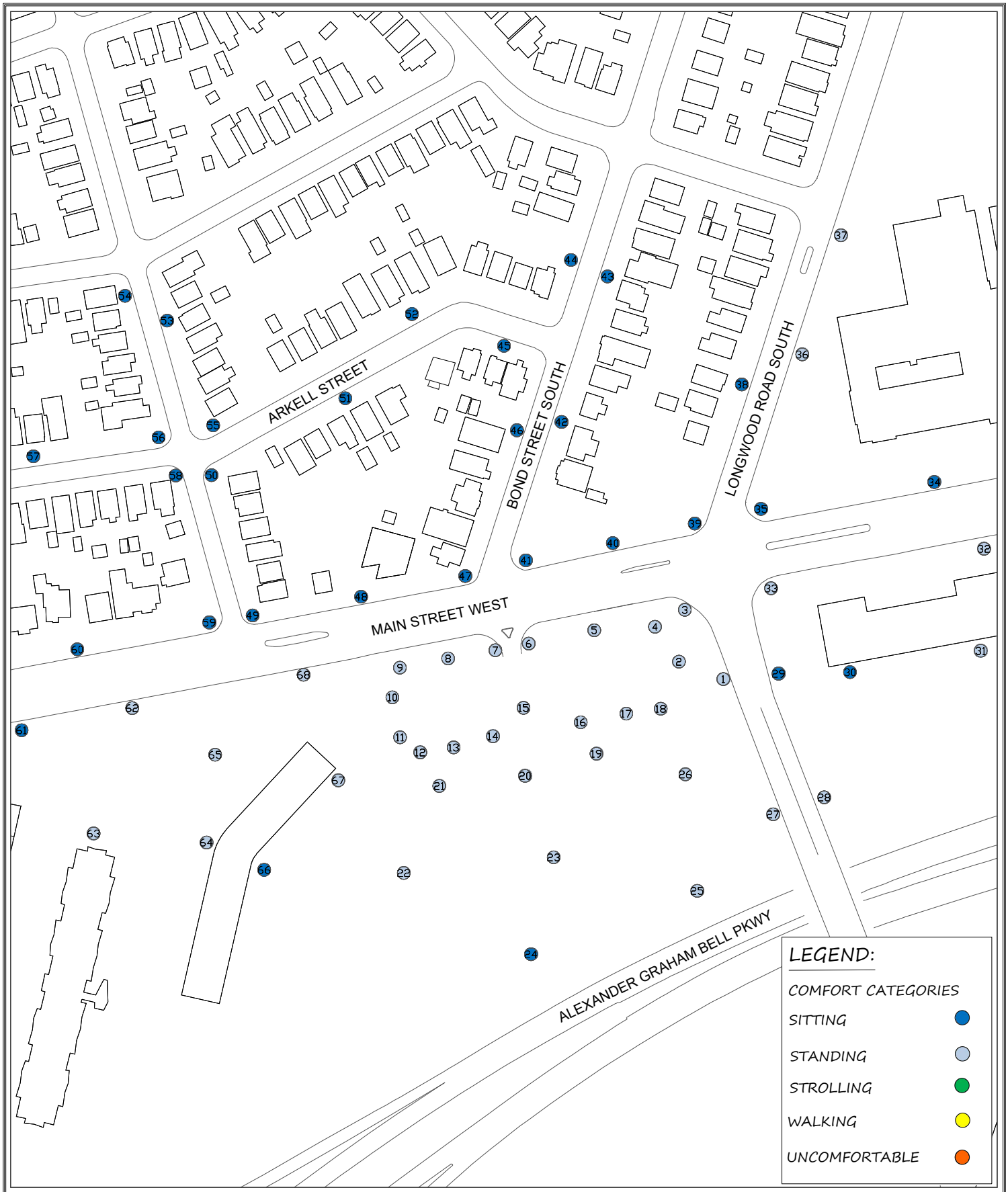
FIGURES



GNOBI CONSULTING INC.

Wind & Microclimate Engineers & Scientists
www.gnobiconsulting.com
contact@gnobiconsulting.com
(519)-400-4996

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PEDESTRIAN LEVEL WIND TUNNEL STUDY

1.1 - EXISTING (SUMMER)

HOURS: 6:00 - 23:00

GNOBI PROJECT #:420024

DATE: APRIL. 2, 2026

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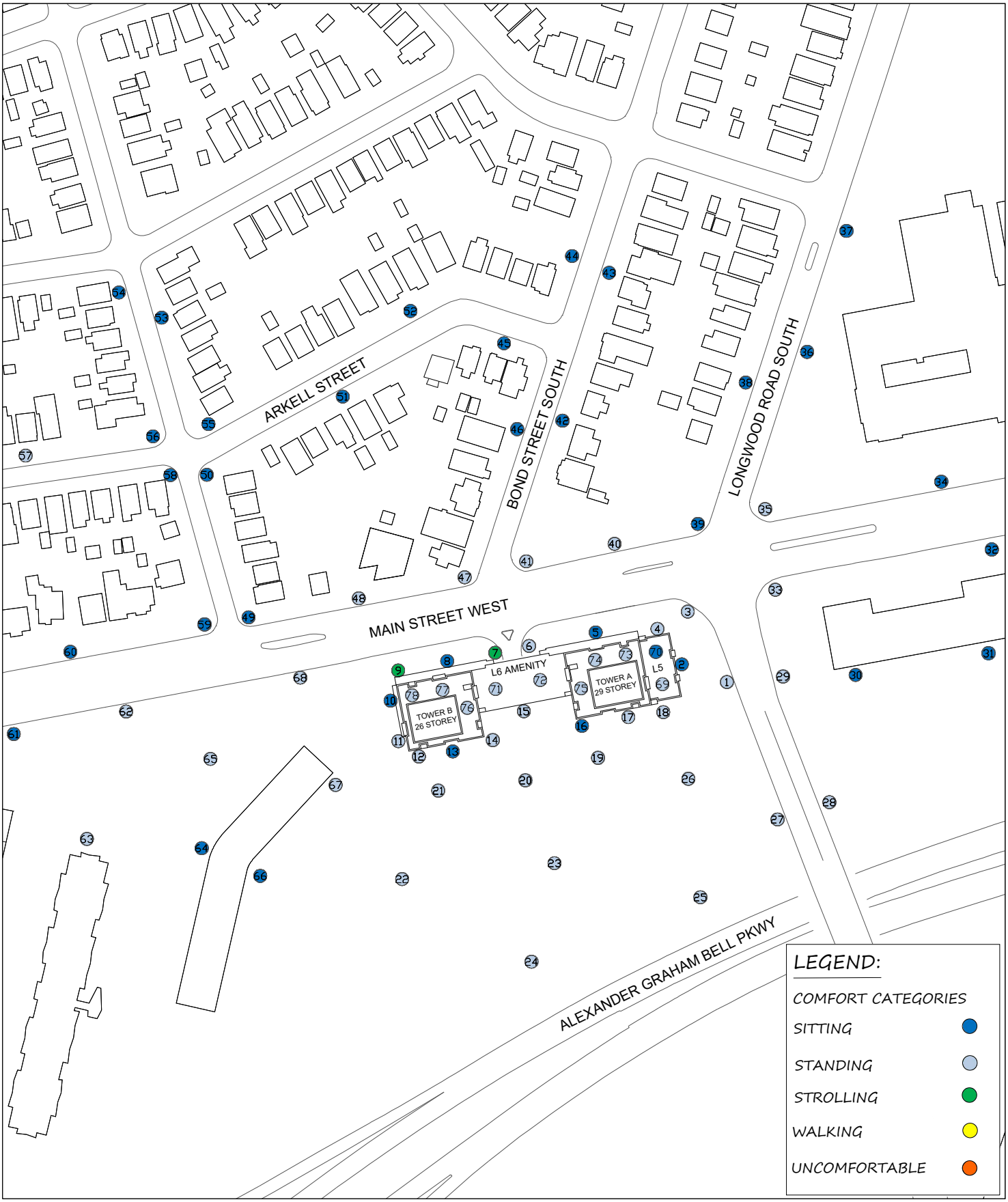

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1.2 - PROPOSED (SUMMER)

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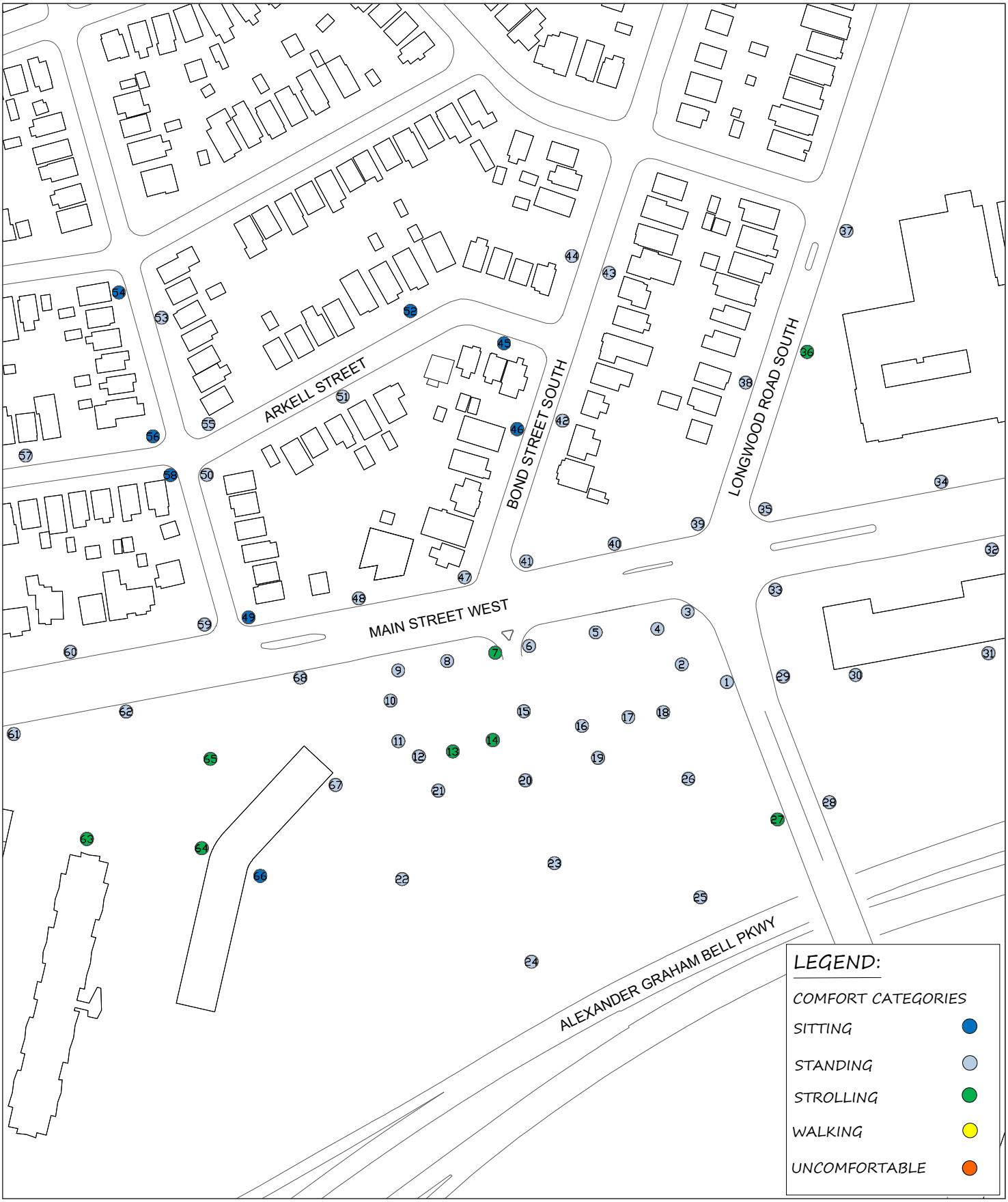

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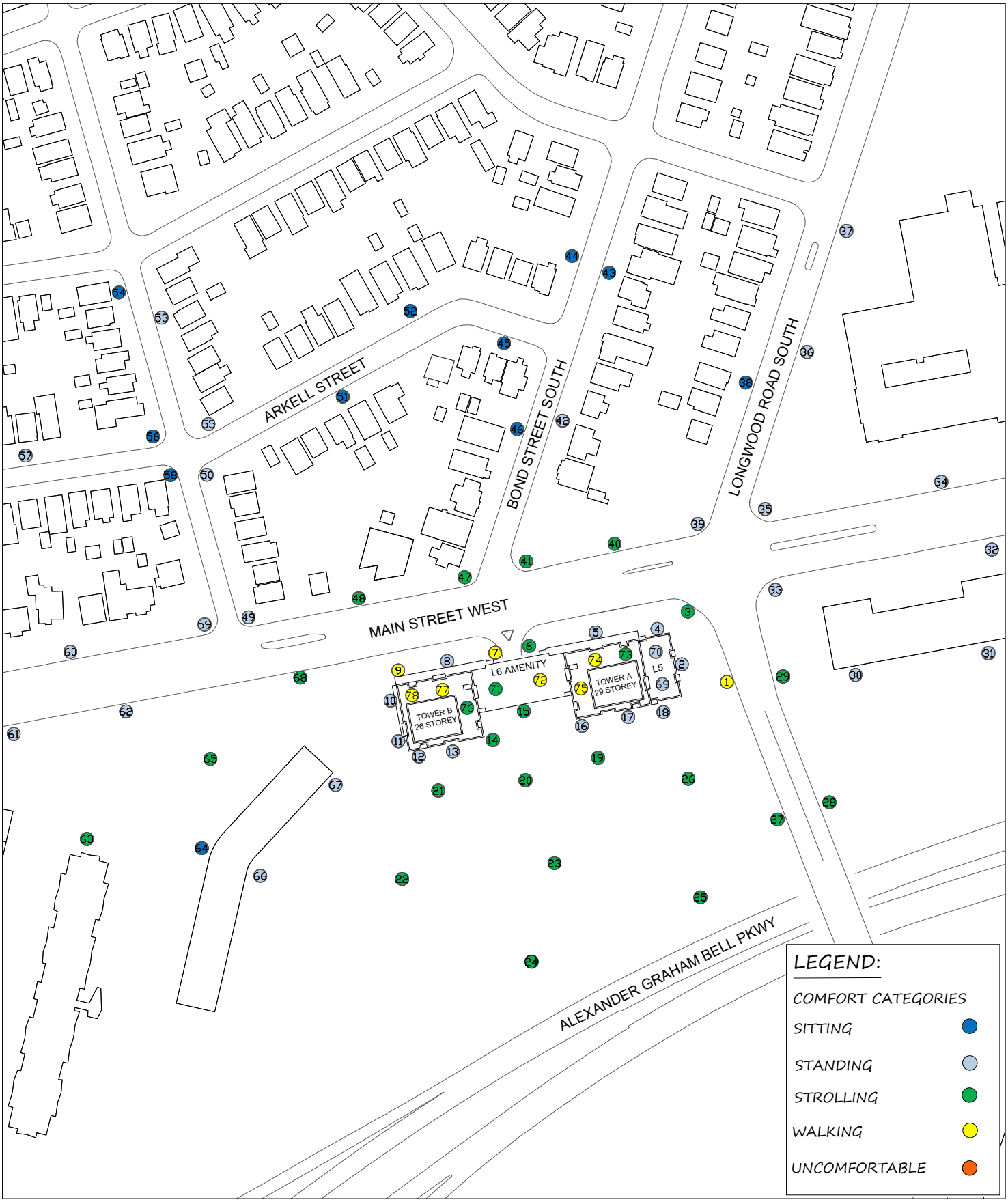

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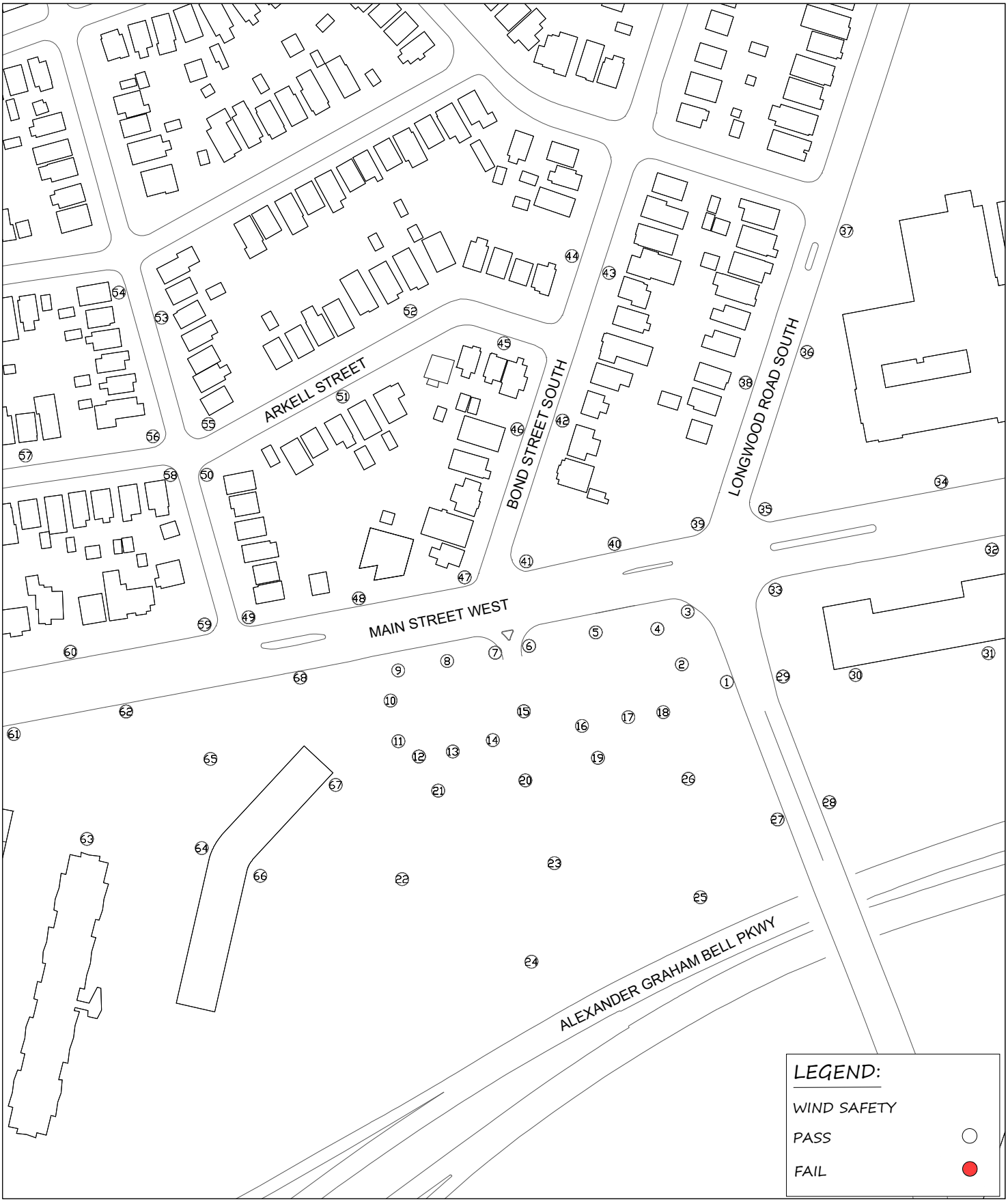

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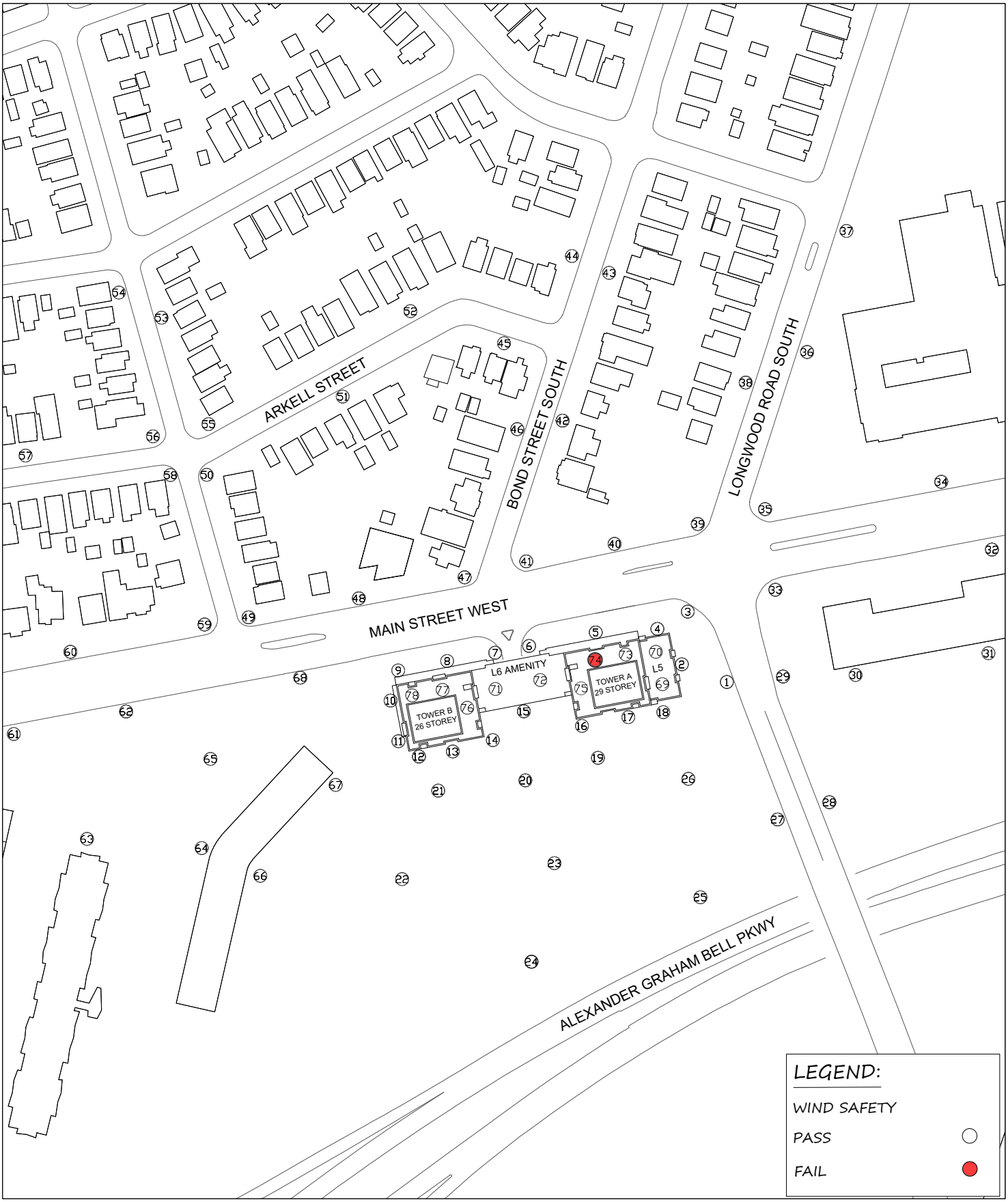

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3.2 - PROPOSED SAFETY (ANNUAL)

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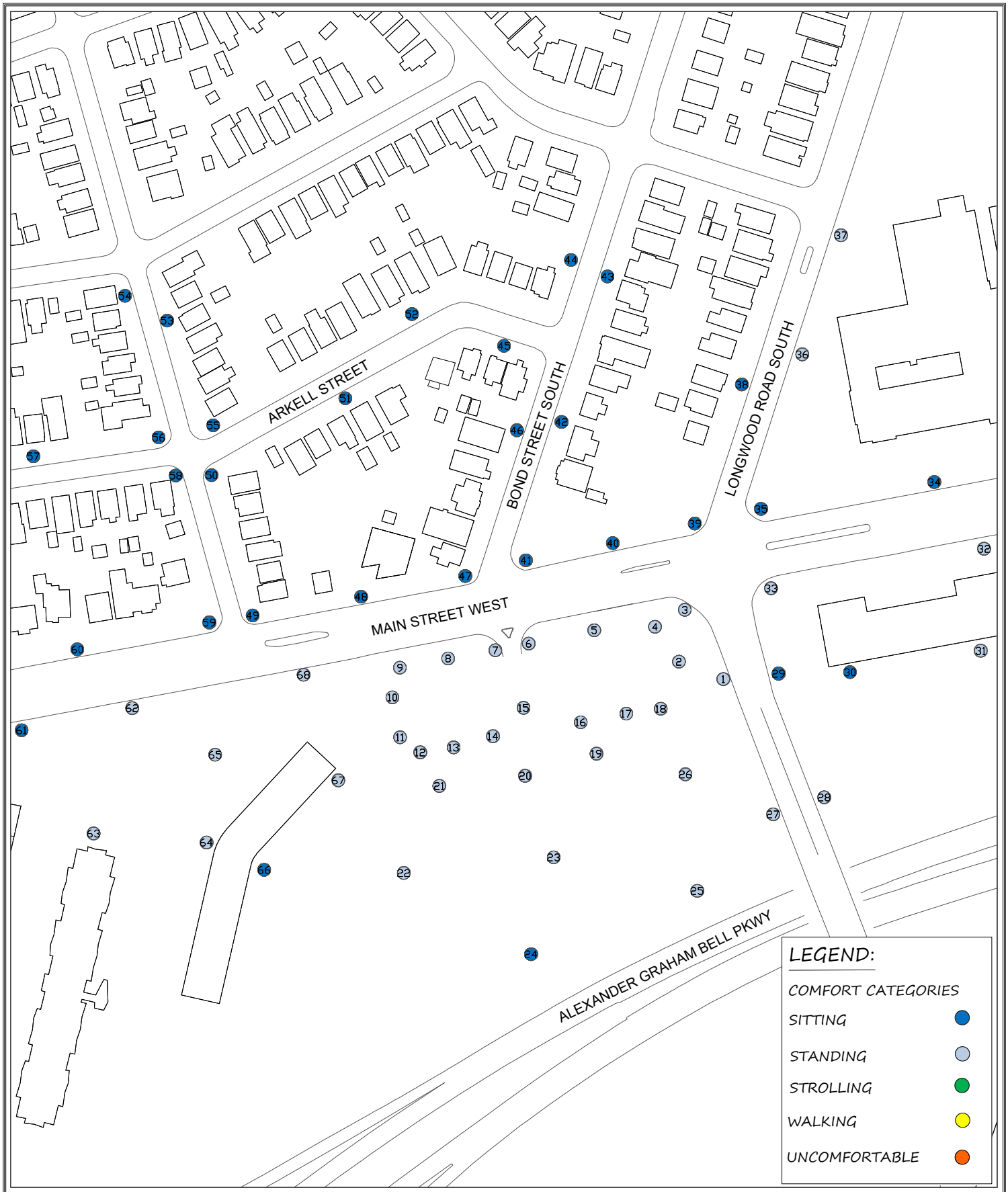
TABLES



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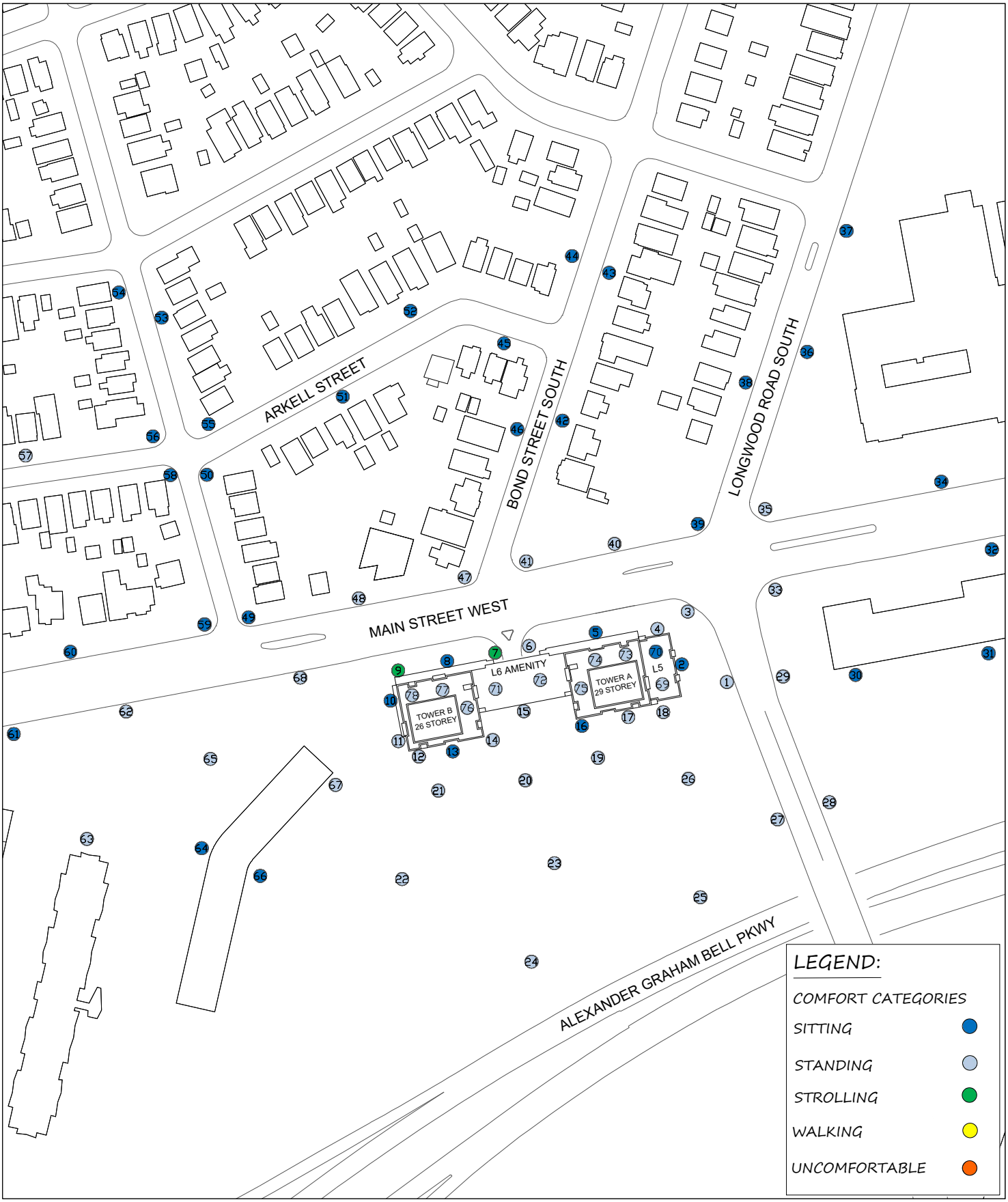

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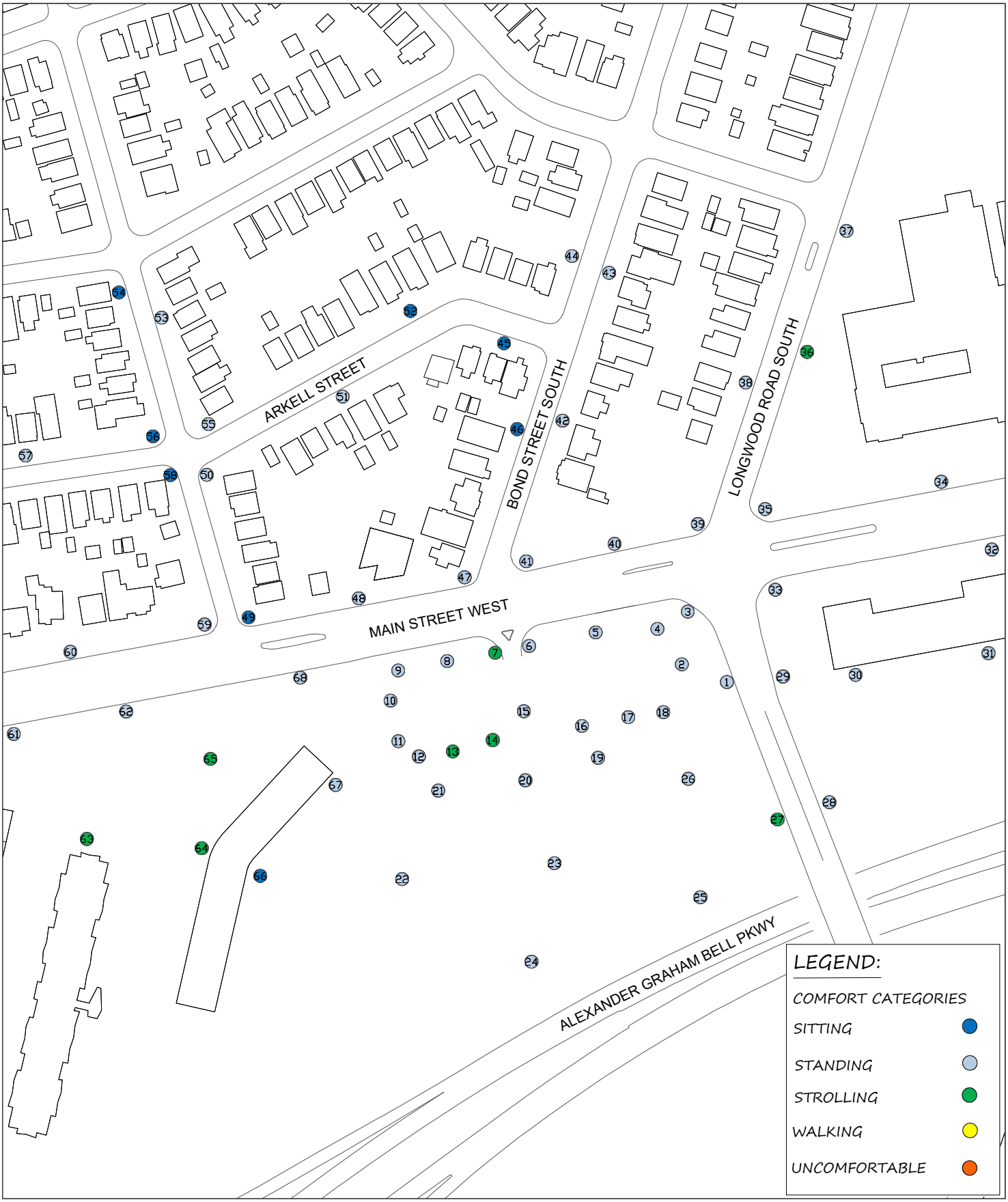

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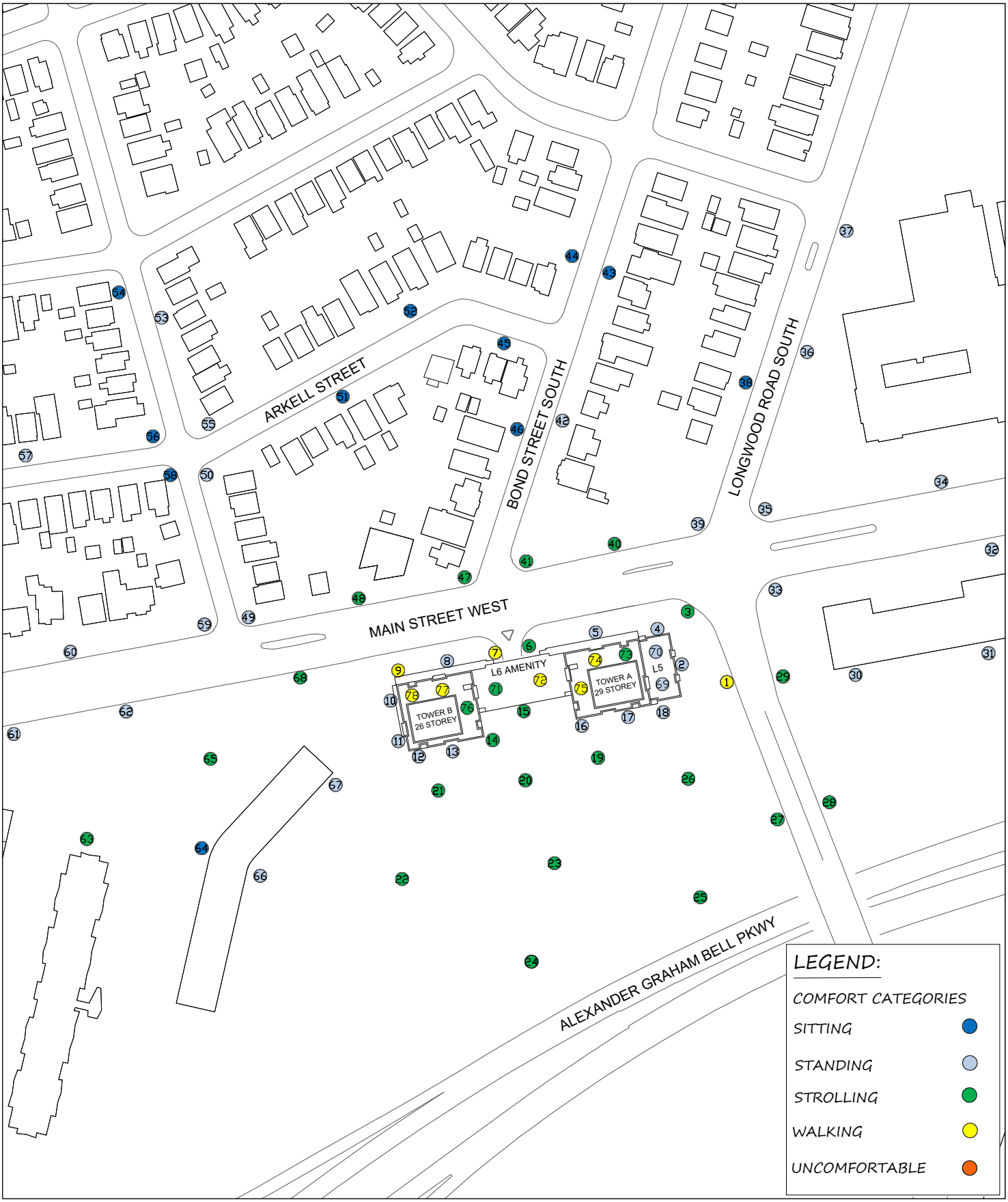

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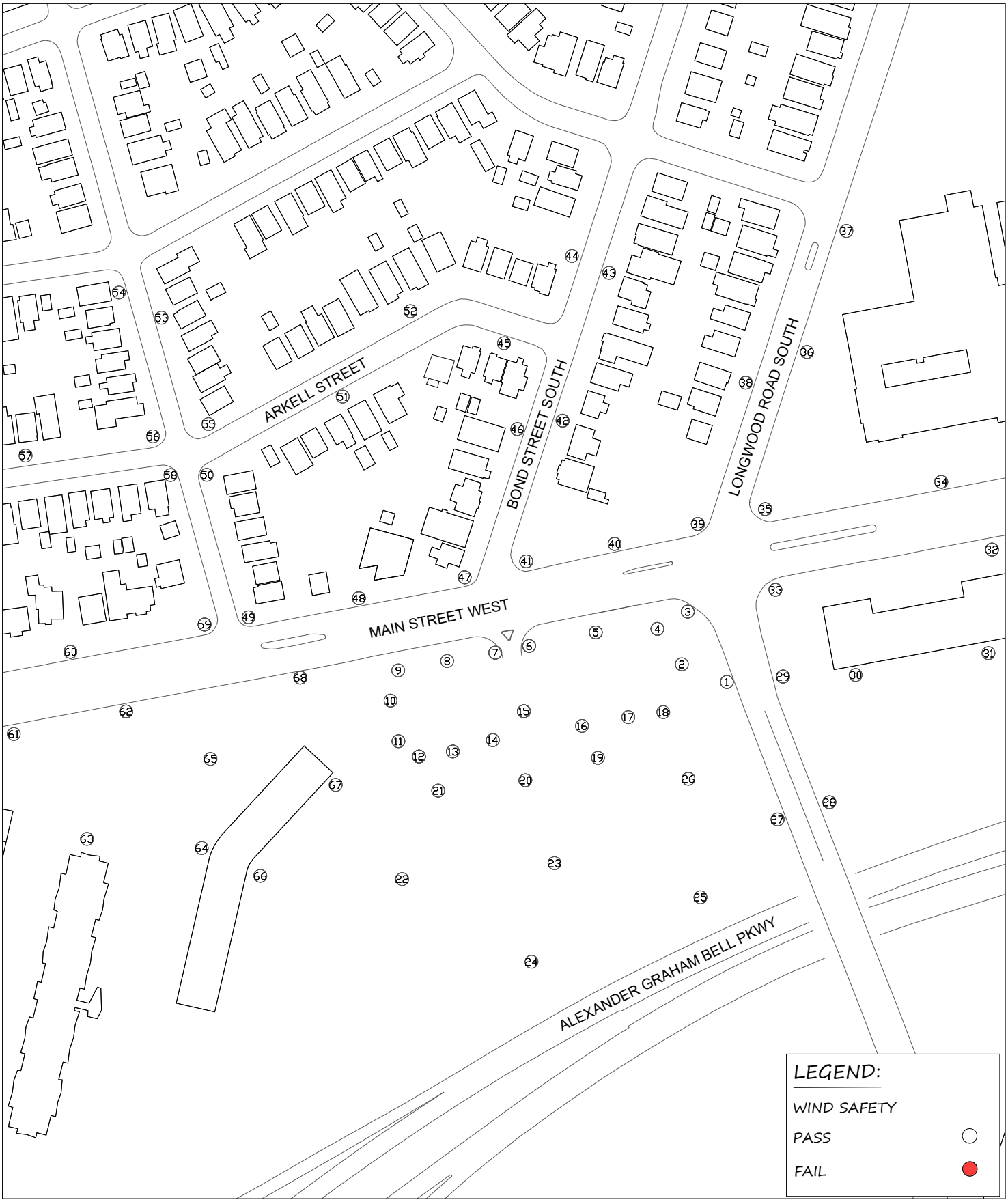

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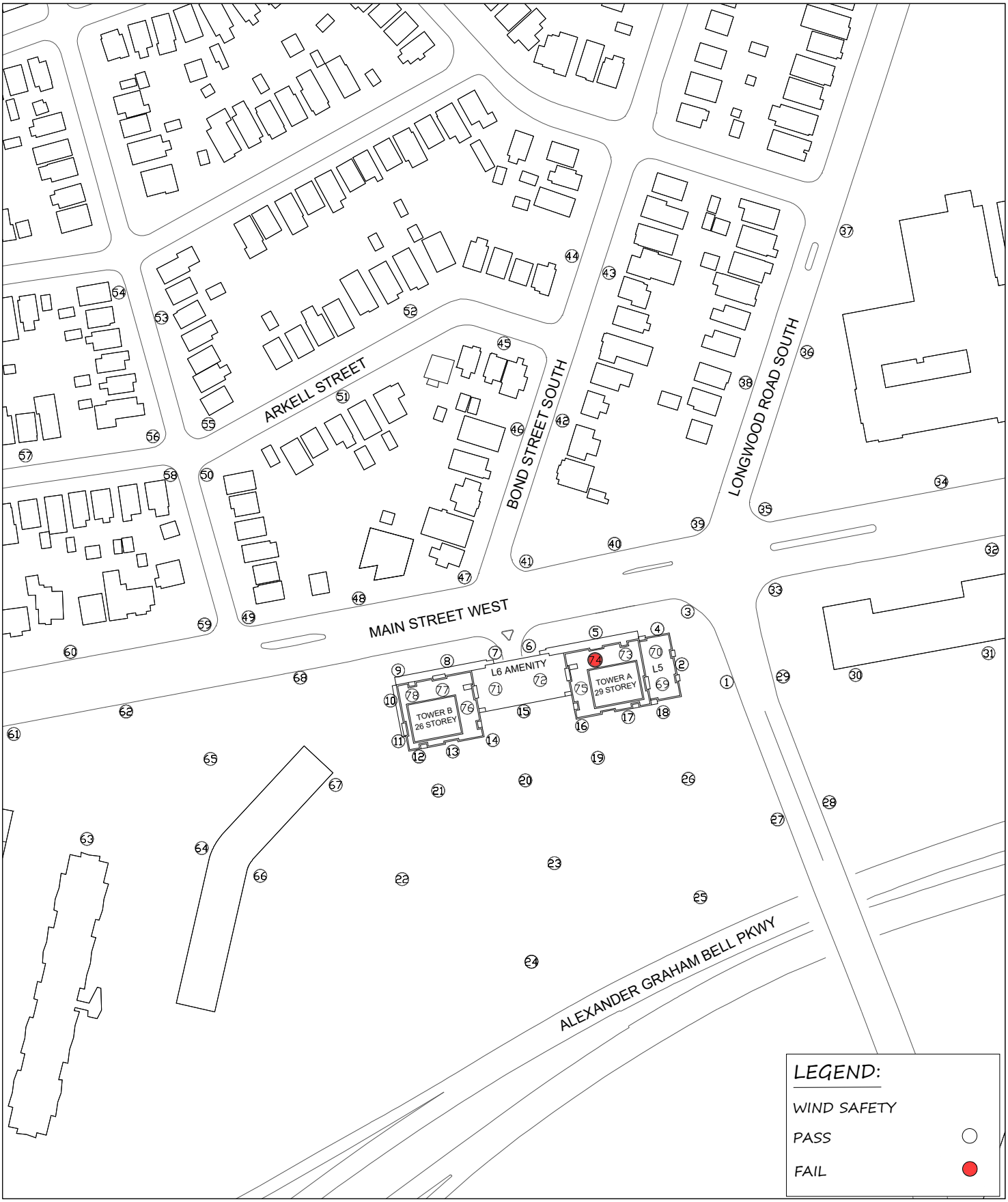

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