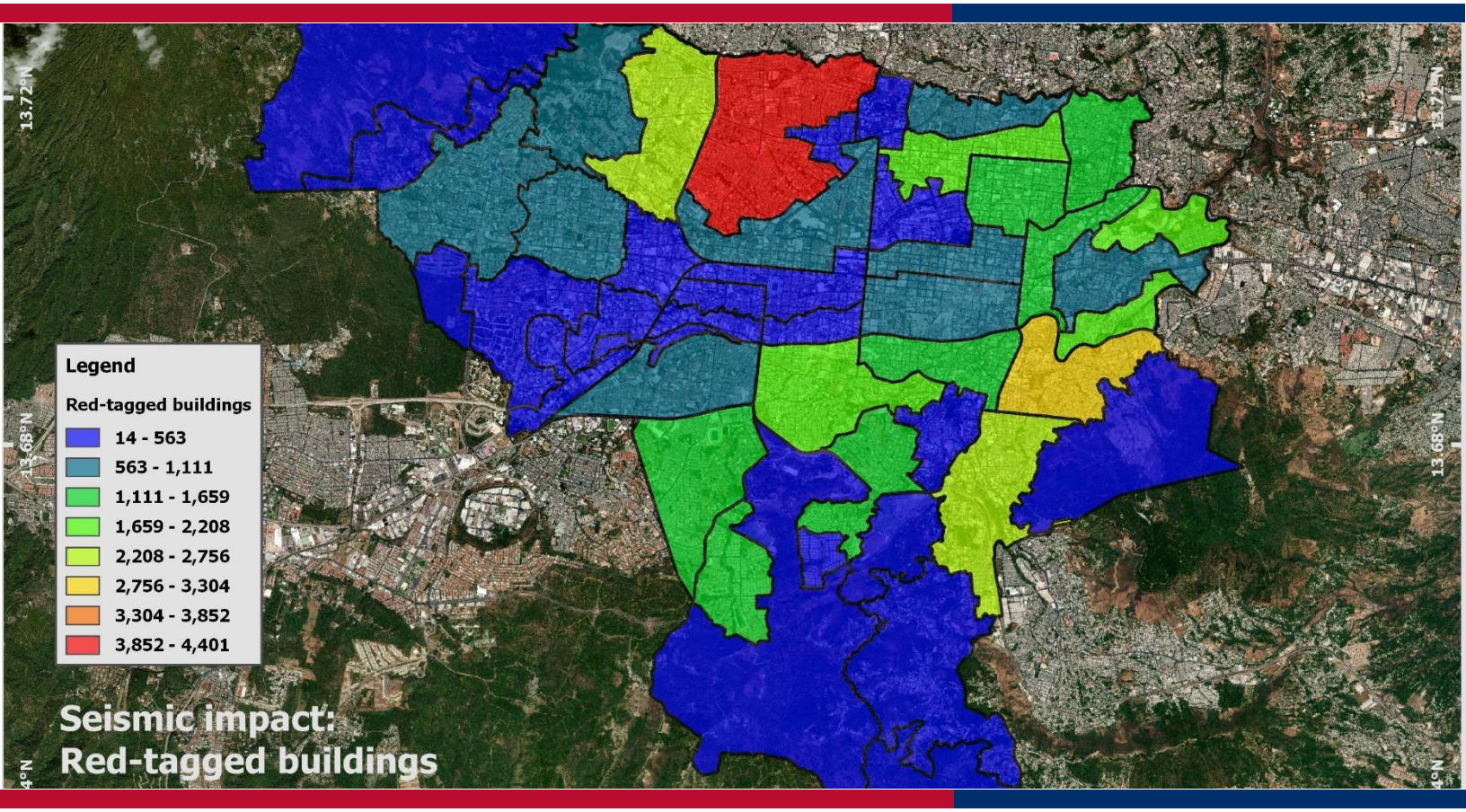
PREPARE II

PREPARING TO LESSEN THE SOCIAL AND ECONOMIC IMPACTS OF EARTHQUAKES



CITYWIDE ASSESSMENT OF EARTHQUAKE RISKS IN SAN SALVADOR, EL SALVADOR

FEB/2020 - EL SALVADOR

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USAID FROM THE AMERICAN PEOPLE

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Acknowledgements

This report forms part of the USAID/OFDA-funded Preparing to Lessen the Social and Economic Impacts of Earthquakes (USAID/OFDA PREPARE II) program.

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The goal of the program is to strengthen risk management policy and practice of national and municipal Disaster Risk Reduction/Management (DRR/DRM) institutions. Such mitigation is intended to help reduce the number of lives lost, the number of people injured, the number of internally displaced persons (IDPs), and the amount of economic disruption in the selected PREPARE II cities: San Salvador, El Salvador; San José, Costa Rica; Pasto, Colombia; and Zapopan, Mexico.

This Phase I report is the result of a multistakeholder engagement and consultation process, which involved authorities from national and municipal governments, academic institutions, and private-sector partners. We hereby acknowledge the contributions of the agencies, institutions, and partners and thank them for their valuable time, guidance, support, and useful feedback.

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EXECUTIVE SUMMARY

Probabilistic seismic risk assessment for the San Salvador Municipality included six contemporary districts and one historic district (hereinafter referred to collectively as "San Salvador"). This assessment of the municipality of San Salvador in El Salvador was undertaken as part of Phase I of the Preparing to Lessen the Social and Economic Impacts of Earthquakes (PREPARE II) program. The objectives of the project were to assess the effects of a potential earthquake, including the expected building damage, fatalities, and injuries for both daytime and nighttime scenarios; the number of internally displaced persons (IDPs); and the debris volume that would result. The findings can then be used to prepare policies, plans, and training activities to reduce the social and economic impacts from future earthquakes in San Salvador.

The current available research data, geographical maps, seismic hazard information, and building codes were the basis in identifying the design-level earthquake (475-year return period) and the site conditions for San Salvador. Those factors were used to determine the seismic intensity for this probabilistic risk analysis. As part of the risk assessment, satellite imagery was examined, and field surveys were conducted to collect data for a pool of representative buildings in San Salvador.

The exposure data for the area of study that was extracted from city census and building stock information is presented in Table 1. The collected and surveyed data was used to divide buildings into various groups of similar construction types and to distribute population according to census statistics. This approach formed the basis for the exposure model that was applied to seismic risk analysis. For each building typology, seismic fragility functions were then developed to represent damageability. The consequence functions (structural damage, fatalities, injuries, IDPs, and debris volume) that correspond to each damage state for a given building type formed the last piece of input to estimate the amount of seismic impact.

The input data was then used to run Monte Carlo simulations with the probabilistic analysis program to estimate seismic risk. The earthquake risk analysis was conducted for all building assets in the exposure model, and the risk results for each building asset were accumulated with respect to individual (primary and special) zones for San Salvador. The seismic risk distribution for individual zones that was identified by land-use pattern and that was used as the unit of risk assessment is beneficial for government and city officials in planning to allocate resources for risk preparedness and mitigation.

Table 1 Exposure data for San Salvador

No. of buildings	Built area, m^2	Occupants (daytime)	Occupants (nighttime)	No. of buildings
102,540		25,990,000	316,000	235,000

Table 2 summarizes the earthquake risks for San Salvador, which were estimated based on the average design level seismic intensity. Analysis showed that:

- The damage area of buildings is anticipated to be 13,800,000 m^2, which is about 53% of the total area of buildings in San Salvador
- The number of buildings that are expected to be yellow-tagged (moderate to extensive damage) or red-tagged (complete damage or collapse) is estimated to be about 73,000 structures, or approximately 70% of the building stock
- Depending on the time of the event, approximately 2,880 to 3,940 fatalities (for an estimated rate of 1.2%) and approximately 23,200 to 31,600 injuries (a rate of 10%) are anticipated
- The number of IDPs is estimated to be about 161,900 immediately after the event, which is a large percentage of the population
- The expected volume of 7,550,000 m^3 of generated debris is significant and must be taken into account for post-earthquake response

Table 2 Expected risk of earthquake impact for San Salvador

Structural damage, m^2 (%)	Fatalities		Injuries		IDPs Person (%)	Damage class tag		Debris volume m^3
	Daytime, person (%)	Nighttime, person (%)	Daytime, person (%)	Nighttime, person (%)		Red, No. (%)	Yellow, No. (%)	
13,800,000 (53%)	3,940 (1.25%)	2,880 (1.22%)	31,600 (10.0%)	23,200 (9.9%)	161,900 (68.9%)	42,900 (42%)	29,900 (29%)	7,550,000

Figure 1 presents the spatial distribution of the approximately 42,900 red-tagged buildings, with a large concentration in just a few zones. The approximate number of expected fatalities, 3,940 people, in a daytime scenario are distributed as shown in Figure 2, and a few zones are identified as high risk for human loss.

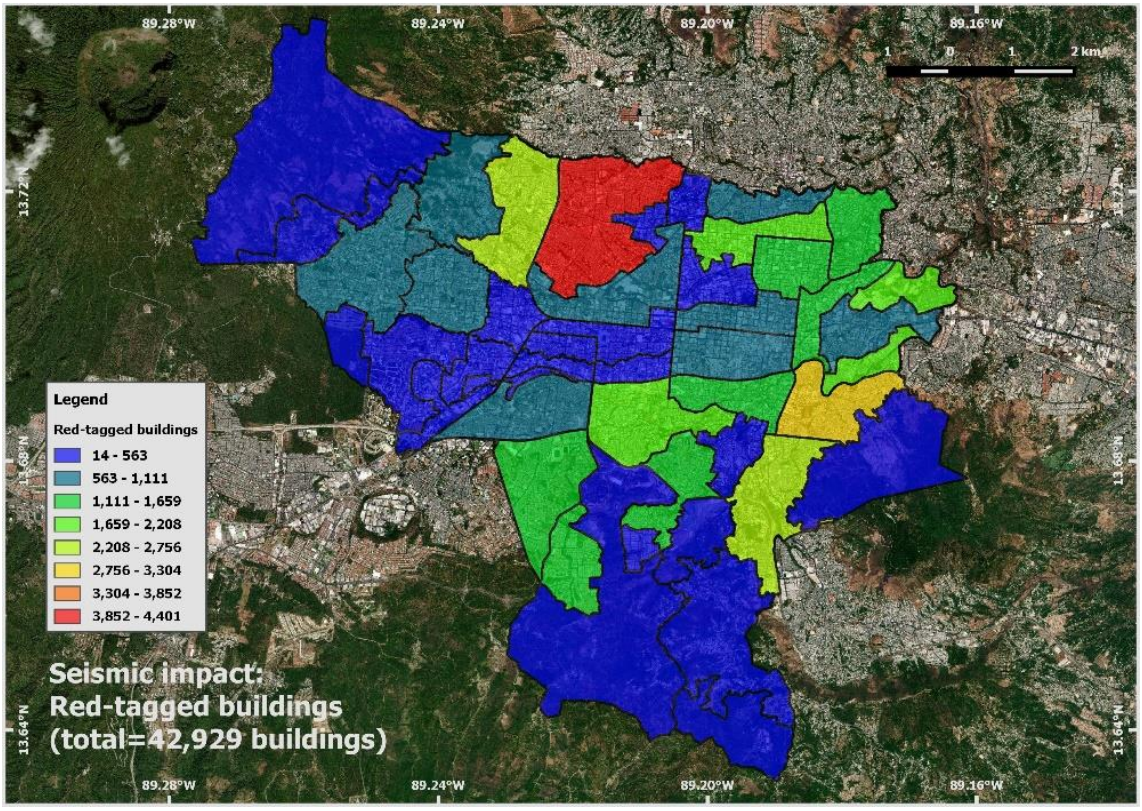

Figure 1 Spatial distribution of red-tagged buildings

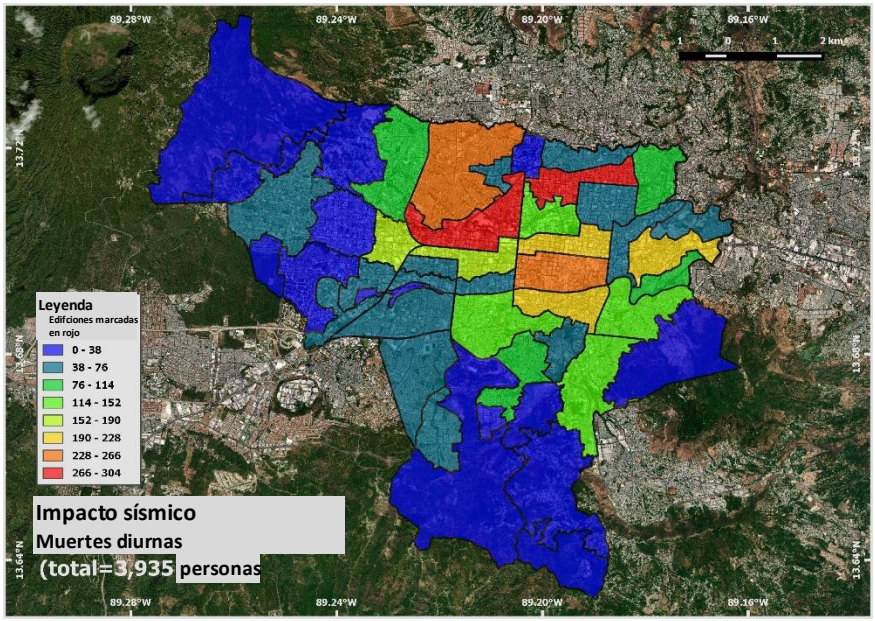

Figure 2 Spatial distribution of daytime fatalities

Because of the large pool of vulnerable buildings, such as unreinforced masonry (URM) or older nonductile construction types, and because of the high seismicity of region, the high rates of earthquake-caused physical damage, fatalities, and injuries that were computed in this study were largely expected. The findings in this study highlight the need for development of a risk mitigation program. As part of such a program, it is recommended that the following strategies be implemented:

- Provide a seismic strengthening program and a prioritization strategy for key buildings that are identified as having the most seismic risk because of their inherent structural vulnerability, density of occupants, and important use for disaster response and recovery
- Establish a post-earthquake damage assessment program. It is critical for San Salvador to develop and administer its own damage assessment logistics and to train and to certify engineers. Such a program helps improve disaster response, recovery activities, and city resiliency after major earthquakes
- Optimize the allocation of emergency and response resources by identifying the most vulnerable zones, with consideration of both building damage and human impacts. It is necessary to prioritize locations so that the limited resources are effectively assigned
- Develop communication and public outreach programs about earthquake risks. It is critical to share the potential risks and the abovementioned strategies with stakeholders. Communities should be informed about earthquake risk, risk reduction methods, and response procedures

Scope and limitations

The results, findings, and conclusions that are presented in this report are based on a seismic risk analysis derived from internationally recognized references and state-of-the-art analytical techniques. However, as with any engineering project, the underlying methods and analysis are based on certain assumptions and engineering judgment. Additionally, the findings are based on a given design-level earthquake intensity and correspond to the expected values or mean values. That is, the results present the expected outcome for an average event from a sample of a large pool of events with similar intensities and extents. As such, the findings in this report include a certain level of uncertainty (inherent in risk assessment) and

should not be extrapolated directly to a future seismic event. Accordingly, these assumptions and variations should be accounted for when interpreting the findings and applying the results for future planning.

It is further noted that the exposure data was based on satellite imagery, census data, and field surveys. Thus, there is a high degree of confidence in that part of the data. However, for this study, only limited site-specific and detailed datasets for fragility functions for buildings in San Salvador and limited soil amplification data were available. Hence, there is less certainty in that data, and a suggestion for future risk assessments is to perform a more detailed investigation to obtain site-specific data for both building fragility and seismic soil effects.

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FIGURES

ACRONYMS

AMSS	Área Metropolitana de San Salvador
ASCE	American Society of Civil Engineers
CM	confined masonry
DRM	disaster risk management
DRR	disaster risk reduction
DS	damage state
E	margin of error
FEMA	Federal Emergency Management Agency
F_{PGA}	site amplification factor
GEM	Global Earthquake Model
HQ	high-quality
IDCT	Inventory Data Capture Tools
IDPs	internally displaced persons
LFRS	lateral-force-resisting system
MCS	Monte Carlo simulation
MMI	Modified Mercalli Intensity
OFDA	Office of U.S. Foreign Disaster Assistance
PGA	peak ground acceleration
PREPARE II	Preparing to Lessen the Social and Economic Impacts of Earthquakes
RCF	reinforced concrete frame
RCMF	reinforced concrete moment frame
RCSW	reinforced concrete shear wall
SBF	steel braced frame
SMF	steel moment frame
URM	unreinforced masonry
USAID	United States Agency for International Development
WUS	Western United States

1 INTRODUCTION

1.1 Project background

The PREPARE II program intends to develop a new disaster risk reduction (DRR) and disaster risk management (DRM) program in San Salvador, El Salvador; in San José, Costa Rica; in Pasto, Colombia; and in Zapopan, Mexico. The multiyear program, with financial support from the United States Agency for International Development/Office of U.S. Foreign Disaster Assistance (USAID/OFDA), includes the cooperation and support of local partner organizations in each city. The targeted beneficiaries are the citizens of those regions who live in areas that are at high risk for future earthquakes.

The PREPARE II program aims to provide national and municipal DRR institutions with a clearer picture of the probable impacts from earthquakes. The program also wants to help these institutions meet their goals to reduce casualties and to mitigate the social and economic impacts of future earthquakes.

The two overarching PREPARE II objectives are:

- To strengthen earthquake response planning and preparedness of national and municipal DRR institutions in San Salvador (El Salvador), San José (Costa Rica), Pasto (Colombia), and Zapopan (Mexico). This objective fits within the OFDA Geological Hazards subsector.
- To reinforce the risk management policies and practices of national and municipal DRR institutions for a reduction in fatalities, injuries, financial costs, and economic disruptions. This objective fits within the OFDA Policy and Planning subsector and the Capacity Building and Training subsector.

Three main components of PREPARE II for San Salvador and Zapopan are to be implemented during three phases:

- **Phase I: Assessment of Earthquake Risks.** Assess seismic hazard and earthquake risks to determine the expected damage to building structures and the probable human impacts among the residents in the area.
- **Phase II: Analysis of Earthquake Scenarios and Planning for Response.** Analyze the earthquake impact scenarios based on the findings from risk assessments; review plans, policies, and practices for the selected response, including rapid damage assessments and debris management.
- **Phase III: Technical Training.** Implement DRR training activities based on a review of the results from the earlier phases. The aim is that, after completing the PREPARE II program, the partner organizations will have gained adequate knowledge to conduct seismic risk assessments and to analyze earthquake impact scenarios and will continue to improve their DRR and DRM capacity in the future.

This report focuses on Phase I of the project for San Salvador, El Salvador.

1.2 Phase I description

San Salvador, El Salvador, is in a high-seismicity region. Because of the dense San Salvador metropolitan area (the largest city in El Salvador), the region is at high risk for severe impacts from future earthquakes. Some newer and superhigh-rise buildings in San Salvador (usually built of reinforced concrete or steel) have been designed and constructed by using modern international design codes. Because they are well constructed, they are anticipated to perform satisfactorily during earthquakes. On the other hand, the city also contains numerous older structures that are vulnerable to earthquake effects. Many older and susceptible structures, which are principally low-rise residences, historic buildings, commercial/retail shops, and mixed-use buildings, are not well built or retrofitted, especially in economically disadvantaged neighborhoods.

El Salvador is on the Pacific Ocean side of Central America, where a tectonic plate boundary exists between the Cocos Plate and the Caribbean Plate, and several volcanoes are also active in the central region of the country. Therefore, El Salvador and San Salvador are in a seismically active region that has experienced large earthquakes. For example, the 1986 Mw 5.4 (Modified Mercalli Intensity [MMI] IX) San Salvador Earthquake resulted in approximately 1,500 fatalities, tens of thousands

of injuries, and collapse of many buildings. The 1965 Mw 6.3 (MMI VII) San Salvador (Rosenblueth and Prince 1965 and Lomnitz and Schultz 1966) Earthquake caused hundreds of casualties and injuries and severely damaged a large number of buildings. The 1917 Mw 6.7 (MMI VIII) San Salvador Volcanic Earthquake caused more than a thousand fatalities in the city.

More recently, in 2001, two large consecutive earthquakes occurred offshore El Salvador and then inland, and those intensities were recorded as Mw 7.6 and Mw 6.6, respectively. Those earthquakes caused severe damage and had significant human and economic impacts. In 2019, although no major damage occurred, a large earthquake of Mw 6.6 struck offshore El Salvador, along the Pacific Ocean coast in May, with many aftershocks in the surrounding areas.

As shown in Figure 3, San Salvador is located in central El Salvador. The country consists of 14 departments, and the city belongs to the department of San Salvador. The city of San Salvador is the capital of the country and is the center of economic, political, educational, and citizen activities. The study area is officially called the "municipality of San Salvador," which is composed of six contemporary districts and one historic district, and the total area of the municipality is about 75 km^2. As a capital city, it has many buildings for offices, commercial activity, industry, government use, religious use, healthcare, and education, as well as residential areas with houses and apartments.

Figure 3 Location of the municipality of San Salvador

The seismic risk estimation for the PREPARE II program was conducted by using the probabilistic analysis program that Miyamoto International developed for earthquake risk simulation. The estimation was also based on state-of-the-art analytical techniques that consist of earthquake engineering, structural engineering, and probability and reliability theory. All the input data for the risk analysis phase of this study was provided for use in similar application software, such as

OpenQuake from the Global Earthquake Model (GEM) Foundation and Hazus from the U.S. Federal Emergency Management Agency (FEMA).

To collect various data about buildings and zones in the study area, this phase relied on two sources: satellite imagery information and direct observation on the ground. Data collection in the field used the mobile application Inventory Data Capture Tools (IDCT), which was developed by the GEM Foundation. The gathered data was then used mainly to specify building structural types, to identify the fragility functions of different building types, and to assign population distribution in the area.

2 EARTHQUAKE HAZARD FOR SAN SALVADOR

2.1 Overview

The earthquake hazard for this study was based on a seismic intensity (peak ground acceleration, or PGA) for the design-level earthquake (return period of 475 years) for San Salvador. This level of seismic intensity is appropriate to examine the seismic vulnerability of and the expected damage to existing buildings in the city because it is generally used for new building design and is applied globally in modern seismic design for buildings. The site PGA was determined by using the bedrock acceleration and surficial soil investigation (site soil classification) data for San Salvador, then the accelerations at ground level considering site amplification effects (i.e., the amplified PGA) were spatially estimated as input for this risk analysis.

2.2 Bedrock acceleration

To identify the PGA intensity based on bedrock soil and corresponding to the design-level earthquake for San Salvador, local building codes and several research studies were compared and examined (TSED 1994, Staller et al. 2016a, RESIS II 2009, Salazar et al. 2013, and GSHAP 1999). The seismicity in El Salvador is high compared with the eastern coastal regions of Central America, and the design earthquake for San Salvador is categorized in the higher class, ZONA I, specified in the El Salvador building code (TSED 1994).

Figure 4 is a seismic hazard map of El Salvador that shows PGA distributions based on bedrock soil conditions and is part of a recent study by Staller et al. (2016a). In this research, the PGA based on bedrock soil for San Salvador was estimated by considering interpolate earthquake zones and local fault systems along a volcanic chain, which are two main sources of seismicity in El Salvador. As the hazard map in Figure 4 shows, the PGA with a return period of 475 years equals 0.41g in this research, which is the same value as for the design-level earthquake for ZONA I. The ZONA 1 value is 0.4g, as specified in Salvadoran building code. Because this seismic hazard study is based on the latest knowledge, includes newer research than other studies (e.g., RESIS II 2009, Salazar et al. 2013, and GSHAP 1999), and corresponds to the local seismic design level, the PGA value of 0.41g can be considered as the appropriate seismic intensity for the risk assessment in this study.

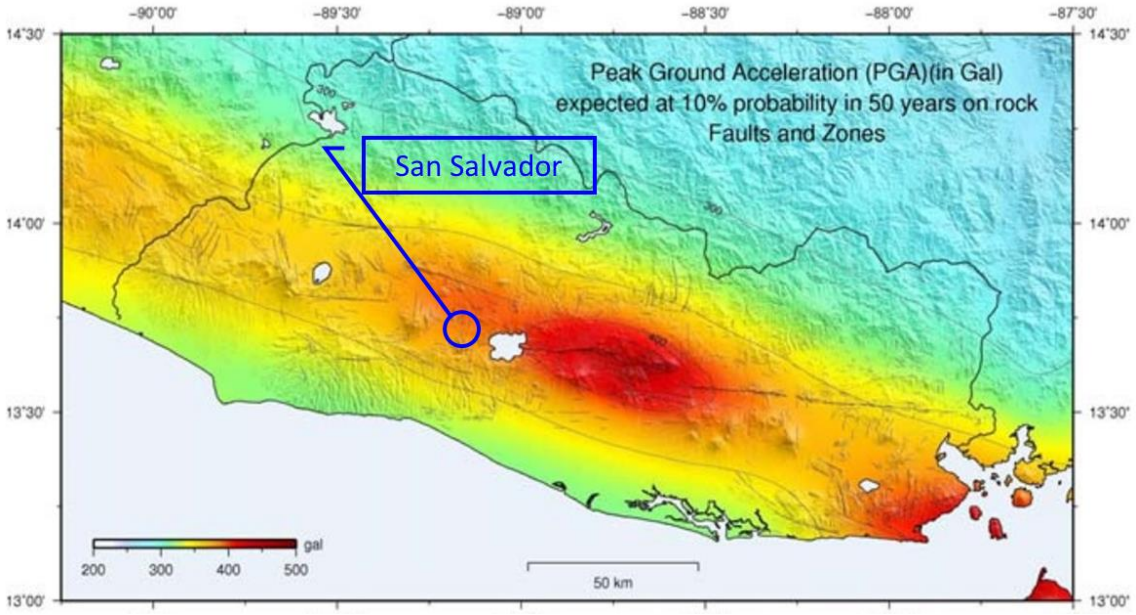


Figure 4 Seismic hazard map of El Salvador (Staller et al. 2016a)

2.3 Site soil classification

The soil investigation for San Salvador was based on the research by the Ministry of the Environment and Natural Resources (Ministerio de Medio Ambiente y Recursos Naturales) (MARN 2017). That research categorized the San Salvador region into five soil classes based on the predominant period of the soil; those soil class distributions are shown in Figure 5. Based on the site soil classification from the research, the soil class for the target area of this study was identified according to the soil class index of the Salvadoran building code (see Table 3, TSED 1994). Then the classification based on the Salvadoran building code was converted to the soil class index of ASCE 7-16 (see Table 4, ASCE 2017).

The soil amplification factors for PGA that are specified in ASCE 7-16 were adjusted to San Salvador, with consideration of local soil characteristics, and those adjusted values were used for this risk study. This approach was taken because no research about soil amplification effects in San Salvador was available, except for elastic analysis, and no amplification effects for PGA were provided in the El Salvador building code.

Based on the researched soil characteristics in Figure 5 and on the code-specified indexes, the site soil classes for San Salvador were geographically evaluated as presented in Figure 6. As depicted in Figure 6, the northeastern area and part of the southern area are Class C (S2, very dense soil and soft rock) or Class D (S3, stiff soil), and part of the central city and hilly area are identified as Class A (S1, hard rock) or Class B (S1, rock). A limited eastern area is Class E (S4, soft clay soil), and this soft-soil feature can be assumed to extend from lakeside soft soil (Lake Ilopango).

Note that seismic liquefaction might be possible at the soft-soil sites like Class E (S4). However, the soft-soil locations in this study area are just at the edge of the soft-soil field, and those limited areas are far from Lake Ilopango. In addition, the water table is at a depth of 80 to 90 m in the study area, and no liquefaction damage has been observed in past earthquakes, except along the shore of Ilopango (Bommer et al. 1997). There is also insufficient information to determine the potential for severe liquefaction in these areas. Therefore, the possibility of seismic liquefaction can be assumed to be very low in the area, and liquefaction damage due to earthquake is not considered further in this study.

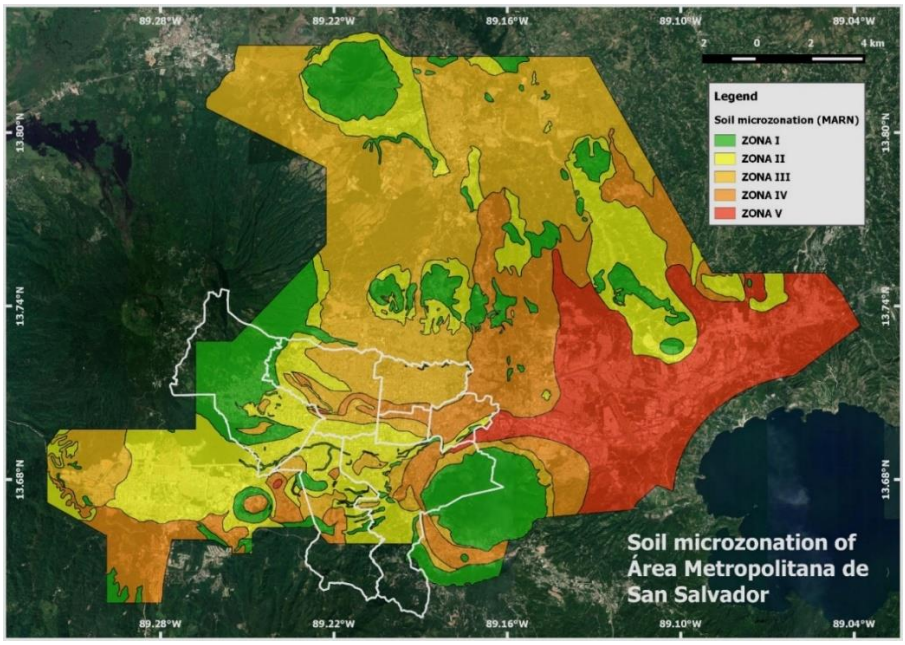


Figure 5 Soil class identification for the San Salvador area (MARN 2017)

Table 3 Soil class identification by the El Salvador building code (TSED 1994)

Soil class	Description
S1	(a) Rock appearance materials characterized by shear wave velocities greater than 500 m/sec. (b) Rigid or dense soil condition with a thickness not greater than 30 m above the rock layer.
S2	(a) Rigid or very dense soil condition with a thickness equal to 30 m or more above the rock layer. (b) Compact or very compact soils or medium dense with a thickness under 30 m.
S3	Soil profile with an accumulated thickness from 4 to 12 m of cohesive soils from soft to medium compact or loose non cohesive soils.
S4	Soil profile that contains more than 12 m of soft cohesive soil or loose non cohesive soil and characterized by a shear wave velocity of less than 150 m/sec.

Table 4 Soil class identification by the ASCE building code, ASCE 7-16 (ASCE 2017)

Soil class	Description
A	Hard rock, Vs30 > 1,524 m/s.
B	Rock, Vs30 = 762 to 1,524 m/s.
C	Very dense soil and soft rock, Vs30 = 366 to 762 m/s, N or Nch > 153 blows/m, Su > 96 kN/m^2.
D	Stiff soil, Vs30 = 183 to 366 m/s, N or Nch = 46 to 153 blows/m, Su = 48 to 96 kN/m^2.
E, F	Soft clay soil (or Soil requiring site analysis), Vs30 < 183 m/s, N or Nch < 46 blows/m, Su < 48 kN/m^2.

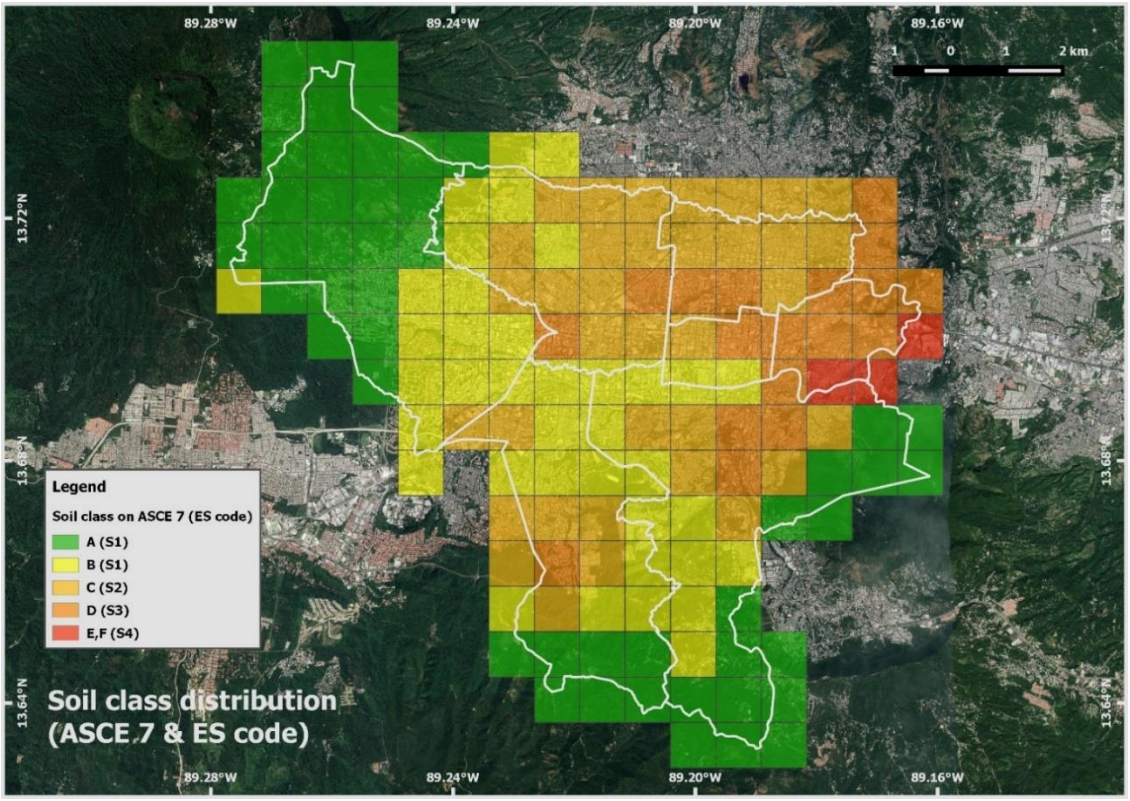


Figure 6 Spatial distribution of site soil class for the study area

2.4 Seismic design parameters

The site amplification factors (F_{PGA}) for PGA have been developed for this study by adjusting ASCE 7-16 factors (ASCE 2017) with consideration of local soil effects as researched by Flórez (2016). As Figure 7 shows, the site amplification factors are expressed according to the site class and the earthquake intensity, which is PGA in this study. For firm and rocky soil (Class A and Class B), no amplification due to surficial soil needs to be considered; therefore, F_{PGA} is approximately 1. For other soil types (e.g., softer soils), a certain level of amplification must be taken into account, according to the earthquake intensity.

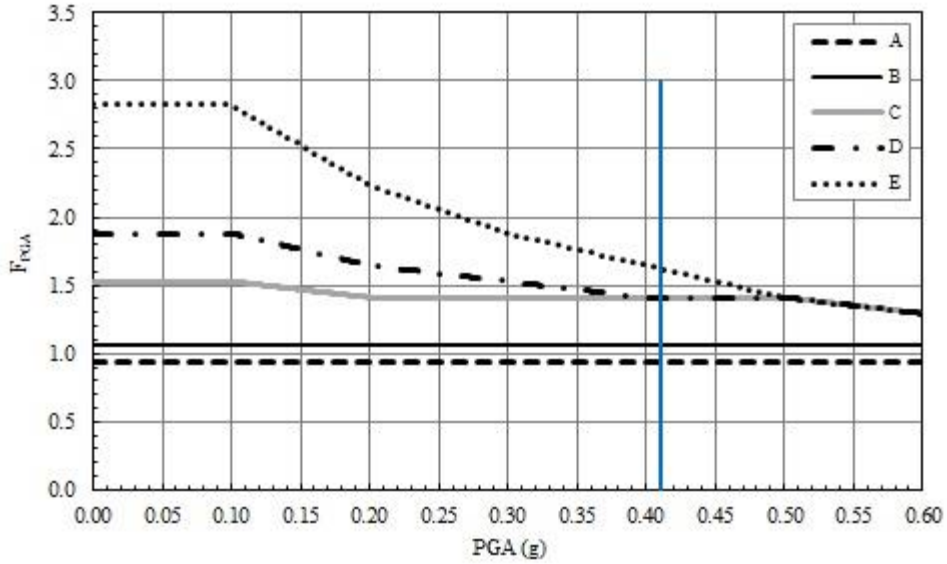


Figure 7 PGA site amplification factor adjustment of ASCE 7-16 (ASCE 2017 and Flórez 2016)

For San Salvador, the PGA based on bedrock soil equals 0.41g, as discussed in Section 0. The PGA amplification factors were computed based on this PGA intensity and are listed for each soil class in Table 5. Thus, with the consideration of soil amplification, the site-specific PGA for the design-level earthquake for San Salvador would be from 0.39g to 0.67g. Figure 8 presents a spatial distribution of the site-specific design PGA values for San Salvador according to site soil class. The grid zone spacing of 0.0075 degree (approximately 830 m) was used to simplify the PGA intensity distribution that applied to the risk analysis.

Table 5 PGA site amplification factors for the study area

Site class	F_{PGA}
A (S1)	0.94
B (S1)	1.06
C (S2)	1.41
D (S3)	1.41
E, F (S4)	1.62

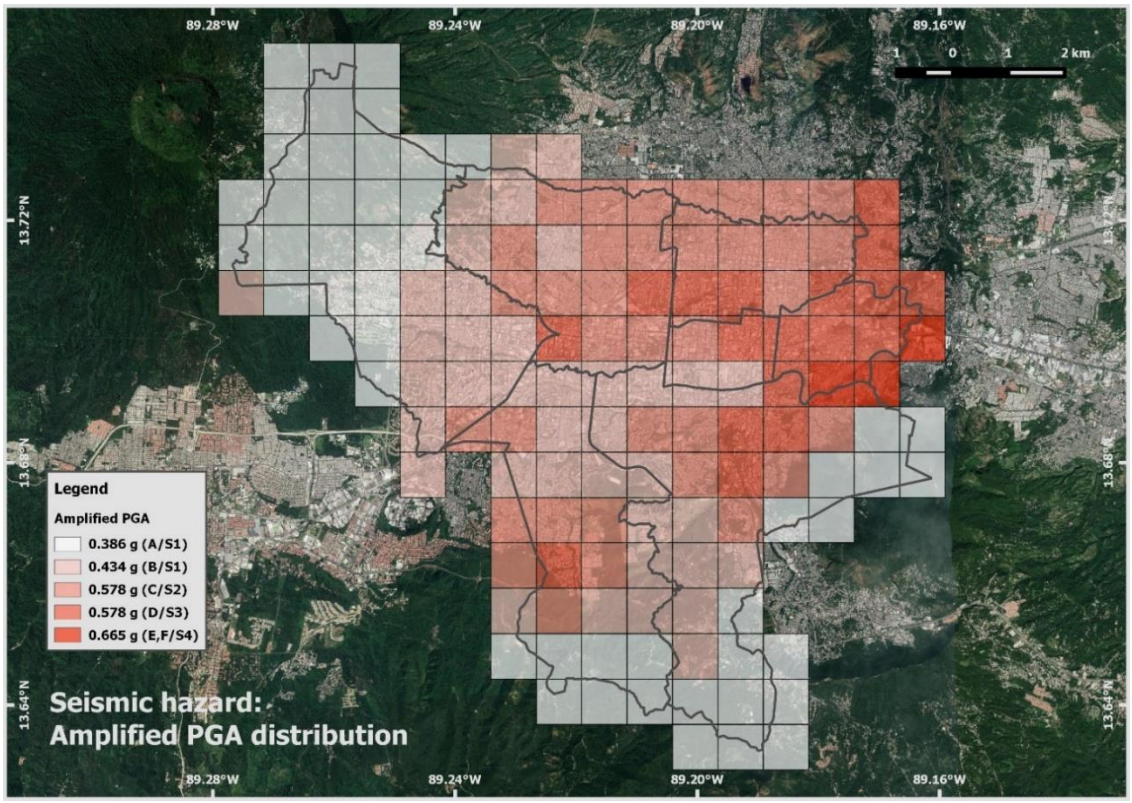


Figure 8 Design earthquake PGA with site amplification for the study area

3 EXPOSURE MODEL

3.1 Overview

The exposure model of San Salvador was developed through a statistical methodology by using city census data about buildings and the population (MINEC 2008, DIGESTYC 2009, MINSAL 2018, VMVDU 2007, and UCAMSS 2007), field survey information about existing buildings, and a zoning approach. The city was divided into several zones according to representative land-use patterns to reflect the regional features. The buildings and population, based on census data and city observation, were then allocated to each zone, considering the building typologies that were investigated by the field surveys. Thus, each zone includes information about the buildings and the population that are exposed to seismic hazard and is the areal unit to evaluate earthquake risks in this study.

3.2 Boundary of assessed zone

El Salvador consists of 14 departments, as shown in Figure 9 (CNJ 2019); the study area is part of the department of San Salvador, as encircled on the figure. The department is composed of 19 municipalities, and one, the municipality of San Salvador, is the study area for this seismic risk assessment. Local stakeholders have agreed to this selection as the study area.

Six contemporary districts and one historic district make up the municipality (referred to collectively as “San Salvador” in this report) as presented in 0. The municipality is the center of the metropolitan area of San Salvador, and therefore it contains a large amount of the built environment. According to the census data, the San Salvador study area is also densely inhabited. In addition, it can be assumed that numerous people living in the suburbs commute to or visit the municipality during the day. Table 6 presents the key statistics about buildings and occupants for the study area.

Table 6 Key statistics for San Salvador

Buildings		Occupants	
No.	Area, m^2	Day	Night
102,540	25,990,000	316,000	235,000

Figure 9 Fourteen departments of El Salvador, with the study area encircled (CNJ 2019)

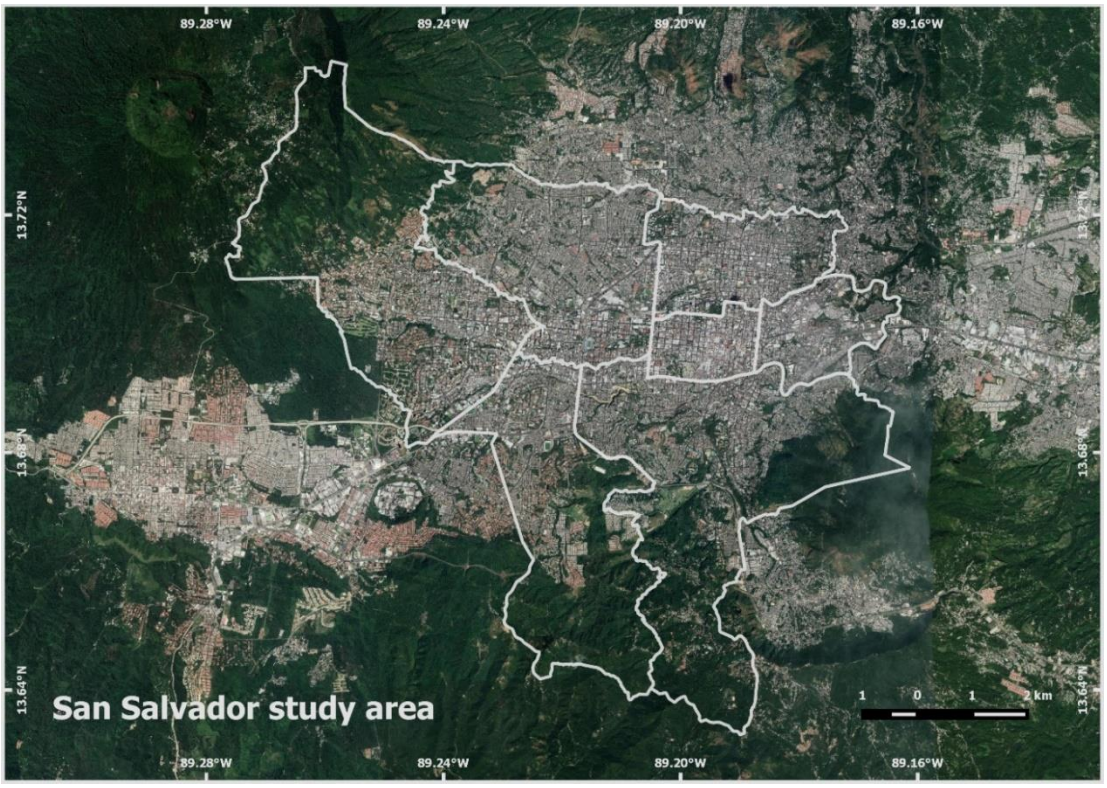


Figure 10 Study area of the municipality of San Salvador

3.3 Building typology

Building typology in San Salvador was investigated by performing structural observation of buildings in the field and by reviewing satellite imagery for the area. The buildings in San Salvador were then categorized into 9 construction types based on the lateral-force-resisting system (LFRS) and the construction materials. Four of the construction types were further subdivided into 2 or 3 groups based on the building height and design quality. The resulting 16 building types that are listed in Table 7 represent the typical building types in San Salvador. These types were used as the basic building types in San Salvador for the field survey, for the exposure model, and for further processes such as the development of fragility and consequence functions.

Other primary building features, such as the floor/roof material, building code cycle and typical occupancy and observed amount, are listed in Table 8 according to each building type. The photographs in Figure 11 show example buildings that represent each construction type in San Salvador. These features were confirmed by structural observations in the field, desk research, and information from local structural engineers.

Note that a small number of buildings might have previous structural damage from earthquakes (e.g., from the 1986 San Salvador Earthquake) that has still not been repaired. However, the structural field observation did not detect any clear earthquake damage. Therefore, this type of existing seismic damage is not considered further in the common building types in this study.

Table 7 Representative building types in San Salvador

Type	LFRS and material	Height[1]
1	Adobe (nonengineered)	Low
2	Bahareque[2] or informal (nonengineered)	Low
3	Unreinforced/unconfined masonry (URM)	Low
4	Confined masonry (CM, masonry bearing wall)	Low
5	CM, masonry bearing wall	Mid
6	CM, masonry bearing wall, HQ[3]	Low
7	RC frame (RCF) with masonry infill	Low/Mid
8	RCF with masonry infill	High
9	RC moment frame or RC shear wall (RCMF or RCSW)	Low/Mid
10	RCMF or RCSW	High
11	RC moment frame or RC shear wall (RCMF or RCSW)	Superhigh
12	Steel moment frame or steel braced frame (SMF or SBF)	Low/Mid
13	SMF or SBF	High
14	Steel moment frame or steel braced frame (SMF or SBF)	Superhigh
15	Light-gauge steel	Low
16	Wood light frame	Low

[1] Low, Mid, and High denote low-, mid-, and high-rise for 1–3, 4–7, and 8+ stories, respectively, and Superhigh indicates skyscraper buildings.
[2] Bahareque is mud/clay wall construction with timber/bamboo studs and a light roof in El Salvador.
[3] HQ indicates high-quality building design for a single residence, generally built in gated/high-priced communities.

Table 8 Primary features of representative building types

Type	Floor/roof	Code cycle	Occupancy	No. of building
1	Wood/metal	<1966 or <1997	Residential (single), historic (old town)	Very few
2	Wood/metal	<1966 or <1997	Residential (single), commercial (small shop)	Few
3	Wood/metal/PC concrete panel	<1966 or <1997	Residential (single), historic (church, old town), commercial (small shop), industrial (small factory)	Many
4	Concrete/PC concrete panel/ metal	<1997	Residential (single, multi), commercial (small shop), industrial (small factory), office	Many
5				
6		<1997 or 1997<	Residential (single, high-priced community)	Some
7	Concrete/PC concrete panel	<1997 or 1997<	Residential (multi), commercial, industrial, office	Some
8				
9	Concrete	<1997 or 1997<	Commercial, office, assembly	Some
10			Office, hospital	
11		International design code	High-rise residential (multi), commercial, office	Few
12	Concrete/metal (roof)	<1997 or 1997<	Commercial (shopping center), industrial, assembly	Some
13			Commercial, office	
14		International design code	High-rise residential (multi), commercial, office	Few
15	Metal/wood	<1997	Commercial (small shop), industrial (small factory)	Some
16	Wood/metal	<1966 or <1997	Residential (single), commercial (small shop), historic	Few


Type 1


Type 2


Type 3


Type 4 and Type 5


Type 6


Type 7 and Type 8


Type 9 and type 10


Type 11


Type 12 and type 13


Type 14


Type 15


Type 16

Figure 11 Examples of building types in San Salvador

3.4 San Salvador building assets

3.4.1 Overview

The distribution and occupancy of buildings in San Salvador naturally lend themselves to division between the so-called *primary* and *special* zones. The larger primary zones designate a typical distribution of land-use patterns and buildings, whereas the special zones designate a small number of usually high-density specialized land-use patterns for a relatively

small zone footprint. To spatially analyze seismic risk probabilistically and numerically, it is necessary to zone a study area for a quantitative risk assessment. The range of zoning must be determined according to the total area and to the density of the study area.

By reviewing satellite imagery and city data and by observing the study area in the field, seven primary patterns and five special patterns of land use were identified for San Salvador; see Table 9 and Table 10, respectively. The study area was then divided into 47 primary zones and 71 special zones for risk analysis, as presented in Figure 12. Figure 13 and Figure 14 show the spatial distributions of the primary and the special zones, respectively, for various land-use patterns.

Table 9 Land-use patterns for primary zones

No.	Land Use Pattern	Primary Description
1	Industrial	Low- and mid-rise buildings for industrial and commercial use
2	Urban	Low-, mid-, and high-rise buildings for residential, commercial, office, or educational use
3	Commercial	Low- and mid-rise buildings for commercial (and residential) use
4	Residential	Low- and mid-rise buildings for residential (and commercial) use
5	Sparse residential	Low-rise buildings for low-density residential use
6	Informal	Low-rise buildings for residential (and commercial) use
7	Open space (other)	Primarily open space such as parks and fields with a few low-rise buildings

Table 10 Land-use patterns for special zones

No.	Land-use pattern	Primary description
101	High-rise complex	Mid-, high-, and superhigh-rise residential/office/hotel/commercial complexes
102	Large hospital	Low- and mid-rise large (~city block) medical facilities
103	Large church	Low-rise large (~city block) religious institutions
104	Large commercial complex	Low- and mid-rise large (~city block) commercial complexes (shopping, amusement, sports)
105	Large manufacturing facility	Low-rise large (~city block) manufacturing facilities (factory, plant, workshop)

Figure 13 and Figure 14 also depict the numbering system that was used for the primary and the special zones, respectively, in this report. Note that the zonal boundaries and numbering system do not necessarily correlate with any administrative or municipal subdivisions in San Salvador. Rather, they were selected to promote uniformity in land-use pattern and for high accuracy in having the sample of surveyed buildings represent the San Salvador building pool as a whole.

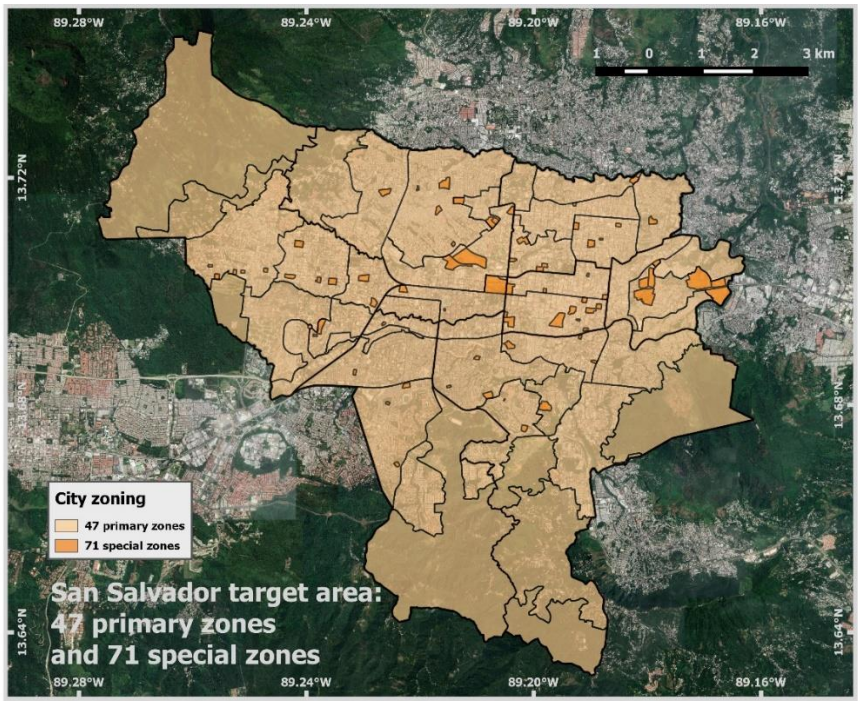


Figure 12 City zoning for the exposure model

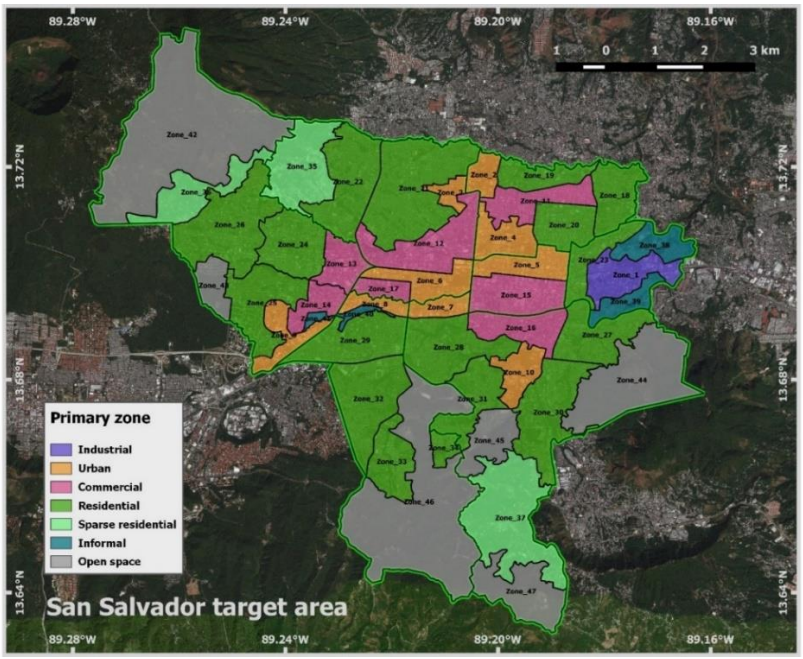


Figure 13 Spatial distribution of the 47 primary zones

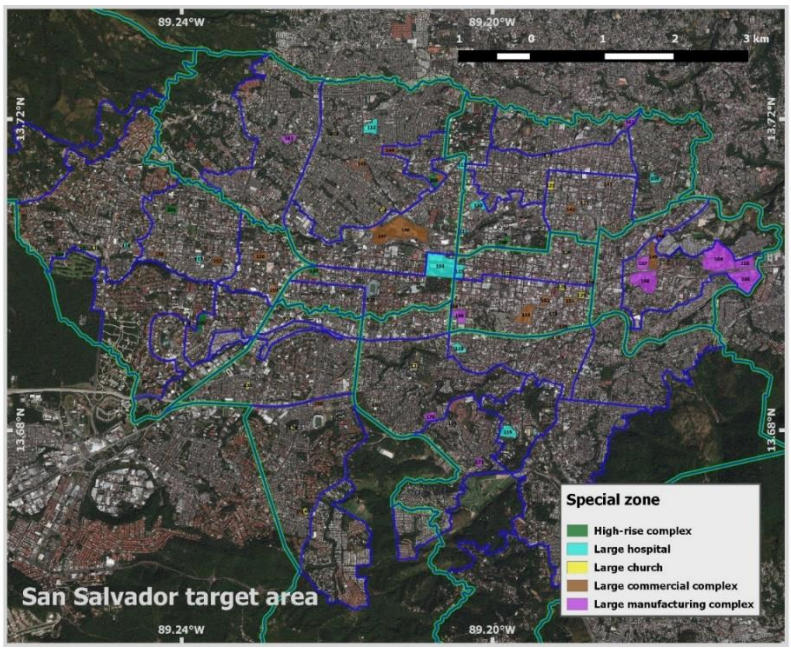


Figure 14 Spatial distribution of the 71 special zones

3.4.2 Distribution of building assets

Table 11 and

Table 12 present the distribution of buildings in the primary and special zones, respectively. Data from the city census (UCAMSS 2007) and satellite imagery were used to investigate the number, height, footprint area, and total area of low-, mid-, and high-rise buildings in each zone. To bridge the gap between the actual circumstances and the city census data, new buildings that had been constructed recently and the buildings that were unrecorded in the census data were manually added to this building asset value by visual check and by hand-vectorization.

Table 11 Distribution of buildings in primary zones

Zone properties			Number of buildings[4]				Building footprint area, m²			
No.	Primary land use	Area, m²	L	M	H	Total	L	M	H	Total
1	Industrial	829,464	1,145	22	0	1,167	234,036	5,476	0	239,512
2	Urban	524,682	307	4	0	311	72,446	4,197	0	76,644
3	Urban	299,209	535	5	0	540	112,221	3,965	0	116,186
4	Urban	925,643	641	39	4	684	195,426	22,848	3,674	221,948
5	Urban	940,998	1,235	50	0	1,285	349,580	21,341	0	370,921
6	Urban	896,194	887	14	2	903	265,812	8,011	1,034	274,857
7	Urban	492,124	986	1	0	987	198,465	90	0	198,555
8	Urban	397,611	731	6	0	737	123,997	4,832	0	128,829
9	Urban	827,280	339	7	0	346	172,597	10,919	0	183,516
10	Urban	806,089	701	28	0	729	129,272	1,472	0	130,743
11	Commercial	1,201,491	3,455	15	0	3,470	506,751	2,254	0	509,005

[4] L, M, and H denote low-rise (1–3 stories), mid-rise (4–7 stories), and high-rise (8+ stories), respectively.

Zone properties			Number of buildings[4]				Building footprint area, m²			
No.	Primary land use	Area, m²	L	M	H	Total	L	M	H	Total
12	Commercial	1,766,806	2,114	62	3	2,179	497,672	31,344	2,543	531,559
13	Commercial	820,636	743	11	2	756	264,369	12,796	1,269	278,434
14	Commercial	658,602	523	10	2	535	214,922	4,920	1,438	221,279
15	Commercial	1,362,579	2,097	76	0	2,173	447,721	22,250	0	469,971
16	Commercial	1,176,198	3,264	21	0	3,285	447,262	5,020	0	452,282
17	Commercial	445,137	634	10	0	644	145,627	10,836	0	156,463
18	Residential	1,191,235	2,729	72	0	2,801	349,779	13,653	0	363,431
19	Residential	882,998	2,049	11	0	2,060	291,891	1,986	0	293,877
20	Residential	1,081,488	2,863	16	0	2,879	437,650	2,438	0	440,088
21	Residential	3,467,641	9,018	19	0	9,037	1,384,042	3,446	0	1,387,488
22	Residential	2,226,971	6,345	7	0	6,352	800,407	3,829	0	804,236
23	Residential	920,887	2,118	5	0	2,123	354,047	1,056	0	355,102
24	Residential	1,556,089	2,532	18	1	2,551	609,999	12,023	1,194	623,216
25	Residential	1,803,517	1,278	22	9	1,309	497,587	14,814	6,095	518,497
26	Residential	2,820,311	4,262	44	8	4,314	970,231	21,891	3,882	996,004
27	Residential	1,660,842	6,159	3	0	6,162	606,230	671	0	606,901
28	Residential	2,065,434	4,918	122	0	5,040	614,513	23,109	0	637,622
29	Residential	1,866,039	2,755	15	1	2,771	692,070	7,191	403	699,664
30	Residential	2,280,982	5,645	4	0	5,649	651,916	2,596	0	654,512
31	Residential	1,316,700	4,266	13	0	4,279	439,227	559	0	439,786
32	Residential	2,232,146	4,115	13	0	4,128	699,078	6,204	0	705,282
33	Residential	1,206,732	3,211	0	0	3,211	381,488	0	0	381,488
34	Residential	343,037	1,696	0	0	1,696	113,978	0	0	113,978
35	Sparse residential	2,077,881	2,241	2	0	2,243	254,316	343	0	254,659
36	Sparse residential	1,410,678	696	0	0	696	118,937	0	0	118,937
37	Sparse residential	3,420,531	1,679	0	0	1,679	323,282	0	0	323,282
38	Informal	863,905	3,425	0	0	3,425	197,835	0	0	197,835
39	Informal	609,238	2,821	7	0	2,828	212,702	2,285	0	214,988
40	Informal	155,313	1,214	0	0	1,214	56,249	0	0	56,249
41	Informal	106,453	1,105	0	0	1,105	46,711	0	0	46,711
42	Open space	7,528,415	574	0	0	574	48,768	0	0	48,768
43	Open space	685,139	51	0	0	51	7,529	0	0	7,529
44	Open space	3,296,612	36	0	0	36	3,721	0	0	3,721
45	Open space	1,135,329	98	0	0	98	9,900	0	0	9,900
46	Open space	6,834,594	695	0	0	695	77,819	0	0	77,819
47	Open space	1,755,736	109	0	0	109	14,257	0	0	14,257
Total		73,173,615	101,040	774	32	101,846	15,644,333	290,665	21,532	15,956,530

Table 12 Distribution of buildings in special zones

Zone properties			Number of buildings[5]				Building footprint area, m²			
No.[6]	Primary land use	Area, m²	L	M	H	Total	L	M	H	Total
101	High-rise complex	19,625	4	1	3	8	4,065	356	3,631	8,052
102	High-rise complex	3,856	2	0	1	3	569	0	973	1,542

[5] L, M, and H denote low-rise (1–3 stories), mid-rise (4–7 stories), and high-rise (8+ stories), respectively.

[6] Zones with shaded entries were used to count the total building population but were not directly surveyed because they are similar to other surveyed zones with the same land-use pattern.

Zone properties			Number of buildings[5]				Building footprint area, m²			
No.[6]	Primary land use	Area, m²	L	M	H	Total	L	M	H	Total
103	High-rise complex	6,608	2	0	1	3	477	0	1,206	1,683
104	High-rise complex	9,651	3	0	3	6	2,566	0	1,359	3,925
105	High-rise complex	31,729	4	0	5	9	3,875	0	5,133	9,009
106	High-rise complex	23,849	5	0	5	10	4,180	0	3,321	7,501
107	High-rise complex	18,030	1	0	4	5	431	0	6,563	6,994
108	High-rise complex	20,750	6	1	1	8	1,336	2,364	755	4,455
109	Large hospital	17,262	4	0	0	4	4,115	0	0	4,115
110	Large hospital	21,887	21	4	1	26	7,270	1,098	164	8,532
111	Large hospital	8,752	4	0	0	4	1,527	0	0	1,527
112	Large hospital	33,232	18	4	0	22	3,397	5,814	0	9,210
113	Large hospital	14,962	5	3	1	9	958	2,030	627	3,615
114	Large hospital	133,420	86	0	0	86	43,258	0	0	43,258
115	Large hospital	26,558	4	2	0	6	5,474	3,830	0	9,305
116	Large hospital	5,890	0	1	0	1	0	2,392	0	2,392
117	Large hospital	7,810	3	3	0	6	1,038	2,378	0	3,416
118	Large hospital	19,209	3	1	0	4	1,020	5,884	0	6,903
119	Large hospital	33,899	20	0	0	20	10,491	0	0	10,491
120	Large church	4,367	5	0	0	5	1,693	0	0	1,693
121	Large church	13,166	4	0	0	4	4,417	0	0	4,417
122	Large church	2,162	1	0	0	1	1,546	0	0	1,546
123	Large church	2,979	5	0	0	5	1,144	0	0	1,144
124	Large church	4,600	3	0	0	3	1,265	0	0	1,265
125	Large church	1,199	1	0	0	1	520	0	0	520
126	Large church	2,611	1	0	0	1	2,159	0	0	2,159
127	Large church	5,495	1	0	0	1	1,656	0	0	1,656
128	Large church	8,927	1	0	0	1	2,659	0	0	2,659
129	Large church	9,317	3	0	0	3	2,170	0	0	2,170
130	Large church	2,033	2	0	0	2	879	0	0	879
131	Large church	3,856	1	0	0	1	601	0	0	601
132	Large church	5,218	2	0	0	2	2,548	0	0	2,548
133	Large church	6,344	9	0	0	9	3,092	0	0	3,092
134	Large church	798	1	0	0	1	449	0	0	449
135	Large church	4,242	2	0	0	2	1,313	0	0	1,313
136	Large church	5,290	1	0	0	1	664	0	0	664
137	Large church	3,468	1	0	0	1	1,322	0	0	1,322
138	Large church	5,575	2	0	0	2	1,857	0	0	1,857
139	Large church	3,363	2	0	0	2	409	0	0	409
140	Large church	6,911	1	0	0	1	561	0	0	561
141	Large commercial complex	6,388	3	0	0	3	2,834	0	0	2,834
142	Large commercial complex	17,152	5	0	0	5	7,848	0	0	7,848
143	Large commercial complex	11,113	5	1	0	6	3,236	809	0	4,045
144	Large commercial complex	25,181	14	0	0	14	7,514	0	0	7,514
145	Large commercial complex	12,846	6	0	0	6	3,818	0	0	3,818
146	Large commercial complex	139,058	9	0	0	9	37,982	0	0	37,982
147	Large commercial complex	63,257	6	0	0	6	14,048	0	0	14,048
148	Large commercial complex	12,058	4	0	0	4	4,324	0	0	4,324
149	Large commercial complex	40,581	62	0	0	62	15,064	0	0	15,064
150	Large commercial complex	9,492	1	0	0	1	4,619	0	0	4,619
151	Large commercial complex	16,552	5	0	1	6	7,330	0	632	7,962

Zone properties			Number of buildings[5]				Building footprint area, m²			
No.[6]	Primary land use	Area, m²	L	M	H	Total	L	M	H	Total
152	Large commercial complex	16,817	18	0	0	18	9,690	0	0	9,690
153	Large commercial complex	51,647	63	0	0	63	28,568	0	0	28,568
154	Large commercial complex	7,561	1	0	0	1	1,813	0	0	1,813
155	Large commercial complex	5,063	1	0	0	1	2,250	0	0	2,250
156	Large commercial complex	14,515	9	0	0	9	3,793	0	0	3,793
157	Large commercial complex	18,153	1	0	0	1	7,918	0	0	7,918
158	Large commercial complex	22,069	0	2	0	2	0	10,712	0	10,712
159	Large commercial complex	15,825	3	0	0	3	7,861	0	0	7,861
160	Large commercial complex	12,355	1	0	0	1	4,325	0	0	4,325
161	Large commercial complex	3,116	2	0	0	2	1,498	0	0	1,498
162	Large manufacturing facility	15,733	6	0	0	6	3,943	0	0	3,943
163	Large manufacturing facility	21,830	8	0	0	8	10,077	0	0	10,077
164	Large manufacturing facility	40,120	58	5	0	63	29,755	2,822	0	32,577
165	Large manufacturing facility	147,304	9	0	0	9	9,332	0	0	9,332
166	Large manufacturing facility	104,774	26	0	0	26	31,056	0	0	31,056
167	Large manufacturing facility	32,281	21	0	0	21	14,259	0	0	14,259
168	Large manufacturing facility	93,904	34	0	0	34	29,430	0	0	29,430
169	Large manufacturing facility	30,855	6	0	0	6	15,576	0	0	15,576
170	Large manufacturing facility	19,537	8	0	0	8	5,467	0	0	5,467
171	Large manufacturing facility	12,327	2	0	0	2	7,597	0	0	7,597
Total		1,598,364	641	28	26	695	461,794	40,489	24,365	526,649

Table 13 shows the computed cumulative number and footprint area of buildings from Table 11 and

Table 12. In addition to that summarized information about building assets, the total area and the number of stories per building were accumulated and applied to calculate the total area and average number of stories for the building assets of San Salvador and are presented in Table 14.

Table 13 Total number and footprint of buildings in all zones

Zone properties		Number of buildings				Building footprint area, m²			
Zone	Area, m²	L	M	H	Total	L	M	H	Total
Primary zone	73,173,615	101,040	774	32	101,846	15,644,333	290,665	21,532	15,956,530
Special zone	1,598,364	641	28	26	695	461,794	40,489	24,365	526,649
Total	74,771,979	101,681	802	58	102,541	16,106,128	331,155	45,896	16,483,179

Table 14 Building total area and average number of stories

Zone properties		Building total area, m²				Average number of stories			
Zone	Area, m²	L	M	H	Total	L	M	H	Total
Primary zone	73,173,615	23,095,558	1,338,478	202,735	24,636,771	1.5	4.6	9.4	1.5
Special zone	1,598,364	797,177	195,705	360,902	1,353,784	1.7	4.8	14.8	2.6
Total	74,771,979	23,892,736	1,534,183	563,636	25,990,555	1.5	4.6	12.3	1.6

3.5 Surveyed buildings

3.5.1 Overview

Building surveys were conducted by teams that consisted of multiple assessors who were supervised by several engineering professors. Before the inception of the survey, to ensure that high reliability and uniformity were maintained during data collection of buildings in the field, Miyamoto engineers conducted a two-day survey training, which consisted of an office lecture and field practice for assessors and supervisors. During the first few weeks of the actual field survey, Miyamoto engineers also supervised the assessors in the field. To minimize human error, all the data was collected electronically through the Inventory Data Capture Tools (IDCT) on tablets (GEM 2014). Appendix B presents a detailed discussion about the expected margin of error (*E*) and about the fidelity of the survey data.

3.5.2 Spatial distribution of surveyed buildings

Unless any safety concerns existed, the building field surveys were performed in the representative blocks of each primary zone and in the selected special zones. Teams surveyed in the field 2,910 buildings (2.8% of the total), which was a little more than the planned number. Figure 15 depicts the spatial distribution of those buildings. The number of buildings that had to be surveyed for each zone depended on the size and the features of each zone and was determined also by considering the height and the number of buildings based on the city census data, as discussed in Section 0. Table 41 in Appendix A presents the detailed information that was collected for those surveyed buildings. The information that was gathered in the field for each building in each zone was then applied to develop the exposure model of San Salvador for seismic risk analysis.

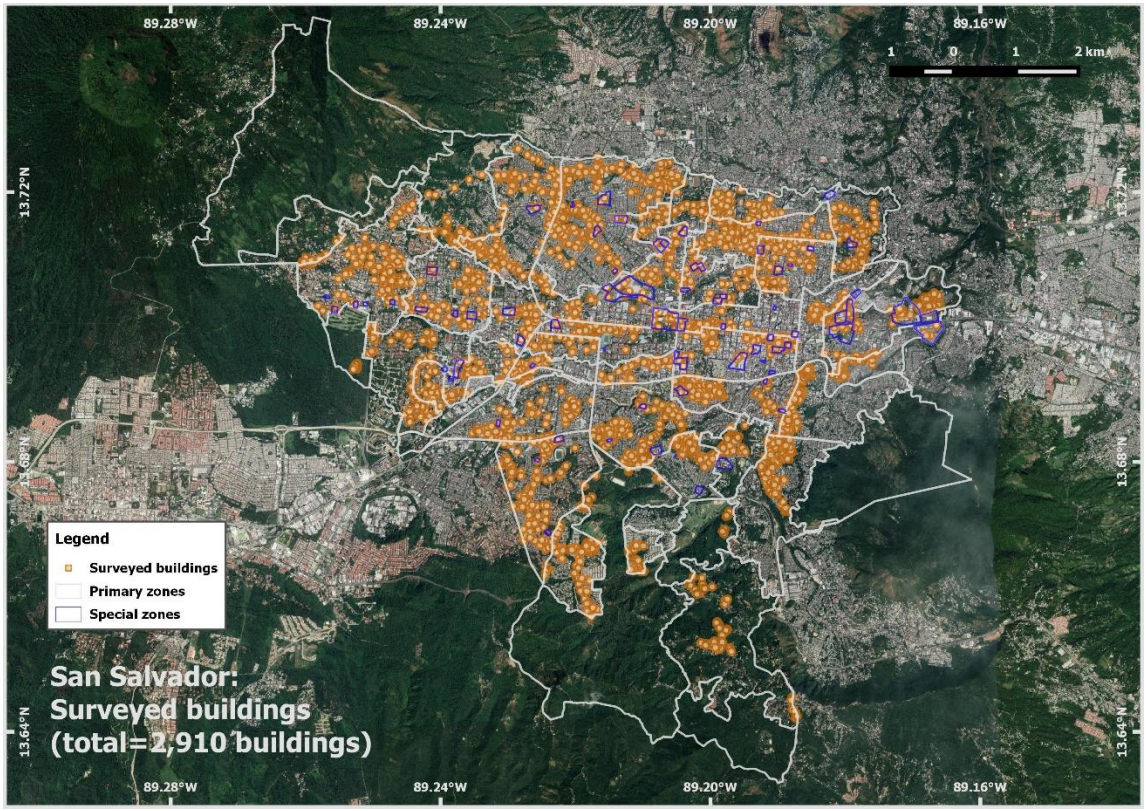


Figure 15 Spatial distribution of the 2,910 surveyed buildings

3.5.3 Zonal distribution of surveyed buildings

Table 15 and Table 16 present the distribution of the 2,910 surveyed buildings for the primary and the special zones, respectively. In total, approximately 2.7% of the buildings in the primary zones (4.3% of the building footprint area) and 24% of the buildings in the special zones (44% of the building footprint area) were surveyed. In the tables, the breakdown of the number and the footprint area of the surveyed buildings in each zone is shown according to the building height category.

Table 15 Distribution of surveyed buildings, primary zones

Zone	Number of buildings[7]				Building footprint area, m^2			
	L	M	H	Total	L	M	H	Total
1	31	6	--	37	5,593	1,516	--	7,109
2	18	1	--	19	20,739	2,304	--	23,043
3	21	--	--	21	4,005	--	--	4,005
4	30	10	--	40	13,442	9,232	--	22,674
5	29	11	--	40	10,887	8,292	--	19,179
6	27	3	1	31	8,428	1,700	300	10,428
7	28	1	--	29	8,096	81	--	8,177
8	24	1	--	25	9,646	300	--	9,946
9	24	3	--	27	16,075	3,555	--	19,630
10	23	4	--	27	5,151	324	--	5,475
11	90	2	--	92	19,422	628	--	20,050
12	58	12	3	73	21,910	7,666	1,629	31,205
13	28	3	1	32	20,428	6,650	1,600	28,678
14	27	2	1	30	14,554	956	625	16,135
15	49	19	--	68	24,306	13,814	--	38,120
16	79	5	--	84	11,233	543	--	11,776
17	22	2	--	24	17,039	2,625	--	19,664
18	77	16	--	93	10,393	3,149	--	13,542
19	58	3	--	61	15,265	729	--	15,994
20	67	3	--	70	20,599	1,084	--	21,683
21	187	4	--	191	31,362	1,253	--	32,615
22	140	1	--	141	31,167	400	--	31,567
23	51	1	--	52	12,861	312	--	13,173
24	62	4	1	67	28,194	2,104	600	30,898
25	56	5	2	63	16,062	2,700	840	19,602
26	95	25	8	128	21,021	13,590	6,303	40,914
27	129	1	--	130	17,180	350	--	17,530
28	113	18	--	131	11,815	5,516	--	17,331
29	72	3	1	76	20,503	5,292	600	26,395
30	122	2	--	124	18,780	216	--	18,996
31	101	2	--	103	9,364	660	--	10,024
32	100	4	--	104	23,718	1,330	--	25,048
33	83	--	--	83	12,061	--	--	12,061
34	38	--	--	38	2,438	--	--	2,438
35	52	2	1	55	8,380	1,250	798	10,428
36	23	--	--	23	3,649	--	--	3,649
37	72	--	--	72	9,750	--	--	9,750

[7] L, M, and H denote low-rise (1–3 stories), mid-rise (4–7 stories), and high-rise (8+ stories), respectively.

Zone	Number of buildings[7]				Building footprint area, m²			
	L	M	H	Total	L	M	H	Total
38	76	--	--	76	7,070	--	--	7,070
39	66	2	--	68	5,509	231	--	5,740
40	33	--	--	33	1,468	--	--	1,468
41	13	--	--	13	1,065	--	--	1,065
42	--	--	--	--	--	--	--	--
43	11	--	--	11	1,115	--	--	1,115
44	--	--	--	--	--	--	--	--
45	12	1	--	13	1,225	72	--	1,297
46	22	--	--	22	1,622	--	--	1,622
47	--	--	--	--	--	--	--	--
Total	2,539	182	19	2,740	574,590	100,424	13,295	688,309

Table 16 Distribution of surveyed buildings, special zones

Zone[8]	Number of buildings[9]				Building footprint area, m²			
	L	M	H	Total	L	M	H	Total
101	--	3	1	4	--	7,890	870	8,760
102	--	--	--	--	--	--	--	--
103	--	--	--	--	--	--	--	--
104	1	--	2	3	675	--	840	1,515
105	2	--	2	4	2,326	--	3,970	6,296
106	2	--	2	4	1,546	--	1,073	2,619
107	1	--	2	3	400	--	2,900	3,300
108	1	--	3	4	620	--	2,540	3,160
109	--	--	--	--	--	--	--	--
110	5	2	1	8	2,106	441	225	2,772
111	--	--	--	--	--	--	--	--
112	--	3	--	3	--	2,577	--	2,577
113	4	--	1	5	2,558	--	720	3,278
114	14	1	--	15	26,383	2,000	--	28,383
115	5	2	1	8	4,095	910	441	5,446
116	--	--	--	--	--	--	--	--
117	--	--	--	--	--	--	--	--
118	2	2	--	4	2,143	4,950	--	7,093
119	--	--	--	--	--	--	--	--
120	2	--	--	2	1,878	--	--	1,878
121	2	--	--	2	4,613	--	--	4,613
122	1	--	--	1	800	--	--	800
123	--	--	--	--	--	--	--	--
124	2	--	--	2	920	--	--	920
125	--	--	--	--	--	--	--	--
126	--	--	--	--	--	--	--	--
127	1	--	--	1	1,275	--	--	1,275
128	1	--	--	1	1,716	--	--	1,716

[8] Zones with shaded entries were used to count the total building population but were directly surveyed because they are similar to other surveyed zones with the same land-use pattern. A few zones were not surveyed because of safety reasons, but those zones are also similar to other surveyed zones.

[9] L, M, and H denote low-rise (1–3 stories), mid-rise (4–7 stories), and high-rise (8+ stories), respectively.

Zone[8]	Number of buildings[9]				Building footprint area, m²			
	L	M	H	Total	L	M	H	Total
129	3	--	--	3	2,251	--	--	2,251
130	--	--	--	--	--	--	--	--
131	1	--	--	1	300	--	--	300
132	1	--	--	1	176	--	--	176
133	3	--	--	3	1,640	--	--	1,640
134	--	--	--	--	--	--	--	--
135	--	--	--	--	--	--	--	--
136	--	--	--	--	--	--	--	--
137	1	--	--	1	805	--	--	805
138	1	--	--	1	1,800	--	--	1,800
139	1	--	--	1	530	--	--	530
140	--	--	--	--	--	--	--	--
141	--	--	--	--	--	--	--	--
142	1	--	--	1	6,900	--	--	6,900
143	--	--	--	--	--	--	--	--
144	5	--	--	5	7,195	--	--	7,195
145	2	--	--	2	2,817	--	--	2,817
146	3	--	--	3	5,432	--	--	5,432
147	3	--	--	3	3,495	--	--	3,495
148	--	--	--	--	--	--	--	--
149	16	--	--	16	4,005	--	--	4,005
150	1	--	--	1	6,241	--	--	6,241
151	3	--	--	3	10,047	--	--	10,047
152	--	--	--	--	--	--	--	--
153	13	--	--	13	16,972	--	--	16,972
154	--	--	--	--	--	--	--	--
155	--	--	--	--	--	--	--	--
156	--	--	--	--	--	--	--	--
157	--	--	--	--	--	--	--	--
158	--	1	--	1	--	20,000	--	20,000
159	1	--	--	1	8,000	--	--	8,000
160	2	--	--	2	4,313	--	--	4,313
161	1	--	--	1	1,350	--	--	1,350
162	--	--	--	--	--	--	--	--
163	3	--	--	3	4,240	--	--	4,240
164	13	1	1	15	3,594	360	324	4,278
165	--	--	--	--	--	--	--	--
166	4	--	--	4	4,144	--	--	4,144
167	--	--	--	--	--	--	--	--
168	7	2	--	9	12,664	399	--	13,063
169	2	--	--	2	13,750	--	--	13,750
170	--	--	--	--	--	--	--	--
171	--	--	--	--	--	--	--	--
Total	137	17	16	170	176,715	39,527	13,903	230,145

3.5.4 Land-use distribution of surveyed buildings

Figure 16 and Figure 17 present the percentage of surveyed buildings (relative to the total surveyed) for each type of land-use pattern for the primary zones and the special zones, respectively.

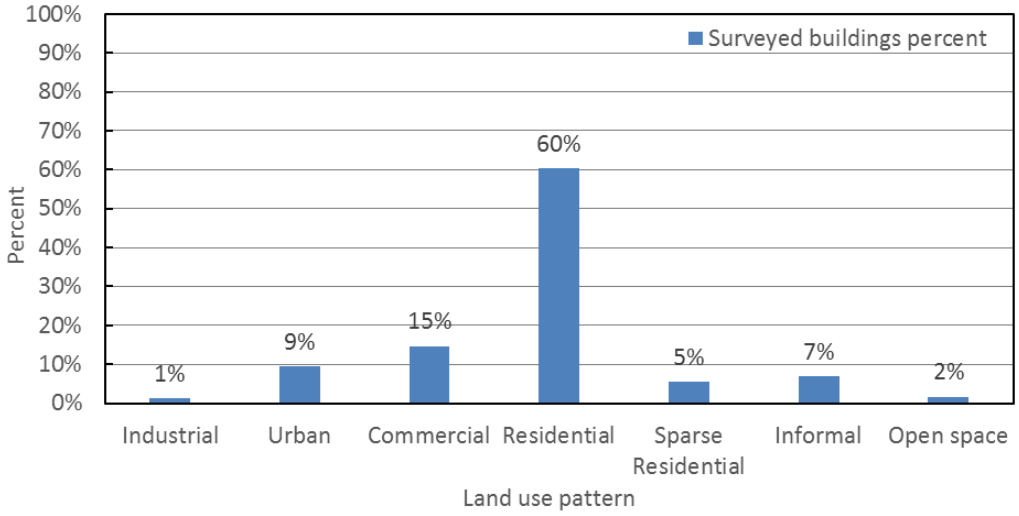


Figure 16 Rate of land-use for surveyed buildings, primary zones

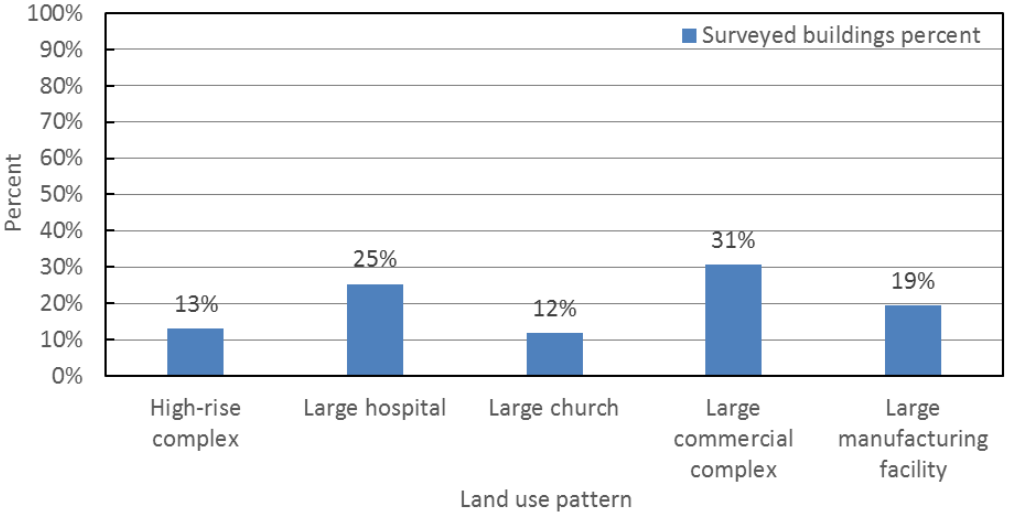


Figure 17 Rate of land-use for surveyed buildings, special zones

3.6 Building type and occupancy distribution of exposure model

The collected information about the 2,910 surveyed buildings was used to establish the exposure model for San Salvador that was applied to this risk study. The model was first developed for each zone based on the surveyed building data (e.g., construction type, area, height, occupancy) about the corresponding zone and then was integrated by combining all zones for the whole study area. The integrated exposure model contains all the necessary information for risk analysis, such as building construction type, LFRS, occupancy type and number of occupants, height, area, volume (size), occupancy, and occupant. The following sections provide information about the composition of the major features of the exposure model for San Salvador that was developed for this risk assessment.

3.6.1 Distribution based on construction type

Table 17 presents the composition of the exposure model based on the 16 building types in Table 7. Figure 18 depicts the distribution of buildings in the exposure model by building type, and the data is shown for both the number of buildings and the total area of buildings. In Figure 18, the data is normalized to either the total number or the total area of buildings.

Note that the bulk of the buildings in the exposure model consist of low-rise types 3 and 4 (URM and confined masonry, respectively).

Table 17 Composition of the exposure model based on building type

Type	LFRS and material	Buildings	
		Number	Area, m^2
1	Adobe (nonengineered)	126	7,386
2	Bahareque or informal (nonengineered)	262	15,601
3	Unreinforced/unconfined masonry (URM)	19,010	3,279,549
4	Confined masonry (CM, masonry bearing wall)	69,152	14,059,461
5	CM, masonry bearing wall	392	410,065
6	CM, masonry bearing wall HQ	7,398	2,851,780
7	RC frame (RCF) with masonry infill	2,874	1,959,978
8	RCF with masonry infill	6	35,508
9	RC moment frame or RC shear wall (RCMF or RCSW)	703	1,059,286
10	RCMF or RCSW	20	148,009
11	RCMF or RCSW	23	302,737
12	Steel moment frame or steel braced frame (SMF or SBF)	635	1,118,090
13	SMF or SBF	5	61,681
14	SMF or SBF	5	15,702
15	Light-gauge steel	1,704	627,378
16	Wood light frame	228	38,344
Total		102,541	25,990,555

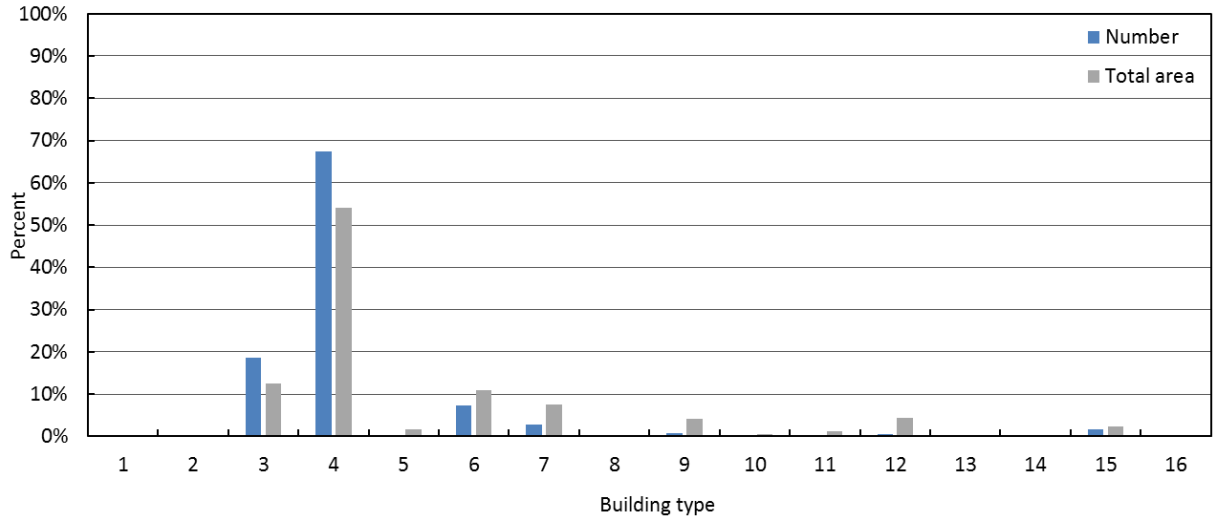


Figure 18 Building composition based on building type (normalized)

3.6.2 Distribution based on occupancy type

Table 18 presents the composition of the exposure model based on the occupancy types that were defined by the field survey. Figure 19 presents the rate of each type of occupancy in the pool of exposure-model buildings, and the data is shown for both the number of buildings and the total area of buildings. In Figure 19, the data is normalized to either the total number or the total area of buildings.

Note that residential and commercial and public are the prominent occupancy types of the buildings in the exposure model.

Table 18 Composition of the exposure model base on building occupancy type

Notation	Occupancy	Buildings	
		Number	Area, m^2
R	Residential	64,301	9,881,544
C	Commercial and public	23,853	10,350,843
I	Industrial	2,480	1,015,274
G	Government	634	426,019
E	Education	2,918	1,787,343
As	Assembly	2,686	1,191,220
Ag	Agriculture	45	14,511
M	Mixed use	4,292	941,939
O	Other occupancy type	843	200,476
U	Unknown occupancy type	490	181,385
Total		102,541	25,990,555

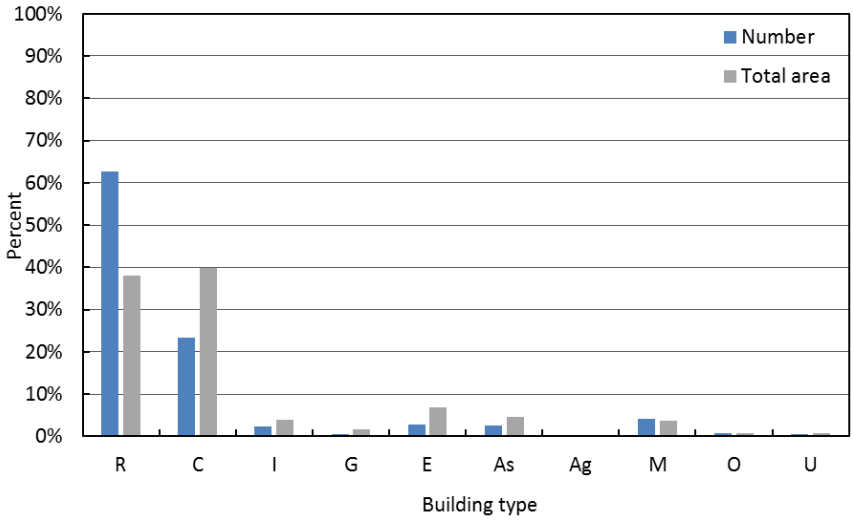


Figure 19 Building composition based on occupancy type (normalized)

3.6.3 Distribution based on building height

Table 19 presents the composition of the exposure model based on building height. Figure 20 presents the rate of each building height in the pool of exposure-model buildings, and the data is shown for both the number of buildings and the total area of buildings. In Figure 20, the data is normalized to either the total number or the total area of buildings.

Note that the low-rise (one- to three-story) buildings contribute approximately 99% of the number of buildings and 92% of the total area of buildings in the exposure model.

Table 19 Composition of the exposure model based on building height

Notation	Occupancy	Buildings	
		Number	Area, m²
Low	Low-rise (1–3 stories)	101,681	23,892,736
Mid	Mid-rise (4–7 stories)	802	1,534,183
High	High-rise (8 or more stories including Superhigh)	58	563,636
Total		102,541	25,990,555

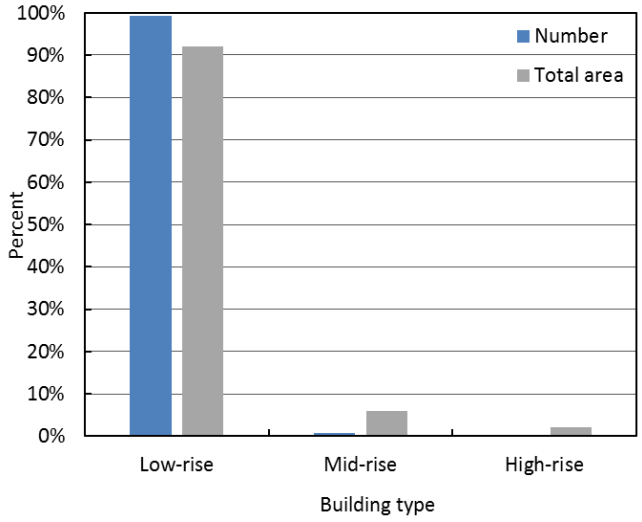
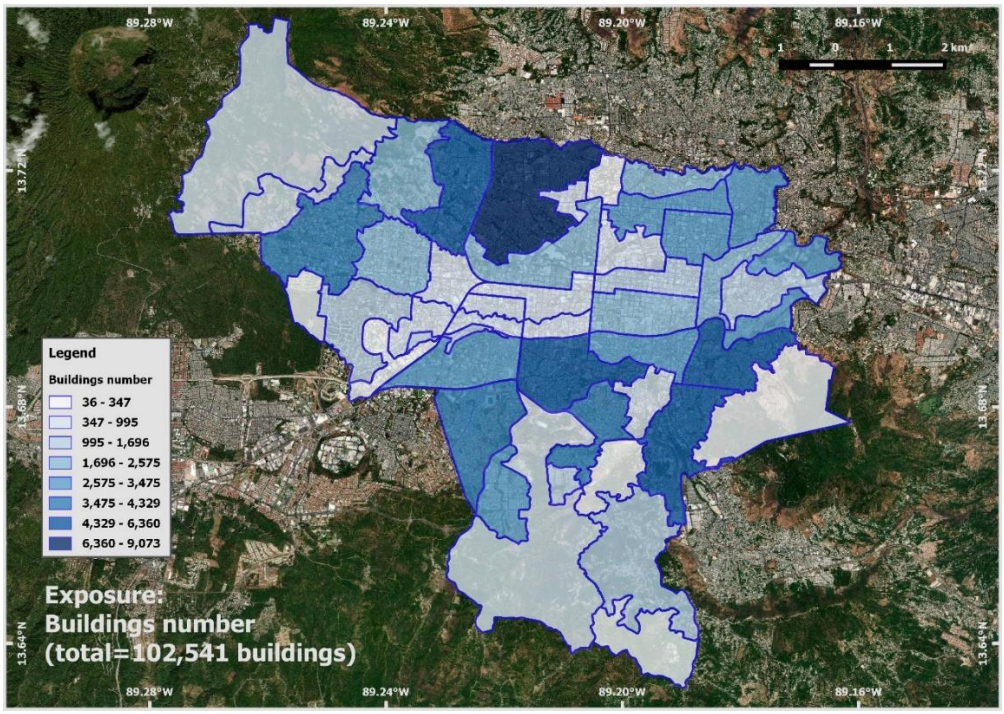


Figure 20 Building composition based on building height (normalized)

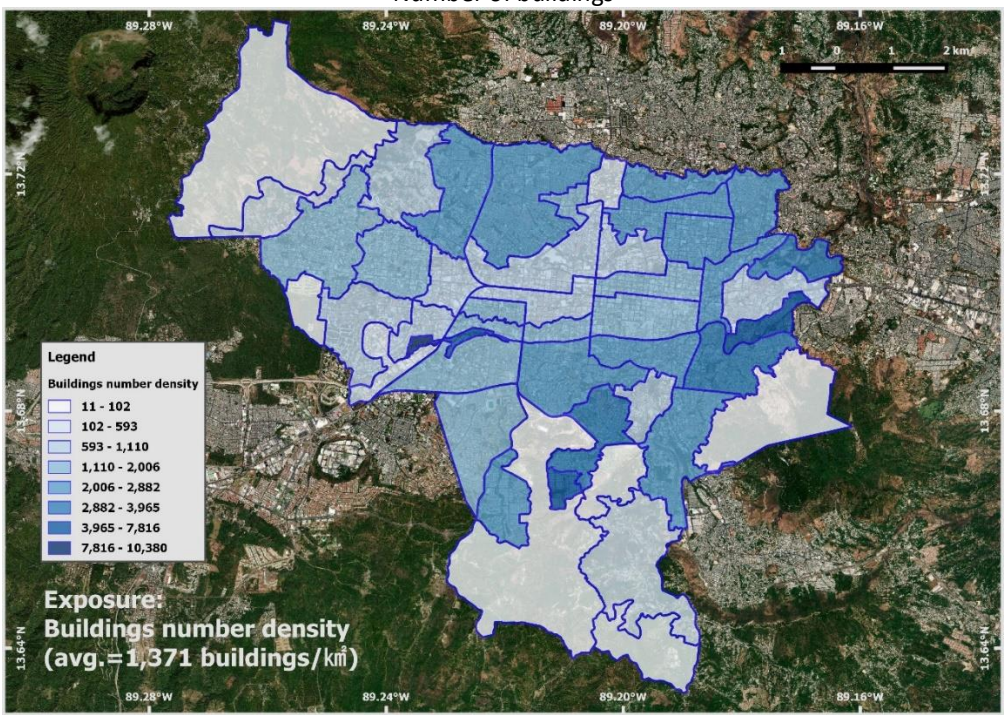
Table 20 summarizes the key components of the San Salvador exposure model. Figure 21 through Figure 24 present the spatial distribution of the number of buildings, of the total area of buildings, and of daytime and nighttime occupants, respectively, according to each primary zone and including the corresponding special zones. In the figures, to compare the component density of each zone in a normalized field, the amounts of each component are divided by the area of the corresponding zone.

Table 20 Key components of the San Salvador exposure model

City zoning		Buildings		Occupants	
Primary	Special	No.	Area, m^2	Daytime	Nighttime
47	71	102,540	25,990,000	316,000	235,000

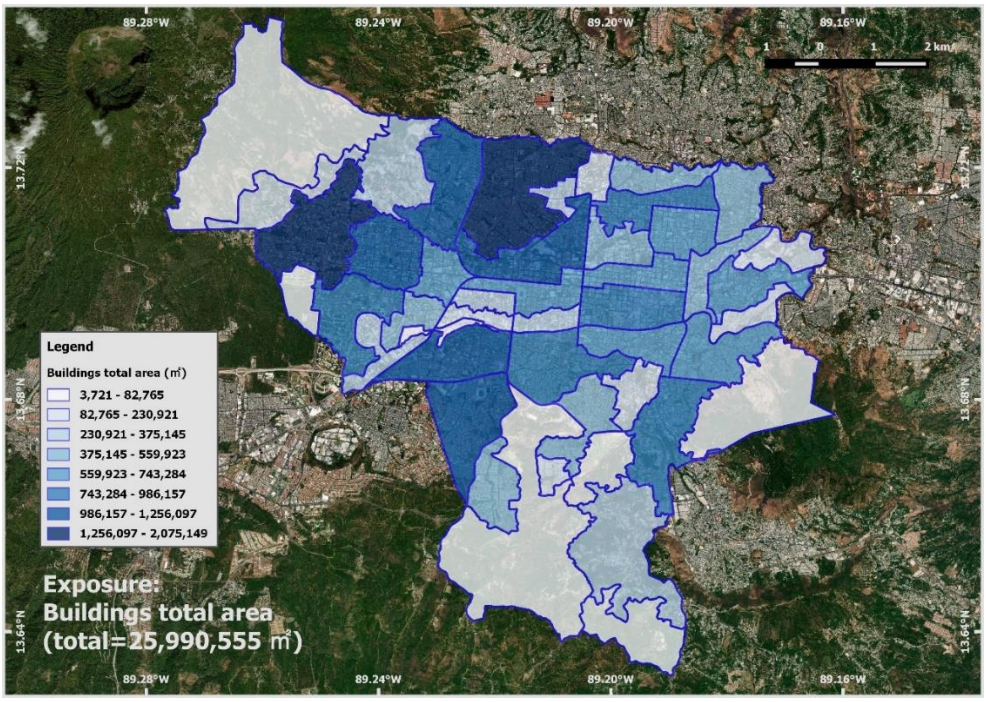


Number of buildings

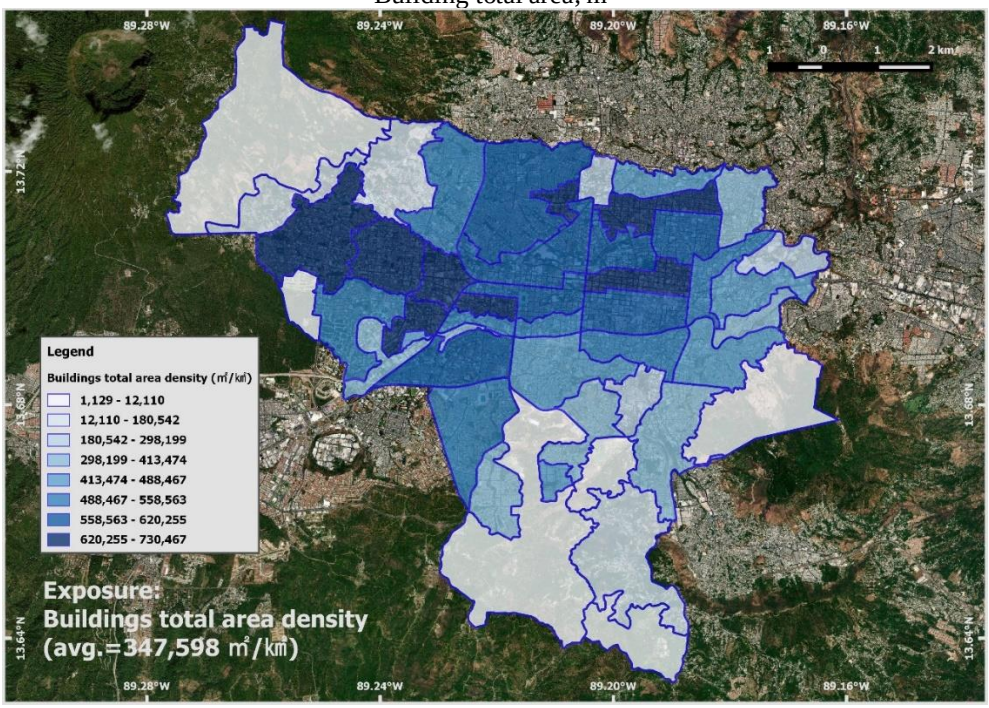


Density of buildings, number/km^2

Figure 21 Spatial distribution of the number of buildings

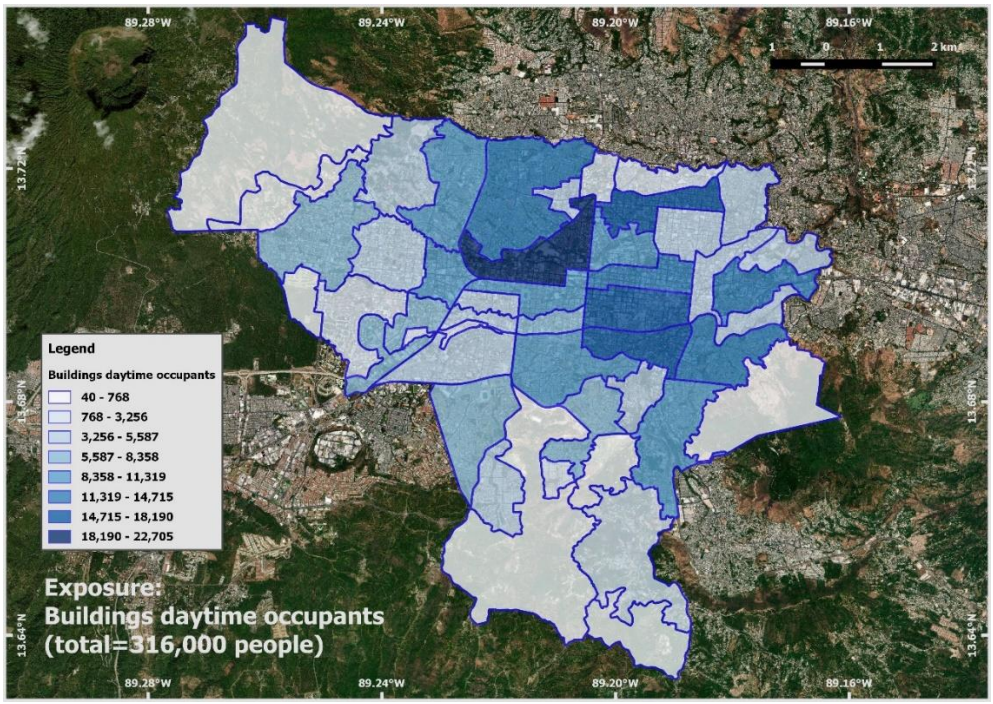


Building total area, m^2

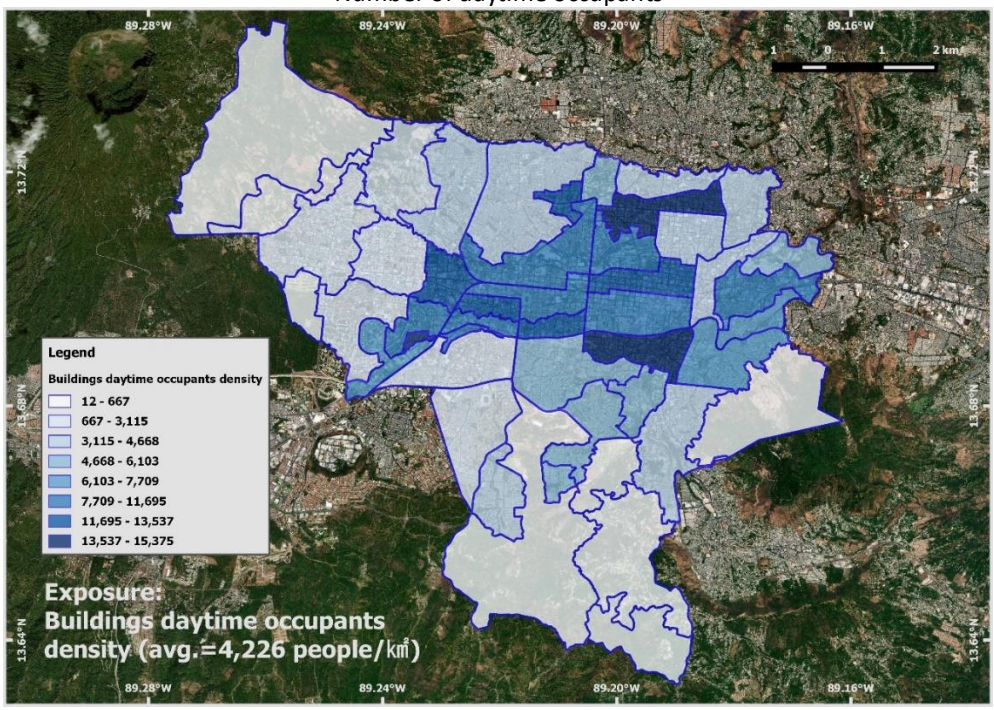


Density of building total area, m^2/km^2

Figure 22 Spatial distribution of building total area

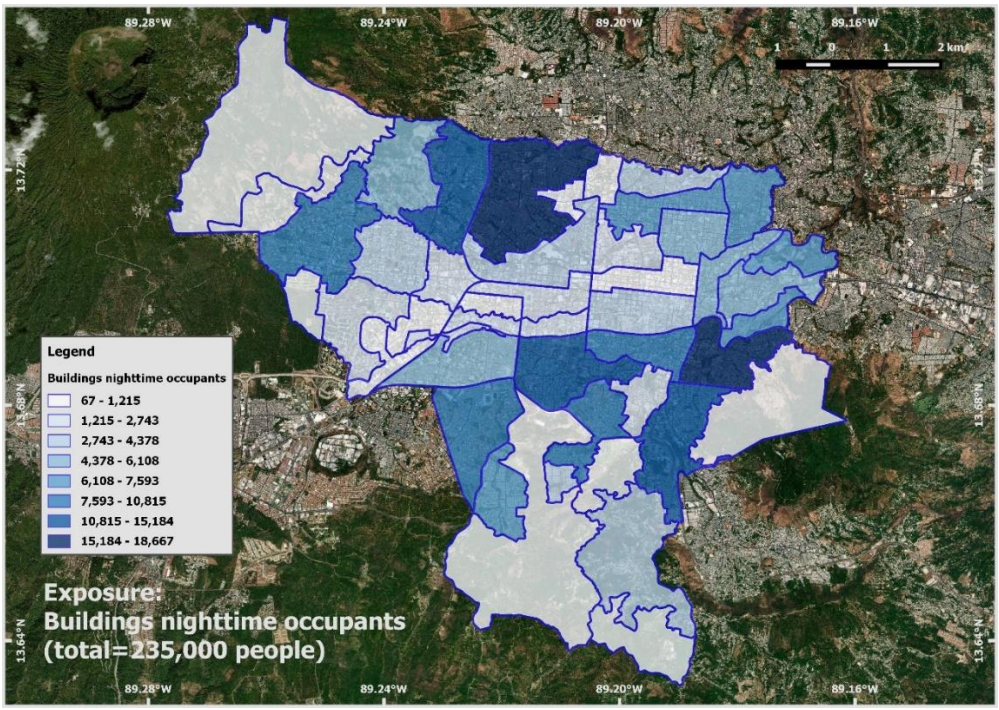


Number of daytime occupants

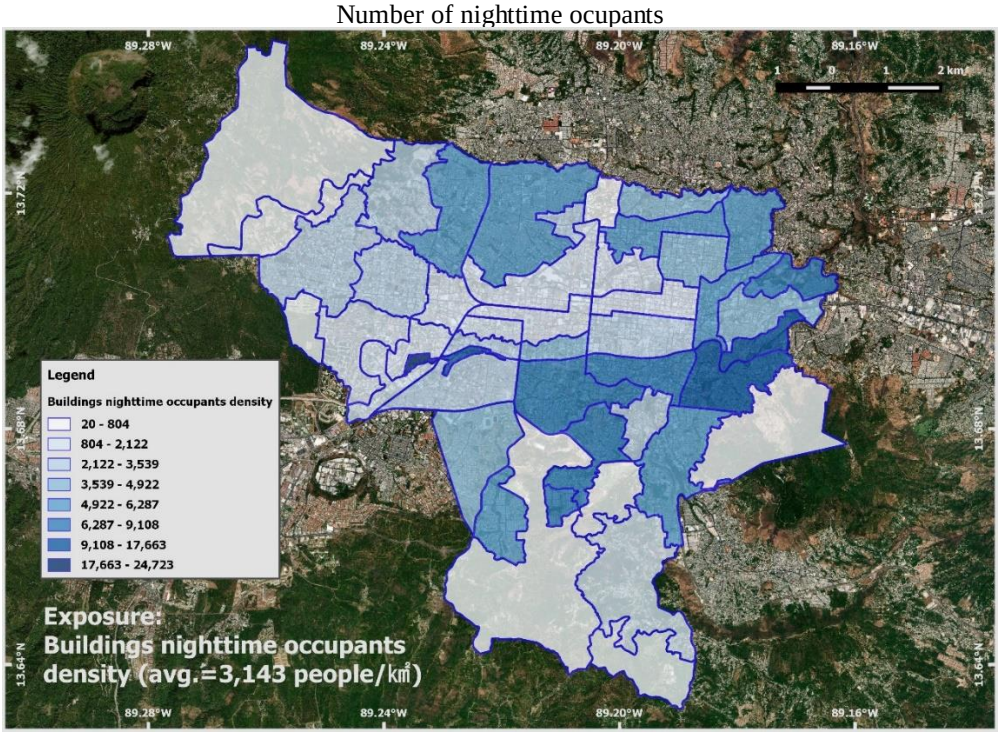


Density of daytime occupants, people/km^2

Figure 23 Spatial distribution of daytime occupants



Number of nighttime ocupants



Density of nighttime occupants, people/km^2

Figure 24 Spatial distribution of nighttime occupants

4 FRAGILITY AND CONSEQUENCE FUNCTIONS

4.1 Fragility functions

4.1.1 FEMA Hazus default values

The FEMA Hazus (FEMA 2013) methodology was used to guide engineering judgment in categorizing the 16 building types into various fragility classifications; see Table 21. Because no comprehensive seismic fragility functions (based on PGA corresponding to the seismic hazard intensity) for buildings in San Salvador had been studied, for this risk analysis, the seismic fragility functions established by FEMA Hazus for the United States were adopted and were modified to fit the San Salvador built environment.

Table 21 Fragility classifications of buildings

Type	LFRS and material	FEMA Hazus notation		
		Height[10]	Classification	Code[11]
1	Adobe (nonengineered)	Low	equiv. Pre-URML	Pre-code
2	Bahareque or informal (nonengineered)	Low	equiv. Pre-URML/S3/W1	Pre-code
3	Unreinforced/unconfined masonry (URM)	Low	URML	Low-code
4	Confined masonry (CM, masonry bearing wall)	Low	equiv. RM1L	Low/ Moderate-code
5	CM, masonry bearing wall	Mid	equiv. RM1M	Low/ Moderate-code
6	CM, masonry bearing wall HQ	Low	equiv. RM1L	Moderate-code
7	RC frame (RCF) with masonry infill	Low/Mid	C3L/C3M	Moderate-code
8	RCF with masonry infill	High	C3H	Moderate-code
9	RC moment frame or RC shear wall (RCMF or RCSW)	Low/Mid	C1L, C1M/C2L, C2M	Moderate-code
10	RCMF or RCSW	High	C1H/C2H	Moderate-code
11	RCMF or RCSW	Superhigh	C1H/C2H	High-code
12	Steel moment frame or steel braced frame (SMF or SBF)	Low/Mid	S1L, S1M/S2L, S2M	Moderate-code
13	SMF or SBF	High	S1H/S2H	Moderate-code
14	SMF or SBF	Superhigh	S1H/S2H	High-code
15	Light-gauge steel	Low	S3	Low/ Moderate-code
16	Wood light frame	Low	W1	Pre-code

[10] Low, Mid, and High denote low-, mid-, and high-rise for 1–3, 4–7, and 8+ stories, respectively, and Superhigh indicates skyscraper buildings.

[11] The code designation represents the expected relative compliance with modern seismic codes in design, detailing, and construction.

Table 22 (FEMA 2013) presents the default values for the PGA fragility functions per Hazus building type for various damage states (DSs). These default values were developed for buildings in the United States by empirically analyzing past seismic damage to buildings and by statistically simulating the expected damage level for various building types according to earthquake intensity. These fragility functions are probabilistically expressed by lognormal distribution, with the characteristic values such as median and standard deviation as shown in the table.

Table 22 Hazus default parameters of fragility functions (FEMA 2013)

Type	DS median PGA, g[12]				Ln (std. dev.)
	DS1	DS2	DS3	DS4	
1	0.13	0.17	0.26	0.37	0.64
2	0.13	0.19	0.31	0.48	0.64
3	0.14	0.20	0.32	0.46	0.64
4	0.19	0.25	0.40	0.70	0.64
5	0.16	0.23	0.43	0.83	0.64
6	0.22	0.30	0.50	0.85	0.64
7	0.15	0.25	0.44	0.78	0.64
8	0.10	0.19	0.50	0.87	0.64
9	0.16	0.25	0.49	0.89	0.64
10	0.12	0.21	0.49	0.91	0.64
11	0.12	0.26	0.72	1.61	0.64
12	0.16	0.23	0.46	0.86	0.64
13	0.11	0.19	0.44	0.90	0.64
14	0.11	0.22	0.59	1.46	0.64
15	0.12	0.16	0.27	0.49	0.64
16	0.18	0.29	0.51	0.77	0.64

FEMA Hazus provides a descriptive narrative for each DS and for each building type. For example, for the confined masonry (CM, masonry bearing wall) buildings, the document states:

> *Slight DS: Diagonal hairline cracks on masonry wall surfaces; larger cracks around door and window openings in walls with large proportion of openings; minor separation of walls from the floor and roof diaphragms.*
>
> *Moderate DS: Most wall surfaces exhibit diagonal cracks; some of the shear walls have exceeded their yield capacities indicated by larger diagonal cracks. Some walls may have visibly pulled away from the roof.*
>
> *Extensive DS: In buildings with relatively large area of wall openings most shear walls have exceeded their yield capacities and some of the walls have exceeded their ultimate capacities indicated by large, through-the-wall diagonal cracks and visibly buckled wall reinforcement. The plywood diaphragms may exhibit cracking and separation along plywood joints. Partial collapse of the roof may result from failure of the wall-to-diaphragm anchorages or the connections of beams to walls.*

[12] DS1 = Slight, DS2 = Moderate, DS3 = Extensive, and DS4 = Complete (including collapse).

Complete DS: Structure has collapsed or is in imminent danger of collapse due to failure of the wall anchorages or due to failure of the wall panels. Approximately 13% (low-rise) or 10% (mid-rise) of the total area of RM1 buildings with Complete damage is expected to be collapsed.

4.1.2 Fragility function modifications

To account for the construction quality and the seismic sources in San Salvador, the default medians and standard deviations of the FEMA Hazus fragility functions were modified as described in this section.

The default median values of the Hazus fragility functions correspond to certain ground motion types, as listed in Table 23. The earthquake hazard in San Salvador has differing properties, because of the area's specific seismicity, soil type, and location (Staller et al. 2016b, MARN 2017, TSED 1994, and Silva et al. 1999), as also listed in Table 23.

Table 23 Hazus default and San Salvador ground movement characteristics

Parameter	Hazus (default)	San Salvador
Site to source, km	≥15	≤20
Magnitude, Mw	7.0	7.0
Site class	D	D-E
Geographic	Western United States (WUS)	Similar to WUS

Modification factors for the FEMA Hazus default included:

- Factor to account for the 20-km distance, Mw of 7.0, and WUS soil = 1.2 (FEMA 2013)
- Factor to account for the site class = 1.5/*Fv*, where *Fv* = 1.867 (FEMA 2013 and ASCE 2010)

Thus, the modification factor for the median values for the ground motion variation was computed from:

Equation 1 $\quad$ *Factor = (Spectral shape at ~20 km)*(1.5/Fv) = 1.2*(1.5/1.867) = 0.964*

Furthermore, FEMA Hazus values were developed based on U.S. construction and on U.S. code provisions, as mentioned earlier. To account for the variation between U.S. and San Salvador construction techniques (Kattan Jokisch 2010), another modification factor of 0.9 was applied to the median values for building types 1 and 2 and a factor of 0.95 was applied to building types 3, 4, 5, 7, 9, 12, 15, and 16. These factors are similar to the Hazus adjustment factors that are used for code vintage modification.

The comparatively newer building types, such as types 6, 8, 10, 11, 13, and 14, were assigned a factor of 1.0 because it can be assumed that the construction quality of those building types is the same level as for U.S. construction. High- and superhigh-rise buildings that use concrete and steel were designed and constructed by following internationally recognized building codes (based on information from local engineers), and it can be assumed that CM single-family houses in higher-priced communities were built under good quality control.

To obtain the corresponding values for San Salvador building types (except for types 6, 8, 10, 11, 13, and 14), the Hazus fragility median values were therefore modified by either a factor of 0.87 (0.964*0.9) or 0.92 (0.964*0.95). For type 6, 8, 10, 11, 13, and 14 buildings, a factor of 0.96 (0.964*1.0) was applied to modify the Hazus fragility median values to fit those building types in San Salvador.

Assuming that the uncertainties are independently distributed, the total uncertainty can then be computed from the square root of the sum of the squares of the response (hazard) and the damage (quality) uncertainties (FEMA 2013), or:

Equation 2 $\quad \beta_{TOT} = \sqrt{\beta_{SH}^2 + \beta_{DC}^2}$

The abovementioned modification factors based on construction quality are also applied to the uncertainty that relates to damage (quality), the second term. Table 24 presents the modifications for the standard deviation for lognormal distribution of the seismic fragility functions for the San Salvador building types.

Table 24 Adjustment factors for standard deviation

Parameter		Hazus default	San Salvador		
			Type 1 & 2	Types 3, 4, 5, 7, 9, 12, 15, & 16	Types 6, 8, 10, 11, 13, & 14
β_{SH}	Seismic hazard	0.5	0.5	0.5	0.5
β_{DC}	Design/construction quality	0.4	0.4/0.9	0.4/0.95	0.4/1.0
β_{TOT}	Total	0.64	0.669	0.654	0.64

4.1.3 Fragility parameters for San Salvador buildings

The modified parameters for seismic fragility functions that are suitable for the buildings in San Salvador and that were used in analysis are presented in Table 25. For San Salvador, research about only one PGA-based analytical seismic fragility curve is available, and it is for masonry residential buildings (Valencia Mármol and Sugano 2017). In that research, the fragility curves for masonry dwellings are the same as in Table 25 for this study; therefore, it can be assumed that the developed fragility curves in this study are reasonable for the built environment of San Salvador.

Table 25 Modified parameters of fragility functions for San Salvador

Type	DS median PGA, g				Ln (std. dev.)
	DS1	DS2	DS3	DS4	
1	0.113	0.148	0.226	0.321	0.669
2	0.113	0.162	0.269	0.416	0.669
3	0.128	0.183	0.293	0.421	0.654
4	0.174	0.229	0.362	0.637	0.654
5	0.147	0.206	0.394	0.760	0.654
6	0.212	0.289	0.482	0.819	0.640
7	0.134	0.229	0.406	0.715	0.654
8	0.095	0.187	0.477	0.841	0.640
9	0.142	0.229	0.444	0.813	0.654
10	0.111	0.198	0.472	0.873	0.640
11	0.111	0.246	0.694	1.552	0.640
12	0.142	0.208	0.424	0.785	0.654
13	0.101	0.178	0.424	0.868	0.640
14	0.101	0.207	0.564	1.403	0.640
15	0.105	0.147	0.243	0.449	0.654
16	0.165	0.266	0.467	0.705	0.654

Figure 25 through Figure 40 present the sets of plots for the various DS fragility functions for the 16 building types that were studied in this report. The functions were generated by using the San Salvador–modified parameters that are listed in

Table 25. The fragility curves corresponding to each damage state are defined as a function of failure probability according to earthquake intensity (PGA in this study) and are expressed by a lognormal distribution function. The building damage states are then identified by PGA value in the form of fragility curves, and probabilities of exceeding each building damage state can be derived from the curves.

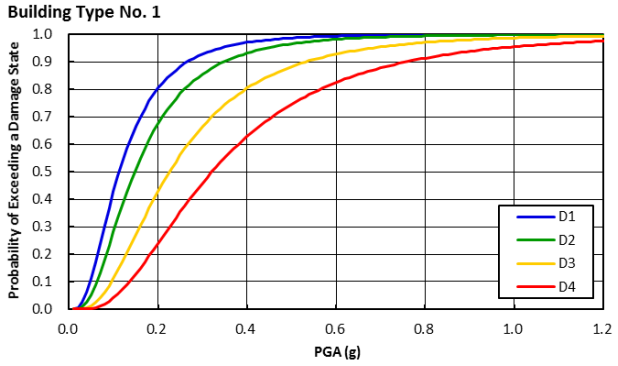


Figure 25 Fragility functions for type 1 (adobe, low-rise) buildings

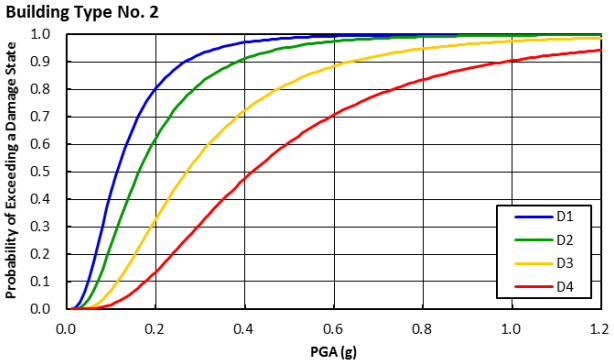


Figure 26 Fragility functions for type 2 (bahareque/informal, low-rise) buildings

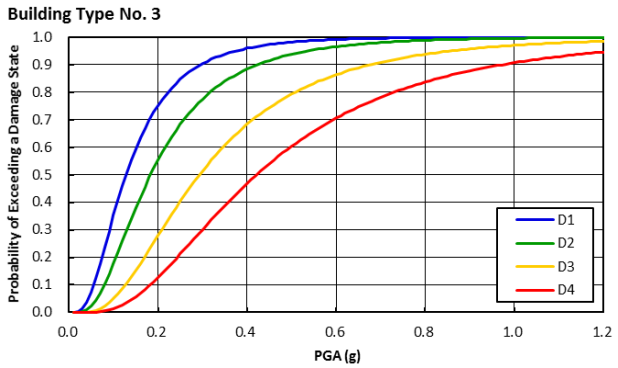


Figure 27 Fragility functions for type 3 (URM, low-rise) buildings

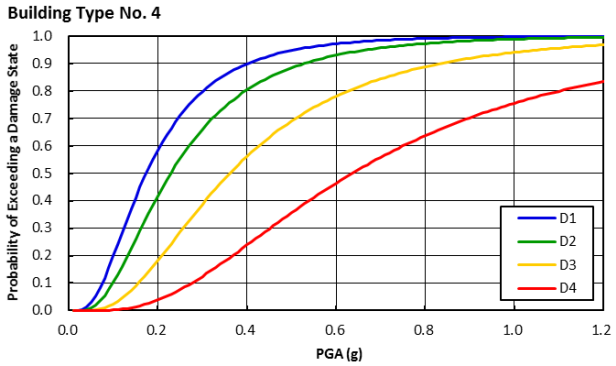


Figure 28 Fragility functions for type 4 (CM, low-rise) buildings

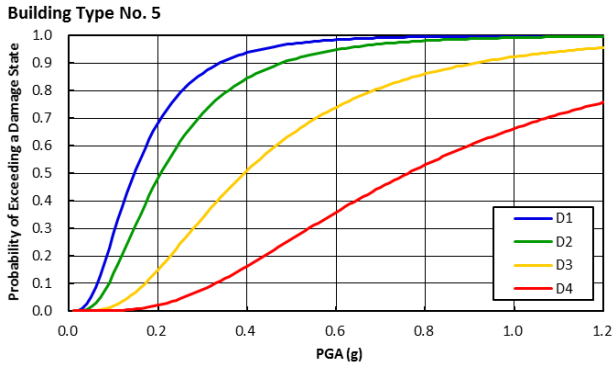


Figure 29 Fragility functions for type 5 (CM, mid-rise) buildings

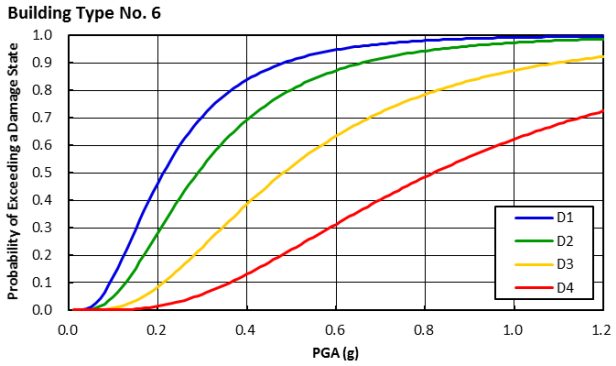


Figure 30 Fragility functions for type 6 (CM, HQ, low-rise) buildings

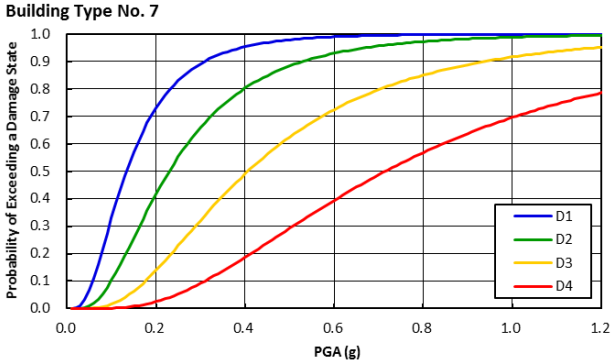


Figure 31 Fragility functions for type 7 (RCF with masonry infill, low-/mid-rise) buildings

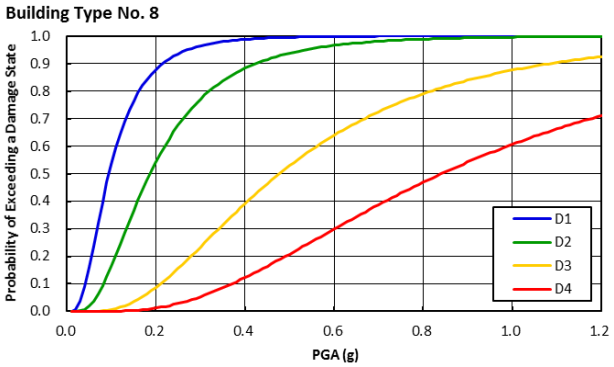


Figure 32 Fragility functions for type 8 (RCF with masonry infill, high-rise) buildings

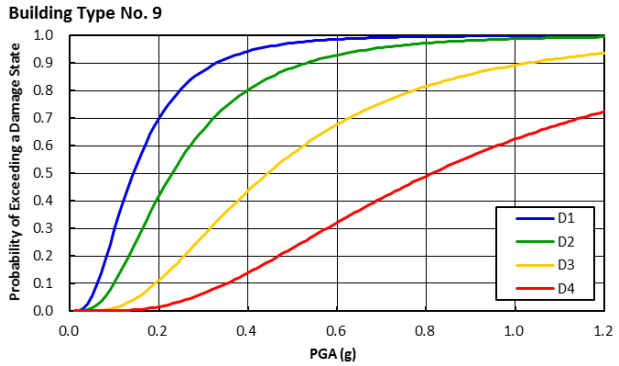


Figure 33 Fragility functions for type 9 (RCMF/RCSW, low-/mid-rise) buildings

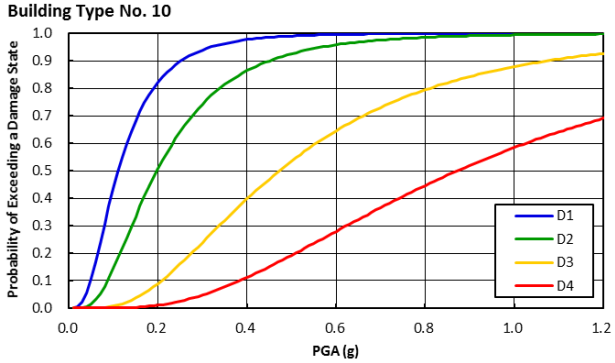


Figure 34 Fragility functions for type 10 (RCMF/RCSW, high-rise) buildings

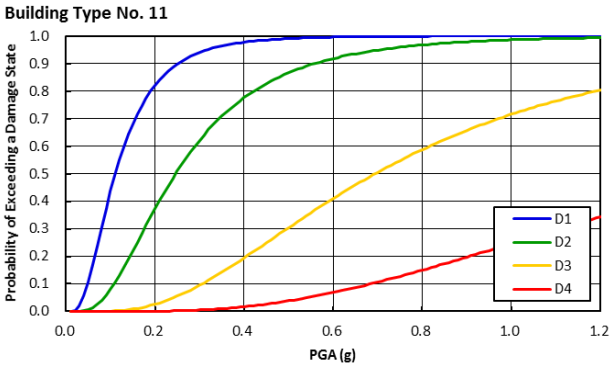


Figure 35 Fragility functions for type 11 (RCMF/RCSW, superhigh-rise) buildings

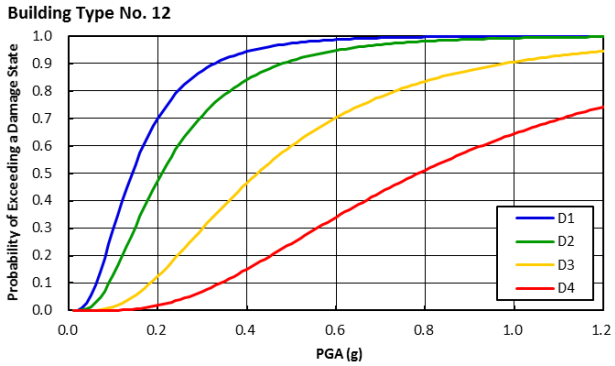


Figure 36 Fragility functions for type 12 (SMF/SBF, low-/mid-rise) buildings

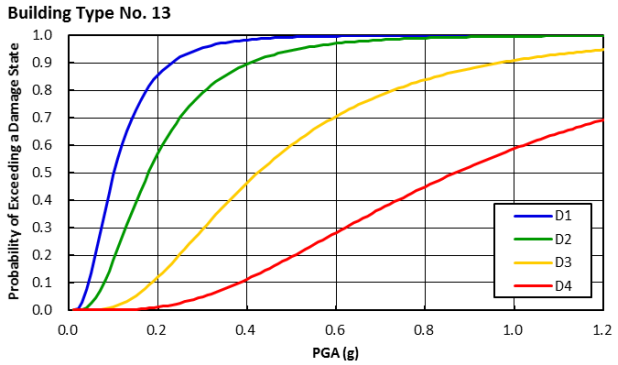


Figure 37 Fragility functions for type 13 (SMF/SBF, high-rise) buildings

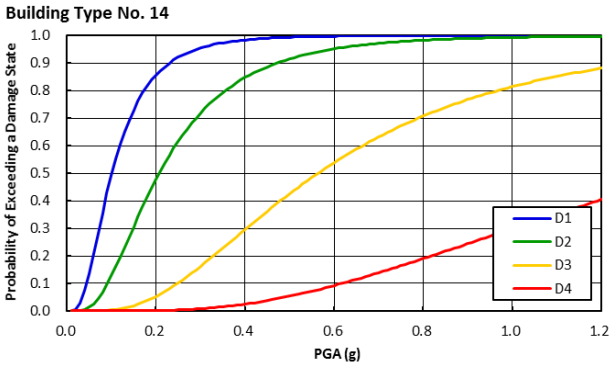


Figure 38 Fragility functions for type 14 (SMF/SBF, superhigh-rise) buildings

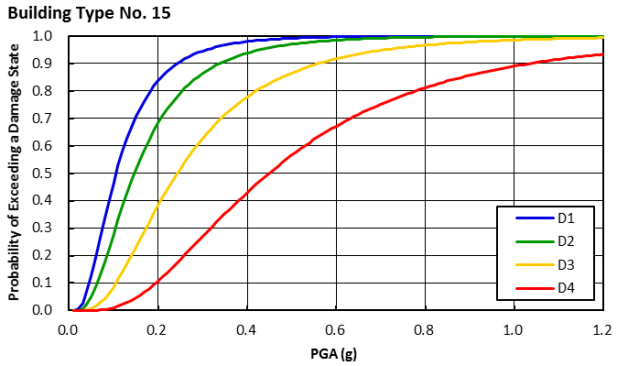


Figure 39 Fragility functions for type 15 (light-gauge steel, low-rise) buildings

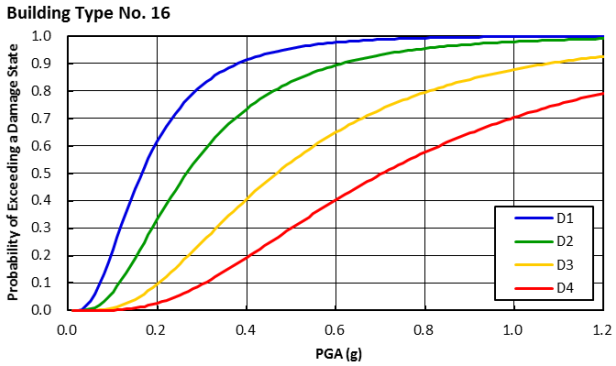


Figure 40 Fragility functions for type 16 (wood light-frame, low-rise) buildings

4.2 Consequence functions

4.2.1 Structural damage

The consequence functions that relate the structural damage of buildings to the DS were based on the damage ratios defined by FEMA Hazus (FEMA 2013), which were then modified for the San Salvador built environment. Table 26 presents the default physical (structural) damage ratios as specified in FEMA Hazus for the building types that are considered in this study.

Table 26 Hazus default structural damage ratios (FEMA 2013)

Type	DS			
	DS1	DS2	DS3	DS4
1	0.02	0.10	0.40	1.00
2	0.02	0.10	0.40	1.00
3	0.02	0.10	0.40	1.00
4	0.02	0.10	0.40	1.00
5	0.02	0.10	0.40	1.00
6	0.02	0.10	0.40	1.00
7	0.02	0.10	0.40	1.00
8	0.02	0.10	0.40	1.00
9	0.02	0.10	0.40	1.00
10	0.02	0.10	0.40	1.00
11	0.02	0.10	0.40	1.00
12	0.02	0.10	0.40	1.00
13	0.02	0.10	0.40	1.00
14	0.02	0.10	0.40	1.00
15	0.02	0.10	0.40	1.00
16	0.02	0.10	0.40	1.00

The structural damage ratios, corresponding to damage states, in Table 26 are based on U.S. statistical data about past seismic damage. Therefore, for application to San Salvador, the default structural damage ratios must be modified. For that modification, the structural damage ratio of buildings (direct loss) is considered to be proportional to the seismic economic loss rate; thus, it is acceptable to estimate damage ratios by using the research data for this type of seismic loss.

Research by USGS et al. (2011) about seismic economic loss is publicly available for this approach. Figure 41 shows examples of the economic loss rates with respect to the Modified Mercalli Intensity (MMI) scale that have been developed for many countries worldwide. For an MMI VIII to IX (approximate PGA of 0.37g to 0.70g) earthquake in El Salvador, Figure 41 estimates an economic loss rate of approximately 0.05% to 18%. However, those rates seem to be low for San Salvador and do not appear to account for the large pool of vulnerable URM and old CM buildings that exist in San Salvador.

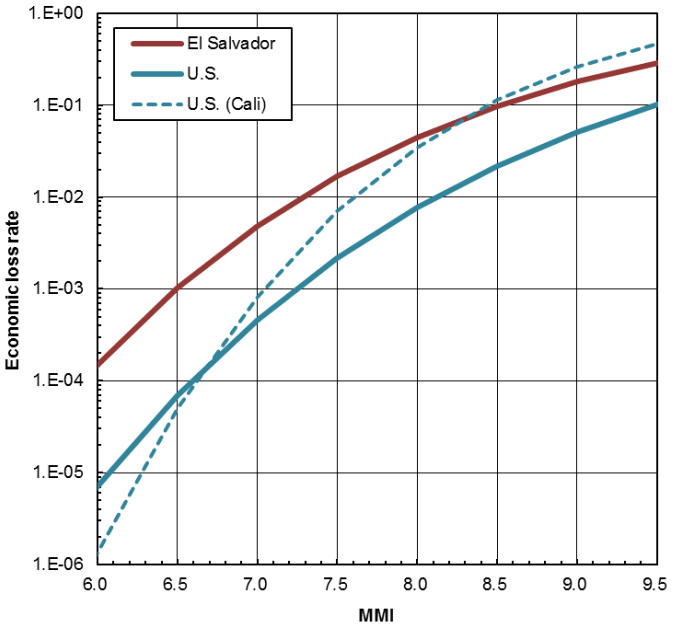


Figure 41 Predicted economic loss rates for the United States and for El Salvador (USGS et al. 2011)

Different damage ratios have been observed from past earthquakes in the San Salvador area, so the recorded data about past earthquake damage should also be considered for the modification. The building structural damage or economic loss from past major earthquakes was estimated based on the data available at the time of this writing, and those values are listed in Table 27. The structural damage from the 1986 San Salvador Earthquake (Mw 5.4, MMI IX) was estimated at 28%, and structural damage from the 1965 San Salvador Earthquake (Mw 6.3, MMI VII) was estimated at 6%. Both earthquakes occurred around the San Salvador area, in a region of local fault systems. Thus, these historical records of earthquake damage that affected construction similar to that in San Salvador were incorporated to determine the modification factors.

Table 27 Damage ratios for past earthquakes in the San Salvador area

Event	Mw	MMI	Damage/loss ratio
1917 San Salvador Volcanic EQ	6.7	VIII	No record
1965 San Salvador EQ	6.3	VII	6%
1986 San Salvador EQ	5.4	IX	28%

Among the earthquakes that are listed in Table 27, because of its epicenter location and its seismic intensity, the 1986 San Salvador Earthquake seems to be similar to an expected earthquake for this study. Because this earthquake affected mainly the eastern parts of San Salvador and because the extensive damage and strong motion were recorded in the eastern areas, more structural damage would have been generated if the earthquake had affected the entire area of San Salvador.

By considering these factors and by calibrating the ratios in Figure 41, a 50% to 55% damage ratio was determined for San Salvador for the earthquake intensity and spatial distribution that are considered in this study. The default Hazus damage ratios were then modified as follows: (1) type 1 and 2, adobe nonengineered buildings and bahareque/informal nonengineered buildings, no change; (2) types 3 through 11 that are built of masonry or concrete material (heavy and relatively large section elements), apply a regional modification factor of 1.125 to DS1 through DS3; and (3) types 12 through 16 that are built of steel or wood material (light and relatively small section elements), no change. The revised structural damage ratios that were used in this study are presented in Table 28.

Table 28 Modified structural damage ratios applied to San Salvador

Type	DS			
	DS1	DS2	DS3	DS4
1	0.02	0.1	0.4	1.00
2	0.02	0.1	0.4	1.00
3	0.0225	0.1125	0.45	1.00
4	0.0225	0.1125	0.45	1.00
5	0.0225	0.1125	0.45	1.00
6	0.0225	0.1125	0.45	1.00
7	0.0225	0.1125	0.45	1.00
8	0.0225	0.1125	0.45	1.00
9	0.0225	0.1125	0.45	1.00
10	0.0225	0.1125	0.45	1.00
11	0.0225	0.1125	0.45	1.00
12	0.02	0.1	0.4	1.00
13	0.02	0.1	0.4	1.00
14	0.02	0.1	0.4	1.00
15	0.02	0.1	0.4	1.00
16	0.02	0.1	0.4	1.00

To evaluate building damage state based on the tagging procedure, red tags indicate complete damage or collapse; yellow tags mean moderate to extensive damage; and green tags denote no or little damage. The three damage tags are generally defined as: red means that the building is unsafe to enter; yellow means restricted use to occupy the building; and green means that the building is usable and safe to occupy.

4.2.2 Fatalities (FEMA Hazus severity 4 y severity 3)

The consequence functions that relate fatality rate to DS were based on the estimated values from FEMA Hazus (FEMA 2013), which were then modified for San Salvador. Table 29 presents the default fatality rates determined by FEMA Hazus for the building types that are considered in this study.

Table 29 Hazus default fatality rates by severity 4 & 3 (FEMA 2013)

Type	DS			
	DS1	DS2	DS3	DS4
1	0%	0.00358%	0.00716%	4.522%
2	0%	0.00129%	0.00450%	1.820%
3	0%	0.00260%	0.00520%	3.284%
4	0%	0%	0.00240%	2.167%
5	0%	0%	0.00260%	1.918%

6	0%	0%	0.00240%	2.167%
7	0%	0%	0.00260%	2.717%
8	0%	0%	0.00320%	2.518%
9	0%	0%	0.00230%	2.043%
10	0%	0%	0.00260%	1.369%
11	0%	0%	0.00260%	1.369%
12	0%	0%	0.00230%	1.294%
13	0%	0%	0.00260%	1.069%
14	0%	0%	0.00260%	1.069%
15	0%	0%	0.00200%	0.270%
16	0%	0.00020%	0.00260%	0.409%

The fatality rates in the table were developed by FEMA Hazus and are based on statistical and historical data that was collected in the United States. This study considers severity 4 and severity 3, so only those rates are listed in Table 29. To determine San Salvador fatality rates, a regional modification factor had to be applied to these default U.S. fatality rates. In the modification process, research by USGS et al. (2009) about fatality rates according to earthquake intensity was consulted, as well as historical records about the number of fatalities from earthquakes in El Salvador.

Figure 42 (USGS et al. 2009) shows examples of researched fatality rates with respect to the MMI scale that have been developed for many countries in seismically active regions. For an MMI VIII to IX (approximate PGA of 0.37g to 0.70g) earthquake in El Salvador, Figure 42 estimates a fatality rate of about 0.01% to 0.05%. However, these rates seem to be low for San Salvador and do not appear to account for the large pool of vulnerable URM and old CM buildings that exist in San Salvador.

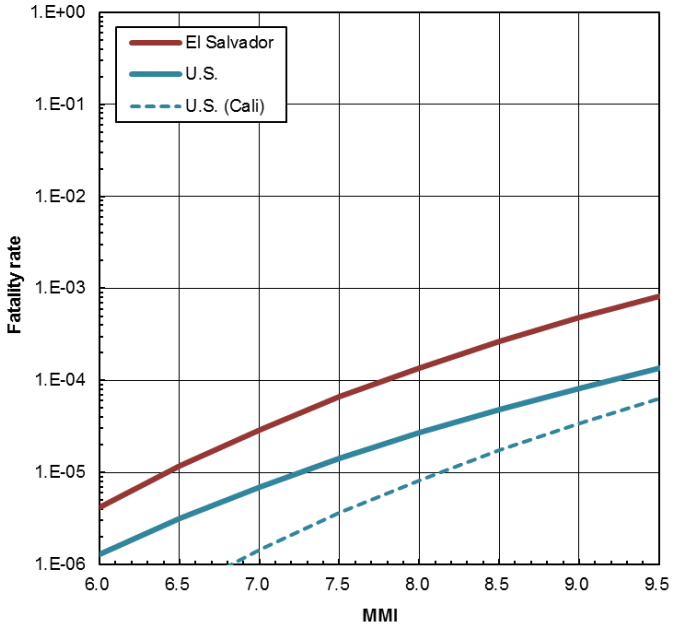


Figure 42 Predicted fatality rates in the United States and in El Salvador (USGS et al. 2009)

Dissimilar fatality rates have been observed in past earthquakes in El Salvador, so the recorded data about past earthquake fatalities in the country should also be considered for the modification approach. By using the published data and census

information about population, the fatality ratios for past major earthquakes were estimated based on the recorded number of actual fatalities and the total exposed population for each earthquake. These estimates are listed in Table 30. The fatality ratio for the 1986 San Salvador Earthquake (Mw 5.4, MMI IX) was estimated at 0.91%; the fatality ratio for the 1965 San Salvador Earthquake (Mw 6.3, MMI VII) was estimated at 0.11%; and the fatality rate due to the 1917 San Salvador Volcanic Earthquake (Mw 6.7, MMI VIII) was approximated at 1.75%. These earthquakes occurred around the San Salvador area, in a region of local fault systems. Thus, these historical records of seismic fatality rate in areas with construction similar to San Salvador were incorporated to determine the modification factors.

Table 30 Fatality ratios for past earthquakes in the San Salvador area

Event	Mw	MMI	Fatality rate
1917 San Salvador Volcanic EQ	6.7	VIII	1.75%
1965 San Salvador EQ	6.3	VII	0.11%
1986 San Salvador EQ	5.4	IX	0.91%

Among the earthquakes that are listed in Table 30, because of its structural damage and fatality ratios, the 1986 San Salvador Earthquake appears to be similar to an expected earthquake for this study. Because this earthquake struck the southeastern part of San Salvador and affected mainly the eastern area, more human losses can be anticipated if a similar earthquake occurs at the center of San Salvador and induces severe shaking all over the area.

By considering these conditions and by calibrating the fatality rates in Figure 42, a 1% to 1.5% fatality ratio is anticipated for the earthquake intensity and spatial distribution that are considered in this study. Based on these evaluations and engineering judgment, the default Hazus fatality ratios were modified by multiplying them by a factor of 1.3 (30% larger than the U.S. default rates) for all building types. The revised fatality rates used in this study are presented in Table 31.

Table 31 Modified fatality rates applied to San Salvador

Type	DS			
	DS1	DS2	DS3	DS4
1	0%	0.00465%	0.00931%	5.879%
2	0%	0.00167%	0.00585%	2.365%
3	0%	0.00338%	0.00676%	4.269%
4	0%	0%	0.00312%	2.818%
5	0%	0%	0.00338%	2.493%
6	0%	0%	0.00312%	2.818%
7	0%	0%	0.00338%	3.532%
8	0%	0%	0.00416%	3.273%
9	0%	0%	0.00299%	2.656%
10	0%	0%	0.00338%	1.780%
11	0%	0%	0.00338%	1.780%
12	0%	0%	0.00299%	1.682%
13	0%	0%	0.00338%	1.390%
14	0%	0%	0.00338%	1.390%
15	0%	0%	0.00260%	0.352%
16	0%	0.00026%	0.00338%	0.532%

4.2.3 Injuries (FEMA Hazus severity 2 y severity 1)

The consequence functions that relate injury rate to DS were based on the values from FEMA Hazus (FEMA 2013), which were then modified for San Salvador by using the same procedure as for the fatality rate modification. Table 32 presents the FEMA Hazus default injury rates for the building types and for the levels of severity, 2 and 1, that this study considers.

Table 32 Hazus default injury rates by severity 2 & 1 (FEMA 2013)

Type	DS			
	DS1	DS2	DS3	DS4
1	0.069%	0.764%	3.939%	36.08%
2	0.069%	0.512%	2.474%	20.18%
3	0.050%	0.555%	2.860%	26.20%
4	0.050%	0.280%	1.320%	15.52%
5	0.050%	0.280%	1.430%	14.30%
6	0.050%	0.280%	1.320%	15.52%
7	0.050%	0.280%	1.430%	17.51%
8	0.050%	0.280%	1.760%	16.10%
9	0.050%	0.335%	1.265%	14.91%
10	0.050%	0.335%	1.430%	12.20%
11	0.050%	0.335%	1.430%	12.20%
12	0.050%	0.280%	1.265%	12.21%
13	0.050%	0.280%	1.430%	11.12%
14	0.050%	0.280%	1.430%	11.12%
15	0.050%	0.225%	1.100%	7.63%
16	0.050%	0.335%	1.430%	10.12%

For application to San Salvador, the injury rates also had to be modified. It was determined that the rates of injury should be modified by the same increment as for the fatality rate modification. The default Hazus injury rates in Table 32 were then adjusted by multiplying them by a factor of 1.3 (the same modification as for the fatality rate). The revised injury rates that were used in this study are presented in Table 33.

Table 33 Modified injury rates applied to San Salvador

Type	DS			
	DS1	DS2	DS3	DS4
1	0.090%	0.994%	5.120%	46.90%
2	0.090%	0.665%	3.216%	26.23%
3	0.065%	0.722%	3.718%	34.06%
4	0.065%	0.364%	1.716%	20.18%
5	0.065%	0.364%	1.859%	18.59%
6	0.065%	0.364%	1.716%	20.18%
7	0.065%	0.364%	1.859%	22.76%
8	0.065%	0.364%	2.288%	20.93%
9	0.065%	0.436%	1.645%	19.38%
10	0.065%	0.436%	1.859%	15.86%
11	0.065%	0.436%	1.859%	15.86%
12	0.065%	0.364%	1.645%	15.87%
13	0.065%	0.364%	1.859%	14.46%
14	0.065%	0.364%	1.859%	14.46%
15	0.065%	0.293%	1.430%	9.92%
16	0.065%	0.436%	1.859%	13.16%

4.2.4 Internally displaced persons (IDPs)

In this study, *internally displaced persons* (IDPs) is defined as people who are forced to evacuate their home because of seismic impacts or who cannot stay in their residence because it has been physically damaged by an earthquake. Thus, the number of IDPs in this study is initially based on building damage that is classified by red and yellow tags. That number is then refined by subtracting the fatalities from the number of nighttime occupants of red- or yellow-tagged buildings. Note that the number of IDPs that is estimated here is the number at the initial post-earthquake stage (i.e., the maximum number that is generated by an earthquake), and this number generally decreases as time goes by and recovery work is implemented. The calculation for IDPs in this study is expressed by the following formula:

Equation 3 $$IDPs = N_{ORN} + N_{OYN} - N_{FN}$$

Where:

N_{ORN} = number of nighttime occupants of red-tagged buildings
N_{OYN} = number of nighttime occupants of yellow-tagged buildings
N_{FN} = number of nighttime fatalities

4.2.5 Debris volume

The debris volume was evaluated based on the methodology that was developed after the 2010 Haiti Earthquake and was calibrated with the measured volumes from that event (Miyamoto 2011). The methodology was modified to account for San Salvador construction types and materials. In this study, the debris is assumed to be the consequence of structural

damage to buildings that are classified as red tagged (complete damage or collapse). The calculation for total debris volume is then based on the following unit debris volume:

Equation 4 $$w = \frac{1}{HA} \cdot c_f \cdot \sum_1^H (c_s \cdot A \cdot t + c_w \cdot L \cdot h \cdot t_w + c_m)$$

Where:

w = unit debris volume in m^3 per m^2 of building floor area
A = building footprint in m^2
H = number of stories
$A \cdot t$ = floor slab volume per story in m^3
$L \cdot h \cdot t_w$ = wall volume per story in m^3
c_f, c_s, c_w, c_m = adjustment factors

To modify this methodology for the San Salvador built environment, the typical material and thickness of slabs and walls for San Salvador construction types were estimated based on the field surveys that Miyamoto engineers conducted, and some adjustment factors were assumed by using empirical data and engineering judgment. Table 34 presents the estimated three classes of unit debris volume used for the building types in San Salvador, and the three classes of unit debris volume were evaluated with respect to the size of structural members (thicker, moderate, thinner member sizes, respectively).

Table 34 Unit debris volume applied to San Salvador

Type	Unit debris volume, $m^3/(m^2$ of floor area)/story	Type	Unit debris volume, $m^3/(m^2$ of floor area)/story
1	0.81	9	0.75
2	0.81	10	0.75
3	0.81	11	0.75
4	0.81	12	0.50
5	0.81	13	0.50
6	0.81	14	0.50
7	0.75	15	0.50
8	0.75	16	0.50

Based on the unit debris volume, the building damage status due to the earthquake, and the building footprint and height, the total debris volume for the study area was calculated as the accumulation of the debris volume from all red-tagged buildings:

Equation 5 $$V = \sum_1^{N_R} w \cdot A_i \cdot N_i$$

Where:

V = total debris volume in m^3
N_R = number of red tagged buildings
w = unit debris volume in m^3 per m^2 of building flood area
A_i = building footprint in m^2 of each building
N_i = number of stories in each building

5 RISK ASSESSMENT METHODOLOGY

5.1 Overview

Figure 43 presents the flowchart for seismic risk analysis that was applied to San Salvador. As the flowchart shows, the seismic hazard, building exposure, and building fragility are the major input to the analysis. For this project, the probabilistic analysis program that Miyamoto International developed for seismic risk estimation was used as the simulation module.

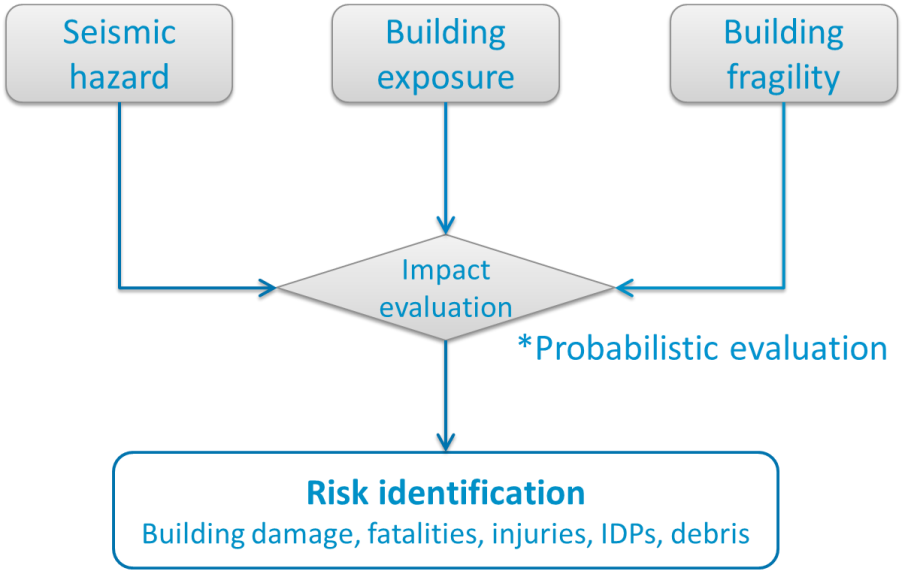


Figure 43 Flowchart for seismic risk analysis

5.2 Risk analysis algorithm

The probabilistic risk assessment in this study used Monte Carlo simulations (MCSs), and to obtain convergence in simulation results, 10,000 MCSs were performed. The specific process of risk analysis is as follows (also see Figure 44):

- Execute one process of simulation:
  - Determine site seismic intensity based on the selected earthquake scenario;
  - Use exposure and fragility data about buildings in the study area;
  - Run the risk analysis program and determine the DS distributions;
  - By applying the consequence functions and the obtained DSs, compute structural damage, fatalities, injuries, IDPs, and debris volume.
- Repeat the process 10,000 times for the converged result.
- Compute the expected value (mean) for the quantities of interest.
- Postprocess and aggregate for the zones and for San Salvador.

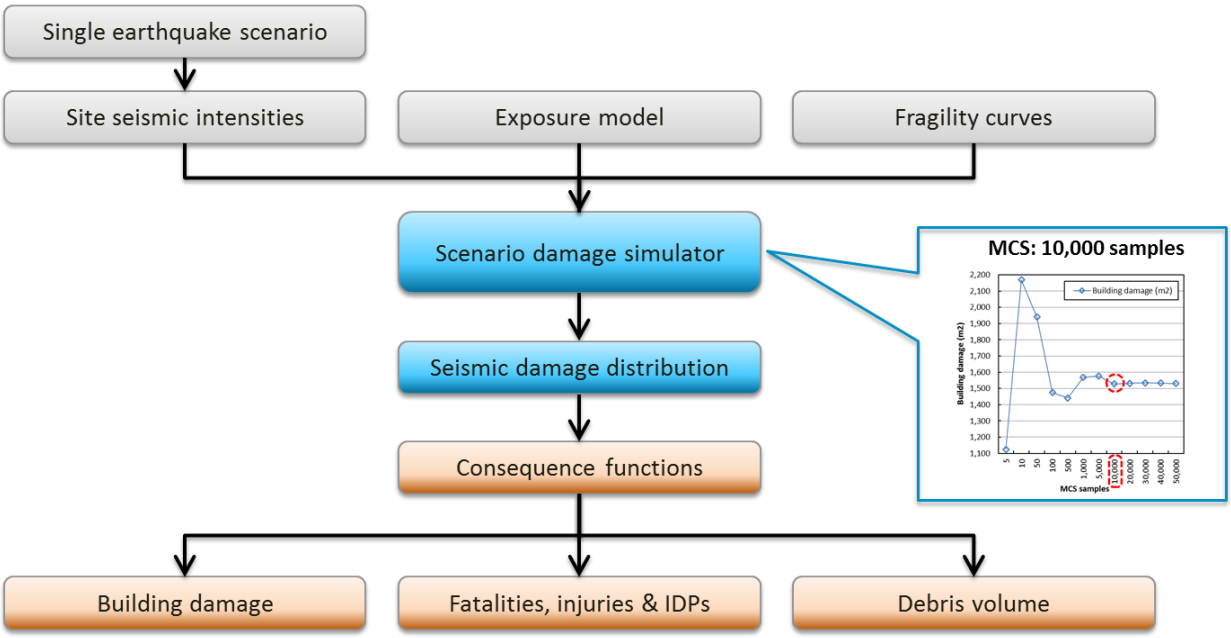


Figure 44 Process Flow using a seismic risk analysis program

5.3 Monte Carlo Simulation (MCS)

5.3.1 Overview

In analysis, the seismic damageability of buildings is probabilistically expressed as a seismic fragility function, which represents the probability of certain DSs of buildings for a given earthquake intensity, such as PGA in this study. The fragility function, therefore, is applied to simulate the DSs of buildings due to the corresponding PGAs, depending on the location. On the basis of PGAs and building fragility characteristics, the DSs of buildings from the target earthquake scenario are obtained by executing MCS. MCS is a functional technique to simulate a consequence that contains uncertainties; therefore, because a building DS caused by a future earthquake cannot be exactly known or can be random, MCS is appropriate for this study.

The building DS probabilities due to the target seismic hazard were estimated for each building asset by each simulation in this study. This analysis process was repeated for the specified number of MCSs (10,000 times) for this study. Upon completion, the expected (mean) values of seismic impacts based on all the simulation cases were obtained for each building asset by applying the consequence functions, and those seismic impacts were aggregated according to the corresponding zones and for San Salvador.

5.3.2 Methodology

By applying building fragility and PGA distribution, the impacts from a target earthquake intensity are probabilistically estimated through the building damage. Because seismic damage estimation includes several uncertainties, to obtain the expected damage, a probabilistic estimation must be performed by using either a theoretical approximation method or a numerical simulation method.

MCS, a numerical simulation method, was used to analyze the seismic damage for this study. The Monte Carlo technique is one of the computational simulation approaches that relies on random sampling to obtain numerical results. The main concept of MCS is to estimate the expected value and the variability of the response of a complex system by using a

reasonable subset of the solution space. The subspace is determined by sampling the original space, which means that numerous simulations are required to obtain a reliable result.

For this study, the appropriate number of simulations to achieve a reasonable result, one that converges on the expected value of seismic damage, had to be determined. The results for a range of simulation runs are presented in Figure 45. Inspection of the figure reveals that the results vary substantially when only small numbers of simulations (e.g., 5, 10, and 50 realizations) are run. Likewise, the solution is still nonconvergent with 100 and 500 simulations. The simulation results converge at approximately 10,000 realizations (i.e., the result for 10,000 simulations and beyond is consistent).

From this convergence investigation, a 10,000 times' simulation was found to yield reasonably stable results and was selected for the MCS of this study. Here, the building damage state was assumed to be randomly and probabilistically distributed in the simulation for each realization, and the expected values of seismic impacts were then calculated by applying consequence functions.

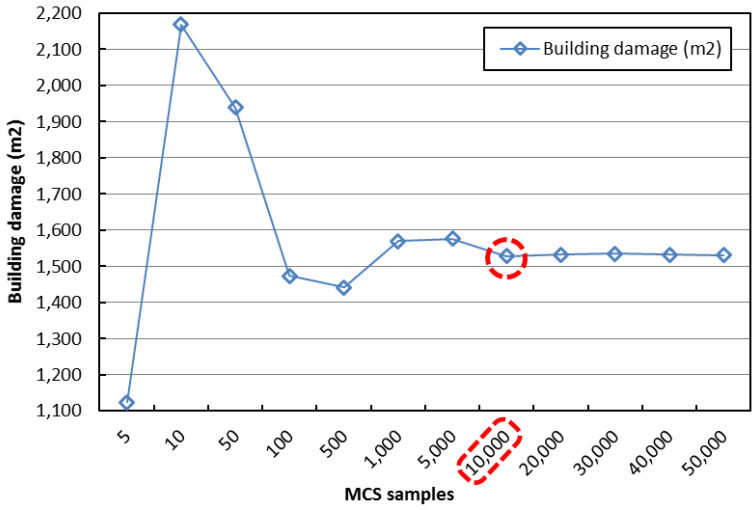


Figure 45 Distribution of MCS outcomes for sample building

Figure 46 presents MCS outcomes for a sample building.[13] For this building, out of 10,000 simulations, approximately 400 outcomes fall into the No Damage state; about 800 fall into the Slight DS; about 3,400 fall into the Moderate DS; about 3,300 fall into the Extensive DS; and about 2,100 fall into the Complete DS. The distributions vary from building to building, depending on the site seismicity and the building fragility.

[13] DS0 = No Damage

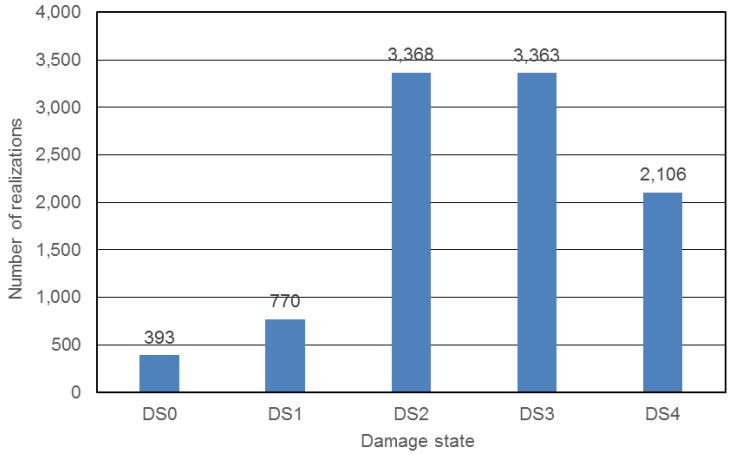


Figure 46 Distribution of MCS outcomes for a sample of buildings

The flowchart in Figure 47 illustrates the damage estimation procedure by using MCS for this study. As discussed earlier in this report, the expected (mean) values of structural damage, fatalities, injuries, IDPs, and debris volume are the key risk assessment parameters that are used to evaluate the seismic impacts on San Salvador.

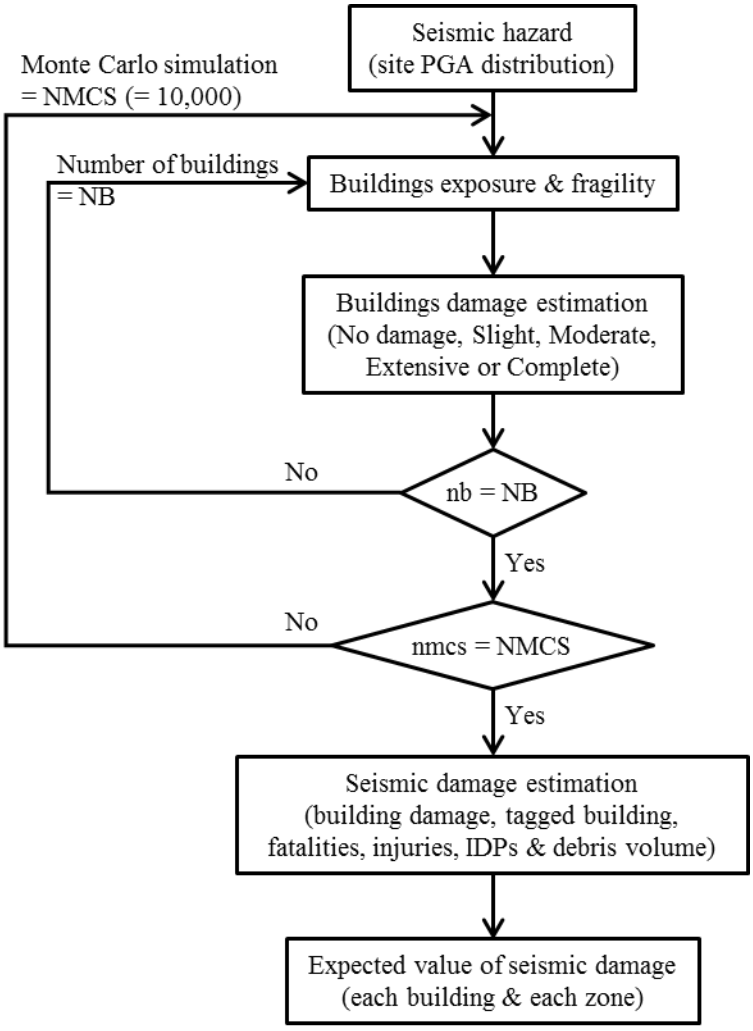


Figure 47 Flowchart of seismic damage estimation for this study area

6 RISK ASSESSMENT RESULTS

6.1 Overview

For each building, the seismic impacts (structural damage, fatalities, injuries, IDPs, and debris volume) were computed based on the expected (mean) value from 10,000 Monte Carlo simulations (MCSs). The analysis results were expressed in relative values, such as damage probability. By using the consequence functions and the building exposure data, the damage probabilities were then converted to damaged area, fatalities, injuries, IDPs, and debris volume. Key exposure data (building number, total area, and occupants) for the zones is provided in Table 42 and Table 43 for primary zones and for special zones, respectively. The impacts were then aggregated for each zone and were summed over all zones to obtain the total impacts on San Salvador. The different building damage states were grouped into three categories that correspond to the expected level of post-earthquake damage: green-, yellow-, and red-tagged (FEMA 2001).

6.2 Findings

6.2.1 Overview

The following sections present the aggregated impacts on the primary zones of San Salvador. Both percentages and absolute values are shown. The tabulated expected values of physical damage and human impact for primary zones and for special zones are thoroughly presented in Table 44 through Table 47.

6.2.2 Expected human impact (fatalities and injuries)

Because it is not known when an earthquake will occur, the fatality and injury estimates in this section are based on the average values of daytime and nighttime fatalities and injuries for each zone. Figure 48 presents the expected distribution of fatality and injury rates for each primary zone. The distribution of fatality rates indicates a maximum rate of 1.8% for the most affected zone and a mean value of 1.2%. The corresponding injury rates are approximately 14.4% and 9.9%, respectively.

Figure 49 shows the distribution of average fatalities (in people) for the primary zones, sorted by number of fatalities. The dashed horizontal line in the figure depicts the average fatalities for all zones. Note that for the most vulnerable zones, the fatalities exceed the average number by factor of 3 to 4, whereas for nearly eight zones, the expected fatalities are 15 or fewer. This data could be used to strategically allocate emergency and medical resources to the most vulnerable areas in terms of fatality number and rate.

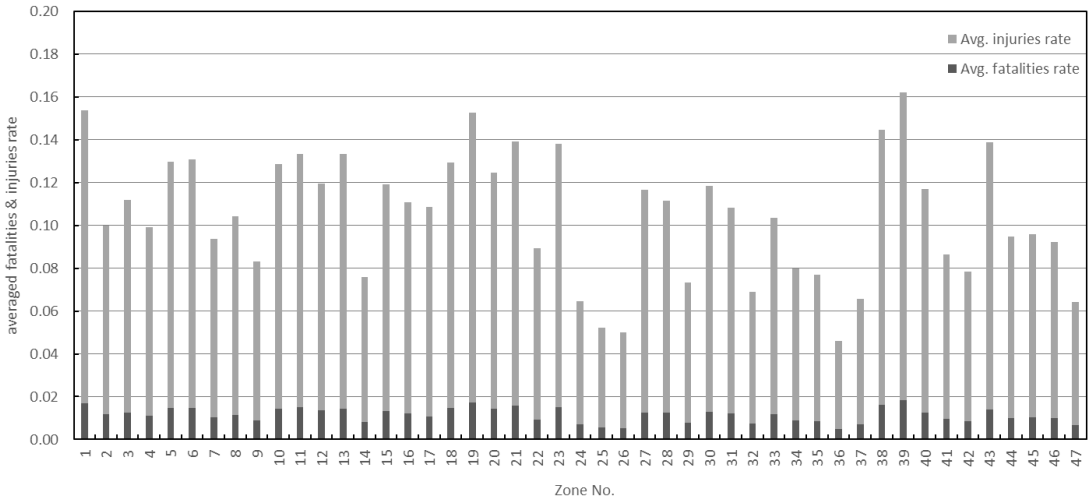


Figure 48 Distribution of the average rate of fatalities and injuries for primary zones

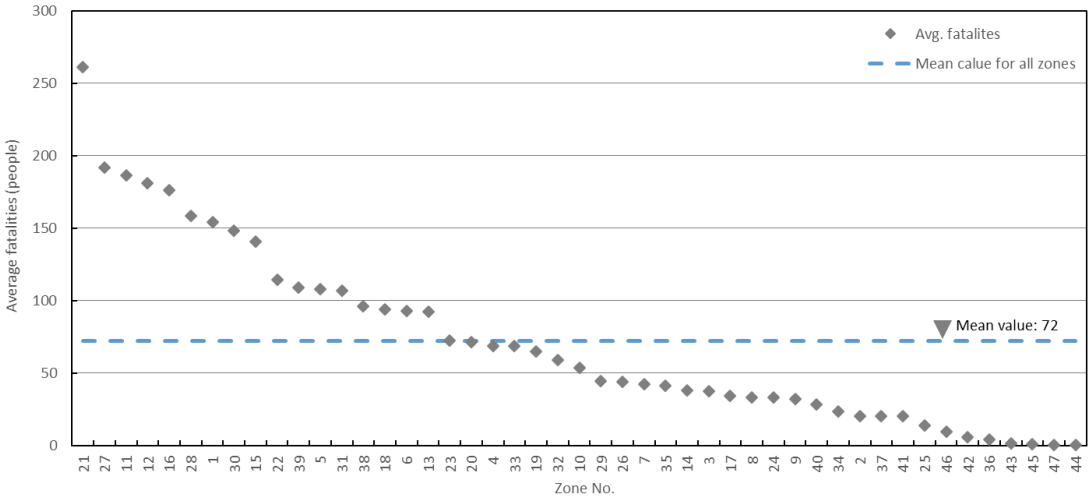


Figure 49 Distribution of the average rate of fatalities and injuries for special zones

6.2.3 Expected building damage (by colored tag categories)

After an earthquake, a building damage survey for the affected area would usually be performed. The distribution of assigned tag colors (green, yellow, and red, for usable, restricted, and unsafe occupancy, respectively) is estimated here based on the expected building damage due to the seismic intensity for this study (the design-level earthquake). Figure 50 presents the expected distribution of assessment tag colors for each primary zone. Note that the distribution of green-, yellow-, and red-tagged building rates is almost uniform for most of the zones. However, for some zones, damage that is more extensive is anticipated because of lower building performance or higher earthquake intensity.

As shown in Figure 51, for approximately 30 primary zones, the anticipated red-tagged buildings would be in the range of less than 40% of the building population, and red- and yellow-tagged buildings would be about 70% at a maximum. However, for a handful of zones, worse performance (such as a high percentage of red- and yellow-tagged buildings with more than 50% red-tagged buildings) is expected. For those zones, extensive damage and a high rate of human impact are

anticipated. This data therefore can be used to plan to dispatch assessment teams to the most adversely affected areas to determine whether or not buildings are safe to reoccupy. Quickly and efficiently tagging buildings that are usable to occupy can reduce the need for temporary housing during the recovery period.

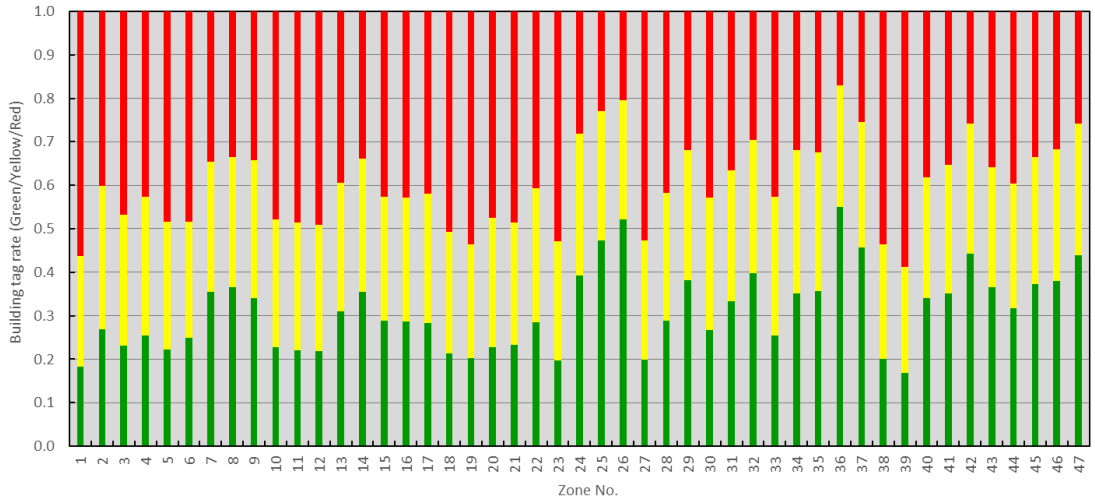


Figure 50 Distribution of building damage categories for primary zones

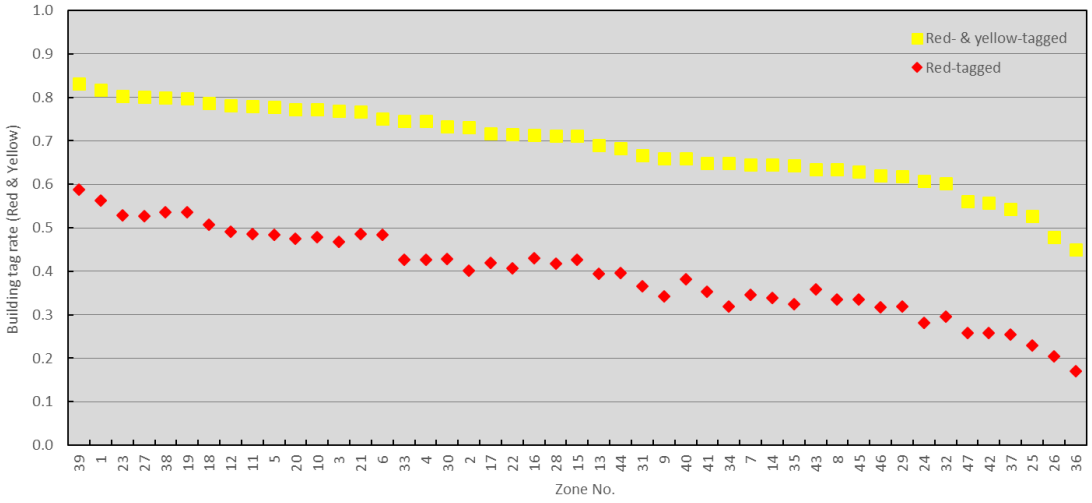


Figure 51 Sorted distribution of red- and yellow-tagged buildings for primary zones

6.2.4 Expected physical impact (damage rate and debris volume)

After an earthquake, a community-level damage assessment of the affected area would typically be performed to determine the extent of building damage in the community. Also, provisions for debris removal are usually necessary to allow the city to recover and to return to normal community activity.

Figure 52 presents the expected distribution of building damage for each primary zone. Note that the distribution is uniform, at approximately 50% or less, for most of the zones. However, for some zones, more severe structural damage is anticipated for the buildings.

Figure 53 shows the sorted distribution of expected debris volume (in m^3) for the primary zones. The dashed horizontal line in the figure depicts the average volume for all zones. Note that the amount of debris is significantly larger than the average for some of the most affected zones, and those zones likely have a combination of more buildings (i.e., larger exposure) and a higher damage rate (i.e., more vulnerable). This data would be beneficial to allocate construction equipment and personnel to the most vulnerable areas for assisting in recovery.

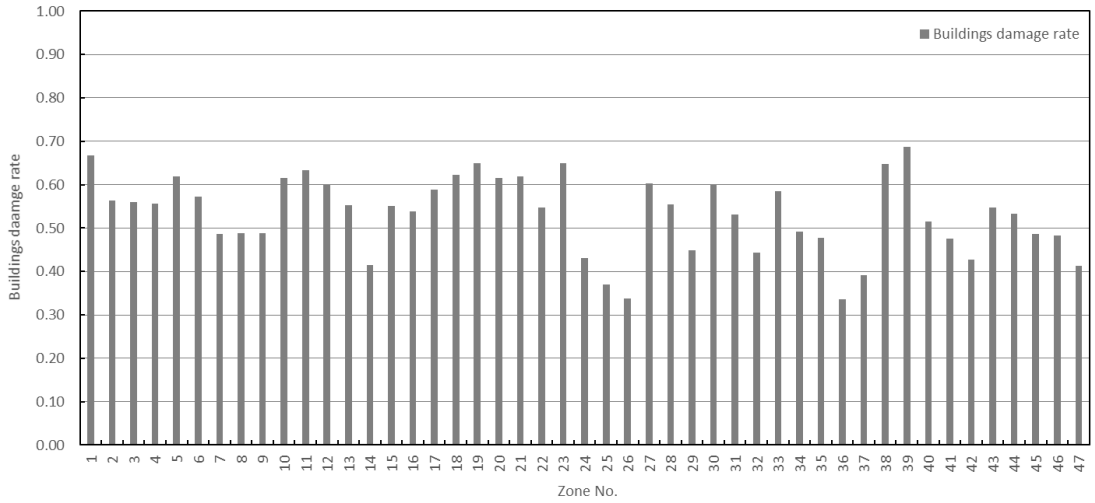


Figure 52 Distribution of building damage rates for primary zones

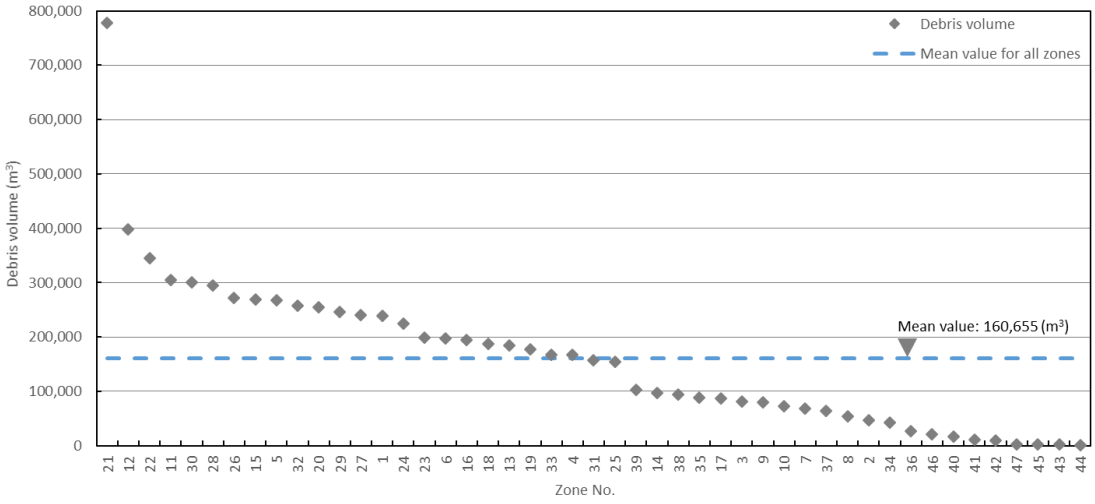


Figure 53 Sorted distribution of debris volume (in m^3) for primary zones

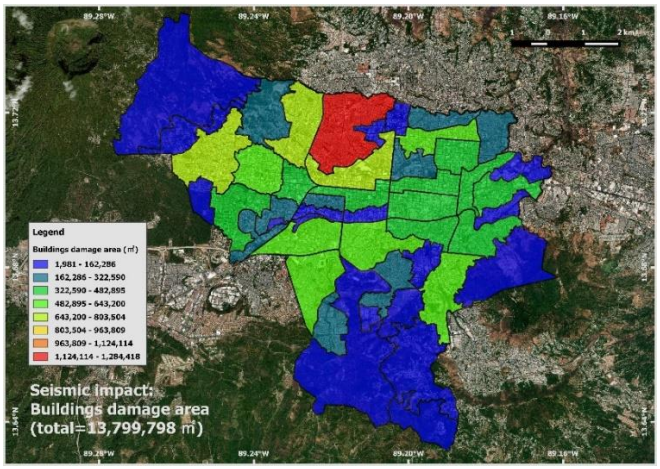
6.3 Risk distribution maps

The geographical distribution of seismic impacts that was evaluated from probabilistic risk analysis is presented in the following zonal maps. To provide the appropriate countermeasures according to the locations and to enhance the disaster resilience of the vulnerable zones, it is important to understand the spatial dispersion of the expected impacts. Figure 54 through Figure 61 present the spatial distribution of building structural damage, red-tagged buildings, fatalities, injuries, IDPs, and debris volume, respectively. Each result is essentially expressed in three formats: absolute value, rate, and density

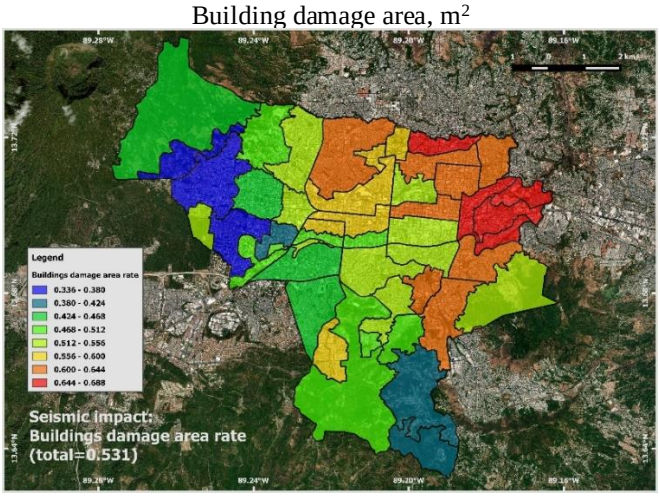
of impact per zone. Because the latter two formats are a proportion of the population and an average value by zone area, some relative studies could be performed for each zone in a normalized field. The results that are presented correspond to the expected (mean) values, as discussed previously.

In the figures, the color distribution indicates the expected intensity of each consequence. The data from these maps can be used to identify the zones that are most susceptible to earthquake impacts, which can then be prioritized for allocation of resources for seismic retrofit and earthquake preparedness. In particular:

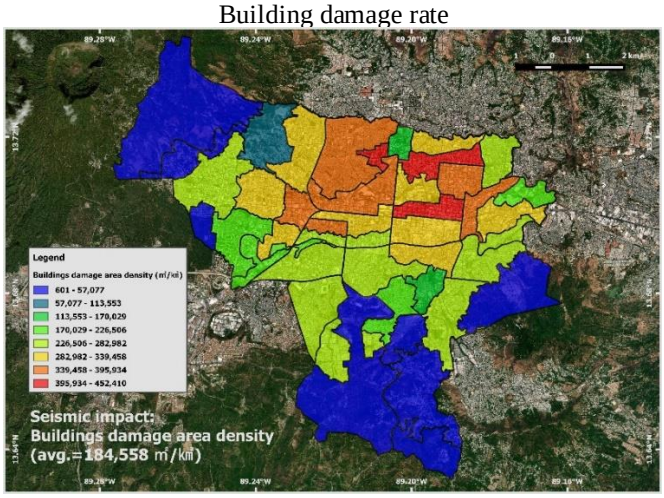
- The major physical impact (e.g., building structural damage and red-tagged buildings) dispersion in the zones depends on several factors. Those factors include generally building fragility, building density, building volume, and earthquake intensity according to each zone. Because the deficiencies of these factors cannot be improved quickly or significantly, this type of distribution information about building damage should be used to establish an effective process for post-earthquake damage assessment and a repair/demolition plan, as well as to develop a building retrofit program for pre-earthquake preparation.
- The distribution of fatalities and injuries in zones differs significantly for daytime and nighttime earthquake scenarios, and it tends to depend on the distribution of exposed occupants. This difference is mainly attributed to citizens' commuting to work from their households and visitor activities during the day, which alter the distribution of occupants. As such, it is imperative that both scenarios be considered for human risk management, such as an emergency care scheme that considers geographical extent or allocation of urgent medical facilities.
- The number of IDPs and the debris volume for each zone are governed mainly by building damage states; therefore, their impact distributions become similar to the physical damage distributions. Because IDPs affect the number and the location of temporary shelters and because debris volume can hinder the activities for emergency response and quick recovery, these two seismic impacts must be dealt with right after an earthquake. In addition, the spatial distribution of these impacts should be considered in regard to transportation availability (e.g., highways and local roads) in a postdisaster situation.
- Depending on the chosen consequence parameter, different zones show various risk trends or increased vulnerability. For example, the risk distribution of building structural damage is not necessarily the same as the distribution of human impacts, and the distribution of the absolute value of an impact is different from the distribution of the relative ratio of an impact. However, certain zones appear to be vulnerable to multiple seismic risks. Those zones require careful attention to deal with several risks when planning seismic risk mitigation and preparedness programs.



Building damage area, m^2

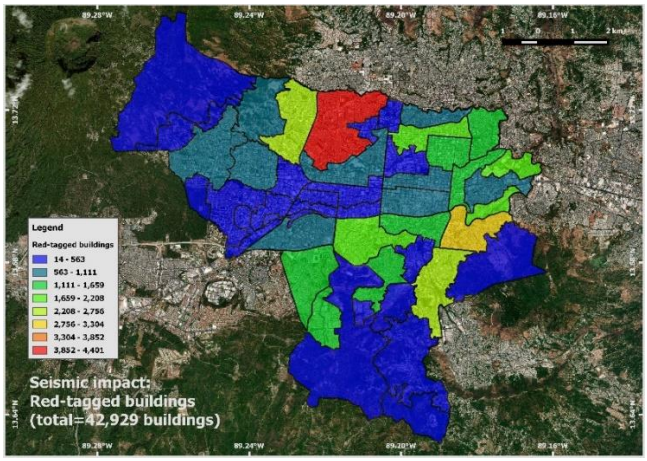


Building damage rate

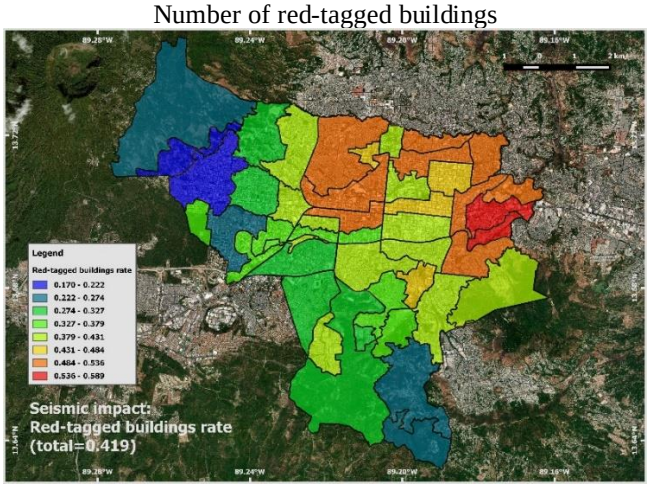


Building damage area density, m^2/km^2

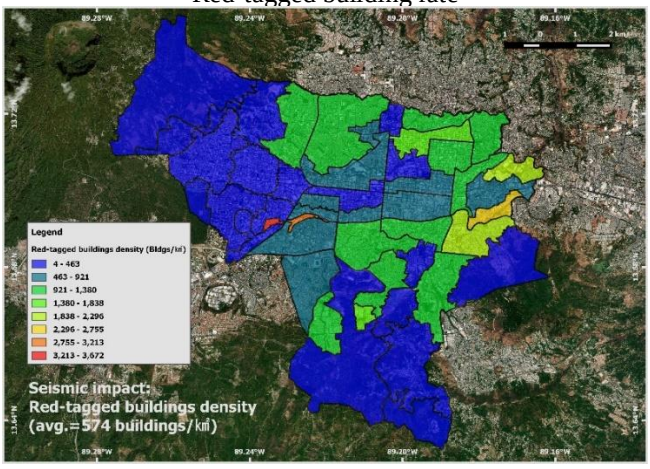
Figure 54 Spatial distribution of structural damage



Number of red-tagged buildings

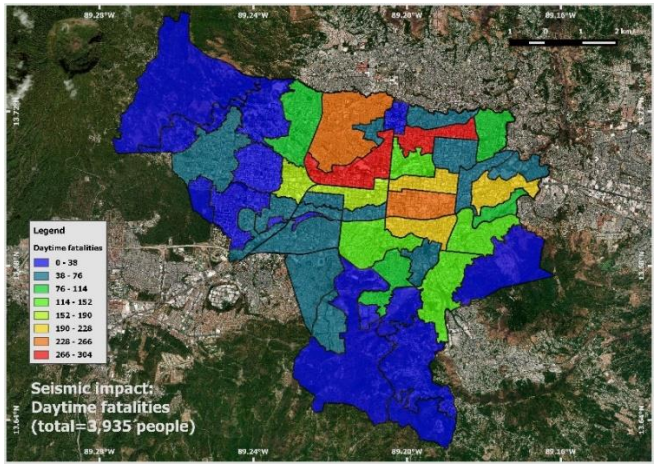


Red-tagged building rate

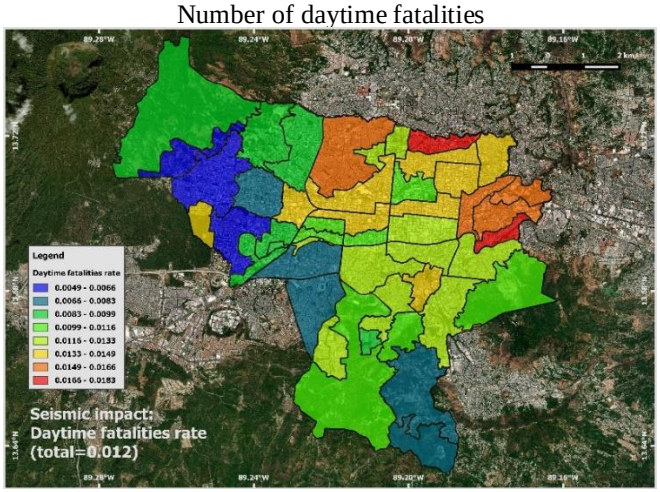


Red-tagged building density, number/km^2

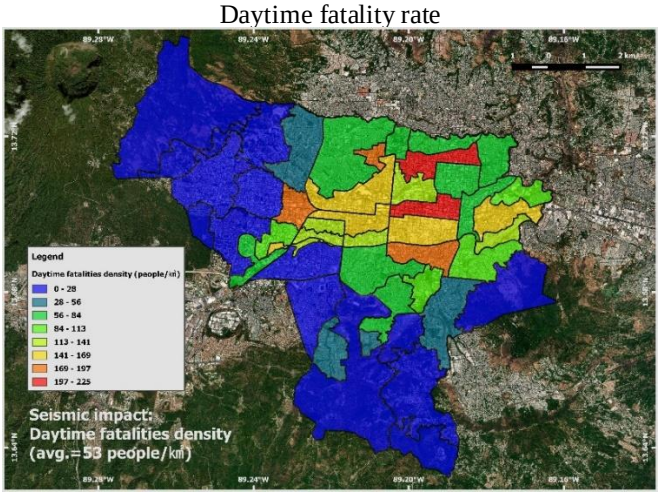
Figure 55 Spatial distribution of red-tagged buildings



Number of daytime fatalities

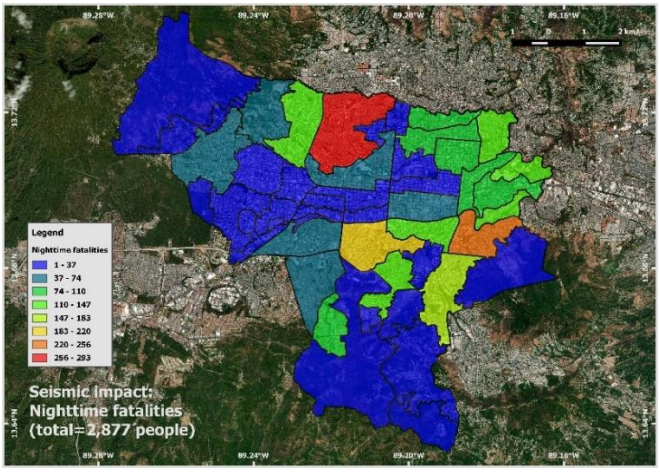


Daytime fatality rate

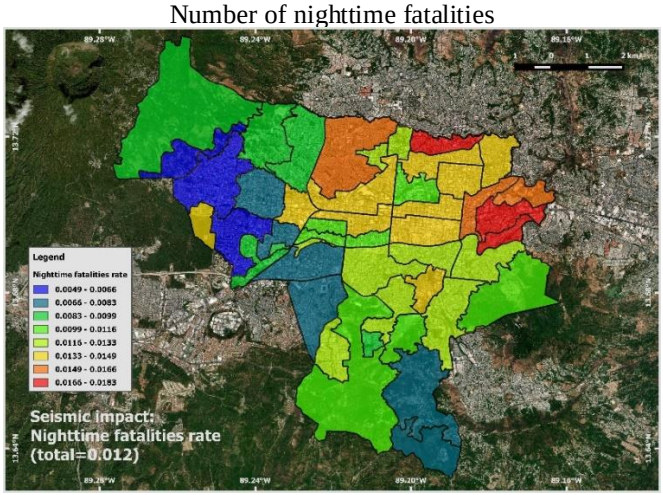


Daytime fatality density, people/km^2

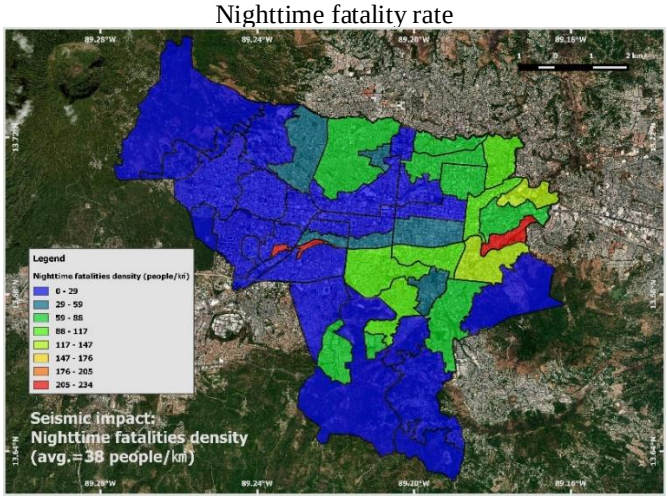
Figure 56 Spatial distribution of the number of daytime fatalities



Number of nighttime fatalities

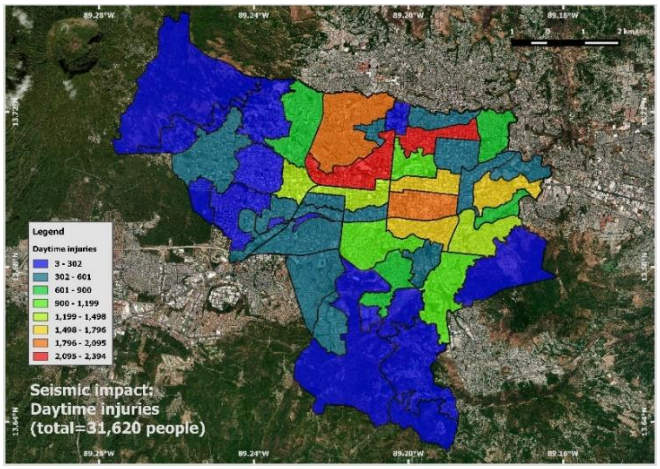


Nighttime fatality rate

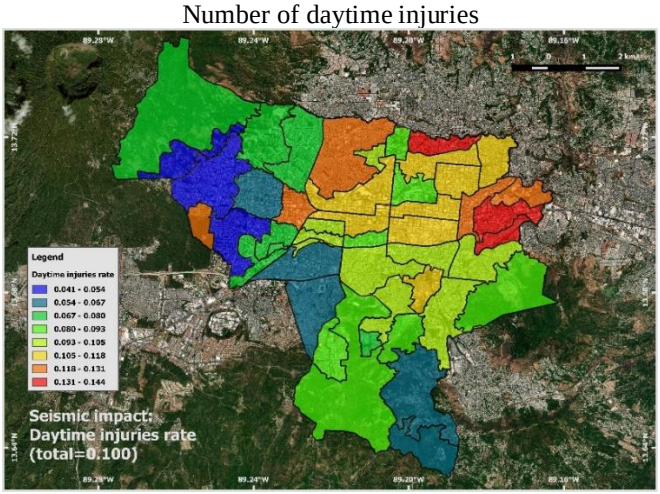


Nighttime fatality density, people /km^2

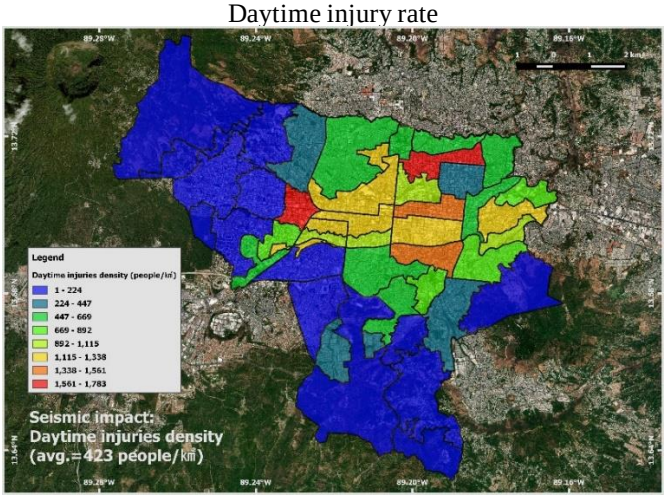
Figure 57 Spatial distribution of the number of nighttime fatalities



Number of daytime injuries

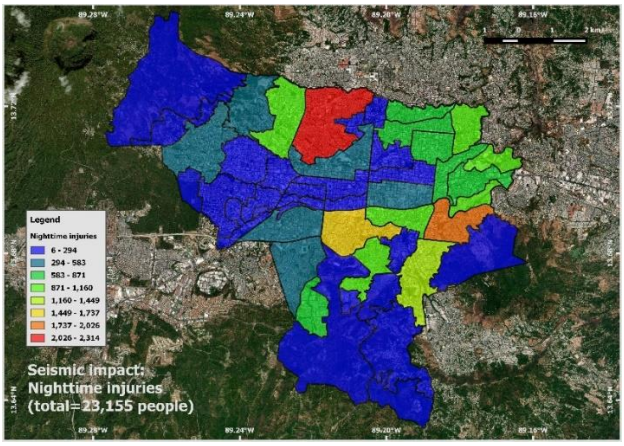


Daytime injury rate

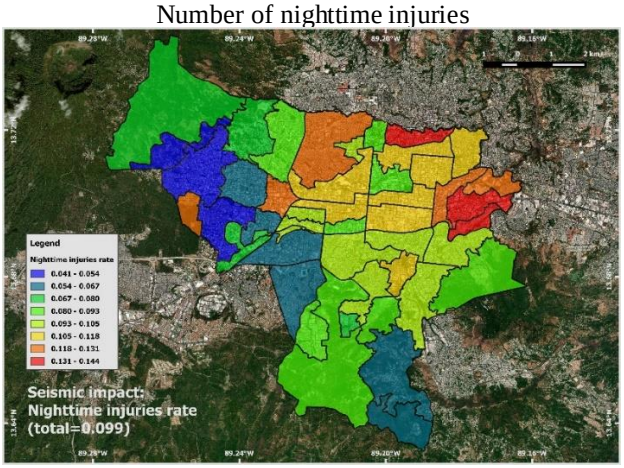


Daytime injury density, people/km^2

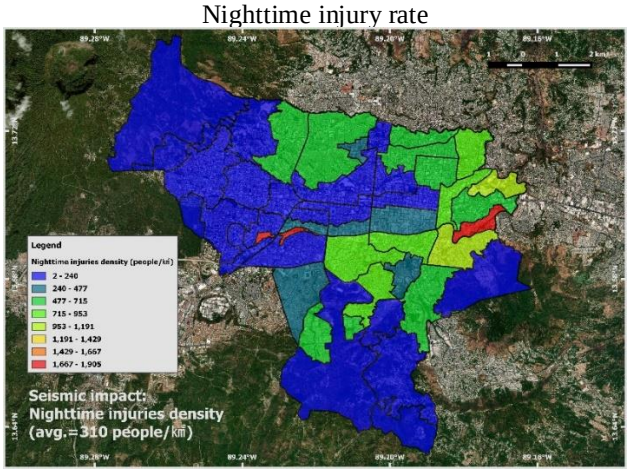
Figure 58 Spatial distribution of the number of daytime injuries



Number of nighttime injuries

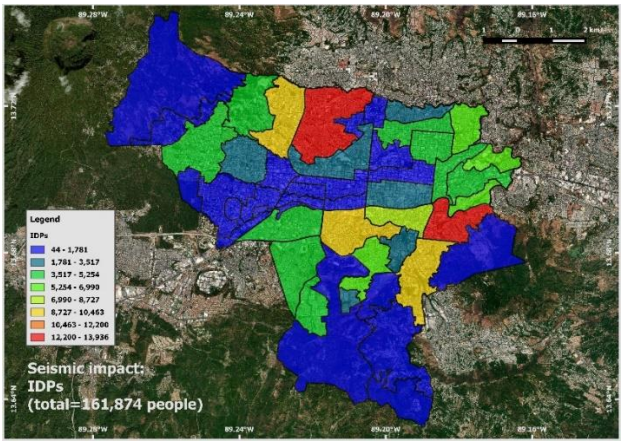


Nighttime injury rate

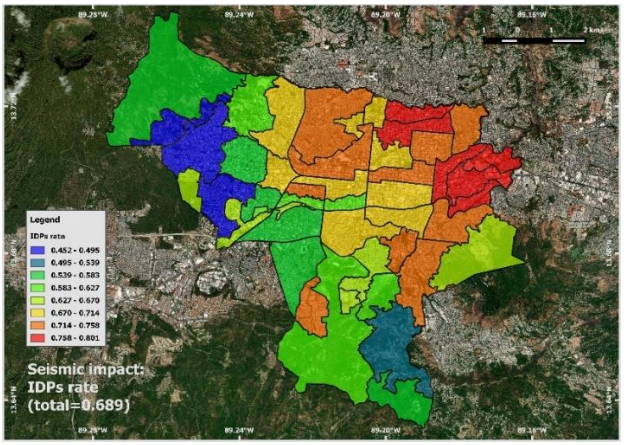


Nighttime injury density, people/km^2

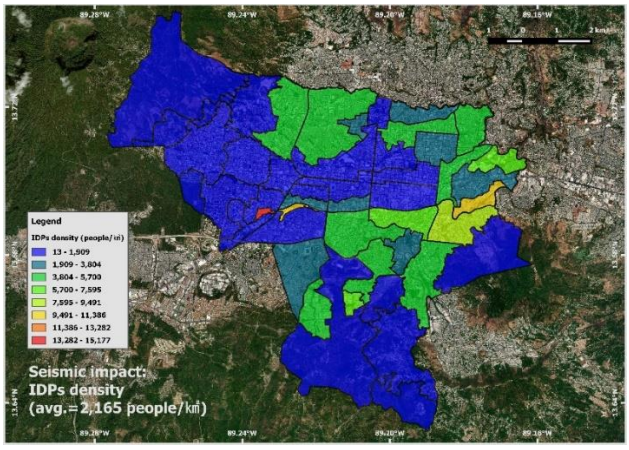
Figure 59 Spatial distribution of the number of nighttime injuries



Number of IDPs

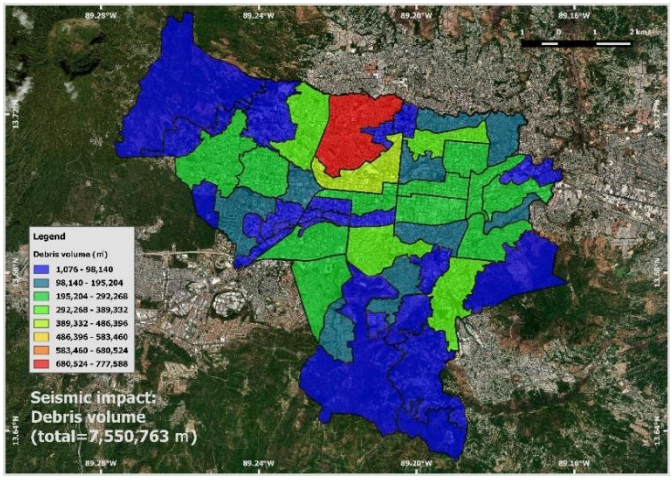


IDP rate

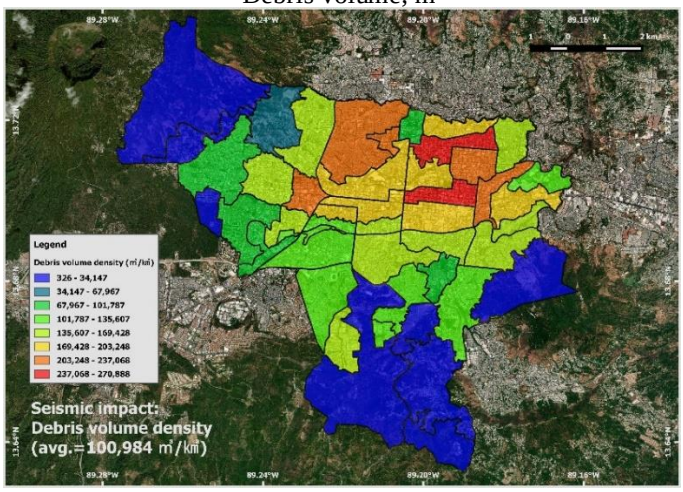


IDP density, people/km^2

Figure 60 Spatial distribution of number of IDPs



Debris volume, m^3



Debris volume density, m^3/km^2

Figure 61 Spatial distribution of debris volume

6.4 Aggregated results

6.4.1 Overview

Table 35 presents the exposure data for the study area. The study area of San Salvador has a population that varies from approximately 316,000 (daytime) to 235,000 (nighttime) occupants, and the area has nearly 102,540 buildings. It is important to keep those numbers in mind when reviewing the aggregated data.

Table 35 Exposure data for San Salvador

Buildings		Population	
No.	Area, m^2	Daytime	Nighttime
102,540	25,990,000	316,000	235,000

6.4.2 Physical impacts

Table 36 lists the expected physical impacts on the built area that is subject to the seismic intensity for this study (the design-level earthquake). Note that approximately 70% of the buildings would be classified as red- or yellow-tagged. The damaged area is nearly 53% of the total building area, and the subject earthquake could result in approximately 7,550,000 m^3 of debris for the entire study area.

Table 36 Expected values of physical impacts

Damage		Red-tagged		Yellow-tagged		Debris volume, m^3
%	Area, m^2	%	No.	%	No.	
53%	13,800,000	42%	42,900	29%	29,900	7,550,000

6.4.3 Human impacts

The anticipated human impacts from the design-level earthquake are listed in Table 37. The study area of San Salvador could experience approximately 2,900 to 3,900 fatalities and approximately 23,000 to 32,000 injuries, which are nearly 1.2% and 10%, respectively, of the total population. The difference between the daytime and nighttime scenarios is due to a dissimilar population distribution for different types of buildings. Also, the expected number of IDPs is nearly 162,000.

Table 37 Expected values of human impact

Scenario	Fatalities %	No. of fatalities	Injury %	No. of injuries	No. of IDPs
Daytime	1.25%	3,940	10.0%	31,600	161,900 (68.9%)
Nighttime	1.22%	2,880	9.9%	23,200	

6.4.4 Discussion

The results of earthquake risk estimation for San Salvador show that significant structural damage and moderately high fatality rates are to be expected by the seismic intensity that is considered in this study (the design-level earthquake). The assessment has also revealed that some zones are particularly vulnerable to adverse consequences from such an event. These findings point to the need to develop an earthquake preparedness program, including allocation of resources, retrofitting of vulnerable buildings, countermeasure planning, and development of a post-earthquake assessment and recovery strategy.

Note that the results that are discussed in this report are based on probabilistic analysis that used both engineering assumptions and engineering judgment, and the presented results are the expected (mean) values. Furthermore, those results were obtained from a given design-level earthquake intensity. Because several uncertainties were considered in the probabilistic risk analysis, the results essentially contain a certain level of variation that comes from the assumed stochastic distributions. Therefore, such variations should be accounted for when interpreting the findings and applying the results for future planning.

7 CONCLUSION

Experience from past and recent earthquakes in El Salvador has shown that extensive damage affects the entire built environment, resulting in loss of life and causing massive physical damage that jeopardizes a significant portion of the region's GDP. Within the seismically active regions of El Salvador, San Salvador—the largest city in the country in terms of both economic and human activities, with a population of approximately 316,000—is the subject of this report.

The risk assessment algorithm used the following parameters as input: (1) a design-level seismic hazard; (2) a citywide exposure model, including structural properties and number of occupants; (3) building seismic fragility functions for the common structural types; and (4) consequence functions, relating the number of fatalities, injuries, IDPs, structural damage, and debris volume to the building damage state.

More specifically, the site soil class and bedrock acceleration were combined to develop peak ground accelerations (PGAs) for the design-level earthquake by applying the available data. The seismic design parameters for PGAs were computed and were estimated at 0.39g to 0.67g according to location. Field surveys of 2,910 buildings (2.8% of the building stock), satellite image data, land-use information, field investigations, and census data were used to develop the exposure model. That data and that information were also used to divide buildings into various groups of common construction type. According to the construction type, the building fragility functions that are suitable for San Salvador construction were determined by modifying well-known worldwide resources such as FEMA Hazus. The consequence functions, based on global research and local historical records, were developed for the construction types that are found in San Salvador. Table 38 presents a summary of the exposure model for San Salvador.

Table 38 Building area and population exposure for San Salvador

No. of buildings	Construction area, m^2	Occupants (daytime)	Occupants (night time)
102,540	25,990,000	316,000	235,000

Seismic risk analysis was then performed by using a probabilistic analysis program to compute the associated seismic impacts. The results for individual building assets were aggregated to obtain the expected risk values for each zone and were then summed for the entire study area of San Salvador. Table 39 presents the key aggregated results from the seismic risk analysis.

The analysis results in Table 39 show that:

The area of buildings that are damaged by the expected earthquake intensity is anticipated to be 13,800,000 m^2, which is about 53% of the total area of buildings in the study area.

- The number of buildings that are expected to be yellow-tagged (moderate to extensive damage) or red-tagged (complete damage or collapse) is estimated to be about 73,000 structures, or approximately 70% of the building stock.
- Depending on the time that the event occurs, approximately 2,880 to 3,940 fatalities (for an estimated rate of 1.2%) are anticipated.
- Depending on the time that the event occurs, approximately 23,200 to 31,600 injuries (for an estimated rate of 10%) are expected.
- The number of IDPs is expected to be about 161,900 immediately after the event, which is a large percentage of the total population.
- The expected debris volume of 7,550,000 m^3 is significant and must be taken into account for post-earthquake response.

Table 39 Expected values of earthquake risk for San Salvador

Structural damage m^2 (%)	Fatalities		Injuries		IDPs, person (%)	Damage class tag		Debris volume, m^3
	Daytime, person (%)	Nighttime, Person (%)	Daytime, person (%)	Nighttime, Person (%)		Red, No. (%)	Yellow, No. (%)	
13,800,000	3,940	2,880	31,600	23,200	161,900	42,900	29,900	7,550,000

Because of the large pool of vulnerable buildings, such as URM or older nonductile construction types, and because of the high seismicity of region, the high rates of physical damage, fatalities, and injuries due to earthquake that were computed in this study were expected. The findings in this study highlight the need for development of a risk mitigation program. As part of such a program, it is recommended that the following strategies be implemented:

- Provide a seismic strengthening program and a prioritization strategy for key buildings that are identified as having the most seismic risk because of their inherent structural vulnerability, high-seismicity location, density of occupants, and important use for disaster response and recovery.
- Establish a post-earthquake damage assessment program. It is critical for San Salvador to develop its own damage assessment logistic and to train and to certify engineers. Such a program helps improve disaster response, recovery activities, and city resiliency after major earthquakes.
- Optimize the allocation of emergency and response resources by identifying the most vulnerable zones, with consideration of both building damage and human impacts. It is necessary to prioritize the locations so that limited resources are effectively assigned.
- Develop communication and public outreach programs about earthquake risks. It is critical to share the potential risks and the abovementioned strategies with stakeholders. Communities should be informed about earthquake risk, risk reduction methods, and response procedures.

Scope and limitations

The results, findings, and conclusions that are presented in this report are based on a seismic risk analysis derived from internationally recognized references and state-of-the-art analytical techniques. However, as with any engineering project, the underlying methods and analysis are based on certain assumptions and engineering judgment. Additionally, the findings are based on a given design-level earthquake intensity and correspond to the expected values or mean values. That is, the results present the expected outcome for an average event from a sample of a large pool of events with similar intensities and extents. As such, the findings in this report include a certain level of uncertainty (inherent in risk assessment) and should not be extrapolated directly to a future seismic event. Accordingly, these assumptions and variations should be accounted for when interpreting the findings and applying the results for future planning.

It is further noted that the exposure data was based on satellite imagery, census data, and field surveys. Thus, there is a high degree of confidence in that part of the data. However, site-specific and detailed datasets for fragility functions for buildings in San Salvador or soil amplification data for the city was barely available at the time of this report. Hence, there is less certainty in that data, and a suggestion for future risk assessments is to perform a more detailed investigation to obtain site-specific data for both building fragility and seismic soil effects.

8 RECOMMENDATIONS FOR FUTURE STUDIES

During the final phase of the seismic risk assessment, a technical discussion was conducted. The primary objective of the discussion was to present the assumptions, methodology, and key findings to the local engineering group (the Seismic Risk Commission). This group is comprised of:

> The Sistema Nacional de Protección Civil, especially the Ministerio de Gobernación; Cámara Salvadoreña de la Industria de la Construcción (CASALCO); Asociación Salvadoreña de Ingenieros y Arquitectos (ASIA); Universidad de El Salvador (UES); Ministerio de Obras Públicas y de Transporte (MOPT); Ministerio de Medio Ambiente y Recursos Naturales (MARN); Consultant Walter Salazar; and Consultant Kevin Cruz.

The following comments about the seismic risk assessment of San Salvador are based on those technical discussions. The main topics include expansion to other municipalities and cities, further study of earthquake intensity for risk (including historical earthquakes and soil amplification of San Salvador), and sharing of the data and methodology, and the suggested items are recommended for future investigations. The engineering group's discussion points and suggestions are in Table 40.

Table 40 Technical discussion for seismic risk assessment of San Salvador on November 7, 2019

No.	Comments	Inquisitor	Response
1	Under the PREPARE program, to which countries has this seismic risk assessment been applied?	In discussion	The seismic risk of San José, Costa Rica; Pasto, Colombia; and Zapopan, Mexico, has been studied.
2	The study area is only the municipality of San Salvador. Are there any plans to perform the same assessment on neighboring municipalities such as Santa Tecla?	In discussion	Based on the initial discussion with local stakeholders, the municipality of San Salvador (six contemporary districts and one historic district) was chosen for this study. However, the methodology can be applied to other municipalities or cities for future work.
3	To identify the site soil class of San Salvador, what kind of research was used?	In discussion	Several resources, such as local research (MARN 2017), the Salvadoran building code (TSED 1994), and a U.S. building code (ASCE 2017), were used to identify the site soil class of San Salvador to determine the soil amplification effects from the earthquake PGA.
4	A strong-motion sensor network has been deployed in San Salvador. Is it possible to update the assessment based on a monitored earthquake in the future?	In discussion	If the earthquake intensities according to location are recorded by the sensor network, those recorded intensities (PGAs) can be applied to the methodology of seismic risk assessment in this study.
5	For the input and output data (e.g., fragility, exposure, results), is there a plan to share the data with local stakeholders?	In discussion	Unless there are any issues with local and U.S. stakeholders, the data about seismic risk assessment from this study will be shared.

No.	Comments	Inquisitor	Response
6	If the information from Rosenblueth and Prince (1965) and Lomnitz and Schultz (1966) are taken as a reference, the magnitude of 6.2 for the 1965 earthquake seems consistent.	Rodolfo Torres (MARN)	The research by Rosenblueth and Prince (1965) and Lomnitz and Schultz (1966) has been reviewed to examine the 1965 San Salvador Earthquake.
7	According to the RESIS II report, the magnitude of the 1917 San Salvador Volcanic Earthquake was 6.5 for the first of the two volcanic earthquakes. Which reference was reviewed to determine Mw 6.7 in this report?	Rodolfo Torres (MARN)	For the 1917 San Salvador Volcanic Earthquake, a national report by MIGOBDT (2017) was reviewed, and it does not seem to differ greatly from the RESIS II report.
8	What I do like is that the information is well structured, so it can be referred to for future research.	Rodolfo Torres (MARN)	We agree that this seismic risk study can be referred to and can be useful for future research.
9	In relation to the geographical coverage of the study, why are small, sparsely populated green areas included, and densely populated areas of the AMSS, such as San Martín or Santa Tecla, are left out?	Rolando Durán (ASIA)	Based on the initial discussion with local stakeholders, the municipality of San Salvador (six contemporary districts and one historic district) was chosen for this study. However, the methodology can be applied to other municipalities or cities for future work.
10	With respect to seismic microzonation for site effects, what research was reviewed in this study (the OPAMSS study or other studies)? Or were any geophysical studies performed for this risk study?	Rolando Durán (ASIA)	No geological tests were conducted for this risk study. Several local organizations were requested to share their geological data, and the received microzonation data (MARN 2017) seemed to be recent and detailed information that met the needs of this risk analysis.
11	Can the calculation methodology be applied for other cities in El Salvador with high seismicity or more vulnerability?	Rolando Durán (ASIA)	The calculation methodology that is used in this risk study can be applied to any area as long as all input data is properly prepared.
12	The analyzed areas correspond to Districts D-1, D-2, D-3, D-4, DCH, D-5, and D-6. Green areas make up 30% of the total analyzed area, and the surrounding densely populated urban areas are not considered. Is it possible to study the surrounding areas if a new phase of the program is carried out?	Kevin Cruz (KCE)	Based on the initial discussion with local stakeholders, the municipality of San Salvador (six contemporary districts and one historic district) was chosen for this study. However, the methodology can be applied to other municipalities or cities for future work.
13	The impact analysis of seismic risk considers three factors: seismic hazard, exposure, and fragility of buildings. Will the analysis also consider social	Kevin Cruz (KCE)	This risk assessment focuses on the impacts from building damage. Several consequence (impact) functions for structural damage, fatalities, injuries,

No.	Comments	Inquisitor	Response
	parameters such as the economic fragility of a country or an index of resilience?		IDPs, and debris volume are considered. Other risk indexes might be good for future work.
14	The document (Hernandez Guevara 2004) can be used as a reference for the seismicity of El Salvador.	Kevin Cruz (KCE)	We appreciate your sharing the document. The shared document seems to be a good reference for fault, soil, and seismological studies of San Salvador.
15	With regard to the maximum ground accelerations, the document (Alonso-Henar et al. 2018) studied the latest results in terms of seismic hazard.	Kevin Cruz (KCE)	We appreciate your sharing the document. The shared document seems to be a good reference for some specific scenario earthquakes. This risk study focuses on a "uniform" seismic hazard with Tr = 475 years (the design-level earthquake) for San Salvador. Specific scenario earthquakes might be good for future work and analysis.
16	As for the soil type, OPAMSS can be recommended to contact because that organization might take into account the geological map of El Salvador.	Kevin Cruz (KCE)	Several local organizations were requested to share their geological data about San Salvador, and the received microzonation data (MARN 2017) seemed to be recent and detailed information that met the needs of this risk analysis.
17	The document (CERESIS 1986) contains the information that was gathered from the 1986 earthquake in San Salvador, including the recorded seismic intensities and the economic data.	Kevin Cruz (KCE)	We appreciate your sharing the document. The shared document seems to be a good reference for the 1986 San Salvador Earthquake, and several reports that refer to this document have been reviewed for this risk study.
18	The impact evaluation of this study was performed by using a probabilistic assessment. However, the technical manual *Hazus–MH2.1* (pp. 8–11) mentions that a deterministic model is convenient to define the movement of soil. Deterministic events can be defined based on the recorded data from historical earthquakes. Two types of earthquakes occur in El Salvador, those generated from the interaction of tectonic plates and those generated by local faults within the continent. In both cases, the maximum accelerations depend on the distance from the epicenter and the soil strata, so both scenarios are relevant.	Kevin Cruz (KCE)	A deterministic seismic hazard was applied to this seismic risk assessment by analyzing the building damage probabilistically. More specifically, the design-level earthquake (in PGA intensity), such as a "uniform" seismic hazard that considers both a tectonic earthquake and a local-fault earthquake in El Salvador, was used for this risk study.

No.	Comments	Inquisitor	Response
19	Is it possible to share the parameters that were used to define the demand spectra and the capacity curves that correspond to the fragility curves for each building type in this study?	Kevin Cruz (KCE)	The fragility curves for the buildings in this study were based on U.S. fragility curves (developed by Hazus), which were then modified to correspond with San Salvador construction features. Therefore, no specific demand spectra or capacity curves were developed for this risk study. However, a fragility curve that is developed based on the Hazus approach might be good for future work.

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APPENDIX A: SUPPLEMENTARY DATA

A.1 Overview

Supplementary data for the Phase I report is presented in this appendix. This data includes:

- Field surveys of buildings
- Tabulated exposure model and seismic risk assessment results for individual zones

A.2 Building exposure model

A.2.1 Building survey

The exposure pool was developed by using the 2,910 surveyed buildings as a base; see Table 41. Data for these buildings were collected by the teams of surveyors and supervisors who had been trained beforehand. Field surveys were conducted for the 2,910 buildings, or approximately 3% of the pool of buildings in the study area of San Salvador. Note that only a portion of the database for each building is shown in Table 41. Additional survey information, such as approximate construction date, irregularities, building shape, etc., were also noted during the data collection in field.

Table 41 Key data for surveyed buildings

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1	1	-89.1785	13.7006	651	1	4	E	200	--
2	1	-89.1779	13.6999	35	1	3	R	3	5
3	1	-89.1780	13.6999	98	1	3	R	3	5
4	1	-89.1811	13.7007	40	1	3	R	3	5
5	1	-89.1801	13.7041	400	1	4	C	15	2
6	1	-89.1817	13.7023	30	1	15	R	3	5
7	1	-89.1818	13.7022	60	1	4	C	3	2
8	1	-89.1822	13.7003	60	1	3	C	15	--
9	1	-89.1821	13.7003	144	1	3	C	8	--
10	1	-89.1818	13.7005	275	1	4	G	20	10
11	1	-89.1830	13.7015	225	1	4	C	6	2
12	1	-89.1780	13.6997	300	1	4	I	15	1

[14] 1 = Adobe (non-engineered); 2 = Bahareque or informal (non-engineered); 3 = Unreinforced/unconfined masonry (URM); 4 = Confined masonry (CM, masonry bearing wall), low-rise; 5 = Confined masonry (CM, masonry bearing wall), mid-rise; 6 = Confined masonry (CM, masonry bearing wall), HQ, low-rise; 7 = RC frame (RCF) with masonry infill, low-/mid-rise; 8 = RC frame (RCF) with masonry infill, high-rise; 9 = RC moment frame or RC shear wall (RCMF or RCSW), low-/mid-rise; 10 = RC moment frame or RC shear wall (RCMF or RCSW), high-rise; 11 = RC moment frame or RC shear wall (RCMF or RCSW), superhigh-rise; 12 = Steel moment frame or Steel braced frame (SMF or SBF), low-/mid-rise; 13 = Steel moment frame or Steel braced frame (SMF or SBF), high-rise; 14 = Steel moment frame or Steel braced frame (SMF or SBF), superhigh-rise; 15 = Light gauge steel; and 16 = Wood light frame.

[15] R=residential, C=commercial/public, I=industrial/office, G=government, E=education, As= assembly, Ag=agriculture, M=mixed use, O=other occupancy type, and U=unknown occupancy type.

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
13	1	-89.1779	13.6999	40	1	1	R	3	10
14	1	-89.1810	13.7007	540	1	4	E	25	2
15	1	-89.1785	13.7000	234	2	3	R	2	7
16	1	-89.1803	13.7040	108	2	4	C	10	1
17	1	-89.1812	13.7025	240	2	4	C	10	2
18	1	-89.1799	13.7030	64	2	3	R	4	8
19	1	-89.1799	13.7031	84	2	4	M	3	2
20	1	-89.1803	13.7039	195	2	4	C	10	2
21	1	-89.1807	13.7035	84	2	3	M	5	5
22	1	-89.1808	13.7033	200	2	4	C	20	2
23	1	-89.1820	13.7004	50	2	3	C	10	2
24	1	-89.1829	13.7011	60	2	4	R	12	20
25	1	-89.1827	13.7009	100	2	3	R	4	8
26	1	-89.1822	13.7020	320	2	4	C	5	2
27	1	-89.1782	13.7005	180	2	3	E	25	1
28	1	-89.1786	13.6998	480	2	3	I	25	2
29	1	-89.1808	13.7033	128	3	4	R	15	30
30	1	-89.1819	13.7021	108	3	4	M	15	30
31	1	-89.1830	13.7011	60	3	4	R	15	2
32	1	-89.1790	13.7038	42	4	5	C	5	1
33	1	-89.1803	13.6957	160	4	5	R	24	48
34	1	-89.1813	13.6959	320	4	5	R	48	96
35	1	-89.1781	13.6956	400	4	5	R	48	96
36	1	-89.1784	13.6958	416	4	5	R	52	104
37	1	-89.1830	13.6961	178	4	5	M	24	48
38	2	-89.2007	13.7172	810	1	4	E	15	1
39	2	-89.2014	13.7180	70	1	4	E	8	--
40	2	-89.2006	13.7169	216	1	4	E	308	--
41	2	-89.2053	13.7201	750	2	7	E	100	--
42	2	-89.2048	13.7200	2,000	2	4	E	300	1
43	2	-89.2053	13.7168	540	2	4	E	500	2
44	2	-89.2053	13.7170	540	2	4	E	500	2
45	2	-89.2012	13.7167	1,400	2	4	E	300	--
46	2	-89.2018	13.7180	1,750	3	7	E	50	1
47	2	-89.2012	13.7173	1,080	3	9	E	4	1
48	2	-89.2011	13.7182	4,200	3	4	E	600	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
49	2	-89.2025	13.7181	800	3	7	E	205	1
50	2	-89.2013	13.7172	1,125	3	7	E	240	2
51	2	-89.2005	13.7167	450	3	7	E	30	2
52	2	-89.2041	13.7180	1,000	3	7	E	500	--
53	2	-89.2041	13.7177	1,800	3	4	E	400	--
54	2	-89.2052	13.7173	1,008	3	7	E	700	2
55	2	-89.2034	13.7182	1,200	3	7	E	600	--
56	2	-89.2025	13.7172	2,304	7	9	E	2,000	--
57	3	-89.2064	13.7159	280	1	4	C	5	1
58	3	-89.2087	13.7170	220	2	4	As	5	2
59	3	-89.2091	13.7167	150	2	4	O	5	100
60	3	-89.2097	13.7167	208	2	4	O	10	15
61	3	-89.2074	13.7169	120	2	4	R	3	15
62	3	-89.2071	13.7174	135	2	4	R	2	5
63	3	-89.2062	13.7180	120	2	4	C	5	1
64	3	-89.2070	13.7169	40	2	4	R	1	5
65	3	-89.2078	13.7167	120	2	4	R	10	25
66	3	-89.2077	13.7169	450	2	4	C	15	--
67	3	-89.2078	13.7163	70	2	4	R	4	14
68	3	-89.2078	13.7152	81	2	3	R	4	7
69	3	-89.2084	13.7150	152	2	3	C	7	--
70	3	-89.2094	13.7143	250	2	3	C	80	2
71	3	-89.2098	13.7139	195	2	4	R	3	--
72	3	-89.2099	13.7144	400	2	4	C	8	1
73	3	-89.2104	13.7139	84	2	4	R	3	3
74	3	-89.2111	13.7134	300	2	4	E	200	2
75	3	-89.2066	13.7168	240	3	4	R	4	9
76	3	-89.2102	13.7162	150	3	7	C	10	--
77	3	-89.2100	13.7144	240	3	4	M	11	12
78	4	-89.2031	13.7064	128	1	4	As	100	150
79	4	-89.1980	13.7040	1,680	1	3	G	300	2
80	4	-89.1970	13.7043	500	1	4	E	30	--
81	4	-89.1973	13.7035	250	2	3	C	12	1
82	4	-89.2029	13.7060	81	2	4	R	3	8
83	4	-89.1952	13.7060	425	2	9	C	20	2
84	4	-89.1939	13.7078	300	2	4	C	40	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
85	4	-89.1936	13.7084	390	2	4	C	30	2
86	4	-89.1969	13.7045	168	2	4	G	25	10
87	4	-89.1981	13.7029	660	2	4	E	50	5
88	4	-89.1987	13.7024	112	2	4	I	3	1
89	4	-89.1973	13.7038	144	2	4	C	10	2
90	4	-89.1973	13.7035	540	2	4	As	12	1
91	4	-89.1971	13.7035	308	2	4	E	18	1
92	4	-89.1944	13.7082	180	2	4	G	15	2
93	4	-89.1940	13.7083	364	2	4	C	25	5
94	4	-89.1946	13.7083	119	2	4	C	8	16
95	4	-89.1947	13.7081	63	2	4	G	12	1
96	4	-89.1950	13.7081	80	2	4	G	12	1
97	4	-89.1957	13.7081	60	2	4	R	5	10
98	4	-89.2020	13.7098	750	3	9	C	200	150
99	4	-89.2003	13.7041	2,400	3	4	C	250	1
100	4	-89.2039	13.7072	336	3	4	C	25	1
101	4	-89.2000	13.7050	900	3	9	G	75	2
102	4	-89.1955	13.7059	600	3	7	C	60	2
103	4	-89.1950	13.7060	360	3	9	C	73	1
104	4	-89.1943	13.7072	289	3	4	G	30	1
105	4	-89.1936	13.7079	500	3	7	G	150	2
106	4	-89.1938	13.7075	180	3	4	M	14	--
107	4	-89.1983	13.7024	575	3	4	C	7	80
108	4	-89.2025	13.7101	558	4	5	C	400	350
109	4	-89.2021	13.7103	361	4	9	C	50	2
110	4	-89.2014	13.7086	120	4	9	C	65	3
111	4	-89.2030	13.7068	528	4	5	C	150	1
112	4	-89.2035	13.7086	361	4	5	C	50	1
113	4	-89.2027	13.7114	400	4	9	C	70	1
114	4	-89.1976	13.7064	3,000	4	9	G	1,100	30
115	4	-89.1962	13.7071	2,500	5	9	G	700	20
116	4	-89.1983	13.7064	1,250	5	9	U	700	20
117	4	-89.2013	13.7084	154	7	9	C	120	2
118	5	-89.2024	13.6994	200	1	4	C	20	2
119	5	-89.1997	13.7010	375	1	4	C	10	3
120	5	-89.2011	13.7002	100	1	4	C	15	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
121	5	-89.2024	13.6997	150	1	4	C	15	1
122	5	-89.1993	13.7000	121	2	4	C	6	--
123	5	-89.1975	13.6998	200	2	4	C	10	2
124	5	-89.1969	13.7001	800	2	3	C	30	1
125	5	-89.1996	13.7000	121	2	4	C	8	1
126	5	-89.2026	13.7003	150	2	4	M	12	3
127	5	-89.2020	13.6999	528	2	4	C	40	2
128	5	-89.2011	13.7001	224	2	4	C	20	--
129	5	-89.2034	13.6995	280	2	4	C	5	2
130	5	-89.1995	13.7007	180	2	3	As	--	--
131	5	-89.1989	13.7006	600	2	4	C	5	--
132	5	-89.1985	13.7004	120	2	4	C	15	--
133	5	-89.1971	13.7007	180	2	4	C	8	2
134	5	-89.1986	13.7000	96	2	3	C	15	2
135	5	-89.1985	13.7003	120	2	4	C	15	2
136	5	-89.2024	13.7000	135	2	4	C	40	4
137	5	-89.2026	13.7005	270	2	3	C	40	4
138	5	-89.2002	13.7001	400	2	3	E	20	4
139	5	-89.2030	13.7001	450	2	4	C	10	--
140	5	-89.2034	13.7001	1,400	2	4	E	60	--
141	5	-89.1966	13.7000	288	3	4	C	15	1
142	5	-89.1998	13.7000	125	3	7	E	20	2
143	5	-89.2024	13.6997	84	3	4	C	10	--
144	5	-89.2046	13.6999	290	3	3	E	10	2
145	5	-89.1997	13.7000	400	3	4	E	60	2
146	5	-89.2015	13.6998	2,500	3	4	C	50	2
147	5	-89.1973	13.6998	300	4	5	C	10	2
148	5	-89.2023	13.7000	192	4	7	C	10	--
149	5	-89.2032	13.7003	100	4	5	C	40	1
150	5	-89.2006	13.7005	1,000	5	5	E	1,000	3
151	5	-89.2019	13.7002	1,500	5	7	E	40	4
152	5	-89.2016	13.7005	900	5	7	C	15	2
153	5	-89.2005	13.7004	1,250	5	7	C	20	2
154	5	-89.2030	13.7003	300	5	7	C	20	2
155	5	-89.2033	13.7003	150	5	5	C	15	--
156	5	-89.1945	13.7005	2,100	6	7	C	175	10

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
157	5	-89.2019	13.6993	500	6	7	C	30	1
158	6	-89.2164	13.6995	250	1	4	C	10	1
159	6	-89.2151	13.7002	525	2	3	C	8	--
160	6	-89.2178	13.6993	1,650	2	7	C	7	1
161	6	-89.2196	13.7007	500	2	7	E	20	2
162	6	-89.2154	13.6998	150	2	3	R	2	5
163	6	-89.2154	13.6999	200	2	4	C	20	2
164	6	-89.2187	13.7005	250	2	4	C	35	1
165	6	-89.2201	13.6991	420	2	4	C	12	2
166	6	-89.2135	13.6993	120	2	3	C	20	2
167	6	-89.2139	13.6996	144	2	4	M	5	2
168	6	-89.2140	13.6993	240	2	3	R	6	1
169	6	-89.2173	13.6998	375	2	3	C	20	1
170	6	-89.2179	13.7002	208	2	7	C	40	40
171	6	-89.2169	13.7002	130	2	3	C	10	2
172	6	-89.2156	13.6997	48	2	3	M	8	6
173	6	-89.2175	13.6986	105	2	3	M	2	4
174	6	-89.2182	13.7002	450	2	4	E	6	--
175	6	-89.2206	13.7005	840	2	4	C	24	1
176	6	-89.2132	13.7000	80	2	3	C	7	4
177	6	-89.2108	13.6998	288	2	3	C	15	--
178	6	-89.2114	13.6989	180	2	4	As	8	1
179	6	-89.2125	13.6967	375	2	4	As	15	4
180	6	-89.2182	13.6999	280	3	4	M	100	150
181	6	-89.2144	13.6999	250	3	4	M	80	150
182	6	-89.2149	13.6996	50	3	3	R	7	7
183	6	-89.2117	13.6999	160	3	7	E	300	1
184	6	-89.2114	13.6985	160	3	4	C	36	--
185	6	-89.2179	13.7000	200	4	9	C	41	--
186	6	-89.2185	13.6995	600	5	9	C	250	75
187	6	-89.2127	13.6999	900	6	9	E	30	4
188	6	-89.2194	13.6994	300	10	10	C	70	2
189	7	-89.2116	13.6921	720	1	4	C	20	1
190	7	-89.2127	13.6918	1,100	1	4	I	20	2
191	7	-89.2131	13.6919	1,400	1	4	I	50	2
192	7	-89.2113	13.6945	120	1	3	R	1	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
193	7	-89.2062	13.6954	336	1	3	I	40	1
194	7	-89.2077	13.6953	80	1	15	O	2	1
195	7	-89.2161	13.6929	120	1	3	R	4	4
196	7	-89.2154	13.6921	50	1	4	R	2	4
197	7	-89.2061	13.6943	800	1	4	I	15	2
198	7	-89.2123	13.6933	80	2	3	R	4	6
199	7	-89.2117	13.6943	78	2	4	R	3	7
200	7	-89.2125	13.6939	444	2	3	E	200	1
201	7	-89.2122	13.6931	128	2	3	R	3	8
202	7	-89.2120	13.6928	63	2	3	R	2	6
203	7	-89.2118	13.6924	81	2	4	R	2	7
204	7	-89.2080	13.6952	300	2	4	I	25	2
205	7	-89.2089	13.6953	96	2	4	C	4	1
206	7	-89.2136	13.6934	512	2	4	As	5	5
207	7	-89.2153	13.6917	494	2	4	C	15	1
208	7	-89.2148	13.6925	224	2	4	R	3	6
209	7	-89.2061	13.6950	70	2	4	R	3	6
210	7	-89.2074	13.6948	50	2	4	R	2	5
211	7	-89.2080	13.6940	144	2	4	C	8	1
212	7	-89.2093	13.6947	54	2	4	R	1	3
213	7	-89.2098	13.6948	49	2	4	R	3	5
214	7	-89.2066	13.6951	200	3	4	C	30	1
215	7	-89.2077	13.6948	195	3	4	I	30	1
216	7	-89.2085	13.6942	108	3	4	R	4	6
217	7	-89.2108	13.6951	81	5	5	R	12	50
218	8	-89.2280	13.6947	375	1	4	C	25	2
219	8	-89.2243	13.6952	170	1	4	M	5	5
220	8	-89.2246	13.6954	24	1	4	R	1	3
221	8	-89.2253	13.6949	36	1	4	R	2	6
222	8	-89.2290	13.6939	330	1	3	C	7	1
223	8	-89.2292	13.6930	2,700	1	4	C	94	30
224	8	-89.2243	13.6950	90	1	3	R	1	4
225	8	-89.2247	13.6952	60	1	4	R	2	5
226	8	-89.2269	13.6940	375	2	4	R	4	10
227	8	-89.2280	13.6938	500	2	7	C	15	2
228	8	-89.2282	13.6936	750	2	4	C	20	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
229	8	-89.2275	13.6938	90	2	4	R	3	6
230	8	-89.2269	13.6938	200	2	4	C	15	2
231	8	-89.2272	13.6944	200	2	3	R	7	3
232	8	-89.2265	13.6945	300	2	3	R	5	--
233	8	-89.2264	13.6950	225	2	4	C	20	4
234	8	-89.2262	13.6951	120	2	4	C	60	2
235	8	-89.2255	13.6946	150	2	4	C	20	1
236	8	-89.2286	13.6947	1,248	2	3	C	100	4
237	8	-89.2287	13.6931	805	2	4	C	6	--
238	8	-89.2243	13.6947	48	2	4	R	2	4
239	8	-89.2256	13.6952	200	2	4	C	10	2
240	8	-89.2244	13.6956	450	3	4	R	20	70
241	8	-89.2242	13.6955	200	3	3	M	15	15
242	8	-89.2239	13.6952	300	4	7	R	20	100
243	9	-89.2416	13.6901	300	1	4	M	70	1
244	9	-89.2438	13.6925	138	1	3	G	30	2
245	9	-89.2420	13.6927	2,100	1	4	C	20	3
246	9	-89.2426	13.6906	180	1	4	C	50	2
247	9	-89.2416	13.6898	512	1	4	G	40	5
248	9	-89.2411	13.6895	3,000	1	12	C	75	1
249	9	-89.2404	13.6900	126	1	4	C	30	2
250	9	-89.2406	13.6905	425	2	4	C	70	1
251	9	-89.2404	13.6907	120	2	4	C	7	--
252	9	-89.2431	13.6944	1,155	2	3	M	9	6
253	9	-89.2414	13.6948	264	2	15	C	23	2
254	9	-89.2422	13.6902	90	2	4	R	2	6
255	9	-89.2412	13.6904	700	2	12	C	25	8
256	9	-89.2415	13.6935	3,200	2	4	C	25	300
257	9	-89.2413	13.6904	700	2	12	C	60	2
258	9	-89.2412	13.6912	1,000	2	4	As	50	--
259	9	-89.2403	13.6906	96	2	4	C	4	5
260	9	-89.2402	13.6906	200	2	4	C	8	--
261	9	-89.2404	13.6903	105	2	4	M	5	8
262	9	-89.2437	13.6937	750	2	4	C	60	2
263	9	-89.2428	13.6946	144	2	4	C	5	1
264	9	-89.2437	13.6927	500	2	4	C	50	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
265	9	-89.2426	13.6948	150	2	12	C	2	25
266	9	-89.2397	13.6905	120	3	4	R	5	5
267	9	-89.2408	13.6935	525	4	7	R	6	20
268	9	-89.2418	13.6915	2,400	5	5	R	220	875
269	9	-89.2401	13.6883	630	7	12	R	30	70
270	10	-89.1960	13.6833	595	1	9	C	20	1
271	10	-89.1957	13.6838	288	1	4	C	5	1
272	10	-89.1953	13.6815	200	1	3	R	1	4
273	10	-89.1964	13.6831	168	1	4	E	50	1
274	10	-89.1976	13.6813	195	1	4	R	1	4
275	10	-89.1978	13.6828	180	1	4	R	2	4
276	10	-89.1972	13.6820	390	1	4	C	5	--
277	10	-89.1959	13.6837	364	1	4	G	28	1
278	10	-89.1949	13.6854	450	1	4	C	3	1
279	10	-89.1952	13.6821	240	2	4	R	3	6
280	10	-89.1948	13.6815	160	2	4	R	1	5
281	10	-89.1966	13.6817	459	2	4	R	4	6
282	10	-89.1975	13.6827	190	2	3	C	15	1
283	10	-89.1977	13.6821	66	2	4	R	3	6
284	10	-89.1976	13.6820	80	2	3	R	--	2
285	10	-89.1976	13.6815	390	2	4	I	15	2
286	10	-89.1983	13.6819	117	2	4	R	1	4
287	10	-89.1982	13.6824	15	2	4	R	1	5
288	10	-89.1974	13.6836	160	3	4	R	25	50
289	10	-89.1975	13.6835	160	3	4	R	25	50
290	10	-89.1985	13.6816	48	3	4	R	3	4
291	10	-89.1981	13.6821	216	3	3	R	2	2
292	10	-89.1971	13.6825	20	3	3	R	2	6
293	10	-89.1967	13.6846	81	5	5	R	50	120
294	10	-89.1968	13.6849	81	5	5	R	50	130
295	10	-89.1970	13.6849	81	5	5	R	40	160
296	10	-89.1971	13.6851	81	6	5	R	60	160
297	11	-89.2011	13.7127	200	1	4	R	4	9
298	11	-89.1952	13.7152	600	1	4	C	1	1
299	11	-89.1970	13.7156	120	1	4	R	2	5
300	11	-89.1959	13.7149	128	1	4	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
301	11	-89.1942	13.7112	375	1	3	C	7	2
302	11	-89.1995	13.7133	150	1	4	C	2	--
303	11	-89.1996	13.7128	48	1	3	R	2	5
304	11	-89.1855	13.7136	64	1	4	R	1	4
305	11	-89.1834	13.7129	250	1	4	As	3	2
306	11	-89.1983	13.7154	150	1	4	R	2	6
307	11	-89.1986	13.7158	180	1	4	C	6	--
308	11	-89.1946	13.7130	750	1	4	C	11	2
309	11	-89.1925	13.7137	990	1	3	C	30	10
310	11	-89.1940	13.7139	340	1	15	I	10	1
311	11	-89.1970	13.7145	72	1	4	R	2	4
312	11	-89.2001	13.7123	60	2	3	E	50	--
313	11	-89.1860	13.7139	50	2	4	M	2	5
314	11	-89.1858	13.7137	50	2	4	R	2	5
315	11	-89.1861	13.7145	120	2	4	C	8	1
316	11	-89.1857	13.7151	98	2	4	R	3	6
317	11	-89.1850	13.7159	150	2	4	M	6	6
318	11	-89.1941	13.7153	200	2	4	R	2	5
319	11	-89.1957	13.7154	250	2	4	R	2	5
320	11	-89.1986	13.7155	200	2	3	R	4	6
321	11	-89.1932	13.7114	600	2	4	C	10	2
322	11	-89.1938	13.7112	420	2	15	C	10	--
323	11	-89.1941	13.7116	128	2	4	R	3	6
324	11	-89.1955	13.7118	40	2	4	R	2	5
325	11	-89.1975	13.7122	250	2	3	C	30	--
326	11	-89.1992	13.7132	96	2	3	R	3	6
327	11	-89.1990	13.7133	90	2	3	R	3	6
328	11	-89.1853	13.7131	72	2	4	R	1	4
329	11	-89.1833	13.7136	110	2	4	R	2	6
330	11	-89.1825	13.7134	65	2	4	R	1	5
331	11	-89.1860	13.7132	338	2	4	C	12	1
332	11	-89.1942	13.7148	450	2	4	C	60	1
333	11	-89.1956	13.7148	120	2	3	R	1	6
334	11	-89.1954	13.7144	120	2	4	I	45	45
335	11	-89.1960	13.7143	250	2	4	C	5	1
336	11	-89.1969	13.7144	64	2	4	U	2	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
337	11	-89.1882	13.7134	200	2	3	I	30	2
338	11	-89.1889	13.7133	400	2	4	C	5	1
339	11	-89.1894	13.7134	690	2	3	E	15	2
340	11	-89.1960	13.7140	100	2	4	C	6	2
341	11	-89.1928	13.7144	216	2	4	C	12	--
342	11	-89.1933	13.7144	180	2	4	C	5	--
343	11	-89.1939	13.7145	144	2	4	R	2	6
344	11	-89.1942	13.7149	300	2	4	I	15	2
345	11	-89.1959	13.7136	375	2	4	C	5	2
346	11	-89.1978	13.7145	56	2	4	R	2	6
347	11	-89.1930	13.7128	80	2	3	M	8	4
348	11	-89.1934	13.7128	126	2	4	As	5	--
349	11	-89.1934	13.7126	60	2	4	R	1	3
350	11	-89.1947	13.7121	48	2	4	R	4	8
351	11	-89.1956	13.7127	96	2	3	R	8	16
352	11	-89.1988	13.7134	414	2	3	R	5	10
353	11	-89.1988	13.7131	336	2	7	C	5	1
354	11	-89.1986	13.7128	240	2	4	C	5	1
355	11	-89.1929	13.7137	272	2	3	C	28	1
356	11	-89.1941	13.7129	150	2	4	C	10	1
357	11	-89.1964	13.7129	165	2	4	R	2	5
358	11	-89.1966	13.7137	240	2	4	C	3	1
359	11	-89.1970	13.7130	80	2	4	C	5	1
360	11	-89.1976	13.7130	120	2	4	O	5	1
361	11	-89.1979	13.7137	242	2	4	C	5	1
362	11	-89.1973	13.7132	112	2	4	R	2	5
363	11	-89.1970	13.7121	50	2	4	R	2	6
364	11	-89.1978	13.7121	200	2	4	G	85	2
365	11	-89.1945	13.7138	60	2	4	I	3	1
366	11	-89.1961	13.7140	152	2	4	C	3	1
367	11	-89.1968	13.7140	72	2	4	R	2	5
368	11	-89.2001	13.7138	600	2	4	C	20	2
369	11	-89.2012	13.7120	300	2	4	O	5	--
370	11	-89.2014	13.7124	180	3	4	R	4	8
371	11	-89.2004	13.7159	96	3	4	R	48	75
372	11	-89.1864	13.7135	54	3	4	R	2	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
373	11	-89.1872	13.7136	96	3	15	C	10	2
374	11	-89.1977	13.7119	120	3	4	R	3	6
375	11	-89.1916	13.7136	380	3	4	C	25	2
376	11	-89.1910	13.7135	324	3	4	C	10	2
377	11	-89.1940	13.7134	256	3	4	C	30	2
378	11	-89.1941	13.7135	150	3	4	C	20	2
379	11	-89.1945	13.7138	180	3	4	C	6	--
380	11	-89.1937	13.7124	600	3	7	E	500	--
381	11	-89.1985	13.7133	300	3	4	R	3	6
382	11	-89.1986	13.7125	228	3	4	C	5	--
383	11	-89.1940	13.7134	144	3	7	C	18	1
384	11	-89.1997	13.7139	150	3	4	C	10	5
385	11	-89.2001	13.7131	130	3	4	R	5	10
386	11	-89.2017	13.7117	350	3	4	C	10	2
387	11	-89.2022	13.7124	348	4	5	G	70	50
388	11	-89.1949	13.7128	280	4	5	As	10	1
389	12	-89.2178	13.7044	200	1	15	C	7	1
390	12	-89.2172	13.7040	400	1	15	C	6	1
391	12	-89.2177	13.7040	156	1	4	C	8	1
392	12	-89.2054	13.7125	1,100	1	4	I	15	2
393	12	-89.2048	13.7136	150	1	4	C	40	1
394	12	-89.2044	13.7147	336	1	4	As	175	40
395	12	-89.2246	13.7056	800	1	4	C	10	2
396	12	-89.2067	13.7114	256	1	4	C	4	1
397	12	-89.2052	13.7137	170	1	4	C	3	30
398	12	-89.2060	13.7082	360	1	4	C	3	1
399	12	-89.2202	13.7012	800	2	4	C	8	1
400	12	-89.2197	13.7010	198	2	4	C	25	1
401	12	-89.2196	13.7032	48	2	3	R	--	4
402	12	-89.2091	13.7075	100	2	3	R	4	8
403	12	-89.2090	13.7074	100	2	3	R	3	6
404	12	-89.2081	13.7067	36	2	3	C	6	1
405	12	-89.2076	13.7068	100	2	4	R	3	6
406	12	-89.2079	13.7073	72	2	4	R	723	6
407	12	-89.2081	13.7085	120	2	4	R	4	8
408	12	-89.2205	13.7015	247	2	3	C	4	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
409	12	-89.2202	13.7018	84	2	3	O	5	--
410	12	-89.2208	13.7027	400	2	4	C	20	1
411	12	-89.2212	13.7029	70	2	4	C	5	1
412	12	-89.2204	13.7031	144	2	4	C	5	1
413	12	-89.2204	13.7035	90	2	4	C	15	1
414	12	-89.2095	13.7077	96	2	4	E	10	2
415	12	-89.2094	13.7076	99	2	4	R	2	4
416	12	-89.2092	13.7074	100	2	4	R	4	4
417	12	-89.2091	13.7073	144	2	3	M	20	2
418	12	-89.2095	13.7085	120	2	4	C	20	2
419	12	-89.2262	13.7076	1,500	2	4	As	10	--
420	12	-89.2253	13.7068	1,350	2	4	C	75	2
421	12	-89.2251	13.7069	2,250	2	3	C	15	2
422	12	-89.2247	13.7074	2,250	2	4	C	15	2
423	12	-89.2245	13.7075	2,250	2	4	C	15	2
424	12	-89.2243	13.7060	360	2	4	C	10	2
425	12	-89.2233	13.7049	220	2	9	C	15	2
426	12	-89.2045	13.7146	63	2	4	R	1	5
427	12	-89.2050	13.7076	96	2	3	R	2	4
428	12	-89.2055	13.7078	207	2	3	R	3	6
429	12	-89.2063	13.7085	90	2	3	C	8	2
430	12	-89.2061	13.7094	207	2	4	R	3	6
431	12	-89.2060	13.7102	80	2	3	C	12	1
432	12	-89.2058	13.7103	81	2	4	C	6	1
433	12	-89.2060	13.7113	435	2	4	C	25	1
434	12	-89.2057	13.7120	80	2	4	R	3	7
435	12	-89.2196	13.7026	128	3	4	M	30	1
436	12	-89.2196	13.7036	112	3	4	R	20	84
437	12	-89.2095	13.7078	112	3	4	R	12	40
438	12	-89.2089	13.7068	54	3	4	R	4	16
439	12	-89.2083	13.7074	70	3	4	R	3	6
440	12	-89.2087	13.7078	319	3	4	C	40	2
441	12	-89.2062	13.7115	28	3	4	C	14	1
442	12	-89.2059	13.7122	840	3	4	C	72	3
443	12	-89.2264	13.7080	300	3	4	E	50	2
444	12	-89.2241	13.7055	832	3	4	C	15	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
445	12	-89.2055	13.7127	100	3	4	R	8	25
446	12	-89.2050	13.7125	400	3	4	C	18	6
447	12	-89.2200	13.7022	1,350	4	7	E	2,000	2
448	12	-89.2074	13.7106	450	4	7	C	22	1
449	12	-89.2044	13.7062	150	4	5	C	12	1
450	12	-89.2046	13.7054	750	4	5	C	150	100
451	12	-89.2115	13.7027	1,500	4	5	E	800	2
452	12	-89.2124	13.7069	490	4	7	C	100	2
453	12	-89.2103	13.7041	800	4	5	R	50	100
454	12	-89.2227	13.7014	120	4	7	U	6	1
455	12	-89.2209	13.7013	280	4	7	C	70	2
456	12	-89.2109	13.7081	540	5	9	C	300	300
457	12	-89.2105	13.7080	456	6	9	C	300	300
458	12	-89.2250	13.7030	780	6	9	C	380	5
459	12	-89.2100	13.7078	104	8	13	C	2	2
460	12	-89.2128	13.7065	625	10	10	C	200	2
461	12	-89.2097	13.7043	900	12	8	C	300	5
462	13	-89.2266	13.6992	500	1	7	C	50	2
463	13	-89.2265	13.7026	276	1	4	C	10	1
464	13	-89.2284	13.7020	200	1	3	C	35	--
465	13	-89.2270	13.7030	500	1	4	C	40	1
466	13	-89.2280	13.7027	140	2	4	C	14	--
467	13	-89.2283	13.7026	1,625	2	4	G	18	10
468	13	-89.2318	13.7024	144	2	7	C	80	10
469	13	-89.2288	13.7026	242	2	4	C	20	--
470	13	-89.2288	13.7023	660	2	15	C	15	1
471	13	-89.2259	13.7026	700	2	15	C	35	1
472	13	-89.2276	13.6996	240	2	3	M	14	8
473	13	-89.2289	13.7018	560	2	3	C	20	1
474	13	-89.2260	13.7007	1,225	2	4	C	60	4
475	13	-89.2258	13.7012	1,034	2	7	G	125	1
476	13	-89.2270	13.7012	840	2	3	G	75	--
477	13	-89.2279	13.6996	323	2	7	R	2	6
478	13	-89.2265	13.7020	650	2	4	E	32	--
479	13	-89.2259	13.7018	1,400	2	4	C	25	--
480	13	-89.2274	13.7028	240	2	4	R	2	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
481	13	-89.2274	13.7027	169	2	4	C	10	2
482	13	-89.2263	13.7031	144	2	4	E	25	2
483	13	-89.2261	13.7031	144	2	4	C	25	1
484	13	-89.2260	13.7031	144	2	4	C	10	2
485	13	-89.2274	13.7029	378	3	3	C	20	3
486	13	-89.2311	13.7013	900	3	4	C	120	3
487	13	-89.2274	13.6991	150	3	4	M	5	5
488	13	-89.2268	13.7030	400	3	7	C	40	4
489	13	-89.2274	13.7019	6,500	3	3	E	100	2
490	13	-89.2271	13.7007	3,850	4	9	C	300	8
491	13	-89.2274	13.6981	1,800	5	9	C	750	7
492	13	-89.2267	13.6987	1,000	5	9	C	400	5
493	13	-89.2268	13.6998	1,600	8	10	C	1,200	20
494	14	-89.2304	13.6935	1,050	1	4	C	28	2
495	14	-89.2392	13.6891	91	1	4	C	10	1
496	14	-89.2382	13.6895	306	1	4	C	5	1
497	14	-89.2342	13.6947	550	1	4	R	3	7
498	14	-89.2301	13.6970	150	2	3	C	3	--
499	14	-89.2309	13.6974	338	2	3	C	8	--
500	14	-89.2363	13.6949	600	2	4	C	96	5
501	14	-89.2366	13.6929	800	2	4	C	16	3
502	14	-89.2336	13.6934	450	2	4	C	10	1
503	14	-89.2350	13.6937	1,800	2	4	C	15	5
504	14	-89.2290	13.6950	2,480	2	4	C	200	6
505	14	-89.2345	13.6932	320	2	4	C	15	1
506	14	-89.2354	13.6932	500	2	4	C	30	--
507	14	-89.2297	13.6965	80	2	4	C	5	1
508	14	-89.2306	13.6973	320	2	4	M	5	--
509	14	-89.2394	13.6897	600	2	4	C	10	2
510	14	-89.2369	13.6904	351	2	4	C	10	1
511	14	-89.2376	13.6904	117	2	4	C	15	--
512	14	-89.2341	13.6933	255	2	4	R	3	8
513	14	-89.2362	13.6929	216	2	4	C	60	--
514	14	-89.2359	13.6930	375	2	4	C	2	80
515	14	-89.2355	13.6936	144	2	4	M	10	15
516	14	-89.2350	13.6937	460	2	3	C	20	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
517	14	-89.2341	13.6933	225	2	4	C	15	15
518	14	-89.2361	13.6940	1,600	3	4	C	50	6
519	14	-89.2381	13.6903	96	3	3	C	28	--
520	14	-89.2383	13.6900	280	3	3	C	40	1
521	14	-89.2301	13.6947	648	5	9	C	50	2
522	14	-89.2354	13.6953	308	6	9	R	3	25
523	14	-89.2302	13.6965	625	15	11	R	110	280
524	15	-89.1940	13.6966	690	1	3	As	3	3
525	15	-89.2005	13.6984	1,215	1	4	C	20	2
526	15	-89.1993	13.6971	180	1	3	R	2	6
527	15	-89.1936	13.6986	2,000	1	4	C	75	2
528	15	-89.1925	13.6983	270	1	3	C	5	--
529	15	-89.1998	13.6996	2,040	1	3	E	10	2
530	15	-89.2003	13.6989	720	1	4	C	10	2
531	15	-89.1898	13.6987	418	1	3	C	20	--
532	15	-89.1919	13.6990	350	1	3	C	15	--
533	15	-89.1924	13.6983	450	1	3	C	20	1
534	15	-89.2036	13.6986	300	2	4	C	10	--
535	15	-89.2033	13.6957	108	2	4	U	2	2
536	15	-89.2028	13.6958	525	2	4	I	40	2
537	15	-89.2004	13.6971	90	2	4	C	10	1
538	15	-89.1891	13.6979	960	2	3	C	30	1
539	15	-89.1921	13.6987	70	2	3	C	4	--
540	15	-89.1929	13.6982	360	2	4	C	15	--
541	15	-89.1921	13.6987	242	2	4	C	6	--
542	15	-89.1943	13.6988	108	2	4	C	10	--
543	15	-89.1907	13.6973	450	2	4	C	15	10
544	15	-89.2004	13.6969	392	2	4	C	5	1
545	15	-89.2004	13.6966	60	2	4	R	3	5
546	15	-89.2012	13.6993	240	2	3	C	12	2
547	15	-89.1899	13.6981	580	2	3	C	30	--
548	15	-89.1888	13.6986	100	2	4	C	6	--
549	15	-89.1886	13.6986	200	2	4	C	5	--
550	15	-89.1884	13.6984	325	2	4	C	6	--
551	15	-89.1881	13.6983	1,590	2	7	C	35	2
552	15	-89.1878	13.6984	240	2	4	C	12	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
553	15	-89.1903	13.6972	224	2	3	C	15	2
554	15	-89.1888	13.6967	1,750	2	4	As	2	2
555	15	-89.1930	13.6982	300	2	4	C	15	--
556	15	-89.1947	13.6987	300	2	4	C	10	--
557	15	-89.1896	13.6978	500	2	4	C	30	2
558	15	-89.1892	13.6986	240	2	4	C	4	--
559	15	-89.1874	13.6971	300	2	3	C	4	1
560	15	-89.1907	13.6964	400	3	7	C	25	--
561	15	-89.1997	13.6979	304	3	7	C	15	8
562	15	-89.2009	13.6984	805	3	4	C	10	1
563	15	-89.2038	13.6957	180	3	4	R	2	5
564	15	-89.1888	13.6971	320	3	3	C	20	1
565	15	-89.1906	13.6981	500	3	3	C	20	1
566	15	-89.1936	13.6990	368	3	3	C	50	1
567	15	-89.1910	13.6960	455	3	4	C	30	2
568	15	-89.1995	13.6992	272	3	4	C	6	1
569	15	-89.2010	13.6988	360	3	7	C	20	2
570	15	-89.1948	13.6984	280	3	4	C	15	--
571	15	-89.1947	13.6983	300	3	4	C	15	1
572	15	-89.1883	13.6971	875	3	7	C	45	2
573	15	-89.1905	13.6976	300	4	7	C	25	--
574	15	-89.1991	13.6976	150	4	7	C	22	--
575	15	-89.1998	13.6977	644	4	5	C	50	2
576	15	-89.1906	13.6975	600	4	5	C	20	1
577	15	-89.1902	13.6973	560	4	5	C	20	1
578	15	-89.1943	13.6988	300	4	5	C	10	--
579	15	-89.1997	13.6991	320	4	5	E	10	2
580	15	-89.2019	13.6993	216	4	7	C	7	--
581	15	-89.1887	13.6980	1,880	4	5	C	20	--
582	15	-89.1901	13.6981	299	4	5	C	20	2
583	15	-89.1937	13.6980	800	4	7	C	10	--
584	15	-89.1897	13.6983	120	4	7	M	10	1
585	15	-89.2049	13.6957	3,400	5	9	C	55	25
586	15	-89.1943	13.6986	400	5	7	C	25	2
587	15	-89.1944	13.6983	625	5	5	C	20	2
588	15	-89.1911	13.6970	2,600	5	5	E	70	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
589	15	-89.1899	13.6984	100	5	7	C	15	--
590	15	-89.1946	13.6984	200	6	7	C	10	--
591	15	-89.1907	13.6966	300	7	5	C	40	2
592	16	-89.2017	13.6905	128	1	4	R	2	3
593	16	-89.2012	13.6906	384	1	4	E	95	1
594	16	-89.1915	13.6911	100	1	1	M	2	4
595	16	-89.1902	13.6875	576	1	4	E	200	1
596	16	-89.2031	13.6923	112	1	4	R	4	8
597	16	-89.2025	13.6910	144	1	3	R	4	8
598	16	-89.2025	13.6912	130	1	4	R	1	3
599	16	-89.2022	13.6910	102	1	4	R	1	6
600	16	-89.2028	13.6910	200	1	4	R	1	5
601	16	-89.1920	13.6886	42	1	3	R	1	3
602	16	-89.2046	13.6920	35	1	3	R	2	4
603	16	-89.2043	13.6920	63	1	3	R	2	4
604	16	-89.2024	13.6919	754	1	4	C	10	2
605	16	-89.2050	13.6917	196	1	3	I	10	--
606	16	-89.2045	13.6923	162	1	3	R	2	5
607	16	-89.2039	13.6926	352	1	4	I	15	8
608	16	-89.2040	13.6923	20	1	3	R	2	4
609	16	-89.2032	13.6926	560	1	4	I	10	--
610	16	-89.1980	13.6898	55	1	4	R	2	5
611	16	-89.1983	13.6899	54	1	2	R	2	5
612	16	-89.1985	13.6900	84	1	4	R	2	6
613	16	-89.1987	13.6900	24	1	4	R	3	8
614	16	-89.1990	13.6900	56	1	4	M	2	5
615	16	-89.1991	13.6899	77	1	4	R	4	8
616	16	-89.1994	13.6901	72	1	4	R	1	5
617	16	-89.2014	13.6896	144	1	4	R	1	4
618	16	-89.2028	13.6897	162	1	4	R	2	4
619	16	-89.1903	13.6881	607	1	16	C	22	5
620	16	-89.2021	13.6905	316	2	4	I	12	1
621	16	-89.2010	13.6899	1,089	2	7	As	350	2
622	16	-89.2007	13.6893	100	2	4	R	2	6
623	16	-89.2019	13.6894	70	2	4	R	1	4
624	16	-89.2026	13.6897	120	2	4	R	2	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
625	16	-89.2032	13.6911	180	2	4	R	1	5
626	16	-89.1906	13.6882	225	2	4	R	1	4
627	16	-89.2038	13.6911	135	2	3	R	4	8
628	16	-89.2038	13.6915	63	2	3	R	4	8
629	16	-89.2038	13.6920	60	2	4	R	4	8
630	16	-89.2033	13.6919	64	2	3	R	4	8
631	16	-89.2030	13.6919	64	2	4	R	4	8
632	16	-89.2031	13.6917	48	2	4	R	4	8
633	16	-89.2019	13.6911	48	2	3	R	4	8
634	16	-89.2015	13.6912	72	2	4	R	6	10
635	16	-89.2028	13.6909	108	2	3	R	4	8
636	16	-89.2037	13.6914	54	2	4	R	3	5
637	16	-89.2037	13.6911	220	2	4	As	2	1
638	16	-89.2032	13.6911	135	2	4	R	2	5
639	16	-89.2025	13.6911	126	2	4	R	1	4
640	16	-89.2029	13.6909	48	2	4	R	2	4
641	16	-89.1916	13.6882	25	2	3	R	1	4
642	16	-89.2024	13.6922	168	2	4	U	5	2
643	16	-89.2008	13.6914	72	2	4	R	2	5
644	16	-89.2003	13.6914	32	2	4	R	2	4
645	16	-89.1993	13.6913	36	2	3	R	2	5
646	16	-89.1991	13.6916	48	2	3	R	6	10
647	16	-89.1986	13.6920	117	2	3	R	2	5
648	16	-89.1985	13.6908	54	2	3	R	2	5
649	16	-89.1992	13.6908	48	2	4	R	3	5
650	16	-89.1987	13.6906	120	2	4	I	12	2
651	16	-89.1998	13.6910	72	2	4	R	2	5
652	16	-89.2001	13.6909	104	2	4	R	3	5
653	16	-89.2001	13.6912	64	2	4	R	2	5
654	16	-89.2000	13.6904	80	2	4	R	2	6
655	16	-89.1997	13.6902	70	2	4	R	3	8
656	16	-89.1999	13.6898	49	2	4	R	2	8
657	16	-89.1993	13.6906	100	2	4	R	4	8
658	16	-89.2052	13.6920	48	2	3	R	1	4
659	16	-89.2018	13.6925	162	2	3	I	10	--
660	16	-89.2026	13.6905	75	2	4	M	5	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
661	16	-89.2016	13.6905	72	2	4	R	2	6
662	16	-89.2006	13.6898	40	2	4	R	1	4
663	16	-89.2007	13.6889	42	2	4	R	1	1
664	16	-89.2031	13.6913	72	2	4	R	1	4
665	16	-89.1914	13.6922	84	2	3	R	1	5
666	16	-89.1915	13.6917	120	2	4	C	9	1
667	16	-89.1919	13.6886	75	2	4	C	4	1
668	16	-89.1917	13.6875	120	3	3	R	15	45
669	16	-89.1986	13.6903	80	3	4	As	4	1
670	16	-89.2018	13.6899	244	3	4	I	5	--
671	16	-89.1933	13.6901	120	4	7	R	24	80
672	16	-89.1912	13.6889	63	5	5	R	10	40
673	16	-89.1930	13.6903	120	5	7	R	24	80
674	16	-89.1931	13.6901	120	5	7	R	24	80
675	16	-89.1926	13.6898	120	5	7	R	24	80
676	17	-89.2265	13.6970	525	1	4	E	100	--
677	17	-89.2258	13.6971	150	1	3	R	2	6
678	17	-89.2183	13.6966	378	1	4	As	100	30
679	17	-89.2209	13.6976	2,400	1	4	I	4	1
680	17	-89.2238	13.6972	300	1	4	G	4	1
681	17	-89.2237	13.6983	600	2	4	C	54	3
682	17	-89.2252	13.6971	200	2	4	R	2	7
683	17	-89.2248	13.6987	300	2	4	As	150	1
684	17	-89.2249	13.6986	180	2	4	C	40	2
685	17	-89.2250	13.6985	300	2	4	C	40	2
686	17	-89.2264	13.6974	4,800	2	15	C	100	3
687	17	-89.2205	13.6985	2,520	2	3	C	94	14
688	17	-89.2169	13.6983	600	2	3	C	5	1
689	17	-89.2173	13.6971	629	2	3	C	15	1
690	17	-89.2204	13.6968	150	2	4	C	10	1
691	17	-89.2204	13.6963	300	2	4	R	3	6
692	17	-89.2247	13.6971	450	3	4	M	45	20
693	17	-89.2249	13.6988	300	3	7	C	5	100
694	17	-89.2260	13.6972	100	3	4	C	8	1
695	17	-89.2216	13.6985	370	3	7	C	10	--
696	17	-89.2177	13.6983	112	3	4	M	75	105

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
697	17	-89.2192	13.6982	1,375	3	7	E	1,500	2
698	17	-89.2243	13.6987	2,000	6	12	C	450	--
699	17	-89.2223	13.6986	625	7	7	C	560	6
700	18	-89.1782	13.7140	72	1	4	R	2	5
701	18	-89.1770	13.7141	88	1	4	R	2	4
702	18	-89.1768	13.7151	697	1	4	As	50	20
703	18	-89.1758	13.7183	124	1	4	R	3	8
704	18	-89.1773	13.7100	135	1	4	R	1	5
705	18	-89.1775	13.7091	80	1	3	R	1	4
706	18	-89.1783	13.7124	128	1	4	G	--	--
707	18	-89.1770	13.7116	90	1	3	R	3	6
708	18	-89.1772	13.7111	90	1	3	R	3	5
709	18	-89.1774	13.7111	70	1	3	R	3	6
710	18	-89.1777	13.7105	90	1	3	R	2	6
711	18	-89.1797	13.7149	72	1	4	R	1	5
712	18	-89.1813	13.7147	81	1	4	R	2	5
713	18	-89.1817	13.7147	48	1	3	R	1	4
714	18	-89.1790	13.7169	72	1	4	R	1	6
715	18	-89.1803	13.7087	64	1	3	R	1	4
716	18	-89.1782	13.7136	112	1	3	R	2	4
717	18	-89.1809	13.7130	800	1	4	As	--	2
718	18	-89.1779	13.7114	170	1	4	R	2	5
719	18	-89.1774	13.7113	112	1	3	R	2	6
720	18	-89.1818	13.7166	420	1	4	I	20	2
721	18	-89.1776	13.7090	112	1	3	R	2	5
722	18	-89.1790	13.7170	72	1	4	R	2	4
723	18	-89.1791	13.7171	72	1	4	R	1	4
724	18	-89.1776	13.7142	112	2	4	R	3	6
725	18	-89.1757	13.7164	242	2	4	C	5	1
726	18	-89.1759	13.7175	110	2	4	R	3	6
727	18	-89.1789	13.7096	154	2	4	R	3	7
728	18	-89.1797	13.7132	360	2	4	R	16	32
729	18	-89.1782	13.7126	100	2	4	R	3	6
730	18	-89.1777	13.7107	75	2	3	R	2	5
731	18	-89.1777	13.7099	99	2	3	R	2	6
732	18	-89.1772	13.7100	200	2	4	I	4	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
733	18	-89.1814	13.7154	200	2	4	R	8	20
734	18	-89.1805	13.7148	50	2	4	R	2	5
735	18	-89.1775	13.7100	77	2	4	R	1	6
736	18	-89.1786	13.7098	144	2	4	R	2	6
737	18	-89.1820	13.7162	165	2	3	C	7	1
738	18	-89.1810	13.7176	54	2	4	R	2	7
739	18	-89.1805	13.7175	83	2	4	M	5	5
740	18	-89.1786	13.7092	36	2	3	R	3	6
741	18	-89.1793	13.7092	32	2	3	R	1	4
742	18	-89.1817	13.7089	48	2	3	R	10	5
743	18	-89.1787	13.7140	36	2	3	R	2	8
744	18	-89.1775	13.7153	240	2	3	C	10	1
745	18	-89.1782	13.7164	66	2	3	C	15	2
746	18	-89.1795	13.7172	40	2	4	R	2	4
747	18	-89.1780	13.7130	192	2	3	R	8	16
748	18	-89.1761	13.7143	322	2	4	C	6	2
749	18	-89.1768	13.7122	121	2	3	R	4	6
750	18	-89.1775	13.7127	232	2	4	R	7	15
751	18	-89.1808	13.7179	126	2	4	M	3	5
752	18	-89.1805	13.7180	45	2	4	R	1	5
753	18	-89.1787	13.7168	84	2	4	R	1	5
754	18	-89.1790	13.7090	36	2	3	R	1	4
755	18	-89.1797	13.7089	128	2	4	R	2	6
756	18	-89.1802	13.7092	135	2	4	R	2	6
757	18	-89.1804	13.7175	72	2	4	R	3	6
758	18	-89.1803	13.7178	63	2	4	R	2	4
759	18	-89.1805	13.7174	112	2	4	R	2	4
760	18	-89.1805	13.7180	70	2	4	R	2	6
761	18	-89.1806	13.7180	80	2	4	R	2	6
762	18	-89.1800	13.7175	63	2	4	R	2	6
763	18	-89.1807	13.7179	84	2	4	R	2	6
764	18	-89.1787	13.7168	108	2	4	R	2	5
765	18	-89.1784	13.7168	99	2	4	R	2	5
766	18	-89.1785	13.7172	66	2	4	R	2	5
767	18	-89.1757	13.7146	91	3	4	R	3	8
768	18	-89.1755	13.7154	147	3	4	R	3	9

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
769	18	-89.1800	13.7144	108	3	4	As	15	1
770	18	-89.1814	13.7147	64	3	4	R	2	5
771	18	-89.1818	13.7173	300	3	4	R	15	50
772	18	-89.1777	13.7156	75	3	4	R	2	10
773	18	-89.1781	13.7160	120	3	4	R	2	8
774	18	-89.1781	13.7134	94	3	4	R	10	20
775	18	-89.1778	13.7126	175	3	4	R	4	8
776	18	-89.1816	13.7176	387	3	4	R	9	40
777	18	-89.1772	13.7096	112	4	5	R	8	50
778	18	-89.1796	13.7097	112	4	5	R	6	40
779	18	-89.1795	13.7135	168	4	7	R	16	40
780	18	-89.1775	13.7096	112	4	5	R	8	32
781	18	-89.1817	13.7154	154	4	5	R	12	40
782	18	-89.1774	13.7135	160	4	5	R	16	32
783	18	-89.1798	13.7141	469	4	7	R	32	64
784	18	-89.1785	13.7128	280	4	5	R	10	20
785	18	-89.1771	13.7126	245	4	5	R	10	20
786	18	-89.1820	13.7156	154	4	5	R	8	60
787	18	-89.1798	13.7137	175	4	7	R	16	32
788	18	-89.1791	13.7132	300	4	5	R	64	130
789	18	-89.1799	13.7137	175	4	5	R	64	130
790	18	-89.1816	13.7157	175	4	5	R	16	32
791	18	-89.1799	13.7136	100	4	5	R	32	64
792	18	-89.1798	13.7137	258	4	7	R	40	100
793	19	-89.1997	13.7187	78	1	3	R	2	6
794	19	-89.1920	13.7170	1,250	1	4	C	10	2
795	19	-89.1912	13.7190	2,571	1	3	I	50	20
796	19	-89.1974	13.7193	48	1	3	R	1	3
797	19	-89.1969	13.7186	30	1	15	C	4	--
798	19	-89.1991	13.7173	280	1	3	R	3	8
799	19	-89.1982	13.7186	240	1	3	R	2	6
800	19	-89.1920	13.7161	250	1	4	C	5	1
801	19	-89.1931	13.7161	96	1	3	R	1	6
802	19	-89.1984	13.7162	800	1	3	I	20	20
803	19	-89.1998	13.7187	90	1	3	R	1	4
804	19	-89.1996	13.7177	88	1	4	R	1	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
805	19	-89.1989	13.7175	143	1	4	R	1	4
806	19	-89.1976	13.7189	130	1	4	R	1	4
807	19	-89.1986	13.7188	96	1	3	R	2	4
808	19	-89.1987	13.7199	48	1	4	R	2	5
809	19	-89.1992	13.7188	84	1	4	R	1	4
810	19	-89.1998	13.7188	143	2	3	R	2	8
811	19	-89.1997	13.7190	83	2	3	R	2	8
812	19	-89.1995	13.7192	76	2	3	R	3	6
813	19	-89.1918	13.7167	28	2	4	R	2	6
814	19	-89.1923	13.7181	4,200	2	4	C	20	20
815	19	-89.1990	13.7162	156	2	4	M	25	5
816	19	-89.1906	13.7168	83	2	4	E	30	2
817	19	-89.1907	13.7168	700	2	4	I	6	2
818	19	-89.1979	13.7175	264	2	4	R	3	6
819	19	-89.1978	13.7187	144	2	4	R	2	6
820	19	-89.1980	13.7184	120	2	4	R	4	1
821	19	-89.1955	13.7204	12	2	4	C	2	1
822	19	-89.1929	13.7163	90	2	4	R	1	4
823	19	-89.1937	13.7168	190	2	4	R	5	6
824	19	-89.1936	13.7173	126	2	3	R	2	6
825	19	-89.1936	13.7181	48	2	3	R	1	4
826	19	-89.1943	13.7182	42	2	4	R	2	5
827	19	-89.1971	13.7168	150	2	3	R	2	6
828	19	-89.1990	13.7163	63	2	4	R	6	12
829	19	-89.1990	13.7170	78	2	4	As	3	--
830	19	-89.1984	13.7192	55	2	3	R	2	5
831	19	-89.1979	13.7178	72	2	3	R	2	6
832	19	-89.1975	13.7173	100	2	4	C	5	--
833	19	-89.1912	13.7161	128	2	3	R	5	12
834	19	-89.1935	13.7158	112	2	3	R	3	5
835	19	-89.1944	13.7161	270	2	4	R	3	6
836	19	-89.1970	13.7165	363	2	3	I	50	2
837	19	-89.1977	13.7181	63	2	3	R	2	5
838	19	-89.1979	13.7185	90	2	4	R	2	5
839	19	-89.1973	13.7187	72	2	4	R	1	4
840	19	-89.1972	13.7197	48	2	4	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
841	19	-89.1984	13.7182	120	2	4	R	2	5
842	19	-89.1989	13.7198	36	2	4	R	1	5
843	19	-89.1992	13.7186	80	2	4	R	2	5
844	19	-89.1996	13.7175	48	2	3	R	2	5
845	19	-89.1973	13.7173	144	3	4	R	4	16
846	19	-89.1899	13.7168	60	3	4	R	30	15
847	19	-89.1915	13.7177	35	3	4	R	3	7
848	19	-89.1927	13.7180	96	3	4	R	6	20
849	19	-89.1975	13.7179	120	3	4	R	4	8
850	19	-89.1971	13.7170	35	3	4	C	10	--
851	19	-89.1994	13.7170	536	4	5	R	30	60
852	19	-89.1895	13.7169	105	4	5	R	10	20
853	19	-89.1921	13.7177	88	4	5	M	50	80
854	20	-89.1904	13.7126	200	1	4	C	4	--
855	20	-89.1931	13.7102	90	1	4	R	2	5
856	20	-89.1890	13.7122	120	1	4	I	6	1
857	20	-89.1885	13.7118	112	1	4	I	12	1
858	20	-89.1891	13.7116	260	1	4	R	3	40
859	20	-89.1916	13.7066	650	1	4	C	30	2
860	20	-89.1917	13.7069	72	1	3	R	1	4
861	20	-89.1923	13.7133	375	1	4	C	30	15
862	20	-89.1922	13.7107	64	1	4	O	6	1
863	20	-89.1877	13.7129	220	1	4	C	4	1
864	20	-89.1872	13.7129	180	1	4	C	10	1
865	20	-89.1873	13.7126	192	1	4	R	2	5
866	20	-89.1877	13.7116	170	1	4	R	5	5
867	20	-89.1875	13.7099	1,224	1	4	C	25	1
868	20	-89.1918	13.7094	110	1	4	R	2	2
869	20	-89.1849	13.7126	264	1	4	C	4	1
870	20	-89.1862	13.7116	4,592	1	4	C	50	2
871	20	-89.1856	13.7097	520	1	4	C	15	1
872	20	-89.1881	13.7099	160	1	16	C	10	1
873	20	-89.1894	13.7114	250	1	4	C	15	1
874	20	-89.1856	13.7090	150	1	4	R	2	5
875	20	-89.1853	13.7086	105	1	3	I	15	1
876	20	-89.1898	13.7069	96	1	4	C	2	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
877	20	-89.1912	13.7123	230	2	4	C	10	1
878	20	-89.1915	13.7118	440	2	3	C	5	1
879	20	-89.1929	13.7108	395	2	3	C	5	--
880	20	-89.1891	13.7130	240	2	4	C	12	1
881	20	-89.1895	13.7125	64	2	4	R	1	3
882	20	-89.1888	13.7118	170	2	4	M	5	6
883	20	-89.1900	13.7114	99	2	4	R	2	6
884	20	-89.1889	13.7113	150	2	4	C	12	1
885	20	-89.1883	13.7121	81	2	4	E	14	1
886	20	-89.1851	13.7099	96	2	3	M	4	7
887	20	-89.1853	13.7100	70	2	4	M	3	4
888	20	-89.1850	13.7103	80	2	4	R	4	6
889	20	-89.1850	13.7103	48	2	4	R	2	4
890	20	-89.1848	13.7098	35	2	3	R	2	4
891	20	-89.1927	13.7066	336	2	4	M	25	15
892	20	-89.1920	13.7072	459	2	4	E	25	1
893	20	-89.1907	13.7088	160	2	4	M	5	8
894	20	-89.1913	13.7087	204	2	4	C	3	1
895	20	-89.1922	13.7071	392	2	4	M	8	6
896	20	-89.1912	13.7132	375	2	4	C	25	1
897	20	-89.1878	13.7108	100	2	4	R	2	5
898	20	-89.1868	13.7098	64	2	4	R	4	1
899	20	-89.1856	13.7097	252	2	4	I	25	2
900	20	-89.1900	13.7120	70	2	4	I	7	1
901	20	-89.1904	13.7103	120	2	4	R	1	4
902	20	-89.1912	13.7090	180	2	4	C	17	1
903	20	-89.1866	13.7128	75	2	4	C	4	1
904	20	-89.1855	13.7109	21	2	4	R	1	4
905	20	-89.1897	13.7129	154	2	4	C	10	1
906	20	-89.1851	13.7093	320	2	4	R	2	5
907	20	-89.1853	13.7088	252	2	3	I	15	2
908	20	-89.1855	13.7087	280	2	4	As	2	--
909	20	-89.1909	13.7059	80	2	4	R	1	5
910	20	-89.1901	13.7055	1,584	2	4	U	10	1
911	20	-89.1890	13.7056	572	2	4	I	20	1
912	20	-89.1891	13.7067	210	2	4	C	25	10

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
913	20	-89.1918	13.7062	180	3	3	E	15	1
914	20	-89.1923	13.7065	192	3	4	C	15	1
915	20	-89.1918	13.7056	150	3	3	C	15	1
916	20	-89.1929	13.7088	675	3	7	C	70	2
917	20	-89.1853	13.7089	56	3	3	R	2	5
918	20	-89.1906	13.7055	88	3	4	C	15	10
919	20	-89.1908	13.7071	462	3	7	U	10	5
920	20	-89.1905	13.7066	162	3	4	E	130	1
921	20	-89.1895	13.7120	400	4	5	C	60	3
922	20	-89.1916	13.7132	504	4	7	C	65	2
923	20	-89.1903	13.7116	180	4	7	C	25	2
924	21	-89.2123	13.7228	140	1	4	C	2	6
925	21	-89.2152	13.7235	128	1	4	R	1	4
926	21	-89.2165	13.7242	35	1	4	R	2	5
927	21	-89.2164	13.7248	160	1	4	R	3	6
928	21	-89.2219	13.7202	403	1	4	C	10	1
929	21	-89.2061	13.7212	136	1	4	R	3	5
930	21	-89.2064	13.7212	162	1	3	R	3	5
931	21	-89.2094	13.7218	150	1	3	R	15	30
932	21	-89.2122	13.7226	96	1	3	R	1	4
933	21	-89.2162	13.7231	340	1	3	R	2	5
934	21	-89.2219	13.7218	50	1	15	C	3	1
935	21	-89.2197	13.7231	210	1	4	R	2	5
936	21	-89.2193	13.7167	420	1	4	C	3	2
937	21	-89.2194	13.7119	120	1	4	R	2	5
938	21	-89.2196	13.7124	120	1	4	R	1	4
939	21	-89.2189	13.7133	300	1	4	C	12	1
940	21	-89.2204	13.7120	200	1	4	R	1	6
941	21	-89.2230	13.7135	500	1	4	C	25	1
942	21	-89.2079	13.7211	100	1	3	R	3	5
943	21	-89.2090	13.7215	165	1	3	O	6	4
944	21	-89.2109	13.7201	570	1	4	O	1	1
945	21	-89.2100	13.7185	112	1	3	R	3	5
946	21	-89.2100	13.7180	132	1	4	R	1	4
947	21	-89.2194	13.7140	120	1	4	R	2	5
948	21	-89.2191	13.7137	117	1	15	I	6	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
949	21	-89.2179	13.7129	200	1	3	R	2	6
950	21	-89.2172	13.7145	169	1	4	C	15	15
951	21	-89.2102	13.7178	250	1	4	R	1	5
952	21	-89.2101	13.7217	77	1	4	R	2	8
953	21	-89.2106	13.7219	126	1	3	R	2	5
954	21	-89.2128	13.7228	126	1	4	R	2	8
955	21	-89.2169	13.7220	170	1	4	R	3	8
956	21	-89.2150	13.7107	235	1	4	C	12	1
957	21	-89.2237	13.7111	468	1	4	As	28	--
958	21	-89.2069	13.7216	84	1	3	R	2	5
959	21	-89.2061	13.7244	105	1	4	R	1	5
960	21	-89.2068	13.7241	84	1	4	R	1	4
961	21	-89.2137	13.7235	360	1	4	C	6	6
962	21	-89.2145	13.7236	120	1	4	R	--	4
963	21	-89.2214	13.7216	64	1	4	R	2	4
964	21	-89.2208	13.7220	81	1	3	R	2	58
965	21	-89.2208	13.7223	60	1	3	R	3	5
966	21	-89.2193	13.7225	216	1	3	C	8	1
967	21	-89.2186	13.7230	90	1	3	R	3	5
968	21	-89.2168	13.7222	63	1	3	R	1	6
969	21	-89.2191	13.7139	143	1	4	C	3	--
970	21	-89.2106	13.7227	98	2	4	R	3	6
971	21	-89.2109	13.7225	180	2	4	R	1	5
972	21	-89.2132	13.7241	135	2	4	R	1	4
973	21	-89.2219	13.7208	162	2	4	C	10	1
974	21	-89.2201	13.7230	65	2	4	C	8	2
975	21	-89.2195	13.7237	77	2	4	R	2	8
976	21	-89.2193	13.7239	81	2	4	R	2	8
977	21	-89.2212	13.7170	100	2	3	R	2	8
978	21	-89.2216	13.7165	105	2	3	R	2	5
979	21	-89.2224	13.7160	50	2	3	R	2	8
980	21	-89.2220	13.7168	150	2	3	R	2	5
981	21	-89.2195	13.7168	150	2	3	M	5	5
982	21	-89.2169	13.7151	400	2	4	C	22	50
983	21	-89.2074	13.7212	160	2	3	R	1	5
984	21	-89.2080	13.7217	28	2	4	R	1	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
985	21	-89.2104	13.7218	35	2	3	R	1	3
986	21	-89.2109	13.7220	28	2	3	R	1	4
987	21	-89.2166	13.7218	150	2	7	M	10	30
988	21	-89.2169	13.7211	300	2	4	M	15	25
989	21	-89.2169	13.7207	150	2	3	R	2	6
990	21	-89.2218	13.7217	792	2	7	C	100	4
991	21	-89.2218	13.7223	612	2	7	C	100	2
992	21	-89.2211	13.7233	286	2	7	C	12	2
993	21	-89.2202	13.7232	70	2	4	R	2	6
994	21	-89.2178	13.7232	99	2	4	R	2	5
995	21	-89.2173	13.7230	180	2	7	C	8	2
996	21	-89.2214	13.7175	240	2	4	C	10	1
997	21	-89.2209	13.7172	130	2	4	R	2	6
998	21	-89.2199	13.7170	144	2	4	C	6	1
999	21	-89.2174	13.7156	84	2	4	R	2	5
1000	21	-89.2180	13.7159	80	2	4	R	2	6
1001	21	-89.2143	13.7096	300	2	4	R	180	200
1002	21	-89.2165	13.7099	80	2	4	R	2	6
1003	21	-89.2159	13.7115	192	2	4	C	75	75
1004	21	-89.2176	13.7126	300	2	4	C	10	2
1005	21	-89.2200	13.7118	120	2	4	R	2	6
1006	21	-89.2215	13.7125	150	2	4	R	2	5
1007	21	-89.2215	13.7135	200	2	4	C	16	1
1008	21	-89.2209	13.7123	150	2	4	R	2	6
1009	21	-89.2062	13.7204	112	2	3	R	3	5
1010	21	-89.2065	13.7207	96	2	3	R	4	5
1011	21	-89.2073	13.7208	144	2	3	R	5	6
1012	21	-89.2095	13.7213	75	2	4	C	8	1
1013	21	-89.2114	13.7201	104	2	4	R	3	6
1014	21	-89.2117	13.7200	100	2	4	R	4	6
1015	21	-89.2197	13.7141	91	2	4	R	1	4
1016	21	-89.2205	13.7144	160	2	3	R	2	6
1017	21	-89.2209	13.7147	150	2	3	R	2	6
1018	21	-89.2223	13.7152	84	2	4	As	2	25
1019	21	-89.2208	13.7144	160	2	4	C	10	1
1020	21	-89.2177	13.7147	56	2	4	R	2	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1021	21	-89.2174	13.7140	72	2	4	C	20	1
1022	21	-89.2175	13.7136	72	2	4	R	2	5
1023	21	-89.2058	13.7207	64	2	4	R	1	5
1024	21	-89.2074	13.7205	144	2	4	R	2	6
1025	21	-89.2077	13.7199	300	2	4	C	50	2
1026	21	-89.2077	13.7188	64	2	4	R	2	6
1027	21	-89.2090	13.7193	225	2	4	R	2	8
1028	21	-89.2099	13.7181	400	2	4	R	2	8
1029	21	-89.2120	13.7223	36	2	4	As	25	80
1030	21	-89.2170	13.7231	160	2	3	R	2	8
1031	21	-89.2168	13.7207	54	2	4	R	2	8
1032	21	-89.2213	13.7214	96	2	3	R	2	6
1033	21	-89.2210	13.7212	96	2	3	R	2	6
1034	21	-89.2209	13.7219	120	2	3	R	2	6
1035	21	-89.2195	13.7229	120	2	3	R	2	6
1036	21	-89.2184	13.7230	80	2	3	R	2	6
1037	21	-89.2173	13.7230	210	2	4	C	10	1
1038	21	-89.2203	13.7180	190	2	4	As	200	1
1039	21	-89.2200	13.7178	210	2	4	As	10	1
1040	21	-89.2197	13.7182	248	2	4	As	100	50
1041	21	-89.2197	13.7179	40	2	4	R	2	5
1042	21	-89.2195	13.7179	188	2	4	R	2	8
1043	21	-89.2183	13.7172	628	2	4	C	10	1
1044	21	-89.2176	13.7167	1,175	2	3	As	50	2
1045	21	-89.2214	13.7166	80	2	4	R	2	6
1046	21	-89.2215	13.7164	80	2	4	R	--	3
1047	21	-89.2214	13.7161	80	2	4	R	2	6
1048	21	-89.2221	13.7162	120	2	4	R	3	6
1049	21	-89.2223	13.7164	60	2	4	R	2	6
1050	21	-89.2169	13.7155	60	2	3	R	2	5
1051	21	-89.2172	13.7152	136	2	4	C	5	--
1052	21	-89.2166	13.7102	225	2	4	C	30	2
1053	21	-89.2154	13.7118	48	2	4	R	2	5
1054	21	-89.2170	13.7121	50	2	4	C	25	2
1055	21	-89.2227	13.7154	78	2	4	R	2	--
1056	21	-89.2230	13.7150	72	2	4	R	2	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1057	21	-89.2218	13.7148	84	2	4	R	2	4
1058	21	-89.2214	13.7139	84	2	4	R	2	3
1059	21	-89.2216	13.7135	160	2	4	R	4	7
1060	21	-89.2218	13.7132	90	2	4	C	5	1
1061	21	-89.2226	13.7116	130	2	4	R	2	5
1062	21	-89.2223	13.7104	70	2	4	R	2	6
1063	21	-89.2040	13.7215	24	2	15	R	2	3
1064	21	-89.2048	13.7222	150	2	3	R	2	5
1065	21	-89.2051	13.7220	88	2	3	R	3	5
1066	21	-89.2056	13.7221	109	2	4	R	3	6
1067	21	-89.2065	13.7224	170	2	3	R	3	5
1068	21	-89.2078	13.7222	28	2	4	R	2	4
1069	21	-89.2079	13.7224	110	2	4	R	3	6
1070	21	-89.2078	13.7219	50	2	4	R	2	5
1071	21	-89.2088	13.7219	32	2	4	R	2	4
1072	21	-89.2049	13.7224	225	2	4	R	1	5
1073	21	-89.2058	13.7228	110	2	4	R	3	6
1074	21	-89.2068	13.7228	180	2	4	R	1	5
1075	21	-89.2073	13.7229	168	2	3	R	--	4
1076	21	-89.2073	13.7237	80	2	3	R	1	4
1077	21	-89.2074	13.7243	96	2	3	R	2	6
1078	21	-89.2079	13.7226	55	2	4	R	--	4
1079	21	-89.2117	13.7231	70	2	4	M	1	15
1080	21	-89.2113	13.7228	400	2	4	E	400	2
1081	21	-89.2113	13.7239	90	2	4	R	--	4
1082	21	-89.2133	13.7232	180	2	4	M	4	6
1083	21	-89.2169	13.7237	180	2	4	R	2	5
1084	21	-89.2167	13.7251	192	2	3	R	2	7
1085	21	-89.2219	13.7180	35	2	3	C	5	4
1086	21	-89.2204	13.7174	80	2	3	R	1	3
1087	21	-89.2198	13.7173	140	2	15	C	3	--
1088	21	-89.2192	13.7171	544	2	4	C	15	--
1089	21	-89.2186	13.7168	48	2	3	R	3	5
1090	21	-89.2172	13.7164	1,344	2	3	E	20	--
1091	21	-89.2166	13.7161	28	2	3	R	3	5
1092	21	-89.2200	13.7141	130	2	4	M	4	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1093	21	-89.2203	13.7148	100	2	4	R	1	5
1094	21	-89.2216	13.7135	189	2	4	C	6	1
1095	21	-89.2221	13.7140	90	2	4	R	1	4
1096	21	-89.2225	13.7145	60	2	4	R	1	5
1097	21	-89.2213	13.7233	189	3	4	C	25	10
1098	21	-89.2219	13.7162	75	3	4	R	2	22
1099	21	-89.2054	13.7210	296	3	4	M	25	50
1100	21	-89.2052	13.7213	296	3	4	R	60	30
1101	21	-89.2090	13.7217	288	3	7	I	15	--
1102	21	-89.2186	13.7164	189	3	4	O	10	2
1103	21	-89.2149	13.7102	150	3	9	C	200	300
1104	21	-89.2204	13.7095	240	3	9	C	50	1
1105	21	-89.2179	13.7151	36	3	4	R	2	5
1106	21	-89.2165	13.7215	287	3	9	C	30	5
1107	21	-89.2189	13.7173	150	3	4	R	1	4
1108	21	-89.2140	13.7101	242	3	4	R	75	150
1109	21	-89.2088	13.7223	108	3	4	R	--	5
1110	21	-89.2236	13.7143	120	3	7	C	10	1
1111	21	-89.2163	13.7151	72	4	7	R	7	15
1112	21	-89.2137	13.7081	546	4	4	R	80	180
1113	21	-89.2213	13.7092	360	5	12	E	350	2
1114	21	-89.2138	13.7096	275	5	4	R	10	25
1115	22	-89.2234	13.7162	300	1	4	C	30	11
1116	22	-89.2237	13.7167	2,400	1	15	C	60	45
1117	22	-89.2325	13.7091	750	1	15	C	70	2
1118	22	-89.2318	13.7087	228	1	4	C	5	1
1119	22	-89.2291	13.7216	108	1	4	R	2	6
1120	22	-89.2291	13.7206	79	1	15	C	60	2
1121	22	-89.2234	13.7233	120	1	4	R	2	6
1122	22	-89.2230	13.7232	120	1	4	R	2	6
1123	22	-89.2310	13.7098	270	1	4	C	6	1
1124	22	-89.2307	13.7112	2,800	1	15	C	100	30
1125	22	-89.2316	13.7109	192	1	4	C	25	1
1126	22	-89.2316	13.7125	680	1	4	C	17	15
1127	22	-89.2223	13.7207	128	1	4	C	6	1
1128	22	-89.2223	13.7219	90	1	4	C	25	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1129	22	-89.2223	13.7222	296	1	4	C	40	45
1130	22	-89.2293	13.7091	36	1	3	R	3	6
1131	22	-89.2292	13.7093	180	1	4	As	6	100
1132	22	-89.2259	13.7225	153	1	4	C	12	35
1133	22	-89.2290	13.7224	170	1	4	C	5	20
1134	22	-89.2317	13.7109	360	1	4	C	8	1
1135	22	-89.2313	13.7119	54	1	4	M	3	5
1136	22	-89.2315	13.7107	250	1	4	C	50	2
1137	22	-89.2292	13.7229	80	1	3	R	1	4
1138	22	-89.2303	13.7096	52	1	3	U	2	3
1139	22	-89.2226	13.7191	180	1	3	C	12	1
1140	22	-89.2223	13.7200	84	1	4	C	3	1
1141	22	-89.2222	13.7205	49	1	4	R	3	6
1142	22	-89.2222	13.7207	100	1	4	C	8	1
1143	22	-89.2223	13.7192	100	2	4	C	20	2
1144	22	-89.2223	13.7197	70	2	4	C	20	2
1145	22	-89.2246	13.7202	64	2	4	R	4	6
1146	22	-89.2254	13.7204	392	2	4	R	4	8
1147	22	-89.2267	13.7205	70	2	4	R	3	6
1148	22	-89.2272	13.7205	36	2	4	R	3	9
1149	22	-89.2276	13.7205	48	2	4	R	4	6
1150	22	-89.2339	13.7108	72	2	4	R	2	6
1151	22	-89.2345	13.7109	108	2	4	R	2	5
1152	22	-89.2352	13.7115	72	2	4	R	4	10
1153	22	-89.2347	13.7126	140	2	4	R	2	6
1154	22	-89.2351	13.7129	145	2	4	R	1	6
1155	22	-89.2360	13.7123	80	2	4	R	1	4
1156	22	-89.2364	13.7122	128	2	4	R	2	2
1157	22	-89.2368	13.7128	75	2	4	R	2	5
1158	22	-89.2322	13.7084	72	2	4	C	25	1
1159	22	-89.2309	13.7097	195	2	4	E	185	1
1160	22	-89.2308	13.7101	100	2	4	R	1	5
1161	22	-89.2314	13.7108	50	2	4	R	1	5
1162	22	-89.2290	13.7222	225	2	4	M	10	5
1163	22	-89.2291	13.7210	200	2	4	C	2	8
1164	22	-89.2236	13.7235	160	2	3	R	3	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1165	22	-89.2253	13.7244	280	2	4	R	3	6
1166	22	-89.2257	13.7248	160	2	4	R	4	--
1167	22	-89.2264	13.7250	160	2	4	R	4	--
1168	22	-89.2272	13.7256	90	2	4	R	4	8
1169	22	-89.2310	13.7097	330	2	7	C	4	--
1170	22	-89.2308	13.7095	200	2	7	R	15	--
1171	22	-89.2293	13.7087	225	2	4	R	3	6
1172	22	-89.2319	13.7114	72	2	4	R	2	6
1173	22	-89.2323	13.7115	55	2	4	R	2	6
1174	22	-89.2296	13.7228	144	2	4	R	2	4
1175	22	-89.2301	13.7222	72	2	4	R	1	5
1176	22	-89.2313	13.7219	210	2	4	R	2	6
1177	22	-89.2313	13.7222	98	2	4	R	1	5
1178	22	-89.2307	13.7224	72	2	4	R	1	4
1179	22	-89.2224	13.7210	20	2	4	R	2	4
1180	22	-89.2223	13.7211	56	2	4	C	10	1
1181	22	-89.2227	13.7230	2,600	2	12	C	200	2
1182	22	-89.2320	13.7108	126	2	4	C	14	1
1183	22	-89.2320	13.7113	80	2	4	C	14	1
1184	22	-89.2324	13.7114	28	2	4	R	3	6
1185	22	-89.2331	13.7114	66	2	4	R	2	4
1186	22	-89.2334	13.7110	72	2	4	R	2	4
1187	22	-89.2337	13.7107	80	2	4	R	2	4
1188	22	-89.2344	13.7107	98	2	4	R	2	4
1189	22	-89.2350	13.7112	80	2	4	R	2	4
1190	22	-89.2342	13.7111	48	2	4	R	2	4
1191	22	-89.2342	13.7107	60	2	4	R	2	4
1192	22	-89.2322	13.7108	36	2	4	R	3	6
1193	22	-89.2326	13.7106	105	2	4	C	8	2
1194	22	-89.2335	13.7111	80	2	4	R	3	6
1195	22	-89.2339	13.7111	90	2	4	R	3	6
1196	22	-89.2340	13.7108	36	2	4	R	4	11
1197	22	-89.2233	13.7226	300	2	7	R	20	35
1198	22	-89.2239	13.7222	120	2	3	R	2	7
1199	22	-89.2265	13.7211	80	2	4	R	1	6
1200	22	-89.2277	13.7225	120	2	3	R	2	7

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1201	22	-89.2284	13.7222	80	2	4	R	1	5
1202	22	-89.2225	13.7218	121	2	4	C	2	25
1203	22	-89.2230	13.7176	160	2	4	C	12	--
1204	22	-89.2239	13.7158	1,040	2	4	C	5	5
1205	22	-89.2242	13.7148	36	2	3	R	3	5
1206	22	-89.2248	13.7126	30	2	4	C	2	--
1207	22	-89.2257	13.7111	180	2	4	M	4	7
1208	22	-89.2236	13.7185	288	2	4	I	25	10
1209	22	-89.2314	13.7116	180	2	4	R	2	5
1210	22	-89.2329	13.7111	25	2	4	R	2	4
1211	22	-89.2335	13.7113	36	2	4	R	1	4
1212	22	-89.2339	13.7114	40	2	4	C	5	1
1213	22	-89.2340	13.7118	60	2	4	R	2	5
1214	22	-89.2344	13.7120	35	2	4	R	2	5
1215	22	-89.2342	13.7123	40	2	4	R	2	5
1216	22	-89.2314	13.7116	136	2	4	R	2	6
1217	22	-89.2318	13.7120	416	2	4	O	50	2
1218	22	-89.2324	13.7113	128	2	4	R	2	6
1219	22	-89.2298	13.7227	70	2	4	R	1	4
1220	22	-89.2296	13.7223	84	2	4	R	2	6
1221	22	-89.2305	13.7222	70	2	3	R	2	8
1222	22	-89.2316	13.7225	90	2	4	R	1	6
1223	22	-89.2306	13.7225	150	2	4	R	1	5
1224	22	-89.2309	13.7102	88	2	4	R	3	5
1225	22	-89.2309	13.7101	64	2	4	R	1	3
1226	22	-89.2305	13.7098	144	2	3	C	7	1
1227	22	-89.2304	13.7098	150	2	3	R	2	4
1228	22	-89.2290	13.7089	36	2	3	C	3	2
1229	22	-89.2286	13.7087	60	2	4	R	3	5
1230	22	-89.2226	13.7186	260	2	3	C	40	70
1231	22	-89.2224	13.7193	169	2	4	C	4	1
1232	22	-89.2223	13.7198	75	2	3	C	4	1
1233	22	-89.2293	13.7226	108	2	3	O	3	1
1234	22	-89.2293	13.7222	120	2	3	O	10	1
1235	22	-89.2293	13.7214	72	2	3	R	3	8
1236	22	-89.2294	13.7212	25	2	4	R	3	7

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1237	22	-89.2294	13.7210	240	2	4	M	4	12
1238	22	-89.2296	13.7201	300	2	4	C	5	10
1239	22	-89.2234	13.7199	152	3	4	E	200	2
1240	22	-89.2249	13.7200	256	3	4	C	8	2
1241	22	-89.2298	13.7090	500	3	7	E	200	--
1242	22	-89.2284	13.7085	88	3	7	R	3	8
1243	22	-89.2239	13.7153	1,200	3	7	C	7	1
1244	22	-89.2319	13.7099	240	3	4	E	415	1
1245	22	-89.2290	13.7228	105	3	4	C	10	2
1246	22	-89.2285	13.7264	96	3	4	R	7	15
1247	22	-89.2307	13.7095	200	3	9	C	15	1
1248	22	-89.2290	13.7086	180	3	4	R	2	6
1249	22	-89.2286	13.7083	240	3	4	C	1	--
1250	22	-89.2278	13.7076	1,800	3	9	C	200	6
1251	22	-89.2229	13.7210	96	3	4	R	2	2
1252	22	-89.2261	13.7216	288	3	4	U	3	8
1253	22	-89.2239	13.7152	800	3	15	C	20	2
1254	22	-89.2284	13.7085	60	3	4	C	15	--
1255	22	-89.2231	13.7171	400	4	9	C	100	--
1256	23	-89.1839	13.7023	208	1	3	C	15	15
1257	23	-89.1805	13.7046	220	1	4	C	2	--
1258	23	-89.1806	13.7039	480	1	15	C	6	1
1259	23	-89.1809	13.7036	221	1	15	C	6	1
1260	23	-89.1815	13.7026	48	1	15	C	3	--
1261	23	-89.1839	13.7013	100	1	3	C	3	3
1262	23	-89.1844	13.7017	150	1	15	C	4	--
1263	23	-89.1851	13.7014	400	1	4	R	6	2
1264	23	-89.1850	13.7021	70	1	4	R	3	6
1265	23	-89.1848	13.7024	70	1	4	R	4	7
1266	23	-89.1833	13.7019	800	1	4	R	15	25
1267	23	-89.1801	13.7050	1,575	1	4	C	50	3
1268	23	-89.1808	13.7037	75	1	4	U	2	--
1269	23	-89.1813	13.7033	144	1	4	C	3	--
1270	23	-89.1815	13.7027	120	1	4	C	3	--
1271	23	-89.1846	13.7012	117	1	4	I	10	1
1272	23	-89.1851	13.7014	136	1	15	I	3	--

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1273	23	-89.1845	13.7026	48	1	4	C	3	1
1274	23	-89.1841	13.7033	147	1	4	R	2	5
1275	23	-89.1843	13.7033	63	1	4	R	2	4
1276	23	-89.1847	13.7017	165	2	3	R	7	15
1277	23	-89.1847	13.7019	280	2	4	R	18	40
1278	23	-89.1850	13.7019	64	2	4	C	10	2
1279	23	-89.1849	13.7024	160	2	3	C	15	--
1280	23	-89.1836	13.7024	600	2	4	C	20	--
1281	23	-89.1832	13.7027	150	2	2	R	4	10
1282	23	-89.1801	13.7043	374	2	3	C	9	--
1283	23	-89.1812	13.7030	240	2	4	R	10	8
1284	23	-89.1813	13.7029	960	2	4	R	10	8
1285	23	-89.1814	13.7028	112	2	4	R	8	1
1286	23	-89.1817	13.7025	60	2	4	R	3	7
1287	23	-89.1841	13.7014	220	2	3	C	5	2
1288	23	-89.1843	13.7013	75	2	15	C	4	--
1289	23	-89.1846	13.7027	100	2	4	C	3	--
1290	23	-89.1841	13.7025	280	2	4	C	6	10
1291	23	-89.1838	13.7025	600	2	4	R	15	30
1292	23	-89.1833	13.7023	200	2	4	M	15	30
1293	23	-89.1815	13.7031	180	2	4	C	8	15
1294	23	-89.1817	13.7024	120	2	4	R	2	6
1295	23	-89.1837	13.7012	1,400	2	4	E	25	2
1296	23	-89.1850	13.7018	144	2	3	M	4	5
1297	23	-89.1849	13.7022	96	2	4	R	2	5
1298	23	-89.1849	13.7027	100	2	4	R	2	1
1299	23	-89.1843	13.7025	30	2	4	R	2	4
1300	23	-89.1832	13.7026	105	2	3	R	5	15
1301	23	-89.1832	13.7024	105	2	3	M	5	15
1302	23	-89.1833	13.7012	144	3	3	C	20	--
1303	23	-89.1834	13.7012	156	3	3	C	8	--
1304	23	-89.1846	13.7017	80	3	3	C	20	40
1305	23	-89.1830	13.7022	225	3	4	R	8	20
1306	23	-89.1810	13.7035	144	3	4	R	50	72
1307	23	-89.1811	13.7033	312	4	3	R	6	1
1308	24	-89.2418	13.7024	345	1	4	C	15	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1309	24	-89.2408	13.7025	700	1	4	C	10	2
1310	24	-89.2343	13.7079	400	1	4	I	6	--
1311	24	-89.2409	13.7031	600	1	4	O	10	2
1312	24	-89.2396	13.7034	300	1	4	C	10	--
1313	24	-89.2390	13.7029	160	1	4	C	4	--
1314	24	-89.2400	13.7029	391	1	12	C	12	1
1315	24	-89.2356	13.7083	260	1	4	C	10	25
1316	24	-89.2338	13.7073	300	1	4	C	5	1
1317	24	-89.2377	13.7064	325	1	4	R	2	4
1318	24	-89.2364	13.7059	91	1	4	C	10	1
1319	24	-89.2360	13.7038	374	1	4	C	50	1
1320	24	-89.2355	13.7061	319	1	4	C	10	1
1321	24	-89.2413	13.7018	315	2	4	C	6	1
1322	24	-89.2426	13.7027	2,700	2	4	M	250	3
1323	24	-89.2442	13.7024	72	2	3	R	8	20
1324	24	-89.2336	13.7020	480	2	4	C	30	--
1325	24	-89.2362	13.7016	120	2	4	C	10	--
1326	24	-89.2359	13.7003	42	2	4	C	7	3
1327	24	-89.2368	13.7003	96	2	4	C	6	1
1328	24	-89.2416	13.7031	525	2	7	C	20	2
1329	24	-89.2423	13.7032	234	2	4	C	5	2
1330	24	-89.2439	13.7029	924	2	7	C	30	2
1331	24	-89.2438	13.7029	234	2	4	C	18	--
1332	24	-89.2353	13.7065	540	2	4	C	20	2
1333	24	-89.2357	13.7069	300	2	7	C	5	1
1334	24	-89.2357	13.7070	480	2	4	C	20	2
1335	24	-89.2354	13.7069	512	2	4	C	10	2
1336	24	-89.2403	13.7025	750	2	12	C	20	2
1337	24	-89.2389	13.7013	300	2	4	R	5	8
1338	24	-89.2383	13.7015	750	2	4	C	20	10
1339	24	-89.2342	13.7018	700	2	4	C	10	3
1340	24	-89.2345	13.7020	375	2	4	M	45	25
1341	24	-89.2358	13.7009	2,200	2	4	As	10	2
1342	24	-89.2365	13.7003	84	2	4	C	7	2
1343	24	-89.2392	13.7003	250	2	4	C	20	2
1344	24	-89.2392	13.7007	180	2	4	C	10	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1345	24	-89.2339	13.7036	300	2	4	R	1	5
1346	24	-89.2331	13.7036	120	2	4	C	20	1
1347	24	-89.2327	13.7058	875	2	4	C	100	2
1348	24	-89.2396	13.7032	100	2	4	C	3	--
1349	24	-89.2368	13.7027	375	2	7	C	7	--
1350	24	-89.2345	13.7074	180	2	4	R	2	6
1351	24	-89.2351	13.7071	180	2	4	E	20	1
1352	24	-89.2360	13.7084	500	2	4	R	15	15
1353	24	-89.2328	13.7058	788	2	4	C	100	3
1354	24	-89.2372	13.7064	80	2	4	R	3	5
1355	24	-89.2364	13.7070	168	2	4	C	10	--
1356	24	-89.2364	13.7072	220	2	4	R	3	6
1357	24	-89.2424	13.7019	575	3	4	G	60	12
1358	24	-89.2449	13.7029	288	3	4	C	30	6
1359	24	-89.2387	13.7016	300	3	4	M	8	1
1360	24	-89.2413	13.7032	961	3	7	C	20	1
1361	24	-89.2430	13.7032	576	3	4	C	5	2
1362	24	-89.2359	13.7057	429	3	7	G	60	1
1363	24	-89.2362	13.7054	625	3	7	M	20	36
1364	24	-89.2351	13.7056	546	3	9	G	7	1
1365	24	-89.2405	13.7015	180	3	4	C	10	2
1366	24	-89.2374	13.7012	1,050	3	12	O	25	3
1367	24	-89.2344	13.7041	375	3	4	E	80	2
1368	24	-89.2345	13.7064	375	3	4	R	12	36
1369	24	-89.2343	13.7067	300	3	4	R	18	30
1370	24	-89.2432	13.7028	144	4	7	C	25	1
1371	24	-89.2381	13.7093	300	4	7	E	250	1
1372	24	-89.2424	13.7045	660	6	9	R	40	90
1373	24	-89.2445	13.7044	1,000	7	7	R	60	180
1374	24	-89.2430	13.7068	600	11	13	C	250	5
1375	25	-89.2417	13.6888	225	1	15	C	20	2
1376	25	-89.2411	13.6888	700	1	15	C	100	2
1377	25	-89.2431	13.6950	192	1	6	C	70	1
1378	25	-89.2433	13.6892	135	1	4	C	36	--
1379	25	-89.2415	13.6975	450	1	6	C	45	60
1380	25	-89.2423	13.6980	375	1	6	C	21	--

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1381	25	-89.2415	13.6991	513	1	6	C	12	12
1382	25	-89.2440	13.6894	360	1	4	C	10	--
1383	25	-89.2446	13.6880	700	1	4	C	40	2
1384	25	-89.2446	13.6866	300	1	6	C	20	1
1385	25	-89.2444	13.6907	405	1	4	C	8	1
1386	25	-89.2421	13.6953	420	1	3	C	30	70
1387	25	-89.2447	13.6975	275	1	6	C	10	2
1388	25	-89.2500	13.6987	40	1	6	C	8	4
1389	25	-89.2444	13.6910	500	2	6	C	35	1
1390	25	-89.2441	13.6932	1,050	2	6	R	12	50
1391	25	-89.2441	13.6917	240	2	6	C	30	2
1392	25	-89.2416	13.6978	324	2	6	C	23	40
1393	25	-89.2415	13.6980	150	2	6	C	20	--
1394	25	-89.2410	13.6982	600	2	6	C	35	1
1395	25	-89.2421	13.6992	80	2	4	R	2	7
1396	25	-89.2415	13.6957	96	2	6	C	15	2
1397	25	-89.2427	13.6980	180	2	6	C	8	--
1398	25	-89.2446	13.6987	350	2	6	R	2	6
1399	25	-89.2425	13.6881	120	2	6	R	10	20
1400	25	-89.2423	13.6877	540	2	4	R	9	6
1401	25	-89.2417	13.6868	400	2	6	C	60	1
1402	25	-89.2453	13.6871	800	2	12	C	24	2
1403	25	-89.2428	13.6879	130	2	6	C	50	100
1404	25	-89.2434	13.6867	90	2	4	C	3	--
1405	25	-89.2443	13.6913	196	2	4	As	20	--
1406	25	-89.2500	13.6994	72	2	4	R	2	4
1407	25	-89.2503	13.6995	72	2	4	R	1	4
1408	25	-89.2495	13.6988	750	2	6	As	9	2
1409	25	-89.2501	13.6985	300	2	6	C	20	1
1410	25	-89.2498	13.6964	187	2	4	R	2	6
1411	25	-89.2506	13.6961	150	2	6	R	2	6
1412	25	-89.2501	13.7000	74	2	4	R	2	5
1413	25	-89.2504	13.7000	54	2	4	R	2	6
1414	25	-89.2497	13.6980	40	2	6	C	10	2
1415	25	-89.2499	13.6996	96	2	4	R	4	8
1416	25	-89.2503	13.6995	72	2	4	R	4	8

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1417	25	-89.2500	13.6993	64	2	6	C	4	--
1418	25	-89.2500	13.6984	200	2	6	C	10	1
1419	25	-89.2502	13.6965	120	2	4	C	12	1
1420	25	-89.2501	13.7001	90	2	6	R	2	5
1421	25	-89.2504	13.7002	78	2	4	R	4	5
1422	25	-89.2453	13.6986	276	2	4	R	4	6
1423	25	-89.2460	13.6989	390	2	6	R	3	6
1424	25	-89.2463	13.6989	390	2	6	R	3	6
1425	25	-89.2437	13.6897	400	3	6	R	5	10
1426	25	-89.2440	13.6902	144	3	4	R	2	6
1427	25	-89.2444	13.6912	300	3	4	C	22	1
1428	25	-89.2474	13.6980	272	3	6	R	32	64
1429	25	-89.2447	13.6980	315	3	6	R	24	48
1430	25	-89.2499	13.7002	220	3	7	C	25	1
1431	25	-89.2405	13.6873	500	4	5	R	33	67
1432	25	-89.2421	13.6861	320	4	5	R	32	64
1433	25	-89.2446	13.6876	552	6	7	R	36	144
1434	25	-89.2428	13.6883	756	7	9	R	42	84
1435	25	-89.2435	13.6883	572	7	7	R	30	105
1436	25	-89.2430	13.6867	264	13	14	R	60	150
1437	25	-89.2446	13.6860	576	18	11	R	70	200
1438	26	-89.2473	13.7074	150	1	4	R	4	5
1439	26	-89.2487	13.7067	300	1	6	C	5	1
1440	26	-89.2440	13.7066	60	1	3	C	3	1
1441	26	-89.2462	13.7074	300	1	4	R	2	5
1442	26	-89.2529	13.7103	250	1	4	R	4	7
1443	26	-89.2468	13.7099	234	1	3	E	15	2
1444	26	-89.2475	13.7099	120	1	6	R	3	6
1445	26	-89.2468	13.7106	315	1	3	R	4	6
1446	26	-89.2461	13.7100	405	1	3	M	8	1
1447	26	-89.2458	13.7096	88	1	4	O	5	1
1448	26	-89.2520	13.7093	168	1	6	R	1	4
1449	26	-89.2474	13.7097	378	1	4	C	5	2
1450	26	-89.2477	13.7098	378	1	4	M	5	2
1451	26	-89.2470	13.7112	136	1	6	M	10	1
1452	26	-89.2582	13.7031	200	1	6	E	50	--

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1453	26	-89.2484	13.7081	216	2	6	C	15	2
1454	26	-89.2482	13.7090	60	2	6	R	4	5
1455	26	-89.2477	13.7081	120	2	6	R	4	5
1456	26	-89.2474	13.7074	150	2	6	R	4	5
1457	26	-89.2478	13.7076	288	2	6	R	4	5
1458	26	-89.2480	13.7081	72	2	6	R	4	5
1459	26	-89.2482	13.7079	49	2	6	R	4	5
1460	26	-89.2481	13.7063	360	2	6	C	50	50
1461	26	-89.2476	13.7062	120	2	4	C	10	1
1462	26	-89.2474	13.7060	84	2	4	R	2	5
1463	26	-89.2484	13.7066	280	2	6	R	1	4
1464	26	-89.2459	13.7063	140	2	3	E	6	1
1465	26	-89.2451	13.7065	81	2	3	R	2	5
1466	26	-89.2449	13.7065	90	2	4	C	7	7
1467	26	-89.2443	13.7065	180	2	3	R	1	5
1468	26	-89.2454	13.7076	55	2	6	R	2	5
1469	26	-89.2461	13.7071	160	2	6	R	2	6
1470	26	-89.2468	13.7071	128	2	6	R	2	4
1471	26	-89.2469	13.7074	42	2	6	M	5	6
1472	26	-89.2471	13.7075	150	2	6	R	3	6
1473	26	-89.2474	13.7074	56	2	6	R	2	6
1474	26	-89.2473	13.7072	150	2	6	R	5	8
1475	26	-89.2470	13.7072	128	2	6	R	2	4
1476	26	-89.2483	13.7068	450	2	6	R	3	6
1477	26	-89.2479	13.7069	400	2	6	R	2	6
1478	26	-89.2472	13.7066	200	2	6	C	20	2
1479	26	-89.2469	13.7066	240	2	4	R	5	7
1480	26	-89.2467	13.7066	240	2	4	R	3	5
1481	26	-89.2466	13.7065	120	2	6	R	4	5
1482	26	-89.2464	13.7066	60	2	6	R	4	5
1483	26	-89.2462	13.7066	56	2	6	R	2	5
1484	26	-89.2460	13.7067	56	2	6	R	2	5
1485	26	-89.2459	13.7067	56	2	6	R	2	5
1486	26	-89.2537	13.7084	135	2	4	R	--	--
1487	26	-89.2535	13.7083	135	2	4	R	--	--
1488	26	-89.2535	13.7083	135	2	4	R	--	--

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1489	26	-89.2471	13.7097	126	2	3	R	4	5
1490	26	-89.2466	13.7101	240	2	6	R	6	1
1491	26	-89.2455	13.7094	187	2	3	R	4	5
1492	26	-89.2521	13.7096	320	2	6	C	30	30
1493	26	-89.2468	13.7101	238	2	6	R	2	5
1494	26	-89.2463	13.7103	296	2	4	R	2	5
1495	26	-89.2461	13.7103	256	2	4	R	1	5
1496	26	-89.2464	13.7095	182	2	6	Ag	6	1
1497	26	-89.2461	13.7092	178	2	4	R	--	3
1498	26	-89.2500	13.7120	36	2	4	R	--	4
1499	26	-89.2495	13.7087	90	2	12	R	2	6
1500	26	-89.2503	13.7096	120	2	6	C	15	2
1501	26	-89.2507	13.7090	154	2	3	C	15	1
1502	26	-89.2486	13.7072	750	2	6	C	150	60
1503	26	-89.2455	13.7035	625	2	6	C	18	2
1504	26	-89.2481	13.7049	150	2	6	R	1	6
1505	26	-89.2481	13.7059	375	2	4	R	10	17
1506	26	-89.2472	13.7152	190	2	4	R	2	7
1507	26	-89.2460	13.7170	396	2	6	C	12	--
1508	26	-89.2454	13.7175	152	2	4	R	1	5
1509	26	-89.2453	13.7177	152	2	4	R	1	5
1510	26	-89.2447	13.7179	152	2	4	R	1	5
1511	26	-89.2446	13.7176	150	2	4	R	1	5
1512	26	-89.2447	13.7175	224	2	4	R	1	5
1513	26	-89.2488	13.7089	700	2	7	C	50	2
1514	26	-89.2482	13.7094	360	2	6	R	15	30
1515	26	-89.2483	13.7109	182	2	6	C	20	--
1516	26	-89.2470	13.7104	102	2	6	R	5	8
1517	26	-89.2472	13.7093	270	3	6	M	40	10
1518	26	-89.2474	13.7067	210	3	6	R	30	70
1519	26	-89.2551	13.7071	300	3	6	R	10	20
1520	26	-89.2552	13.7048	250	3	6	R	8	15
1521	26	-89.2464	13.7097	512	3	12	C	25	1
1522	26	-89.2498	13.7083	240	3	4	R	2	6
1523	26	-89.2492	13.7090	150	3	4	R	2	6
1524	26	-89.2490	13.7050	600	3	6	C	90	60

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1525	26	-89.2478	13.7037	256	3	6	C	25	40
1526	26	-89.2467	13.7160	216	3	4	R	1	5
1527	26	-89.2467	13.7163	216	3	4	R	1	5
1528	26	-89.2466	13.7162	216	3	4	R	1	5
1529	26	-89.2442	13.7182	93	3	4	R	12	22
1530	26	-89.2472	13.7091	160	3	6	R	6	24
1531	26	-89.2575	13.7025	200	3	4	R	2	7
1532	26	-89.2542	13.7044	1,125	3	12	C	200	3
1533	26	-89.2486	13.7054	260	4	5	R	30	50
1534	26	-89.2532	13.7117	300	4	7	C	30	1
1535	26	-89.2498	13.7071	88	4	12	C	15	2
1536	26	-89.2483	13.7119	227	4	5	C	15	2
1537	26	-89.2509	13.7119	450	4	9	G	25	1
1538	26	-89.2466	13.7043	600	4	12	C	20	8
1539	26	-89.2473	13.7069	495	4	9	R	20	50
1540	26	-89.2476	13.7088	540	4	7	R	20	75
1541	26	-89.2526	13.7094	900	5	5	R	40	130
1542	26	-89.2535	13.7079	610	5	5	E	48	2
1543	26	-89.2516	13.7106	190	5	5	R	8	30
1544	26	-89.2526	13.7094	848	5	9	R	62	125
1545	26	-89.2476	13.7044	300	5	5	R	30	70
1546	26	-89.2483	13.7119	500	5	7	C	60	1
1547	26	-89.2516	13.7104	240	5	7	R	6	25
1548	26	-89.2526	13.7094	800	5	12	R	50	100
1549	26	-89.2520	13.7115	540	6	5	R	60	140
1550	26	-89.2538	13.7107	225	6	7	R	38	80
1551	26	-89.2529	13.7036	600	6	7	R	48	100
1552	26	-89.2520	13.7114	468	6	12	R	20	80
1553	26	-89.2511	13.7116	800	7	7	R	40	120
1554	26	-89.2541	13.7079	1,229	7	7	As	10	2
1555	26	-89.2513	13.7132	1,200	7	12	R	25	110
1556	26	-89.2475	13.7082	700	7	12	R	50	130
1557	26	-89.2505	13.7094	480	7	9	R	28	112
1558	26	-89.2543	13.7047	1,000	8	8	R	50	112
1559	26	-89.2513	13.7116	600	8	8	R	29	100
1560	26	-89.2476	13.7052	457	8	13	R	25	172

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1561	26	-89.2486	13.7118	221	9	10	R	20	100
1562	26	-89.2503	13.7104	1,000	10	8	R	60	150
1563	26	-89.2477	13.7055	450	11	8	R	50	80
1564	26	-89.2478	13.7056	825	11	10	R	33	175
1565	26	-89.2527	13.7032	1,750	14	11	R	168	350
1566	27	-89.1863	13.6925	88	1	3	R	4	6
1567	27	-89.1862	13.6934	64	1	4	R	4	6
1568	27	-89.1881	13.6868	96	1	3	R	4	3
1569	27	-89.1871	13.6854	75	1	4	R	4	7
1570	27	-89.1870	13.6913	100	1	4	R	2	3
1571	27	-89.1870	13.6913	56	1	3	R	2	3
1572	27	-89.1870	13.6912	56	1	4	R	2	3
1573	27	-89.1868	13.6923	54	1	4	R	2	5
1574	27	-89.1868	13.6924	30	1	4	R	2	2
1575	27	-89.1867	13.6935	48	1	3	M	3	5
1576	27	-89.1872	13.6893	250	1	4	As	5	30
1577	27	-89.1876	13.6901	75	1	3	M	5	--
1578	27	-89.1889	13.6852	208	1	4	C	11	1
1579	27	-89.1864	13.6899	35	1	4	C	3	5
1580	27	-89.1871	13.6899	84	1	4	R	2	5
1581	27	-89.1898	13.6840	104	1	4	M	4	5
1582	27	-89.1893	13.6839	96	1	4	R	1	5
1583	27	-89.1887	13.6839	300	1	4	R	5	10
1584	27	-89.1895	13.6843	40	1	4	R	1	4
1585	27	-89.1881	13.6886	36	1	4	R	1	4
1586	27	-89.1879	13.6893	200	1	4	R	1	4
1587	27	-89.1871	13.6890	54	1	4	R	1	4
1588	27	-89.1868	13.6893	48	1	4	R	1	4
1589	27	-89.1867	13.6900	144	1	3	R	4	1
1590	27	-89.1882	13.6889	40	1	4	R	2	5
1591	27	-89.1874	13.6893	48	1	4	R	3	1
1592	27	-89.1870	13.6910	40	1	4	R	2	4
1593	27	-89.1869	13.6910	40	1	4	R	2	4
1594	27	-89.1869	13.6910	16	1	4	R	1	3
1595	27	-89.1868	13.6909	140	1	4	R	2	5
1596	27	-89.1864	13.6908	35	1	4	C	6	--

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1597	27	-89.1854	13.6936	200	1	4	R	3	5
1598	27	-89.1854	13.6938	60	1	4	R	3	5
1599	27	-89.1853	13.6941	72	1	4	R	3	5
1600	27	-89.1853	13.6939	80	1	4	R	2	5
1601	27	-89.1858	13.6931	54	1	4	R	2	5
1602	27	-89.1861	13.6930	96	1	4	R	4	10
1603	27	-89.1859	13.6933	140	1	4	R	1	5
1604	27	-89.1864	13.6932	56	1	4	R	1	5
1605	27	-89.1856	13.6936	49	1	4	R	2	5
1606	27	-89.1855	13.6936	49	1	4	R	2	5
1607	27	-89.1855	13.6937	56	1	4	R	2	5
1608	27	-89.1855	13.6943	56	1	4	R	2	5
1609	27	-89.1856	13.6932	60	1	4	R	2	8
1610	27	-89.1854	13.6932	70	1	3	R	2	5
1611	27	-89.1853	13.6931	35	1	3	C	2	5
1612	27	-89.1974	13.6721	20	1	4	R	3	5
1613	27	-89.1972	13.6727	50	1	4	R	2	5
1614	27	-89.1858	13.6931	48	1	3	R	1	4
1615	27	-89.1851	13.6930	120	1	1	R	1	4
1616	27	-89.1872	13.6910	143	2	3	R	4	6
1617	27	-89.1865	13.6916	60	2	4	R	4	6
1618	27	-89.1863	13.6918	60	2	4	R	4	6
1619	27	-89.1867	13.6921	60	2	4	R	4	6
1620	27	-89.1864	13.6920	42	2	4	R	4	6
1621	27	-89.1859	13.6923	42	2	4	R	4	6
1622	27	-89.1861	13.6925	72	2	4	R	4	6
1623	27	-89.1867	13.6935	128	2	4	R	4	6
1624	27	-89.1883	13.6877	1,140	2	4	C	27	2
1625	27	-89.1878	13.6874	892	2	4	C	50	2
1626	27	-89.1877	13.6866	60	2	3	R	4	9
1627	27	-89.1874	13.6867	48	2	4	R	4	6
1628	27	-89.1871	13.6860	50	2	4	R	4	8
1629	27	-89.1869	13.6912	100	2	4	R	3	5
1630	27	-89.1869	13.6898	72	2	3	R	2	5
1631	27	-89.1871	13.6901	100	2	4	M	10	5
1632	27	-89.1866	13.6906	64	2	4	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1633	27	-89.1862	13.6904	108	2	4	M	10	5
1634	27	-89.1893	13.6855	198	2	4	M	8	2
1635	27	-89.1882	13.6854	220	2	4	As	12	1
1636	27	-89.1873	13.6849	85	2	4	M	6	7
1637	27	-89.1880	13.6848	32	2	4	R	2	5
1638	27	-89.1883	13.6848	54	2	4	R	1	5
1639	27	-89.1887	13.6848	120	2	4	R	2	3
1640	27	-89.1886	13.6857	70	2	4	R	1	5
1641	27	-89.1876	13.6892	77	2	3	R	3	5
1642	27	-89.1872	13.6904	120	2	4	I	12	1
1643	27	-89.1868	13.6909	60	2	4	R	3	5
1644	27	-89.1863	13.6904	126	2	4	R	2	5
1645	27	-89.1865	13.6904	105	2	4	R	2	5
1646	27	-89.1895	13.6840	120	2	4	C	15	1
1647	27	-89.1889	13.6840	54	2	4	R	1	5
1648	27	-89.1883	13.6838	48	2	4	M	5	5
1649	27	-89.1894	13.6844	54	2	4	R	2	5
1650	27	-89.1879	13.6886	36	2	4	R	2	5
1651	27	-89.1872	13.6893	416	2	4	As	5	2
1652	27	-89.1895	13.6859	132	2	3	R	3	5
1653	27	-89.1893	13.6858	54	2	4	R	3	5
1654	27	-89.1890	13.6870	60	2	4	C	4	1
1655	27	-89.1890	13.6872	49	2	3	C	5	1
1656	27	-89.1888	13.6871	120	2	4	C	10	2
1657	27	-89.1884	13.6868	40	2	3	R	2	5
1658	27	-89.1883	13.6869	48	2	3	C	5	1
1659	27	-89.1885	13.6862	56	2	3	R	2	5
1660	27	-89.1877	13.6885	189	2	4	C	15	8
1661	27	-89.1869	13.6893	100	2	4	E	5	5
1662	27	-89.1867	13.6906	56	2	4	R	2	6
1663	27	-89.1855	13.6935	100	2	4	R	3	5
1664	27	-89.1854	13.6937	179	2	4	R	3	5
1665	27	-89.1859	13.6929	90	2	4	R	4	10
1666	27	-89.1860	13.6933	112	2	4	R	1	5
1667	27	-89.1862	13.6933	28	2	4	M	2	4
1668	27	-89.1856	13.6934	56	2	4	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1669	27	-89.1854	13.6940	96	2	4	R	2	6
1670	27	-89.1851	13.6929	42	2	3	R	3	5
1671	27	-89.1855	13.6930	42	2	3	R	3	5
1672	27	-89.1850	13.6929	42	2	3	R	3	5
1673	27	-89.1850	13.6929	42	2	3	R	3	5
1674	27	-89.1857	13.6931	150	2	3	M	3	5
1675	27	-89.1855	13.6930	150	2	3	M	3	5
1676	27	-89.1854	13.6931	71	2	3	R	1	4
1677	27	-89.1854	13.6930	71	2	3	R	1	4
1678	27	-89.1853	13.6931	80	2	3	R	1	4
1679	27	-89.1853	13.6930	42	2	3	R	1	4
1680	27	-89.1855	13.6933	42	2	4	R	3	5
1681	27	-89.1856	13.6935	56	2	4	R	2	3
1682	27	-89.1857	13.6935	81	2	4	R	1	4
1683	27	-89.1858	13.6935	90	2	3	R	3	5
1684	27	-89.1862	13.6937	180	2	4	R	4	5
1685	27	-89.1859	13.6938	130	2	3	R	3	5
1686	27	-89.1858	13.6936	72	2	4	R	2	5
1687	27	-89.1879	13.6881	2,236	3	12	R	70	56
1688	27	-89.1884	13.6873	2,236	3	12	R	75	58
1689	27	-89.1875	13.6894	60	3	3	R	3	10
1690	27	-89.1868	13.6893	140	3	4	E	8	4
1691	27	-89.1882	13.6887	104	3	4	R	2	6
1692	27	-89.1875	13.6894	50	3	3	R	3	2
1693	27	-89.1853	13.6940	36	3	4	R	3	5
1694	27	-89.1856	13.6937	63	3	4	R	2	6
1695	27	-89.1869	13.6903	350	4	5	R	200	400
1696	28	-89.2104	13.6802	300	1	4	I	11	1
1697	28	-89.2160	13.6852	80	1	4	C	5	2
1698	28	-89.2120	13.6798	110	1	4	R	1	4
1699	28	-89.2128	13.6804	130	1	4	R	1	4
1700	28	-89.2127	13.6799	100	1	4	M	2	4
1701	28	-89.2124	13.6810	136	1	4	R	1	4
1702	28	-89.2113	13.6813	210	1	4	R	2	5
1703	28	-89.2126	13.6845	64	1	4	R	2	5
1704	28	-89.2126	13.6841	63	1	3	R	1	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1705	28	-89.2147	13.6840	70	1	3	R	1	4
1706	28	-89.2150	13.6841	96	1	3	R	2	5
1707	28	-89.2056	13.6869	100	1	3	R	3	5
1708	28	-89.2048	13.6861	238	1	3	U	5	1
1709	28	-89.2096	13.6831	80	1	4	R	5	10
1710	28	-89.2129	13.6854	200	1	15	As	3	20
1711	28	-89.2073	13.6880	58	1	3	R	1	5
1712	28	-89.2157	13.6849	112	1	4	R	2	4
1713	28	-89.2157	13.6846	112	1	4	R	3	5
1714	28	-89.2067	13.6866	190	1	4	R	1	3
1715	28	-89.2063	13.6868	60	1	4	R	3	5
1716	28	-89.2063	13.6872	114	1	4	R	3	5
1717	28	-89.2059	13.6869	80	1	4	R	1	4
1718	28	-89.2124	13.6844	81	1	4	R	3	5
1719	28	-89.2128	13.6846	70	1	3	R	2	4
1720	28	-89.2129	13.6848	36	1	4	R	4	2
1721	28	-89.2122	13.6854	416	1	4	As	3	1
1722	28	-89.2123	13.6849	48	1	3	R	1	4
1723	28	-89.2128	13.6852	30	1	3	R	1	3
1724	28	-89.2127	13.6858	72	1	4	R	3	6
1725	28	-89.2139	13.6859	40	1	15	R	1	3
1726	28	-89.2142	13.6860	50	1	3	R	1	4
1727	28	-89.2051	13.6869	80	1	3	R	1	4
1728	28	-89.2047	13.6869	100	1	3	R	1	5
1729	28	-89.2040	13.6855	80	1	3	R	2	4
1730	28	-89.2073	13.6853	54	1	4	R	1	4
1731	28	-89.2078	13.6843	36	1	4	R	1	4
1732	28	-89.2094	13.6800	220	2	4	As	5	2
1733	28	-89.2092	13.6804	66	2	4	R	2	2
1734	28	-89.2099	13.6798	45	2	4	R	1	6
1735	28	-89.2118	13.6800	121	2	4	R	2	7
1736	28	-89.2129	13.6802	135	2	4	C	7	1
1737	28	-89.2125	13.6807	80	2	4	R	1	4
1738	28	-89.2121	13.6814	72	2	4	R	2	6
1739	28	-89.2117	13.6804	80	2	4	R	1	5
1740	28	-89.2112	13.6805	80	2	4	R	3	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1741	28	-89.2152	13.6849	112	2	4	R	3	7
1742	28	-89.2163	13.6845	143	2	4	R	2	6
1743	28	-89.2055	13.6878	176	2	4	R	2	5
1744	28	-89.2056	13.6883	64	2	4	R	2	6
1745	28	-89.2052	13.6876	105	2	4	R	1	5
1746	28	-89.2043	13.6873	180	2	4	R	1	5
1747	28	-89.2037	13.6872	108	2	3	R	1	4
1748	28	-89.2095	13.6803	60	2	4	R	1	5
1749	28	-89.2094	13.6799	126	2	4	R	1	5
1750	28	-89.2117	13.6809	180	2	4	R	1	5
1751	28	-89.2124	13.6848	84	2	3	R	1	4
1752	28	-89.2136	13.6841	60	2	4	R	1	5
1753	28	-89.2142	13.6845	30	2	4	As	--	--
1754	28	-89.2084	13.6811	180	2	4	R	2	5
1755	28	-89.2090	13.6801	176	2	4	R	10	20
1756	28	-89.2053	13.6868	48	2	3	R	3	6
1757	28	-89.2047	13.6867	121	2	3	R	3	6
1758	28	-89.2100	13.6809	80	2	4	R	2	8
1759	28	-89.2101	13.6815	49	2	4	R	2	5
1760	28	-89.2097	13.6818	120	2	4	R	2	6
1761	28	-89.2095	13.6821	150	2	4	R	2	5
1762	28	-89.2093	13.6832	64	2	4	R	2	8
1763	28	-89.2131	13.6849	96	2	4	R	2	6
1764	28	-89.2146	13.6851	125	2	4	R	3	6
1765	28	-89.2143	13.6849	100	2	4	R	2	6
1766	28	-89.2075	13.6881	72	2	3	R	1	5
1767	28	-89.2068	13.6883	36	2	3	R	1	4
1768	28	-89.2157	13.6832	112	2	4	R	3	6
1769	28	-89.2152	13.6834	90	2	4	R	2	7
1770	28	-89.2144	13.6832	60	2	4	R	2	5
1771	28	-89.2143	13.6840	60	2	4	R	2	5
1772	28	-89.2143	13.6844	60	2	4	R	2	5
1773	28	-89.2143	13.6850	60	2	4	R	1	4
1774	28	-89.2126	13.6856	72	2	4	C	5	2
1775	28	-89.2131	13.6860	60	2	4	R	3	6
1776	28	-89.2146	13.6847	192	2	4	R	3	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1777	28	-89.2148	13.6846	112	2	4	R	3	6
1778	28	-89.2148	13.6851	84	2	4	R	2	5
1779	28	-89.2152	13.6849	112	2	4	R	5	8
1780	28	-89.2162	13.6848	112	2	4	R	35	--
1781	28	-89.2149	13.6843	84	2	4	R	2	6
1782	28	-89.2071	13.6865	121	2	4	R	4	6
1783	28	-89.2066	13.6867	120	2	4	R	3	5
1784	28	-89.2062	13.6874	132	2	4	R	3	6
1785	28	-89.2057	13.6871	144	2	4	R	1	3
1786	28	-89.2099	13.6806	126	2	3	R	3	6
1787	28	-89.2098	13.6815	120	2	3	R	--	--
1788	28	-89.2098	13.6817	153	2	3	R	3	4
1789	28	-89.2101	13.6822	190	2	3	R	3	5
1790	28	-89.2102	13.6827	90	2	3	R	3	5
1791	28	-89.2101	13.6830	171	2	4	R	3	6
1792	28	-89.2099	13.6825	84	2	4	R	3	5
1793	28	-89.2102	13.6817	100	2	4	R	2	6
1794	28	-89.2123	13.6846	63	2	4	R	3	6
1795	28	-89.2119	13.6840	81	2	4	R	1	4
1796	28	-89.2131	13.6848	105	2	4	R	4	6
1797	28	-89.2130	13.6859	48	2	3	R	2	6
1798	28	-89.2145	13.6857	72	2	4	I	2	2
1799	28	-89.2056	13.6871	80	2	3	R	2	2
1800	28	-89.2042	13.6852	49	2	4	R	1	4
1801	28	-89.2075	13.6850	72	2	4	R	1	4
1802	28	-89.2160	13.6827	330	3	4	R	5	40
1803	28	-89.2062	13.6878	96	3	4	R	2	8
1804	28	-89.2108	13.6795	120	3	7	I	35	2
1805	28	-89.2062	13.6877	100	3	4	R	3	8
1806	28	-89.2141	13.6860	42	3	3	R	2	6
1807	28	-89.2043	13.6856	60	3	4	R	2	6
1808	28	-89.2076	13.6857	36	3	4	R	2	5
1809	28	-89.2167	13.6844	370	4	5	R	16	64
1810	28	-89.2166	13.6837	370	4	5	R	16	64
1811	28	-89.2156	13.6823	370	4	5	R	16	64
1812	28	-89.2169	13.6846	135	4	7	R	16	35

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1813	28	-89.2168	13.6847	135	4	5	R	16	35
1814	28	-89.2173	13.6847	288	4	5	R	25	50
1815	28	-89.2174	13.6839	288	4	5	R	16	35
1816	28	-89.2089	13.6829	200	4	5	R	25	50
1817	28	-89.2101	13.6897	186	4	5	R	32	64
1818	28	-89.2105	13.6890	186	4	5	R	32	64
1819	28	-89.2106	13.6885	186	4	5	R	32	64
1820	28	-89.2094	13.6878	186	4	5	R	32	64
1821	28	-89.2083	13.6878	240	4	5	R	32	64
1822	28	-89.2151	13.6827	1,296	4	7	G	150	25
1823	28	-89.2072	13.6885	240	4	5	R	14	64
1824	28	-89.2080	13.6890	240	4	5	R	15	64
1825	28	-89.2084	13.6839	300	4	5	R	25	75
1826	28	-89.2088	13.6837	300	4	5	R	25	75
1827	29	-89.2324	13.6837	429	1	4	C	30	--
1828	29	-89.2215	13.6863	360	1	4	R	3	6
1829	29	-89.2241	13.6867	320	1	4	C	15	2
1830	29	-89.2265	13.6835	500	1	6	C	6	2
1831	29	-89.2301	13.6869	545	1	6	As	150	1
1832	29	-89.2312	13.6843	300	1	6	C	30	1
1833	29	-89.2311	13.6857	525	1	3	C	125	2
1834	29	-89.2331	13.6840	330	1	4	C	25	3
1835	29	-89.2318	13.6835	160	1	4	C	25	1
1836	29	-89.2301	13.6847	104	1	4	R	3	1
1837	29	-89.2258	13.6871	330	1	3	C	6	1
1838	29	-89.2285	13.6834	142	1	6	C	6	4
1839	29	-89.2279	13.6835	540	1	6	C	25	2
1840	29	-89.2267	13.6835	943	1	6	C	15	2
1841	29	-89.2298	13.6834	400	1	6	As	25	2
1842	29	-89.2311	13.6835	450	1	6	As	25	2
1843	29	-89.2301	13.6826	1,200	1	15	C	50	5
1844	29	-89.2347	13.6843	99	1	3	R	5	7
1845	29	-89.2327	13.6848	150	1	3	R	2	5
1846	29	-89.2325	13.6849	150	1	3	R	2	5
1847	29	-89.2335	13.6849	90	1	3	R	2	5
1848	29	-89.2346	13.6850	150	1	3	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1849	29	-89.2321	13.6853	450	2	4	R	6	1
1850	29	-89.2330	13.6850	288	2	4	R	5	--
1851	29	-89.2330	13.6842	144	2	4	R	5	--
1852	29	-89.2326	13.6837	234	2	6	C	10	--
1853	29	-89.2305	13.6838	150	2	4	R	6	--
1854	29	-89.2298	13.6848	56	2	6	R	6	--
1855	29	-89.2199	13.6873	250	2	4	R	2	6
1856	29	-89.2197	13.6879	450	2	6	R	3	10
1857	29	-89.2207	13.6868	300	2	6	R	2	5
1858	29	-89.2214	13.6858	363	2	6	R	10	1
1859	29	-89.2215	13.6864	200	2	4	R	2	7
1860	29	-89.2207	13.6869	239	2	4	R	--	6
1861	29	-89.2216	13.6875	440	2	4	C	15	25
1862	29	-89.2213	13.6876	96	2	4	R	5	10
1863	29	-89.2211	13.6882	225	2	6	R	--	5
1864	29	-89.2292	13.6859	252	2	4	C	25	2
1865	29	-89.2303	13.6853	80	2	4	R	3	8
1866	29	-89.2301	13.6859	60	2	4	C	18	2
1867	29	-89.2307	13.6853	150	2	4	R	3	6
1868	29	-89.2321	13.6852	225	2	4	C	20	2
1869	29	-89.2325	13.6853	150	2	4	R	4	6
1870	29	-89.2249	13.6837	96	2	6	C	3	1
1871	29	-89.2313	13.6878	350	2	6	C	250	10
1872	29	-89.2303	13.6874	150	2	4	C	15	1
1873	29	-89.2302	13.6858	150	2	6	C	25	1
1874	29	-89.2300	13.6838	220	2	4	I	50	2
1875	29	-89.2207	13.6893	140	2	4	R	1	4
1876	29	-89.2197	13.6887	100	2	4	R	1	5
1877	29	-89.2177	13.6891	300	2	4	I	40	2
1878	29	-89.2203	13.6889	204	2	4	R	1	5
1879	29	-89.2236	13.6840	150	2	6	R	1	5
1880	29	-89.2279	13.6860	70	2	3	R	1	4
1881	29	-89.2312	13.6843	80	2	7	C	2	--
1882	29	-89.2256	13.6874	700	2	12	C	80	1
1883	29	-89.2252	13.6891	160	2	4	C	15	2
1884	29	-89.2247	13.6909	690	2	6	As	25	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1885	29	-89.2221	13.6908	48	2	4	R	5	1
1886	29	-89.2220	13.6905	48	2	4	R	5	1
1887	29	-89.2305	13.6834	900	2	6	C	25	1
1888	29	-89.2353	13.6843	112	2	4	R	5	8
1889	29	-89.2346	13.6846	130	2	4	R	5	8
1890	29	-89.2343	13.6846	132	2	4	R	5	8
1891	29	-89.2330	13.6842	180	2	4	R	2	5
1892	29	-89.2318	13.6845	270	2	4	R	2	5
1893	29	-89.2268	13.6885	180	3	6	R	10	--
1894	29	-89.2263	13.6875	286	3	6	R	10	20
1895	29	-89.2244	13.6857	624	3	6	R	55	110
1896	29	-89.2241	13.6838	180	3	6	M	20	2
1897	29	-89.2286	13.6835	234	3	6	C	25	2
1898	29	-89.2296	13.6828	600	3	6	C	30	2
1899	29	-89.2202	13.6882	3,600	4	7	E	100	3
1900	29	-89.2269	13.6872	992	6	9	R	60	120
1901	29	-89.2214	13.6883	700	7	9	R	20	60
1902	29	-89.2265	13.6872	600	10	10	R	60	120
1903	30	-89.1906	13.6839	146	1	4	E	170	1
1904	30	-89.1894	13.6837	77	1	4	R	1	4
1905	30	-89.1897	13.6836	56	1	4	R	1	1
1906	30	-89.1912	13.6828	288	1	3	R	2	5
1907	30	-89.1905	13.6831	28	1	3	R	1	3
1908	30	-89.1907	13.6833	112	1	15	R	2	2
1909	30	-89.1896	13.6821	126	1	3	R	4	6
1910	30	-89.1894	13.6812	56	1	4	R	4	8
1911	30	-89.1885	13.6814	48	1	4	R	4	8
1912	30	-89.1893	13.6804	42	1	4	R	4	7
1913	30	-89.1883	13.6804	72	1	4	R	4	7
1914	30	-89.1910	13.6820	63	1	4	R	2	4
1915	30	-89.1908	13.6808	1,480	1	3	As	200	1
1916	30	-89.1912	13.6826	50	1	4	R	2	4
1917	30	-89.1896	13.6774	120	1	4	C	2	5
1918	30	-89.1891	13.6774	30	1	4	R	2	5
1919	30	-89.1913	13.6757	165	1	4	R	2	4
1920	30	-89.1906	13.6755	144	1	4	R	1	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1921	30	-89.1895	13.6737	480	1	4	I	30	1
1922	30	-89.1887	13.6727	300	1	4	R	1	5
1923	30	-89.1914	13.6761	209	1	4	C	4	1
1924	30	-89.1892	13.6741	990	1	4	I	50	1
1925	30	-89.1890	13.6727	187	1	4	As	5	1
1926	30	-89.1908	13.6763	725	1	4	C	5	1
1927	30	-89.1907	13.6832	90	1	16	R	2	6
1928	30	-89.1920	13.6799	100	1	4	R	2	5
1929	30	-89.1911	13.6823	198	1	4	R	3	5
1930	30	-89.1909	13.6773	228	1	4	U	6	2
1931	30	-89.1909	13.6768	81	1	4	R	2	6
1932	30	-89.1911	13.6787	220	1	4	R	4	5
1933	30	-89.1918	13.6770	48	1	4	R	2	5
1934	30	-89.1919	13.6774	48	1	4	R	3	5
1935	30	-89.1923	13.6788	100	1	4	E	5	--
1936	30	-89.1925	13.6797	128	1	4	R	3	6
1937	30	-89.1900	13.6822	96	1	4	R	2	5
1938	30	-89.1896	13.6821	64	1	4	R	2	5
1939	30	-89.1895	13.6821	49	1	4	R	2	5
1940	30	-89.1883	13.6825	400	1	4	As	5	40
1941	30	-89.1918	13.6783	128	1	3	M	5	6
1942	30	-89.1920	13.6807	140	1	4	R	2	5
1943	30	-89.1900	13.6763	94	1	4	R	2	4
1944	30	-89.1903	13.6837	120	2	4	I	14	2
1945	30	-89.1885	13.6836	112	2	4	M	5	7
1946	30	-89.1882	13.6833	96	2	4	R	3	6
1947	30	-89.1900	13.6835	40	2	4	C	3	1
1948	30	-89.1907	13.6833	80	2	3	R	--	5
1949	30	-89.1908	13.6837	40	2	4	R	2	8
1950	30	-89.1903	13.6824	306	2	3	R	6	9
1951	30	-89.1891	13.6821	84	2	4	R	4	8
1952	30	-89.1887	13.6821	98	2	4	R	6	9
1953	30	-89.1887	13.6815	49	2	4	R	5	7
1954	30	-89.1891	13.6814	28	2	4	R	4	8
1955	30	-89.1892	13.6812	56	2	4	R	3	8
1956	30	-89.1878	13.6815	100	2	4	R	6	9

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1957	30	-89.1880	13.6817	72	2	4	R	6	9
1958	30	-89.1882	13.6822	49	2	4	R	4	6
1959	30	-89.1892	13.6806	70	2	4	R	4	7
1960	30	-89.1887	13.6808	25	2	4	R	4	7
1961	30	-89.1885	13.6805	24	2	4	R	4	7
1962	30	-89.1913	13.6786	56	2	4	R	4	7
1963	30	-89.1917	13.6784	50	2	4	R	4	7
1964	30	-89.1904	13.6821	63	2	4	R	2	5
1965	30	-89.1907	13.6794	72	2	3	R	2	5
1966	30	-89.1916	13.6784	54	2	4	R	2	5
1967	30	-89.1904	13.6774	90	2	4	R	3	6
1968	30	-89.1901	13.6774	105	2	4	R	2	6
1969	30	-89.1892	13.6774	180	2	4	R	3	7
1970	30	-89.1890	13.6774	150	2	4	R	7	9
1971	30	-89.1901	13.6751	1,050	2	15	I	40	1
1972	30	-89.1888	13.6731	36	2	4	R	1	4
1973	30	-89.1912	13.6758	80	2	4	R	5	7
1974	30	-89.1906	13.6755	150	2	4	I	6	1
1975	30	-89.1908	13.6753	224	2	4	M	4	9
1976	30	-89.1888	13.6732	36	2	4	R	1	4
1977	30	-89.1915	13.6829	90	2	4	R	3	5
1978	30	-89.1907	13.6833	84	2	4	R	4	7
1979	30	-89.1906	13.6836	121	2	4	R	2	6
1980	30	-89.1898	13.6836	96	2	4	R	3	6
1981	30	-89.1918	13.6808	200	2	4	R	3	6
1982	30	-89.1920	13.6808	80	2	4	R	3	7
1983	30	-89.1914	13.6820	35	2	4	R	2	5
1984	30	-89.1905	13.6821	64	2	4	R	3	5
1985	30	-89.1907	13.6821	328	2	3	R	2	3
1986	30	-89.1906	13.6802	825	2	4	E	200	4
1987	30	-89.1908	13.6790	90	2	3	R	2	5
1988	30	-89.1912	13.6786	66	2	3	R	3	5
1989	30	-89.1911	13.6774	154	2	4	E	60	1
1990	30	-89.1911	13.6767	120	2	4	C	5	2
1991	30	-89.1912	13.6774	72	2	4	R	2	6
1992	30	-89.1918	13.6770	24	2	4	R	2	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
1993	30	-89.1921	13.6784	45	2	4	R	2	6
1994	30	-89.1919	13.6798	28	2	4	R	1	3
1995	30	-89.1890	13.6821	64	2	4	R	2	6
1996	30	-89.1892	13.6823	56	2	4	R	2	6
1997	30	-89.1889	13.6822	56	2	4	R	2	6
1998	30	-89.1888	13.6825	56	2	4	R	2	6
1999	30	-89.1900	13.6802	216	2	4	R	3	5
2000	30	-89.1900	13.6802	77	2	4	R	4	6
2001	30	-89.1901	13.6800	144	2	4	R	2	4
2002	30	-89.1900	13.6798	144	2	4	R	2	4
2003	30	-89.1902	13.6800	144	2	4	R	2	4
2004	30	-89.1903	13.6800	144	2	4	R	2	4
2005	30	-89.1902	13.6799	144	2	4	R	2	4
2006	30	-89.1902	13.6799	120	2	4	R	3	6
2007	30	-89.1907	13.6795	100	2	4	R	2	6
2008	30	-89.1919	13.6776	45	2	3	M	3	5
2009	30	-89.1921	13.6791	285	2	3	U	12	20
2010	30	-89.1921	13.6797	40	2	4	R	1	3
2011	30	-89.1921	13.6798	50	2	4	M	2	5
2012	30	-89.1903	13.6823	72	2	4	R	3	9
2013	30	-89.1912	13.6816	260	2	4	E	120	1
2014	30	-89.1911	13.6811	64	2	4	R	3	5
2015	30	-89.1908	13.6792	72	2	4	R	1	6
2016	30	-89.1914	13.6784	52	2	4	R	1	4
2017	30	-89.1911	13.6770	154	2	4	M	5	5
2018	30	-89.1907	13.6768	192	2	4	R	2	7
2019	30	-89.1905	13.6766	30	2	4	R	1	4
2020	30	-89.1904	13.6753	144	2	4	As	85	2
2021	30	-89.1906	13.6828	750	3	4	E	25	1
2022	30	-89.1899	13.6830	40	3	4	C	5	--
2023	30	-89.1914	13.6833	360	3	4	E	250	2
2024	30	-89.1925	13.6794	132	3	4	R	24	48
2025	30	-89.1916	13.6831	126	4	5	E	200	2
2026	30	-89.1915	13.6833	90	4	5	E	100	2
2027	31	-89.2025	13.6831	72	1	4	R	2	6
2028	31	-89.2029	13.6813	72	1	4	R	2	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2029	31	-89.2017	13.6811	140	1	3	R	3	6
2030	31	-89.2013	13.6806	70	1	4	R	3	6
2031	31	-89.2054	13.6831	49	1	4	R	2	5
2032	31	-89.2022	13.6837	96	1	6	R	2	4
2033	31	-89.2014	13.6806	40	1	4	R	2	6
2034	31	-89.1999	13.6802	119	1	4	R	2	5
2035	31	-89.1999	13.6802	84	1	4	R	2	5
2036	31	-89.1997	13.6802	168	1	4	R	2	5
2037	31	-89.1996	13.6799	96	1	4	R	2	6
2038	31	-89.2023	13.6834	96	1	4	R	2	8
2039	31	-89.2025	13.6829	84	1	4	R	2	8
2040	31	-89.2028	13.6814	96	1	4	R	2	8
2041	31	-89.2029	13.6814	128	1	4	R	2	8
2042	31	-89.2023	13.6811	160	1	3	R	2	8
2043	31	-89.2019	13.6807	98	1	4	R	2	8
2044	31	-89.1994	13.6805	80	1	4	R	2	5
2045	31	-89.2025	13.6832	80	1	6	R	1	1
2046	31	-89.2042	13.6840	75	1	6	R	1	4
2047	31	-89.2046	13.6835	84	1	6	R	1	1
2048	31	-89.2047	13.6838	84	1	6	R	1	1
2049	31	-89.2040	13.6836	120	1	6	R	1	4
2050	31	-89.2046	13.6832	140	1	6	R	1	4
2051	31	-89.2040	13.6840	120	1	6	R	1	4
2052	31	-89.2021	13.6839	36	1	6	R	1	4
2053	31	-89.2023	13.6834	49	1	4	R	2	4
2054	31	-89.2035	13.6829	70	1	4	R	2	4
2055	31	-89.2035	13.6827	70	1	4	R	2	4
2056	31	-89.2033	13.6825	70	1	4	R	2	4
2057	31	-89.2039	13.6817	70	1	4	R	2	4
2058	31	-89.2044	13.6811	52	1	6	R	2	4
2059	31	-89.2044	13.6819	50	1	4	R	1	4
2060	31	-89.2049	13.6823	72	1	4	R	1	4
2061	31	-89.1998	13.6811	180	1	4	R	3	6
2062	31	-89.1996	13.6812	120	1	4	R	3	6
2063	31	-89.2025	13.6830	42	1	4	R	4	6
2064	31	-89.2024	13.6811	56	1	4	R	4	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2065	31	-89.2023	13.6809	42	1	3	R	4	6
2066	31	-89.2022	13.6810	100	1	3	R	4	6
2067	31	-89.2017	13.6809	88	1	4	R	4	6
2068	31	-89.2013	13.6805	90	1	3	R	5	9
2069	31	-89.2023	13.6823	84	2	4	R	2	6
2070	31	-89.2024	13.6821	84	2	4	R	2	6
2071	31	-89.2025	13.6821	140	2	4	R	2	6
2072	31	-89.2028	13.6815	90	2	4	R	2	6
2073	31	-89.2013	13.6804	100	2	3	R	3	3
2074	31	-89.2014	13.6802	100	2	4	R	3	6
2075	31	-89.2054	13.6828	90	2	6	R	2	5
2076	31	-89.2056	13.6827	24	2	4	R	2	5
2077	31	-89.2052	13.6825	60	2	4	R	1	4
2078	31	-89.2051	13.6830	36	2	4	R	2	5
2079	31	-89.2022	13.6838	140	2	6	R	3	5
2080	31	-89.2022	13.6836	84	2	4	R	1	3
2081	31	-89.2025	13.6829	84	2	4	R	4	5
2082	31	-89.2025	13.6831	84	2	4	R	4	5
2083	31	-89.2025	13.6822	84	2	4	R	3	6
2084	31	-89.2026	13.6816	84	2	4	R	3	6
2085	31	-89.2014	13.6806	105	2	4	R	2	6
2086	31	-89.2017	13.6804	100	2	4	R	3	8
2087	31	-89.2001	13.6805	81	2	4	R	2	5
2088	31	-89.1999	13.6805	100	2	4	R	2	5
2089	31	-89.2028	13.6815	128	2	4	R	2	8
2090	31	-89.2011	13.6805	110	2	3	R	2	8
2091	31	-89.2008	13.6793	96	2	4	R	2	8
2092	31	-89.1998	13.6805	96	2	4	R	2	8
2093	31	-89.2002	13.6801	120	2	4	R	2	8
2094	31	-89.2014	13.6806	96	2	4	R	2	8
2095	31	-89.2001	13.6803	100	2	4	R	2	6
2096	31	-89.1995	13.6801	288	2	3	R	2	8
2097	31	-89.1993	13.6801	192	2	3	R	2	8
2098	31	-89.2022	13.6836	102	2	6	R	1	4
2099	31	-89.2034	13.6833	126	2	6	R	4	16
2100	31	-89.2037	13.6836	72	2	6	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2101	31	-89.2037	13.6840	42	2	6	R	2	5
2102	31	-89.2042	13.6836	140	2	6	R	1	5
2103	31	-89.2035	13.6833	42	2	6	R	2	8
2104	31	-89.2048	13.6831	120	2	6	R	1	5
2105	31	-89.2050	13.6834	120	2	6	R	1	4
2106	31	-89.2052	13.6835	120	2	6	R	1	4
2107	31	-89.2038	13.6822	60	2	4	R	2	6
2108	31	-89.2037	13.6821	60	2	4	R	2	5
2109	31	-89.2041	13.6812	16	2	15	R	--	2
2110	31	-89.2040	13.6820	105	2	7	R	2	5
2111	31	-89.2045	13.6821	72	2	7	R	2	5
2112	31	-89.2048	13.6823	60	2	7	R	2	6
2113	31	-89.2006	13.6807	200	2	4	R	2	5
2114	31	-89.2005	13.6806	200	2	4	R	2	5
2115	31	-89.1994	13.6811	120	2	4	R	2	6
2116	31	-89.1991	13.6808	120	2	4	R	2	6
2117	31	-89.2025	13.6827	40	2	4	R	4	6
2118	31	-89.2024	13.6824	48	2	4	R	4	6
2119	31	-89.2025	13.6819	48	2	4	R	4	6
2120	31	-89.2026	13.6818	36	2	4	R	4	6
2121	31	-89.2011	13.6804	56	2	3	R	4	6
2122	31	-89.2011	13.6806	42	2	3	R	5	4
2123	31	-89.2008	13.6805	32	2	3	R	5	4
2124	31	-89.2007	13.6806	72	2	3	R	3	6
2125	31	-89.2001	13.6799	225	2	4	R	5	10
2126	31	-89.1996	13.6804	150	2	3	R	3	8
2127	31	-89.2015	13.6804	30	3	4	R	3	6
2128	31	-89.2030	13.6830	330	4	5	R	16	64
2129	31	-89.2031	13.6829	330	4	5	R	16	64
2130	32	-89.2245	13.6821	300	1	3	R	2	5
2131	32	-89.2306	13.6827	300	1	6	C	40	60
2132	32	-89.2237	13.6680	400	1	4	E	120	1
2133	32	-89.2244	13.6671	100	1	4	R	2	5
2134	32	-89.2282	13.6750	1,120	1	4	E	46	2
2135	32	-89.2269	13.6712	144	1	4	M	2	15
2136	32	-89.2269	13.6728	200	1	4	O	3	60

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2137	32	-89.2261	13.6683	105	1	3	R	--	5
2138	32	-89.2277	13.6683	48	1	3	M	3	5
2139	32	-89.2279	13.6692	400	1	6	C	20	30
2140	32	-89.2258	13.6785	225	1	6	C	10	15
2141	32	-89.2281	13.6786	630	1	4	C	1	1
2142	32	-89.2270	13.6760	2,520	1	6	C	400	600
2143	32	-89.2238	13.6826	160	1	4	R	2	8
2144	32	-89.2260	13.6830	483	1	6	C	15	2
2145	32	-89.2272	13.6735	96	1	4	R	1	4
2146	32	-89.2269	13.6713	60	1	4	C	20	--
2147	32	-89.2277	13.6696	256	1	4	R	1	4
2148	32	-89.2287	13.6732	36	1	4	R	4	6
2149	32	-89.2256	13.6780	288	1	15	C	3	3
2150	32	-89.2242	13.6825	150	1	4	R	1	5
2151	32	-89.2247	13.6810	150	1	4	R	1	5
2152	32	-89.2249	13.6802	150	1	4	C	5	1
2153	32	-89.2286	13.6816	3,500	1	12	C	35	10
2154	32	-89.2248	13.6832	54	1	4	C	2	8
2155	32	-89.2272	13.6758	180	1	4	As	--	15
2156	32	-89.2262	13.6767	80	1	4	R	2	8
2157	32	-89.2237	13.6823	250	2	4	R	4	6
2158	32	-89.2253	13.6830	1,020	2	4	As	3	5
2159	32	-89.2243	13.6773	72	2	4	R	3	10
2160	32	-89.2237	13.6776	300	2	6	R	2	5
2161	32	-89.2223	13.6780	225	2	6	R	3	6
2162	32	-89.2214	13.6794	600	2	6	R	2	6
2163	32	-89.2245	13.6683	180	2	4	M	15	4
2164	32	-89.2239	13.6673	225	2	6	R	2	5
2165	32	-89.2253	13.6676	150	2	4	R	2	6
2166	32	-89.2240	13.6815	160	2	4	R	2	5
2167	32	-89.2248	13.6818	180	2	6	R	1	6
2168	32	-89.2247	13.6736	108	2	4	R	1	5
2169	32	-89.2243	13.6725	35	2	4	R	1	4
2170	32	-89.2248	13.6702	140	2	4	R	2	5
2171	32	-89.2250	13.6684	60	2	4	M	6	12
2172	32	-89.2268	13.6697	112	2	4	R	2	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2173	32	-89.2274	13.6690	160	2	4	M	4	6
2174	32	-89.2255	13.6700	114	2	6	R	2	6
2175	32	-89.2259	13.6716	78	2	6	R	2	6
2176	32	-89.2256	13.6720	100	2	6	R	2	6
2177	32	-89.2269	13.6721	240	2	4	R	2	6
2178	32	-89.2269	13.6708	98	2	6	R	1	5
2179	32	-89.2295	13.6794	225	2	6	R	2	--
2180	32	-89.2299	13.6799	140	2	6	R	1	5
2181	32	-89.2303	13.6807	60	2	6	R	2	4
2182	32	-89.2230	13.6829	81	2	7	R	3	6
2183	32	-89.2262	13.6829	380	2	6	C	30	2
2184	32	-89.2270	13.6741	120	2	3	R	1	5
2185	32	-89.2278	13.6701	120	2	4	R	2	5
2186	32	-89.2280	13.6741	60	2	4	R	1	4
2187	32	-89.2301	13.6801	171	2	6	R	2	5
2188	32	-89.2311	13.6795	48	2	4	R	2	5
2189	32	-89.2312	13.6793	72	2	6	R	2	5
2190	32	-89.2298	13.6766	154	2	6	R	2	6
2191	32	-89.2282	13.6734	60	2	6	R	2	5
2192	32	-89.2260	13.6779	88	2	6	C	4	1
2193	32	-89.2242	13.6819	70	2	4	R	1	6
2194	32	-89.2234	13.6834	40	2	4	R	2	5
2195	32	-89.2236	13.6834	252	2	15	C	7	1
2196	32	-89.2240	13.6833	170	2	4	R	--	5
2197	32	-89.2258	13.6787	100	2	4	R	2	5
2198	32	-89.2272	13.6755	35	2	4	R	2	8
2199	32	-89.2276	13.6750	150	2	6	C	6	1
2200	32	-89.2292	13.6735	120	2	6	R	2	5
2201	32	-89.2286	13.6733	30	2	6	R	2	8
2202	32	-89.2276	13.6745	32	2	4	R	2	8
2203	32	-89.2247	13.6704	100	2	6	R	2	5
2204	32	-89.2244	13.6714	135	2	4	R	2	8
2205	32	-89.2243	13.6725	81	2	4	R	2	5
2206	32	-89.2242	13.6735	216	2	4	R	2	8
2207	32	-89.2258	13.6734	100	2	4	R	2	5
2208	32	-89.2305	13.6801	90	2	4	R	1	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2209	32	-89.2300	13.6795	270	2	6	R	2	6
2210	32	-89.2296	13.6780	90	2	4	R	1	5
2211	32	-89.2307	13.6799	72	2	6	R	1	5
2212	32	-89.2301	13.6764	200	2	4	R	2	5
2213	32	-89.2296	13.6766	200	2	6	R	2	5
2214	32	-89.2279	13.6734	60	2	6	R	1	4
2215	32	-89.2303	13.6800	180	2	4	R	1	5
2216	32	-89.2257	13.6775	100	3	6	R	7	15
2217	32	-89.2264	13.6737	264	3	4	M	3	10
2218	32	-89.2266	13.6754	225	3	4	M	5	15
2219	32	-89.2268	13.6688	150	3	6	R	2	5
2220	32	-89.2261	13.6708	162	3	6	R	1	5
2221	32	-89.2298	13.6798	96	3	6	R	2	6
2222	32	-89.2294	13.6789	150	3	6	R	2	8
2223	32	-89.2281	13.6780	360	3	6	R	10	--
2224	32	-89.2294	13.6785	96	3	6	R	2	6
2225	32	-89.2246	13.6825	300	3	6	C	20	30
2226	32	-89.2303	13.6806	77	3	6	R	1	5
2227	32	-89.2233	13.6835	250	3	9	C	350	5
2228	32	-89.2260	13.6709	42	3	6	R	2	6
2229	32	-89.2292	13.6735	132	3	4	R	2	5
2230	32	-89.2232	13.6835	250	4	7	C	28	--
2231	32	-89.2301	13.6803	220	5	9	R	15	50
2232	32	-89.2222	13.6785	600	6	7	R	25	50
2233	32	-89.2201	13.6821	260	6	5	R	10	50
2234	33	-89.2228	13.6673	88	1	4	M	6	5
2235	33	-89.2195	13.6658	90	1	4	M	2	5
2236	33	-89.2195	13.6620	48	1	4	M	2	5
2237	33	-89.2183	13.6625	120	1	4	R	1	5
2238	33	-89.2199	13.6630	120	1	4	R	--	4
2239	33	-89.2201	13.6633	104	1	4	R	1	4
2240	33	-89.2199	13.6646	120	1	4	R	--	4
2241	33	-89.2183	13.6680	40	1	3	R	2	5
2242	33	-89.2176	13.6678	65	1	4	R	1	4
2243	33	-89.2174	13.6677	45	1	4	R	1	4
2244	33	-89.2172	13.6680	85	1	3	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2245	33	-89.2228	13.6666	2,310	1	4	C	1,500	2
2246	33	-89.2230	13.6693	810	1	4	C	15	2
2247	33	-89.2221	13.6708	88	1	4	C	4	1
2248	33	-89.2223	13.6706	56	1	4	R	3	6
2249	33	-89.2180	13.6672	50	1	4	R	3	5
2250	33	-89.2182	13.6579	84	1	4	R	1	5
2251	33	-89.2168	13.6582	60	1	4	R	3	5
2252	33	-89.2177	13.6571	60	1	4	R	--	4
2253	33	-89.2178	13.6587	112	1	4	R	1	5
2254	33	-89.2208	13.6670	72	1	4	R	3	5
2255	33	-89.2208	13.6670	81	1	4	C	4	5
2256	33	-89.2205	13.6672	96	1	4	M	5	3
2257	33	-89.2201	13.6670	96	1	4	R	2	5
2258	33	-89.2199	13.6670	96	1	4	R	2	5
2259	33	-89.2245	13.6635	70	1	4	R	4	8
2260	33	-89.2240	13.6641	48	1	4	R	3	5
2261	33	-89.2232	13.6674	250	2	4	M	3	3
2262	33	-89.2222	13.6673	350	2	4	R	6	12
2263	33	-89.2218	13.6672	280	2	7	C	12	1
2264	33	-89.2207	13.6672	54	2	4	R	3	5
2265	33	-89.2184	13.6667	216	2	4	R	2	6
2266	33	-89.2178	13.6665	100	2	4	R	6	3
2267	33	-89.2177	13.6667	100	2	4	R	2	6
2268	33	-89.2175	13.6667	125	2	4	R	3	5
2269	33	-89.2171	13.6668	100	2	4	R	2	6
2270	33	-89.2173	13.6668	216	2	4	R	2	6
2271	33	-89.2184	13.6670	216	2	4	R	2	6
2272	33	-89.2206	13.6670	90	2	4	M	4	8
2273	33	-89.2193	13.6666	90	2	4	R	2	5
2274	33	-89.2193	13.6652	105	2	4	R	1	5
2275	33	-89.2195	13.6643	200	2	7	E	40	2
2276	33	-89.2196	13.6628	96	2	4	M	6	10
2277	33	-89.2191	13.6628	180	2	4	M	10	25
2278	33	-89.2179	13.6624	120	2	4	R	2	6
2279	33	-89.2202	13.6635	330	2	4	R	6	18
2280	33	-89.2187	13.6671	270	2	4	R	2	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2281	33	-89.2184	13.6678	40	2	4	R	--	4
2282	33	-89.2180	13.6681	100	2	15	R	2	5
2283	33	-89.2178	13.6682	84	2	4	R	1	5
2284	33	-89.2167	13.6681	160	2	4	R	--	4
2285	33	-89.2184	13.6675	88	2	4	R	2	5
2286	33	-89.2181	13.6677	45	2	4	R	1	4
2287	33	-89.2176	13.6676	45	2	4	R	1	4
2288	33	-89.2220	13.6670	35	2	4	R	1	5
2289	33	-89.2218	13.6669	70	2	4	R	1	5
2290	33	-89.2220	13.6657	150	2	4	R	2	--
2291	33	-89.2230	13.6688	110	2	4	R	4	7
2292	33	-89.2224	13.6700	75	2	4	R	3	6
2293	33	-89.2226	13.6694	70	2	4	R	3	6
2294	33	-89.2179	13.6672	50	2	4	R	3	5
2295	33	-89.2176	13.6674	50	2	4	R	3	5
2296	33	-89.2174	13.6672	75	2	4	R	3	5
2297	33	-89.2174	13.6674	40	2	4	R	3	5
2298	33	-89.2175	13.6671	50	2	4	R	3	5
2299	33	-89.2183	13.6671	81	2	4	R	3	5
2300	33	-89.2192	13.6609	180	2	4	R	1	6
2301	33	-89.2183	13.6608	90	2	4	R	1	4
2302	33	-89.2186	13.6597	180	2	4	R	1	6
2303	33	-89.2183	13.6590	224	2	4	R	2	5
2304	33	-89.2174	13.6584	60	2	4	R	2	6
2305	33	-89.2203	13.6672	80	2	7	R	3	5
2306	33	-89.2200	13.6673	36	2	4	R	3	6
2307	33	-89.2197	13.6672	100	2	4	R	2	5
2308	33	-89.2193	13.6670	70	2	4	C	5	6
2309	33	-89.2205	13.6670	96	2	4	M	5	5
2310	33	-89.2193	13.6666	72	2	4	R	2	6
2311	33	-89.2191	13.6667	16	2	4	R	1	3
2312	33	-89.2243	13.6646	160	2	4	R	4	8
2313	33	-89.2243	13.6640	104	2	4	R	4	8
2314	33	-89.2244	13.6638	405	2	4	As	8	1
2315	33	-89.2245	13.6632	56	2	4	R	6	1
2316	33	-89.2184	13.6675	112	3	4	R	--	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2317	34	-89.2112	13.6677	75	1	4	R	2	5
2318	34	-89.2121	13.6664	120	2	4	R	3	5
2319	34	-89.2122	13.6669	42	2	4	R	2	5
2320	34	-89.2116	13.6669	36	2	4	R	2	5
2321	34	-89.2113	13.6677	66	2	4	R	5	8
2322	34	-89.2112	13.6676	32	2	4	R	2	5
2323	34	-89.2109	13.6677	40	2	4	R	2	5
2324	34	-89.2104	13.6677	48	2	4	R	3	6
2325	34	-89.2116	13.6657	56	2	4	R	2	5
2326	34	-89.2114	13.6657	56	2	4	R	2	5
2327	34	-89.2113	13.6656	56	2	4	R	2	5
2328	34	-89.2110	13.6656	56	2	4	R	2	5
2329	34	-89.2107	13.6650	56	2	4	R	2	5
2330	34	-89.2105	13.6640	49	2	4	R	2	5
2331	34	-89.2103	13.6638	88	2	4	R	2	5
2332	34	-89.2099	13.6639	49	2	4	R	2	5
2333	34	-89.2098	13.6638	88	2	4	R	2	5
2334	34	-89.2101	13.6637	88	2	4	R	2	5
2335	34	-89.2104	13.6648	88	2	4	R	2	5
2336	34	-89.2121	13.6666	56	2	4	R	2	6
2337	34	-89.2121	13.6667	56	2	4	R	2	6
2338	34	-89.2119	13.6667	56	2	4	R	2	6
2339	34	-89.2119	13.6667	56	2	4	R	2	6
2340	34	-89.2117	13.6667	56	2	4	R	2	6
2341	34	-89.2113	13.6670	80	2	4	R	2	6
2342	34	-89.2111	13.6676	40	2	4	R	2	6
2343	34	-89.2110	13.6676	96	2	4	R	2	6
2344	34	-89.2099	13.6675	48	2	4	R	2	6
2345	34	-89.2114	13.6657	56	2	4	R	2	4
2346	34	-89.2112	13.6656	81	2	4	R	2	4
2347	34	-89.2109	13.6655	56	2	4	R	2	4
2348	34	-89.2107	13.6654	56	2	4	R	2	4
2349	34	-89.2106	13.6644	96	2	4	R	2	4
2350	34	-89.2108	13.6640	56	2	4	R	2	4
2351	34	-89.2112	13.6640	96	2	4	R	2	4
2352	34	-89.2115	13.6640	96	2	4	R	2	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2353	34	-89.2116	13.6640	56	2	4	R	2	4
2354	34	-89.2118	13.6640	56	2	4	R	2	4
2355	35	-89.2391	13.7149	550	1	15	As	45	1
2356	35	-89.2394	13.7143	280	1	4	I	11	1
2357	35	-89.2392	13.7144	90	1	4	R	2	6
2358	35	-89.2311	13.7152	108	1	4	C	6	--
2359	35	-89.2306	13.7170	60	1	4	R	3	6
2360	35	-89.2308	13.7172	40	1	4	R	3	6
2361	35	-89.2412	13.7137	120	1	4	R	6	3
2362	35	-89.2430	13.7144	70	1	3	C	4	6
2363	35	-89.2431	13.7144	120	1	3	C	3	6
2364	35	-89.2423	13.7143	240	1	2	C	3	1
2365	35	-89.2392	13.7143	104	1	4	R	3	5
2366	35	-89.2418	13.7197	260	1	4	C	7	4
2367	35	-89.2339	13.7226	112	1	4	C	6	2
2368	35	-89.2374	13.7121	510	1	4	As	5	100
2369	35	-89.2375	13.7124	35	1	4	R	1	3
2370	35	-89.2412	13.7134	64	1	4	R	3	3
2371	35	-89.2383	13.7132	150	2	4	R	2	6
2372	35	-89.2383	13.7126	70	2	4	R	1	4
2373	35	-89.2385	13.7130	72	2	4	R	1	5
2374	35	-89.2373	13.7120	1,000	2	4	E	100	2
2375	35	-89.2376	13.7125	160	2	4	R	3	6
2376	35	-89.2381	13.7132	75	2	4	R	4	10
2377	35	-89.2385	13.7135	40	2	7	R	1	5
2378	35	-89.2360	13.7133	90	2	4	R	3	6
2379	35	-89.2366	13.7137	60	2	4	R	3	6
2380	35	-89.2373	13.7141	90	2	4	R	3	6
2381	35	-89.2368	13.7145	120	2	4	R	3	6
2382	35	-89.2363	13.7139	90	2	4	R	3	6
2383	35	-89.2307	13.7167	84	2	7	C	7	1
2384	35	-89.2318	13.7138	45	2	4	R	--	5
2385	35	-89.2324	13.7146	45	2	4	R	--	5
2386	35	-89.2411	13.7136	200	2	4	R	3	5
2387	35	-89.2406	13.7142	144	2	4	R	4	6
2388	35	-89.2306	13.7178	110	2	4	C	5	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2389	35	-89.2384	13.7131	105	2	4	R	1	4
2390	35	-89.2383	13.7132	225	2	4	R	1	4
2391	35	-89.2376	13.7126	84	2	4	R	--	4
2392	35	-89.2394	13.7141	80	2	4	R	1	5
2393	35	-89.2409	13.7143	336	2	4	R	3	8
2394	35	-89.2338	13.7132	105	2	4	R	10	30
2395	35	-89.2356	13.7132	63	2	4	R	1	5
2396	35	-89.2357	13.7135	84	2	4	R	2	6
2397	35	-89.2358	13.7133	50	2	4	R	3	5
2398	35	-89.2359	13.7134	50	2	4	R	3	5
2399	35	-89.2360	13.7134	50	2	4	R	3	5
2400	35	-89.2361	13.7136	50	2	4	R	3	5
2401	35	-89.2392	13.7161	800	3	7	E	200	1
2402	35	-89.2408	13.7196	128	3	4	C	25	1
2403	35	-89.2379	13.7206	450	3	12	C	2	100
2404	35	-89.2382	13.7129	78	3	4	R	1	5
2405	35	-89.2359	13.7138	144	3	4	R	4	6
2406	35	-89.2371	13.7141	90	3	4	R	2	6
2407	35	-89.2358	13.7219	1,000	4	7	C	110	30
2408	35	-89.2389	13.7156	250	5	5	R	15	40
2409	35	-89.2378	13.7127	798	8	10	R	20	96
2410	36	-89.2595	13.7093	240	1	6	O	2	1
2411	36	-89.2605	13.7095	35	1	6	R	2	5
2412	36	-89.2606	13.7097	30	1	4	R	2	5
2413	36	-89.2577	13.7103	90	2	4	R	2	4
2414	36	-89.2601	13.7093	35	2	6	R	4	5
2415	36	-89.2604	13.7097	48	2	6	R	3	5
2416	36	-89.2577	13.7103	128	2	6	R	2	5
2417	36	-89.2587	13.7097	324	2	6	R	4	4
2418	36	-89.2598	13.7101	860	2	4	E	120	1
2419	36	-89.2599	13.7103	40	2	6	R	3	1
2420	36	-89.2600	13.7103	70	2	6	R	--	4
2421	36	-89.2549	13.7131	120	2	6	R	2	5
2422	36	-89.2578	13.7103	50	2	4	R	2	5
2423	36	-89.2579	13.7102	50	2	4	R	2	5
2424	36	-89.2580	13.7102	80	2	4	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2425	36	-89.2600	13.7096	25	2	4	R	2	5
2426	36	-89.2603	13.7094	18	2	4	R	2	5
2427	36	-89.2603	13.7096	120	2	4	R	2	5
2428	36	-89.2592	13.7097	196	3	6	R	18	18
2429	36	-89.2592	13.7099	500	3	4	R	15	45
2430	36	-89.2547	13.7133	150	3	6	R	3	6
2431	36	-89.2554	13.7127	360	3	6	R	24	40
2432	36	-89.2569	13.7108	80	3	4	R	2	5
2433	37	-89.1873	13.6425	234	1	6	C	4	2
2434	37	-89.1878	13.6433	576	1	4	As	2	1
2435	37	-89.2032	13.6618	72	1	3	R	2	4
2436	37	-89.2021	13.6606	360	1	4	As	2	1
2437	37	-89.2015	13.6605	200	1	4	C	3	6
2438	37	-89.1978	13.6595	28	1	4	R	2	4
2439	37	-89.1977	13.6594	49	1	4	C	2	4
2440	37	-89.1999	13.6529	120	1	4	R	2	5
2441	37	-89.1999	13.6530	800	1	6	R	3	6
2442	37	-89.2007	13.6531	96	1	6	R	3	5
2443	37	-89.1989	13.6522	441	1	4	As	3	1
2444	37	-89.1989	13.6562	20	1	6	R	--	2
2445	37	-89.1991	13.6562	70	1	6	R	1	4
2446	37	-89.1991	13.6560	56	1	4	R	1	4
2447	37	-89.1975	13.6552	342	1	4	E	5	1
2448	37	-89.1978	13.6548	42	1	4	E	1	1
2449	37	-89.1994	13.6528	520	1	6	M	5	8
2450	37	-89.2010	13.6531	322	1	6	C	4	5
2451	37	-89.1990	13.6530	154	1	4	R	1	5
2452	37	-89.1874	13.6420	40	1	4	R	3	6
2453	37	-89.1875	13.6430	98	1	4	C	12	2
2454	37	-89.1880	13.6450	264	1	4	As	8	2
2455	37	-89.2030	13.6621	72	1	3	R	3	6
2456	37	-89.2025	13.6630	160	1	3	C	9	1
2457	37	-89.2012	13.6618	24	1	3	R	3	6
2458	37	-89.1997	13.6615	48	1	3	R	3	6
2459	37	-89.1979	13.6589	108	1	3	R	3	6
2460	37	-89.1986	13.6527	60	1	4	R	3	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2461	37	-89.1984	13.6524	56	1	4	R	3	6
2462	37	-89.1971	13.6525	42	1	4	R	3	6
2463	37	-89.1971	13.6523	112	1	4	R	3	6
2464	37	-89.1969	13.6519	140	1	4	R	3	6
2465	37	-89.1872	13.6423	91	1	6	C	--	2
2466	37	-89.1879	13.6451	540	1	6	C	5	3
2467	37	-89.2029	13.6617	165	1	4	As	5	2
2468	37	-89.2012	13.6628	104	1	3	R	2	3
2469	37	-89.2023	13.6611	30	1	3	C	3	4
2470	37	-89.1974	13.6597	48	1	6	R	2	3
2471	37	-89.2001	13.6531	98	1	6	R	2	2
2472	37	-89.2007	13.6528	120	1	4	M	3	5
2473	37	-89.2009	13.6529	100	1	3	R	4	5
2474	37	-89.2014	13.6532	128	1	6	R	2	3
2475	37	-89.1990	13.6527	154	1	4	C	5	6
2476	37	-89.1989	13.6533	63	1	3	R	3	8
2477	37	-89.1985	13.6553	60	1	4	R	1	4
2478	37	-89.1987	13.6557	25	1	6	R	2	3
2479	37	-89.1987	13.6559	128	1	4	R	2	4
2480	37	-89.1990	13.6563	35	1	4	R	2	2
2481	37	-89.1991	13.6561	56	1	7	R	5	7
2482	37	-89.1975	13.6551	210	1	6	E	4	1
2483	37	-89.1977	13.6550	63	1	6	E	2	1
2484	37	-89.1986	13.6535	143	1	6	C	2	3
2485	37	-89.1988	13.6530	72	1	6	R	2	4
2486	37	-89.1993	13.6524	40	1	4	R	1	3
2487	37	-89.1994	13.6535	35	1	4	R	1	3
2488	37	-89.2011	13.6612	100	2	3	R	3	4
2489	37	-89.2010	13.6612	144	2	4	R	3	4
2490	37	-89.2008	13.6613	225	2	4	R	2	4
2491	37	-89.2013	13.6532	96	2	6	R	3	5
2492	37	-89.1982	13.6543	36	2	6	R	1	4
2493	37	-89.1986	13.6553	60	2	4	R	1	5
2494	37	-89.1984	13.6535	64	2	4	R	2	5
2495	37	-89.1992	13.6530	31	2	4	R	2	5
2496	37	-89.2007	13.6528	176	2	6	R	1	4

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2497	37	-89.2012	13.6613	100	2	4	R	3	6
2498	37	-89.2021	13.6604	72	2	4	As	3	1
2499	37	-89.2020	13.6604	45	2	4	R	2	5
2500	37	-89.1982	13.6533	35	2	6	R	2	5
2501	37	-89.1994	13.6533	66	2	6	R	1	4
2502	37	-89.1881	13.6447	150	3	6	C	8	2
2503	37	-89.2008	13.6612	60	3	6	R	3	5
2504	37	-89.1992	13.6525	56	3	4	R	5	7
2505	38	-89.1694	13.7033	45	1	3	R	2	5
2506	38	-89.1694	13.7031	45	1	3	R	2	5
2507	38	-89.1696	13.7036	72	1	3	R	2	5
2508	38	-89.1691	13.7036	80	1	3	R	2	5
2509	38	-89.1683	13.7045	150	1	3	R	2	5
2510	38	-89.1665	13.7039	98	1	3	R	2	5
2511	38	-89.1663	13.7035	60	1	3	R	2	5
2512	38	-89.1674	13.7026	80	1	3	R	2	5
2513	38	-89.1675	13.7025	80	1	3	R	2	5
2514	38	-89.1689	13.7037	220	1	3	As	2	2
2515	38	-89.1688	13.7035	60	1	3	R	3	5
2516	38	-89.1687	13.7036	60	1	3	R	3	5
2517	38	-89.1689	13.7034	60	1	3	R	3	5
2518	38	-89.1681	13.7039	75	1	3	R	3	5
2519	38	-89.1692	13.7036	60	1	3	R	2	5
2520	38	-89.1691	13.7034	60	1	3	R	2	6
2521	38	-89.1679	13.7033	90	1	3	C	15	2
2522	38	-89.1670	13.7033	200	1	3	R	2	5
2523	38	-89.1669	13.7036	120	1	3	R	2	5
2524	38	-89.1667	13.7037	120	1	3	R	2	5
2525	38	-89.1666	13.7036	120	1	3	R	2	5
2526	38	-89.1693	13.7035	50	2	4	R	2	5
2527	38	-89.1685	13.7034	40	2	4	R	2	5
2528	38	-89.1685	13.7035	40	2	4	R	2	5
2529	38	-89.1685	13.7036	40	2	4	R	2	5
2530	38	-89.1679	13.7035	460	2	4	R	2	6
2531	38	-89.1677	13.7037	460	2	4	R	2	6
2532	38	-89.1667	13.7042	102	2	4	R	3	6

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2533	38	-89.1660	13.7034	60	2	4	R	2	5
2534	38	-89.1660	13.7033	70	2	4	R	2	6
2535	38	-89.1669	13.7027	72	2	4	R	2	5
2536	38	-89.1669	13.7028	56	2	4	R	2	5
2537	38	-89.1672	13.7030	72	2	4	R	2	5
2538	38	-89.1680	13.7024	150	2	4	C	5	2
2539	38	-89.1693	13.7031	48	2	4	R	2	6
2540	38	-89.1694	13.7033	40	2	4	R	2	6
2541	38	-89.1687	13.7038	132	2	4	R	2	6
2542	38	-89.1685	13.7039	140	2	4	R	2	6
2543	38	-89.1671	13.7041	112	2	4	R	2	6
2544	38	-89.1673	13.7047	112	2	4	R	2	6
2545	38	-89.1669	13.7041	72	2	4	R	2	6
2546	38	-89.1667	13.7042	187	2	4	R	2	6
2547	38	-89.1665	13.7039	77	2	4	O	9	--
2548	38	-89.1661	13.7036	77	2	4	R	3	6
2549	38	-89.1664	13.7035	169	2	4	R	3	7
2550	38	-89.1659	13.7031	128	2	4	R	2	6
2551	38	-89.1662	13.7033	104	2	4	R	2	6
2552	38	-89.1669	13.7031	128	2	4	R	2	6
2553	38	-89.1667	13.7028	78	2	4	R	2	6
2554	38	-89.1692	13.7029	18	2	4	R	3	5
2555	38	-89.1691	13.7028	18	2	4	R	3	5
2556	38	-89.1690	13.7028	18	2	4	R	3	5
2557	38	-89.1690	13.7026	18	2	4	R	3	5
2558	38	-89.1689	13.7026	18	2	4	R	3	5
2559	38	-89.1692	13.7035	60	2	4	R	3	5
2560	38	-89.1681	13.7040	75	2	4	R	2	5
2561	38	-89.1684	13.7043	36	2	3	R	3	5
2562	38	-89.1679	13.7041	75	2	4	R	3	5
2563	38	-89.1668	13.7051	96	2	4	R	2	5
2564	38	-89.1662	13.7047	75	2	4	R	2	5
2565	38	-89.1670	13.7032	96	2	4	M	10	5
2566	38	-89.1674	13.7025	96	2	4	R	3	5
2567	38	-89.1678	13.7022	120	2	3	R	4	6
2568	38	-89.1679	13.7023	100	2	4	C	5	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2569	38	-89.1684	13.7027	75	2	4	R	3	5
2570	38	-89.1692	13.7028	50	2	4	R	5	7
2571	38	-89.1685	13.7031	60	2	3	R	2	7
2572	38	-89.1681	13.7033	60	2	3	R	2	7
2573	38	-89.1687	13.7030	50	2	3	R	5	8
2574	38	-89.1687	13.7031	25	2	3	R	2	5
2575	38	-89.1689	13.7031	60	2	4	R	3	8
2576	38	-89.1690	13.7034	60	2	4	R	3	8
2577	38	-89.1690	13.7032	60	2	4	R	2	5
2578	38	-89.1677	13.7031	150	2	4	R	5	10
2579	38	-89.1676	13.7031	150	2	4	R	2	8
2580	38	-89.1668	13.7049	120	3	4	As	5	2
2581	39	-89.1773	13.6952	24	1	4	M	2	5
2582	39	-89.1768	13.6955	40	1	4	R	2	5
2583	39	-89.1763	13.6958	36	1	4	M	3	5
2584	39	-89.1760	13.6960	12	1	3	M	2	5
2585	39	-89.1758	13.6961	12	1	3	M	2	--
2586	39	-89.1755	13.6960	36	1	3	R	2	4
2587	39	-89.1753	13.6961	32	1	3	R	2	4
2588	39	-89.1752	13.6961	42	1	3	R	2	4
2589	39	-89.1789	13.6952	80	1	4	R	1	4
2590	39	-89.1788	13.6951	56	1	4	R	1	4
2591	39	-89.1790	13.6951	56	1	4	R	1	4
2592	39	-89.1788	13.6950	56	1	4	R	1	4
2593	39	-89.1805	13.6948	30	1	15	R	1	3
2594	39	-89.1804	13.6947	20	1	2	R	1	3
2595	39	-89.1811	13.6927	80	1	3	R	1	1
2596	39	-89.1784	13.6951	288	1	4	As	3	1
2597	39	-89.1783	13.6951	432	1	4	As	3	2
2598	39	-89.1766	13.6956	512	1	3	R	8	16
2599	39	-89.1761	13.6959	32	1	3	R	2	3
2600	39	-89.1757	13.6960	48	1	4	R	2	4
2601	39	-89.1757	13.6961	32	1	4	R	1	4
2602	39	-89.1756	13.6961	15	1	4	R	2	4
2603	39	-89.1807	13.6941	120	1	4	R	3	6
2604	39	-89.1769	13.6954	30	1	3	R	5	8

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2605	39	-89.1770	13.6952	45	1	3	R	5	8
2606	39	-89.1768	13.6955	24	1	3	R	5	8
2607	39	-89.1765	13.6957	36	1	3	R	5	8
2608	39	-89.1759	13.6960	12	1	3	R	2	5
2609	39	-89.1757	13.6962	120	1	4	As	5	1
2610	39	-89.1768	13.6955	28	1	3	R	2	4
2611	39	-89.1765	13.6956	56	1	3	R	2	4
2612	39	-89.1756	13.6960	32	1	4	R	2	4
2613	39	-89.1807	13.6941	81	1	3	R	2	5
2614	39	-89.1804	13.6934	90	1	3	R	2	4
2615	39	-89.1803	13.6932	104	1	3	R	3	6
2616	39	-89.1803	13.6927	72	1	3	R	2	2
2617	39	-89.1800	13.6929	54	1	4	R	3	5
2618	39	-89.1811	13.6929	90	1	4	R	3	5
2619	39	-89.1807	13.6935	102	2	3	M	3	7
2620	39	-89.1808	13.6932	98	2	3	R	1	5
2621	39	-89.1760	13.6960	24	2	4	R	2	4
2622	39	-89.1807	13.6943	130	2	4	R	3	6
2623	39	-89.1802	13.6946	32	2	4	R	2	2
2624	39	-89.1803	13.6935	180	2	4	R	3	6
2625	39	-89.1802	13.6933	80	2	4	R	3	6
2626	39	-89.1800	13.6932	40	2	4	R	2	5
2627	39	-89.1808	13.6924	120	2	4	R	3	6
2628	39	-89.1812	13.6928	60	2	4	R	3	6
2629	39	-89.1760	13.6944	96	2	4	R	8	12
2630	39	-89.1761	13.6959	32	2	3	R	10	15
2631	39	-89.1779	13.6950	150	2	4	C	2	1
2632	39	-89.1760	13.6951	240	2	4	C	8	12
2633	39	-89.1759	13.6959	35	2	4	R	2	4
2634	39	-89.1756	13.6961	38	2	4	R	3	5
2635	39	-89.1754	13.6961	24	2	4	R	2	4
2636	39	-89.1805	13.6928	65	2	4	R	3	6
2637	39	-89.1801	13.6929	80	2	4	R	3	5
2638	39	-89.1800	13.6927	96	2	4	R	2	5
2639	39	-89.1819	13.6930	120	2	3	R	2	6
2640	39	-89.1807	13.6941	35	2	3	R	2	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2641	39	-89.1805	13.6937	77	2	3	R	3	5
2642	39	-89.1805	13.6934	70	2	4	R	3	6
2643	39	-89.1804	13.6930	90	2	4	R	2	4
2644	39	-89.1803	13.6928	30	2	4	R	3	6
2645	39	-89.1804	13.6945	280	3	4	R	65	240
2646	39	-89.1802	13.6927	120	3	4	R	3	5
2647	39	-89.1804	13.6949	56	4	3	R	8	16
2648	39	-89.1801	13.6950	175	5	5	R	50	100
2649	40	-89.2276	13.6919	54	1	4	R	1	4
2650	40	-89.2285	13.6926	35	1	3	As	1	1
2651	40	-89.2286	13.6926	30	1	3	R	1	3
2652	40	-89.2270	13.6919	70	1	3	R	4	5
2653	40	-89.2273	13.6920	60	1	3	R	4	5
2654	40	-89.2276	13.6929	40	1	3	R	4	5
2655	40	-89.2273	13.6932	32	1	3	R	4	5
2656	40	-89.2269	13.6932	40	1	3	R	4	5
2657	40	-89.2272	13.6918	32	1	3	R	2	4
2658	40	-89.2274	13.6921	54	1	3	R	2	4
2659	40	-89.2277	13.6919	54	1	3	R	2	4
2660	40	-89.2277	13.6918	54	1	3	R	2	4
2661	40	-89.2282	13.6927	60	1	3	R	2	4
2662	40	-89.2286	13.6925	24	1	3	R	1	5
2663	40	-89.2270	13.6920	50	1	4	R	1	4
2664	40	-89.2269	13.6919	75	1	3	M	4	4
2665	40	-89.2271	13.6925	60	1	4	R	1	4
2666	40	-89.2276	13.6928	40	1	4	R	1	4
2667	40	-89.2274	13.6931	15	1	4	R	2	3
2668	40	-89.2272	13.6931	12	1	4	R	2	3
2669	40	-89.2268	13.6933	16	1	4	M	3	5
2670	40	-89.2266	13.6934	56	1	4	I	4	4
2671	40	-89.2273	13.6918	24	2	4	R	2	3
2672	40	-89.2274	13.6920	45	2	4	R	2	3
2673	40	-89.2275	13.6920	45	2	4	R	2	3
2674	40	-89.2283	13.6927	48	2	4	R	1	4
2675	40	-89.2284	13.6927	63	2	4	M	3	5
2676	40	-89.2272	13.6918	42	2	4	C	4	5

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2677	40	-89.2266	13.6934	20	2	4	R	4	5
2678	40	-89.2267	13.6933	70	2	4	R	4	8
2679	40	-89.2264	13.6935	64	2	4	C	4	5
2680	40	-89.2283	13.6926	42	2	4	R	3	9
2681	40	-89.2283	13.6926	42	2	4	R	3	9
2682	41	-89.2312	13.6918	180	1	3	R	3	8
2683	41	-89.2311	13.6919	15	1	3	C	3	--
2684	41	-89.2310	13.6920	12	1	3	C	2	--
2685	41	-89.2309	13.6920	18	1	2	R	2	4
2686	41	-89.2310	13.6922	54	2	4	R	2	5
2687	41	-89.2310	13.6923	81	2	4	R	2	5
2688	41	-89.2364	13.6904	160	2	4	R	3	7
2689	41	-89.2312	13.6921	105	2	4	As	5	2
2690	41	-89.2310	13.6919	100	2	4	R	3	8
2691	41	-89.2311	13.6919	50	2	4	R	3	8
2692	41	-89.2314	13.6918	50	2	4	R	3	8
2693	41	-89.2363	13.6901	150	2	4	R	3	8
2694	41	-89.2361	13.6902	90	2	4	R	3	8
2695	43	-89.2523	13.6944	35	1	4	M	2	4
2696	43	-89.2524	13.6944	35	1	4	M	2	4
2697	43	-89.2523	13.6947	165	1	15	M	2	5
2698	43	-89.2526	13.6945	35	1	4	R	2	4
2699	43	-89.2526	13.6944	35	1	4	R	2	4
2700	43	-89.2524	13.6939	150	1	3	R	4	10
2701	43	-89.2526	13.6939	150	1	3	R	4	10
2702	43	-89.2524	13.6938	150	1	3	R	4	10
2703	43	-89.2527	13.6938	150	1	3	R	4	10
2704	43	-89.2529	13.6941	150	1	3	R	4	10
2705	43	-89.2530	13.6937	60	1	15	R	2	5
2706	45	-89.1974	13.6721	35	1	2	R	2	4
2707	45	-89.1977	13.6720	35	1	16	C	1	2
2708	45	-89.1972	13.6723	35	1	4	R	1	4
2709	45	-89.1971	13.6727	54	1	4	R	1	5
2710	45	-89.1974	13.6721	20	1	4	R	3	5
2711	45	-89.1972	13.6727	50	1	3	R	2	5
2712	45	-89.1980	13.6698	96	1	4	E	80	1

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2713	45	-89.1976	13.6721	24	1	4	R	3	5
2714	45	-89.1978	13.6700	160	2	4	E	4	2
2715	45	-89.1980	13.6694	200	2	3	R	4	5
2716	45	-89.1979	13.6699	96	2	4	E	150	1
2717	45	-89.1979	13.6701	420	3	4	E	20	2
2718	45	-89.1982	13.6697	72	7	5	R	5	2
2719	46	-89.2184	13.6739	108	1	4	R	3	6
2720	46	-89.2185	13.6737	216	1	3	R	3	6
2721	46	-89.2181	13.6737	84	1	4	R	3	6
2722	46	-89.2180	13.6742	96	1	4	R	3	6
2723	46	-89.2188	13.6738	90	1	4	R	2	5
2724	46	-89.2193	13.6734	48	1	4	I	10	--
2725	46	-89.2186	13.6745	16	1	4	R	4	8
2726	46	-89.2185	13.6744	24	1	4	R	4	8
2727	46	-89.2187	13.6765	60	1	3	R	4	8
2728	46	-89.2169	13.6779	84	1	4	R	4	8
2729	46	-89.2121	13.6786	100	1	4	R	4	8
2730	46	-89.2121	13.6789	35	1	3	R	1	1
2731	46	-89.2182	13.6740	120	1	4	R	4	6
2732	46	-89.2175	13.6748	80	1	4	R	3	6
2733	46	-89.2186	13.6765	48	1	4	R	3	6
2734	46	-89.2187	13.6766	80	1	16	O	2	1
2735	46	-89.2079	13.6778	48	1	4	C	2	1
2736	46	-89.2181	13.6745	77	2	4	R	3	6
2737	46	-89.2186	13.6731	55	2	4	R	2	5
2738	46	-89.2187	13.6733	36	2	4	R	3	5
2739	46	-89.2188	13.6735	12	2	4	R	2	4
2740	46	-89.2076	13.6776	105	3	4	I	24	2
2741	101	-89.2410	13.7081	4,410	5	9	C	1,000	600
2742	101	-89.2417	13.7082	1,400	5	9	C	300	10
2743	101	-89.2415	13.7087	2,080	6	9	C	300	10
2744	101	-89.2411	13.7086	870	14	11	C	800	20
2745	104	-89.2555	13.7026	675	3	9	C	20	5
2746	104	-89.2559	13.7028	360	13	11	R	50	110
2747	104	-89.2555	13.7030	480	22	11	R	100	200
2748	105	-89.2361	13.6946	352	1	4	C	200	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2749	105	-89.2365	13.6948	1,974	2	9	C	500	1
2750	105	-89.2377	13.6930	2,250	11	10	R	350	658
2751	105	-89.2370	13.6948	1,720	26	11	R	250	500
2752	106	-89.2081	13.7121	972	1	4	G	35	3
2753	106	-89.2081	13.7125	574	1	4	G	22	3
2754	106	-89.2071	13.7129	397	9	10	G	325	2
2755	106	-89.2074	13.7116	676	14	11	M	150	185
2756	107	-89.2229	13.7009	400	1	9	C	4	2
2757	107	-89.2226	13.7002	2,500	9	13	C	2,000	1,200
2758	107	-89.2228	13.7005	400	15	11	C	1,500	400
2759	108	-89.1978	13.7044	620	1	4	G	20	1
2760	108	-89.1988	13.7041	756	8	10	G	200	5
2761	108	-89.1973	13.7045	784	11	10	G	450	--
2762	108	-89.1981	13.7047	1,000	14	10	G	351	2
2763	110	-89.2012	13.7091	192	1	3	M	6	5
2764	110	-89.2022	13.7092	1,150	2	4	C	60	30
2765	110	-89.2027	13.7090	240	2	4	C	14	5
2766	110	-89.2010	13.7089	224	2	3	C	20	3
2767	110	-89.2025	13.7085	300	3	7	C	35	2
2768	110	-89.2024	13.7089	225	5	7	C	85	40
2769	110	-89.2013	13.7094	216	5	7	C	75	20
2770	110	-89.2016	13.7094	225	11	10	C	110	40
2771	112	-89.2165	13.7184	255	4	7	C	80	5
2772	112	-89.2162	13.7184	600	4	7	C	80	5
2773	112	-89.2157	13.7191	1,722	6	7	C	500	500
2774	113	-89.2036	13.7149	450	2	9	C	50	10
2775	113	-89.2039	13.7138	540	3	9	C	40	--
2776	113	-89.2039	13.7142	1,162	3	9	C	200	200
2777	113	-89.2038	13.7144	406	3	9	C	100	50
2778	113	-89.2042	13.7139	720	11	10	C	800	600
2779	114	-89.2063	13.7013	700	1	4	C	80	40
2780	114	-89.2076	13.7023	18,000	1	3	C	300	100
2781	114	-89.2057	13.7017	360	1	4	C	15	2
2782	114	-89.2081	13.7027	80	1	3	G	5	2
2783	114	-89.2083	13.7015	325	1	3	C	200	100
2784	114	-89.2057	13.7020	330	1	4	C	50	20

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2785	114	-89.2083	13.7009	1,125	1	3	C	350	250
2786	114	-89.2050	13.7006	300	2	16	C	100	100
2787	114	-89.2050	13.7001	216	2	16	C	250	200
2788	114	-89.2051	13.6998	300	3	7	C	100	80
2789	114	-89.2081	13.7001	1,600	3	7	G	150	20
2790	114	-89.2077	13.7001	2,275	3	9	G	180	4
2791	114	-89.2052	13.7012	500	3	4	C	50	2
2792	114	-89.2057	13.7013	272	3	4	C	30	10
2793	114	-89.2052	13.7018	2,000	4	7	C	700	100
2794	115	-89.2046	13.7000	1,055	2	4	E	20	2
2795	115	-89.2046	13.6997	300	2	4	E	--	2
2796	115	-89.2039	13.7008	150	3	4	C	--	1
2797	115	-89.2040	13.7012	923	3	4	C	--	1
2798	115	-89.2041	13.7002	1,667	3	4	C	200	100
2799	115	-89.2042	13.7010	700	4	5	C	--	1
2800	115	-89.2035	13.7009	210	6	7	C	100	50
2801	115	-89.2035	13.7010	441	8	8	C	100	50
2802	118	-89.2038	13.6902	756	1	9	C	50	--
2803	118	-89.2049	13.6910	1,387	2	9	C	150	--
2804	118	-89.2044	13.6908	1,800	4	9	C	150	--
2805	118	-89.2044	13.6903	3,150	5	9	C	500	200
2806	120	-89.1927	13.7154	1,680	3	9	As	6	5
2807	120	-89.1927	13.7152	198	3	4	R	2	6
2808	121	-89.1928	13.7122	600	2	3	O	25	2
2809	121	-89.1927	13.7119	4,013	3	7	As	30	10
2810	122	-89.1882	13.7092	800	1	4	As	450	450
2811	124	-89.2140	13.7083	416	1	3	As	10	2
2812	124	-89.2142	13.7085	504	1	3	As	10	2
2813	127	-89.1981	13.7002	1,275	1	16	As	15	3
2814	128	-89.1911	13.6984	1,716	1	9	As	12	2
2815	129	-89.1885	13.6974	975	1	7	As	2	--
2816	129	-89.1888	13.6971	540	2	9	As	20	4
2817	129	-89.1883	13.6971	736	2	9	C	20	4
2818	131	-89.1918	13.6920	300	2	16	As	5	5
2819	132	-89.1893	13.6875	176	1	4	As	2	2
2820	133	-89.2100	13.6885	240	1	4	As	5	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2821	133	-89.2098	13.6885	400	1	4	G	5	2
2822	133	-89.2099	13.6883	1,000	2	4	G	25	15
2823	137	-89.2263	13.6944	805	1	9	As	4	250
2824	138	-89.2315	13.6859	1,800	1	7	As	150	1
2825	139	-89.2256	13.6802	530	1	7	As	15	3
2826	142	-89.1899	13.7087	6,900	1	4	C	1,700	6
2827	144	-89.2131	13.7163	1,280	1	4	C	74	2
2828	144	-89.2140	13.7161	3,040	1	4	C	55	3
2829	144	-89.2128	13.7157	1,271	2	7	C	100	5
2830	144	-89.2125	13.7164	1,240	2	7	C	30	2
2831	144	-89.2125	13.7159	364	2	7	C	15	2
2832	145	-89.2165	13.7144	2,205	1	3	C	80	80
2833	145	-89.2168	13.7139	612	2	7	C	50	25
2834	146	-89.2136	13.7060	200	1	4	C	15	1
2835	146	-89.2120	13.7053	4,000	1	9	C	20	2
2836	146	-89.2100	13.7051	1,232	2	9	C	150	2
2837	147	-89.2154	13.7058	2,475	1	4	C	50	2
2838	147	-89.2151	13.7045	408	1	4	C	15	1
2839	147	-89.2125	13.7047	612	1	7	C	10	1
2840	149	-89.1794	13.7019	2,600	1	15	C	100	40
2841	149	-89.1788	13.7018	360	1	15	C	30	30
2842	149	-89.1789	13.7016	180	1	15	C	30	30
2843	149	-89.1790	13.7017	36	1	15	C	3	--
2844	149	-89.1793	13.7018	480	1	15	C	50	20
2845	149	-89.1788	13.7016	25	1	4	C	4	2
2846	149	-89.1795	13.7028	12	1	15	C	5	1
2847	149	-89.1789	13.7017	50	2	3	C	8	2
2848	149	-89.1788	13.7025	60	2	3	C	10	4
2849	149	-89.1789	13.7022	64	2	4	C	4	1
2850	149	-89.1788	13.7022	16	2	4	C	8	2
2851	149	-89.1787	13.7025	9	2	15	C	8	2
2852	149	-89.1796	13.7023	15	2	15	C	3	1
2853	149	-89.1796	13.7024	30	2	4	C	6	1
2854	149	-89.1797	13.7019	28	2	4	C	3	1
2855	149	-89.1800	13.7030	40	3	4	C	5	2
2856	150	-89.1874	13.6990	6,241	2	4	C	1,675	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2857	151	-89.1897	13.6967	4,942	1	15	C	200	4
2858	151	-89.1903	13.6969	3,150	2	15	C	100	10
2859	151	-89.1899	13.6976	1,955	2	3	C	100	2
2860	153	-89.1953	13.6960	24	1	4	C	1	--
2861	153	-89.1958	13.6958	240	1	15	C	10	--
2862	153	-89.1954	13.6959	9	1	15	C	4	--
2863	153	-89.1954	13.6958	16	1	7	C	2	--
2864	153	-89.1953	13.6959	40	1	7	C	2	--
2865	153	-89.1956	13.6957	36	1	15	C	15	--
2866	153	-89.1954	13.6960	18	1	15	C	15	--
2867	153	-89.1953	13.6959	24	1	15	C	3	1
2868	153	-89.1959	13.6957	6	1	15	C	2	1
2869	153	-89.1953	13.6958	39	1	15	C	5	1
2870	153	-89.1961	13.6953	4,000	1	15	C	100	2
2871	153	-89.1948	13.6959	2,920	2	7	C	3,000	14
2872	153	-89.1959	13.6957	9,600	2	4	C	500	2
2873	158	-89.2293	13.7020	20,000	4	9	C	3,000	200
2874	159	-89.2280	13.6982	8,000	3	12	C	400	30
2875	160	-89.2223	13.6834	1,640	1	7	C	200	3
2876	160	-89.2226	13.6833	2,673	2	7	C	300	50
2877	161	-89.2148	13.6833	1,350	1	15	C	50	2
2878	163	-89.2253	13.7180	3,600	1	4	I	150	25
2879	163	-89.2263	13.7179	160	2	4	C	5	2
2880	163	-89.2259	13.7177	480	3	4	I	150	2
2881	164	-89.1722	13.7020	144	1	15	C	5	1
2882	164	-89.1727	13.7014	150	1	4	C	10	1
2883	164	-89.1727	13.7010	800	1	4	C	10	1
2884	164	-89.1712	13.7019	224	1	15	I	25	2
2885	164	-89.1715	13.7024	40	1	4	I	5	2
2886	164	-89.1704	13.7018	280	1	4	I	20	1
2887	164	-89.1730	13.7005	400	1	4	C	6	5
2888	164	-89.1724	13.7026	330	1	4	C	35	2
2889	164	-89.1722	13.7027	120	1	4	C	35	2
2890	164	-89.1720	13.7020	448	2	4	I	25	2
2891	164	-89.1716	13.7020	224	2	15	I	25	2
2892	164	-89.1722	13.7024	350	2	4	C	30	2

No.	Zone	Long. (deg.)	Lat. (deg.)	Area, m^2	No. of stories	Type[14]	Occupancy[15]	Occupants	
								Daytime	Nighttime
2893	164	-89.1734	13.7026	84	2	4	U	25	--
2894	164	-89.1718	13.7027	360	7	12	C	50	3
2895	164	-89.1719	13.7027	324	9	13	C	70	3
2896	166	-89.1683	13.6991	2,000	1	15	I	20	2
2897	166	-89.1665	13.7003	1,700	1	7	C	300	2
2898	166	-89.1673	13.6988	360	1	15	C	15	2
2899	166	-89.1679	13.6988	84	2	4	C	7	1
2900	168	-89.1816	13.7000	9,540	1	3	I	80	5
2901	168	-89.1802	13.7002	280	1	3	I	5	1
2902	168	-89.1797	13.7002	261	2	4	C	15	1
2903	168	-89.1791	13.7001	1,213	2	4	I	20	5
2904	168	-89.1800	13.6997	350	2	15	I	15	2
2905	168	-89.1792	13.7004	120	2	4	C	40	2
2906	168	-89.1808	13.7002	900	3	4	I	70	2
2907	168	-89.1807	13.7001	133	6	5	I	20	3
2908	168	-89.1804	13.7001	266	6	12	I	100	2
2909	169	-89.2046	13.6951	5,250	1	4	I	100	2
2910	169	-89.2040	13.6942	8,500	1	4	I	150	4

A.2.2 Exposure model for the zones

Table 42 and Table 43 list the key data of exposure model for the primary and special zones, respectively. The exposure data utilize the census researches and investigation records conducted by the local government, and the exposure model for seismic risk analysis in this study was developed based on this census data and the survey results for buildings as presented in the previous section.

Table 42 Key data of exposure model for primary zones

No.	Land use pattern	No. of buildings	Building area, m^2		Occupants	
			Total	Footprint	Day	Night
1	Industrial	1,167	344,083	239,512	8,675	5,377
2	Urban	311	156,459	76,644	3,014	422
3	Urban	540	187,125	116,186	3,834	886
4	Urban	684	505,360	221,948	9,869	1,583
5	Urban	1,285	681,455	370,921	12,725	1,162
6	Urban	903	478,473	274,857	9,220	1,293
7	Urban	987	266,949	198,555	6,037	2,215
8	Urban	737	203,833	128,829	4,444	1,414
9	Urban	346	332,157	183,516	6,417	924
10	Urban	729	185,161	130,743	4,665	2,335
11	Commercial	3,470	798,183	509,005	18,184	6,843
12	Commercial	2,179	985,946	531,559	19,812	4,022
13	Commercial	756	528,509	278,434	10,259	1,552

No.	Land use pattern	No. of buildings	Building area, m^2		Occupants	
			Total	Footprint	Day	Night
14	Commercial	535	365,155	221,279	6,999	923
15	Commercial	2,173	774,273	469,971	15,885	3,704
16	Commercial	3,285	610,391	452,282	17,017	10,435
17	Commercial	644	288,439	156,463	5,587	828
18	Residential	2,801	494,422	363,431	5,183	7,558
19	Residential	2,060	428,987	293,877	3,178	4,352
20	Residential	2,879	667,532	440,088	4,175	5,483
21	Residential	9,037	2,025,048	1,387,488	13,740	18,431
22	Residential	6,352	1,231,530	804,236	10,096	14,118
23	Residential	2,123	498,758	355,102	3,970	5,519
24	Residential	2,551	1,057,276	623,216	3,921	4,185
25	Residential	1,309	986,157	518,497	2,707	2,313
26	Residential	4,314	1,886,187	996,004	7,525	8,349
27	Residential	6,162	743,284	606,901	12,124	18,605
28	Residential	5,040	922,614	637,622	10,302	15,156
29	Residential	2,771	1,107,528	699,664	5,138	6,106
30	Residential	5,649	862,587	654,512	9,323	13,654
31	Residential	4,279	517,092	439,786	7,014	10,567
32	Residential	4,128	1,211,358	705,282	6,941	8,888
33	Residential	3,211	498,952	381,488	4,731	6,791
34	Residential	1,696	167,562	113,978	2,093	3,124
35	Sparse Residential	2,243	375,145	254,659	3,849	6,015
36	Sparse Residential	696	184,809	118,937	768	1,077
37	Sparse Residential	1,679	345,429	323,282	2,283	3,429
38	Informal	3,425	230,921	197,835	4,608	7,187
39	Informal	2,828	229,619	214,988	4,662	7,280
40	Informal	1,214	57,861	56,249	1,718	2,743
41	Informal	1,105	46,711	46,711	1,637	2,632
42	Open space	574	48,768	48,768	542	906
43	Open space	51	7,529	7,529	88	147
44	Open space	36	3,721	3,721	40	67
45	Open space	98	10,025	9,900	90	150
46	Open space	695	82,765	77,819	710	1,187
47	Open space	109	14,642	14,257	89	149
Total		101,846	24,636,771	15,956,530	295,889	232,087

Table 43 Key data from exposure model for special zones

No.	Land use	No. of buildings	Building area, m^2		Occupants	
			Total	Footprint	Day	Night
101	High-rise complex	8	51,891	8,052	455	140
102	High-rise complex	3	12,816	1,542	115	38
103	High-rise complex	3	19,775	1,683	177	59
104	High-rise complex	6	39,107	3,925	349	117
105	High-rise complex	9	132,014	9,009	1,075	219
106	High-rise complex	10	46,674	7,501	472	231
107	High-rise complex	5	59,501	6,994	515	150
108	High-rise complex	8	29,198	4,455	262	89
109	Large hospital	4	4,115	4,115	94	35

No.	Land use	No. of buildings	Building area, m^2		Occupants	
			Total	Footprint	Day	Night
110	Large hospital	26	20,783	8,532	406	65
111	Large hospital	4	4,582	1,527	89	14
112	Large hospital	22	41,675	9,210	871	226
113	Large hospital	9	20,844	3,615	406	63
114	Large hospital	86	69,390	43,258	1,337	188
115	Large hospital	6	27,574	9,305	515	47
116	Large hospital	1	9,567	2,392	187	30
117	Large hospital	6	11,588	3,416	224	33
118	Large hospital	4	31,223	6,903	770	365
119	Large hospital	20	11,719	10,491	295	148
120	Large church	5	2,264	1,693	6	4
121	Large church	4	12,598	4,417	32	17
122	Large church	1	1,546	1,546	4	2
123	Large church	5	1,947	1,144	5	3
124	Large church	3	1,265	1,265	3	2
125	Large church	1	1,039	520	2	1
126	Large church	1	4,319	2,159	9	1
127	Large church	1	1,656	1,656	3	1
128	Large church	1	2,659	2,659	6	2
129	Large church	3	2,170	2,170	5	2
130	Large church	2	1,783	879	4	2
131	Large church	1	1,202	601	5	4
132	Large church	2	3,300	2,548	12	11
133	Large church	9	8,716	3,092	29	22
134	Large church	1	449	449	2	1
135	Large church	2	2,626	1,313	6	2
136	Large church	1	664	664	1	0
137	Large church	1	2,644	1,322	8	5
138	Large church	2	1,857	1,857	4	2
139	Large church	2	1,163	409	3	1
140	Large church	1	561	561	1	1
141	Large commercial complex	3	5,382	2,834	98	5
142	Large commercial complex	5	7,848	7,848	143	7
143	Large commercial complex	6	9,835	4,045	179	9
144	Large commercial complex	14	15,028	7,514	274	14
145	Large commercial complex	6	5,213	3,818	95	5
146	Large commercial complex	9	113,841	37,982	2,072	104
147	Large commercial complex	6	22,856	14,048	416	21
148	Large commercial complex	4	4,324	4,324	79	4
149	Large commercial complex	62	15,064	15,064	274	14
150	Large commercial complex	1	4,619	4,619	84	4
151	Large commercial complex	6	16,880	7,962	307	15
152	Large commercial complex	18	16,507	9,690	300	15
153	Large commercial complex	63	28,568	28,568	520	26
154	Large commercial complex	1	3,625	1,813	66	3
155	Large commercial complex	1	2,250	2,250	41	2
156	Large commercial complex	9	5,694	3,793	104	5
157	Large commercial complex	1	15,836	7,918	288	14
158	Large commercial complex	2	42,850	10,712	780	39

No.	Land use	No. of buildings	Building area, m^2		Occupants	
			Total	Footprint	Day	Night
159	Large commercial complex	3	15,422	7,861	281	14
160	Large commercial complex	1	4,325	4,325	79	4
161	Large commercial complex	2	1,498	1,498	27	1
162	Large manufacturing facility	6	4,754	3,943	78	4
163	Large manufacturing facility	8	24,568	10,077	402	20
164	Large manufacturing facility	63	73,560	32,577	1,203	60
165	Large manufacturing facility	9	9,332	9,332	153	8
166	Large manufacturing facility	26	44,559	31,056	729	37
167	Large manufacturing facility	21	17,940	14,259	293	15
168	Large manufacturing facility	34	86,955	29,430	1,422	72
169	Large manufacturing facility	6	21,122	15,576	345	17
170	Large manufacturing facility	8	5,467	5,467	89	4
171	Large manufacturing facility	2	7,597	7,597	124	6
Total		695	1,353,784	526,649	20,111	2,913

A.3 Seismic risk analysis results for individual zones

A.3.1 Physical and human impacts

Table 44 through Table 47 list the expected (i.e., mean) value of physical and human impacts due to the seismic intensity for this study (i.e., design-level earthquake) for the primary and special zones, respectively. Damaged buildings area, damage tagging status of buildings and debris volume are evaluated as physical impact, and the number of fatalities, injuries and IDPs are estimated as human impact.

Table 44 Physical impact for primary zones

No.	Building damage		Green-tagged		Yellow-tagged		Red-tagged		Debris volume, m^3
	Rate	Area, m^2	Rate	No.	Rate	No.	Rate	No.	
1	67%	230,377	18%	212	25%	289	57%	666	147,275
2	56%	88,024	27%	84	33%	103	40%	125	47,434
3	61%	114,138	23%	123	30%	162	47%	255	67,784
4	56%	282,105	25%	174	32%	219	43%	291	152,640
5	62%	423,895	22%	286	29%	377	48%	622	254,947
6	58%	276,949	25%	225	27%	240	49%	439	160,352
7	49%	129,849	35%	349	30%	297	35%	341	68,870
8	49%	99,989	37%	270	30%	220	34%	247	53,867
9	49%	162,244	34%	118	32%	110	34%	118	79,234
10	62%	115,386	22%	164	29%	213	48%	352	69,953
11	63%	506,208	22%	763	29%	1,021	49%	1,686	304,655
12	61%	604,960	22%	476	29%	631	49%	1,072	358,511
13	58%	304,386	31%	233	30%	224	40%	299	178,436
14	48%	173,973	35%	188	31%	164	34%	183	90,215
15	55%	428,352	29%	630	28%	615	43%	928	244,426
16	55%	334,849	29%	938	28%	935	43%	1,411	189,087
17	59%	169,900	28%	182	30%	192	42%	270	86,437
18	62%	307,940	21%	599	28%	782	51%	1,420	186,222
19	65%	279,102	20%	417	26%	540	54%	1,103	175,756
20	62%	411,693	23%	656	30%	857	47%	1,366	246,150
21	62%	1,256,158	23%	2,097	28%	2,554	49%	4,386	762,511
22	55%	675,811	29%	1,814	31%	1,951	41%	2,588	339,690
23	65%	323,471	20%	418	27%	582	53%	1,122	197,271
24	44%	467,902	39%	997	33%	833	28%	721	218,532

No.	Building damage		Green-tagged		Yellow-tagged		Red-tagged		Debris volume, m^3
	Rate	Area, m^2	Rate	No.	Rate	No.	Rate	No.	
25	37%	364,701	47%	619	30%	389	23%	301	154,434
26	34%	649,126	52%	2,246	27%	1,186	20%	882	268,388
27	60%	447,997	20%	1,226	27%	1,693	53%	3,243	239,752
28	55%	510,151	29%	1,456	29%	1,481	42%	2,103	289,783
29	45%	497,808	38%	1,056	30%	829	32%	886	245,034
30	60%	518,379	27%	1,506	31%	1,727	43%	2,416	300,367
31	53%	274,035	33%	1,428	30%	1,286	37%	1,565	154,921
32	44%	536,211	40%	1,642	31%	1,265	30%	1,221	256,495
33	59%	292,194	25%	816	32%	1,024	43%	1,371	167,848
34	49%	82,543	35%	597	33%	557	32%	542	43,214
35	48%	179,044	36%	798	32%	716	32%	728	87,923
36	34%	62,028	55%	383	28%	195	17%	118	26,047
37	39%	135,160	46%	769	29%	482	26%	429	63,907
38	65%	149,626	20%	687	26%	902	54%	1,836	93,640
39	69%	157,907	17%	474	24%	689	59%	1,664	102,223
40	52%	29,820	34%	414	28%	337	38%	463	16,806
41	48%	22,248	35%	388	29%	326	35%	391	11,607
42	43%	20,797	44%	254	30%	171	26%	149	10,270
43	55%	4,122	37%	19	27%	14	36%	18	2,311
44	53%	1,981	32%	11	29%	10	40%	14	1,076
45	49%	4,884	37%	36	29%	29	33%	33	2,610
46	48%	39,999	38%	264	30%	211	32%	220	21,240
47	41%	6,053	44%	48	30%	33	26%	28	2,821
Overall	53%	13,154,472	29%	29,551	29%	29,663	42%	42,631	7,242,970

Table 45 Physical impact for special zones

No.	Building damage		Green-tagged		Yellow-tagged		Red-tagged		Debris volume, m^3
	Rate	Area, m^2	Rate	No.	Rate	No.	Rate	No.	
101	22%	11,369	61%	5	28%	2	11%	1	1,965
102	17%	2,185	67%	2	24%	1	9%	0	237
103	16%	3,227	66%	2	25%	1	9%	0	272
104	18%	6,973	70%	4	22%	1	8%	0	903
105	24%	32,077	57%	5	29%	3	14%	1	6,835
106	35%	16,128	37%	4	33%	3	30%	3	5,110
107	42%	24,826	45%	2	37%	2	19%	1	6,728
108	49%	14,208	26%	2	34%	3	40%	3	6,499
109	49%	2,030	34%	1	36%	1	30%	1	935
110	58%	12,134	23%	6	28%	7	49%	13	6,836
111	57%	2,598	27%	1	32%	1	41%	2	1,415
112	54%	22,422	33%	7	36%	8	31%	7	11,173
113	50%	10,501	33%	3	35%	3	32%	3	4,926
114	66%	45,817	25%	21	27%	23	48%	41	29,098
115	56%	15,573	26%	2	33%	2	41%	2	8,443
116	40%	3,846	46%	0	32%	0	22%	0	1,605
117	41%	4,789	43%	3	32%	2	25%	2	2,097
118	35%	10,885	52%	2	31%	1	17%	1	3,829
119	49%	5,790	34%	7	35%	7	31%	6	2,684
120	50%	1,142	29%	1	34%	2	37%	2	541
121	57%	7,161	22%	1	25%	1	53%	2	3,816
122	61%	939	23%	0	33%	0	44%	0	552
123	63%	1,236	27%	1	21%	1	52%	3	815

No.	Building damage		Green-tagged		Yellow-tagged		Red-tagged		Debris volume, m^3
	Rate	Area, m^2	Rate	No.	Rate	No.	Rate	No.	
124	77%	977	15%	0	17%	1	68%	2	698
125	77%	804	14%	0	17%	0	68%	1	573
126	60%	2,587	24%	0	32%	0	43%	0	1,515
127	51%	850	37%	0	24%	0	39%	0	324
128	49%	1,292	35%	0	36%	0	29%	0	587
129	51%	1,106	32%	1	35%	1	33%	1	527
130	45%	810	39%	1	33%	1	28%	1	399
131	35%	425	54%	1	23%	0	23%	0	135
132	60%	1,994	24%	0	31%	1	44%	1	1,182
133	61%	5,313	23%	2	32%	3	45%	4	3,149
134	40%	178	46%	0	32%	0	22%	0	73
135	30%	782	59%	1	29%	1	12%	0	243
136	64%	424	26%	0	22%	0	52%	1	279
137	35%	932	52%	1	31%	0	17%	0	336
138	54%	1,011	30%	1	33%	1	37%	1	515
139	41%	475	45%	1	33%	1	23%	0	197
140	54%	305	30%	0	33%	0	37%	0	155
141	60%	3,256	24%	1	32%	1	44%	1	1,928
142	60%	4,713	25%	1	32%	2	44%	2	2,782
143	62%	6,124	23%	1	27%	2	50%	3	3,628
144	57%	8,571	27%	4	33%	5	40%	6	4,675
145	70%	3,626	22%	1	25%	2	53%	3	2,390
146	50%	56,410	31%	3	34%	3	35%	3	26,154
147	59%	13,552	26%	2	33%	2	42%	2	7,814
148	76%	3,266	17%	1	28%	1	55%	2	1,421
149	75%	11,273	15%	10	27%	17	58%	36	5,134
150	60%	2,789	24%	0	32%	0	44%	0	1,638
151	68%	11,425	16%	1	24%	1	60%	4	5,617
152	62%	10,174	19%	3	30%	5	51%	9	5,563
153	47%	13,408	28%	18	33%	21	39%	25	6,179
154	40%	1,456	46%	0	31%	0	22%	0	610
155	63%	1,407	28%	0	21%	0	51%	1	923
156	45%	2,547	41%	4	33%	3	26%	2	1,233
157	35%	5,612	48%	0	34%	0	18%	0	1,451
158	34%	14,770	53%	1	31%	1	16%	0	5,220
159	35%	5,424	49%	1	33%	1	18%	1	1,400
160	40%	1,749	46%	0	32%	0	22%	0	730
161	63%	940	18%	0	34%	1	48%	1	358
162	61%	2,880	23%	1	32%	2	44%	3	1,703
163	46%	11,250	39%	3	33%	3	28%	2	5,573
164	60%	44,486	21%	13	31%	20	47%	30	23,063
165	66%	6,139	21%	2	31%	3	48%	4	2,838
166	67%	29,921	18%	5	29%	8	53%	14	13,811
167	64%	11,529	19%	4	28%	6	53%	11	6,567
168	70%	60,972	21%	7	29%	10	51%	17	39,761
169	46%	9,618	39%	2	33%	2	28%	2	4,765
170	61%	3,310	23%	2	33%	3	44%	4	1,940
171	61%	4,608	24%	0	32%	1	44%	1	2,722
Overall	48%	645,326	27%	188	30%	209	43%	298	307,793

Table 46 Human impact for primary zones

No.	Fatalities				Injuries				IDPs	
	Daytime		Nighttime		Daytime		Nighttime			
	Rate	Person	Rate	Person	Rate	Person	Rate	Person	Rate	Person
1	1.8%	156	1.8%	97	14.3%	1,243	14.3%	770	78.4%	4,217
2	1.2%	36	1.2%	5	8.8%	266	8.8%	37	71.0%	299
3	1.4%	53	1.4%	12	10.8%	413	10.8%	96	74.5%	660
4	1.1%	110	1.1%	18	8.8%	869	8.8%	139	70.4%	1,115
5	1.5%	191	1.5%	17	11.6%	1,479	11.6%	135	75.4%	876
6	1.5%	134	1.5%	19	11.4%	1,049	11.4%	147	70.3%	909
7	1.0%	62	1.0%	23	8.3%	504	8.3%	185	62.0%	1,374
8	1.1%	51	1.1%	16	9.3%	413	9.3%	131	61.5%	870
9	0.9%	56	0.9%	8	7.4%	476	7.4%	69	63.5%	587
10	1.5%	69	1.5%	35	11.7%	547	11.7%	274	75.4%	1,760
11	1.5%	271	1.5%	102	11.8%	2,150	11.8%	809	76.3%	5,225
12	1.4%	278	1.4%	56	11.0%	2,189	11.0%	444	74.8%	3,010
13	1.5%	157	1.5%	24	12.7%	1,301	12.7%	197	68.5%	1,063
14	0.9%	66	0.9%	9	7.6%	529	7.6%	70	61.2%	565
15	1.4%	216	1.4%	50	10.8%	1,720	10.8%	401	67.8%	2,513
16	1.3%	216	1.3%	132	10.1%	1,719	10.1%	1,054	67.7%	7,070
17	1.1%	60	1.1%	9	9.8%	545	9.8%	81	72.5%	600
18	1.5%	76	1.5%	111	11.5%	597	11.5%	871	75.6%	5,714
19	1.7%	55	1.7%	75	13.6%	433	13.6%	592	76.9%	3,347
20	1.4%	60	1.4%	79	11.1%	463	11.1%	608	75.1%	4,119
21	1.6%	216	1.6%	290	12.4%	1,709	12.4%	2,293	74.3%	13,696
22	0.9%	94	0.9%	132	8.0%	811	8.0%	1,134	69.3%	9,789
23	1.5%	60	1.5%	84	12.3%	489	12.3%	680	77.4%	4,274
24	0.8%	30	0.8%	32	6.1%	239	6.1%	255	58.7%	2,456
25	0.5%	15	0.5%	13	4.7%	127	4.7%	108	49.1%	1,136
26	0.5%	41	0.5%	45	4.7%	351	4.7%	389	45.9%	3,833
27	1.3%	152	1.3%	233	10.4%	1,260	10.4%	1,934	74.9%	13,936
28	1.2%	128	1.2%	188	9.9%	1,021	9.9%	1,502	68.6%	10,398
29	0.8%	41	0.8%	48	6.5%	336	6.5%	399	58.0%	3,541
30	1.3%	120	1.3%	176	10.5%	982	10.5%	1,439	73.4%	10,015
31	1.2%	84	1.2%	127	9.6%	675	9.6%	1,017	65.6%	6,934
32	0.7%	52	0.7%	66	6.1%	426	6.1%	545	57.8%	5,136
33	1.2%	56	1.2%	81	9.2%	433	9.2%	622	73.1%	4,962
34	0.9%	19	0.9%	28	7.1%	148	7.1%	222	63.9%	1,997
35	0.8%	32	0.8%	50	6.8%	264	6.8%	412	62.1%	3,737
36	0.5%	4	0.5%	5	4.1%	32	4.1%	44	45.2%	487
37	0.7%	16	0.7%	24	5.9%	134	5.9%	201	51.1%	1,753
38	1.6%	75	1.6%	117	12.8%	592	12.8%	923	77.1%	5,542
39	1.8%	85	1.8%	133	14.4%	671	14.4%	1,048	80.1%	5,833
40	1.3%	22	1.3%	35	10.4%	179	10.4%	286	63.6%	1,746
41	0.9%	16	0.9%	25	7.7%	126	7.7%	203	61.4%	1,616
42	0.8%	5	0.8%	8	7.0%	38	7.0%	63	55.2%	501
43	1.4%	1	1.4%	2	12.5%	11	12.5%	18	65.2%	96
44	1.0%	0	1.0%	1	8.5%	3	8.5%	6	66.4%	44
45	1.0%	1	1.0%	2	8.6%	8	8.6%	13	61.8%	93
46	1.0%	7	1.0%	12	8.2%	58	8.2%	98	61.3%	728
47	0.7%	1	0.7%	1	5.8%	5	5.8%	9	54.8%	81
Overall	1.3%	3,747	1.2%	2,855	10.2%	30,034	9.9%	22,973	69.0%	160,251

Table 47 Human impact for special zones

No.	Fatalities				Injuries				IDPs	
	Daytime		Nighttime		Daytime		Nighttime			
	Rate	Person	Rate	Person	Rate	Person	Rate	Person	Rate	Person
101	0.1%	1	0.1%	0	1.6%	7	1.6%	2	28.1%	39
102	0.1%	0	0.1%	0	1.0%	1	1.0%	0	19.5%	7
103	0.0%	0	0.0%	0	0.9%	2	0.9%	1	18.6%	11
104	0.1%	0	0.1%	0	1.1%	4	1.1%	1	21.0%	25
105	0.1%	1	0.1%	0	1.8%	20	1.8%	4	31.7%	69
106	0.3%	1	0.3%	1	3.3%	15	3.3%	8	47.7%	110
107	0.3%	2	0.3%	0	4.1%	21	4.1%	6	61.3%	92
108	0.7%	2	0.7%	1	6.1%	16	6.1%	5	64.2%	57
109	0.8%	1	0.8%	0	6.6%	6	6.6%	2	65.0%	23
110	1.4%	6	1.4%	1	10.3%	42	10.3%	7	72.0%	47
111	1.3%	1	1.3%	0	9.4%	8	9.4%	1	70.6%	10
112	1.2%	11	1.2%	3	8.7%	76	8.7%	20	68.9%	156
113	0.9%	4	0.9%	1	7.1%	29	7.1%	4	65.7%	41
114	2.0%	27	2.0%	4	16.5%	220	16.5%	31	75.5%	142
115	1.1%	6	1.1%	1	8.4%	43	8.4%	4	72.3%	34
116	0.8%	1	0.8%	0	5.8%	11	5.8%	2	53.2%	16
117	0.8%	2	0.8%	0	6.0%	13	6.0%	2	54.3%	18
118	0.4%	3	0.4%	2	3.8%	30	3.8%	14	47.6%	174
119	0.8%	2	0.8%	1	6.6%	19	6.6%	10	64.9%	96
120	0.8%	0	0.8%	0	6.8%	0	6.8%	0	66.2%	2
121	1.5%	0	1.5%	0	10.5%	3	10.5%	2	70.8%	12
122	1.2%	0	1.2%	0	9.5%	0	9.5%	0	75.6%	2
123	2.2%	0	2.2%	0	18.6%	1	18.6%	1	70.6%	2
124	2.9%	0	2.9%	0	24.0%	1	24.0%	0	82.2%	2
125	2.9%	0	2.9%	0	24.0%	1	24.0%	0	82.6%	1
126	1.2%	0	1.2%	0	9.4%	1	9.4%	0	74.5%	1
127	0.2%	0	0.2%	0	5.7%	0	5.7%	0	62.7%	0
128	0.8%	0	0.8%	0	6.4%	0	6.4%	0	64.2%	1
129	0.9%	0	0.9%	0	7.3%	0	7.3%	0	66.3%	1
130	0.8%	0	0.8%	0	6.3%	0	6.3%	0	60.2%	1
131	0.1%	0	0.1%	0	3.5%	0	3.5%	0	45.8%	2
132	1.3%	0	1.3%	0	9.6%	1	9.6%	1	74.5%	8
133	1.3%	0	1.3%	0	9.6%	3	9.6%	2	75.4%	17
134	0.8%	0	0.8%	0	5.7%	0	5.7%	0	53.2%	1
135	0.3%	0	0.3%	0	3.0%	0	3.0%	0	40.8%	1
136	2.2%	0	2.2%	0	18.7%	0	18.7%	0	71.4%	0
137	0.4%	0	0.4%	0	4.0%	0	4.0%	0	47.9%	2
138	1.3%	0	1.3%	0	9.1%	0	9.1%	0	68.8%	1
139	0.8%	0	0.8%	0	5.8%	0	5.8%	0	54.5%	1
140	1.3%	0	1.3%	0	9.1%	0	9.1%	0	68.7%	0
141	1.3%	1	1.3%	0	9.6%	9	9.6%	0	74.7%	4
142	1.2%	2	1.2%	0	9.5%	14	9.5%	1	74.2%	5
143	1.8%	3	1.8%	0	14.0%	25	14.0%	1	73.8%	7
144	1.3%	3	1.3%	0	9.3%	25	9.3%	1	71.5%	10
145	2.4%	2	2.4%	0	18.9%	18	18.9%	1	77.8%	4
146	0.8%	17	0.8%	1	6.6%	137	6.6%	7	65.3%	68
147	1.3%	5	1.3%	0	9.4%	39	9.4%	2	73.6%	15
148	0.3%	0	0.3%	0	7.0%	6	7.0%	0	89.8%	4
149	0.5%	1	0.5%	0	8.0%	22	8.0%	1	88.9%	12

No.	Fatalities				Injuries				IDPs	
	Daytime		Nighttime		Daytime		Nighttime			
	Rate	Person	Rate	Person	Rate	Person	Rate	Person	Rate	Person
150	1.2%	1	1.2%	0	9.5%	8	9.5%	0	75.1%	3
151	0.9%	3	0.9%	0	9.9%	31	9.9%	2	80.1%	12
152	1.1%	3	1.1%	0	9.1%	27	9.1%	1	76.0%	11
153	0.7%	4	0.7%	0	6.0%	31	6.0%	2	61.6%	16
154	0.8%	1	0.8%	0	5.8%	4	5.8%	0	53.0%	2
155	2.2%	1	2.2%	0	18.2%	7	18.2%	0	69.6%	1
156	0.8%	1	0.8%	0	6.2%	6	6.2%	0	59.3%	3
157	0.3%	1	0.3%	0	3.6%	10	3.6%	1	51.7%	8
158	0.4%	3	0.4%	0	3.8%	30	3.8%	1	46.7%	18
159	0.3%	1	0.3%	0	3.6%	10	3.6%	1	51.0%	7
160	0.8%	1	0.8%	0	5.8%	5	5.8%	0	53.6%	2
161	0.2%	0	0.2%	0	5.3%	1	5.3%	0	81.5%	1
162	1.3%	1	1.3%	0	9.6%	7	9.6%	0	74.9%	3
163	0.8%	3	0.8%	0	6.3%	25	6.3%	1	60.6%	12
164	1.0%	12	1.0%	1	8.4%	101	8.4%	5	75.8%	46
165	0.7%	1	0.7%	0	7.9%	12	7.9%	1	80.4%	6
166	0.7%	5	0.7%	0	7.9%	58	7.9%	3	81.5%	30
167	1.2%	4	1.2%	0	10.1%	30	10.1%	1	78.0%	12
168	2.1%	30	2.1%	2	17.4%	247	17.4%	12	79.5%	57
169	0.8%	3	0.8%	0	6.3%	22	6.3%	1	60.1%	10
170	1.2%	1	1.2%	0	9.5%	8	9.5%	0	75.4%	3
171	1.3%	2	1.3%	0	9.6%	12	9.6%	1	75.0%	5
Overall	0.9%	188	0.7%	21	7.9%	1,587	6.2%	182	55.7%	1,623

APPENDIX B: DISCUSSION ON ASSESSMENT OF SURVEYED DATA

B.1 General

A key consideration for the application of the sampled buildings in San Salvador is the appropriateness of extrapolating results from the pool of collected data to the study area of San Salvador risk assessment. Determining this applicability involves two considerations:

- Use of an adequate sample size
- Use of a representative pool of buildings

B.2 Sample size analysis

In statistical sampling, it is assumed that the population (*N*) has a normal distribution. The margin of error (*E*) for a given confidence level with consideration of the population size effect (the last term of 0) can then be computed as product of *z*-score (i.e., critical value) and standard error of the sample (*n*) from:

$$E = Z_{(a/2)} \cdot \frac{x}{\sqrt{n}} \cdot \sqrt{\frac{(N-n)}{(N-1)}}$$

Where *x* is computed as standard deviation of the sample from:

$$x = \sqrt{r(1-r)}$$

Where $Z_{(a/2)}$ (i.e., *z*-score) is the value corresponding to the area under the curve of normal distribution up to a given confidence interval and is obtained from the standard normal distribution. For example, for a confidence interval of 95%, $Z_{(a/2)}$ is 1.96, corresponding to 1.96 standard deviations, at the 97.5% cumulative probability under the highlighted as shown in Figure 62.

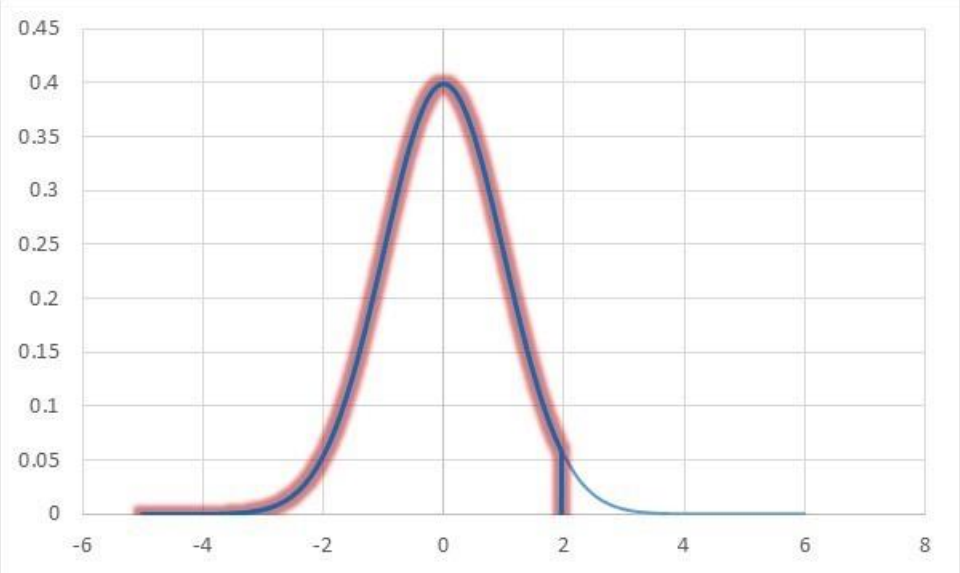


Figure 62 Value of $Z_{(a/2)}$ for two standard deviation (95% confidence interval)

x is the standard deviation of the sample, and as can be seen in 0, it results in the largest value of *x* for *r* value of 0.5.

As seen in 0, approximately 2.7% of the buildings in the primary zones were surveyed. Given the large building stock in the primary zones, the assumption of normal distribution for the population of buildings is justified. For the special zones, a considerably larger percentage of the buildings was surveyed because the number of buildings in the pool is small. Given the similarity of construction for a given occupancy and because all different occupancies were sampled, normal distribution can be assumed for special zones as well.

By using the building inventory and sample sizes, the margin of error (*E*) for the zones and the aggregate for a 95% confidence interval are computed from 0 and are listed in Table 48. The margins of error are small and thus indicate that the sample size was adequate for this study.

Table 48 Sample size evaluation

Zones	Buildings (*N*)	Sampled (*n*)	Percentage	*E*
Primary	101,846	2,740	2.7%	1.9%
Special	695	170	24.5%	6.5%
Total	102,541	2,910	2.8%	1.8%

B.3 Sample representativeness

For the analysis discussed in this report to apply to the study area of San Salvador, it is important for the sample data to be representative of the building stock in the area, that is, for the sampling to be unbiased. As stated earlier, care was taken in subdividing the area into various zones, and the blocks of buildings that represent buildings distribution in a given zone (i.e., representative block) were basically surveyed for each zone, or the buildings in a given zone were uniformly surveyed if the representative blocks have some safety issues. The surveyed buildings were, therefore, representative of buildings construction type, buildings occupancy, number of stories, and land use pattern in the zone. shows representative survey blocks for each primary zone.

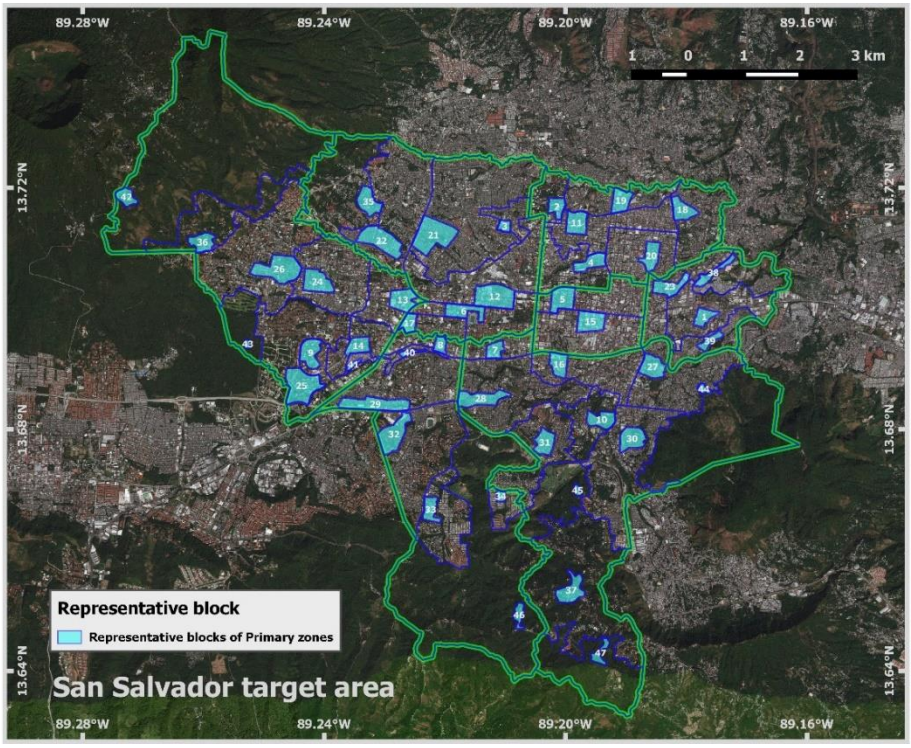


Figure 63 Representative blocks for primary zones

B.4 Population assessment

Table 49 presents the computed population of the study area of San Salvador based on the city census data, on the buildings in the exposure model that were used in analysis, on the subdivided zones according to land use pattern, and on engineering judgment (for key assumptions, see the notes for Table 49). The total population compared positively with the census data that was available from the city. Therefore, there is high confidence that the outcome of the risk analysis program for human impacts—discussed in the main report—would be representative for the study area of San Salvador.

To calculate entries in Table 49 and table footnotes, the following was assumed:

- Population of the study area of San Salvador from census data and census projection is 229,400 (MINEC 2008, DIGESTYC 2009 and MINSAL 2018). This number is also based on the population distribution data according to city segment census (VMVDU 2007)
- It is assumed that the ratio of daytime to nighttime total population is 1.35 by considering that the study area is a big city and the capital city of San Salvador. As shown in Figure 64, this ratio is in close agreement for the data from the U.S. census for cities of similar population
- For non-residents, a ratio of 1.3:1 is assumed for worker to visitor because the study area of San Salvador is assumed to have more offices/workplaces for workers than schools, hospitals, churches, and large shopping malls for visitors

Table 49 Population components and estimation for San Salvador

Residency status	Work status	Daytime	Nighttime	Population distribution assignment to various development types
San Salvador resident	Work in San Salvador	94,300[16]	3,500[17]	Industrial, urban, commercial, high-rise complex, large hospital, large commercial complex, and large manufacturing facility
	Stay but not work in San Salvador	135,100[18]	225,900[19]	City census population distribution, and all types except for large commercial complex and large manufacturing facility
Non-San Salvador resident	Work in San Salvador	48,900[20]	3,600[21]	Industrial, urban, commercial, high-rise complex, large hospital, large commercial complex, and large manufacturing facility
	Visitor	37,700[22]	1,900[23]	Urban, commercial, residential, sparse residential, informal, high-rise complex, large hospital, large church, and large commercial complex
Total population		316,000	235,000	

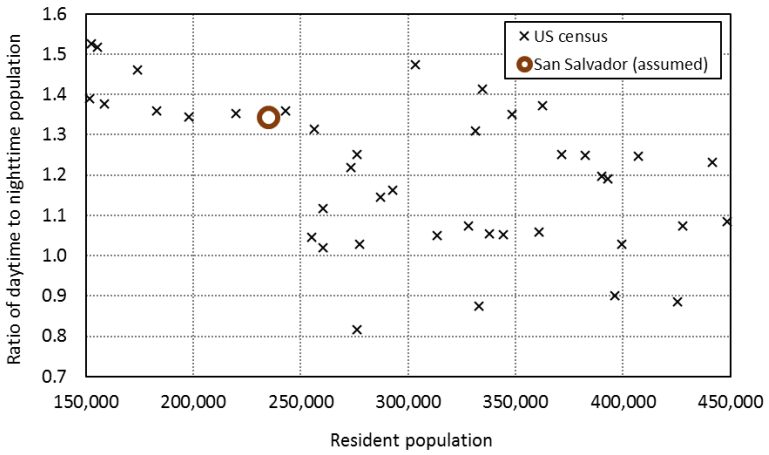


Figure 64 Ratio of daytime to nighttime population for the selected U.S. cities and the assumed value for the study area of San Salvador (USCB 2005)

[16] Based on 100% of workers of residents work in San Salvador, (100%)*(labor force population/total population)*(San Salvador population) = 100%*41.1%*229,400 (Ref. of 41.1%: USGS 2008)

17 Based on partial residents (i.e., half of 5% of total daytime workers) work at nighttime, (1/2)*(5%)*(daytime workers) = 1/2*5%*135,100

18 From 229,400–94,300/1.00

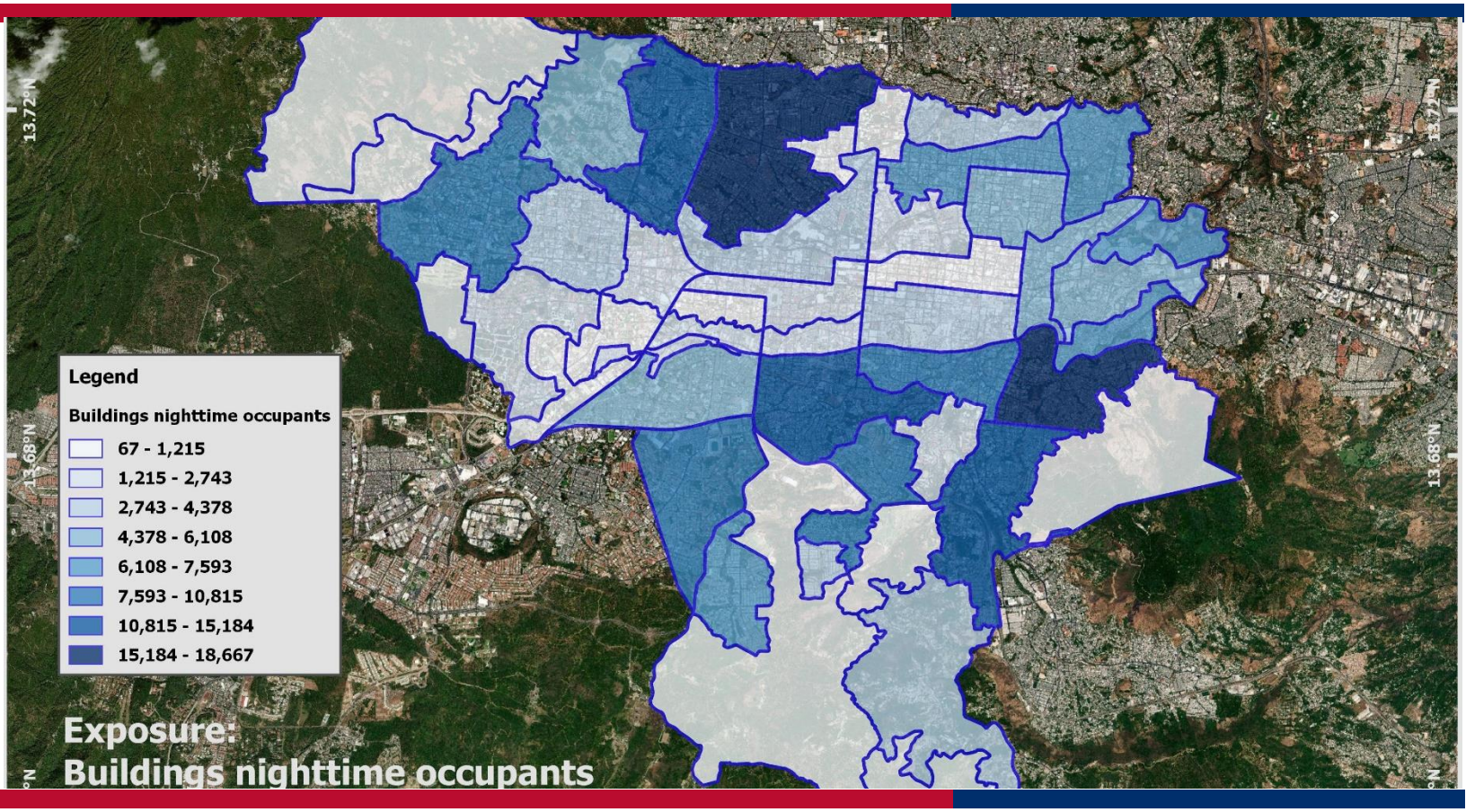
19 From 229,400–3,500

20 Based on the assumptions in the bullets of the body, (1.35*235,000–(94,300+135,100))*(1.3)/(1.3+1)

21 Based on that half of 5% of total daytime workers come to and work in San Salvador from outside at nighttime, (1/2)*(5%)*(daytime workers) = 1/2*5%*135,100

22 Based on the assumption in the bullet of the body, 48,900/1.3

23 Assuming 5% of daytime visitors come from outside at nighttime, (5%)*37,700



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