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Análisis de las propiedades constructivas vulnerables comparativas al reglamento de edificaciones peruano para viviendas en las Vegas, provincia de Picota, región San Martín - 2022

Tesis

Para optar el Título Profesional de Ingeniero Civil

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ANALISIS DE LAS PROPIEDADES CONSTRUCTIVAS VULNERABLES COMPARATIVAS AL REGLAMENTO DE EDIFICACIONES PERUANO PARA VIVIENDAS EN LAS VEGAS, PROVINCIA DE PICOTA, REGIÓN SAN MARTÍ

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ANÁLISIS DE LAS PROPIEDADES CONSTRUCTIVAS VULNERABLES COMPARATIVAS AL REGLAMENTO DE EDIFICACIONES PERUANO PARA VIVIENDAS EN LAS VEGAS, PROVINCIA DE PICOTA, REGIÓN SAN MARTÍN - 2022

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Dirigida con amor a mis padres quienes fueron

motivación de cada día y me impulsaron a

seguir adelante y no rendirme

AGRADECIMIENTO

A mis amigos quienes estuvieron presentes al transcurrir los años, aportando mis días con sus conocimientos, alegrías y tristezas.

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RESUMEN

Se conoció las propiedades constructivas que son vulnerables en comparación al Reglamento de Edificaciones Peruano para viviendas en Las Vegas, provincia de Picota, región San Martín - 2022. Aplicándose para ello el instrumento FEMA 154 en ambos niveles con un resultado menor al valor 2, siendo en su mayoría de 0,4 lo cual registra una vulnerabilidad de las viviendas bajo el formato de vulnerabilidad moderada debido a la zona sísmica donde se asientan las viviendas, reflejado en la norma de reglamentación peruana. Con un nivel descriptivo del estado estructural y no estructural de las viviendas, diseño no experimental y básico de conocimientos adquiridos.

Todas las viviendas han obtenido un índice moderadamente alto de vulnerabilidad tanto en el nivel 1 y 2, indicándose sobre todo la verificación de la falta de confinamiento de sus elementos estructurales, baja capacidad de suelo de cimentación y falta de losa rígida o aligerada que transmita adecuadamente la carga sísmica hacia los elementos estructurales. Por lo que se considera la demolición de las mamposterías de estas estructuras y se puedan construir bajo un diseño con análisis adecuado para la cimentación del tipo de suelo evidenciado.

Palabras claves: Vulnerabilidad sísmica, FEMA 154, edificaciones.

ABSTRACT

The constructive properties that are vulnerable in comparison to the Peruvian Building Regulations for homes in Las Vegas, Picota province, San Martín region - 2022 were known. For this, the FEMA 154 instrument was applied at both levels with a result less than value 2, being mostly 0.4, which registers a vulnerability of the houses under the moderate vulnerability format due to the seismic zone where the houses are located, reflected in the Peruvian regulation standard. With a descriptive level of the structural and non-structural state of the houses, non-experimental design and basic knowledge acquired.

All the houses have obtained a moderately high vulnerability index both at level 1 and 2, indicating above all the verification of the lack of confinement of its structural elements, low capacity of foundation soil and lack of rigid or lightened slab that adequately transmits the seismic load towards the structural elements. Therefore, the demolition of the masonry of these structures is considered and they can be built under a design with adequate analysis for the foundation of the type of soil evidenced.

Keywords: seismic vulnerability, FEMA 154, buildings.

INTRODUCCIÓN

Es de necesidad de la población conocer el estado en el que se encuentran sus viviendas respecto a una forma general de observación estructural y no estructural de estas con la finalidad de tomar alternativas de prevención y/o acción ante futuros desastres. Para lo que la investigación presenta seis capítulos:

Los capítulos 1 y 2 presentan la realidad del problema a investigar en conjunto a su fundamento teórico en el cual se está basando.

El capítulo 3 se enfoca en darnos a conocer el procedimiento por el cual se aplicará la metodología desarrollada.

Los capítulos 4, 5 y 6 nos dan las indicaciones del análisis de los resultados obtenidos y las diversas posibilidades de contribución a prevenir los efectos vulnerables que puede desarrollar un sismo a las viviendas.

CAPÍTULO I

PLANTEAMIENTO DEL PROBLEMA

1.1. Descripción de la realidad problemática

Las Vegas, sector que pertenece a la Provincia de Picota, dicho sector se encuentra ubicada en un terreno cuya pendiente es de más de 15° y con unas superficies aterrazadas, este sector también cuenta con viviendas construidas por la asociación de viviendas de Techo Propio - Fondo mi Vivienda, al igual que casas construidas por las mismas personas cuyas construcciones son de quincha y tierra compactada.

Cabe recalcar que en la actualidad estas viviendas presentan diversos tipos de patología y fallas estructurales, eso incluye también a las construcciones hechas por la asociación de viviendas de techo propio - Fondo mi Vivienda siendo más evidentes las fisuras y el salitre, mientras que las viviendas construidas por las mismos propietarios presentan graves problemas estructurales siendo las más comunes, las grietas longitudinales y se puede observar desprendimiento y deterioro de concreto en las columnas dejando expuesto al estriado y causando así la entrada de humedad y finalmente debilitando.

Esto podría llegar a ser peligroso en caso de algún movimiento sísmico, que terminaría causando la caída de la vivienda e hiriendo a familias enteras.

El contenido de este documento refleja, en síntesis, un diagnóstico de la situación actual en el que se encuentra el sector de las Vegas, y con la participación de todo el sector, construiremos las condiciones necesarias y suficientes para avanzar por el camino del desarrollo integral de Picota. Llegó el momento de pasar de la esperanza a una realidad concreta con proyectos de obras ejecutadas muy bien realizadas sin ningún déficit, y a base de un trabajo serio de transformación de los problemas de vulnerabilidad que se viene presentando.

Para ello planteamos orientar las acciones promovidas como propuesta local un modelo de desarrollo sostenible en el sector de las Vegas que se enfoca en la inversión en potencialidades más no en necesidades, es decir generar condiciones para el desarrollo local y colectivo de la población, enfatizar el aprovechamiento racional de los recursos, reutilizar la materia prima y recuperar los mismos.

Sustentando con un planeamiento estratégico de la gestión de la población afectada en estos casos de vulnerabilidad y para ello en un mediano plazo, se configuran pronósticos como anticipación sistemática al futuro, se establecen objetivos y metas cuantificables, que, como estados deseados del futuro, puedan orientar a las ejecuciones de viviendas bien construidas, cumpliendo con el Reglamento Nacional de Edificaciones [RNE].

1.2. Formulación del problema

1.2.1. Problema General.

¿Qué propiedades constructivas son vulnerables en comparación al Reglamento de Edificaciones Peruano para viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?

1.2.2. Problemas Específicos.

a) ¿Qué características de los suelos inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?

b) ¿Cómo la configuración estructural incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?

c) ¿Qué tipo de ocupación incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?

d) ¿Qué riesgos no estructurales inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?

1.3. Objetivos de la investigación

1.3.1. Objetivo General.

Conocer qué propiedades constructivas son vulnerables en comparación al Reglamento de Edificaciones Peruano para viviendas en Las Vegas, provincia de Picota, región San Martín - 2022.

1.3.2. Objetivos Específicos.

a) Conocer qué características de los suelos inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.

b) Conocer cómo la configuración estructural incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.

c) Conocer qué tipo de ocupación incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.

d) Conocer qué riesgos no estructurales inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.

1.4. Justificación de la investigación

1.4.1. Justificación teórica.

Dar una revisión a la teoría sobre posibles causas de vulnerabilidad a raíz de las propiedades constructivas referenciadas en métodos de inspección como es el FEMA 154 que sirvan de mayor sustento a investigaciones de objetivos similares.

1.4.2. Justificación práctica.

Los datos que se obtendrán de la aplicación de la metodología servirán para toma de acciones por parte de los propietarios de cada una de las viviendas analizadas a fin de mejorar las condiciones de habitabilidad en la que se encuentran.

1.4.3. Justificación normativa.

Fomentar el uso de estas metodologías de inspección rápida a fin de conocer los estados vulnerables de las viviendas en nuestro país apoyándose en una futura norma de revisión que tome de ejemplo el FEMA 154 aplicado.

1.5. Delimitación

1.5.1. Delimitación temporal.

De acuerdo al cronograma establecido posterior a la aprobación del presente plan la ejecución del estudio se centra en los meses de Octubre y Noviembre, posteriormente su revisión y aprobación.

1.5.2. Delimitación de espacio.

Establecido para trabajarse en el sector Las Vegas, del distrito de Picota el cual se observa a continuación.

Figura 1

Ubicación del área de estudio por Google Earth Pro

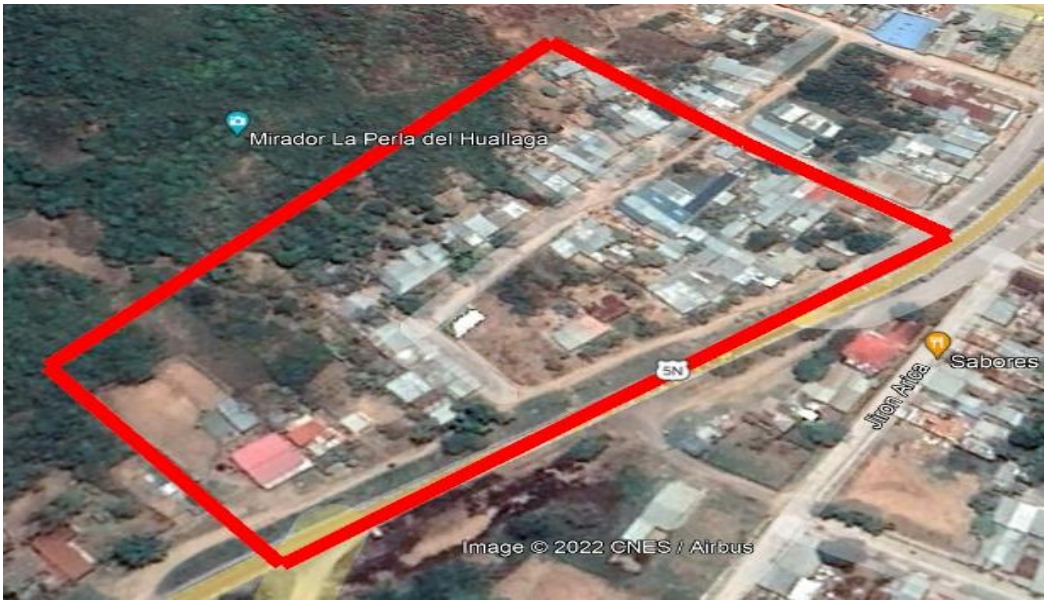
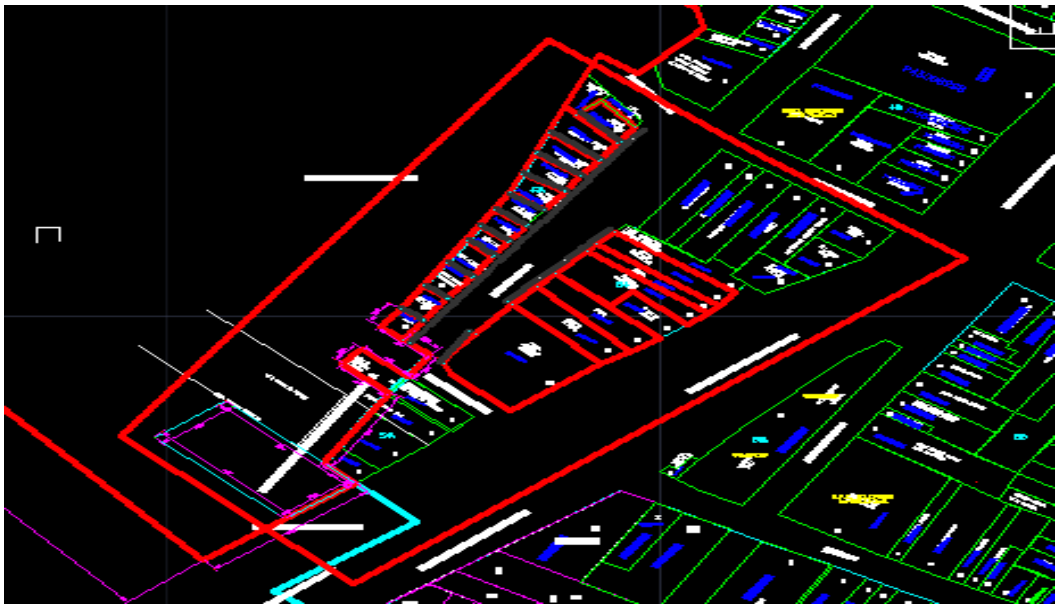


Figura 2

Ubicación del área de estudio por catastro en software AutoCAD



1.6. Viabilidad del estudio

1.6.1. Medios económicos.

El método FEMA 154 al no requerir instrumentos de costo considerable es de financiamiento propio por el tesista, así como la visita a campo y el recojo de datos.

1.6.2. Medios tecnológicos.

El método de FEMA 154 solo requiere uso de instrumentos sencillos de medición de longitud y fotografías por lo que es viable su desarrollo.

1.6.3. Permisos.

Solicitado a cada poblador de las cuales las viviendas serán evaluadas y seleccionadas las que bajo una inspección rápida se visualice la necesidad de aplicación del FEMA 154

CAPÍTULO II

MARCO TEÓRICO

2.1. Antecedentes de la investigación

Investigaciones internacionales.

Loor, Palma y García (2021), realizaron un artículo de investigación la cual tuvo como objetivo de determinar el índice de vulnerabilidad de viviendas rurales en una zona llamada Santa Marianita en Ecuador. La muestra fue de 25 viviendas a la cual se le aplicó la ficha de campo FEMA-154. El resultado fue una incidencia alta de vulnerabilidad en más del 50% de las viviendas ya que no cumplen con la Norma Ecuatoriana de la Construcción. Un 6,2% tiene un valor S=Smin, el 17,93% tiene un valor S>Smin<1, el 44,87% tiene un valor S>1<2, y el 31% tiene un valor S>2.

Criado (2020), realizó un artículo de investigación cuyo objetivo fue determinar el nivel de vulnerabilidad sísmica de las viviendas del barrio Cristo Rey en Colombia. La muestra fue de 483 viviendas a la cual se le aplicó la ficha de campo FEMA-154. El resultado fue una incidencia alta de vulnerabilidad en el 94,62%, moderada en 2,69E% y baja en 2,69% de las viviendas.

Zhiminaycela (2020), en su trabajo de grado cuyo objetivo fue analizar la vulnerabilidad sísmica estructural de la Escuela Diego Minuche Garrido en

Machala. Se aplicó la ficha de campo FEMA-154. El valor de S obtenido fue 2,1 por lo que no requiere una evaluación más detallada es decir pasar a nivel 2, y se puede indicar que la edificación no necesita reforzamiento.

Investigaciones nacionales.

Galdos y Núñez (2020), realizó un trabajo de grado cuyo objetivo fue evaluar la vulnerabilidad sísmica en los edificios de la Escuela Profesional de Ingeniería Civil de la Universidad Nacional de San Antonio Abad del Cusco. La muestra fue a 3 bloques A, B y C de edificación nueva y una edificación antigua a la cual se le aplicó la ficha de campo FEMA-154. El valor S obtenido fue para el bloque B de mayor a 2 ya que existen equipos de gran peso. El bloque A fue de 0,4 para formato moderado alto y 0,3 para el formato alto. El bloque C fue de 1,5 para formato moderado alto y 1,4 para el formato alto. La edificación antigua tuvo un valor de 0,3.

Alvarez y Pulgar (2019), realizaron un trabajo de grado cuyo objetivo fue determinar la vulnerabilidad sísmica de los módulos escolares públicos del distrito de Villa María del Triunfo. La muestra fue de 42 colegios públicos a la cual se le aplicó la ficha de campo FEMA-154. El valor S obtenido para los módulos el 25% fue de S>3 lo cual indica sin presencia de daño estructural y no estructural. El 15 % es de 2>S≤3 lo cual indica daños ligeros. El 31% 0,7>S≤2 lo cual indica presencia de fallas pero con posibilidad de seguir operando. El 29% presentan daños estructurales graves y muy graves.

Chumbes, C. A. (2019), realizó un trabajo de grado cuyo objetivo fue determinar el nivel de vulnerabilidad sísmica en las construcciones informales de viviendas en

el cercado de Huarmey, Huarmey 2019. La muestra fue de 26 viviendas a la cual se le aplicó la ficha de campo FEMA-154. El valor S obtenido para 8% es de vulnerabilidad alta, el 88% es de vulnerabilidad media, el 4% es de vulnerabilidad baja.

2.2. Bases teóricas

Propiedades constructivas vulnerables.

Para la evaluación a las viviendas se plantea utilizar un método validado por la Agencia Federal de Gestión de Emergencias de los Estados Unidos, ya que en la actualidad nuestro país no cuenta con una metodología normativa para obtener vulnerabilidad en viviendas de manera colectiva y rápida, este método es conocido como el FEMA-154, "el cual para la determinación de si se reforzara la edificación lo hace a través de un índice" (Benjamín y Lockhart, 2011, p.258).

Este método establece un sesgo, en el cual si dicho índice es ≤ 2 se deberá aplicar una ficha más detallada del método, si esta vivienda cumple los requisitos de esta otra ficha no hay necesidad de reforzar la vivienda, caso contrario se debe realizar un análisis ya a nivel de software para verificar donde debe reforzarse la vivienda. Ahora cuando este incide sea ≥ 2 la vivienda evaluada no requerirá ningún tiempo de reforzamiento. "el índice 2 significa que la edificación tiene una probabilidad de 1 a 100 de que colapse" (Benjamín y Lockhart, 2011, 2006, p.259).

El método se desarrolla a través de un formulario de recolección de datos en donde se observa a la vivienda a evaluar y se van registrando las observaciones de manera descriptiva y marcando los puntos del formulario adecuados, para ello esta ficha se ve caracterizada básicamente por componentes que en la presente investigación se ha dimensionado en 4 como son:

Suelos.

En la cual se analizara en la primera parte del formulario FEMA 154, aspectos como el tipo de suelo que presenta la cimentación de la vivienda como pueden ser roca dura, roca, suelo denso, suelo rígido, suelo suave, suelo pobre.

Figura 3

Tipo de suelo en formulario FEMA 154

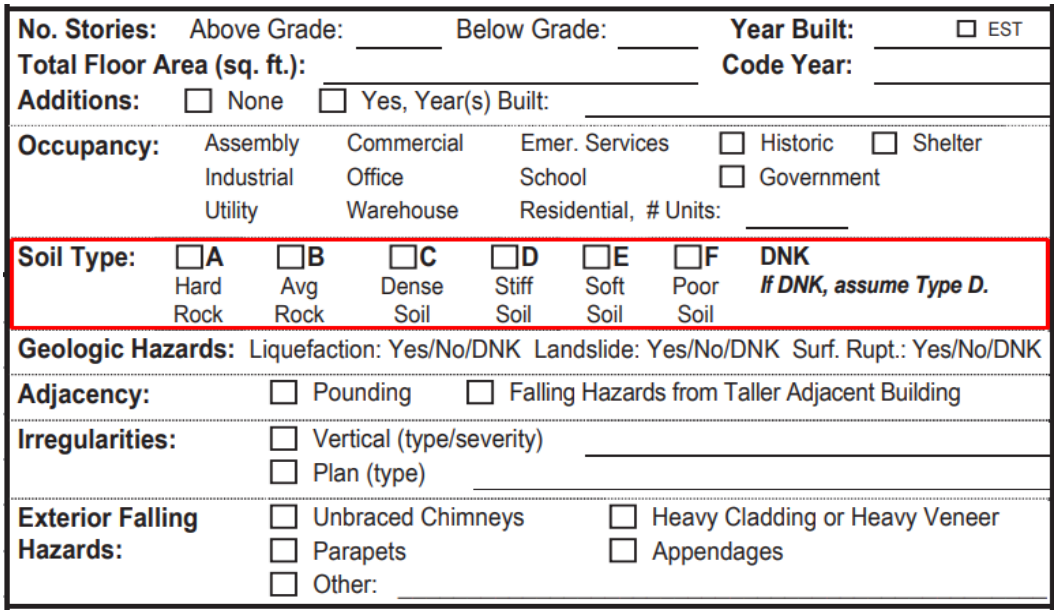
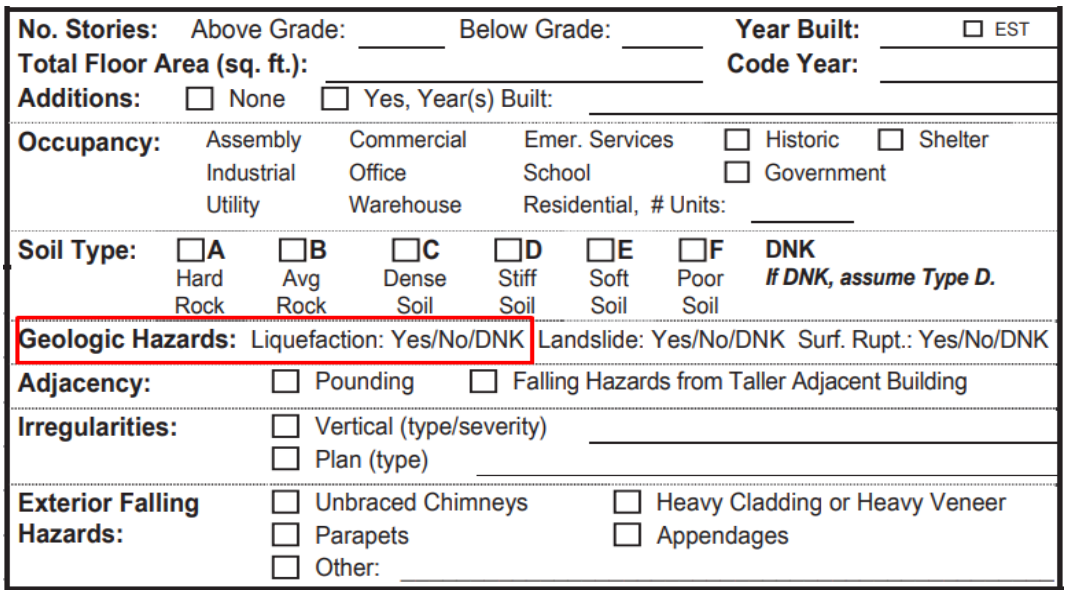


Figura 4

Licuefacción en formulario FEMA 154



Otro factor importante dentro del análisis de los suelos es la presencia de algún tipo de licuefacción en los riesgos geológicos, este también se encuentra dentro del formulario FEMA 154 como es mostrado en la figura 2.

Dentro de la dimensión suelos, el ultimo punto a evaluar son los deslizamientos de tierra que presenta la vivienda, ubicado también en el formulario FEMA 154.

Figura 5

Deslizamiento de suelos en formulario FEMA 154

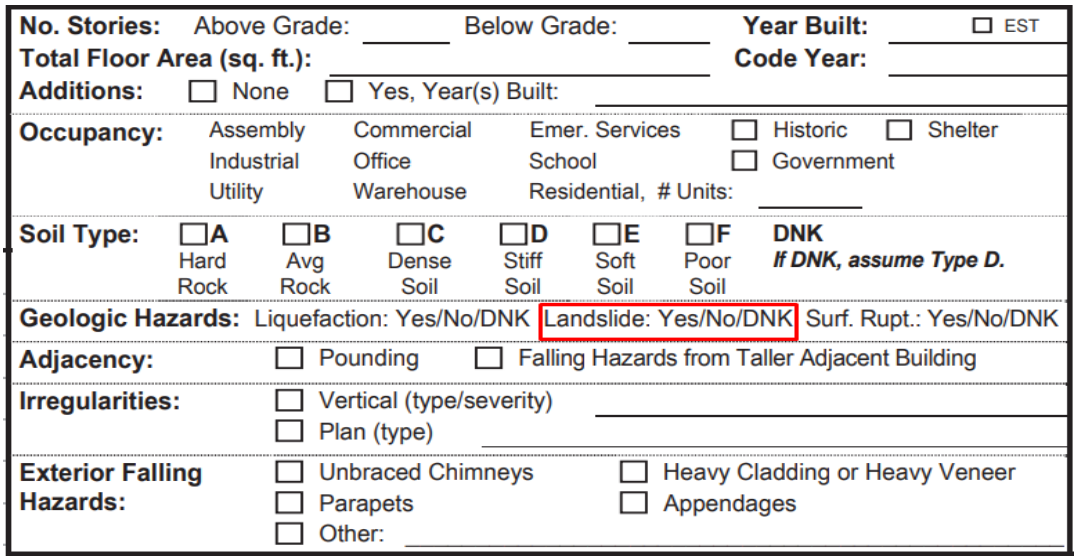
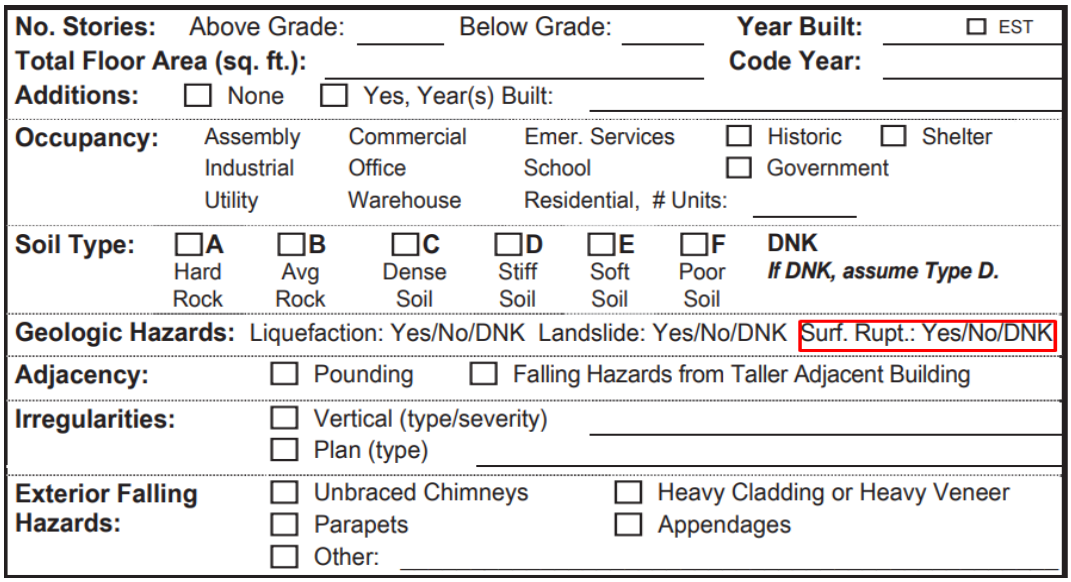


Figura 6

Superficie de ruptura en formulario FEMA 154



El último punto que evalúa, es la existencia de algún tipo de ruptura en la superficie a causa de un evento geológico, el cual no es muy común pero es necesario tenerlo en cuenta para la vulnerabilidad de la vivienda, lo ubicamos en el formulario FEMA 154 en la figura 4.

Configuración estructural.

En la segunda parte del formulario FEMA 154 se evaluara el aspecto sobre las irregularidades que se encuentran en las viviendas evaluadas, estas son en vertical es decir de elevación y de planta, donde se tiene una escala de nula, moderada y severa, pero ello va a depender del tipo de edificación en el que se este evaluando pues de acuerdo al formulario FEMA 154 se tienen una serie de puntuaciones de acuerdo a las características por tipo de edificación las cuales incrementan o disminuyen los valores para las irregularidades.

Figura 7

Irregularidad en planta en formulario FEMA 154

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}																	
FEMA BUILDING TYPE	**Do Not Know**	**W1**	**W1A**	**W2**	**S1** (MRF)	**S2** (BR)	**S3** (LM)	**S4** (RC SW)	**S5** (URM INF)	**C1** (MRF)	**C2** (SW)	**C3** (URM INF)	**PC1** (TU)	**PC2**	**RM1** (FD)	**RM2** (RD)	**URM**	**MH**
Basic Score		**2.1**	**1.9**	**1.8**	**1.5**	**1.4**	**1.6**	**1.4**	**1.2**	**1.0**	**1.2**	**0.9**	**1.1**	**1.0**	**1.1**	**1.1**	**0.9**	**1.1**
Severe Vertical Irregularity, V_{L1}		-0.9	-0.9	-0.9	-0.8	-0.7	-0.8	-0.7	-0.7	-0.7	-0.8	-0.6	-0.7	-0.7	-0.7	-0.7	-0.6	NA
Moderate Vertical Irregularity, V_{L1}		-0.6	-0.5	-0.5	-0.4	-0.4	-0.5	-0.4	-0.3	-0.4	-0.4	-0.3	-0.4	-0.4	-0.4	-0.4	-0.3	NA
Plan Irregularity, P_{L1}		-0.7	-0.7	-0.6	-0.5	-0.5	-0.6	-0.4	-0.4	-0.4	-0.5	-0.3	-0.5	-0.4	-0.4	-0.4	-0.3	NA
Pre-Code		-0.3	-0.3	-0.3	-0.3	-0.2	-0.3	-0.2	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.2	-0.2	0.0	0.0
Post-Benchmark		1.9	1.9	2.0	1.0	1.1	1.1	1.5	NA	1.4	1.7	NA	1.5	1.7	1.6	1.6	NA	0.5
Soil Type A or B		0.5	0.5	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.3	0.1	0.3	0.2	0.3	0.3	0.1	0.1
Soil Type E (1-3 stories)		0.0	-0.2	-0.4	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.2	-0.2	0.0	-0.1
Soil Type E (> 3 stories)		-0.4	-0.4	-0.4	-0.3	-0.3	NA	-0.3	-0.1	-0.1	-0.3	-0.1	NA	-0.1	-0.2	-0.2	0.0	NA
Minimum Score, S_{MIN}		***0.7***	***0.7***	***0.7***	***0.5***	***0.5***	***0.5***	***0.5***	***0.5***	***0.3***	***0.3***	***0.3***	***0.2***	***0.2***	***0.3***	***0.3***	***0.2***	***1.0***

Figura 8

Irregularidad en elevación en formulario FEMA 154

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}																		
FEMA BUILDING TYPE	**Do Not Know**	**W1**	**W1A**	**W2**	**S1** (MRF)	**S2** (BR)	**S3** (LM)	**S4** (RC SW)	**S5** (URM INF)	**C1** (MRF)	**C2** (SW)	**C3** (URM INF)	**PC1** (TU)	**PC2**	**RM1** (FD)	**RM2** (RD)	**URM**	**MH**
Basic Score		**2.1**	**1.9**	**1.8**	**1.5**	**1.4**	**1.6**	**1.4**	**1.2**	**1.0**	**1.2**	**0.9**	**1.1**	**1.0**	**1.1**	**1.1**	**0.9**	**1.1**
Severe Vertical Irregularity, V_{L1}		-0.9	-0.9	-0.9	-0.8	-0.7	-0.8	-0.7	-0.7	-0.7	-0.8	-0.6	-0.7	-0.7	-0.7	-0.7	-0.6	NA
Moderate Vertical Irregularity, V_{L1}		-0.6	-0.5	-0.5	-0.4	-0.4	-0.5	-0.4	-0.3	-0.4	-0.4	-0.3	-0.4	-0.4	-0.4	-0.4	-0.3	NA
Plan Irregularity, P_{L1}		-0.7	-0.7	-0.6	-0.5	-0.5	-0.6	-0.4	-0.4	-0.4	-0.5	-0.3	-0.5	-0.4	-0.4	-0.4	-0.3	NA
Pre-Code		-0.3	-0.3	-0.3	-0.3	-0.2	-0.3	-0.2	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.2	-0.2	0.0	0.0
Post-Benchmark		1.9	1.9	2.0	1.0	1.1	1.1	1.5	NA	1.4	1.7	NA	1.5	1.7	1.6	1.6	NA	0.5
Soil Type A or B		0.5	0.5	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.3	0.1	0.3	0.2	0.3	0.3	0.1	0.1
Soil Type E (1-3 stories)		0.0	-0.2	-0.4	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.2	-0.2	0.0	-0.1
Soil Type E (> 3 stories)		-0.4	-0.4	-0.4	-0.3	-0.3	NA	-0.3	-0.1	-0.1	-0.3	-0.1	NA	-0.1	-0.2	-0.2	0.0	NA
Minimum Score, S_{MIN}		***0.7***	***0.7***	***0.7***	***0.5***	***0.5***	***0.5***	***0.5***	***0.5***	***0.3***	***0.3***	***0.3***	***0.2***	***0.2***	***0.3***	***0.3***	***0.2***	***1.0***

Asimismo se debe evaluar el componente de la altura respecto a la cantidad de pisos y el área que tiene la edificación la cual estará íntimamente vinculada a la irregularidad en vertical que pueda presentar la estructura, de igual forma el formulario FEMA 154 la ubica en sus características iniciales:

Figura 9

Altura de la vivienda en formulario FEMA 154

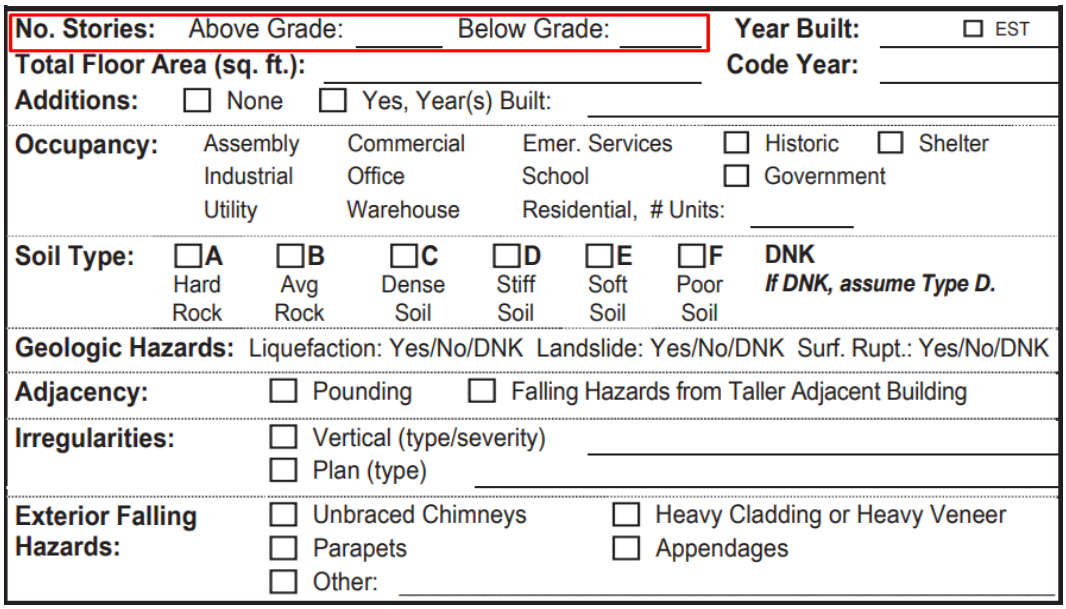
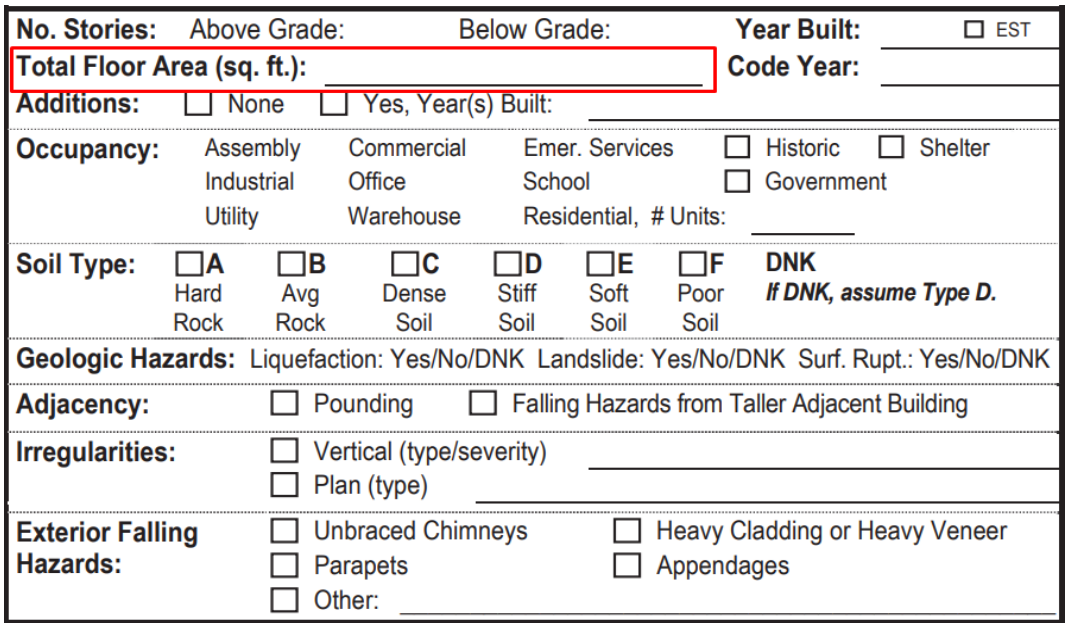


Figura 10

Área de vivienda en formulario FEMA 154



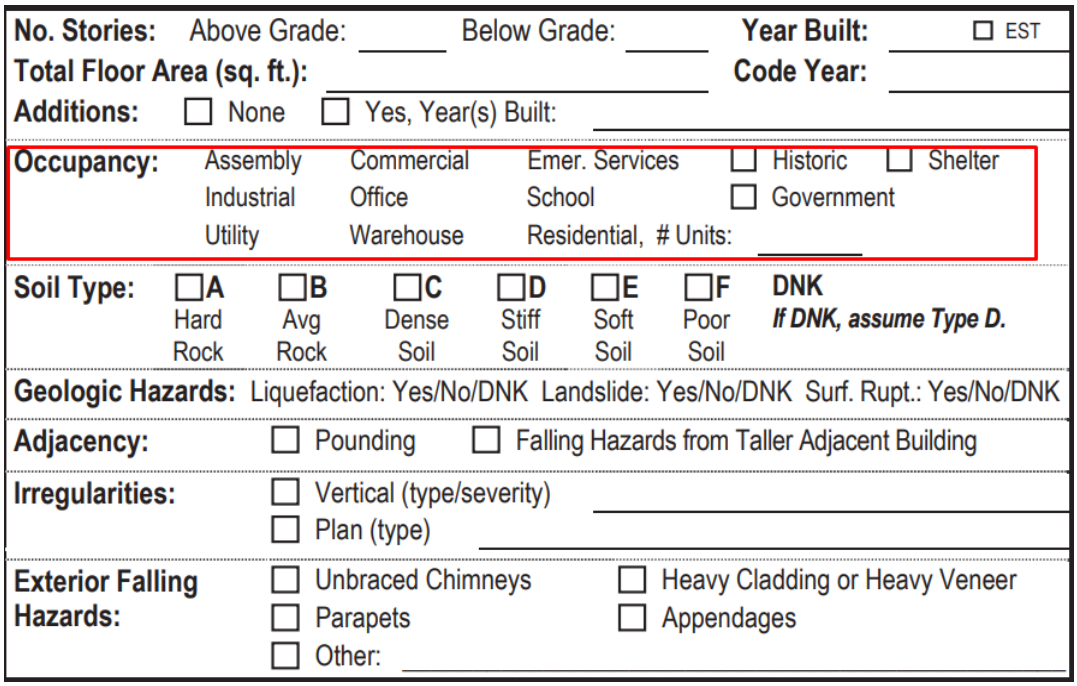
El último punto a evaluar en la configuración es el área de la vivienda, el cual lo registramos en el formulario FEMA 154, de igual forma en la parte inicial del formulario en la figura 8.

Ocupación.

En la primera parte del formulario FEMA 154 podemos ubicar los tipos de ocupaciones que encontramos para la edificación que estamos evaluando, estas ocupaciones son dadas en común como comercio, industrias, oficinas, escuelas, servicios de atención emergente y viviendas, ciertamente en la presenta investigación todas las edificaciones analizadas son viviendas registradas con deficiencias a simple observación previa por lo que en el formulario FEMA 154 estará ubicado en el siguiente punto:

Figura 11

Ocupación de vivienda en formulario FEMA 154



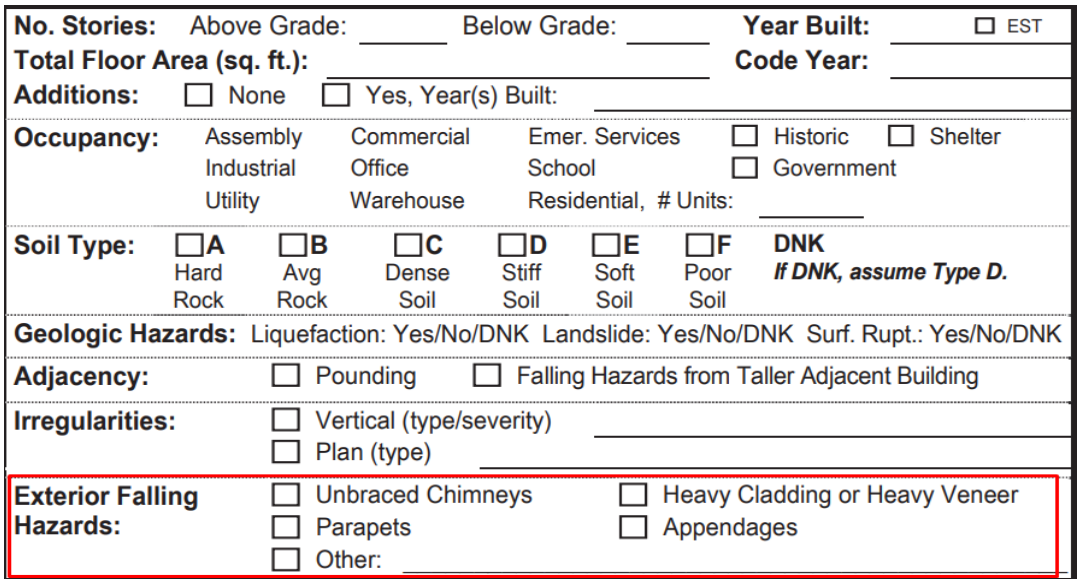
La ocupación es esencial para estimar la vulnerabilidad a la que está expuesta una edificación de acuerdo a su uso, ya que existen edificación que son indispensables.

Riesgos no estructurales.

Esta dimensión es analizada desde dos puntos en el formulario FEMA 154, el primero es en la primera parte para conocer si hay elementos que pueden caer exteriormente de la edificación y posiblemente generar un desastre, lo ubicamos en el formulario FEMA 154, como los revestimientos, parapetos, entre otros.

Figura 12

Riesgo de caídas exteriores en formulario FEMA 154



No. Stories: Above Grade: _____ Below Grade: _____ **Year Built:** ☐ EST
Total Floor Area (sq. ft.): _____ **Code Year:** _____
Additions: ☐ None ☐ Yes, Year(s) Built: _____

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse ☐ Residential, # Units: _____

Soil Type: ☐**A** Hard Rock ☐**B** Avg Rock ☐**C** Dense Soil ☐**D** Stiff Soil ☐**E** Soft Soil ☐**F** Poor Soil **DNK** ***If DNK, assume Type D.***

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

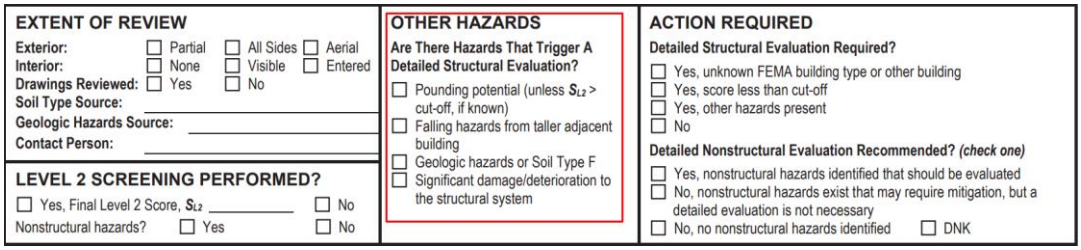
Irregularities: ☐ Vertical (type/severity) _____
☐ Plan (type) _____

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer
☐ Parapets ☐ Appendages
☐ Other: _____

Ahora, en la parte final del formulario FEMA 154, para el cierre de la evaluación de vulnerabilidad encontraremos preguntas importantes sobre la vivienda como otros peligros que debe enfrentar externos a la propia vivienda:

Figura 13

Otros peligros en formulario FEMA 154



EXTENT OF REVIEW

Exterior: ☐ Partial ☐ All Sides ☐ Aerial
Interior: ☐ None ☐ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☐ No
Soil Type Source: _____
Geologic Hazards Source: _____
Contact Person: _____

LEVEL 2 SCREENING PERFORMED?

☐ Yes, Final Level 2 Score, S_{L2} _____ ☐ No
Nonstructural hazards? ☐ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? ***(check one)***

☐ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

2.3. Definición de términos básicos

a. Clasificación AASHTO de suelos.

"Clasificación geotécnica de suelos desarrollada por Terzaghi y Hogentogler, que se basa en sus características granulométricas y de plasticidad. Todos los suelos son clasificados en 8 grupos básicos designados por los símbolos A-1, A-2, A-3, etc" (Hoyos, 2001).

b. Clasificación genética de suelos.

"Clasificación basada en el origen y modo de formación de los depósitos superficiales. Esta clasificación genética está íntimamente ligada al concepto de formación superficial" (Hoyos, 2001).

c. Clasificación unificada de suelos, CUS.

"Clasificación geotécnica de suelos, desarrollada inicialmente por A. Casagrande que se basa en sus características de granulometría y de plasticidad" (Hoyos, 2001).

d. Deslizamiento.

"Término genérico que comprende una amplia variedad de procesos de erosión en masa que incluye el transporte pendiente abajo de masas de suelo y de roca" (Hoyos, 2001).

e. Licuefacción.

"Proceso de transformación de cualquier suelo del estado sólido a un estado líquido; …. como resultado del incremento de la presión en los poros y de la concomitante reducción de la resistencia al corte, asociada a la aplicación de cargas cíclicas" (Hoyos, 2001).

f. Pounding o empuje pasivo

"Presión de una masa de suelo contra una estructura de contención cuando la estructura es desplazada en dirección de la masa de suelo" (Hoyos, 2001).

g. Roca.

"Agregado natural de minerales. Material mineral sólido que se encuentra en grandes masas o fragmentos" (Hoyos, 2001).

h. Roca blanda.

"Corresponde a materiales rocosos que no pueden ser excavados o removidos eficientemente con herramientas manuales y requieren para su excavación y remoción herramientas mecánicas de potencia y modo de operación equivalente a los martillos neumáticos" (Hoyos, 2001).

i. Roca ígnea.

"Término geológico utilizado para designar las rocas formadas por enfriamiento y solidificación de una masa fundida" (Hoyos, 2001).

2.4. Formulación de la hipótesis

El proyecto no requiere de una formulación de hipótesis ya que sólo se requiere conocer bajo una metodología de inspección el estado en el que se encuentra una vivienda.

2.5. Operacionalización de variables

Análisis de las propiedades constructivas vulnerables comparativas al Reglamento de Edificaciones Peruano para viviendas en Las Vegas, provincia de Picota, región San Martín - 2022

Variable	Definición conceptual	Definición operacional	Dimensiones	Indicadores
Propiedades constructivas vulnerables	Para la evaluación a las viviendas se plantea utilizar un método validad por la Agencia Federal de Gestión de Emergencias de los Estados Unidos, ya que en la actualidad nuestro país no cuenta con una metodología normativa para obtener vulnerabilidad en viviendas de manera colectiva y rápida, este método es conocido como el FEMA-154, "el cual para la determinación de si se reforzara la edificación lo hace a través de un índice" (Benjamín y Lockhart, 2011, p.258).	El método se desarrolla a través de un formulario de recolección de datos en donde se observa a la vivienda a evaluar y se van registrando las observaciones de manera descriptiva y marcando los puntos del formulario adecuados, para ello esta ficha se ve caracterizada básicamente por componentes que en la presente investigación se ha dimensionado en 4.	Suelos	Roca dura, roca, suelo denso, suelo rígido, suelo suave, suelo pobre
				Presencia de licuefacción
				Deslizamientos de tierra
				Superficie de ruptura
			Configuración estructural	Irregularidad vertical
				Irregularidad en planta
				Altura
				Área
			Ocupación	
			Riesgos no estructurales	

CAPÍTULO III

METODOLOGÍA

3.1. Diseño metodológico

Tenemos una investigación de nivel descriptiva, la cual:

> Responde a las preguntas: ¿cómo son?, ¿dónde están?, ¿cuántos son?, ¿quiénes son? etc.; es decir, nos dice y refiere sobre las características, cualidades internas y externas, propiedades y rasgos esenciales de los hechos y fenómenos de la realidad, en un momento y tiempo histórico concreto y determinado. (Carrasco, 2006, pp. 41-42)

Además tiene un tipo de investigación básica, "no tiene propósitos aplicativos inmediatos, pues solo busca ampliar y profundizar el caudal de conocimientos científicos existentes acerca de la realidad" (Carrasco, 2006, p.43).

Para Hernández, Fernández y Baptista (2010), el enfoque aplicado es el cuantitativo: "Usa la recolección de datos para probar hipótesis, con base en la medición numérica y el análisis estadístico, para establecer patrones de comportamiento y probar teorías" (p.4).

El diseño de investigación para Carrasco (2006) es el diseño no experimental, "aquellos cuyas variables independientes carecen de manipulación intencional, y no poseen grupo

de control, ni mucho menos experimental. Analizan y estudian los hechos y fenómenos de la realidad después de su ocurrencia" (p.71).

Así mismo, Carrasco (2006) establece dos tipos de diseños no experimentales. El primero es el diseño transeccional o transversal, "se utiliza para realizar estudios de investigación de hechos y fenómenos de la realidad, en un momento determinado del tiempo" (p.72).

3.2. Población y muestra

3.2.1. Población.

"Conjunto de todos los elementos (unidades de análisis) que pertenecen al ámbito espacial donde se desarrolla el trabajo de investigación" (Carrasco, 2006). La cual está concebida por las 08 viviendas seleccionadas para la investigación que cumplen con los requisitos previos adecuados al FEMA 154 en el sector Las Vegas en Picota.

3.2.2. Muestra.

No ha sido necesario seleccionar una muestra debido a que la población seleccionada es pequeña.

3.3. Técnicas de recolección de datos

3.3.1. Técnicas a emplear.

La observación, "proceso sistemático de obtención, recopilación y registro de datos empíricos de un objeto, un suceso, un acontecimiento o conducta humana con el propósito de procesarlo y convertirlo en información" (Carrasco, 2006). Aplicado para la inspección de campo con el instrumento correspondiente.

3.3.2. Descripción de los instrumentos.

Ficha de observación, “se emplea para registrar datos que se generan como resultado del contacto directo entre el observador y la realidad que se observa” (Carrasco, 2016). La cual será aplicada en la inspección de campo a las viviendas.

3.4. Técnicas para el procesamiento de la información

El trabajo de campo se desarrollará bajo el instrumento de ficha de observación del FEMA 154 el cual consiste en un formato inicial de nivel 1, que puede ser categorizado bajo una escala de nivel de incidencia sísmica baja, moderada y alta, la cual será previamente analizada bajo los rangos establecidos de sismicidad en el país indicados en el RNE.

Lo siguiente será evaluar bajo el formato inicial de nivel 1 a cada una de las viviendas, aplicando las herramientas básicas de medición de longitudes y consultas a los propietarios sobre características generales para llenar el formato completo, al término del formato se establecerá el rango de vulnerabilidad y con este se podrá definir si es necesario utilizar la ficha de nivel 2.

Finalmente se indicarán que viviendas se han encontrado con vulnerabilidad significante para el conocimiento de cada propietario.

CAPÍTULO IV

RESULTADOS

4.1. Análisis de resultados

Los resultados a mostrar están de acuerdo a los objetivos planteados del estudio a fin de demostrar su cumplimiento en el desarrollo del trabajo de campo:

Primero el reconocimiento de campo ubica al sector de las Vegas de Picota en la zona de sismicidad 3 (figura 14) de acuerdo a la reglamentación peruana por lo que se aplicará el instrumento de sismicidad moderadamente alta.

Figura 14

Zonas sísmicas

Nota, obtenido del Reglamento Nacional de Edificaciones.

Los registros en las tablas se dataron de acuerdo a los mencionados en los anexos:

Para la vivienda 01, ubicada en la figura 15 se obtuvo el índice de 0,4 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 16) a raíz del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

Para la vivienda 02, ubicada en la figura 17 se obtuvo el índice de 0,0 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 18) a raíz del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

Para la vivienda 03, ubicada en la figura 19 se obtuvo el índice de 0,4 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 20) a raíz del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

Para la vivienda 04, ubicada en la figura 21 se obtuvo el índice de 0,3 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 22) a raíz del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

Para la vivienda 05, ubicada en la figura 23 se obtuvo el índice de 0,4 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 24) a raíz

del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

Para la vivienda 06, ubicada en la figura 25 se obtuvo el índice de 0,4 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 26) a raíz del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

Para la vivienda 07, ubicada en la figura 27 se obtuvo el índice de 0,4 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 28) a raíz del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

Para la vivienda 08, ubicada en la figura 29 se obtuvo el índice de 0,4 para el formato nivel 01, por lo que se desarrolló la aplicación de un formato nivel 02 (figura 30) a raíz del valor menor a 2. En este formato nivel 02, la vivienda obtuvo el valor del índice de 0,3 con lo que se confirma y verifica el alto índice de vulnerabilidad de la vivienda analizada.

CAPÍTULO V

DISCUSIÓN

5.1. Discusión de resultados

Del análisis de resultados, la comparación de los valores de vulnerabilidad está orientados a un índice de moderadamente alto hasta llegar a un nivel de desarrollo 2 del instrumento FEMA 154, de donde se verifica el valor de 0,4 en la mayoría de las viviendas, en comparación con Loor, Palma y García (2021), cuya incidencia alta de vulnerabilidad en más del 50% de las viviendas ya que no cumplen con la Norma Ecuatoriana de la Construcción. Un 6,2% tiene un valor S=Smin, el 17,93% tiene un valor S>Smin<1, el 44,87% tiene un valor S>1<2, y el 31% tiene un valor S>2.

Así mismo los datos de moderadamente alto hasta llegar a un nivel de desarrollo 2 del instrumento FEMA 154 concuerdan con Criado (2020), cuya incidencia alta de vulnerabilidad en el 94,62%, moderada en 2,69E% y baja en 2,69% de las viviendas.

El otro autor con el que comparamos los resultados de aplicar el instrumento nivel 2 es con Chumbes, C. A. (2019), cuya vulnerabilidad obtenida para 8% es de vulnerabilidad alta, el 88% es de vulnerabilidad media, el 4% es de vulnerabilidad baja.

Finalmente, los valores de vulnerabilidad están orientados a un índice de moderadamente alto hasta llegar a un nivel de desarrollo 2 del instrumento FEMA 154, de donde se verifica el valor de 0,4 en la mayoría de las viviendas, en comparación con Galdos y Núñez (2020), cuyo valor obtenido fue para el bloque B de mayor a 2 ya que existen equipos de gran peso. El bloque A fue de 0,4 para formato moderado alto y 0,3 para el formato alto. El bloque C fue de 1,5 para formato moderado alto y 1,4 para el formato alto. La edificación antigua tuvo un valor de 0,3.

CAPÍTULO VI

CONCLUSIONES Y RECOMENDACIONES

6.1. Conclusiones

1. Respecto al análisis de los resultados respecto al objetivo específico 1 de conocer qué características de los suelos inciden en la vulnerabilidad de las viviendas, respecto a las 8 viviendas, se constató que el suelo de la zona es considerado un suelo de arcilla blanda debido a que el nivel freático del suelo se encuentra a poca profundidad de la superficie, siendo una zona de posible asentamiento, por ello las viviendas son normalmente construidas de 01 nivel, ya que la carga admisible es muy baja.

2. Respecto al análisis de los resultados respecto al específico 2 de conocer cómo la configuración estructural incide en la vulnerabilidad de las viviendas, respecto a las 8 viviendas, se constató que las irregularidades verticales en su mayoría es moderada debido a la observación de columnas cortas en todas las viviendas en la mayoría de columnas de la parte frontal de las viviendas, sin considerarse confinamiento de vigas que puedan dar un comportamiento de pórtico, a esto sumarle la ausencia de losas rígidas que permitan el desplazamiento en bloque de la vivienda, por ello es considerada esta irregular importante. Respecto a la irregularidad horizontal la mayoría de viviendas solo cuentan con cimientos, en algunos casos corridos en otros solos, pero no se tiene presencia de zapatas con pórticos que puedan ayudar con la mejora de la carga de la vivienda sobre el terreno.

3. Respecto al análisis de los resultados respecto al específico 3 de conocer qué tipo de ocupación incide en la vulnerabilidad de las viviendas, respecto a las 8 viviendas son de uso residencial de 1 solo nivel respecto al tipo de suelo donde se asienta, ya que no permite elevar de niveles por la baja capacidad portante. Además en la mitad de los casos son de barro y quincha los muros, en la otra mitad son de albañilería de diferentes tipos de ladrillo que buscan disminuir el peso de la vivienda para evitar los posibles asentamientos a generarse.

4. Respecto al análisis de los resultados respecto al específico 4 de conocer qué riesgos no estructurales inciden en la vulnerabilidad de las viviendas, respecto a las 8 viviendas, ninguna tiene losa de concreto ni aligerada, son directamente coberturas de calamina apoyadas sobre listones de madera, en muchos de los casos se encuentran con fisuras y arregladas moderadamente pero pueden generar riesgos a los ocupantes, ya que los listones de madera están solo apoyados sobre los muros de adobe o ladrillo, generando cargas puntuales en la luz entre las columnas, sin poder transmitir la carga como se debe a toda el elemento de mampostería.

5. Respecto al análisis de los específicos, el general que busca conocer qué propiedades constructivas son vulnerables en comparación al Reglamento de Edificaciones Peruano para viviendas, si bien es cierto el análisis de las 8 viviendas ha podido evidenciarse que se trabajaron con un período de código de diseño superior al 2006, pero ninguna de estas viviendas se construyó con un plano de diseño por lo que no se cuenta con un adecuado diseño estructural, por lo que todas las viviendas han obtenido un índice moderadamente alto de vulnerabilidad tanto en el nivel 1 y 2, indicándose sobre todo la verificación de la falta de confinamiento de sus elementos estructurales, baja capacidad de suelo de cimentación y falta de losa rígida o aligerada que transmita adecuadamente la carga sísmica hacia los elementos estructurales. Por lo que se considera la demolición de las mamposterías de estas estructuras y se puedan construir bajo un diseño con análisis adecuado para la cimentación del tipo de suelo evidenciado.

6.2. Recomendaciones

1. Respecto al suelo, mejorar la cimentación con vigas de cimentación de concreto armado para contribuir con la transferencia de la carga hacia el suelo. De igual forma no se debe de elevar el número de pisos existentes, al menos que se mejore la calidad portante del suelo por algún método adecuado.

2. Respecto a los elementos estructurales para el caso de columnas estas se deben dimensionar de acuerdo a la reglamentación vigente y reconstruirlas.
3. Respecto a las vigas y losas, de acuerdo al diseño en conjunto de la albañilería confinada se deben obligatoriamente construir y dar el mantenimiento correcto, colocando coberturas de calaminas sobre estas para evitar que la lluvia constantemente sature de humedad la vivienda.
4. Eliminar la cobertura existente ya que es riesgoso debido a su estado de conservación que presenta y el mal soporte de carga sobre muros y no sobre vigas de transmisión de carga.

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ANEXOS

Matriz de consistencia

Análisis de las propiedades constructivas vulnerables comparativas al Reglamento de Edificaciones Peruano para viviendas en Las Vegas, provincia de Picota, región San Martín - 2022

Problemas general	Objetivo general	Variable	Dimensión	Indicador	Metodología
¿Qué propiedades constructivas son vulnerables en comparación al Reglamento de Edificaciones Peruano para viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?	Conocer qué propiedades constructivas son vulnerables en comparación al Reglamento de Edificaciones Peruano para viviendas en Las Vegas, provincia de Picota, región San Martín - 2022.	Propiedades constructivas vulnerables	Suelos	Roca dura, roca, suelo denso, suelo rígido, suelo suave, suelo pobre	Nivel: Descriptivo
				Presencia de licuefacción	Diseño: No experimental
				Deslizamientos de tierra	
Problemas generales	Objetivos generales			Superficie de ruptura	Tipo: Básica
a) ¿Qué características de los suelos inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?	a) Conocer qué características de los suelos inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.		Configuración estructural	Irregularidad vertical	Enfoque: Cuantitativo
b) ¿Cómo la configuración estructural incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?	b) Conocer cómo la configuración estructural incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.			Irregularidad en planta	Población: 08 viviendas
				Altura	Instrumento: Ficha de observación
c) ¿Qué tipo de ocupación incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?	c) Conocer qué tipo de ocupación incide en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.			Área	Técnica: Observación
			Ocupación		Procesamiento: FEMA 154
d) ¿Qué riesgos no estructurales inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín - 2022?	d) Conocer qué riesgos no estructurales inciden en la vulnerabilidad de las viviendas en Las Vegas, provincia de Picota, región San Martín – 2022.		Riesgos no estructurales		

UNIVERSIDAD NACIONAL JOSÉ FAUSTINO SÁNCHEZ CARRIÓN

ESCUELA PROFESIONAL DE INGENIERÍA CIVIL

FICHA DE OBSERVACION

Rapid Visual Screening of Buildings for Potential Seismic Hazards — **Level 1**
FEMA P-154 Data Collection Form — **MODERATELY HIGH Seismicity**

PHOTOGRAPH

SKETCH

Address: _____
_____ Zip: _____
Other Identifiers: _____
Building Name: _____
Use: _____
Latitude: _____ Longitude: _____
S_S: _____ S_1: _____
Screener(s): _____ Date/Time: _____

No. Stories: Above Grade: ____ Below Grade: ____ Year Built: ☐ EST
Total Floor Area (sq. ft.): _____ Code Year: _____
Additions: ☐ None ☐ Yes, Year(s) Built: _____

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse ☐ Residential, # Units: _____

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☐E Soft Soil ☐F Poor Soil ☐DNK *If DNK, assume Type D.*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☐ Vertical (type/severity) _____ ☐ Plan (type)

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer ☐ Parapets ☐ Appendages ☐ Other: _____

COMMENTS:

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score	**4.1**	**3.7**	**3.2**	**2.3**	**2.2**	**2.9**	**2.2**	**2.0**	**1.7**	**2.1**	**1.4**	**1.8**	**1.5**	**1.8**	**1.8**	**1.2**	**2.2**
Severe Vertical Irregularity, V_{L1}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{L1}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{L1}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	*1.6*	*1.2*	*0.8*	*0.5*	*0.5*	*0.9*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.2*	*1.4*

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$:

EXTENT OF REVIEW

Exterior: ☐ Partial ☐ All Sides ☐ Aerial
Interior: ☐ None ☐ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☐ No
Soil Type Source: _____
Geologic Hazards Source: _____
Contact Person: _____

LEVEL 2 SCREENING PERFORMED?

☐ Yes, Final Level 2 Score, S_{L2} _____ ☐ No
Nonstructural hazards? ☐ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

☐ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Rapid Visual Screening of Buildings for Potential Seismic Hazards — **Level 2 (Optional)**

FEMA P-154 Data Collection Form — **MODERATELY HIGH Seismicity**

Optional Level 2 data collection to be performed by a civil or structural engineering professional, architect, or graduate student with background in seismic evaluation or design of buildings.

Bldg Name:	**Final Level 1 Score:**	S_{L1} =	*(do not consider S_{MIN})*
Screener:	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} =	*Plan Irregularity,* P_{L1} =
Date/Time:	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ =	

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	-0.5	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	-0.5	
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2} = _____
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	-0.5	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		-0.8	
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		-0.4	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2} = _____
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		-0.8	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
		(Cap total pounding modifiers at -1.3)		
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		+0.3	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M = _____

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☐ No

If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement (*Check "Yes" or "No"*)	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.			
	There is heavy cladding or heavy veneer.			
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.			
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.			
	There is a sign posted on the building that indicates hazardous materials are present.			
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.			
	Other observed exterior nonstructural falling hazard:			
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.			
	Other observed interior nonstructural falling hazard:			

Estimated Nonstructural Seismic Performance (*Check appropriate box and transfer to Level 1 form conclusions*)

☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended

☐ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required

☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Figura 15

Vivienda 01 – Nivel 01

Address: Sector las Vegas - Picota
Zip:
Other Identifiers:
Building Name: Vivienda 01
Use: Vivienda unifamiliar
Latitude: Longitude:
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany Date/Time: 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 Year Built: ☐ EST
Total Floor Area (sq. ft.): 78 m2 Code Year: 2006
Additions: ☐ None ☐ Yes, Year(s) Built: 2011
Occupancy: Assembly Commercial Emer. Services ☐ Historic ☐ Shelter
Industrial Office School ☐ Government
Utility Warehouse x Residential, # Units: 1
Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil DNK *If DNK, assume Type D*
Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK
Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building
Irregularities: ☒ Vertical (type/severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre
Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer
☐ Parapets ☐ Appendages
☒ Other: Coberturas en mal estado

COMMENTS:

SKETCH

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score	4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{L1}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{L1}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{L1}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	*1.6*	*1.2*	*0.6*	*0.5*	*0.5*	*0.9*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.2*	*1.4*

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$: -0.6-0.7+2.1-0.4 = 0.4

EXTENT OF REVIEW
Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?
☒ Yes, Final Level 2 Score, S_{L2} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED
Detailed Structural Evaluation Required?
☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No
Detailed Nonstructural Evaluation Recommended? *(check one)*
☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 16

Vivienda 01 – Nivel 02

Bldg Name:	Vivienda 01	**Final Level 1 Score:**	S_{L1} = 0.4	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -0.6	*Plan Irregularity,* P_{L1} = -0.7	
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	-1.5
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2}= -1.3
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2}= -1.3
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
		(Cap total pounding modifiers at -1.3)		
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No

If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended

☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required

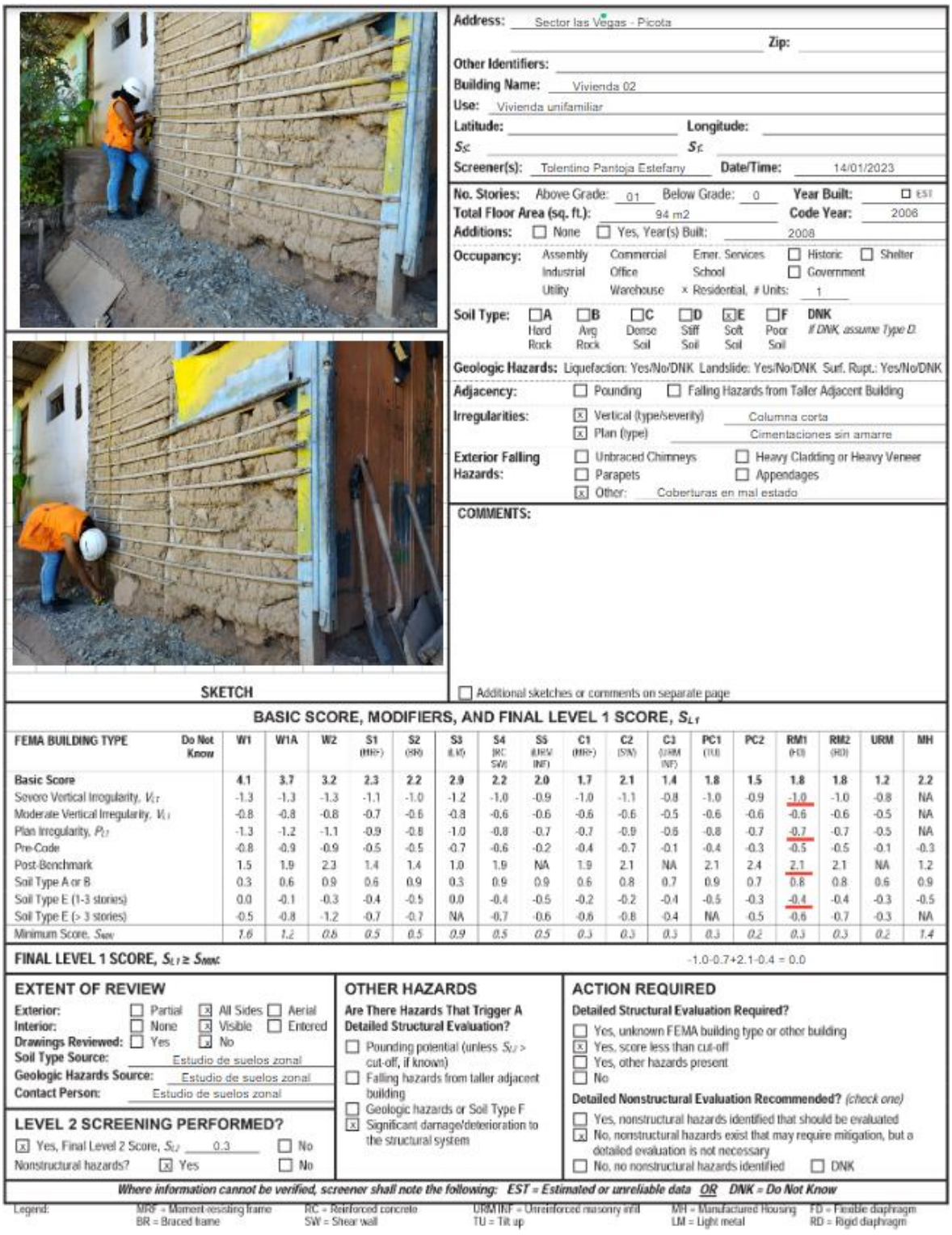
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.

Figura 17

Vivienda 02 – Nivel 01



Address: Sector las Vegas - Picota
Zip:
Other Identifiers:
Building Name: Vivienda 02
Use: Vivienda unifamiliar
Latitude: Longitude:
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany Date/Time: 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 Year Built: ☐ EST
Total Floor Area (sq. ft.): 94 m2 Code Year: 2008
Additions: ☐ None ☐ Yes, Year(s) Built: 2008

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse × Residential, # Units: 1

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil DNK *If DNK, assume Type D*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☒ Vertical (type/severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer
☐ Parapets ☐ Appendages
☒ Other: Coberturas en mal estado

COMMENTS:

SKETCH

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score	4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{1a}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{1b}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{1a}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	*1.6*	*1.2*	*0.6*	*0.5*	*0.5*	*0.9*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.2*	*1.4*

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$ -1.0-0.7+2.1-0.4 = 0.0

EXTENT OF REVIEW
Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?
☒ Yes, Final Level 2 Score, S_{L1} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
☐ Pounding potential (unless S_{L1} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED
Detailed Structural Evaluation Required?
☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No
Detailed Nonstructural Evaluation Recommended? *(check one)*
☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 18

Vivienda 02 – Nivel 02

Bldg Name:	Vivienda 02	**Final Level 1 Score:**	S_{L1} = 0.0	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -1.0	*Plan Irregularity,* P_{L1} =	-0.7
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	-1.5
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2}= -1.3
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2}= -1.3
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
		(Cap total pounding modifiers at -1.3)		
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No

If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended

☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required

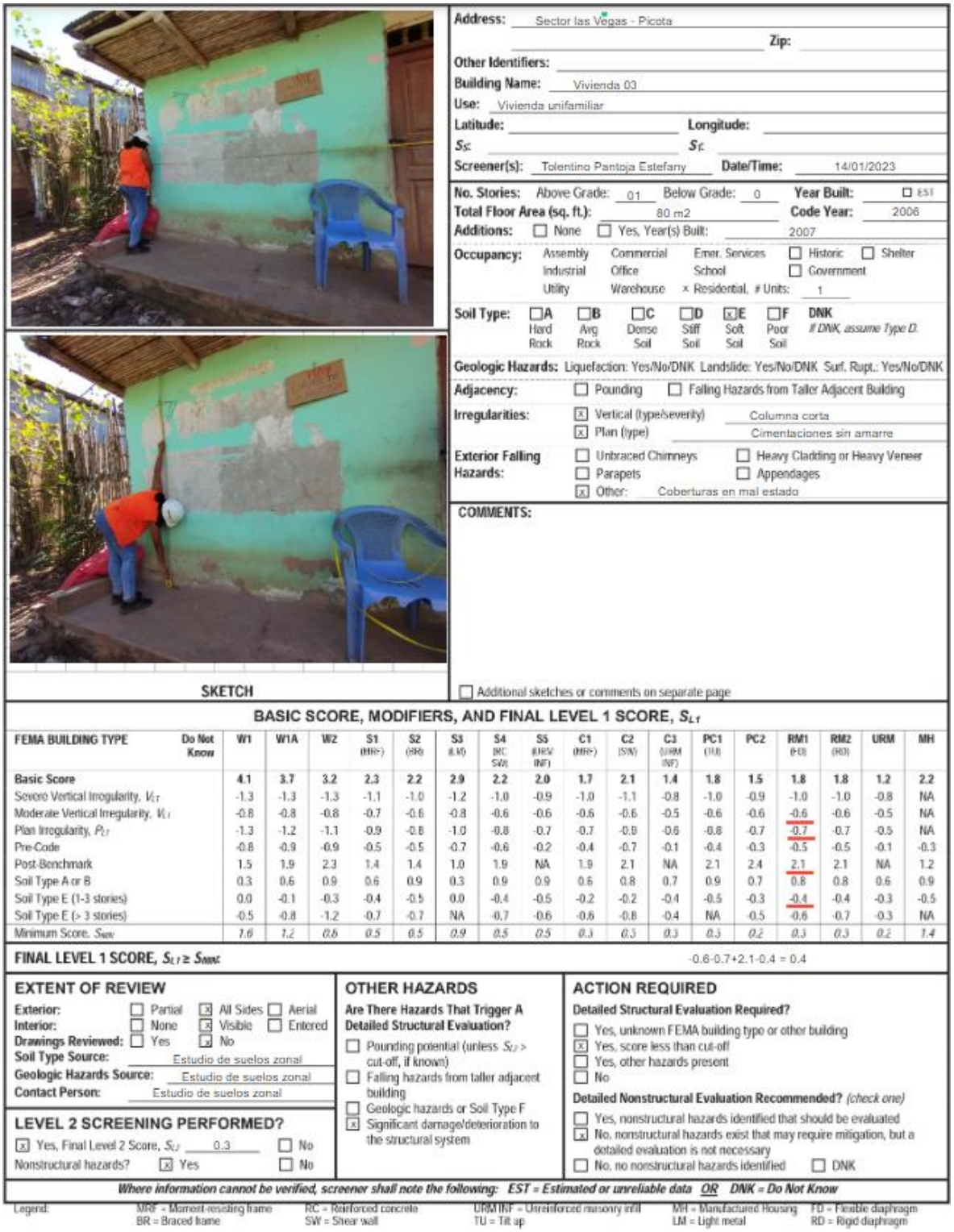
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.

Figura 19

Vivienda 03 – Nivel 01



Address: Sector las Vegas - Picota **Zip:**
Other Identifiers:
Building Name: Vivienda 03
Use: Vivienda unifamiliar
Latitude: **Longitude:**
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany **Date/Time:** 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 **Year Built:** ☐ EST
Total Floor Area (sq. ft.): 80 m2 **Code Year:** 2006
Additions: ☐ None ☐ Yes, Year(s) Built: 2007

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse × Residential, # Units: 1

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil **DNK** *If DNK, assume Type D*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☒ Vertical (type/severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer ☐ Parapets ☐ Appendages ☒ Other: Coberturas en mal estado

COMMENTS:

SKETCH

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score	4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{L1}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{L1}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{L1}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	1.6	1.2	0.6	0.5	0.5	0.9	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	1.4

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$: -0.6-0.7+2.1-0.4 = 0.4

EXTENT OF REVIEW
Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?
☒ Yes, Final Level 2 Score, S_{L1} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
☐ Pounding potential (unless S_{L1} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED
Detailed Structural Evaluation Required?
☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No
Detailed Nonstructural Evaluation Recommended? *(check one)*
☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 20

Vivienda 03 – Nivel 02

Bldg Name:	Vivienda 03	**Final Level 1 Score:**	S_{L1} = 0.4	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -0.6	*Plan Irregularity,* P_{L1} = -0.7	
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	-1.5
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2}= -1.3
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2}= -1.3
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
		(Cap total pounding modifiers at -1.3)		
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No
If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

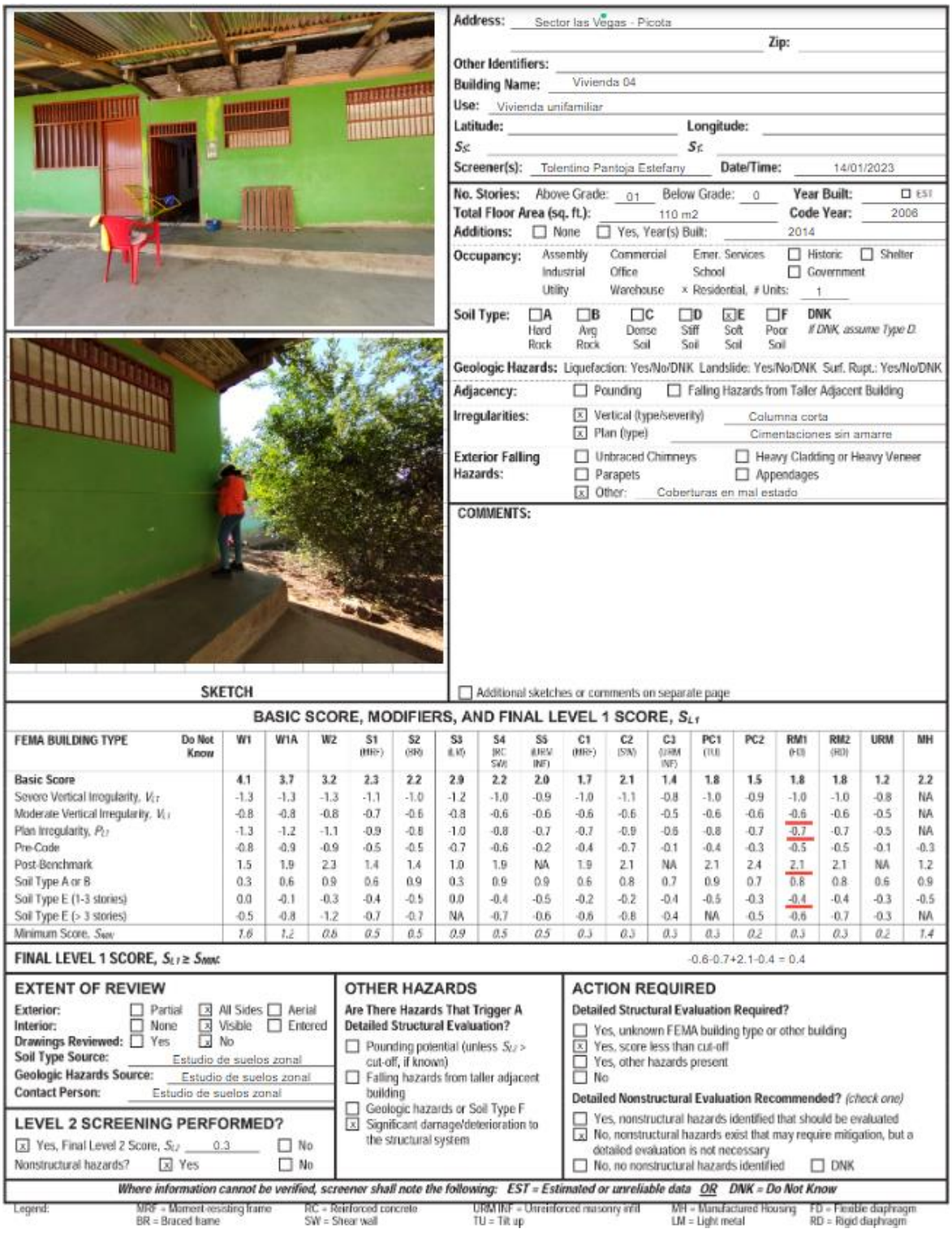
☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended
☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.

Figura 21

Vivienda 04 – Nivel 01



Address: Sector las Vegas - Picota
Zip:
Other Identifiers:
Building Name: Vivienda 04
Use: Vivienda unifamiliar
Latitude: Longitude:
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany Date/Time: 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 Year Built: ☐ EST
Total Floor Area (sq. ft.): 110 m2 Code Year: 2006
Additions: ☐ None ☐ Yes, Year(s) Built: 2014

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse ☒ Residential, # Units: 1

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil DNK *If DNK, assume Type D*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☒ Vertical (type/severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer ☐ Parapets ☐ Appendages ☒ Other: Coberturas en mal estado

COMMENTS:

SKETCH

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (HD)	RM2 (RD)	URM	MH
Basic Score	4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{L1}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{L1}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{L1}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	*1.6*	*1.2*	*0.6*	*0.5*	*0.5*	*0.9*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.2*	*1.4*

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$: -0.6-0.7+2.1-0.4 = 0.4

EXTENT OF REVIEW

Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?

☒ Yes, Final Level 2 Score, S_{L2} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 22

Vivienda 04 – Nivel 02

Bldg Name:	Vivienda 04	**Final Level 1 Score:**	S_{L1} = 0.4	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -0.6	*Plan Irregularity,* P_{L1} = -0.7	
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the *crawl* space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	-1.5
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2}= -1.3
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2}= -1.3
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	*(Cap total pounding modifiers at -1.3)*
		The building is at the end of the block.	-0.5	
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No

If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended

☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required

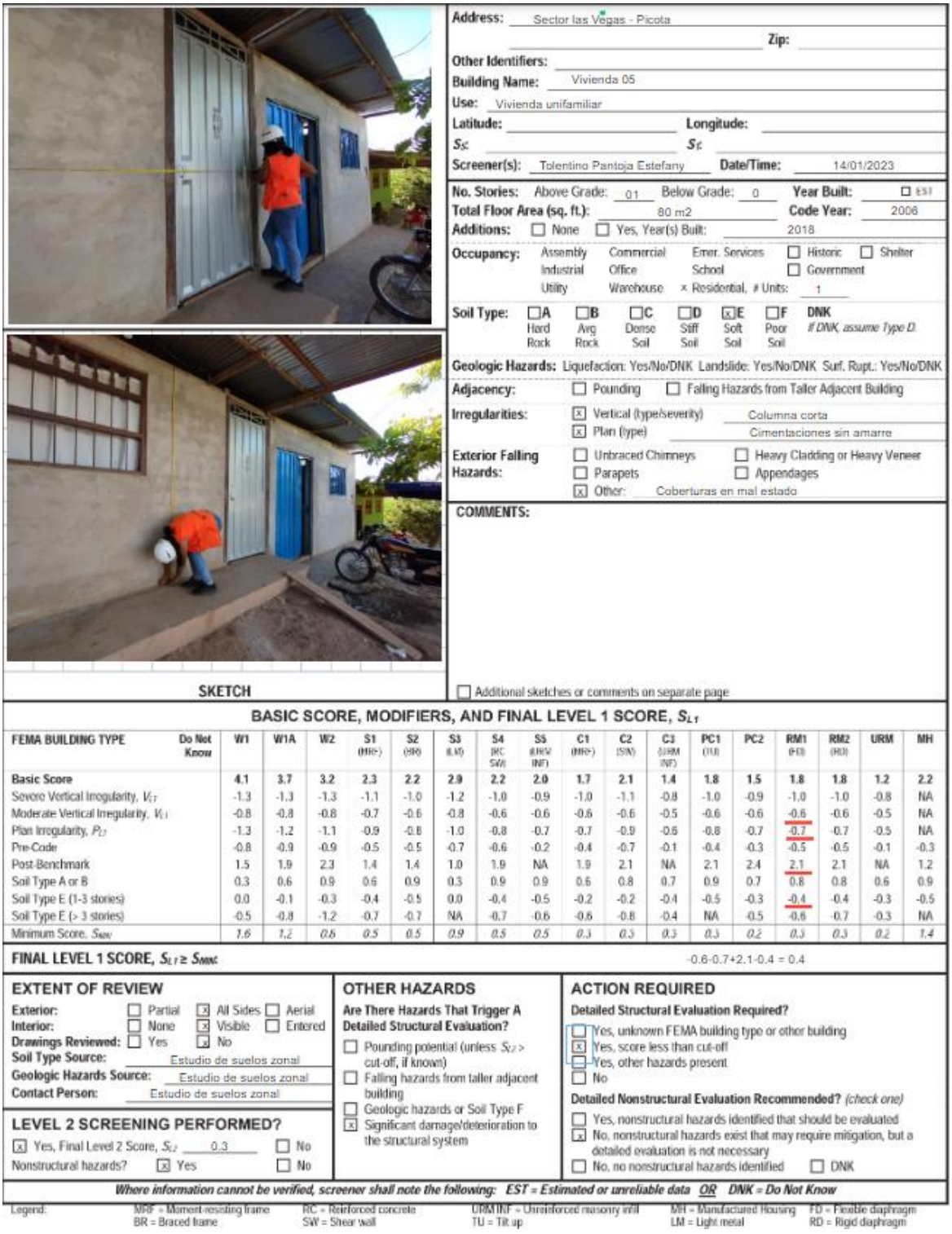
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.

Figura 23

Vivienda 05 – Nivel 01



Address: Sector las Vegas - Picota
Zip:
Other Identifiers:
Building Name: Vivienda 05
Use: Vivienda unifamiliar
Latitude: Longitude:
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany Date/Time: 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 Year Built: ☐ EST
Total Floor Area (sq. ft.): 80 m2 Code Year: 2006
Additions: ☐ None ☐ Yes, Year(s) Built: 2018

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse × Residential, # Units: 1

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil DNK *If DNK, assume Type D*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☒ Vertical (type/severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer ☐ Parapets ☐ Appendages ☒ Other: Coberturas en mal estado

COMMENTS:

SKETCH

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score	4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{1A}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{1C}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{1A}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	*1.6*	*1.2*	*0.6*	*0.5*	*0.5*	*0.9*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.2*	*1.4*

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$: -0.6-0.7+2.1-0.4 = 0.4

EXTENT OF REVIEW

Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?

☒ Yes, Final Level 2 Score, S_{L2} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 24

Vivienda 05 – Nivel 02

Bldg Name:	Vivienda 05	**Final Level 1 Score:**	S_{L1} = 0.4	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -0.6	*Plan Irregularity,* P_{L1} = -0.7	
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	-1.5 ↓ V_{L2} = -1.3 *(Cap at -1.3)*
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2 ↓ P_{L2} = -1.3 *(Cap at -1.3)*
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
		(Cap total pounding modifiers at -1.3)		
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No
If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

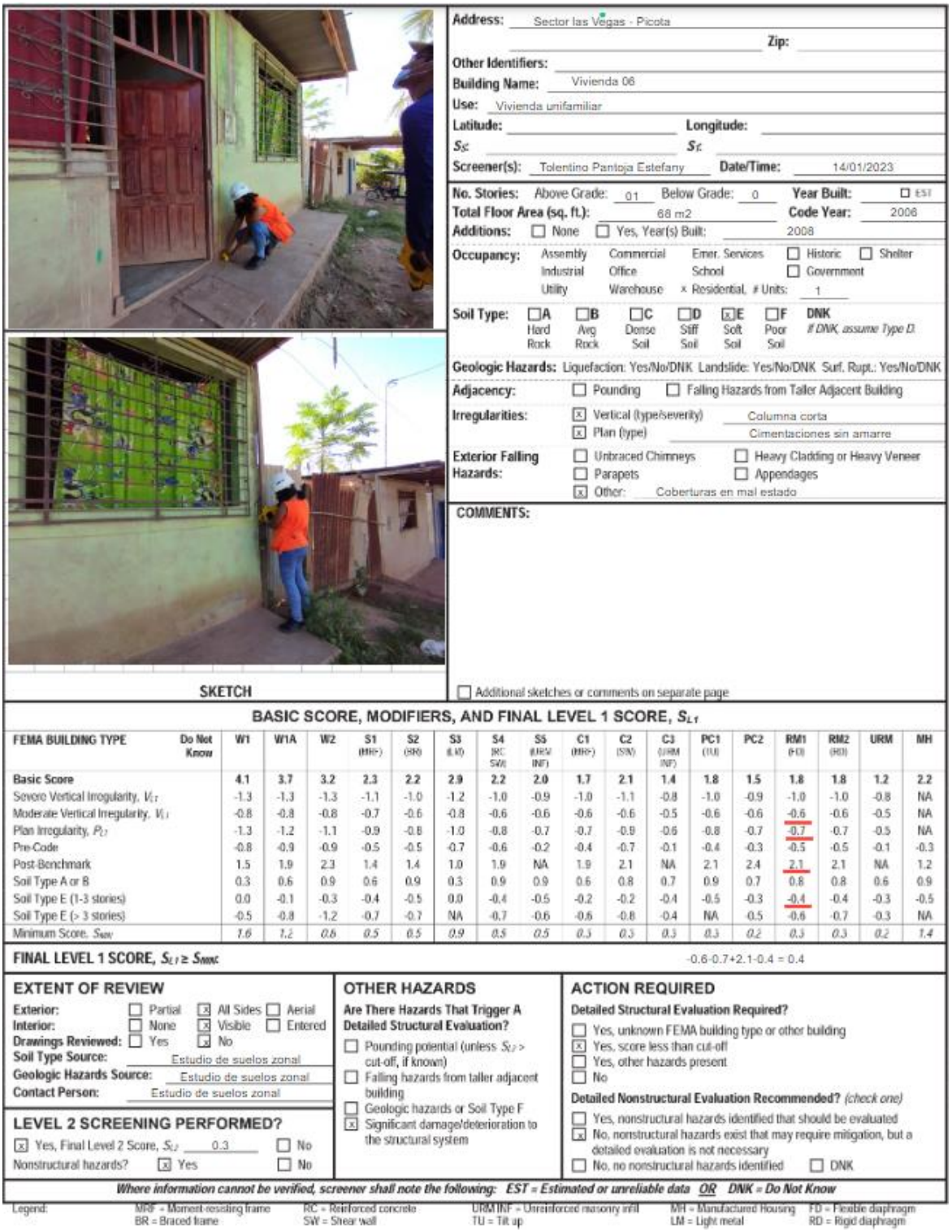
☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended
☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.

Figura 25

Vivienda 06 – Nivel 01



Address: Sector las Vegas - Picota
Zip:
Other Identifiers:
Building Name: Vivienda 06
Use: Vivienda unifamiliar
Latitude: Longitude:
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany Date/Time: 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 Year Built: ☐ EST
Total Floor Area (sq. ft.): 68 m2 Code Year: 2006
Additions: ☐ None ☐ Yes, Year(s) Built: 2008

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse x Residential, # Units: 1

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil DNK *If DNK, assume Type D*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☒ Vertical (type/severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer
☐ Parapets ☐ Appendages
☒ Other: Coberturas en mal estado

COMMENTS:

SKETCH

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (SR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score	4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{L1}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{L1}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{L1}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	1.6	1.2	0.6	0.5	0.5	0.9	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	1.4

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$ -0.6-0.7+2.1-0.4 = 0.4

EXTENT OF REVIEW

Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?

☒ Yes, Final Level 2 Score, S_{L2} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URMINF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 26

Vivienda 06 – Nivel 02

Bldg Name:	Vivienda 06	**Final Level 1 Score:**	S_{L1} = 0.4	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -0.6	*Plan Irregularity,* P_{L1} =	-0.7
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	-1.5
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2} = -1.3
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2} = -1.3
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

(Cap total pounding modifiers at -1.3)

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No

If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended

☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required

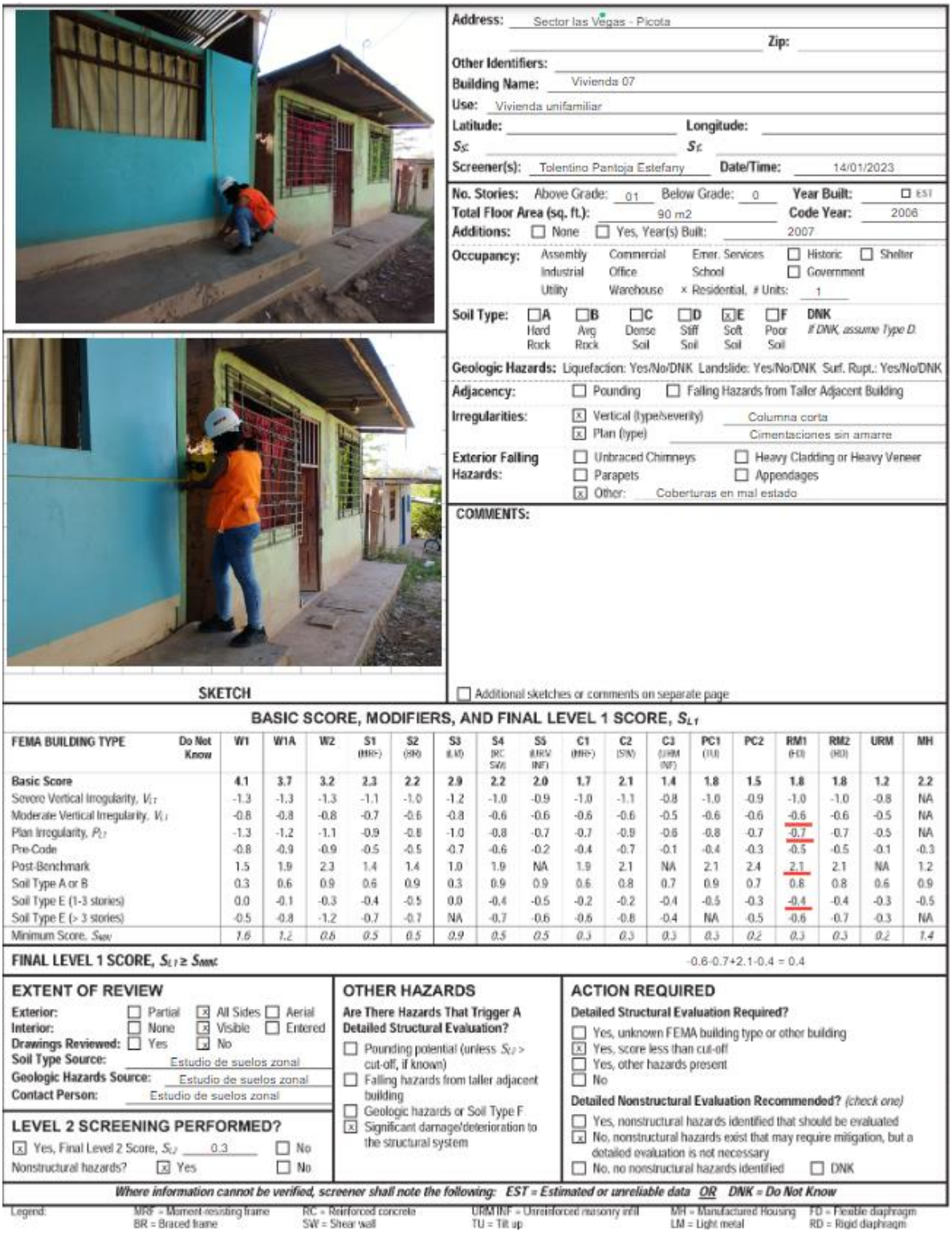
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.

Figura 27

Vivienda 07 – Nivel 01



Address: Sector las Vegas - Picota
Zip:
Other Identifiers:
Building Name: Vivienda 07
Use: Vivienda unifamiliar
Latitude: Longitude:
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany Date/Time: 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 Year Built: ☐ EST
Total Floor Area (sq. ft.): 90 m2 Code Year: 2006
Additions: ☐ None ☐ Yes, Year(s) Built: 2007

Occupancy: Assembly ☐ Commercial ☐ Emer. Services ☐ Historic ☐ Shelter
Industrial ☐ Office ☐ School ☐ Government
Utility ☐ Warehouse × Residential, # Units: 1

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil DNK *If DNK, assume Type D*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☒ Vertical (type&severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer ☐ Parapets ☐ Appendages ☒ Other: Coberturas en mal estado

COMMENTS:

SKETCH

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE	Do Not Know	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score		4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{L1}		-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{L1}		-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{L1}		-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code		-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark		1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B		0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)		0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)		-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}		*1.6*	*1.2*	*0.6*	*0.5*	*0.5*	*0.9*	*0.5*	*0.5*	*0.3*	*0.3*	*0.3*	*0.3*	*0.2*	*0.3*	*0.3*	*0.2*	*1.4*

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$: -0.6-0.7+2.1-0.4 = 0.4

EXTENT OF REVIEW

Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?

☒ Yes, Final Level 2 Score, S_{L2} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame BR = Braced frame RC = Reinforced concrete SW = Shear wall URM INF = Unreinforced masonry infill TU = Tilt up MH = Manufactured Housing LM = Light metal FD = Flexible diaphragm RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 28

Vivienda 07 – Nivel 02

Bldg Name:	Vivienda 07	**Final Level 1 Score:**	S_{L1} = 0.4	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -0.6	*Plan Irregularity,* P_{L1} =	-0.7
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	-1.5
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2}= -1.3
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2}= -1.3
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
		(Cap total pounding modifiers at -1.3)		
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No

If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended

☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required

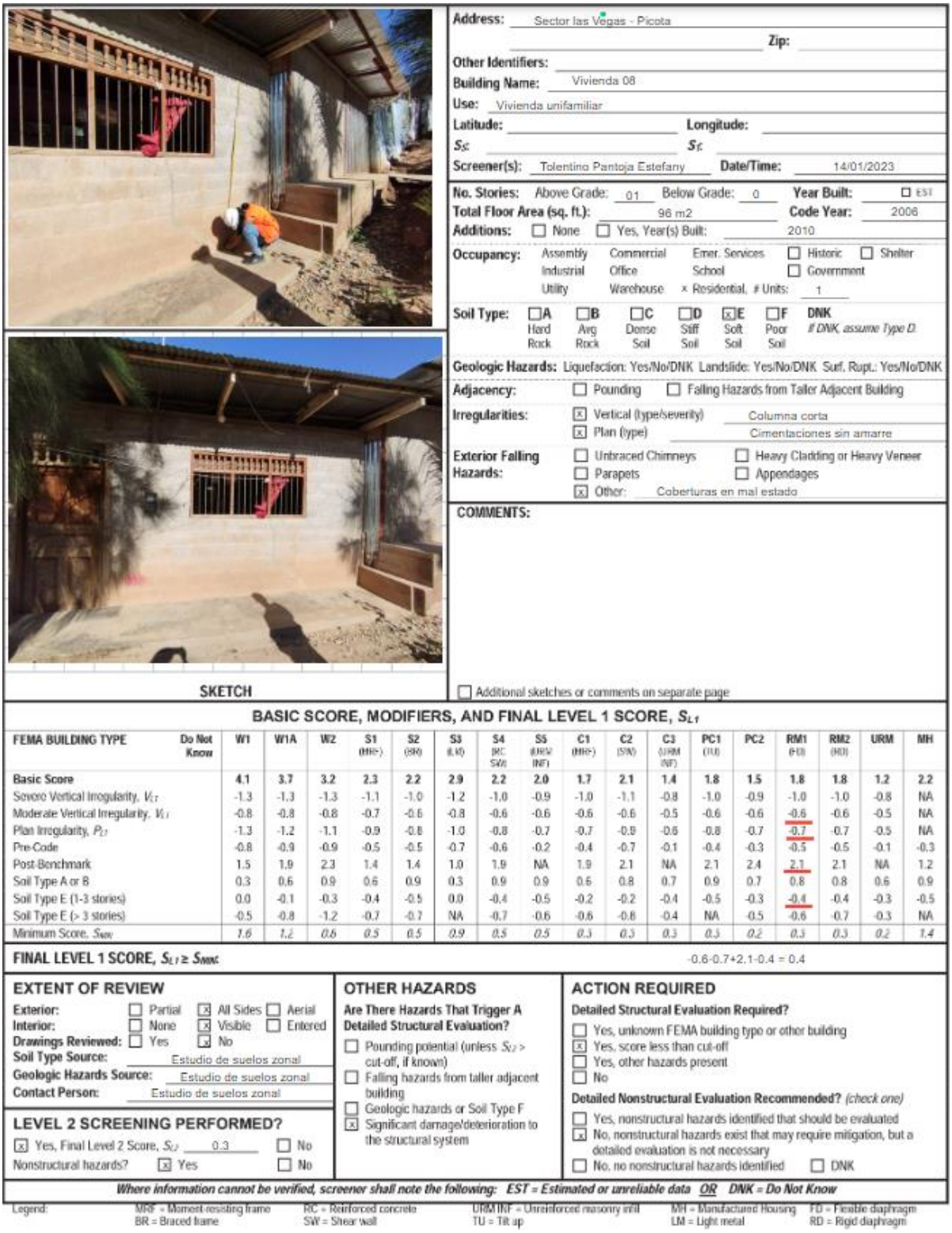
☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.

Figura 29

Vivienda 08 – Nivel 01



Address: Sector las Vegas - Picota
Zip:
Other Identifiers:
Building Name: Vivienda 08
Use: Vivienda unifamiliar
Latitude: Longitude:
S_S: S_1:
Screener(s): Tolentino Pantoja Estefany Date/Time: 14/01/2023

No. Stories: Above Grade: 01 Below Grade: 0 Year Built: ☐ EST
Total Floor Area (sq. ft.): 96 m2 Code Year: 2006
Additions: ☐ None ☐ Yes, Year(s) Built: 2010

Occupancy: Assembly Commercial Emer. Services ☐ Historic ☐ Shelter
Industrial Office School ☐ Government
Utility Warehouse x Residential, # Units: 1

Soil Type: ☐A Hard Rock ☐B Avg Rock ☐C Dense Soil ☐D Stiff Soil ☒E Soft Soil ☐F Poor Soil DNK *If DNK, assume Type D*

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: ☐ Pounding ☐ Falling Hazards from Taller Adjacent Building

Irregularities: ☒ Vertical (type/severity) Columna corta
☒ Plan (type) Cimentaciones sin amarre

Exterior Falling Hazards: ☐ Unbraced Chimneys ☐ Heavy Cladding or Heavy Veneer
☐ Parapets ☐ Appendages
☒ Other: Coberturas en mal estado

SKETCH

COMMENTS:

☐ Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}

FEMA BUILDING TYPE (Do Not Know)	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score	4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, V_{L1}	-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, V_{L1}	-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, P_{L1}	-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code	-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark	1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B	0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)	0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)	-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, S_{MIN}	1.6	1.2	0.8	0.5	0.5	0.9	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	1.4

FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$: -0.6-0.7+2.1-0.4 = 0.4

EXTENT OF REVIEW

Exterior: ☐ Partial ☒ All Sides ☐ Aerial
Interior: ☐ None ☒ Visible ☐ Entered
Drawings Reviewed: ☐ Yes ☒ No
Soil Type Source: Estudio de suelos zonal
Geologic Hazards Source: Estudio de suelos zonal
Contact Person: Estudio de suelos zonal

LEVEL 2 SCREENING PERFORMED?

☒ Yes, Final Level 2 Score, S_{L2} 0.3 ☐ No
Nonstructural hazards? ☒ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☒ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☒ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

☐ Yes, nonstructural hazards identified that should be evaluated
☒ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Nota, desarrollado por el investigador.

Figura 30

Vivienda 08 – Nivel 02

Bldg Name:	Vivienda 08	**Final Level 1 Score:**	S_{L1} = 0.4	*(do not consider S_{MIN})*	
Screener:	Tolentino Pantoja Estefany	**Level 1 Irregularity Modifiers:**	*Vertical Irregularity,* V_{L1} = -0.6	*Plan Irregularity,* P_{L1} = -0.7	
Date/Time:	14/01/2023	**ADJUSTED BASELINE SCORE:**	$S' = (S_{L1} - V_{L1} - P_{L1})$ = 1.7		

STRUCTURAL MODIFIERS TO ADD TO ADJUSTED BASELINE SCORE

Topic	Statement *(If statement is true, circle the "Yes" modifier; otherwise cross out the modifier.)*		Yes	Subtotals
Vertical Irregularity, V_{L2}	Sloping Site	W1 building: There is at least a full story grade change from one side of the building to the other.	-1.3	
		Non-W1 building: There is at least a full story grade change from one side of the building to the other.	-0.3	
	Weak and/or Soft Story *(circle one maximum)*	W1 building cripple wall: An unbraced cripple wall is visible in the crawl space.	-0.6	
		W1 house over garage: Underneath an occupied story, there is a garage opening without a steel moment frame, and there is less than 8' of wall on the same line (for multiple occupied floors above, use 16' of wall minimum).	-1.3	
		W1A building open front: There are openings at the ground story (such as for parking) over at least 50% of the length of the building.	-1.3	
		Non-W1 building: Length of lateral system at any story is less than 50% of that at story above or height of any story is more than 2.0 times the height of the story above.	-1.0	
		Non-W1 building: Length of lateral system at any story is between 50% and 75% of that at story above or height of any story is between 1.3 and 2.0 times the height of the story above.	~~-0.5~~	
	Setback	Vertical elements of the lateral system at an upper story are outboard of those at the story below causing the diaphragm to cantilever at the offset.	-1.0	
		Vertical elements of the lateral system at upper stories are inboard of those at lower stories.	-0.5	
		There is an in-plane offset of the lateral elements that is greater than the length of the elements.	-0.3	
	Short Column/ Pier	C1,C2,C3,PC1,PC2,RM1,RM2: At least 20% of columns (or piers) along a column line in the lateral system have height/depth ratios less than 50% of the nominal height/depth ratio at that level.	~~-0.5~~	-1.5
		C1,C2,C3,PC1,PC2,RM1,RM2: The column depth (or pier width) is less than one half of the depth of the spandrel, or there are infill walls or adjacent floors that shorten the column.	-0.5	
	Split Level	There is a split level at one of the floor levels or at the roof.	-0.5	
	Other Irregularity	There is another observable severe vertical irregularity that obviously affects the building's seismic performance.	-1.0	V_{L2}= -1.3
		There is another observable moderate vertical irregularity that may affect the building's seismic performance.	~~-0.5~~	*(Cap at -1.3)*
Plan Irregularity, P_{L2}	Torsional irregularity: Lateral system does not appear relatively well distributed in plan in either or both directions. *(Do not include the W1A open front irregularity listed above.)*		~~-0.8~~	-2
	Non-parallel system: There are one or more major vertical elements of the lateral system that are not orthogonal to each other.		~~-0.4~~	
	Reentrant corner: Both projections from an interior corner exceed 25% of the overall plan dimension in that direction.		-0.4	
	Diaphragm opening: There is an opening in the diaphragm with a width over 50% of the total diaphragm width at that level.		-0.3	
	C1, C2 building out-of-plane offset: The exterior beams do not align with the columns in plan.		-0.4	P_{L2}= -1.3
	Other irregularity: There is another observable plan irregularity that obviously affects the building's seismic performance.		~~-0.8~~	*(Cap at -1.3)*
Redundancy	The building has at least two bays of lateral elements on each side of the building in each direction.		+0.3	
Pounding	Building is separated from an adjacent structure by less than 0.5% of the height of the shorter of the building and adjacent structure and:	The floors do not align vertically within 2 feet.	-1.0	
		One building is 2 or more stories taller than the other.	-1.0	
		The building is at the end of the block.	-0.5	
		(Cap total pounding modifiers at -1.3)		
S2 Building	"K" bracing geometry is visible.		-1.0	
C1 Building	Flat plate serves as the beam in the moment frame.		-0.5	
PC1/RM1 Bldg	There are roof-to-wall ties that are visible or known from drawings that do not rely on cross-grain bending. *(Do not combine with post-benchmark or retrofit modifier.)*		+0.3	
PC1/RM1 Bldg	The building has closely spaced, full height interior walls (rather than an interior space with few walls such as in a warehouse).		~~+0.3~~	
URM	Gable walls are present.		-0.4	
MH	There is a supplemental seismic bracing system provided between the carriage and the ground.		+1.2	
Retrofit	Comprehensive seismic retrofit is visible or known from drawings.		+1.4	M= 0.3

FINAL LEVEL 2 SCORE, $S_{L2} = (S' + V_{L2} + P_{L2} + M) \geq S_{MIN}$: 1.7-1.3-1.3+0.3 = -0.6 *(Transfer to Level 1 form)*

There is observable damage or deterioration or another condition that negatively affects the building's seismic performance: ☐ Yes ☒ No

If yes, describe the condition in the comment box below and indicate on the Level 1 form that detailed evaluation is required independent of the building's score.

OBSERVABLE NONSTRUCTURAL HAZARDS

Location	Statement *(Check "Yes" or "No")*	Yes	No	Comment
Exterior	There is an unbraced unreinforced masonry parapet or unbraced unreinforced masonry chimney.		x	
	There is heavy cladding or heavy veneer.		x	
	There is a heavy canopy over exit doors or pedestrian walkways that appears inadequately supported.		x	
	There is an unreinforced masonry appendage over exit doors or pedestrian walkways.		x	
	There is a sign posted on the building that indicates hazardous materials are present.		x	
	There is a taller adjacent building with an unanchored URM wall or unbraced URM parapet or chimney.		x	
	Other observed exterior nonstructural falling hazard:	x		Cobertura inestable
Interior	There are hollow clay tile or brick partitions at any stair or exit corridor.	x		Falta de confinamiento
	Other observed interior nonstructural falling hazard:	x		Cobertura inestable

Estimated Nonstructural Seismic Performance *(Check appropriate box and transfer to Level 1 form conclusions)*

☐ Potential nonstructural hazards with significant threat to occupant life safety → Detailed Nonstructural Evaluation recommended

☒ Nonstructural hazards identified with significant threat to occupant life safety → But no Detailed Nonstructural Evaluation required

☐ Low or no nonstructural hazard threat to occupant life safety → No Detailed Nonstructural Evaluation required

Comments:

Nota, desarrollado por el investigador.