SITE AND LOCATION

Image Courtesy: Google Earth
<table>
<thead>
<tr>
<th><strong>Heifer International Center</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Height</strong></td>
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<tr>
<td><strong>Stories</strong></td>
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<tr>
<td><strong>Square Footage</strong></td>
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<tr>
<td><strong>Construction Dates</strong></td>
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<td><strong>Approximate Cost</strong></td>
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<td><strong>Project Delivery</strong></td>
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<td><strong>USGBC Rating</strong></td>
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</table>
TYPICAL FLOOR PLAN

64’-0”

491’-0”
Typical Floor Plan

Public Areas

Mechanical Space

Public Areas

Offices
LATERAL FORCE RESISTING SYSTEM

- Composite Lateral System
  - Steel Plate Shear Wall
  - CMU Masonry Wall
ETABS MODEL

- Lateral Force Resisting System
  - Steel Plate Shear Wall
ETABS Model

- Lateral Force Resisting System
  - Steel Plate Shear Wall

Seismic Joint
ETABS Model

- Lateral Force Resisting System
  - Steel Plate Shear Wall
    - Converted to equivalent concrete shear wall

Columns  Rigid Diaphragm  Pinned Restraint

Steel Plate Shear Walls
SEISMIC LOADING

- Reduction of loading

Loads transferred to Story 3

Story 3

Story 2

Story 1

Base
CRITICAL LFRS ELEMENT

• Seismic | Y-Direction Loading

SW-13 @ Column Line 12
CRITICAL LFRS ELEMENT

- Seismic | Y-Direction Loading

Shear

Moment

SW-13 @ Column Line 12
ENERGY/VIRTUAL WORK DIAGRAM

- Seismic | Y-Direction Loading
**Wind Loading**

Loads transferred to Story 3:
- W1
- W2
- W3
Wind Loading

Case 1

North-South, Y-Direction Loading

East-West, X-Direction Loading

Case 3

North-South, Y-Direction Loading

East-West, X-Direction Loading
**Wind Loading**

**Case 2**

North-South, Y-Direction Loading

East-West, X-Direction Loading

**Case 4**

North-South, Y-Direction Loading

East-West, Y-Direction Loading
CRITICAL LFRS ELEMENT

- Wind | Y-Direction Loading

![Diagram of Shear and Moment](image)

SW-13 @ Column Line 12
ENERGY/VIRTUAL WORK DIAGRAM

- Wind | Y-Direction Loading
Energy/Virtual Work Diagram

[ Alternative View ]

- Seismic | X-Direction Loading

Note: This is not a controlling load case for the LFRS
Adequacy of LFRS

- **Seismic Story Drift**
  Pass!

- **Wind Building Drift**
  Pass!

- **Shear Capacity**
  Pass!

Lateral Force Resisting System Adequate
THANK YOU
Adequacy of LFRS

- **Shear Capacity**
  - \( \varphi V_n = \varphi 0.42 F_y t_w L_{cf} \sin(2\alpha) \)
Adequacy of LFRS

- Deflection Check
  - Joint deflections of SPSW LFRS were measured using ETABS
  - Each value passed