IPRO 339- Providing Affordable Housing through Shipping Containers
Statement of the Problem

• Temporary Olympic Housing
  – Approximately 17,000 people

• Permanent Affordable Housing for the City of Chicago
  • Affordable housing solutions for low income residents

• Showcase sustainability
Semester Goals

- Designed viable housing units for the Olympics
- Ensured easy convertibility to permanent housing structures
- Identified sustainable solutions and alternatives
- Produced a scaled Olympic Village Site Model
- Procured sponsorships to support the long term project
Values & Mission

• Common Values
  – Contribute our individual skills and diverse knowledge base
  – Respect the professional opinion of others
  – Work hard and value the experience

• Mission
  – Develop on previous semester’s work and produce viable designs that will move this IPRO to the next phase of marketability to the Olympic Committee
# Organization of the Team

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Current Semester

• Focus on allocating and optimizing land use
  – Olympic Housing relatively new goal

• Recommendations have been incorporated
  – Chicago Lot
  – Building Heights
  – Sustainability

• Some past research and work has been shelved due to shift in focus
Added Value

• Affordable Housing
  – social fabric

• Monetary Consideration
  – save taxpayers’ money

• Environment
  – Creative solutions

• Prominent Advertising
Ethical Considerations

• Understanding needs of low-income residents.
• Distinguishing between cheap and affordable to ensure the conditions are livable.
• Using local materials and labor from USA.
• Is this housing solution going to effectively increase the standard of living?
• Honesty in assessing fundraising needs.
Precedents

Barking Riverside Marketing Suite

Container city in London
Olympic Housing Proposal
Olympic Housing Unit

1 Module = 4 units stacked 4 stories high
1 Unit = 2 Containers
Transition Strategy

*Step 1:* Shipping container

*Step 2:* Two containers, with one wall cut out

*Step 3:* Olympic Unit, houses four athletes

*Step 4:* Disassembled for transport; bathroom remains

*Step 5a:* 2-Story, Single family; 3 bed, 2.5 bath

*Step 5b:* 3-story, Multi-family; 2 bed, 1 bath
Affordable Housing

Fits a standard Chicago lot size (25’ wide by 125’ deep)
Affordable Housing

2 Story Single Family

Front Elevation

Side Elevation
Affordable Housing Interior

Dining Room and Kitchen

Master Bedroom
Affordable Housing

3 Story Multi-Family
Engineering Sub-Group

- Focus: HVAC, structural, electrical, plumbing, and geotechnical systems

- Challenges: Integrating insulation and building systems within dimensional constraint
Goals & Accomplishments

• Goals:
  – Determining the best way to keep assemblies structurally sound
  – Cost-effective internal building systems
    • Heating, ventilation, and air conditioning
    • Foundation, Electrical and Plumbing
  – ADA accessible
    • Vertilift
Accomplishments

– Confirmed structural integrity of design
– Chose efficient insulation/AC unit
– Developed foundation design
– Calculated Construction Budget
Structural

- Wind load calculations
- Seismic calculation check
- Structural integrity of walls
- Tensile strength of connections verified
Foundation

- Temporary Olympic Village foundation
  - 14”x14” square piers, 2’ deep

- Permanent Affordable Housing Foundation
HVAC

• Typical Chicago summer day heat gain per unit is roughly 2,500 BTU with R-16 insulation

• A low-cost window unit will be installed in Olympic housing

• Small internal heating/cooling unit will be installed in permanent housing (magic-pak)
Plumbing

- Plumbing utilities will be accessible via bathroom utility closet
- Plumbing fixtures chosen for efficiency and cost
Future Work

• What still needs to be done?
  – Finalization for permanent housing systems
  – Clarify and expedite transition phase
  – Budgeting for permanent housing
Potential Sponsors

• Mission
  - Fund and organize an Olympic Village built using Forty Foot Equivalent Units (FEU)

• Goals
  - Work with local Chicago-based companies to create a model of our Olympic Unit

• Obstacles
  - Economic
  - Legal
  - IPRO Funding

• Solutions
  - Marketing Plan
  - Increased Budget
Sponsor Interest

J.C. Restoration is interested in pledging funds

Complete Trucking is interested in supplying transportation
Proposed IIT Site
Cost Analysis

- **Olympic Container Solution**: $65.36 per sq. ft.

- **Permanent Housing vs. Avg. Chicago Home**
  - Adds $12.49 per sq. ft.
  - Totaling $77.85 per sq. ft. vs. $200 per sq. ft.

- **The current cost estimate for the residential Olympic Village is 1 billion dollars or approximately $60,000 per athlete**

- **Our Proposal is currently estimated at 250 million dollars or approximately $15,000 per athlete.**