LINDEN GROVE
High-Rise Modular

Developer
Blue Sea Development Company
Gilbane Development Company

Service Provider
Jewish Association Serving the Aging [JASA]

Public Partners
NYC Housing Authority
NYC Housing Preservation and Development
NYC Housing Development Corporation
NYSERDA

Architect
Chris Benedict, R.A.

Structural Engineer
Murray Engineering

Energy Consultant
Steven Winter Associates

Financial Partners
T.D. Bank
Raymond James
<table>
<thead>
<tr>
<th>Type</th>
<th>Affordable Senior Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>13-stories</td>
</tr>
<tr>
<td>Units</td>
<td>153 (30% formerly homeless set aside)</td>
</tr>
<tr>
<td>Area</td>
<td>100,000 gsf</td>
</tr>
<tr>
<td>Construction</td>
<td>Volumetric Modular</td>
</tr>
<tr>
<td>Certifications</td>
<td>Target: PHIUS+ 2021, LEED Platinum, Energy Star, NGBS, Fitwel</td>
</tr>
<tr>
<td>Completion Target</td>
<td>Spring 2024</td>
</tr>
</tbody>
</table>
Overall
CONSTRUCTION PERIOD

26 months
Underwriting

21 months
Target

16 months
Best Case
Bottom Line
POTENTIAL SAVINGS

$450K per month

x 10 months

= $4.5M

= $45/sf

Construction Interest
Annual LC Fee
General Conditions
Site Safety Manager
Crane Rental
Modular DESIGN

- Layout Efficiency
- UL vs Proprietary System
- Column vs. Bearing Wall
- Façade Type
- Module Dimensions
- Connection Details
- Waterproofing Strategy
- Mechanical penetrations
- Design Preparedness

**MODULE LEGEND**

<table>
<thead>
<tr>
<th>X1</th>
<th>Studio + Corridor</th>
</tr>
</thead>
<tbody>
<tr>
<td>X2</td>
<td>1BDRM [paired with X1]</td>
</tr>
</tbody>
</table>
Modular MANUFACTURING

- Who will build it?
- Factory Location
- What type of Manufacturing system?
- Factory Pipeline
- Subcontractor Dependence
- Bonding Capacity
Modular ASSEMBLY
Electrical
Rough-in and Finish
Mechanical Plumbing and Fire Suppression
HVAC
VRF and ERV
Air Tightness

BLOWER DOOR TEST RESULTS

0.3 cfm50/sf
Requirement
Passive House
LEED
Energy Star

0.15 cfm50/sf
Actual

2X
Modular FABRICATION START

Proposed
At Closing

Actual
6 months after Closing

Best Case
At Closing
<table>
<thead>
<tr>
<th>Completion Rate</th>
<th>4 modules per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed</td>
<td>5 months</td>
</tr>
<tr>
<td>Actual</td>
<td>7 months</td>
</tr>
<tr>
<td>Best Case</td>
<td>5 months</td>
</tr>
</tbody>
</table>

Modular Fabrication
Modular ERECTION RATE AVERAGE

Actual
4 mods per day
1 floor per week
Modular
ERECUTION RATE PEAK

Actual
8 mods per day
1.8 floors per week
Modular ERECTION PERIOD

Proposed 3 months

Actual 3 months

Best Case 12 days
<table>
<thead>
<tr>
<th></th>
<th>PRECAST</th>
<th>MODULAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component Pieces</td>
<td>2,000+</td>
<td>300+</td>
</tr>
<tr>
<td>Truck Loads</td>
<td>1,000+</td>
<td>150+</td>
</tr>
<tr>
<td>Crane Picks</td>
<td>1,000+</td>
<td>350+</td>
</tr>
</tbody>
</table>
Lessons LEARNED

1. **Minimize price uncertainty and financial risk**: 100% CDs and Specifications needed minimum of two months prior to closing to allow for bid leveling and final pricing (reducing potential change orders)

2. **Fabrication Mobilization**: Begin fabrication as soon as possible to ensure a sufficient stockpile for continuous erection of modules. Module stockpile size must be matched to fabrication and erection speed.

3. **Erection Speed**: Base Fabrication timeline off need for at least 8-10 modules per day

4. **Erection Speed**: Plan for some extended workdays/Saturdays to minimize possible weather-related delays

5. **Design for Erection Speed**: Minimize welded connections between modules

6. **Erection Speed**: Lost opportunity for 12 erection days [Mondays] during 3 months erection due to NYC transportation limitations that prohibit crossing bridges with oversized loads on Sunday night. Look at additional staging area in Brooklyn to add Mondays as an erection day, but also would add expense due to double handling of the module trailer.

7. **Schedule**: Include storm and sanitary rough-in riser piping to modules to further reduce field work, material deliveries, etc.

8. **Design**: Include fire rated waterproof membrane on modules from factory, change to bolted connections where possible, design corridors as separate modules with HVAC, electric, sprinkler and plumbing lines incorporated, design with precast or steel frame building cores