



Existing Building System Background

Project Team

<p><u>Owner</u></p> <p>The Buccini Pollin Group</p> <p>http://www.bpgroup.net</p>	 <p>The Buccini/Pollin Group</p>
<p><u>Architect and MEP Engineers</u></p> <p>Burt Hill Kosar Rittleman Associates</p> <p>http://www.burthill.com</p>	
<p><u>General Contractor</u></p> <p>Gilbane Construction Company</p> <p>http://www.gilbaneco.com</p>	
<p><u>Civil Engineer</u></p> <p>Pennoni Associates, Inc.</p> <p>http://www.pennoni.com</p>	
<p><u>Structural Engineer</u></p> <p>O'Donnell & Naccarato, Inc.</p> <p>http://www.o-n.com</p>	
<p><u>Elevator Consultant</u></p> <p>Lerch Bates & Associates, Inc.</p> <p>http://www.lerchbates.com</p>	

(Logos and images courtesy of each respective firm's websites)

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Senior Thesis Report:
Feasibility and Consequences of Staggered Truss Construction



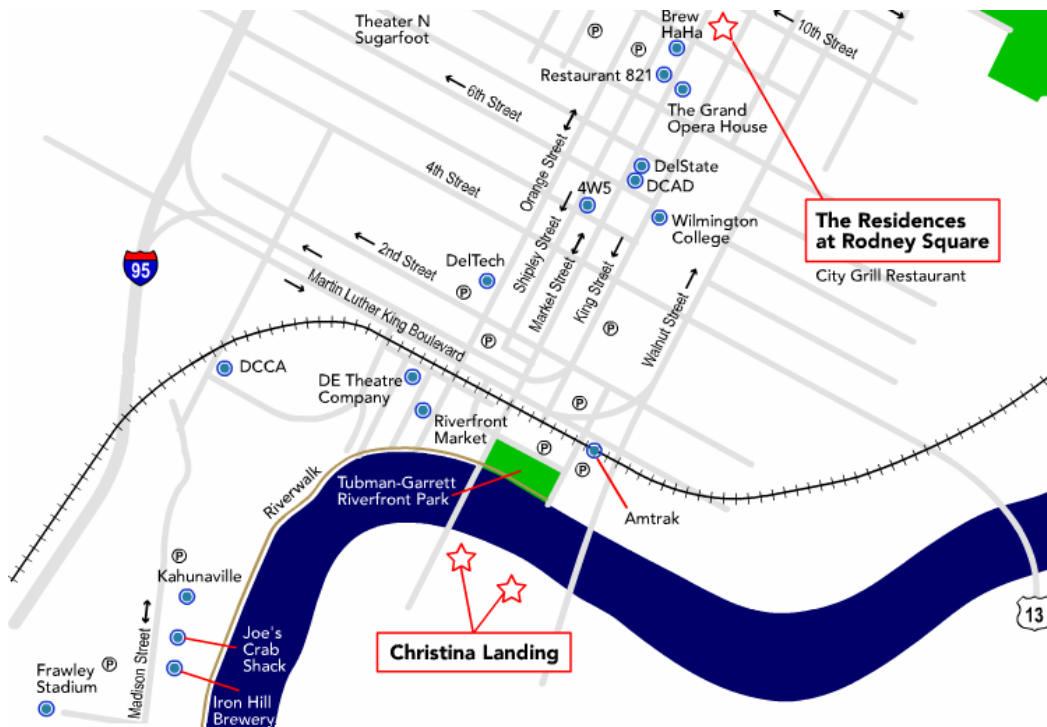
Building Overview

The River Tower at Christina Landing is an integral part of the redevelopment of the Christina River waterfront in Wilmington, DE. Phase one of the riverfront project involves the construction of sixty-three luxury townhouses and a 22-story apartment tower connected by a 2-acre park adjacent to Christina River. Phase two of the redevelopment involves the construction of a second tower, the 25-story River Tower at Christina Landing (the “River Tower”) on what is currently a parking lot for the first apartment tower.



Map of Wilmington, DE, Courtesy of <http://www.mapquest.com>

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Local Map of Wilmington and Christina River, Courtesy of <http://www.christinalanding.net>

Building Architecture

The first floor of the River Tower contains retail space and various management and mechanical rooms on the south side of the building, with the entrance to the parking garage on the northern side of the floor. The second through seventh floors of the River Tower are comprised of a parking garage on the north side and six units on the southern side. The additional spaces required by the parking garage result in a wider base to the building, as the lowest eight floors have a wider footprint than the remaining seventeen floors. The eighth floor consists of a Great Room, Fitness Center, six luxury units, along with an outdoor terrace containing a rooftop pool, spa, garden, and observation deck. The other floors contain eight units a piece, each with master bedrooms and baths. These luxury units range in size from one- and two-bedroom dwellings, each unit having access to its own terrace. The largest units contain dens and multiple terraces.

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Floor Area Usage

Floor/ Level	Residential Spaces		Parking Garage/ Other Use		Total Floor SF (*: Estimated)
	SF	% of SF	SF	% of SF	
1	11105	37.71	18344	62.29	29449
2	9812	33.08	19851	66.92	29663
3 to 6	9812	32.19	20674	67.81	30486
7	9812	24.80	29748	75.20	39560
8	19851	62.80	11759	37.20	31610
9 to 22	12186	100.00	0	0.00	12186
23	5724	61.50	3583	38.50	9307
24 to 25	0	0.00	1070	100.00	1070*



Exterior Rendering of the River Tower, Provided by Burt Hill Kosar Rittleman Associates



Building System Information

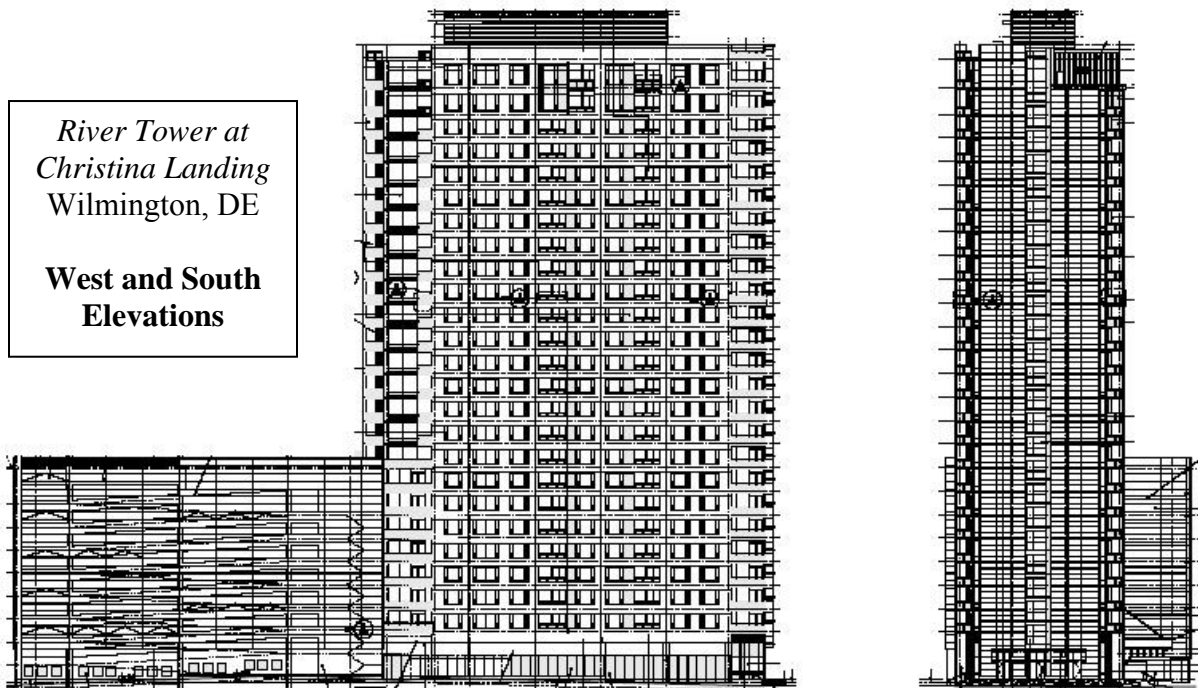
Building Envelope

Brick-faced pre-cast panels line most of the exterior walls. The entrances on the eastern and southern side of the high rise possess an aluminum glass curtain wall system. The main entrance on the southern side has a canopy with aluminum composite panel system cladding. On the ground floor, a concrete block recessed wall painted black dominates the western elevation, partially obscured by a green-screen fence. An 8” composite aluminum panel reveal lines the building at its uppermost floors. An aluminum storefront glass system is used on the stair towers. Sliding doors open from the units to individual terraces (some penthouses have even two terraces), which are lined with an aluminum perforated railing systems, consistent with the open spaces of the parking garage. Horizontal and vertical metal panel systems hide the rooftop mechanical systems. The rooftop terrace, which houses the pool and observation deck, is lined with 6”x6” wood columns with vertical wood infill panels. An expansion joint exists where the edge of the parking garage roof/terrace meets the narrower part of the high rise beginning at level 8. The roofing system will be an adhered membrane/roofing flashing system coated with a water proofing sealer.

Zoning and Historical Use

The redevelopment site is a former tannery and oil storage yard. The site is now zoned as W-4 Waterfront Residential, Commercial District. A number of variances were required due to the normal height restrictions for an apartment building by the city of Wilmington. Normally limited to a maximum height of 72 feet, a variance and an amendment was needed to construct the River Tower. Another variance was necessary when the building coverage of 0.86 building/lot sq. ft. exceeded the normal 0.5 ratio. Finally, the floor area ratio of 5.97 required a variance of the accepted 2.00 ratio.

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Electrical Summary

The power distribution for the River Tower has both standard 480/277V and 208/120V. Two utility company transformers, one a 408V and the other a 208V, bring electrical service into the building. The 208V transformer feeds into a 208V, 100KAIC switchboard with two 2500A bolted pressure switches. Each pressure switch has TVSS protection and customer metering and supply 2500A residential bus duct risers rated at a minimum of 100KAIC.

The 480V transformer feeds into three main areas. This 480V transformer feeds directly into the fire pump control for fire suppression, and the transformer also sends electrical power into the retail space. The transformer also feeds into the main distribution panel, which is a 3000A, 480V switchboard, 65KAIC minimum rated, with a 3000A bolted pressure switch with GFCI protection, TVSS, utility and customer metering. This main distribution panel itself serves: a 1000A automatic transfer switch which feeds emergency power panels; a 480/277V, 3

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phase, 4 wire, 600A MCB, 65 KAIC min. panel for the water booster pumps; a 1000A bus duct riser to the MDP in the penthouse; two 164kW chillers; as well as a 1200A, 480V distribution panel that serves the pool area, corridor lighting, among other things. There is a 480Y/277V, 800kW, 1000kVA emergency generator present to supply power to the fire pump control and critical loads in the building. Two automatic transfer switches, rated at 1000A and 600A, regulate this emergency power.

Some major risers include a 1200A mechanical bus duct and an 800A emergency riser leading to the mechanical penthouse on the 24th floor. Two 2500A residence bus ducts service the 2-15th and 16th-23rd floors respectively. Each condominium unit possesses an individual load center, all rated 208/120V, 1 phase, 3 wire, 125A MCB despite the differences in square footage. These load centers contain circuit breakers for receptacles, garbage disposals, dishwashers, and unit lighting.

Lighting Summary

The outdoor areas immediately surrounding the building will be lit using compact fluorescent triple tube downlights under canopies. Ceramic metal halide spotlights buried within the concrete will run along the setbacks along the perimeter of the building. Metal halide lamps, both surface and pole-mounted, will handle the rest of the exterior ground lighting. The main entrance to the building will be illuminated by recessed halogen PAR38 accent lighting. Recessed compact fluorescent downlights and wall mounted fluorescents will light the connection between the parking garage and main corridors of the ground floor lobby. Pole-mounted ceramic metal halide adjustable spotlights will illuminate most of the pool-area on the terrace level outside the eighth floor. The rest of the terrace will be lit by patio steplights and metal halide uplights for custom columns. The great room will have six pendant compact fluorescent triple tube uplight fixtures even distributed above the room. Halogen downlights will fill in the rest of the lighting requirements of the great room.

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Mechanical Summary

A constant volume heat recovery air handling unit located on the 23rd penthouse/mechanical level provides forced ventilation to reduce indoor air pollution. Stairwell pressurization fans on the 24th level roof provide smoke ventilation in the event of a fire. 325-ton capacity cooling towers on the same level supply the building with the use of chilled water pumps. Air handlers service the first floor telecommunications room and the elevator equipment room, rated at 900 CFM and 1750 CFM respectively. 400W electric radiant panels heat individual units and rooms such as the fitness center and great room. Two exhaust fans run continuously on the roof and together with natural outdoor air ventilation, maintain natural room pressure. This counterbalances the negative pressure created by the exhaust fans present in each units' bathrooms.

Plumbing Summary

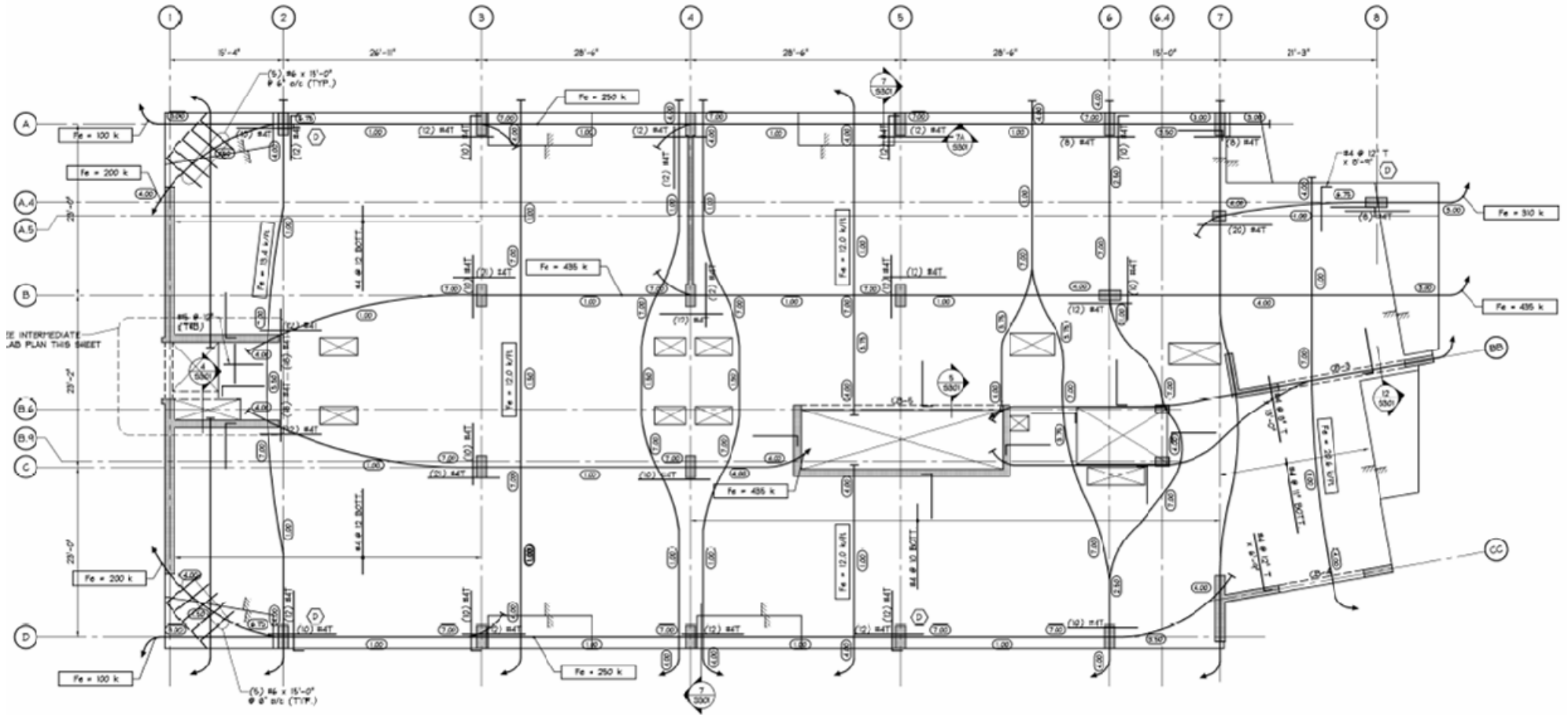
A domestic water booster located at the ground floor services the domestic water system in the River Tower. Four storage tankers are connected to the two main water heaters located on the 23rd floor. These water heaters are gas powered. Two cooling towers are located one level above, on the 25th floor. Storm water conductors are located throughout the perimeter of the building to collect rain water runoff. The pool equipment room is located on level 7.5, which can be accessed from the parking garage. There is no gas pipe access for individual units.

Major National Codes

Primary Code: BOCA 1996 with amendments adopted by the city of Wilmington

Fire Protection: BOCA-1999, Philadelphia Fire Protection Code, NFPA-13 Automatic Sprinklers

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Typical Floor (Levels 9-21) of River Tower Condominium:
Provided by O'Donnell & Naccarato, Structural Engineers