



Chrysalis Facts (9/18/15)

- **Space Program**

- Main Floor of 5,079 sq. ft.
 - 108 ft. wide, 57 ft. deep and 52.5 ft. tall (in front of the stage)
 - 4,495 sq. ft. stage area
 - 584 sq. ft. Dock area and access
- Stages: 2 prosceniums using same stage floor and same hillside for lawn seating
 - Alpha Stage
 - Comparable to Carnegie Hall & Merriweather Post Pavilion stages
 - Big enough for full orchestra with choir complement
 - Proscenium: 60 ft. wide (at stage floor) x 36 ft. tall, aperture of 1,200 sq. ft.
 - Performance Zone: 50 ft. wide, 40 ft. deep, 30 ft. tall (+ rigging height)
 - Stage Left & Right Wing Space: 10+ ft.
 - 10 locations for overhead for production trusses, covering the Performance Zone
 - Designed to suspend 42,000 lb. of theatrical gear from ceiling
 - Beta Stage
 - Proscenium: 30 ft. wide x 24 ft. tall, aperture of 700 sq. ft.
 - 536 sq. ft. exterior Thrust Stage, including terraced stairs
 - Monumental Stairs descend to Dock level and then lawn grade
 - Stage Floor
 - 2 ft. x 2 ft. Ipe wood tiles on top of Bison posts
 - 3" to 9" above drained concrete floor
 - Interstitial space accessible for temporary production cabling
 - Wood tiles can be individually replaced (like carpet tiles)
 - Backstage
 - Alpha & Beta Stages function as Backstage to each other
- Lower Level of 1,547 sq. ft. in walkout basement configuration
 - 1,269 sq. ft. storage, with garage door access
 - 213 sq. ft. electrical power & lighting controls, fire suppression equipment
 - 65 sq. ft. fire suppression pump closet



- **Architecture**

- Technique – Parametric, computational, form finding inflation
- 9 legs forming 8 asymmetric compound curve arches
 - 1 Alpha Proscenium
 - 1 Beta Proscenium with Monumental Terraced Stairs
 - 1 Beta Stage Left (ADA access to Dock)
 - 1 Truck Dock
 - 1 Boardwalk (ADA access to Stage)
 - 2 Woods Windows (view to protected stream buffers)
 - Artists Alcove (at grade)
 - Because of arches, at 6 ft. above Stage, the structure is 74% open to the exterior
- Aluminum Shingles & Purlins Skin, supported by Tubular Steel Structure

- **Structural Engineering**

- Wind Tunnel Testing
 - BMT Fluid Mechanics Limited in London conducted the test
 - The design was 3D printed and then tested
 - Tested for 1,700 year wind event, snow loading & suspended theatrical gear loading
 - Tested 33 types of suspended theatrical gear layouts
 - Tested 8 wind directions
 - Tested 350 different configurations of wind, snow & suspended theatrical gear
- Resulting Structural Design Parameters
 - 60,000 lb. of lateral (straight line wind) pressure
 - 60,000 lb. of uplift (spinnaker effect) wind pressure
 - 140,000 lb. of downward (snow-load) pressure



- **Aluminum Shingles & Purlins Skin**

- Entire Aluminum Skin designed, built and installed by A. Zahner Company
- Shell surface area of 12,027 sq. ft.,
- 5,064 linear ft. of peaks & valleys in pleated surface (nearly a mile)
- 4,000 aluminum Shingles, of 3 sq. ft. on average
- 450 custom ZEPPS Purlins (Zahner Engineered Profiled Panel Systems)
- ZEPPS was first used in the Experience Music Project (EMP) in Seattle
 - Designed by acclaimed architect Frank Gehry, who designed Merriweather Post Pavilion
- 32,000 stainless steel fasteners connect ZEPPS steel tube structure
- Total Skin Weight: 120,000 lb.

- **Steel Tube Structure**

- 37 tons (74,000 lb.) of steel tubes
- 1,000 ft. of compound curved 10” tubular steel
- 675 ft. of straight 8” tubular steel
- Anchor bolted to poured in place concrete foundation
- Concrete floor (below wood floor stage) acts as structural diaphragm for lateral stability
- 300 ft. of 7” curved tubular steel (4 tons) added to suspend up to 42,000 lb. of gear
- Steel tube structure designed by Arup, fabricated & installed by Zahner
- Concrete structure designed by Arup, constructed by Whiting Turner

- **Electrical Service**

- The Chrysalis is served by 2,000 amps of electrical power
- 400 amp, 96 circuit “house” dimmer rack able to serve 230 theatrical lights
- 4 onstage interconnects each with 400 amp service for mobile productions



Chrysalis Team

Developer:	Inner Arbor Trust MerriweatherPark.org
Producer/Director:	Strategic Leisure StrategicLeisure.com
Designer:	Marc Fornes THEVERYMANY THEVERYMANY.com
Architect of Record:	Living Design Lab LivingDesignLab.com
Engineering (SMEP):	Arup (Washington) Arup.com
Theatrical Design:	Arup (New York) Arup.com
Lighting Design:	Arup (New York) Arup.com
Civil Engineering:	Gutschick, Little & Weber GLWPA.com
Landscape Architecture:	Mahan Rykiel MahanRykiel.com
Environmental Design:	Biohabitats Biohabitats.com
Geotechnical Engineering:	The Robert B. Balter Company Balterco.com
Construction Management:	Development Management Group DMGGroup.net
Specialty Design, Fabrication & Installation:	A. Zahner Company AZahner.com
General Contractor:	The Whiting-Turner Company Whiting-Turner.com