New Heavy Timber Recreation Facility Starts Construction in Northern Idaho

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Construction has begun on a new heavy timber project in Worley, Idaho. The Marimn Health Recreation Center is a $16 million, 33,000 SF facility that will host a gymnasium, a natatorium - including a water slide that extends out of the building envelope and then back in again, a weight room, a multi-purpose room and a teen center. NAC Architecture (Spokane, WA) is the architect of record and DCI Engineers (Spokane, WA) is the structural engineer of record.

Construction consists of a combination of heavy timber framing with SIPS roof panels, conventional wood framing, and concrete masonry units.

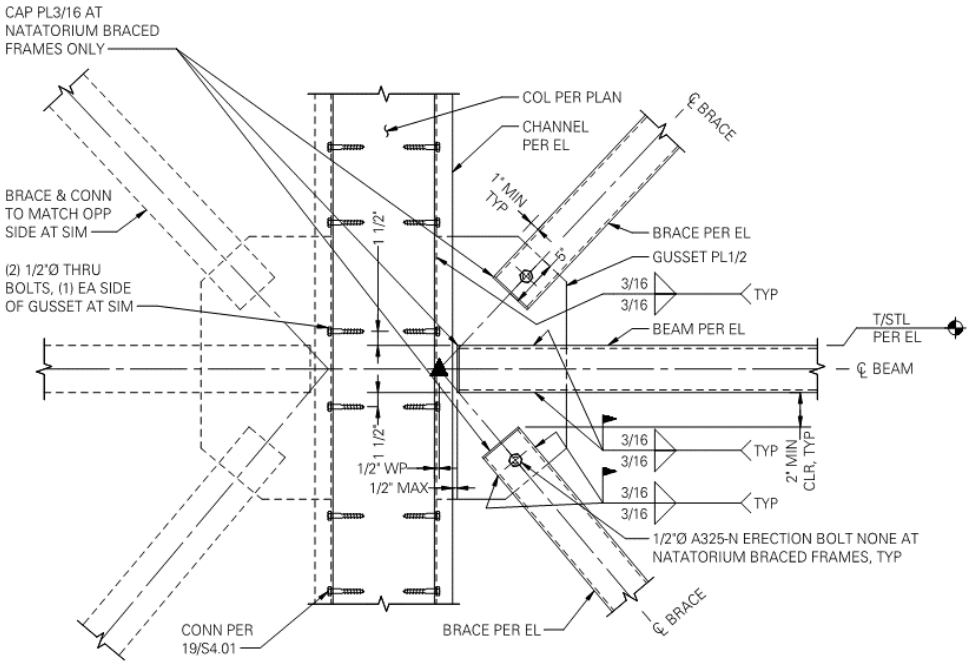
Design challenges faced were large clear spans in a high moisture environment, developing all custom connections for the heavy timber framing with an eye on corrosion protection at the natatorium, integrating steel braced frames with the heavy timber system, and dealing with tall wall heights.

Glulam beams clear span across the natatorium and gymnasium roofs, providing support for the SIPS roof panel system. The beams will be exposed, and in the natatorium were designed using the wet service factor. Beam sizes range from 8 ¾” x 30” up to 10 ¾” x 52 ½” and span up to 70 feet at the longest.

Due to the corrosive nature of the natatorium, all the custom connections of the heavy timber system are specified to be galvanized and painted. The architect wanted the connections to be minimalist in appearance without moving to proprietary connection systems. Knife plates with countersunk bolts were explored as an option to eliminate visible connections entirely. It was found that the net section of the wood with countersunk bolts was not enough to meet the demand on the connections. The solution was to use knife plates but leave the bolts exposed. Efforts were made to replicate connections

wherever possible, however many unique situations dictated a significant quantity of unique connection details.

The lateral system of the building consists of conventional wood shear walls, CMU shear walls, and exposed steel braced frames at areas of full-height glazing. At the braced frames the architect wanted to maintain the look of the heavy timber construction and use wood columns versus the steel columns typically associated with braced frames. The solution was to sister steel channels to the wood columns and use the wood columns to brace the channels against column buckling. The system allowed for the lateral elements to remain all steel, thus simplifying the connections and load path.



8 BRACE/BEAM/COLUMN/BRACE CONNECTION
SCALE: 1" = 1'-0"

At the conventionally wood-framed areas large wall heights were desired due to the massing of the building. The walls will be clad in veneer, requiring the studs to be stiff enough to prevent cracking in the façade. The site location dictated high wind loads with wind exposure C, adding to the complications of the tall wall heights. The solution was for the walls to become 2x8 studs, switching to engineered lumber after a certain height.

EXTERIOR STUD WALL SCHEDULE (UNLESS NOTED OTHERWISE IN THE SHEAR WALL SCHEDULE OR ON PLAN)	
PLATE HEIGHT	STUD SIZE
UP TO 12'-0"	2x8 @ 16"OC
UP TO 16'-0"	LVL1 1/2x7 1/4 @ 16"OC
UP TO 18'-0"	LVL1 1/2x7 1/4 @ 12"OC
UP TO 20'-6"	(2) LVL1 1/2x7 1/4 @ 16"OC

After the contractor was brought on board (Bouten Construction, Spokane WA) a value engineering effort was completed. CLT roof panels were explored as an option to replace the SIPS panels specified in the construction documents. Due to the underside of the panels receiving a vapor barrier, and the decorative tongue and grove ceiling boards, the often-desired pre-finished benefits of CLT panels would be negated. Additionally, high snow loads and spans required a thickness of CLT panels that made the system less efficient than the SIPS panels.

The project presented many challenges to the design team, but the results promise to be a beautiful building that will display some of what is possible with heavy timber framing. Integrating the multiple building materials takes careful focus on constructability and sequencing but it is frequently becoming a reality as heavy timber construction becomes more prevalent.