

ENTRY FORM



DVASE 2022 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

Buildings under \$5M		Buildings Over \$100M	X
Buildings \$5M - \$15M		Other Structures Under \$1M	
Buildings \$15M - \$40M		Other Structures Over \$1M	
Buildings \$40M - \$100M		Single Family Home	

Approximate construction cost of facility submitted:	\$900 Million
Name of Project:	Essentia Health Vision Northland
Location of Project:	Duluth, Minnesota
Date construction was completed (M/Y):	Estimated Q1 2023
Structural Design Firm:	EwingCole
Affiliation:	All entries must be submitted by DVASE member firms or members.
Architect:	EwingCole
General Contractor:	McGough

Company Logo (insert .jpg in box below)



Important Notes:

- Please .pdf your completed entry form and email to bsagusti@barrhorstman.com.
- Please also email separately 2-3 of the best .jpg images of your project, for the slide presentation at the annual virtual presentation and for the DVASE website. Include a brief (approx. 4 sentences) summary of the project for the DVASE Awards Presentation with this separate email.

- Provide a concise project description in the following box (one page maximum). Include the significant aspects of the project and their relationship to the judging criteria.

The Vision Northland Project for Essentia Health located in Duluth, Minnesota is a major renovation and new construction effort by Essentia Health to consolidate hospital services and staff and to become a destination for hospital services for all of northern Minnesota. It has transformed the Duluth skyline and the banks of Lake Superior. Specific attention was paid during design to expanded surgical services, as 20 new operating rooms have been created to serve the community. The project provides over 1.2 million square feet of new and renovated space, including a new nine-story outpatient building, a new inpatient tower that reaches 17 stories above grade at approximately 300', and three new floors of overbuild on an existing hospital building. The site extends over three city blocks approximately 650' in length and required extensive demolition of existing buildings to prepare the site for new work.

The EwingCole team was engaged from the very beginning of the process and explored multiple options for the project. At the request of Essentia Health ownership, EwingCole worked with two different construction management teams on pricing exercises and explored options for both concrete construction and steel construction. Once a CM was selected the team moved quickly to provide early documentation. Steel construction was chosen as the most economical, environmental, and constructible choice. EwingCole delivered early bid packages to facilitate an aggressive construction schedule, while still coordinating the design process. The design team was able to provide a bulk steel mill order package after just six months, allowing for early steel coordination and fabrication.

The structures consist primarily of wide flange steel columns and beams with steel braced frames providing the primary lateral support for each building. Intricate exterior facade detailing utilized primarily structural steel angle hangers and braces with HSS tube steel to support curtain wall and brick returns. Column foundations are supported by shallow spread footings supported directly on bedrock. Approximately 12,000 tons of steel were fabricated and erected to support the extensive new floor plans.

Several existing buildings were demolished during a process roughly seven months long to clear the area for new construction. Demolition also included portions of an existing parking garage and an existing pedestrian bridge. The existing pedestrian bridge was later replaced in kind but was required to be removed at the beginning of the project, as it restricted access to the site that was required during construction. An additional similar pedestrian bridge was included at the new inpatient tower spanning to a new parking garage.

Field conditions required extensive coordination during construction to align exact foundation depths and dimensions with the varying bedrock depths uncovered in the field. Work for new foundations required approximately 53,000 cubic yards of in-place rock blasting, resulting in about 79,500 cubic yards of rock removal by truck volume. Excavation work and rock removal took over four months for the Outpatient building and ten months for the Inpatient building. Foundations were further complicated during construction due to the close proximity to the existing active hospital, requiring coordination of blasting and excavation with hospital schedules to limit noise and vibration to acceptable times. Vibration was also an important design consideration for all new and existing floor framing, in particular at new surgery floors with strict vibration criteria. EwingCole performed vibration analysis per AISC Design Guide 11 and collaborated closely with Novus Environmental Inc to verify all vibration.

The new buildings are built into a steep hill with a 100' elevation drop from the north to south end of the site and span over an existing roadway and alley. To span over these existing streets, transfer trusses up to 18 feet deep and 70 feet in length were utilized. These transfer trusses consist of wide flange steel chords and web members and support up to five levels of occupied space above. Constraints with the existing street and buildings also created conditions where cantilevered trusses and transfer trusses framing to girder trusses were required. Long span trusses over 80 feet in length were also used to span across a roadway to connect the new pedestrian bridges to adjacent buildings. Trusses at these pedestrian bridges utilized HSS web member and wide flange chord members, with all steel being specified as AESS category 3 and left exposed to view. All steel truss members, braced frame members, plate girders, and large column sections were designed using ASTM A913 Grade 65 steel to reduce section sizes and keep steel weights economical.

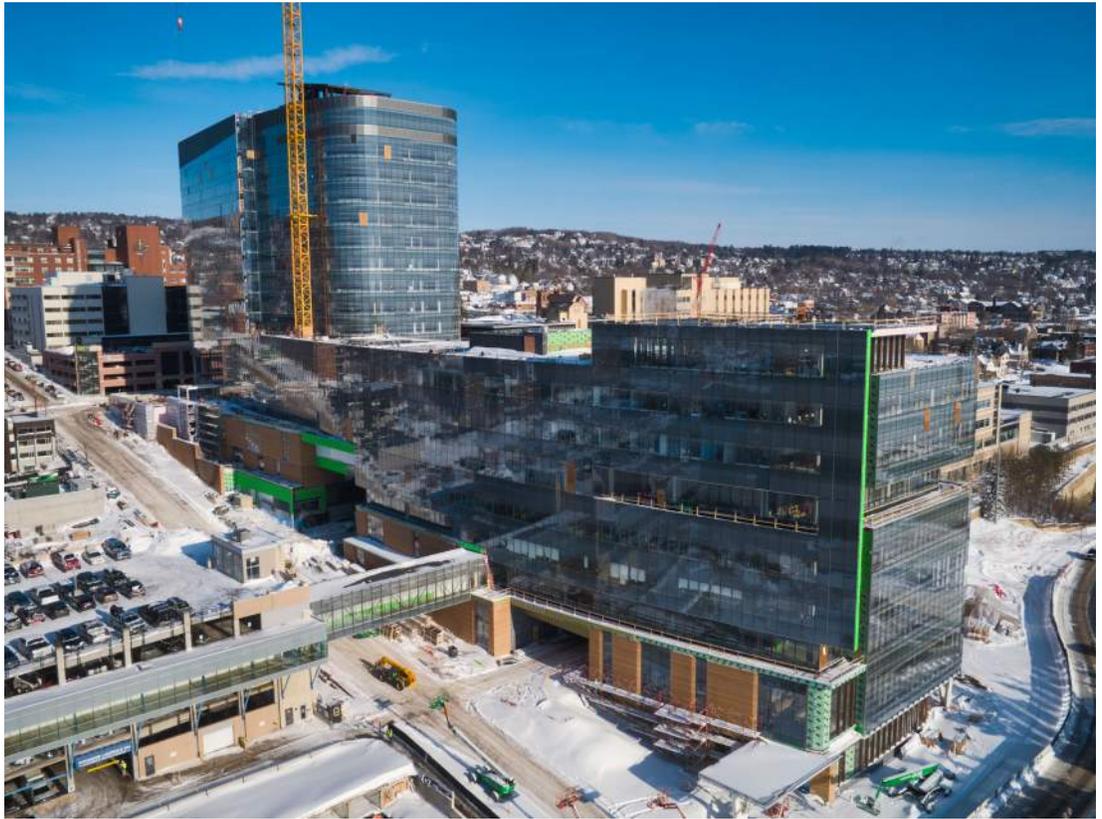
The outpatient building features multiple architectural features with demanding structural aspects. V-columns were designed at a canopy and at the building corner, the latter supporting the entire loading of building. An atrium space was designated at the front face of the building, requiring the use of horizontal trusses to properly transfer facade wind loading to the lateral force resisting members. Transfer plate girder members up to 66 inches deep were used at level six to support levels seven through nine above. These transfers allow for an outdoor balcony space on level six free of column obstructions - coped plate girder details were also required at these locations to allow for balcony pavers. Both buildings feature multiple wing walls and overhangs supported by HSS steel members utilizing end plate connections to allow for thermal break material between interior and exterior spaces. The outpatient building also features a roof garden over the extent of the top level, and was designed to support multiple levels of future expansion overbuild.

The inpatient building features the deepest excavation into the existing hillside, and required retaining walls over 60 feet in height. These walls and associated foundations required mass concrete pours and careful construction sequencing. The mass concrete pours created thermal release issues which required unique construction techniques to maintain acceptable temperature differences between core and surface concrete.

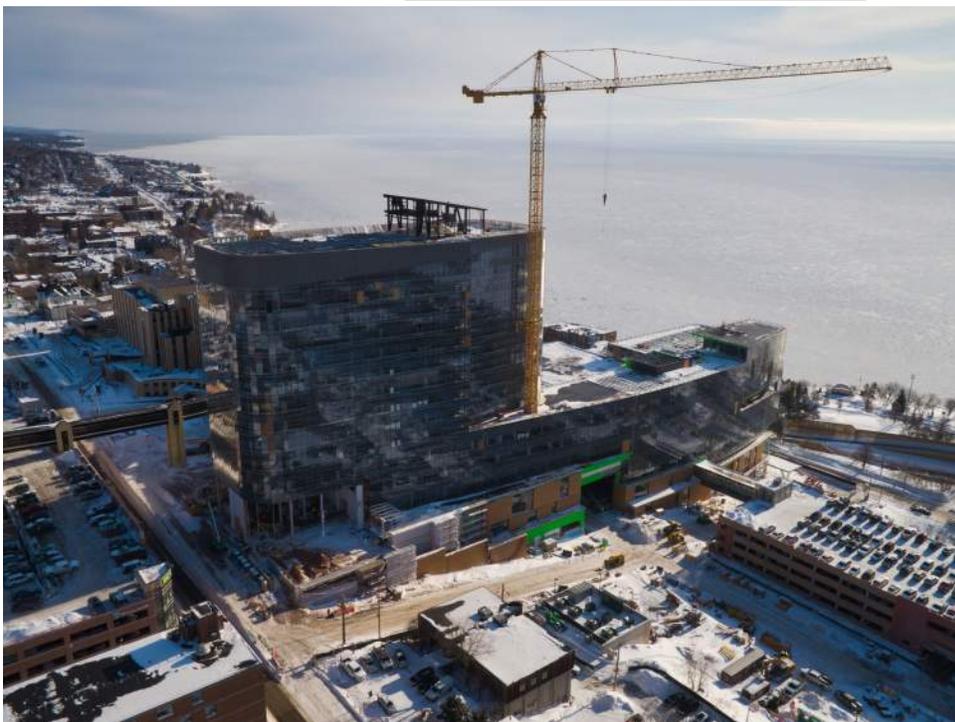
Construction administration for the project was complicated by the COVID-19 pandemic. During the beginning of the steel shop drawing review process the EwingCole offices were closed and the team moved to a work from home environment. Steel shop drawing reviews continued for over a year with employees having limited access to the office, and the team was able to stay on schedule and process shop drawings in a timely fashion. EwingCole was able to coordinate RFI responses and provide final coordination and review under challenging circumstances and keep construction on track with minimal disruptions.

Through partnering with the Construction Manager, and Owner, EC was able to deliver a successful project and to meet demanding project requirements, and Essentia Health Vision Northland has delivered state of the art health care in a landmark facility to Duluth and the surrounding region.

- The following 5 pages (maximum) can be used to portray your project to the awards committee through photos, renderings, sketches, plans, etc...



Aerial view during construction



Aerial view during construction



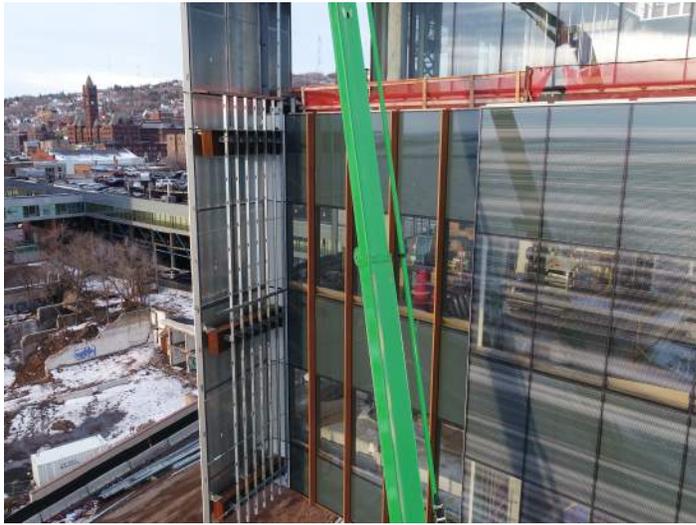
Aerial view during construction



Aerial view during construction



Rendered building section



Wing wall support steel



V Column Transfer Condition



Pedestrian Bridge



Rock Removal and Inpatient Retaining Wall



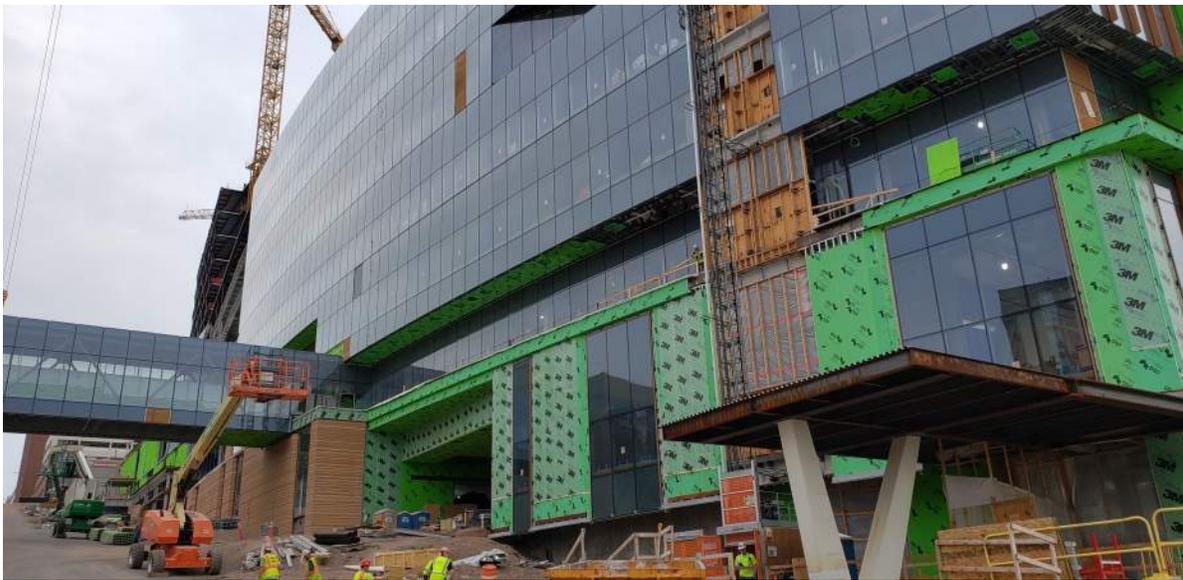
Outpatient V column and Level 6 Setback



Typical Horizontal Truss at Outpatient Atrium



Outpatient transfer trusses over service alley



Canopy V Column and Pedestrian Bridge

By signing, signatory agrees to the following and represents that he or she is authorized to sign for the structural design firm of record.

All entries become the property of DVASE and will not be returned. By entering, the entrant grants a royalty-free license to DVASE to use any copyrighted material submitted.

If selected as an award winner, you may be offered the opportunity to present your project at a DVASE breakfast seminar. Would you be willing to present to your colleagues? **YES** **NO**

Submitted by:

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