# ENTRY FORM



# DVASE 2018 Excellence in Structural Engineering Awards Program

#### **PROJECT CATEGORY (check one):**

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

Approximate construction cost of facility submitted:	\$12.5 Million	
Name of Project:	Merck & Co.  Building 38 PNP + OMPC	
Location of Project:	West Point, PA	
Date construction was	Design: 08/2017	
completed (M/Y):	Construction: Est. End of 2018	
Structural Design Firm:	Mainstay Engineering Group, Inc.	
Affiliation:	All entries must be submitted by DVASE member firms	
	or members.	
Architect:	CRB	
General Contractor:	Lendlease	

#### Company Logo (insert .jpg in box below)

JINSIO ENGINEERING GROUP, INC.

#### **Important Notes:**

- Please .pdf your completed entry form and email to <u>bsagusti@barrhorstman.com</u>.
- Please also email separately 2-3 of the best .jpg images of your project, for the slide presentation at the May dinner 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.

Merck desired to upgrade the vaccine manufacturing and sterile supply within two separate shell space areas in Building 38 at the West Point, PA facility. The existing Merck building 38 structure consists of a high-bay single story building with numerous interstitial spaces including mezzanines, catwalks, and platforms. The building footprint is approximately 528 feet x 440 feet and is structurally divided into four quadrants with double columns and expansion joints. The building is a steel frame structure consisting of tube steel columns, wide flange beams and girders and a poured gypsum roof with integral steel bulb tee framing. The lateral load resisting system for this building structure consists of steel moment frames. The building foundations include interior reinforced concrete spread footings at columns and perimeter reinforced concrete grade beam and trench footings. The structure was constructed in the early 1960's and has been renovated and modified over the years with rooftop dunnage, rooftop duct runs and supports, rooftop pipe runs and supports, interior mezzanines and catwalks, interior concrete trenches and pits, exterior loading docks and appendages among other numerous architectural finishes and MEP systems upgrades.

The existing roof structure is currently at maximum capacity due to the multiple upgrades within the building and the original lightly loaded design criteria. The proposed manufacturing areas required heavy MEP loads of 30 pounds per square foot as well as a walkable ceiling above all manufacturing areas with a dead load of 10 pounds per square foot and a live load of 20 pounds per square foot. The decision was made to construct an independent steel frame system within the building to support the proposed manufacturing loads. This framing system was closely coordinated with the proposed MEP systems to ensure minimal field modifications. Architectural, MEP and structural systems were all modeled in Revit to conduct a 3D analysis of the components. The construction manager facilitated weekly coordination, and clash detection meetings to carefully analyze each clash encountered within the model. The new construction needed to be jointly designed to avoid any disruption to the adjacent manufacturing areas within the building.

One area of manufacturing required multiple new rooftop AHUs to support the proposed use. The existing building did not have adequate capacity to support the proposed equipment. The solution developed was a new independent dunnage frame supported off of the new steel frame under the roof for MEP and ceiling support. The aggressive construction schedule required early steel design packages in multiple stages so that fabrication could begin while the remainder of the steel was designed. This was compounded by the late decision to go with a packaged penthouse structure rather than multiple AHUs on a dunnage structure. Mainstay needed to quickly react to this change to keep the fabrication schedule moving since steel was the critical path.

The existing exterior wall was brick with a masonry backup requiring multiple strip window penetrations. The proposed lintel system was closely coordinated with the construction manager to ensure that the most economical solution was developed while still meeting the architect and client requirements.



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ONE OF A FEW KINKED BEAMS USED TO FRAME AROUND EXISTING UTILITIES







### MERCK & CO. | BUILDING 38 PNP + OMPC



## MERCK & CO. | BUILDING 38 PNP + OMPC



RED FRAMING - IS EXISTING ROOF FRAMING



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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? X YES NO

Print name:		Signature:	11	Date:	
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