ENTRY FORM

DVASE
2019 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

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

Approximate construction cost of facility submitted:	<14MIL
Name of Project:	1133 Columbia Ave. Mixed-Use Podium
Location of Project:	1133 E. Columbia Ave., Phila., PA 19125
Date construction was completed (M/Y):	May 2020
Structural Design Firm:	Orndorf & Associates, Inc.
Affiliation:	**All entries must be submitted by DVASE member firms or members.**
Architect:	Harman Deutsch Ohler Architects
General Contractor:	Carmel Developments

Company Logo (insert .jpg in box below)

ORNDORF & ASSOCIATES, INC.
STRUCTURAL ENGINEERS

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 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.

This 6 1/2 story mixed-use building complex was the first of its kind in Fishtown, Philadelphia. This project takes advantage of every square inch of it's oddly shaped site. It is nestled between properties on East Columbia Avenue, and it discreetly spans an entire city block to Earl Street where tenants can enter it's below grade parking garage. This was a 'podium' building with 5 ½ stories of light fire-retardant treated wood framing (Type 3B construction) over a composite structural steel framed podium / transfer 2nd floor. The Top of roof elevation is at 72 feet above grade and the top of highest structural member is at an elevation of 82 feet above grade. Being one of the tallest buildings in Fishtown, it's apartments showcase full story windows, and beautiful views of Center City and the Ben Franklin Bridge. The development complex can be broken down into two buildings, connected by a multi-level sky-bridge. Both these buildings sit on a common podium and below-grade basement level. Two penthouse residential units are found at the top floor. The entire top level is really a double-height space with nearly 20 feet plate to plate height. A mezzanine level is present at nearly 1/3 of the floor plate area at the top floor (the ½ floor → 6 ½). In reality, this is a code-compliant 6-stories of light wood framing over a podium level building.

The project's numerous structural challenges were evident from the start. Requirements of the developer, the building's geometry, the mostly glass façade on one side, and the site on which this building was constructed on truly pushed the limits of conventional light wood frame construction. Other structural systems were explored, even at times implored (and priced), as it would have made the design simpler and more streamlined, however, finances of the project simply did not allow any deviations from the originally conceived construction type. The design approach chosen was to design two separate wood structures with compatible drift, and to accurately translate the upper floor's lateral forces into the diaphragm of the podium level. Typically, the base-shear of the upper portion is lumped and dumped into the podium level, but here, to accurately account for every line of shear and every chord force, any all locations of lateral forces were modeled as accurately as possible. In the 'building' portion closest to Columbia Avenue, the wood sheathed diaphragms were detailed and constructed with discontinuities (creating multiple diaphragms). Due to lack of any shearwalls at one entire façade, cantilever diaphragms (blocked) were utilized at some discrete areas while at other areas, unblocked diaphragms were used. Shearwall deflections were carefully considered against diaphragm deflection in order to attempt to realize the true performance of the diaphragms and thus the load path of the lateral system. Numerous iterations of the analysis were performed to create an envelope design case, compatible for the entire building. O&A spent nearly a month only fine-tuning the lateral system of the building. Shearwalls, chord-hardware and connections, diaphragm chords and collectors were clearly documented on separate lateral plans and detailed.

The wood framed elevated bridge between the two building clusters posed its own challenges. Introduction of structural steel braced and moment frames (full height) to reduce diaphragm demands were nixed after pricing concerns. A lot of the demand was due to various combination the delta of building drifts between the two buildings. Providing a separation (akin to seismic separation joints) was explored. Diaphragm chords, collector and Strut elements (taking both tension and compression) members were designed to push the diaphragm loads to end of the corridors and directly into each building's lateral system with compatible stiffnesses. Lateral movement in opposite directions for each building were studied, so connections of the corridor to the buildings could be checked for amplified forces.

The gravity design also presented its own challenges. Use of engineered lumber (PSL, similar) in our two-hour rated exterior bearing walls was not possible. Additionally, shrinkage considerations and issues with sill plate crushing (at heavy loaded posts or shearwall chords) compounded vertical movement issues of this tall, conventionally framed wood structure. O&A utilized semi-balloon framing, with engineered lumber floor framing members in order to minimize shrinkage as much as possible and to provide the required 2-hour fire rating at our exterior walls. Engineered lumber and higher grade lumber and steel plates were used to alleviate sill plate crushing concerns. The wall framing itself utilized several different designs, with double studs of various spacing, and grades. Full height built-up studs were used to frame the double height top floor and metal straps and connectors were used to ensure structural integrity. Hot tub supports were designed at the roof level.

At the bottom of the podium level, columns baseplates were designed and detailed as fixed connections to control drift. One major issue encountered was in the construction of these connections. O&A provided routine site visits during construction to ensure full compliance to the construction drawings. In one visit, we realized that the as installed baseplate connections did not provide the required load continuity into our concrete piers. Post installed retrofitting via steel plates and post installed anchors at numerous lateral columns and piers ensured the required load-flow. At the foundation level, strapped founations, combined foundations and smaller mat foundations were used. At an open air area in the garage, reinforced concrete basement wall was designed to span horizontally to transverse concrete shearwalls. The loading conditions and the joint efficiency (due to geometric constraints) did not allow for a heel-less retaining wall.

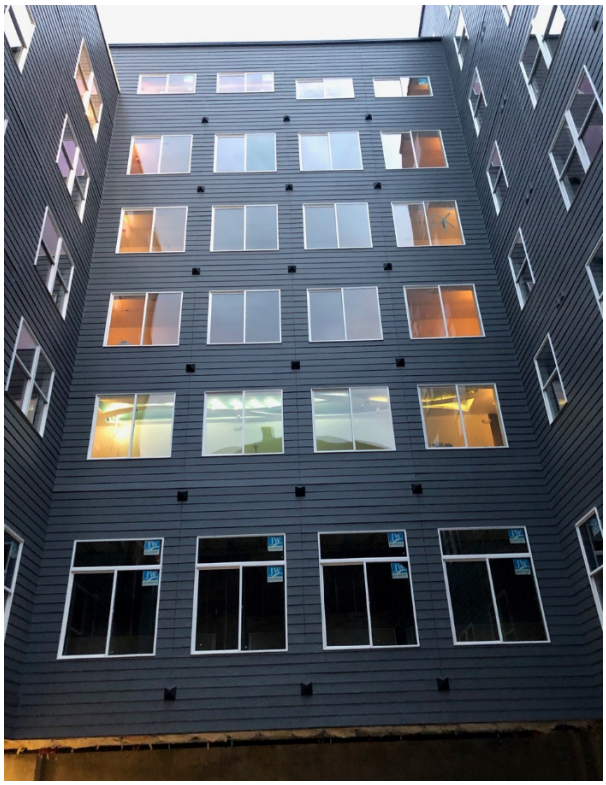
This project was truly an exercise in urban building engineering.

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

View From Girard Avenue

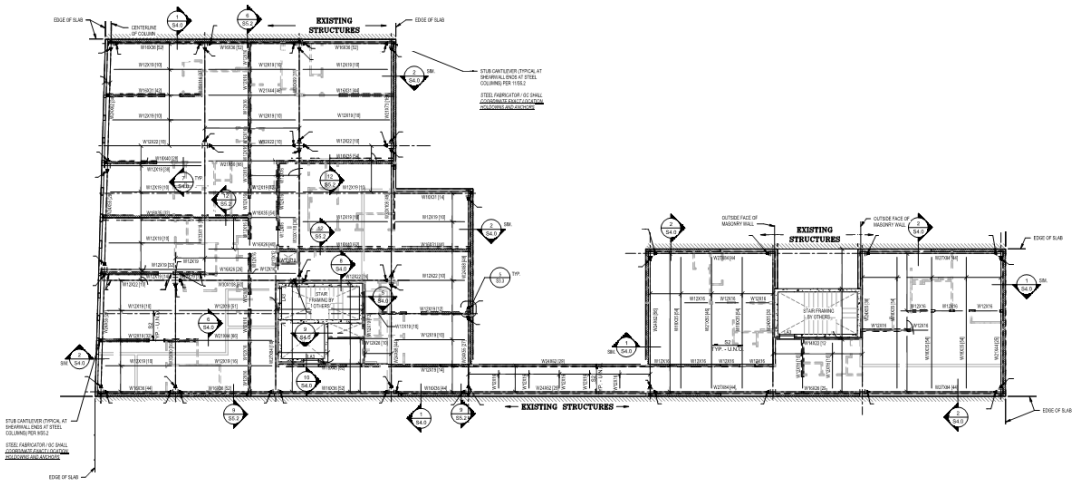
View From East Columbia Avenue

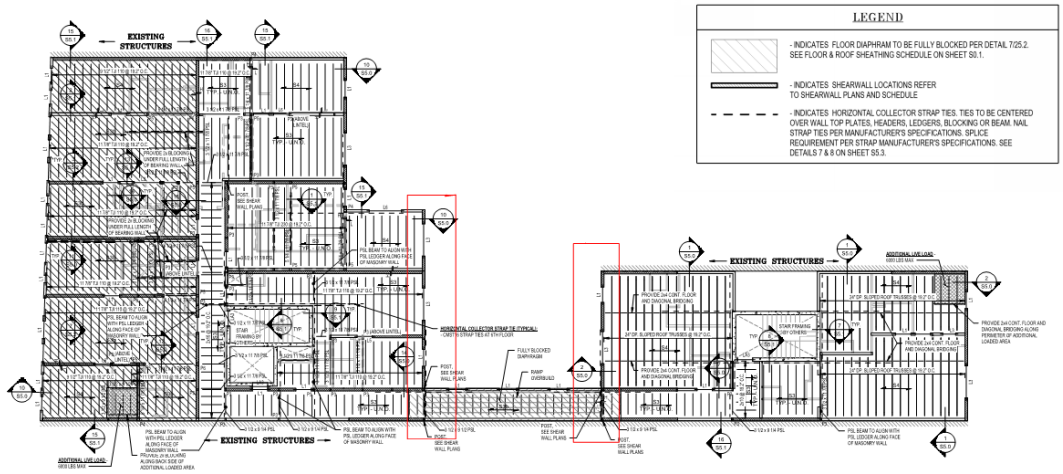
Rendering from Autodesk Revit




Genie

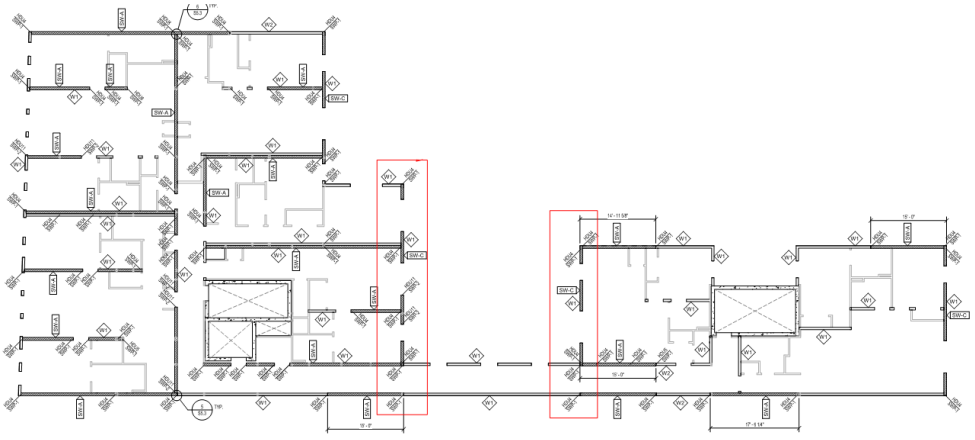
Interior Photos of Double Story Top Floor. The view from the units showcase Center City Philadelphia and the Delaware River

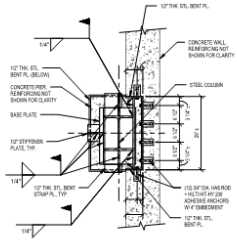




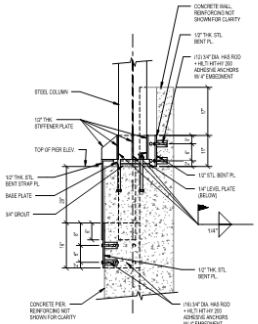
LEGEND

- INDICATES FLOOR DIAPHRAM TO BE FULLY BLOCKED PER DETAIL 7/25.2. SEE FLOOR & ROOF SHEATHING SCHEDULE ON SHEET S0.1.
- INDICATES SHEARWALL LOCATIONS REFER TO SHEARWALL PLANS AND SCHEDULE
- INDICATES HORIZONTAL COLLECTOR STRAP TIES. TIES TO BE CENTERED OVER WALL TOP PLATES, HEADERS, LEDGERS, BLOCKING OR BEAM. NAIL STRAP TIES PER MANUFACTURER'S SPECIFICATIONS. SPLICE REQUIREMENT PER STRAP MANUFACTURER'S SPECIFICATIONS. SEE DETAILS 7 & 8 ON SHEET S5.3.



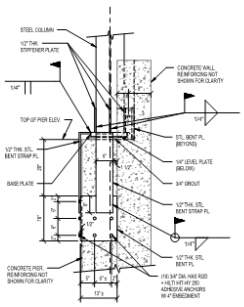


PLAN VIEW

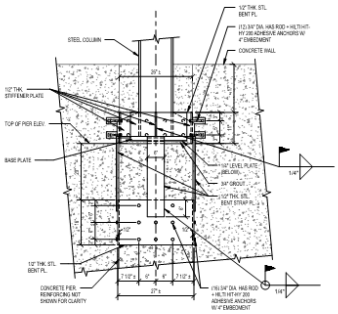


SECTION THRU CENTER OF COLUMN

NOTES:
1. ALL STIFFENER PLATES AND BENT PLATES ARE 1/2" THICK. U.N.O.
2. WELD ALL CORNERS OR STIFFENER PLATES TO STEEL COLUMN.
3. CUT OFF TOP OF ANCHOR BOLTS AS REQUIRED AND WELD TO BASE PLATE.

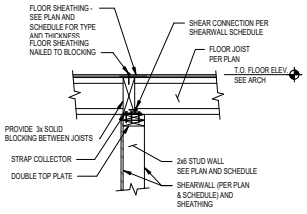


ELEVATION OF SIDE OF COLUMN



ELEVATION OF FRONT OF COLUMN

1 / SK3.1 BASE PLATE REPAIR DETAIL SKETCHES
3/4" = 1'-0"



AT SHEAR WALL

NOTES:
1. HORIZONTAL STRAP TIE NOT SHOWN ON OTHER DETAILS / SECTION FOR CLARITY. AT HORIZONTAL STRAP TIE LOCATIONS (PER PLAN), PROVIDE TIES PER DETAIL 7 & 8 S5.3 (TYP.)

2. DETAILS ARE SCHEMATIC. TIES ARE ATTACHED TO WALL TOP PLATES, HEADERS, BLOCKING, LEDGERS OR BEAM (BASED ON FRAMING CONDITION). ADJUST DETAIL AS NEEDED. STRAP TO INSTALLED IN ONE PIECE, STRAIGHT AND TAUT.

3. ALL FRAMING MEMBERS MUST BE INSTALLED TIGHT (NO GAPS!). I.E. BLOCKING, BEAM END TO FRAMING, ETC.

4. STRAP TIES SHALL BE CONTINUOUS. MANY SHORT STRAPS ARE NOT ALLOWED.

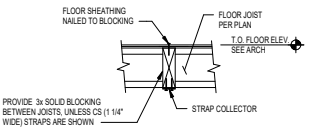
LEGEND

- INDICATES FLOOR DIAPHRAM TO BE FULLY BLOCKED PER DETAIL 7/S5.2. SEE FLOOR & ROOF SHEATHING SCHEDULE ON SHEET S0.1.

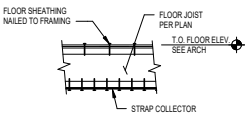
- INDICATES SHEARWALL LOCATIONS REFER TO SHEARWALL PLANS AND SCHEDULE

- INDICATES HORIZONTAL COLLECTOR STRAP TIES. TIES TO BE CENTERED OVER WALL TOP PLATES, HEADERS, LEDGERS, BLOCKING OR BEAM. NAIL STRAP TIES PER MANUFACTURER'S SPECIFICATIONS. SPLICE REQUIREMENT PER STRAP MANUFACTURER'S SPECIFICATIONS. SEE DETAILS 7 & 8 ON SHEET S5.3.

7 / S5.3 HORIZONTAL COLLECTOR STRAP TIE DETAIL
3/4" = 1'-0"



PERPENDICULAR TO FRAMING



PARALLEL TO FRAMING

8 / S5.3 HORIZONTAL COLLECTOR STRAP TIE DETAIL BEYOND SHEARWALL
3/4" = 1'-0"

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:

Print name:	**Signature:**	**Date:**
RAMTIN SANEEKHATAM, P.E.		05/20/2020

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