

ENTRY FORM



DVASE 2020 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	
Buildings \$40M - \$100M		Single Family Home	

Approximate construction cost of facility submitted:	\$35,000,000
Name of Project:	Liberty Triangle North
Location of Project:	Philadelphia, PA
Date construction was completed (M/Y):	12/2020
Structural Design Firm:	Orndorf & Associates, Inc.
Affiliation:	All entries must be submitted by DVASE member firms or members.
Architect:	Harman Deutsch Ohler Architecture
General Contractor:	Reed Street Builders

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 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.

Liberty Triangle North is a mixed-use development occupying a full city block in Philadelphia's Northern Liberties neighborhood. The site consists of three low-rise condominium buildings (one 4-story, one 5-story, and one 6-story building) with five 4-story single-family townhomes. Each of the three multi-family structures utilize "podium" style construction, a mix of Type III and Type V construction over a Type IA podium. The 6-story building features a 12,000 SF full basement with parking, which is accessible via a drive ramp down and through the 5-story building. O&A served as both the design engineer and is continuing to serve in a design and consultation role responsible for engineering solutions pertaining to means and methods of construction.

To offset the loss of the site's permeability, O&A worked with the architect and civil engineer to design a nearly 15,000 CF CIP concrete stormwater detention basin. The basin's location with respect to the 5-story building required it to be designed for several functions: (1) retaining wall adjacent to the drive ramp down to the parking level, (2) support of a truck loading dock over the top of the basin using a one-way slab with heavy dropped beams, (3) buttressed retaining wall to support earth from adjacent site, (4) buttresses also serve as piers to support building's podium columns above, and (5) mat foundation for the podium structure.

The development's deep basement (approx. -20'-0" with respect to sidewalk grade) required heavy shoring of excavation (HP16s x 40'-0" long). At the north side of the 5-story building, piles protruded into the site after they had been fully installed. As a work-around, O&A reanalyzed the foundation walls and developed a series of details to reconfigure the walls as offset from the above-grade structure by approximately 1'-6". The foundations support multiple structural elements, including a 12" concrete shear wall (35 kips shear load at wall base), heavily loaded podium columns and piers, and loading dock ramp edge. A continuous concrete "corbel" (ledge) was designed based on various load criteria and restrained conditions (availability of transverse walls), allowing for no architectural revisions as a result of the shoring of excavation intrusion into the site.

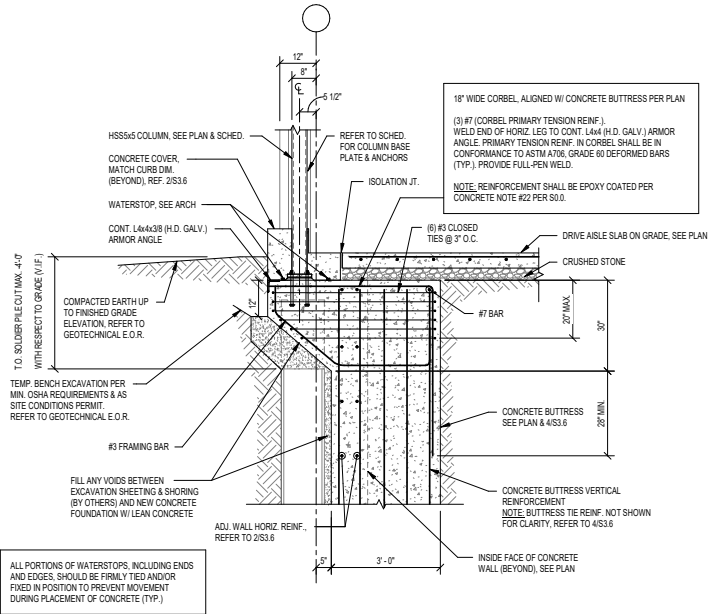
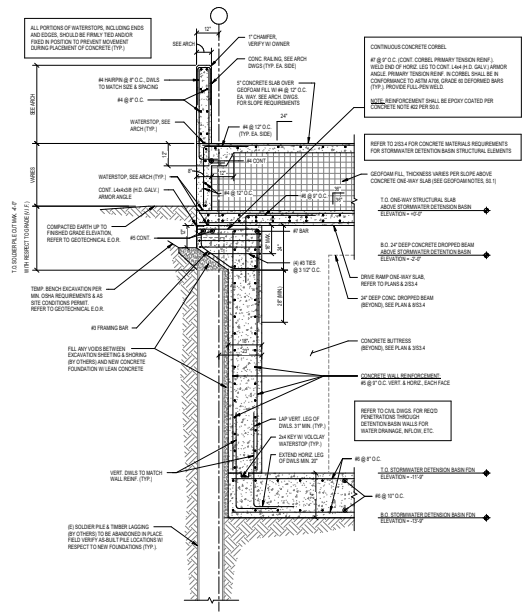
With the 6-story building being situated directly adjacent to a heavily loaded existing commercial building, based on the comfort level of the chosen contractors performing the work, we initially chose to underpin its foundation and utilize a two-level system of walers and struts for lateral bracing. However, we were made aware that the adjacent footing was completely outside of the site (not considered a party wall per the City of Philadelphia), and the owner would thus need to establish an easement agreement with the neighboring property in order to underpin. As an alternative, O&A was tasked with performing construction engineering consultation and design services to temporarily and permanently restrain the earth below the existing footing of the adjacent structure against lateral movement without underpinning or tie-backs.

In addition to lateral earth pressures, we needed to account for surcharge from heavy storage loading on multiple levels of the adjacent structure (floor and bearing wall), a heavily loaded interior column foundation, and a perimeter masonry pilaster. The sum of surcharge and lateral earth pressures translated to a total lateral load of 13 KLF. O&A created a 3D model of the adjacent structure to convey design information with the building owner and coordinate with the geotechnical engineer. The final solution involved installing a series of horizontal walers and removable steel superstruts that span the full width of the basement (end-to-end) to transfer load directly into the earth at the far side of the site. The permanent basement walls were redesigned to support building columns above grade while also serving as an unrestrained buttressed retaining wall. The walls were designed to be constructed in two phases: (1) up to the underside of the superstruts and walers to allow for the removal of the temporary shoring system, and (2) up to the first floor framing elevation.

With limited flexibility in the interior column layout within the 6-story building's basement due to the parking configuration, large steel girders were designed to transfer loading from the 2nd floor and mezzanine level at the first floor. To limit the amount of transfers in other areas (saving cost of additional columns, heavy transfer girders, and foundations) long-span framing elements were utilized at the 2nd floor podium level, particularly in the area over the entrance to the below-grade parking.

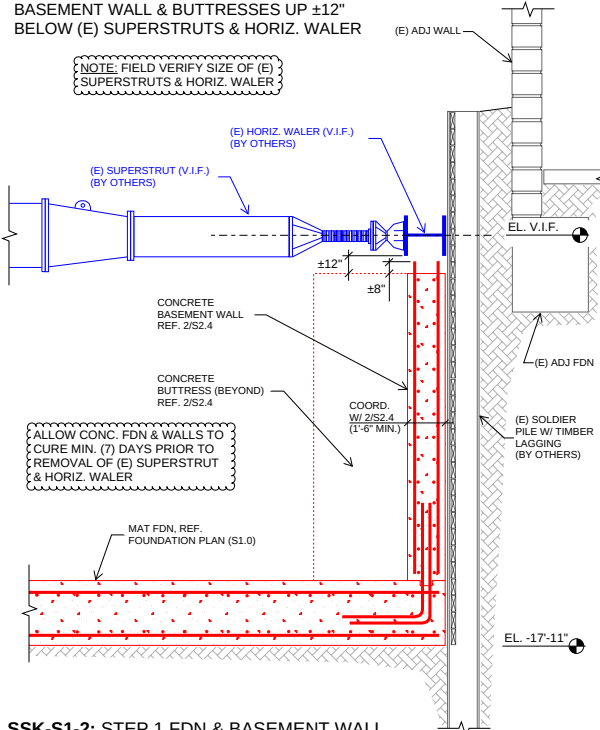
- The following 5 pages (maximum) can be used to portray your project to the awards committee through photos, renderings, sketches, plans, etc...





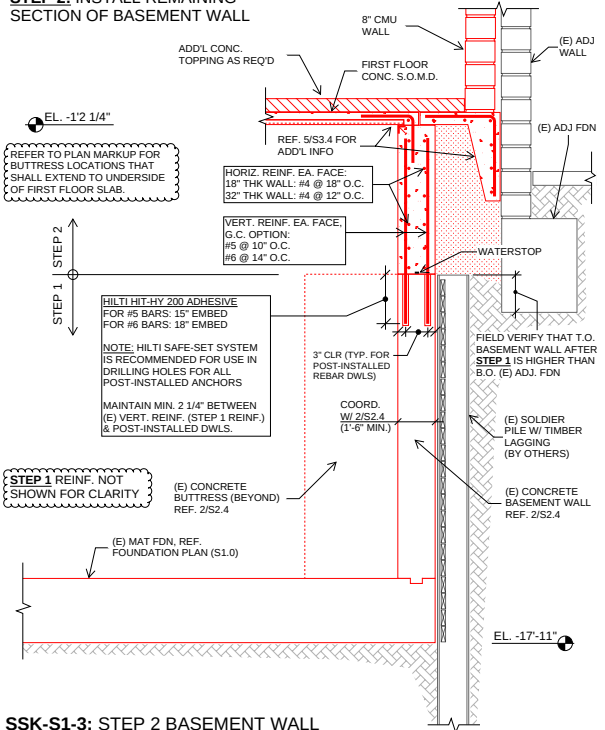
STEP 1: INSTALL MAT FDN, CONC. BASEMENT WALL & BUTTRESSES UP ±12\"/>

NOTE: FIELD VERIFY SIZE OF (E) SUPERSTRUTS & HORIZ. WALER

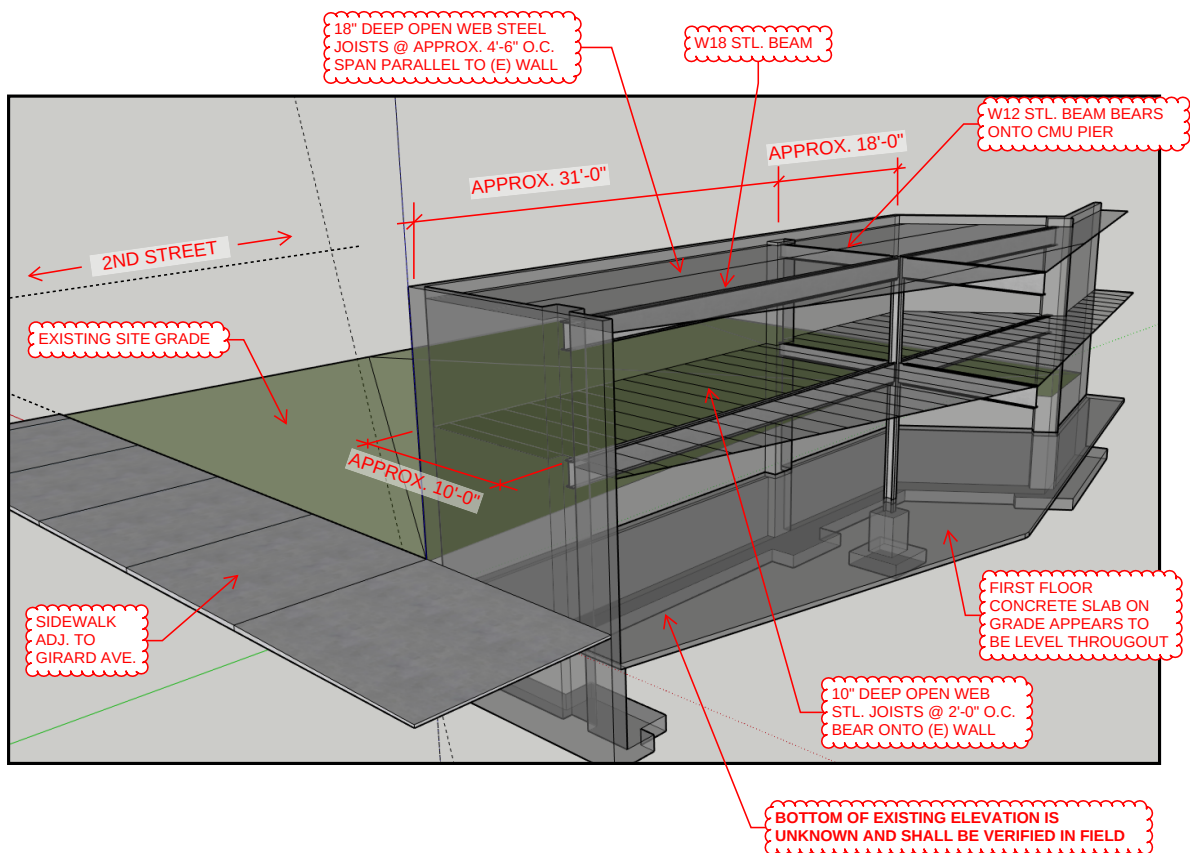


SSK-S1-2: STEP 1 FDN & BASEMENT WALL INSTALLATION AT NW BLDG CORNER

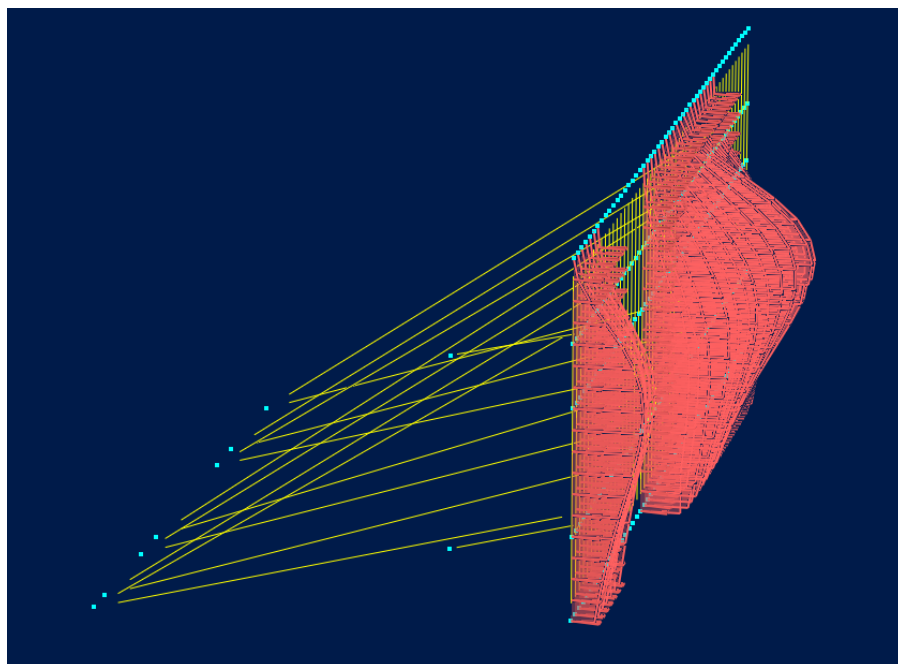
STEP 2: INSTALL REMAINING SECTION OF BASEMENT WALL

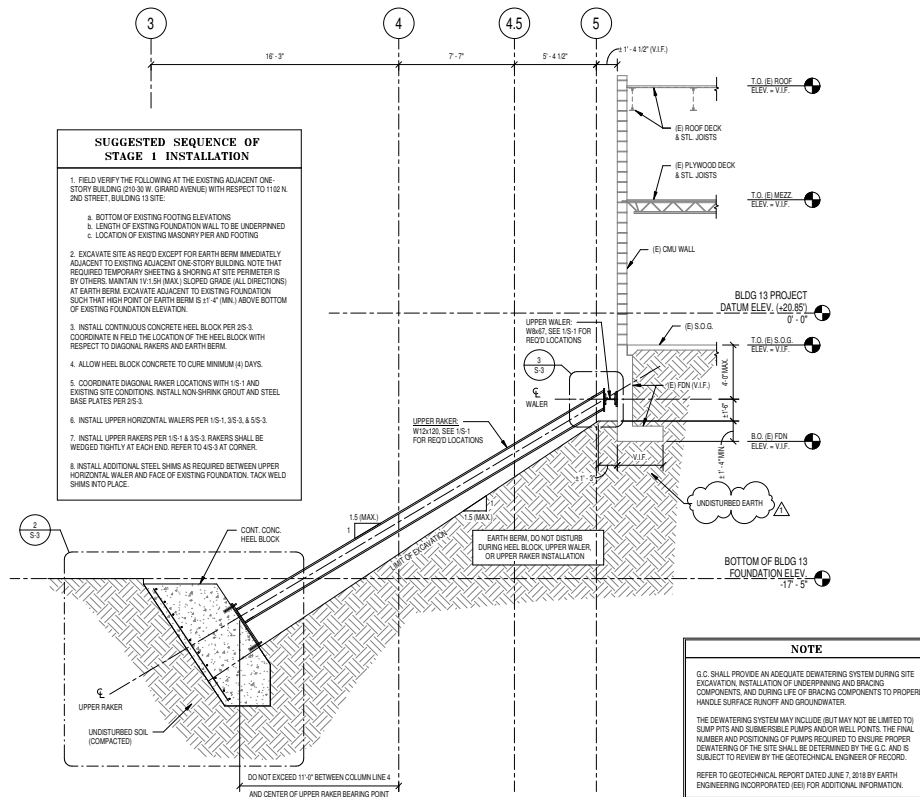


SSK-S1-3: STEP 2 BASEMENT WALL INSTALLATION AT NW BLDG CORNER



VISUALLY OBSERVED EXISTING ADJACENT STRUCTURAL FRAMING INFORMATION





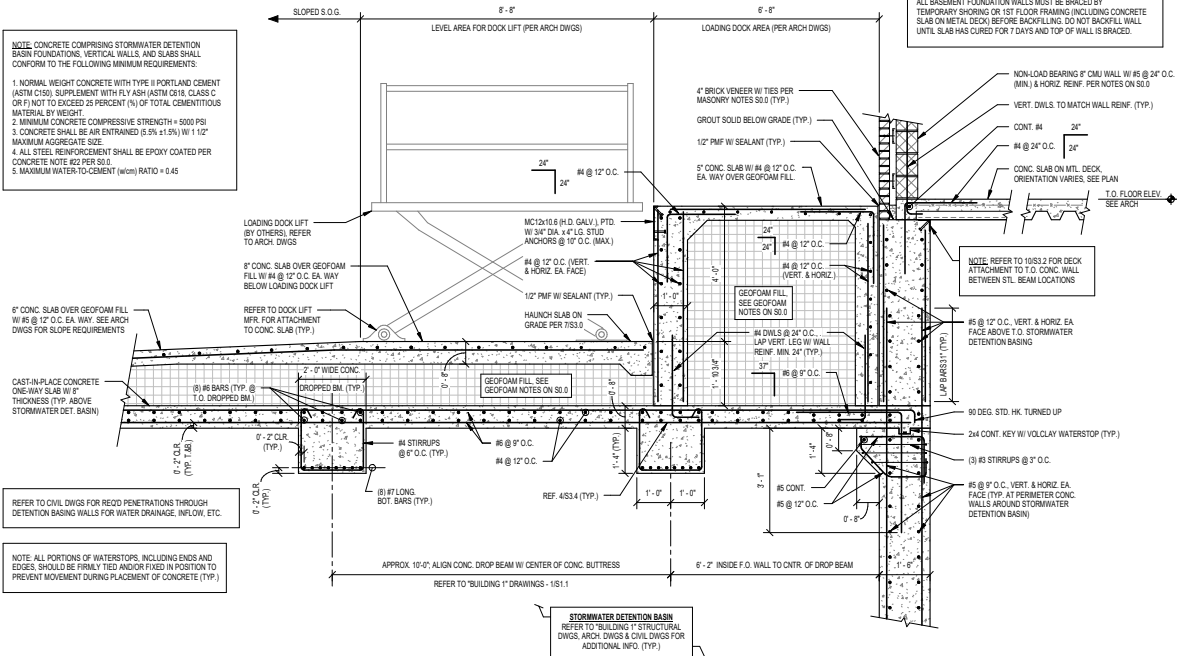
STAGE 1: HEEL BLOCK, UPPER WALERS, & UPPER RAKERS INSTALLATION



NOTE: CONCRETE COMPRISING STORMWATER DETENTION BASIN FOUNDATIONS, VERTICAL WALLS, AND SLABS SHALL CONFORM TO THE FOLLOWING MINIMUM REQUIREMENTS:

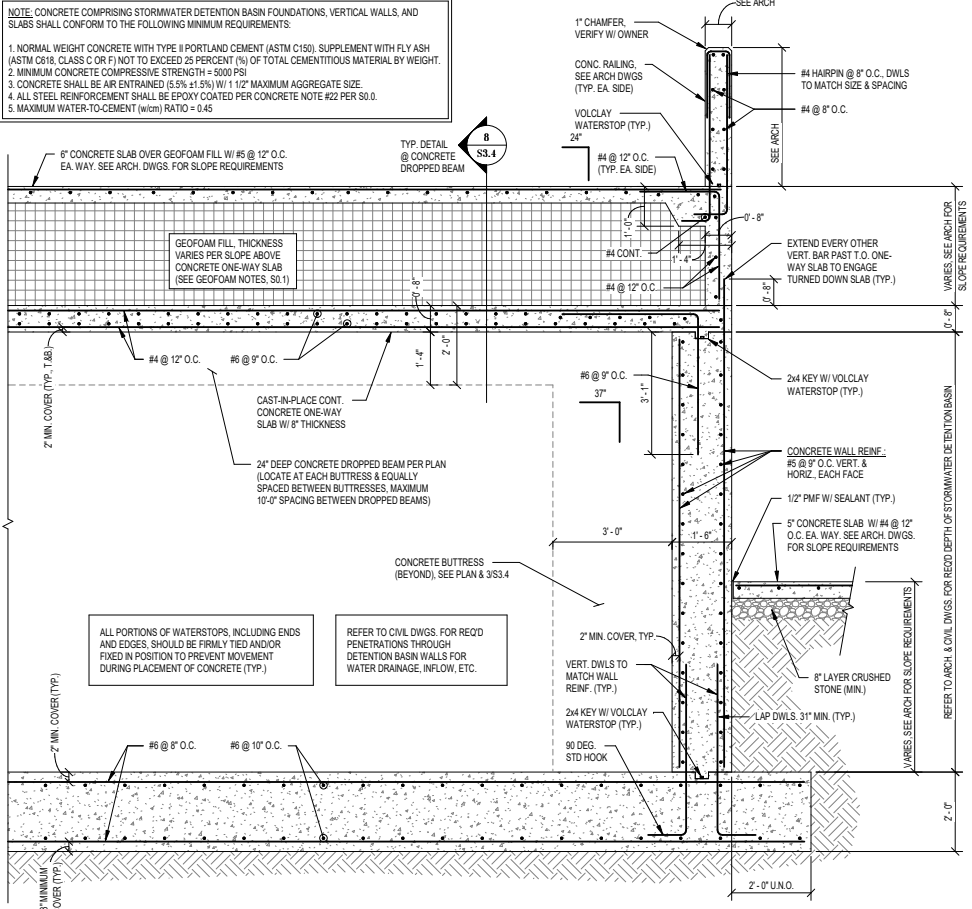
1. NORMAL WEIGHT CONCRETE WITH TYPE II PORTLAND CEMENT (ASTM C150), SUPPLEMENT WITH FLY ASH (ASTM C618, CLASS C OR F) NOT TO EXCEED 25 PERCENT (%) OF TOTAL CEMENTITIOUS MATERIAL BY WEIGHT.
2. MINIMUM CONCRETE COMPRESSIVE STRENGTH = 5000 PSI
3. CONCRETE SHALL BE AIR ENTRAINED (5.5% ±1.5%) W/ 1 1/2" MAXIMUM AGGREGATE SIZE.
4. ALL STEEL REINFORCEMENT SHALL BE EPOXY COATED PER CONCRETE NOTE #22 PER S0.1.
5. MAXIMUM WATER-TO-CEMENT (w/cm) RATIO = 0.45

ALL BASEMENT FOUNDATION WALLS MUST BE BRACED BY TEMPORARY SHORING OR 1ST FLOOR FRAMING (INCLUDING CONCRETE SLAB ON METAL DECK) BEFORE BACKFILLING. DO NOT BACKFILL WALL UNTIL SLAB HAS CURED FOR 7 DAYS AND TOP OF WALL IS BRACED.



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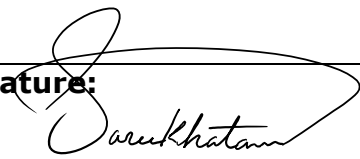


By signing, signatory agrees to the following and represents that he or she is authorized to sign for the structural design firm of record.

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? ☒ **YES** ☐ **NO**

Submitted by:

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