



**DOWNES**  
CONSTRUCTION COMPANY

**CHANGE ORDER PROPOSAL NO.: 4**

**TO:** Mark Allen  
Jacunski Humes Architects, LLC  
15 Massirio Drive  
Suite 101  
Berlin, CT 06037  
Ph: 860-828-9221 Fax: 860-828-9223

**DATE:** 11/20/2023

**PROJECT:** Bethel PD Training Range

**JOB NUMBER:** 25-01-0502

**DESCRIPTION:**

COP #004 - Cutting and Patching Roof for Anchor Installation

The original method of drilling and installing epoxy anchors into the hollow precast ceiling planks was determined by an engineer to not be acceptable for supporting the weight of Action Target's ceiling mounted equipment. A new method, using a through bolt anchor, was proposed and accepted in RFI #005. Per the engineered drawing, there are (96) locations where anchors need to be installed. To facilitate the installation of these anchors, sections of the existing roof membrane, rigid insulation and roof board need to be cut and patched. Greenwood Industries was the original roof installer, and they will maintain the existing NDL warranty.

General Conditions breakdown:  
Superintendent - 4 hours @ \$105/hr = \$420  
Dumpster - \$600

**REASON:**

Description	Vendor	Comments	Amount
Roofing	Greenwood Industries, Inc.	Greenwod Industries Proposal	\$ 23,500.00
General Conditions	Downes Construction Co., LLC	General Conditions - Staffing	\$ 420.00
Dumpsters	Downes Construction Co., LLC	Dumpster	\$ 600.00
General Liability Insurance	Downes Construction Co., LLC	Insurance (0.70%)	\$ 171.64
Construction Management Fee	Downes Construction Co., LLC	CM Fee (3.00%)	\$ 740.75
<b>TOTAL COST OF THIS CHANGE ORDER PROPOSAL IS:</b>			<b>25,432.39</b>

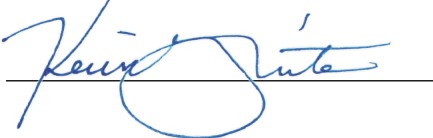
**STATUS:**

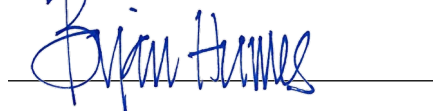
This Change Order Proposal was reviewed by Downes Construction and found to be acceptable.  
If you have any questions or concerns regarding this COP please advise us in writing within five (5) business days.

**Submitted by:**  
Downes Construction Company, LLC

**Architect:**  
Jacunski Humes Architects, LLC

**Owner:**  
Town of Bethel





\_\_\_\_\_

Kevin Guite

Brian Humes

Daniel E. Carter

11/27/2023

11/27/23

\_\_\_\_\_

Date

Date

Date

CC:



# GREENWOOD INDUSTRIES, INC.

Architectural Metal and Roofing Contractors

11/21/2023

To: Downes Construction

Attn: Kevin Guite – Assistant Project Manager

Re: **Bethel Police Department Firing Range – Cutting and Patching**

Greenwood Industries proposes the following pricing for cutting and patch (96) areas into the existing EPDM Roofing System, includes maintaining the existing warranty in place.

### **Scope of Work**

#### **Cut and patch (96) areas which are to receive anchors which will be installed by the Steel Contractor.**

- Cut out (96) openings into the existing insulation and EPDM for steel contractors anchors.
- Discard of debris into dumpster provided by others.
- Infill (96) opening with insulation and coverboard to match the height of the existing roof.
- Install EPDM patch over openings.
- Maintain existing NDL warranty.

**Base Price –Twenty-Three Thousand, Five Hundred Dollars and 00 Cents - \$23,500.00 – Tax Not Included.**

### **Clarifications/ Highlights**

Steel contractor to mark spot areas from roof.  
Dumpsters and debris containers will be provided by others.

### **Exclusions:**

*Off hours and overtime work, Wood Blocking except stringers under tile, Off Site Storage, Substrates not mentioned above, Roof Decking of any kind, Temp Waterproofing, Structural Framing of any kind, Roof Curbs, Anything above and beyond above scope of work, Asbestos Abatement, Carpentry of any kind. Painting or coatings of any kind, Masonry, Caulking, Lead Abatement, Structural Repairs, Lightning Protection Work.*

Submitted by,  
Greenwood Industries Inc.

Michael Beaulieu  
Estimating

File: Bethel PD

**To:** Mark Allen  
Jacunski Humes Architects, LLC  
15 Massirio Drive  
Suite 101  
Berlin, CT 06037  
Ph: 860-828-9221 Fax: 860-828-9223

**RFI #: 005**  
**Date:** 11/2/2023  
**Job:** 25-01-0502 Bethel PD Training Range  
**Phone:**

**CC:**  
**Subject:** Anchoring to Precast Roof Panels

**Drawing:** **Spec Section:**  
**Cost Impact:** TBD **Schedule Impact:** TBD

**Request:** **Date Required: 11/8/2023**

Downes was notified by the Unistrut engineer that the existing precast roof panels are not thick enough for a post-installed anchor to support the Action Target equipment - see attached email. An Oldcastle detail was provided (also attached), showing a through bolt anchor. This would require drilling through the precast panels, and cutting and patching the roof membrane.

Please review and provide direction on how to proceed.

**Requested by:** Kevin Guite  
Downes Construction Co., LLC

**Response:**

Provide proposal to furnish and install anchors as detailed, including anchor layout and calculations signed and sealed by a Connecticut Registered Engineer, roof patching and credit for material and labor installation of slotted channel supports.

MA 11-03-23

\_\_\_\_\_  
Answered by

\_\_\_\_\_  
Company

\_\_\_\_\_  
Date

**From:** [Shawn Keohane](#)  
**To:** [Kevin Guite](#)  
**Cc:** [Anthony DiMauro](#); [Kevin Thibodeau](#)  
**Subject:** FW: Bethel Police Firing Range- Engineering Request  
**Date:** Monday, October 30, 2023 12:15:25 PM

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Good Morning Kevin,

During the Engineer's review of the Unistrut Support at Bethel Police, it has been determined that using post-installed anchors into the Precast Planks won't work to support the unistrut and future loads. This is regardless of the anchor sizing and spacing selected, as there is simply not enough solid material to attach to on the existing planks.

I have attached the email from the Engineer below as reference. Please advise how we should proceed.

Thanks,

---

**Shawn Keohane**  
*Vice President*  
*Structural Steel & Misc. Metals Division*



Steeltech Building Products, Inc.  
636 Nutmeg Road North  
South Windsor, CT 06074

Phone (860) 290-8930 x210  
Fax (860) 290-8940  
[www.steeltechbp.com](http://www.steeltechbp.com)  
AA/EOE

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**From:** Kim Fletcher [mailto:kfletcher@bartonandloguidice.com]  
**Sent:** Monday, October 30, 2023 10:59 AM  
**To:** Shawn Keohane <skeohane@Steeltechbp.com>  
**Subject:** RE: Bethel Police Firing Range- Engineering Request

Hi Shawn,  
I just gave your office a call. We have determined that the roof units are not thick enough for a post-installed anchor. Our solution is to create a frame within the building that we can hang the unistrut from but wanted to discuss it with you prior to moving forward.  
Please give me a call when you get a chance.  
Thank you,  
Kim

**Kim Fletcher, P.E.**  
Managing Engineer

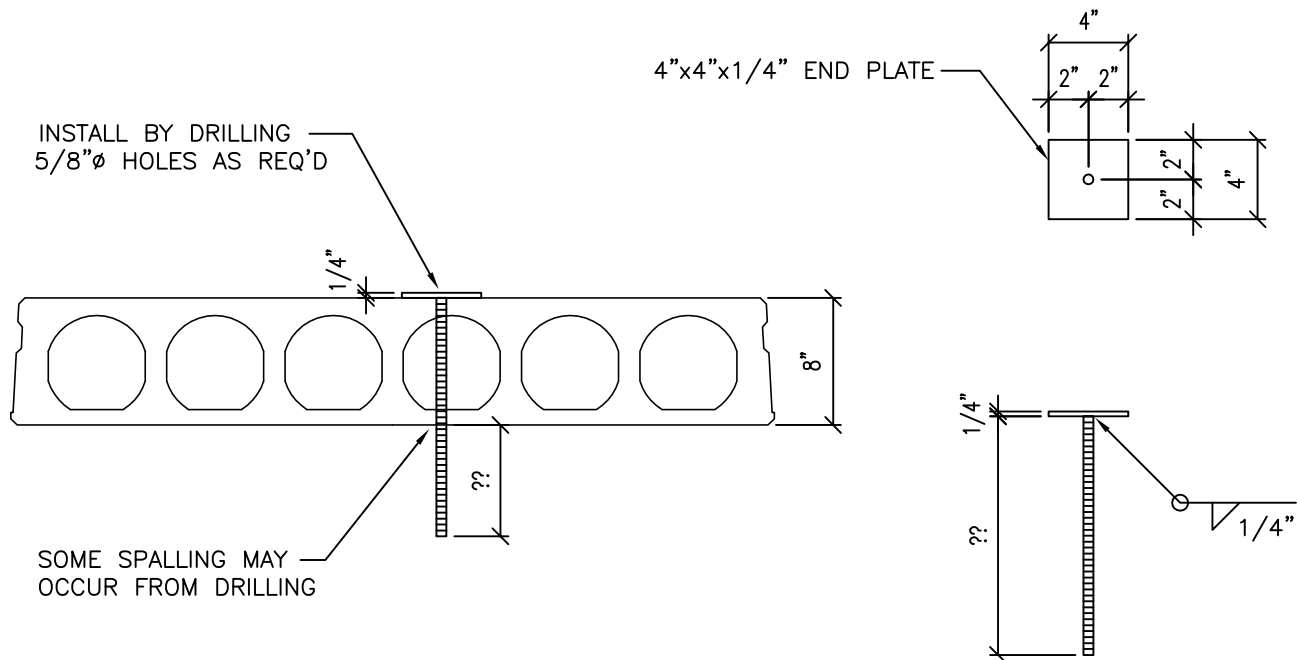
**Barton&Loguidice**

Office: 860.633.8770

Email: [kfletcher@bartonandloguidice.com](mailto:kfletcher@bartonandloguidice.com)

[Website](#) | [LinkedIn](#) | [Twitter](#) | [Facebook](#) | [Vimeo](#)

MATERIALS LIST				FINISH
MARK	QTY	DESCRIPTION	WEIGHT (lbs)	
	1	A36 PLT 4"x1/4" X 0'-4"	1.2	<input type="checkbox"/> - UNFINISHED
	1	A307 1/2"φ ALL THREAD ROD X 0'-0" LG	0.0	<input checked="" type="checkbox"/> - SHOP PRIMER
				<input type="checkbox"/> - HOT DIPPED GALVANIZED
				<input type="checkbox"/> - STAINLESS STEEL
				<input type="checkbox"/> - OTHER:



HEAVY PIPE HANGER (MAX. LOAD = 3,000 LBS)



**Oldcastle Precast®**  
Building Systems

123 CR 101 SOUTH BETHLEHEM, NEW YORK 12161  
PHONE:(518) 767-2269 - FAX:(518) 767-9390

PROJECT NAME:

**SARATOGA WWTP**  
Saratoga Springs, NY

DATE	REV	REVISIONS
REVISION HISTORY		
DET: DW		JOB#:
ENG: DW		<b>9025</b>
CKR: .		ASBY MARK:
DATE: 03-01-10		<b>PH-1</b>
SCALE: AS SHOWN		

Project: Bethel Police Department - Firearms Training Range Fit Out

Location: 12 Judd Avenue Bethel, CT 06801

DCC Job #:

Architect: Jacunski Humes Architects, LLC

MEP Engineer: Kohler Ronan, LLC

Subcontractor / Vendor Area

Date: 11/14/2023

Subcontractor / Vendor: Steeltech

Construction Manager: Downes Construction Company, LLC

200 Stanley Street,  
New Britain, CT 06050  
860-229-3755  
Attention: Kevin Guite

Submittal: Shop Drawing and Calcs for Unistrut  
Description

Specs. Section:

Page:

Paragraph:

First Submission

Resubmission #: \_\_\_\_\_

Submitted as Specified

Submitted as Substitution (As equal)

Comments:

CONTRACTOR HAS DETERMINED AND VERIFIED MATERIALS, FIELD MEASUREMENTS AND FIELD CRITERIA AND HAS CHECKED AND COORDINATED THE INFORMATION CONTAINED IN THIS SUBMITTAL WITH THE REQUIREMENTS OF THE WORK AND OF THE CONTRACT DOCUMENTS AND RECOMMENDS APPROVAL BY THE CONSTRUCTION MANAGER / ARCHITECT / ENGINEER.

By: \_\_\_\_\_

Construction Manager's Stamp Area

<b>SUBMITTAL REVIEW</b>	
<b>DOWNES CONSTRUCTION COMPANY, LLC</b>	
<input checked="" type="checkbox"/> REVIEWED FOR SUBMISSION	<input type="checkbox"/> REJECTED
<b>TO ARCHITECT / ENGINEER</b>	
DOWNES CONSTRUCTION COMPANY'S REVIEW IS FOR GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. MARKINGS AND/OR COMMENTS SHALL NOT BE CONSTRUED AS RELIEVING THE TRADE CONTRACTOR FROM COMPLIANCE WITH THE CONTRACT DOCUMENTS.	
BY: <u>KG</u>	DATE: <u>11/14/2023</u>
SPECS SECTION: _____	SUBMITTAL NUMBER: <u>055000-01</u>
CONTRACT DWG. NO.: _____	REVIEW NUMBER: _____

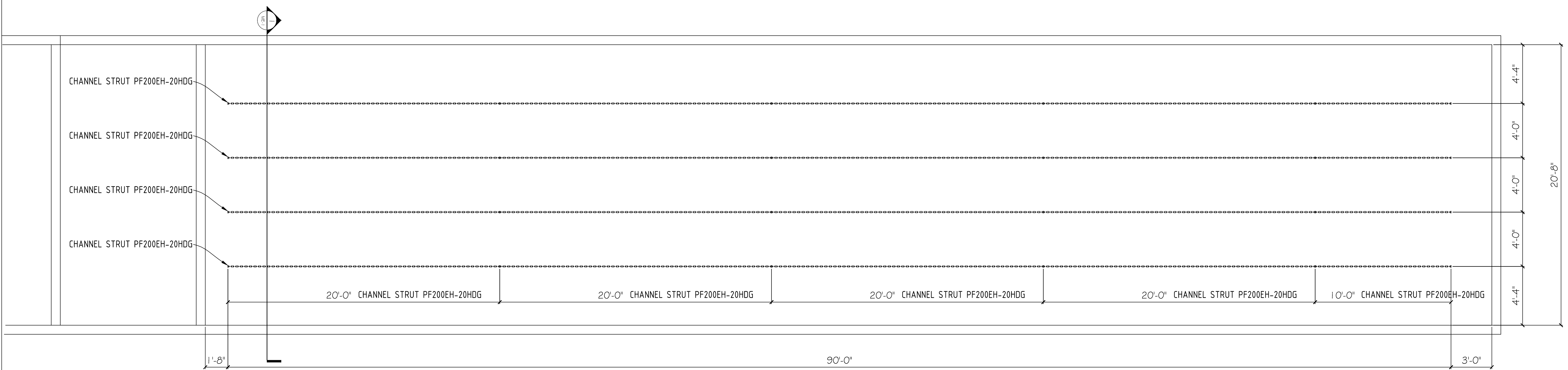
CM HAS COORDINATED THIS SUBMITTAL WITH INFORMATION CONTAINED IN RELATED DOCUMENTS AND RECOMMENDS APPROVAL.

Architect's Stamp Area

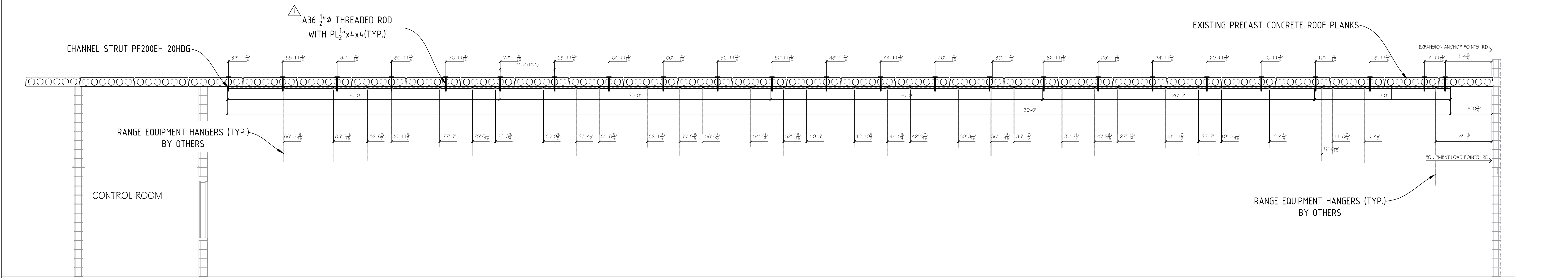
Reviewed  
MA 11-14-23

Engineer's Stamp Area (As Required)

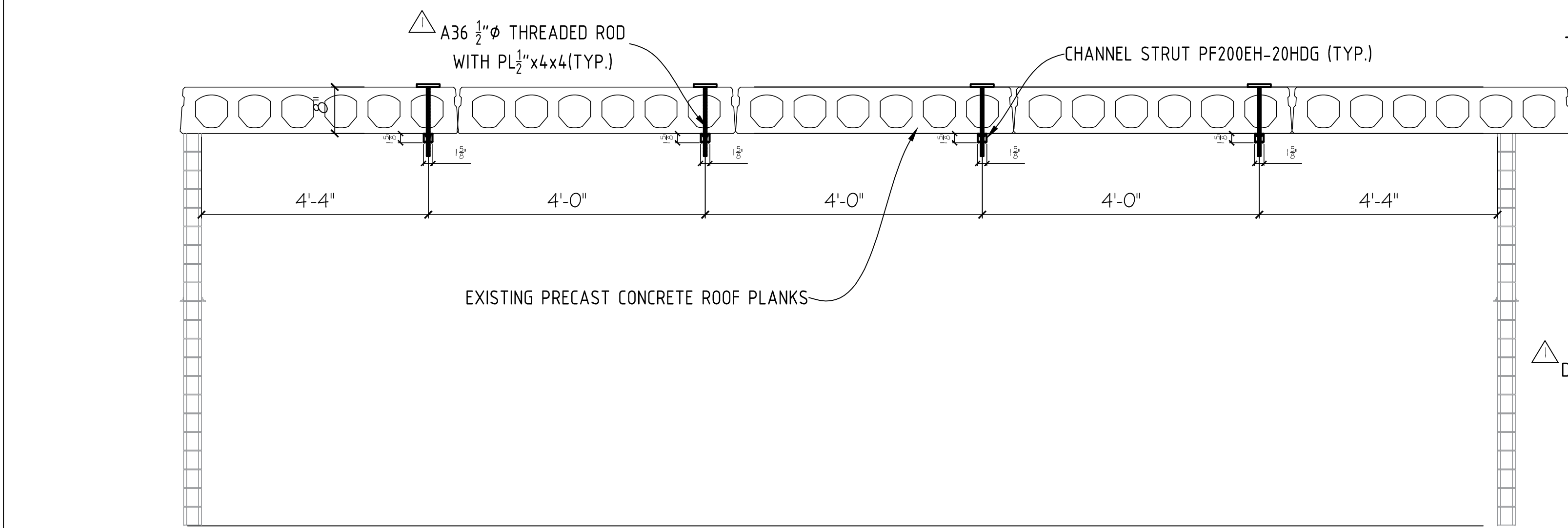
Received Stamp Area



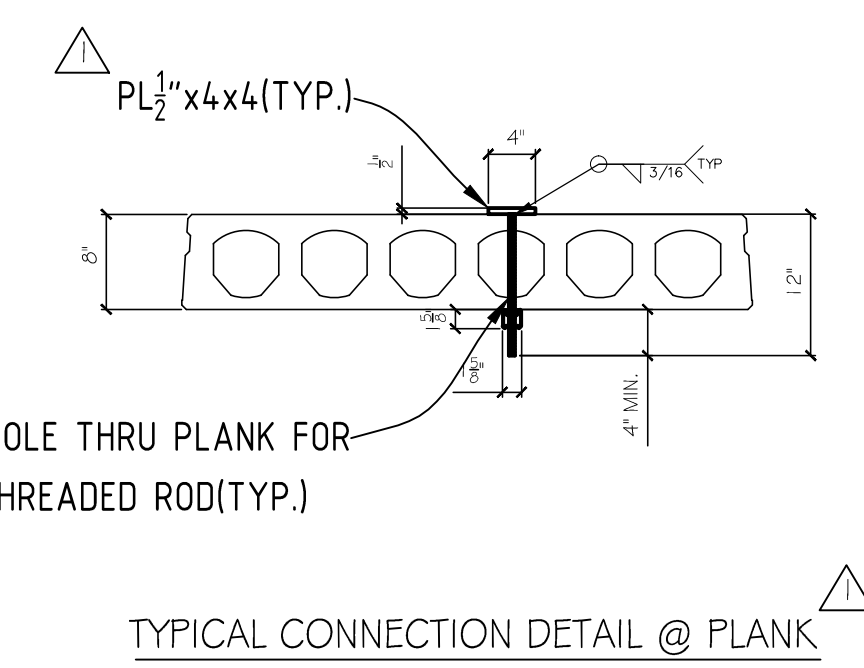
TRAINING RANGE CHANNEL STRUT PLAN



TRAINING RANGE CHANNEL STRUT ELEVATION



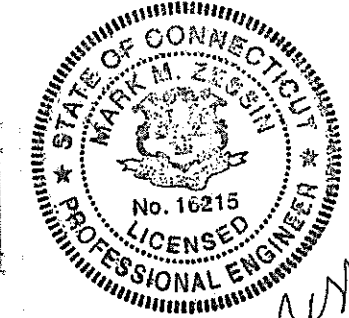
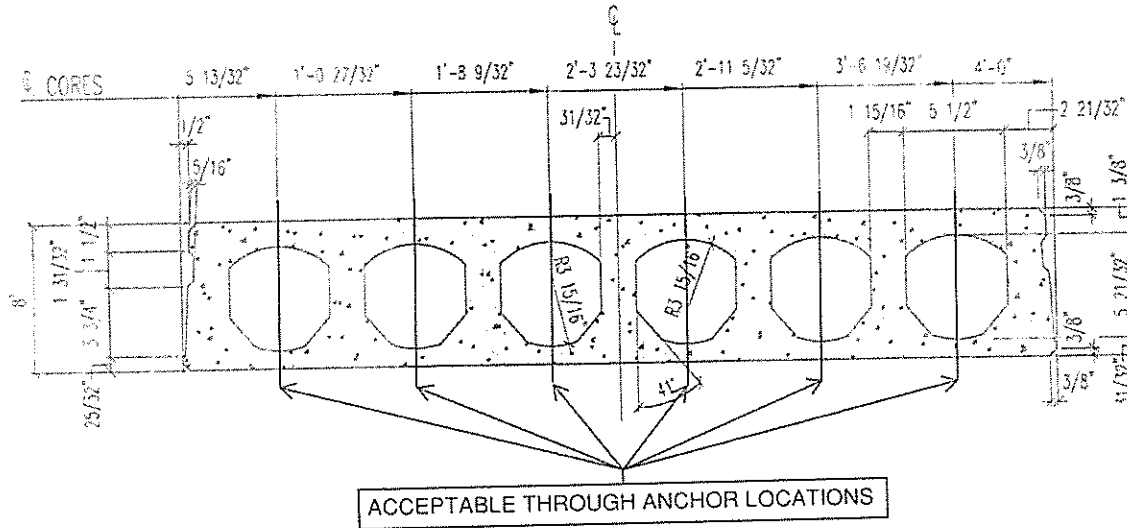
TRAINING RANGE CHANNEL STRUT SECTION-I



REVISIONS		DRAWING ISSUE	BETHEL POLICE DEPT FIREARMS TRAINING RANGE 12 JUDD AVENUE BETHEL CONNECTICUT.	
△	1/13/2023	PER APPROVER NOTES	FOR APPROVAL	DRAWING TITLE: TRAINING RANGE CHANNEL STRUT PLAN
△				FABRICATORS & ERECTORS STRUCTURAL STEEL MISCELLANEOUS METALS
△				<b>Steeltech Building Products, Inc.</b> 636 Nutmeg Rd. North South Windsor CT, 06074 TEL: (860) 290-8930 FAX: (860) 290-8930
△			SHOP BOLTS:	HLS: 3/8" UNO WELDS: 3/16" UNO
△			PAINT: GALV. U.N.O	PREP: ASTM-123 DRY FILM THK: N/A
△			MASONRY ANC: 1/2" UNO	JOB NUMBER: 10-23-1567 DWG. NUMBER: ME-1
△			DRAWN BY: WP	CHKD BY: SD DATE: 10/17/2023

**Firearms Training Range Fitout  
Bethel Police Department  
Bethel, CT**

Disclaimer: Precast concrete planks were not analyzed by B&L for the addition of the channel and hanger loads and are not approved in this calculation.



*Mark M. Zessin*  
11/9/23

**1. Input Information:**

Vert. Load from All Hangers: Per Channel  $P := 13433 \text{ lbf}$

Max Load from Single Hangers:  $P_{max} := \frac{2.434 \text{ kip}}{4}$

$P_{max} = 608.5 \text{ lbf}$

Length of Channel:  $L := 90 \text{ ft}$

Weight of Channel:  $wgt := 1.94 \text{ plf}$

Anchor Rod Spacing:  $s := 4 \text{ ft}$

Provided by Action Target

Provided by Action Target

Reflected Ceiling Plan

Unistrut - PF200EH



Worst Case Moment on Channel:

$$M_{max} := 11.27 \text{ kip} \cdot \text{in}$$

Uniform Load on Channel: factored

$$w := \max\left(\left(\frac{P}{L}\right), \frac{M_{max} \cdot 8}{s^2}\right) + wgt$$

$$w = 471.52 \text{ plf}$$

Load Per Anchor Rod: factored

$$R := w \cdot s + \frac{1470 \text{ lbf}}{4}$$

$$R = 2253.59 \text{ lbf}$$

## 2. Unistrut Design:

Unistrut PF200EH - 1-5/8"x1-5/8" Deep Channel - 12 Gauge

Max. Uniform Load @ 48" Spacing:

$$Load_{48} := 870 \text{ plf}$$

$$w = 471.52 \text{ plf}$$

if  $(w \leq Load_{48}, \text{"OKAY"}, \text{"NG"}) = \text{"OKAY"}$

$$PR_{2a} := \frac{Load_{48}}{w} = 1.85$$

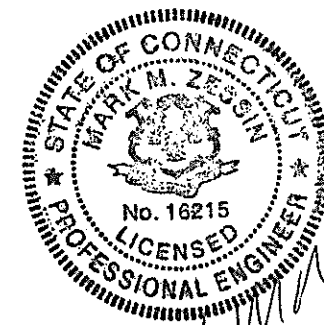
Max. Allowable Load @ Slot Face:

$$Load_{slot} := 2710 \text{ lbf}$$

$$P_{slot} := \max(P_{max}, R)$$

if  $(P_{slot} \leq Load_{slot}, \text{"OKAY"}, \text{"NG"}) = \text{"OKAY"}$

$$PR_{2b} := \frac{Load_{slot}}{P_{slot}} = 1.2$$



*Mark M. Zessin*  
11/9/23

$$P_{slot} = 2253.59 \text{ lbf}$$

**3. Anchor Rod Design:**

A36 1/2"  $\phi$  Threaded Rod

Threaded Rod Area:

$$A_r := 0.126 \text{ in}^2$$

Threaded Rod Yield Strength:

$$F_{y\_rod} := 36 \text{ ksi}$$

Threaded Rod Rupture Strength:

$$F_{u\_rod} := 58 \text{ ksi}$$

Shear Lag Factor:

$$U := 1.0$$

Threaded Effective Rod Area:

$$A_e := U \cdot A_r$$

$$A_e = 0.13 \text{ in}^2$$

**3a. Tensile Yield Check:**

Tensile Yield Strength:

$$P_n := \frac{F_{y\_rod} \cdot A_r}{1.67}$$

$$P_n = 2716.17 \text{ lbf}$$

Load on Anchor:

$$R = 2253.59 \text{ lbf}$$

$$\text{if}(R \leq P_n, \text{"OKAY"}, \text{"NG"}) = \text{"OKAY"}$$

**3b. Tensile Rupture Check:**

Tensile Rupture Strength:

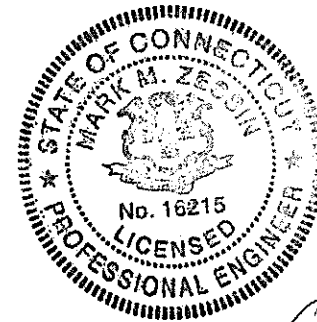
$$P_{nr} := \frac{F_{u\_rod} \cdot (A_e)}{2.00}$$

$$P_{nr} = 3654 \text{ lbf}$$

Load on Anchor:

$$R = 2253.59 \text{ lbf}$$

$$\text{if}(R \leq P_{nr}, \text{"OKAY"}, \text{"NG"}) = \text{"OKAY"}$$



*Mark M. Zecsin*  
11/9/23

AISC [Tb. D3.1]

AISC [D3-1]

AISC [D2-1]

AISC [D2-2]

**4. End Plate Design:**

A36 4"x4" Plate

**4a. End Plate Bearing Design:**

Concrete Strength:

$$f'_c := 5 \text{ ksi}$$

Plate Width/Length:

$$l_{pl} := 4 \text{ in}$$

Area of End Plate:

$$A_1 := l_{pl}^2$$

$$A_1 = 16 \text{ in}^2$$

Bearing Strength:

$$P_p := \frac{0.85 \cdot f'_c \cdot A_1}{2.31}$$

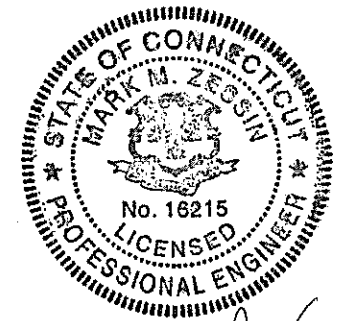
AISC [J8-1]

$$P_p = 29.44 \text{ kip}$$

Load on Anchor:

$$R = 2253.59 \text{ lbf}$$

$$\text{if}(P_p \geq R, \text{"OK"}, \text{"NG"}) = \text{"OK"}$$



*Mark M. Zessin*  
11/9/23

**4b. End Plate Flexure Design:**

Plate Yield Strength:

$$F_{y\_pl} := 36 \text{ ksi}$$

Plate Thickness:

$$t_{pl} := 0.5 \text{ in}$$

Rod Radius:

$$r_o := 0.25 \text{ in}$$

$$0.5 \cdot t_{pl} = 0.25 \text{ in}$$

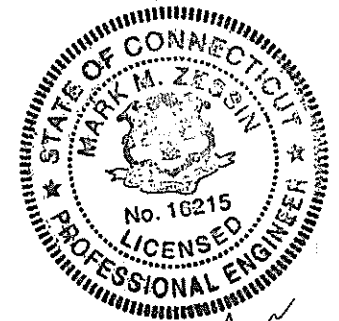
Max. Stress on Plate:

$$\sigma_{max} := \frac{3 \cdot R}{2 \cdot \pi \cdot t_{pl}^2} \cdot \left( (1 + 0.3) \cdot \ln \left( \frac{2 \cdot l_{pl}}{\pi \cdot r_o} \right) + 0.435 \right) = 14.86 \text{ ksi}$$

Allowable Stress on Plate:

$$\sigma_{all} := \frac{F_{y\_pl}}{1.67} = 21.56 \text{ ksi}$$

$$\text{if } (\sigma_{all} \geq \sigma_{max}, \text{"OK"}, \text{"NG"}) = \text{"OK"}$$



*Mark M. Zeggin*  
11/9/23

**5. Weld to End Plate Design:**

**5a. Weld Check:**

1/4" Fillet Weld

Electrode E70:

$$F_{EXX} := 70 \text{ ksi}$$

Nominal Strength of Weld Metal:

$$F_w := 0.6 \cdot F_{EXX} = 42 \text{ ksi}$$

Length of Weld:

$$l := \pi \cdot 0.5 \text{ in}$$

Fillet Weld Size:

$$\text{weld} := \frac{1}{4} \text{ in}$$

Area of Weld:

$$A_w := l \cdot \frac{\text{weld}}{\sqrt{2}}$$

Available Weld Strength:

$$R_{nw} := \frac{F_w \cdot A_w}{2.00}$$

Load on Anchor:

$$R = 2253.59 \text{ lbf}$$

$$\text{if}(R_{nw} \geq R, \text{"OK"}, \text{"NG"}) = \text{"OK"}$$

**5b. Base Metal Check:**

Cross Section Area of Plate:

$$A_{BM} := t_{pl} \cdot l$$

Yield Strength of Base Metal:

$$F_{nBM} := 0.6 \cdot F_{y-pl}$$

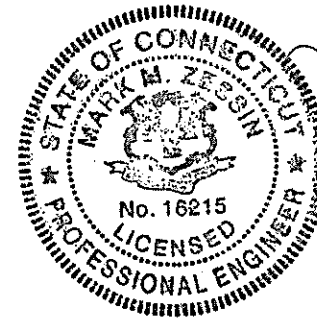
Strength of Base Metal:

$$R_{nBM} := \frac{F_{nBM} \cdot A_{BM}}{2.00}$$

Load on Anchor:

$$R = 2253.59 \text{ lbf}$$

$$\text{if}(R_{nBM} \geq R, \text{"OK"}, \text{"NG"}) = \text{"OK"}$$



*Handwritten signature and date: 11/9/23*

AISC [Tb. J2.5]

$$l = 1.57 \text{ in}$$

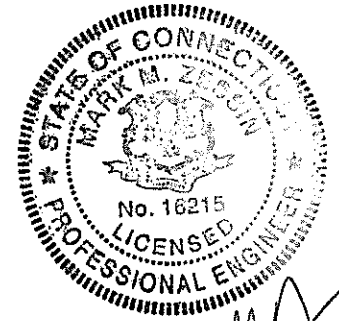
$$A_w = 0.28 \text{ in}^2$$

$$R_{nw} = 5.83 \text{ kip}$$

$$A_{BM} = 0.785 \text{ in}^2$$

$$F_{nBM} = 21.6 \text{ ksi}$$

$$R_{nBM} = 8.482 \text{ kip}$$

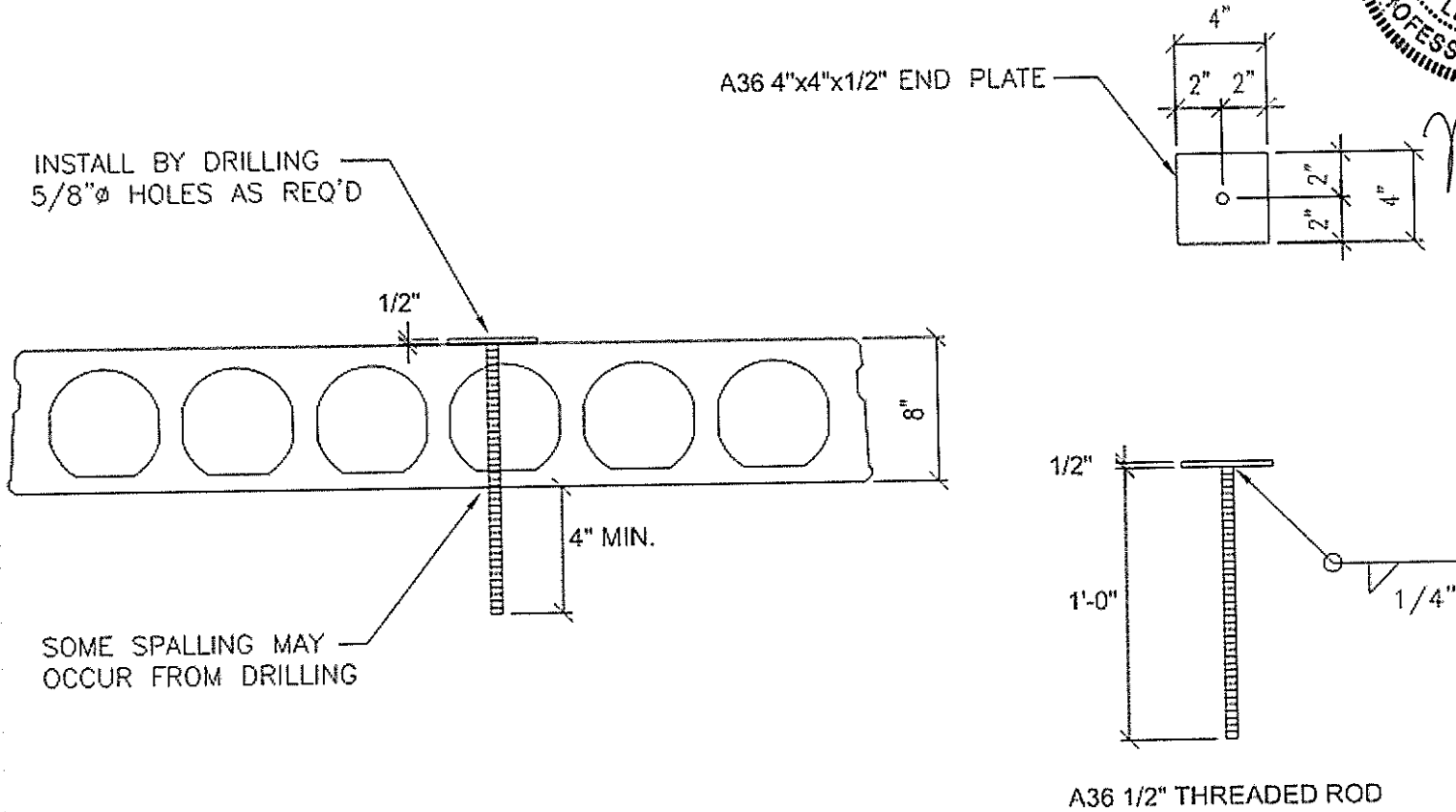


*Mark M. Zegun*  
11/9/23

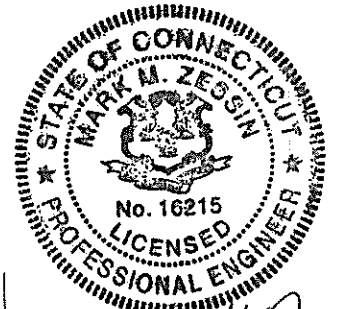
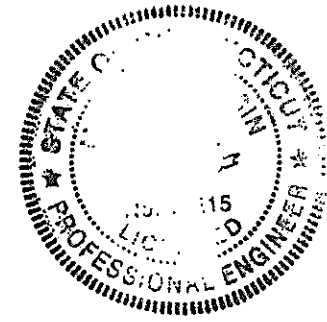
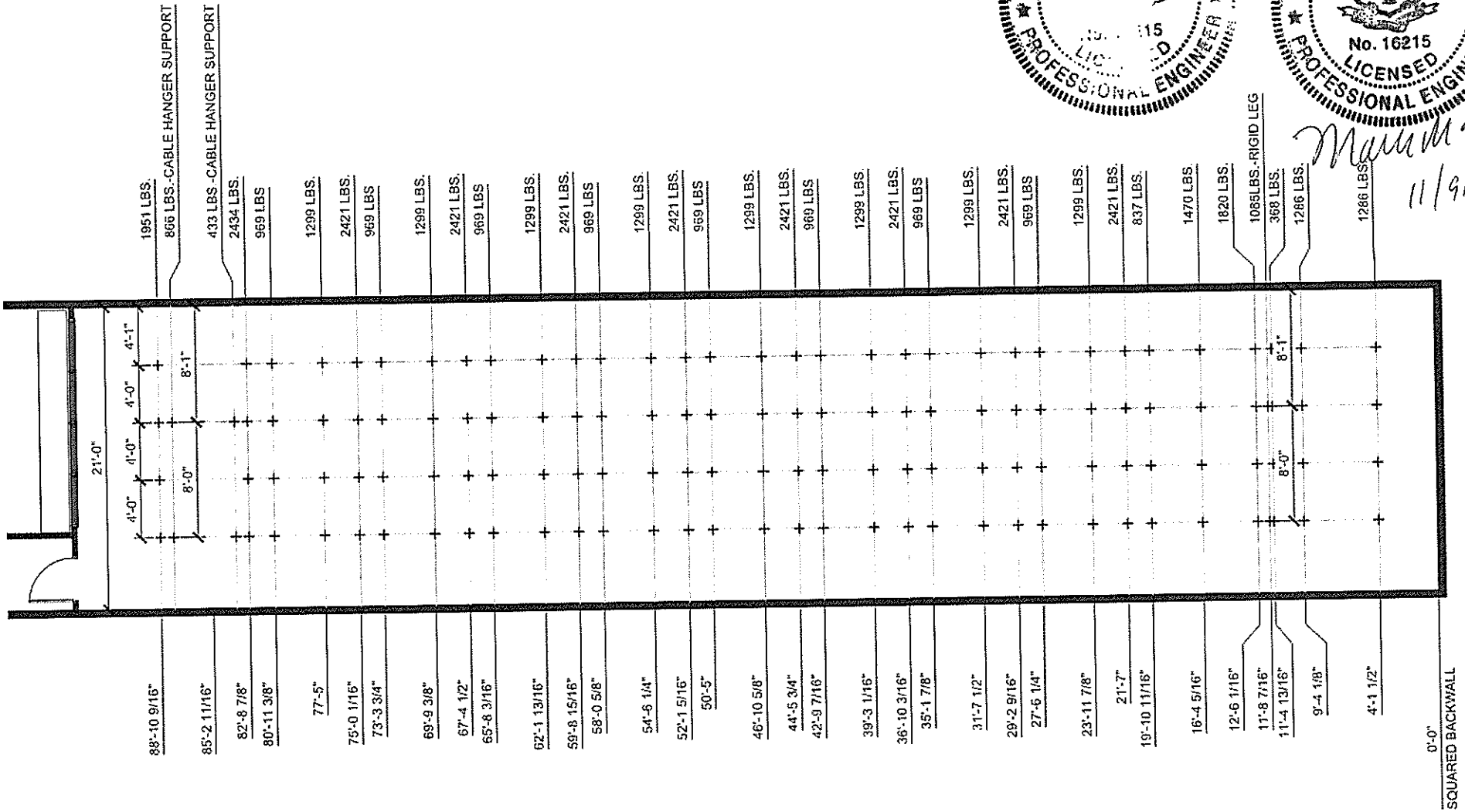
**6. Appendix:**

**6a. Anchor Rods:**

Anchor rods are spaced at 4'-0" (see page for proper location of anchors in deck planks)

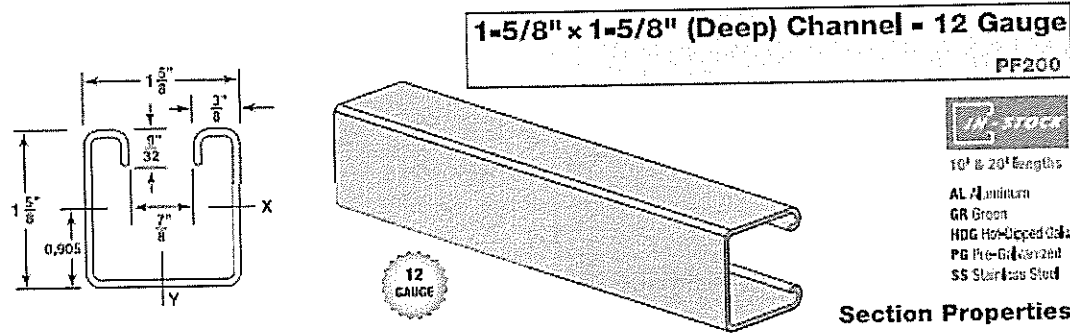


**6b. Hanger Loads from Action Target:**



*Mark M. Zessin*  
11/9/23

**6c. Unistrut Product Specifications:**



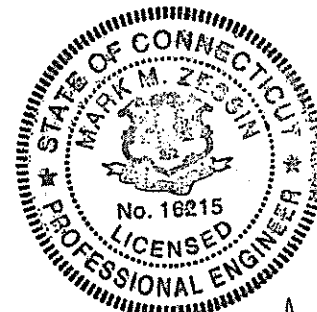
**Unistrut**  
10' & 20' Lengths  
AL Aluminum  
GR Green  
HDG Hot-Dipped Galv.  
PB Pre-Galvanized  
SS Stainless Steel

**Section Properties**

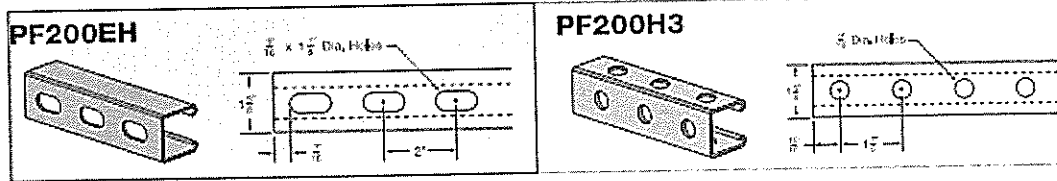
PART NO.	WT./FT. LBS.	AREA OF SECTION SQ. IN.	X-X AXIS			Y-Y AXIS		
			I IN <sup>4</sup>	S IN <sup>3</sup>	R IN.	I IN <sup>4</sup>	S IN <sup>3</sup>	R IN.
PF-200	1.24	0.552	0.188	0.258	0.584	0.235	0.290	0.654

I = Moment of Inertia S = Section Modulus r = Radius of Gyration

SPAN OR UNBRACED HEIGHT (IN.)	MAX. ALLOWABLE UNIFORM LOAD (LBS.)	DEFLECTION IN UNIFORM LOAD (IN.)	UNIFORM LOAD AT DEFLECTION				MAX. ALLOWABLE LOAD AT SLOT FACE (LBS.)	COLUMN LOADING DATA MAX. COLUMN LOAD APPLIED TO C.G.			
			SPAN/18 DEFLECTION (LBS.)	SPAN/24 DEFLECTION (LBS.)	SPAN/36 DEFLECTION (LBS.)	WEIGHT OF CHANNEL (LBS.)		K=10 (LBS.)	K=10 (LBS.)	K=10 (LBS.)	K=1.7 (LBS.)
12	3,480	0.01	3,480	3,480	3,480	1.9	3,850	12,240	11,940	11,460	10,960
18	2,320	0.03	2,320	2,320	2,320	2.9	3,710	11,540	10,980	10,130	9,230
24	1,740	0.06	1,740	1,740	1,740	3.9	3,530	10,690	9,850	8,740	7,710
30	1,390	0.09	1,390	1,390	1,310	4.9	3,330	9,780	8,740	7,470	6,380
36	1,160	0.13	1,160	1,160	910	5.8	3,120	8,880	7,710	6,380	5,910
42	990	0.17	990	990	870	6.8	2,910	8,020	6,850	5,470	4,430
48	870	0.23	870	770	510	7.8	2,710	7,240	6,000	4,890	3,810
60	700	0.35	690	480	330	9.7	2,540	6,910	4,690	3,630	2,960
72	580	0.51	460	340	230	11.6	2,040	4,840	3,810	2,960	2,460
84	500	0.69	340	260	170	13.6	1,800	4,040	3,200	2,480	1,980
96	430	0.90	260	190	130	15.5	1,600	3,480	2,750	2,110	1,570
108	390	1.14	200	150	100	17.5	1,440	3,050	2,400	1,820	**
120	350	1.41	160	120	80	19.4	1,290	2,700	2,110	**	**
144	290	2.03	110	90	60	23.3	1,060	2,180	1,670	**	**
168	250	2.77	80	60	40	27.2	**	1,790	**	**	**
180	230	3.18	70	50	40	28.1	**	**	**	**	**
192	220	3.61	60	50	NR	31.0	**	**	**	**	**
216	190	4.57	50	40	NR	34.9	**	**	**	**	**
240	170	5.65	40	NR	NR	38.0	**	**	**	**	**



*Mark M. Zessin*  
11/9/23





**6c. Oldcastle Elematic HC Plank:** 8"x48" Heavy Section

