catena consulting engineers

February 27, 2017

Mr. Brian Morris
Scott | Edwards Architecture
2525 E. Burnside Street
Portland, Oregon 97214

RE: The Westin Hotel – Ground Floor Stair Landing, Portland, OR
Catena Project Number: 2016114.00

Dear Brian:

The attached calculations verify the structural adequacy of the proposed stair landing addition to the ground floor of the Westin Hotel in Portland, Oregon, as reflected on Catena sketches SK-A through SK-D. We have based our calculations on the 2014 Oregon Structural Specialty Code.

Sincerely,

catena consulting engineers

EXPIRES: 06/30/2018

Jason M. Thompson, S.E.
Principal

16-274305 Rev 01 FA

Westin Hotel Stairs

Dead load:
Shallow VERCO metal deck gage 22 = 1.6psf
3" total slab depth over metal deck=33 psf
Tile= 6 psf
Misc = 2 psf
Total = 42.6 psf

Live load = 100 psf for residential public room (ASCE 7-10 Table4-1)

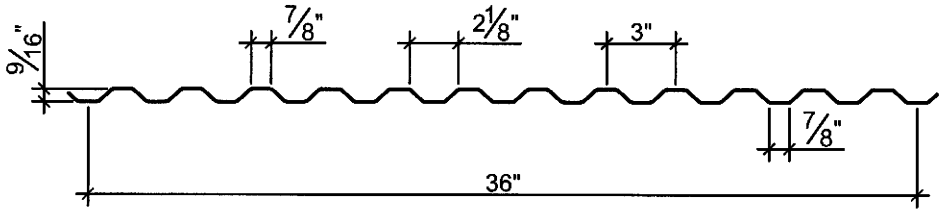
Total allowable uniform load = 100+42.6 = 142.6 psf

From Verco catalog, Max span for this uniform load = 24"

Shallow VERCOR™

- 9/16" Deep Deck
- Galvanized

Dimensions



Shallow VERCOR

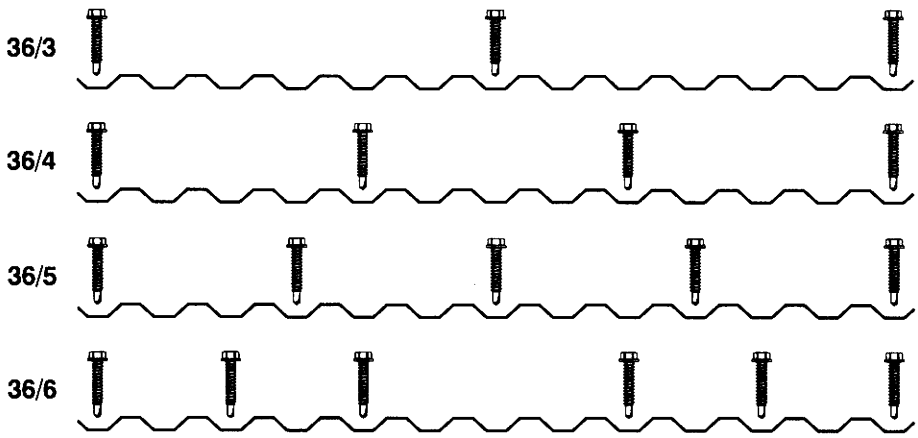
Standard Overlapping Sidelap

Deck Weight and Section Properties

Gage	Weight	I_d for Deflection		Moment		Allowable Reactions per ft of Width (lb) due to Web Crippling							
						One Flange Loading				Two Flange Loading			
	Galv	Single Span	Multi Span	$+S_{eff}$	$-S_{eff}$	End Bearing Length		Interior Bearing Length		End Bearing Length		Interior Bearing Length	
	(psf)	($in.^4$/ft)	($in.^4$/ft)	($in.^3$/ft)	($in.^3$/ft)	1 1/2"	2"	1 1/2"	2"	1 1/2"	2"	1 1/2"	2"
26	1.0	0.013	0.013	0.041	0.043	581	644	788	862	536	582	963	1061
24	1.3	0.018	0.018	0.059	0.059	980	1081	1375	1497	999	1080	1709	1875
22	1.6	0.022	0.022	0.073	0.073	1466	1611	2105	2283	1598	1721	2645	2889

Notes:
1. Section properties are based on F_y = 60,000 psi (specified minimum F_y = 80,000 psi).
2. I_d is for deflection due to uniform loads.
3. S_{eff} (+ or -) is the effective section modulus.
4. Allowable (ASD) reactions are based on web crippling, per AISI S100 Section C3.4, where Ω_w = 1.70 for end bearing and 1.75 for interior bearing. Nominal reactions may be determined by multiplying the table values by Ω_w. LRFD reactions may be determined by multiplying nominal reactions by ϕ_w = 0.9 for end reactions and 0.85 for interior reactions.

Attachment Patterns to Supports



Shallow and Deep VERCOR™ Decks

Footnotes for Allowable Uniform Load Tables

1. Stress = Allowable uniform load based on maximum allowable flexural stress in deck.
2. L/360, L240 or L/180 = Uniform load which produces selected deflection in deck.
3. The symbol ♦♦♦ indicates allowable uniform load based on deflection exceeds allowable uniform load based on stress.
4. Nominal uniform loads based on flexure stress may be determined by multiplying the allowable uniform loads in the table by $\Omega_b = 1.67$. LRFD uniform loads may be determined by multiplying nominal uniform loads by $\phi_b = 0.95$.

Footnotes for Maximum Unshored Clear Span and Allowable Diaphragm Shear Strength Tables

1. Shoring calculations based on the following:
   - Deck supporting dead load of concrete plus 20 psf uniform construction load or 150 pound concentrated construction live load for flexure. 4 psf is added for normal weight concrete and 3 psf is added for light weight concrete to account for ponding due to deck deflection between support members.
   - Dead load deflection limited to L/180 of span length, not to exceed 3/4".
   - Minimum end and interior bearing of 2" for Shallow VERCOR. Minimum end bearing of 2" and minimum interior bearing of 4" for Deep VERCOR. Required bearing should be determined based on allowable reactions shown on pages 128-129.
2. Concrete fill to have minimum compressive strength $f'_c = 3{,}000$ psi.
3. Total slab depth is nominal depth from top of concrete to bottom of steel deck.
4. Nominal diaphragm shear strengths may be determined by multiplying the tabulated strengths by $\Omega = 3.25$. LRFD diaphragm shear strength may be determined by multiplying nominal shear strength by $\phi = 0.50$.
5. Deck is attached with minimum #12 Screws (self-drilling, self-tapping) to supports. Select appropriate screw based on actual substrate thickness. The following table is provided as a guide, proper selection should be verified based on the specific fasteners used.

SUPPORT THICKNESS	FASTENER DESIGNATION
33 mil (0.0346") to 3/16"	#3 Drill Point
1/8" to 1/4"	#4 Drill Point
1/8" to 1/2"	#5 Drill Point

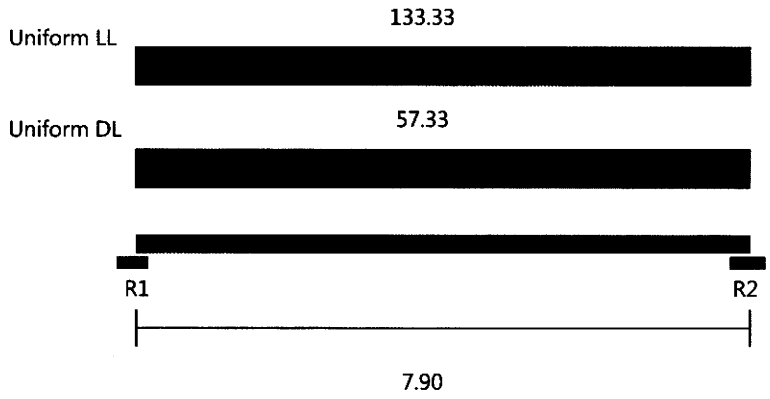
6. Sidelap connections are to be 1 per span, with a maximum of 36" o.c. spacing.

Shallow VERCOR™

Allowable Uniform Loads (psf)

SPAN	DECK GAGE	CRITERIA	Span (ft-in.)										
			1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
SINGLE	26	Stress	300	300	246	157	109	80	62	49	39	33	27
		L/360	♦♦♦	169	71	36	21	13	9	6	5	3	3
		L/240	♦♦♦	253	107	55	32	20	13	9	7	5	4
		L/180	♦♦♦	♦♦♦	142	73	42	27	18	12	9	7	5
	24	Stress	300	300	300	227	157	116	89	70	57	47	39
		L/360	♦♦♦	233	98	50	29	18	12	9	6	5	4
		L/240	♦♦♦	♦♦♦	148	76	44	28	18	13	9	7	5
		L/180	♦♦♦	♦♦♦	197	101	58	37	25	17	13	9	7
	22	Stress	300	300	300	280	195	143	110	87	70	58	49
		L/360	♦♦♦	285	120	62	36	22	15	11	8	6	4
		L/240	♦♦♦	♦♦♦	181	92	54	34	23	16	12	9	7
		L/180	♦♦♦	♦♦♦	241	123	71	45	30	21	15	12	9
DOUBLE	26	Stress	300	300	258	165	115	84	65	51	41	34	29
		L/360	♦♦♦	♦♦♦	171	88	51	32	21	15	11	8	6
		L/240	♦♦♦	♦♦♦	257	132	76	48	32	23	16	12	10
		L/180	♦♦♦	♦♦♦	♦♦♦	♦♦♦	101	64	43	30	22	16	13
	24	Stress	300	300	300	227	157	116	89	70	57	47	39
		L/360	♦♦♦	♦♦♦	237	121	70	44	30	21	15	11	9
		L/240	♦♦♦	♦♦♦	♦♦♦	182	105	66	44	31	23	17	13
		L/180	♦♦♦	♦♦♦	♦♦♦	♦♦♦	141	88	59	42	30	23	18
	22	Stress	300	300	300	280	195	143	110	87	70	58	49
		L/360	♦♦♦	♦♦♦	290	148	86	54	36	25	19	14	11
		L/240	♦♦♦	♦♦♦	♦♦♦	223	129	81	54	38	28	21	16
		L/180	♦♦♦	♦♦♦	♦♦♦	♦♦♦	172	108	72	51	37	28	21
TRIPLE	26	Stress	300	300	300	206	143	105	81	64	52	43	36
		L/360	♦♦♦	♦♦♦	134	69	40	25	17	12	9	6	5
		L/240	♦♦♦	♦♦♦	201	103	60	38	25	18	13	10	7
		L/180	♦♦♦	♦♦♦	268	137	79	50	34	24	17	13	10
	24	Stress	300	300	300	283	197	144	111	87	71	59	49
		L/360	♦♦♦	♦♦♦	186	95	55	35	23	16	12	9	7
		L/240	♦♦♦	♦♦♦	278	143	82	52	35	24	18	13	10
		L/180	♦♦♦	♦♦♦	♦♦♦	190	110	69	46	33	24	18	14
	22	Stress	300	300	300	300	243	179	137	108	88	72	61
		L/360	♦♦♦	♦♦♦	227	116	67	42	28	20	15	11	8
		L/240	♦♦♦	♦♦♦	♦♦♦	174	101	63	43	30	22	16	13
		L/180	♦♦♦	♦♦♦	♦♦♦	232	134	85	57	40	29	22	17

See footnotes on page 130.



Section : 600S200-54 Single C Stud **Fy =** 50.0 ksi
Maxo = 2532.9 Ft-Lb **Moment of Intertia, I =** 3.319 in^4 **Va =** 2822.9 lb
Joist Spacing = 16 in
Deflection Limits: Total Load - 240 Live Load - 360
Load Cases:
1. DL + LL All spans
2. DL + LL Even spans
3. DL + LL Odd spans
4. LL All spans
5. LL Even spans
6. LL Odd spans

Joist Flexural and Deflection Summary

	Mmax Ft-Lb	K-phi lb-in/in	Lm in	Ma-dist Ft-Lb	Mmax/Ma (Min)	Load Case	Total Ld Defl	Load Case	LL Defl	Load Case
Span	1487	0.0	94.8	2281.9	0.652	1	L/556	1	L/794	4

Joist Bending and Web Crippling Summary

Rxn	Load (lb)	Load Case	Bearing (in)	Pa (lb)	Pn (lb)	Mmax (Intr)	Load Case	Stiffeners Required
R1	753.1	1	1.00	598.9	1048.1	0.65	1	YES
R2	753.1	1	1.00	598.9	1048.1	0.65	1	YES

Joist Bending and Shear Summary

Rxn	Vmax (lb)	Load Case	Va Factor	V/Va	M/Ma	Intr. Unstiffened	Load Case	Intr. Stiffened	Load Case
R1	753.1	1	1.000	0.27	0.00	0.27	1	N/A	N/A
R2	753.1	1	1.000	0.27	0.00	0.27	1	N/A	N/A

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STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON MARCH 9, 2004 JASON M THOMPSON

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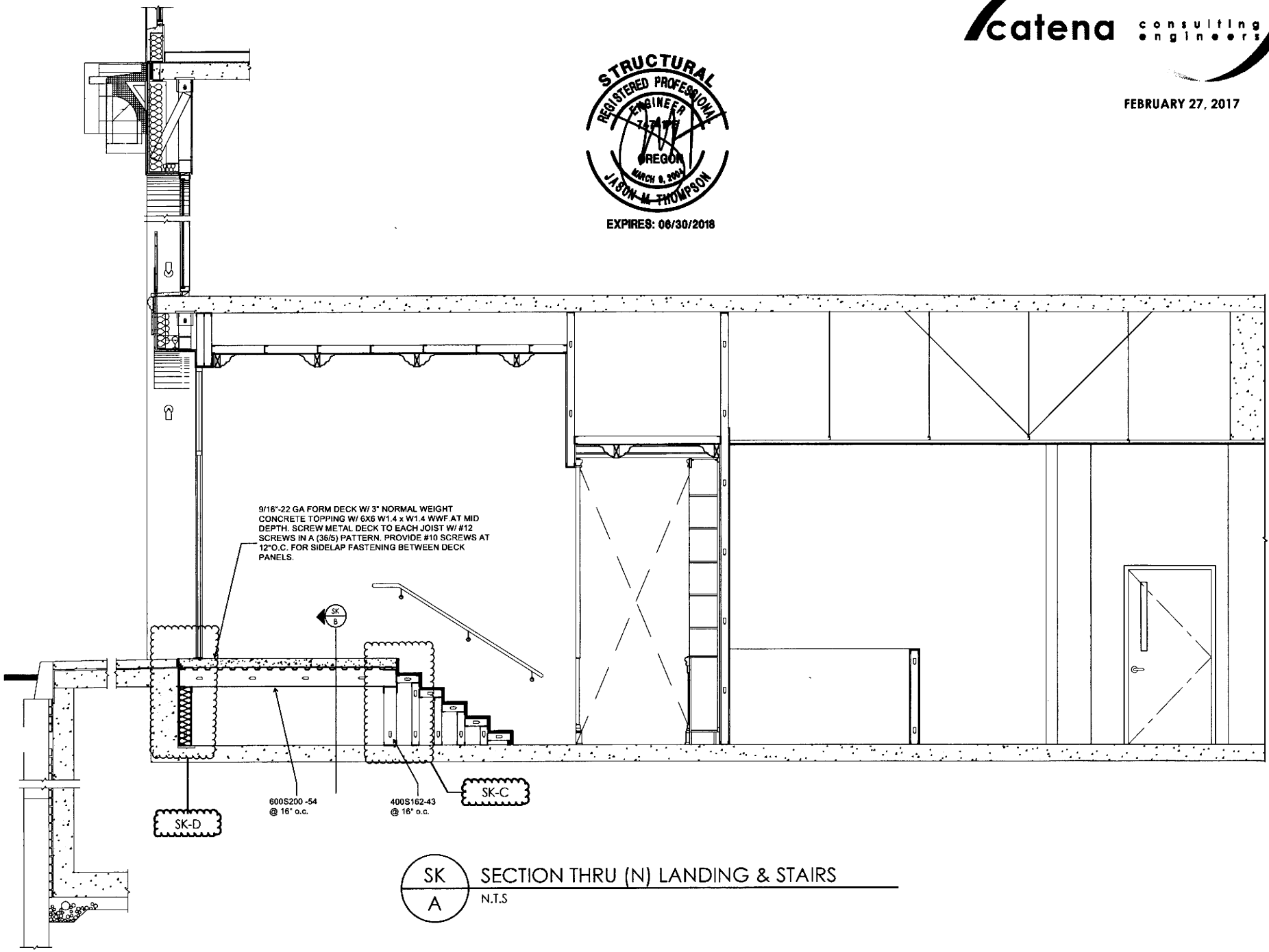

SK A SECTION THRU (N) LANDING & STAIRS

N.T.S

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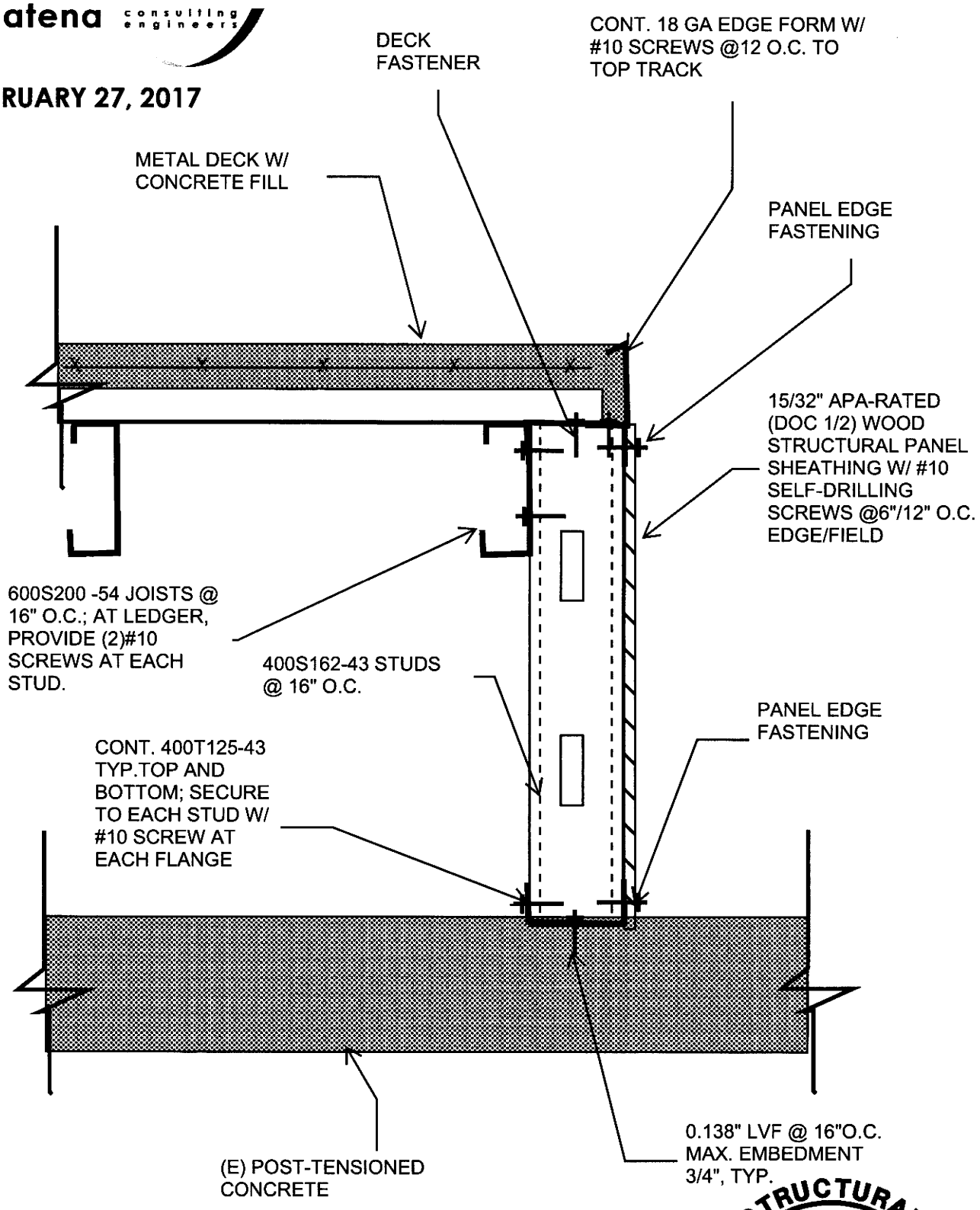

NOTE : ENSURE STUDS ARE FULLY SEATED/INDEXED IN BOTTOM AND TOP TRACKS

SK / B — SIDE WALLS @ (N) LANDING & STAIRS

N.T.S

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 74741PE OREGON MARCH 9, 2001 JASON M. THOMPSON

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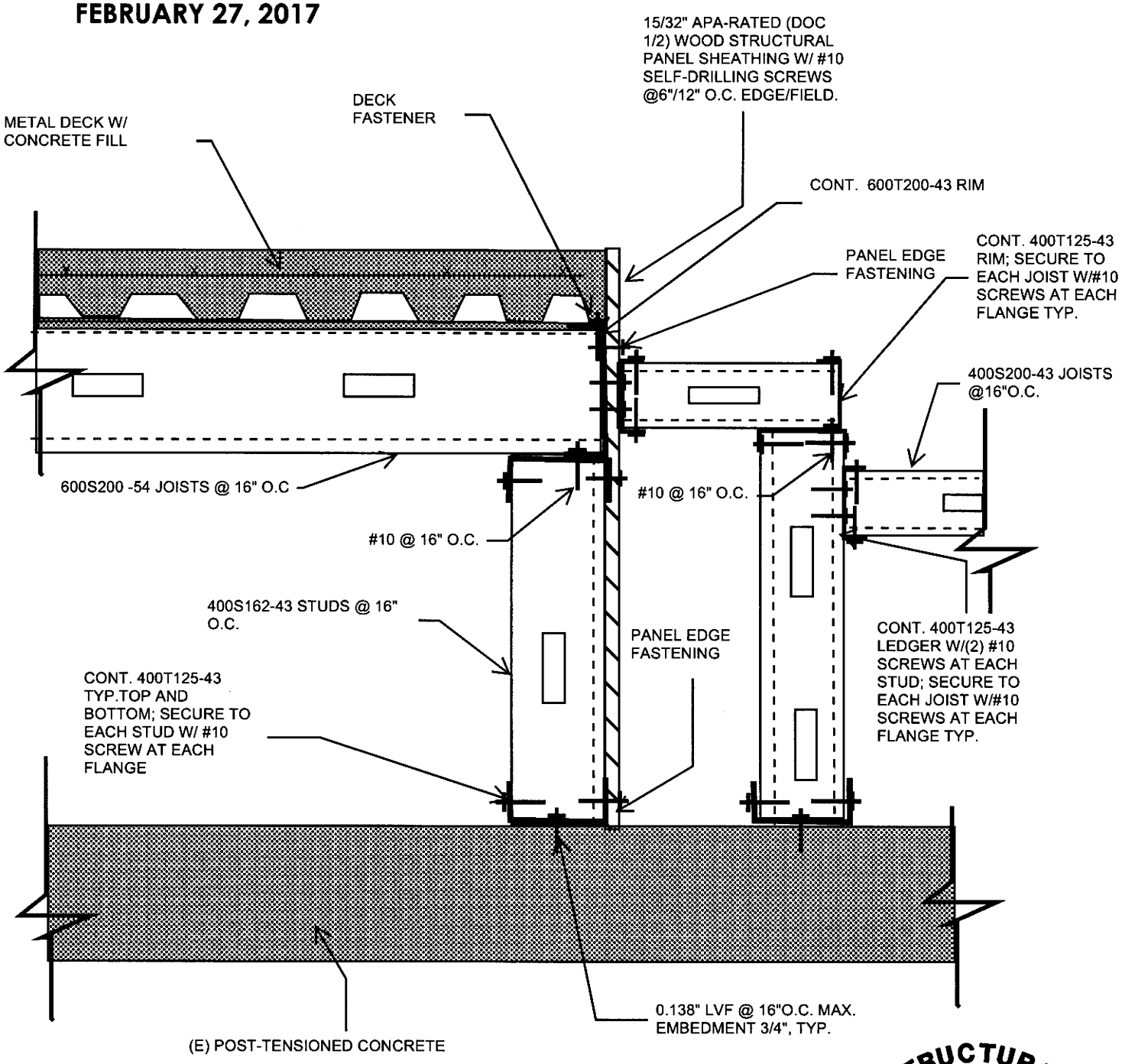

NOTE : ENSURE STUDS ARE FULLY SEATED/INDEXED IN BOTTOM AND TOP TRACKS

SK / C (N) LANDING AT STEPS

N.T.S

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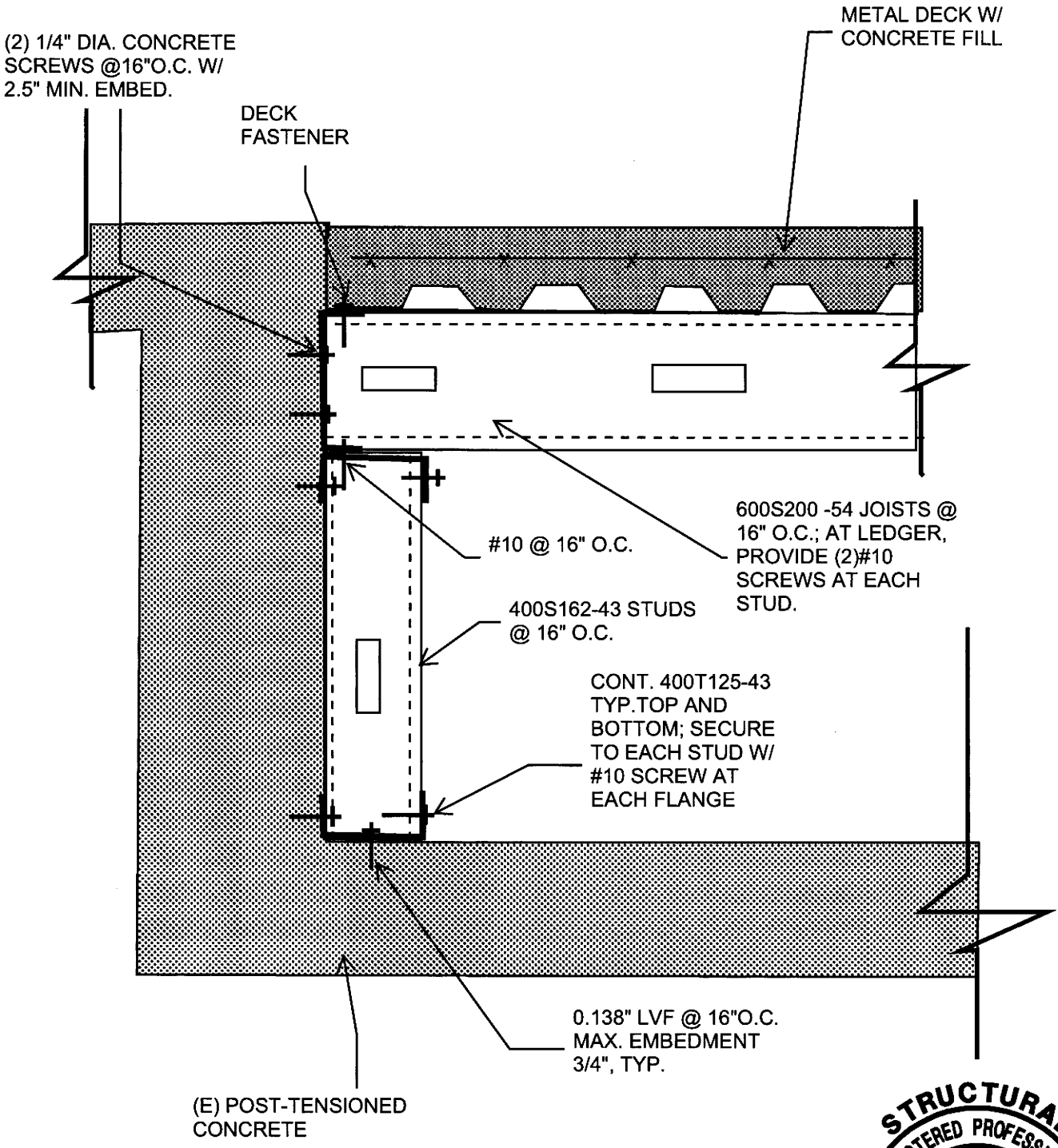

NOTE : ENSURE STUDS ARE FULLY SEATED/INDEXED IN BOTTOM AND TOP TRACKS

SK / D — (N) LANDING AT THRESHOLD

N.T.S

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 77171PE OREGON MARCH 9, 2004 JASON W. THOMPSON

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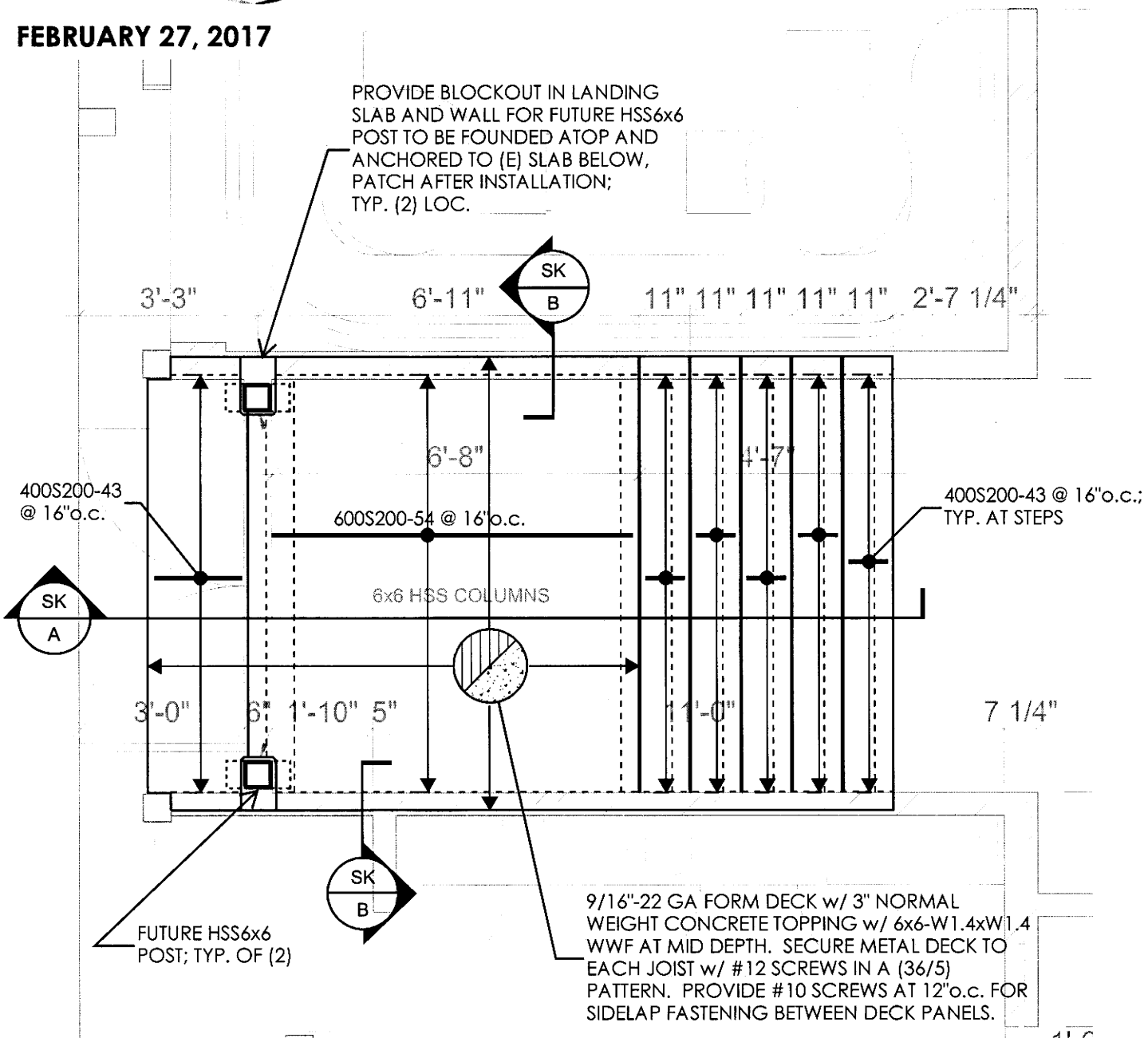

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER 14741PE OREGON MARCH 9, 2004 JASON M. THOMPSON

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SCALE: 1/2" = 1'-0"

S|E A

SCOTT|EDWARDS ARCHITECTURE LLP

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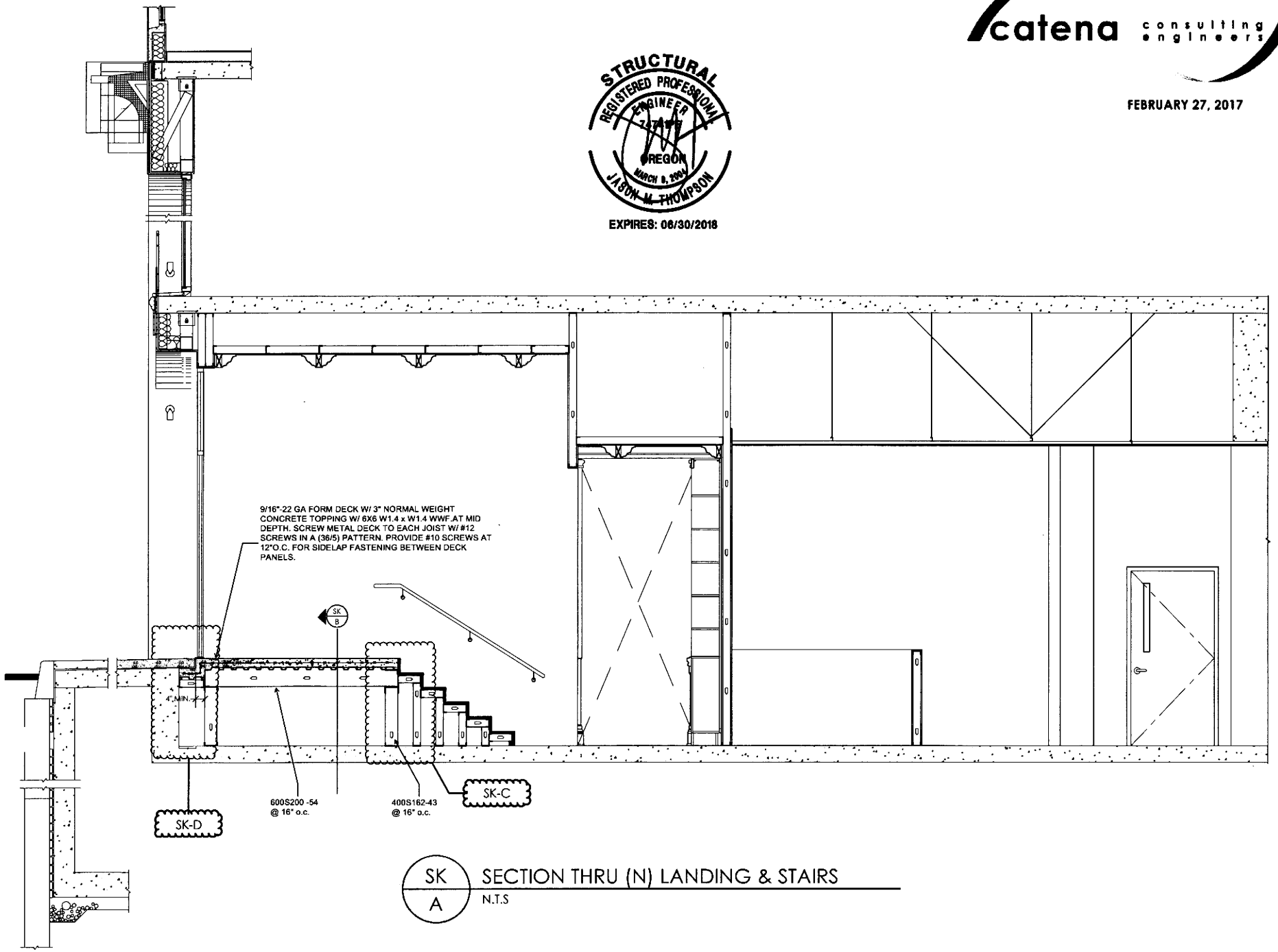
STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER
STATE OF OREGON
MARCH 9, 2004
JASON M. THOMPSON

EXPIRES: 06/30/2018



SK/A SECTION THRU (N) LANDING & STAIRS

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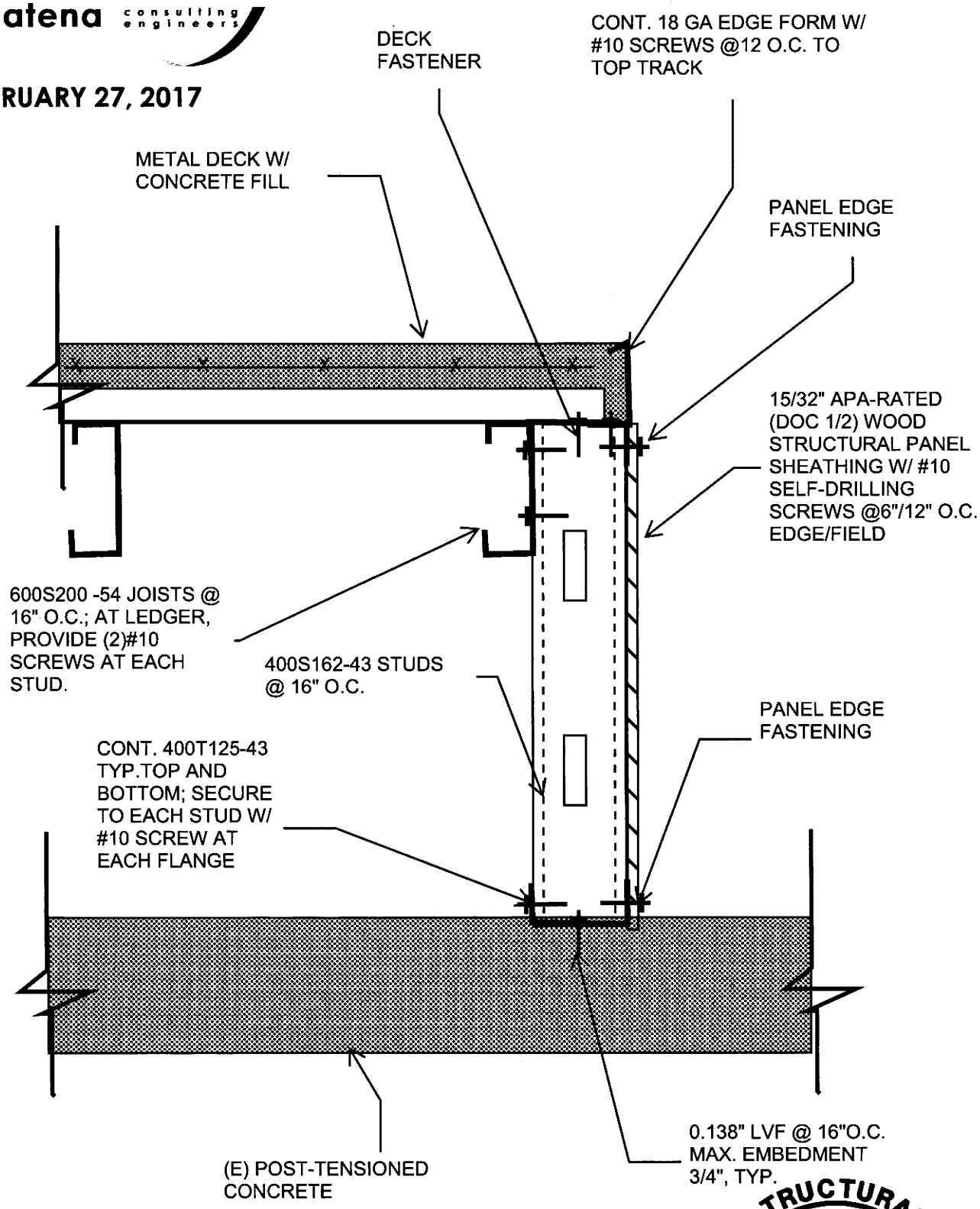

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SK / B — SIDE WALLS @ (N) LANDING & STAIRS

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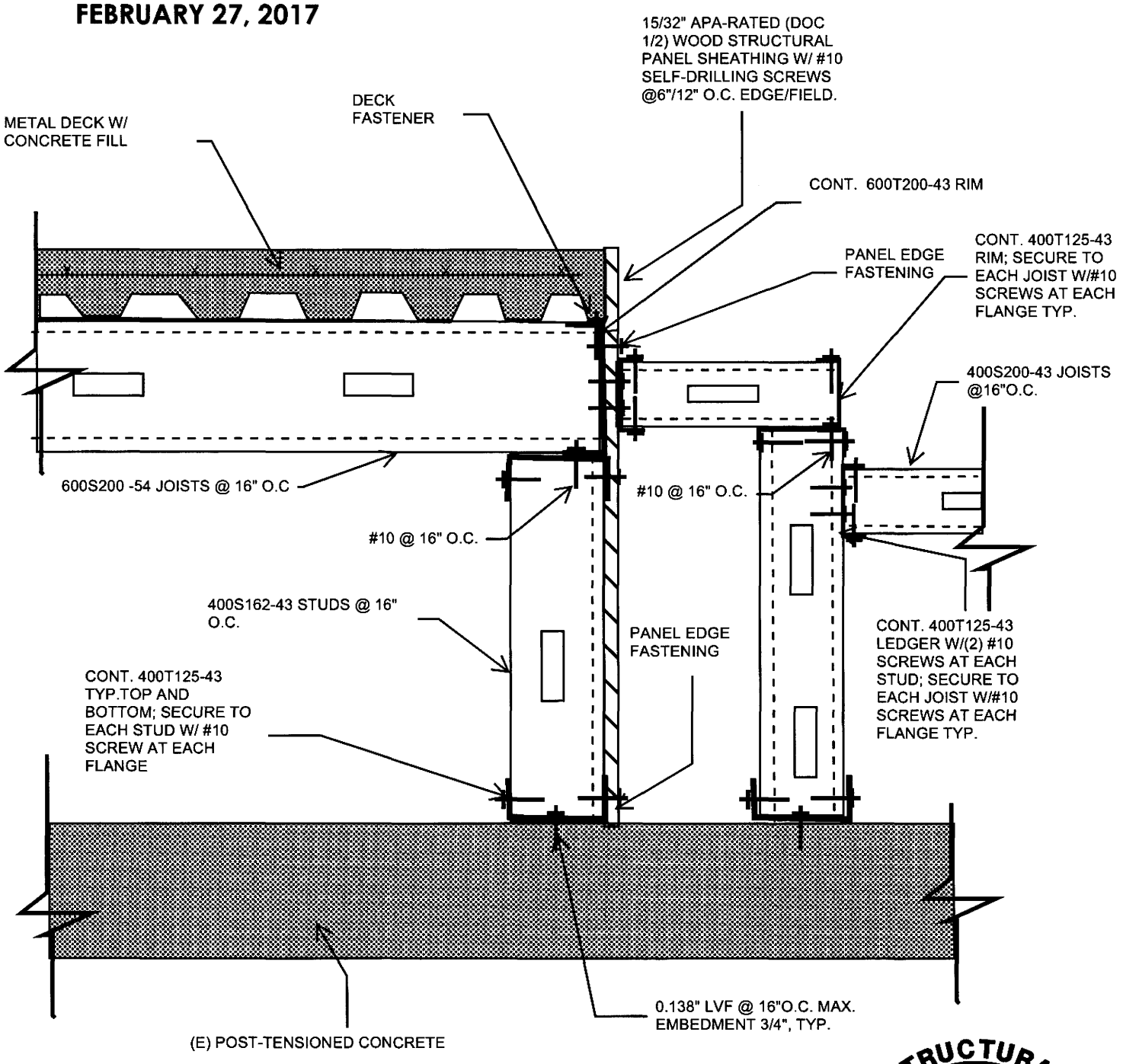

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SK / C (N) LANDING AT STEPS

N.T.S

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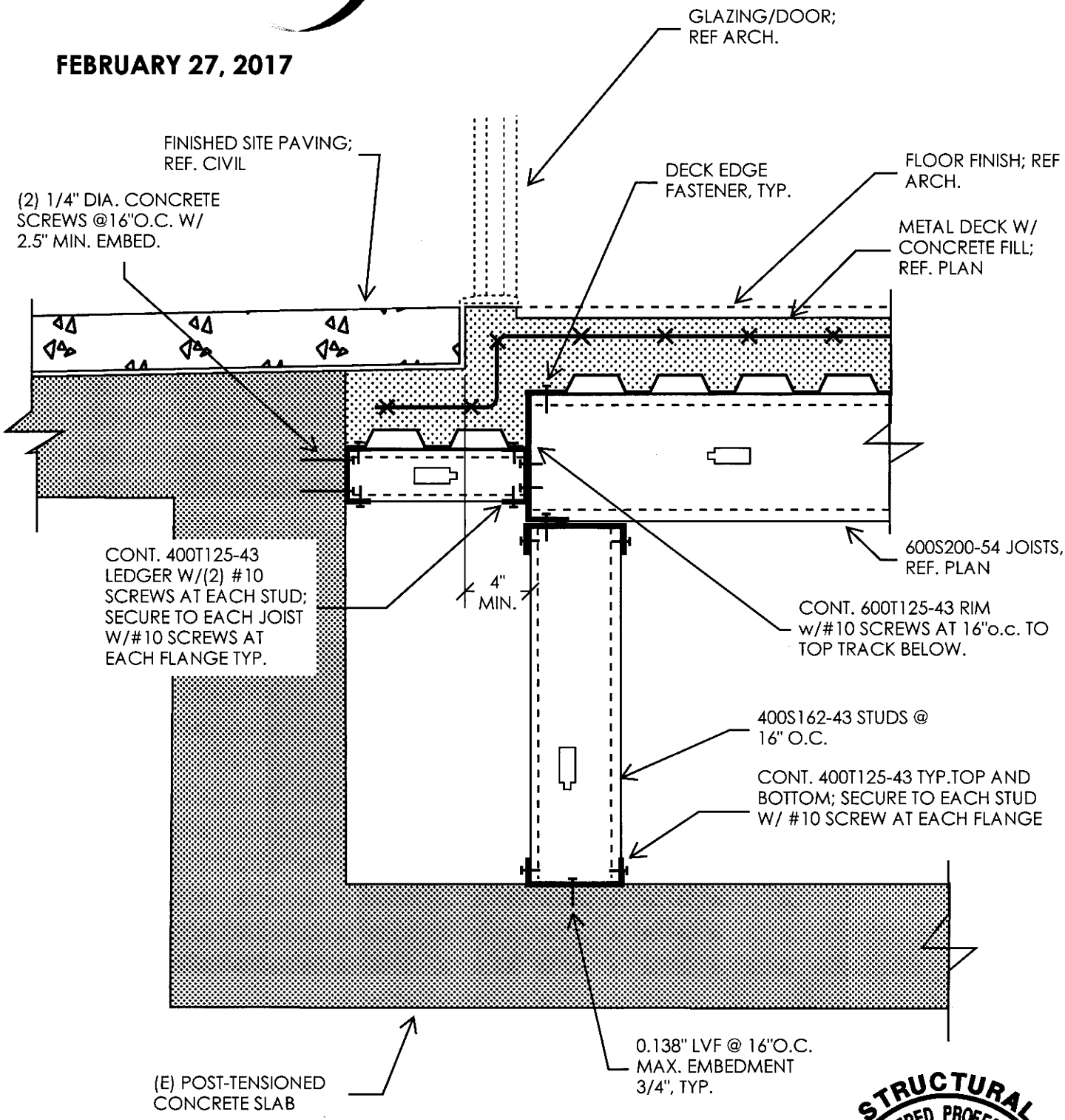

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SK / D (N) LANDING AT THRESHOLD

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