

PRODUCT APPROVAL SUPPORTING CALCULATIONS

Endurance Picture Windows

REPORT TO:

**VPI QUALITY WINDOWS
3420 E. FERRY AVENUE
SPOKANE, WASHINGTON 99202**

REPORT NUMBER: NCTL-110-25164-3 – R1
REVISION 1 REPORT DATE: 10/16/2023

This item has been digitally signed and sealed by Michael D. Stremmel, PE on the date adjacent to the seal.

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Micheal D. Stremmel, PE
FL PE 65868
FL REG 37122

Scope

Molimo, LLC was contracted by VPI Quality Windows to evaluate glazing, installation methods and alternate installation methods for their *Endurance* picture window. The evaluation is based on physical testing and product certifications.

The products considered in this report satisfy the requirements of the current edition of the *Florida Building Code, Building* for the overall sizes, design pressures and installation methods presented in this report.

Table 1 Summary of Product Limitations of Use

Series/Model	Overall Size (W x H)	Performance
<i>Endurance</i> Picture Window	48" x 72"	+50/-50 psf Structural 7.52 psf Water Test (see also Table 5)
<i>Endurance</i> 2-Wide Picture Window	72" x 72"	+27.6/-27.6 psf Structural 7.52 psf Water Test (see also Table 6)
<i>Endurance</i> 3-Wide Picture Window	108" x 72"	+27.6/-27.6 psf Structural 7.52 psf Water Test (see also Table 6)

Reference standards utilized in this project include:

Current Edition of the *Florida Building Code, Building*. International Code Council.

ANSI/AWC NDS-2018 *National Design Specification (NDS) for Wood Construction*. American Wood Council, 2018.

AISI S100-16(2020) *North American Specification for the Design of Cold-Formed Steel Structural Members, 2020*. American Iron and Steel Institute, 2020.

ICC-ES Report ESR-1976 *ITW Buildex TEKS Self-Drilling Fasteners*. ICC Evaluation Service. 04/2021.

NOA 21-0201.06 *Tapcon Concrete and Masonry Anchors with Advanced Threadform Technology*. Miami-Dade County Product Control Section. 02/01/21.

ASTM E1300-12ae1 *Standard Practice for Determining Load Resistance of Glass in Buildings*. ASTM International, 2012.

The anchorage analyses presented herein do not address the water resistance, water penetration or air infiltration performance of the installation method or the installed product. In addition, the analyses rely on the assumption that the building substrate is capable of withstanding incurred loads.

Certification of Independence

In accordance with Rule 61G20-3 Florida Administrative Code, National Certified Testing Laboratories hereby certifies the following:

- Molimo, LLC does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products tested or labeled by the agency.
- Molimo, LLC Laboratories is not owned, operated or controlled by any company manufacturing or distributing products it tests or labels.
- Micheal D. Stremmel, P.E. does not have nor will acquire, a financial interest in any company manufacturing or distributing products for which the reports are being issued.
- Micheal D. Stremmel, P.E does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

Analyses

Summary of Test Results

The following table summarizes the various VPI Quality Windows *Endurance* picture window products and their corresponding performance levels which have been established by testing.

Table 2 Summary of Test Results

Series/Model	Test Report Number	Overall Size (W x H)	Performance
<i>Endurance</i> Picture Window	N3980.01-901-44 (Rev. -, 03/21/22)	48" x 72"	+50/-50 psf Structural 7.52 psf Water Test
<i>Endurance</i> Twin Single Hung Window	N3979.01-901-44 (Rev. -, 03/17/22)	72" x 60"	+50/-50 psf Structural 7.52 psf Water Test

The twin single hung window is included for the purpose of qualifying the impost for fixed composite windows.

Testing documented in Table 1 was conducted by Intertek in Kent, Washington (Florida Department of Business & Professional Regulation Test Lab No. TST4310, IAS Laboratory Accreditation TL-330).

Glazing Evaluation

The glazing is evaluated with ASTM E1300-12ae1 *Standard Practice for Determining Load Resistance of Glass in Buildings* assuming four-sided support. Glazing constructions are listed in Table 3. Glazing analyses are presented on page 6 to page 7 and summarized in Table 4.

Table 3 Glazing Constructions

Glass Type	Glazing Construction
Insulating Glass	5/32" Annealed Glass (Exterior) 5/32" Annealed Glass (Interior)

Table 4 Glazing Analyses

Overall Size (W x H)	Glass Type	Glass Size (W x H)	Load Resistance
48" x 72"	Insulating Glass	44-5/16" x 68-1/8"	56.1 psf
72" x 72" O O 108" x 72" O O O	Insulating Glass	32-5/16" x 68-1/8"	59.9 psf

The glazing load resistances exceed the product design pressures thereby validating the glazing for the evaluated windows.

Comparative Analyses

For individual fixed windows, calculations are performed to establish design pressures for the compared products that would cause the same uniform load distributions (ULD) as proven by the tested products. Several potential design pressures are calculated, and the proposed design pressure of the compared product shall be the least of the calculated design pressures. Furthermore, positive design pressures may be limited by the achieved water test pressure. Calculations are presented no page 8 to page 11 and summarized in the following table.

Table 5 Results of Comparative Analyses for Individual Windows

		Design Pressure (psf)						
		Window Width (inch)						
		24	30	36	42	48	54	60
Window Height (inch)	48	+50.0/-88.9	+50.0/-77.6	+50.0/-66.7	+50.0/-57.1	+/-50.0	+/-45.0	+/-41.7
	54	+50.0/-85.7	+50.0/-73.8	+50.0/-66.7	+50.0/-57.1	+/-50.0	+/-44.4	+/-40.4
	60	+50.0/-83.3	+50.0/-71.1	+50.0/-63.5	+50.0/-57.1	+/-50.0	+/-44.4	
	66	+50.0/-81.5	+50.0/-69.0	+50.0/-61.1	+50.0/-55.9	+/-50.0		
	72	+50.0/-80.0	+50.0/-67.4	+50.0/-59.3	+50.0/-53.8	+/-50.0		
	78	+50.0/-78.8	+50.0/-66.0	+50.0/-57.8	+50.0/-52.1			
	84	+50.0/-77.8	+50.0/-64.9	+50.0/-56.6				
	90	+50.0/-76.9	+50.0/-64.0	+50.0/-55.6				
	96	+50.0/-76.2	+50.0/-63.2	+50.0/-54.7				
	102	+50.0/-75.6	+50.0/-62.5					
	108	+50.0/-75.0	+50.0/-61.9					

A > 24 ft²

For composite windows, calculations are performed to establish design pressures for the compared products that would cause the same uniform load distributions (ULD) as proven by the tested products. Several potential design pressures are calculated, and the proposed design pressure of the compared product shall be the least of the calculated design pressures. And, proportional deflections and point loads are not to exceed the tested conditions. Calculations are presented on page 12 and summarized in the following table.

Table 6 Results of Comparative Analyses for Composite Windows

		Design Pressure (psf)				
		Panel Width, W (inch)				
		24	30	36	42	48
Panel Height, H (inch)	48	+50.0/-87.5	+50.0/-76.4	+50.0/-70.0	+50.0/-66.7	+50.0/-65.6
	54	+50.0/-75.0	+50.0/-64.6	+50.0/-58.3	+50.0/-54.5	+50.0/-52.5
	60	+50.0/-65.6	+50.0/-56.0	+/-50.0	+/-45.1	+/-42.0
	66	+50.0/-51.4	+/-42.3	+/-36.6	+/-32.8	+/-30.3
	72	+/-39.2	+/-32.2	+/-27.6	+/-24.6	+/-22.5

As-Tested Installation Analysis

For air/water/structural testing, the test specimens were secured to a Spruce-Pine-Fir buck as summarized in Table 7. The as-tested installation methods are evaluated on page 13 and the established design capacities are presented in Table 7.

Table 7 As-tested Anchorage Design Capacities

Test	Connection	Capacity
Air/Water/Structural Test	<u>Head/Jambs/Sill</u> Nail Fin #8 x 1" Screw	33 lb

The capacities presented in Table 7 will be used to prove acceptable alternate anchors and substrates for the window.

Alternate Anchorages

Calculations on page 14 determine the design capacity of alternate fin installation anchorages for the window. The alternate anchorage capacities are summarized in Table 8.

Table 8 Alternate Anchorage Capacities for Fin Installation

Substrate	Anchor	Capacity	Comments
Wood Framing Wood Buckstrip	6d x 2" Nail	56 lb	1. Spruce-Pine-Fir (G = 0.42). 2. Use 8d nail if non-structural sheathing covers stud.
18 Gauge Steel Stud	#10-16 TEKS Screw	104 lb	1. 33 KSI yield strength stud. 2. Full penetration +3 threads. 3. Limited by pull-out.

Calculations presented on page 15 show the as-tested and alternate anchors have sufficient design capacity for the as-tested anchor spacing and the established design pressures.

Attachments

Appendix A – Revision Log (1 page)

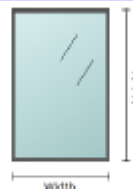
Glazing Analyses

Report

May 19, 2022

Glazing Information

Supported Edges:	Four sides simply supported
Shape:	Rectangular
Lite Width:	44.3 in.
Lite Height:	68.1 in.
Glazing Angle:	90.0 °



Glazing Construction (Double Glazed Insulating Unit)

- Exterior Lite (Monolithic 5/32 in. Annealed)
 Airspace (0.500 in.)
- Interior Lite (Monolithic 5/32 in. Annealed)

Comparisons

Short Duration		
50.0 psf 3.00 sec \leq 56.1 psf		OK
Approximate center of glass deflection		
Exterior Lite		0.66 in.
Interior Lite		0.66 in.

Notes

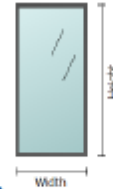
Load resistance values are computed in accordance with ASTM E1300-12 Section 6

Report

May 19, 2022

Glazing Information

Supported Edges:	Four sides simply supported
Shape:	Rectangular
Lite Width:	32.3 in.
Lite Height:	68.1 in.
Glazing Angle:	90.0 °



Glazing Construction (Double Glazed Insulating Unit)

- Exterior Lite (Monolithic 5/32 in. Annealed)
 Airspace (0.500 in.)
- Interior Lite (Monolithic 5/32 in. Annealed)

Comparisons

Short Duration	
50.0 psf 3.00 sec \leq 59.9 psf	OK
Approximate center of glass deflection	
Exterior Lite	0.38 in.
Interior Lite	0.38 in.

Notes

Load resistance values are computed in accordance with ASTM E1300-12 Section 6

Comparative Analyses – Fixed Windows

Uniform Load Distribution (ULD) Calculator

 AAMA 103.3
 FBC 1709.5.1.3.ii

Manufacturer VPI Quality Windows
Series/Model 355 Picture Window
Comments Widths 24 to 30

Tested Product

Test Report or Certification N3980.01-901-44
Design Pressure (DP) 50.0 psf
Maximum Cyclic Pressure psf

Width	48.0 inch	Area	24.0 ft ²
Height	72.0 inch		
ULD Width	4.17 lb/inch		
ULD Height	5.56 lb/inch		

Compared Windows

Width (inch)	Height (inch)	DP Width (psf)	DP Height (psf)	DP (psf)	Area (ft ²)	Area Check
24	48	100.0	88.9	88.9	8.0	OK
24	54	100.0	85.7	85.7	9.0	OK
24	60	100.0	83.3	83.3	10.0	OK
24	66	100.0	81.5	81.5	11.0	OK
24	72	100.0	80.0	80.0	12.0	OK
24	78	100.0	78.8	78.8	13.0	OK
24	84	100.0	77.8	77.8	14.0	OK
24	90	100.0	76.9	76.9	15.0	OK
24	96	100.0	76.2	76.2	16.0	OK
24	102	100.0	75.6	75.6	17.0	OK
24	108	100.0	75.0	75.0	18.0	OK
30	48	80.0	77.6	77.6	10.0	OK
30	54	80.0	73.8	73.8	11.3	OK
30	60	80.0	71.1	71.1	12.5	OK
30	66	80.0	69.0	69.0	13.8	OK
30	72	80.0	67.4	67.4	15.0	OK
30	78	80.0	66.0	66.0	16.3	OK
30	84	80.0	64.9	64.9	17.5	OK
30	90	80.0	64.0	64.0	18.8	OK
30	96	80.0	63.2	63.2	20.0	OK
30	102	80.0	62.5	62.5	21.3	OK
30	108	80.0	61.9	61.9	22.5	OK

Uniform Load Distribution (ULD) Calculator

 AAMA 103.3
 FBC 1709.5.1.3.ii

Manufacturer VPI Quality Windows
Series/Model 355 Picture Window
Comments Widths 36 to 42

Tested Product

Test Report or Certification N3980.01-901-44
Design Pressure (DP) 50.0 psf
Maximum Cyclic Pressure psf

Width	48.0 inch	Area	24.0 ft ²
Height	72.0 inch		
ULD Width	4.17 lb/inch		
ULD Height	5.56 lb/inch		

Compared Windows

Width (inch)	Height (inch)	DP Width (psf)	DP Height (psf)	DP (psf)	Area (ft ²)	Area Check
36	48	66.7	71.1	66.7	12.0	OK
36	54	66.7	66.7	66.7	13.5	OK
36	60	66.7	63.5	63.5	15.0	OK
36	66	66.7	61.1	61.1	16.5	OK
36	72	66.7	59.3	59.3	18.0	OK
36	78	66.7	57.8	57.8	19.5	OK
36	84	66.7	56.6	56.6	21.0	OK
36	90	66.7	55.6	55.6	22.5	OK
36	96	66.7	54.7	54.7	24.0	OK
36	102	66.7	54.0	54.0	25.5	NOT OK
36	108	66.7	53.3	53.3	27.0	NOT OK
42	48	57.1	67.7	57.1	14.0	OK
42	54	57.1	62.3	57.1	15.8	OK
42	60	57.1	58.6	57.1	17.5	OK
42	66	57.1	55.9	55.9	19.3	OK
42	72	57.1	53.8	53.8	21.0	OK
42	78	57.1	52.1	52.1	22.8	OK
42	84	57.1	50.8	50.8	24.5	NOT OK
42	90	57.1	49.7	49.7	26.3	NOT OK
42	96	57.1	48.8	48.8	28.0	NOT OK
42	102	57.1	48.0	48.0	29.8	NOT OK
42	108	57.1	47.3	47.3	31.5	NOT OK

Uniform Load Distribution (ULD) Calculator

 AAMA 103.3
 FBC 1709.5.1.3.ii

Manufacturer VPI Quality Windows
Series/Model 355 Picture Window
Comments Widths 48 to 54

Tested Product

Test Report or Certification N3980.01-901-44
Design Pressure (DP) 50.0 psf
Maximum Cyclic Pressure psf

Width	48.0 inch	Area	24.0 ft ²
Height	72.0 inch		
ULD Width	4.17 lb/inch		
ULD Height	5.56 lb/inch		

Compared Windows

Width (inch)	Height (inch)	DP Width (psf)	DP Height (psf)	DP (psf)	Area (ft ²)	Area Check
48	48	50.0	66.7	50.0	16.0	OK
48	54	50.0	60.0	50.0	18.0	OK
48	60	50.0	55.6	50.0	20.0	OK
48	66	50.0	52.4	50.0	22.0	OK
48	72	50.0	50.0	50.0	24.0	OK
48	78	50.0	48.1	48.1	26.0	NOT OK
48	84	50.0	46.7	46.7	28.0	NOT OK
48	90	50.0	45.5	45.5	30.0	NOT OK
48	96	50.0	44.4	44.4	32.0	NOT OK
48	102	50.0	43.6	43.6	34.0	NOT OK
48	108	50.0	42.9	42.9	36.0	NOT OK
54	48	45.0	66.7	45.0	18.0	OK
54	54	44.4	59.3	44.4	20.3	OK
54	60	44.4	53.9	44.4	22.5	OK
54	66	44.4	50.1	44.4	24.8	NOT OK
54	72	44.4	47.4	44.4	27.0	NOT OK
54	78	44.4	45.3	44.4	29.3	NOT OK
54	84	44.4	43.7	43.7	31.5	NOT OK
54	90	44.4	42.3	42.3	33.8	NOT OK
54	96	44.4	41.2	41.2	36.0	NOT OK
54	102	44.4	40.3	40.3	38.3	NOT OK
54	108	44.4	39.5	39.5	40.5	NOT OK

Uniform Load Distribution (ULD) Calculator

 AAMA 103.3
 FBC 1709.5.1.3.ii

Manufacturer VPI Quality Windows
Series/Model 355 Picture Window
Comments Width 60

Tested Product

Test Report or Certification N3980.01-901-44
Design Pressure (DP) 50.0 psf
Maximum Cyclic Pressure psf

Width	48.0 inch	Area	24.0 ft ²
Height	72.0 inch		
ULD Width	4.17 lb/inch		
ULD Height	5.56 lb/inch		

Compared Windows

Width (inch)	Height (inch)	DP Width (psf)	DP Height (psf)	DP (psf)	Area (ft ²)	Area Check
60	48	41.7	66.7	41.7	20.0	OK
60	54	40.4	59.3	40.4	22.5	OK
60	60	40.0	53.3	40.0	25.0	NOT OK
60	66	40.0	48.9	40.0	27.5	NOT OK
60	72	40.0	45.7	40.0	30.0	NOT OK
60	78	40.0	43.3	40.0	32.5	NOT OK
60	84	40.0	41.5	40.0	35.0	NOT OK
60	90	40.0	40.0	40.0	37.5	NOT OK
60	96	40.0	38.8	38.8	40.0	NOT OK
60	102	40.0	37.8	37.8	42.5	NOT OK
60	108	40.0	36.9	36.9	45.0	NOT OK

Comparative Analysis – Composite Windows

Mullion Comparative Analysis

AAMA 2502-19

Florida Building Code 1709.5.1

International Building Code 1709.5

International Residential Building Code R609.3.1

Manufacturer: VPI Quality Windows
Product: Endurance PW
Test Report: Intertek N3979.01-901-44
Panel Height: 60 inch
Panel Width: 36 inch
Design Pressure: 50 psf

	DP (psf)	Panel Height (inch)	Panel Width (inch)	Load Area (ft ²)	K	B	C	DP Stress (psf)	DP Defl (psf)	DP Point Load (psf)	DP (psf)
Test	50	60	36	5.25	0.30	6.357	62.31				
		48	24	3.00	0.25	6.539	63.79	112.5	140.0	87.5	87.5
		54	24	3.50	0.22	6.656	64.76	87.2	96.2	75.0	75.0
		60	24	4.00	0.20	6.757	65.63	69.8	69.1	65.6	65.6
		66	24	4.50	0.18	6.846	66.39	57.1	51.4	58.3	51.4
		72	24	5.00	0.17	6.923	67.06	47.6	39.2	52.5	39.2
		48	30	3.44	0.31	6.318	62.00	94.9	118.7	76.4	76.4
		54	30	4.06	0.28	6.433	62.92	72.7	80.6	64.6	64.6
		60	30	4.69	0.25	6.539	63.79	57.6	57.3	56.0	56.0
		66	30	5.31	0.23	6.633	64.58	46.9	42.3	49.4	42.3
		72	30	5.94	0.21	6.718	65.30	38.9	32.2	44.2	32.2
		48	36	3.75	0.38	6.154	60.79	84.7	106.7	70.0	70.0
		54	36	4.50	0.33	6.257	61.54	63.8	71.1	58.3	58.3
		60	36	5.25	0.30	6.357	62.31	50.0	50.0	50.0	50.0
		66	36	6.00	0.27	6.452	63.07	40.4	36.6	43.8	36.6
		72	36	6.75	0.25	6.539	63.79	33.3	27.6	38.9	27.6
		48	42	3.94	0.44	6.047	60.16	79.3	100.6	66.7	66.7
		54	42	4.81	0.39	6.125	60.60	58.4	65.5	54.5	54.5
		60	42	5.69	0.35	6.212	61.21	45.1	45.3	46.2	45.1
		66	42	6.56	0.32	6.300	61.87	36.0	32.8	40.0	32.8
		72	42	7.44	0.29	6.385	62.53	29.5	24.6	35.3	24.6
		48	48	4.00	0.50	6.000	60.00	77.4	98.7	65.6	65.6
		54	48	5.00	0.44	6.039	60.12	55.4	62.5	52.5	52.5
		60	48	6.00	0.40	6.104	60.47	42.0	42.5	43.8	42.0
		66	48	7.00	0.36	6.179	60.97	33.1	30.3	37.5	30.3
		72	48	8.00	0.33	6.257	61.54	26.9	22.5	32.8	22.5

As-Tested Installation – Nail Fin to Wood

#8 x 1" Pan Head Screw

0.062" thick Nail Fin

Spruce-Pine-Fir 2x Wood Substrate Minimum (G=0.42)

Allowable Tension of #8 x 1" Pan Head Screw

$$W = 1.6(1"-0.062")(82 \text{ lb/in}) \quad (\text{NDS, Table 12.2B})$$

$$W = 123 \text{ lb}$$

Allowable Pull-Over of #8 x 1" Pan Head Screw

Validated by Testing

As-tested spacing: 4" on center

Window Width 48"

Design Pressure 50 psf

Anchor Load: $F = (50 \text{ psf}/144)(4")(48"/2) = 33 \text{ lb.}$

As-tested anchor head size: 0.314"

Capacity of Connection is 33 lb

Alternate Installation – Nail Fin to Wood with Nail

6d Nail (2" x 0.113" dia.)

0.062" thick Nail Fin

Spruce-Pine-Fir 2x Wood Substrate Minimum (G=0.42)

Allowable Tension of 6d Nail

$$W = 1.6(2.00"-0.062")(18 \text{ lb/in}) \quad (\text{NDS, Table 12.2C})$$
$$W = 56 \text{ lb}$$

Capacity of Connection is 56 lb

Use 8d nail (2-1/2") long if must penetrate non-structural sheathing

Alternate Installation – Nail Fin to Steel Stud

#10-16 TEKS Screw

Minimum 18 gauge 33 KSI Steel Stud

Allowable Tension of #10-16 TEKS Screw

$$P_{ss}/\Omega = 885 \text{ lb} \quad (\text{ESR-1976})$$

Pull-Out of #10-16 TEKS Screw

$$P_{\text{not}} = 0.85t_c d F_{u2} / \Omega$$
$$P_{\text{not}} = 0.85(0.0428")(0.190")(45,000 \text{ psi}) / 3.0$$
$$P_{\text{not}} = 104 \text{ lb}$$

Pull-Over of #10-16 TEKS Screw

Head Diameter = 0.400" > 0.314" (as tested) **OK**

Capacity of Connection is 104 lb

48x72 +50/-50 psf

Anchorage Requirements – Nail Fin

Window Overall Size: 48" x 72"
Window Overall Area: $(48")(72")/144 = 24.0 \text{ ft}^2$
Window Overall Wind Load: $(50 \text{ psf})(24.0 \text{ ft}^2) = 1,200 \text{ lb}$
Installed Anchor Spacing: 4" head; 4" sill; 4" each jamb
Installed Anchors: 11 head + 11 sill + 2(17) jambs = 56 installed anchors
Minimum Anchor Capacity: 33 lb/anchor
Total Anchor Capacity: $(56 \text{ anchors})(33 \text{ lb/anchor}) = 1,848 \text{ lb} > 1,200 \text{ lb}$ **OK**

72x72 2-Wide +28/-28 psf

Anchorage Requirements – Nail Fin

Window Overall Size: 72" x 72"
Window Overall Area: $(72")(72")/144 = 36.0 \text{ ft}^2$
Window Overall Wind Load: $(28 \text{ psf})(36.0 \text{ ft}^2) = 1,008 \text{ lb}$
Installed Anchor Spacing: 4" head; 4" sill; 4" each jamb
Installed Anchors: 17 head + 17 sill + 2(17) jambs = 68 installed anchors
Minimum Anchor Capacity: 33 lb/anchor
Total Anchor Capacity: $(68 \text{ anchors})(33 \text{ lb/anchor}) = 2,244 \text{ lb} > 1,008 \text{ lb}$ **OK**

108x72 3-Wide +28/-28 psf

Anchorage Requirements – Nail Fin

Window Overall Size: 108" x 72"
Window Overall Area: $(108")(72")/144 = 54.0 \text{ ft}^2$
Window Overall Wind Load: $(28 \text{ psf})(54.0 \text{ ft}^2) = 1,512 \text{ lb}$
Installed Anchor Spacing: 4" head; 4" sill; 4" each jamb
Installed Anchors: 26 head + 26 sill + 2(17) jambs = 86 installed anchors
Minimum Anchor Capacity: 33 lb/anchor
Total Anchor Capacity: $(86 \text{ anchors})(33 \text{ lb/anchor}) = 2,838 \text{ lb} > 1,512 \text{ lb}$ **OK**

Appendix A

Revision Log

<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	05/18/22	Not Applicable
Revision 1	10/16/2023	Updated Analysis for 8 th Edition of the FBC