

## APPLICATION FOR APPROVAL OF CONSTRUCTION CHANGE DOCUMENT – CCD CATEGORY A

CCD Category A is for construction changes to or affecting Structural Safety, Fire & Life Safety or Accessibility.

This form shall be completed by the Design Professional in General Responsible Charge of the project, in accordance with California Code of Regulations, Title 24, Part 1, Section 4-338 (c) and in compliance with DSA IR A-6.

School District/Owner: Davis Joint Unified School District	DSA File #: 57	- 11
Project Name/School: R.W. Emerson Jr. H. S. / Da Vinci Charter School	DSA App. #: 02	- 114292

### APPLICANT

CCD #: 001	Date Submitted: 1-5-2016	Attached Pages?: <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes ( 29 pages)
Firm Name: HMC Architects	Contact Name: Raija Clar	
Email: raija.clar@hmcarchitects.com	Phone Number: (916) 325-1100	
Address: 2495 Natomas Park Drive, Studio 655		
City: Sacramento	State: CA	Zip: 95833
<input type="checkbox"/> A DSA 301-N, DSA 301-P, or 90-Day Letter has been issued for this project.		

### DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE

Name of Design Professional in General Responsible Charge: Arturo Levenfeld	
Professional License #: C-29647	Discipline: Architect of Record

**Design Professional in General Responsible Charge Statement:** The attached Construction Change Documents have been examined by me for design intent and appear to meet the appropriate requirements of Title 24, California Code of Regulations and the project specifications. They are acceptable for incorporation into the construction of the project.

Signature: \_\_\_\_\_

DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE

**CHECK THIS BOX:** ☐ To confirm that all CCD drawings and calculations have been stamped and signed by the Responsible Design Professional.

Brief description of construction change (attach additional sheets if needed):  
Remove and replace four existing skylights on existing curb.

List of DSA approved drawings affected by this CCD: A4.1

<p><b>DSA USE ONLY</b> (for paper submittal only)</p> <p>SSS _____ Date _____ Approved/Disapproved/Not Req'd</p> <p>FLS _____ Date _____ Approved/Disapproved/Not Req'd</p> <p>ACS _____ Date _____ Approved/Disapproved/Not Req'd</p> <p>Remarks _____</p>	<p>For business office use only</p> <p>Date Sent _____</p> <p>Return By _____</p> <p>Delivery Method _____</p>	<p><b>DSA Approval Stamp</b></p> <p><b>APPROVED</b></p> <p><b>DIV OF THE STATE ARCHITECT</b></p> <p><b>SACRAMENTO REGIONAL</b></p> <p>AC <u>N/A</u> F/LS <u>GC</u> SS <u>GYL</u></p> <p>APP # <u>02-114292</u> DATE <u>01/08/2016</u></p> <p>DOC NAME: <u>CCD# 001</u></p>
---	--	--



## NOTES

1. REFER TO SHEET A10.1 & A10.2 FOR TYPICAL TPA AND STANDING SEAM ROOFING DETAILS
2. MINIMUM ROOF COVERING CLASSIFICATION: B
3. RISK CATEGORY: III, WIND LOAD: 115

Key Plan

APPROVED  
DIV. OF THE STATE ARCHITECT  
SACRAMENTO REGIONAL  
AC N/A FLS GC SS GVL  
APP # 02-114292 DATE 01/08/2016  
DOC NAME: CD# 001

Agency Approval

FILE NO. 57-11		
IDENTIFICATION STAMP DIV. OF THE STATE ARCHITECT OFFICE OF REGULATION SERVICES		
APPL. 02-114292		
AC	FLS	SS
DATE		

Project Title:

R.W. EMERSON JR. HIGH SCHOOL /  
DA VINCI CHARTER SCHOOL  
DAVIS JOINT USD  
RE-ROOFING

**DJUSD** 2121 CALAVERAS AVENUE  
DAVIS, CA 95616  
(916) 643.7400

No.	Description	Date	No.	Description	Date
1	CD-001	11-20-2015			

Drawing Title: **OVERALL ROOF PLAN**  
**BLDG A**

Architect's Seal	Designed: RC	Project No. 3447010.000
	Drawn: RC	Scale: 1/16" = 1' - 0"
	QA/QC: MZ	Drawing No. <b>A4.1</b>
	Date: 7-6-2015	

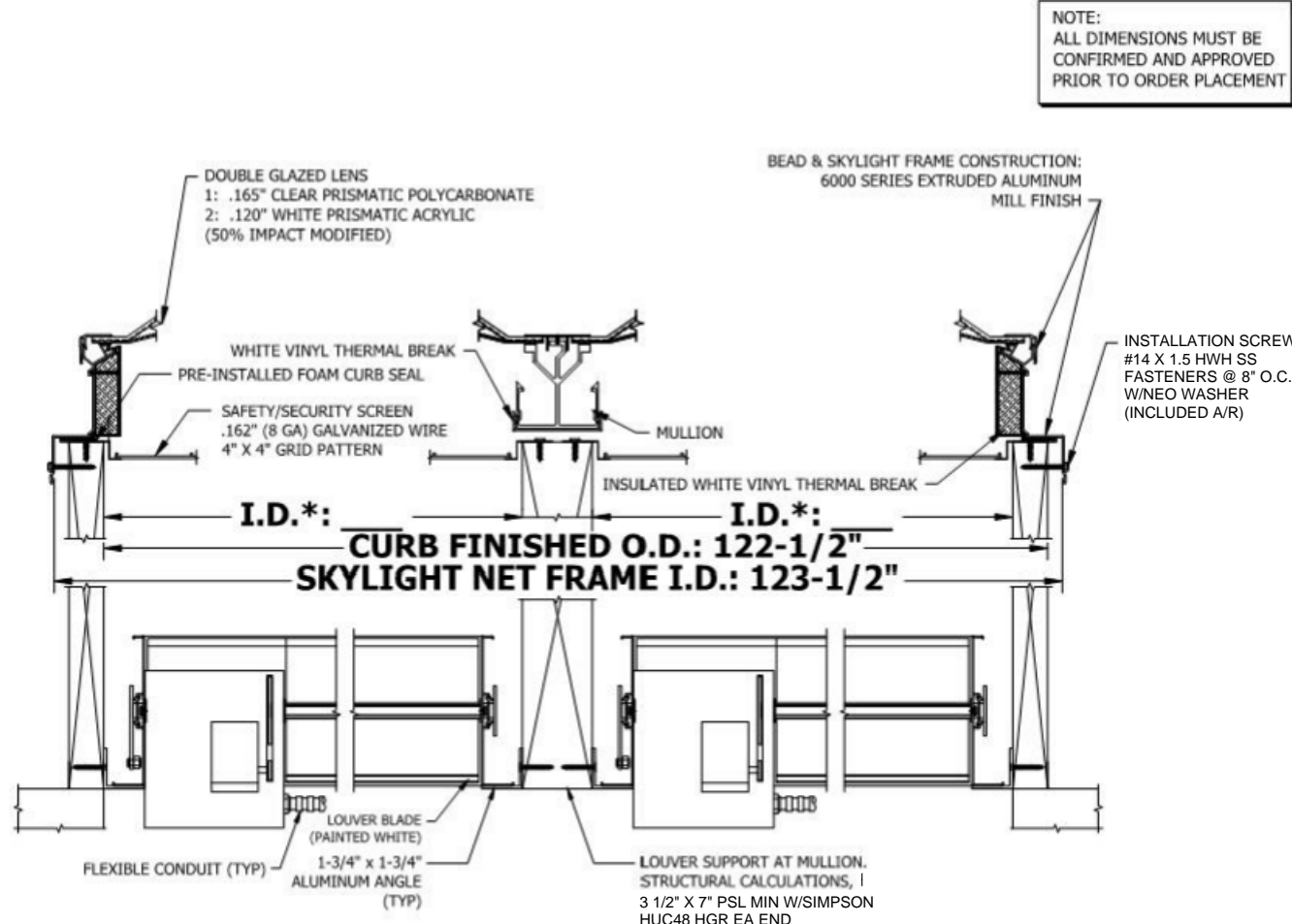
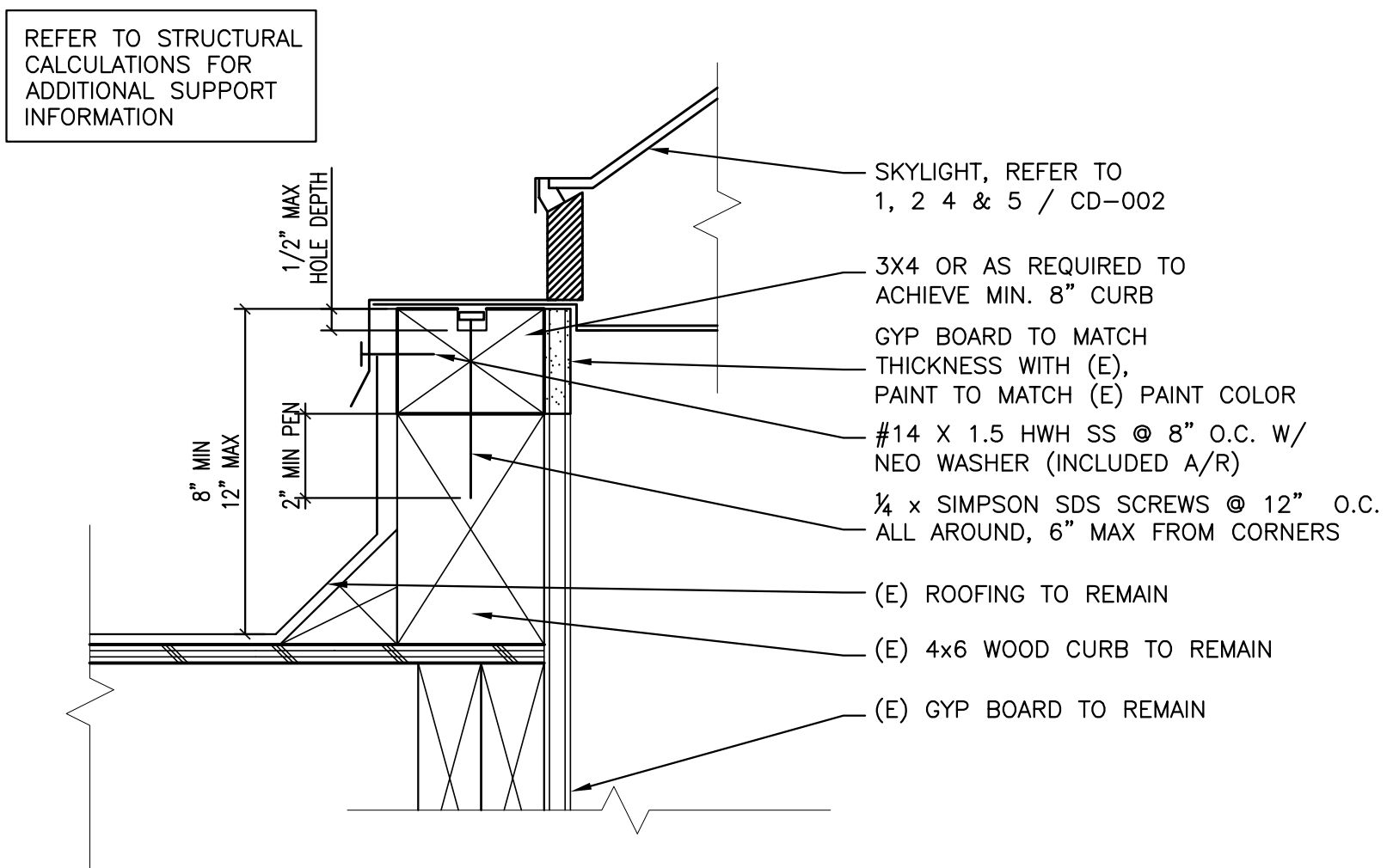
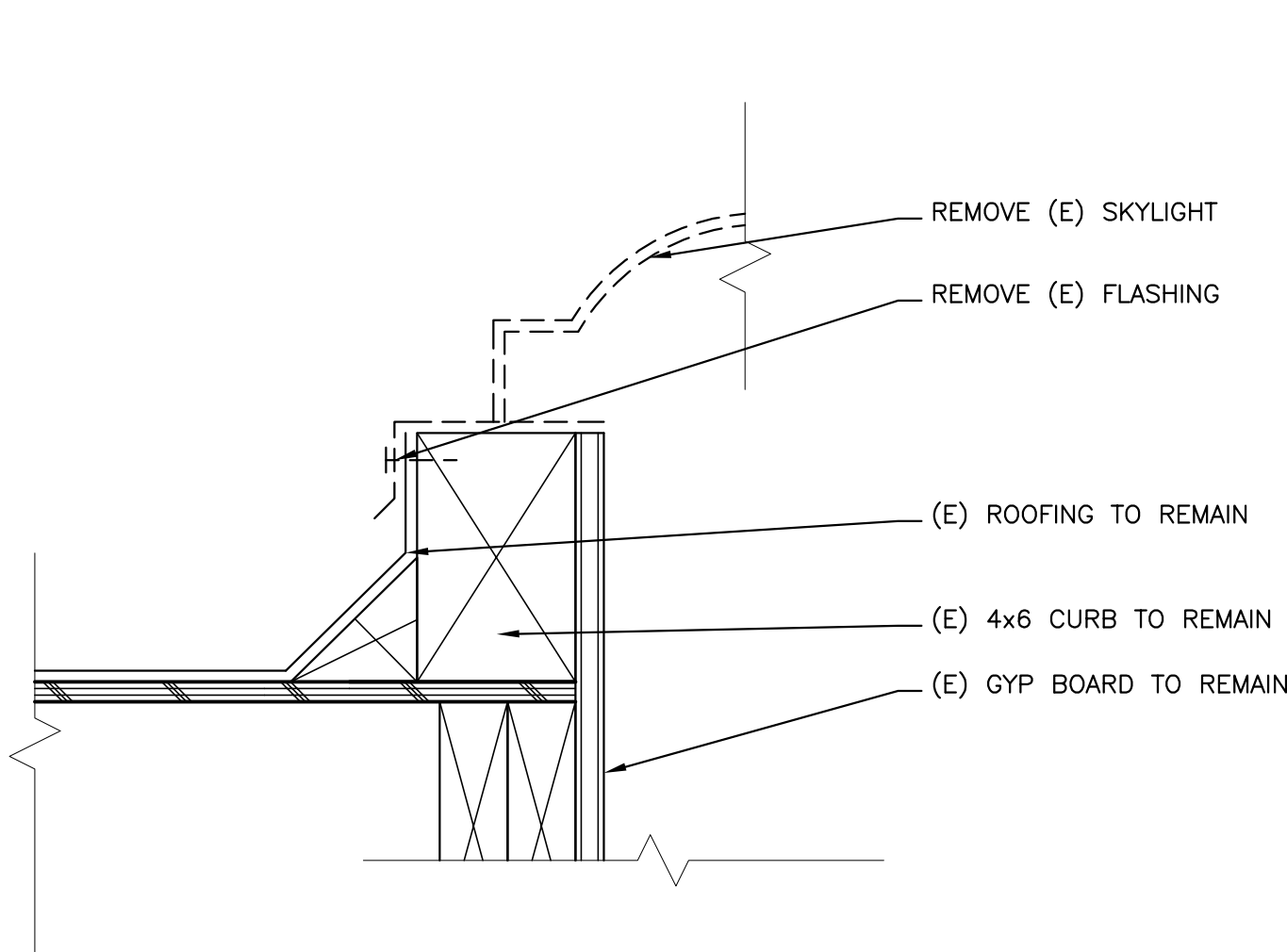
OVERALL ROOF PLAN - BLDG A

1/16"=1'-0"

1



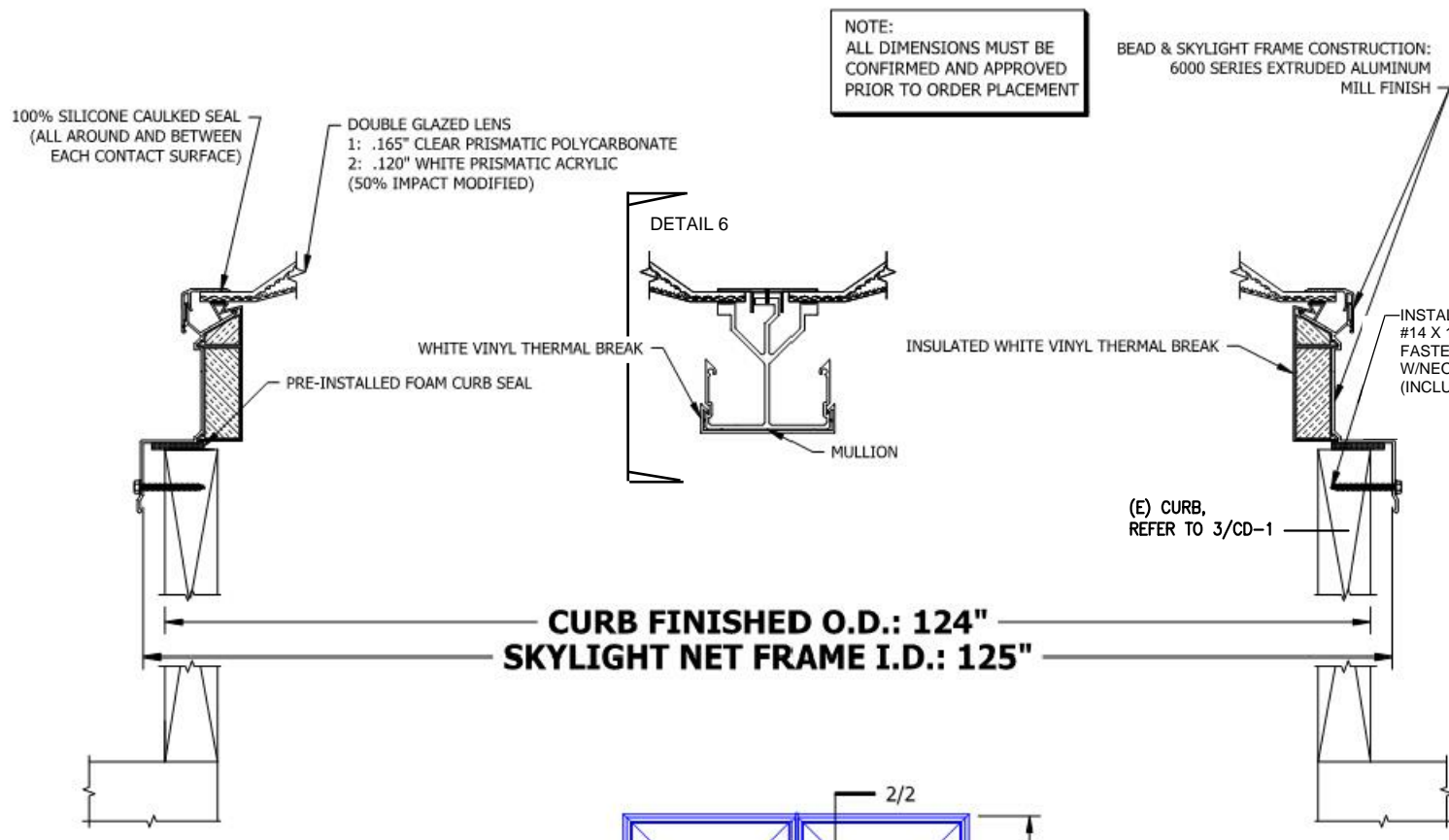
NOTES:  
REFER TO SHEETS A10.1 & A10.2 FOR TYPICAL ROOF DETAILS



SECTION 2/3

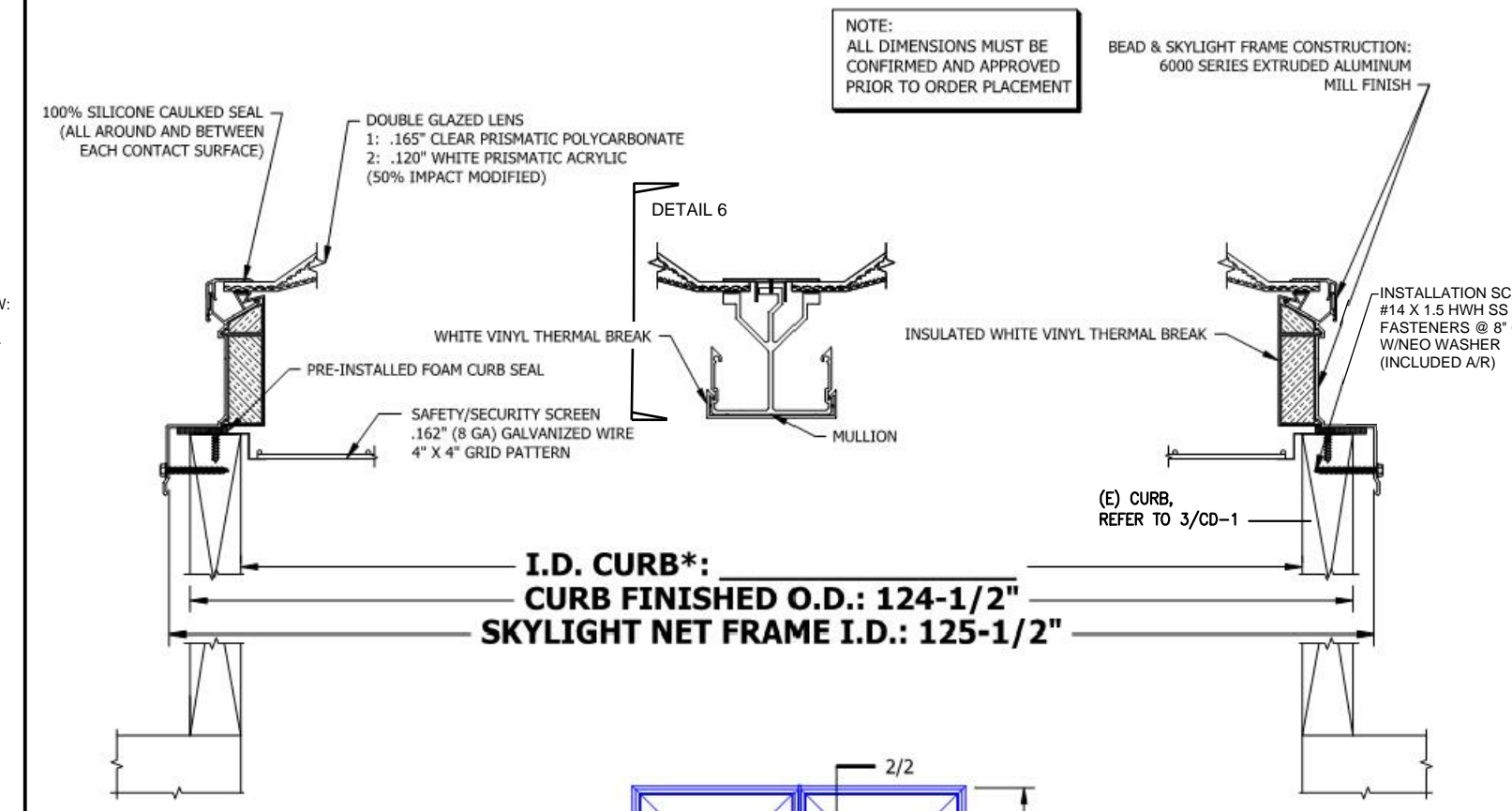
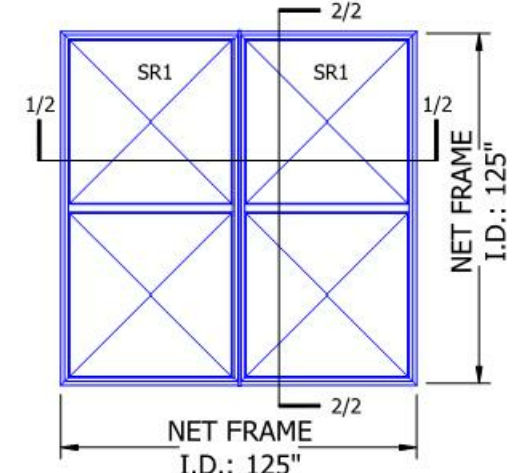
SKYLIGHT CURB DETAIL

3\"/>



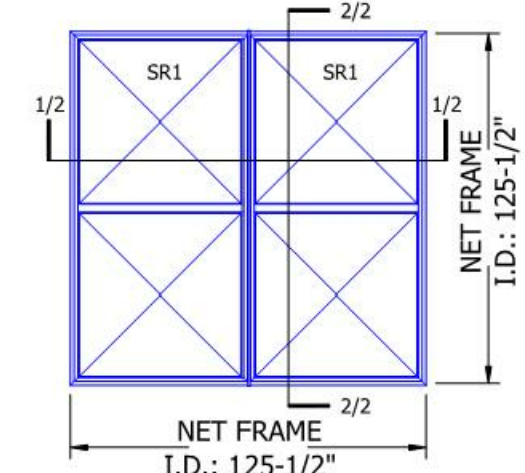
SECTION 2/2

SECTION PROPERTIES  
AREA = 1.95 IN<sup>2</sup>  
I<sub>x</sub> = 11.22 IN<sup>4</sup>  
I<sub>y</sub> = 7.908 IN<sup>4</sup>  
S<sub>x</sub>BOT = 1.584 IN<sup>3</sup>  
S<sub>x</sub>TOP = 2.01 IN<sup>3</sup>



SECTION 2/2

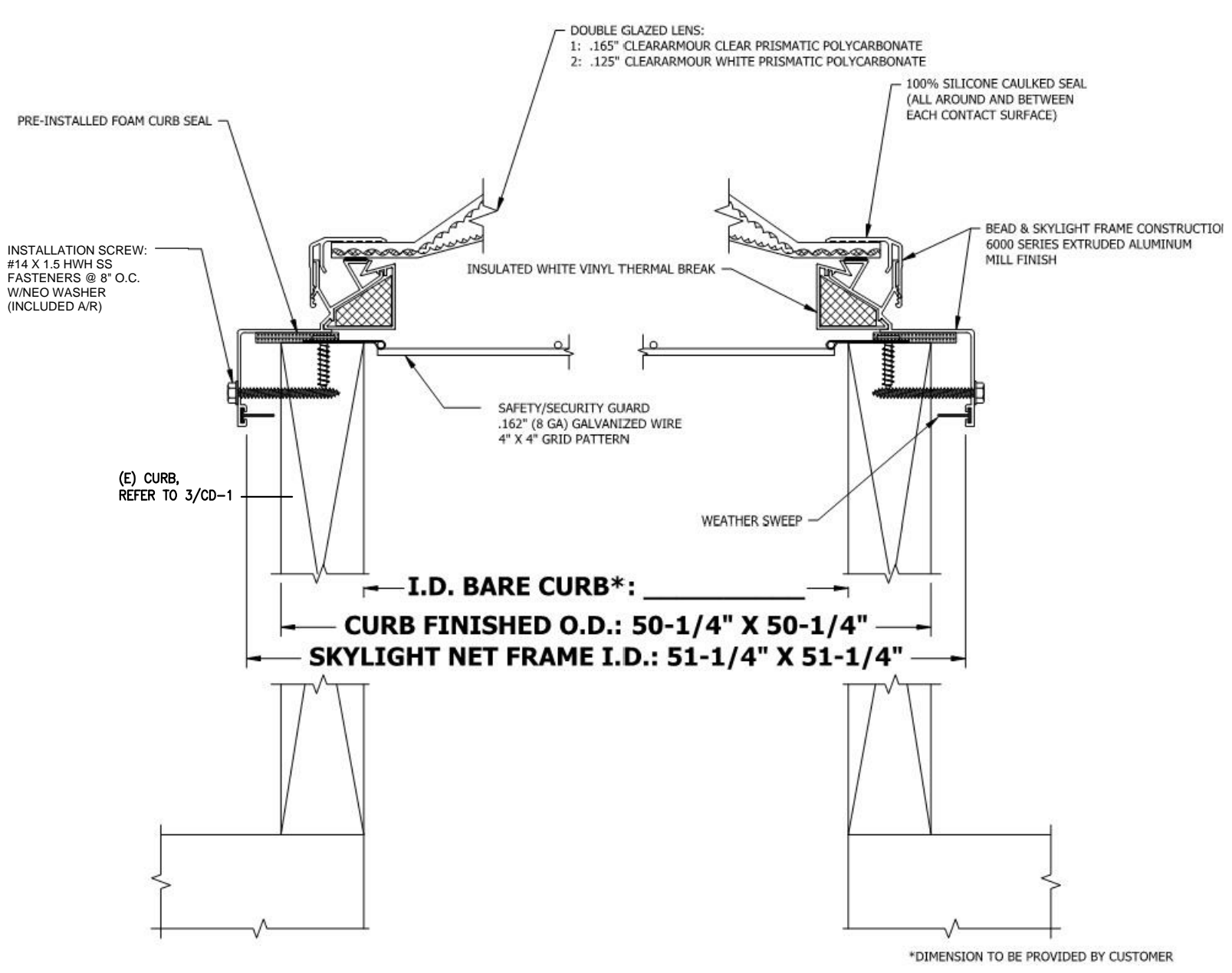
SECTION PROPERTIES  
AREA = 1.95 IN<sup>2</sup>  
I<sub>x</sub> = 11.22 IN<sup>4</sup>  
I<sub>y</sub> = 7.908 IN<sup>4</sup>  
S<sub>x</sub>BOT = 1.584 IN<sup>3</sup>  
S<sub>x</sub>TOP = 2.01 IN<sup>3</sup>



DETAIL AT MULLION

N.T.S.

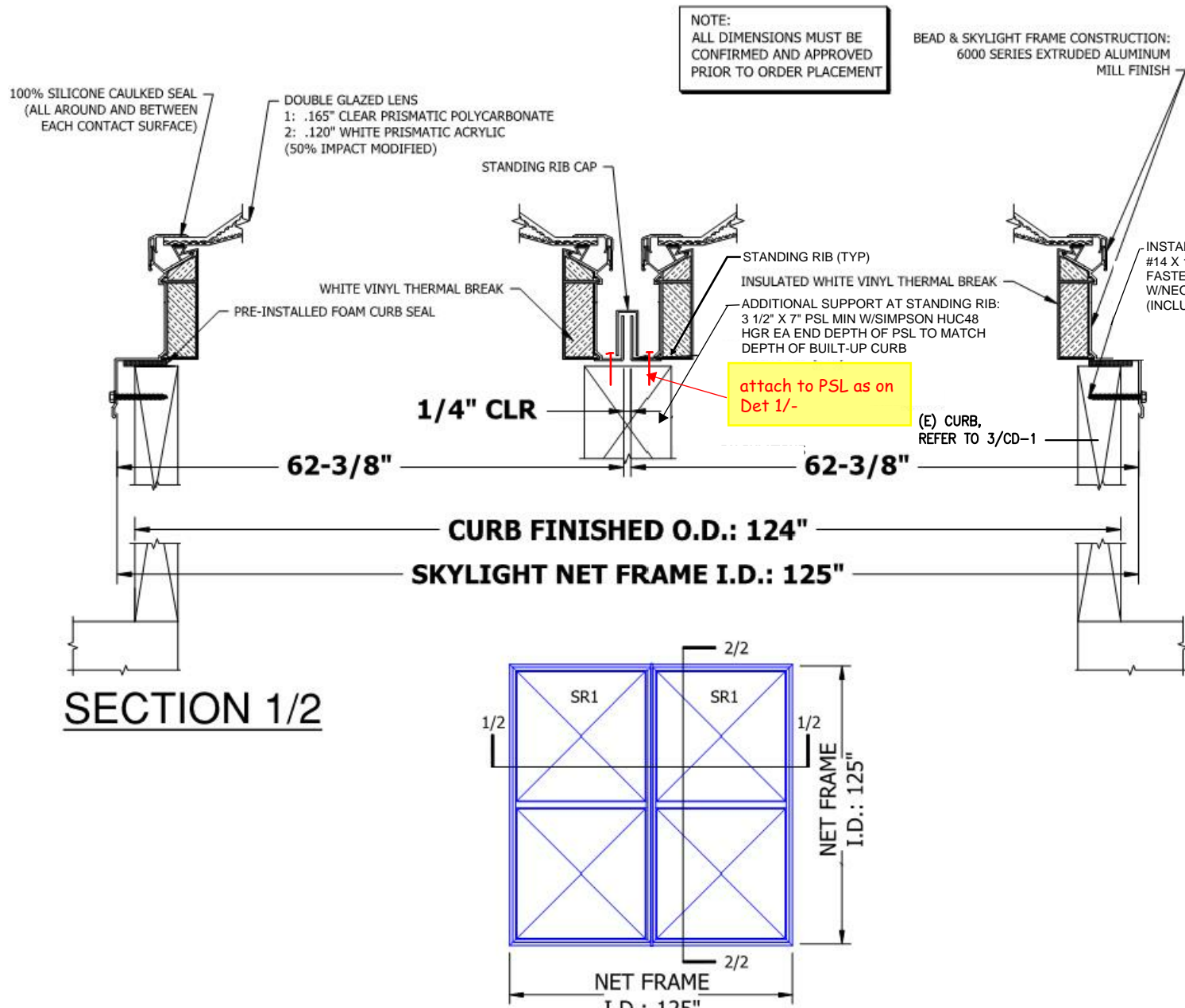
6



SKYLIGHT TYPE #4 (PYRAMID)

MANUFACTURER: SUNOPTICS 3/8\"/>

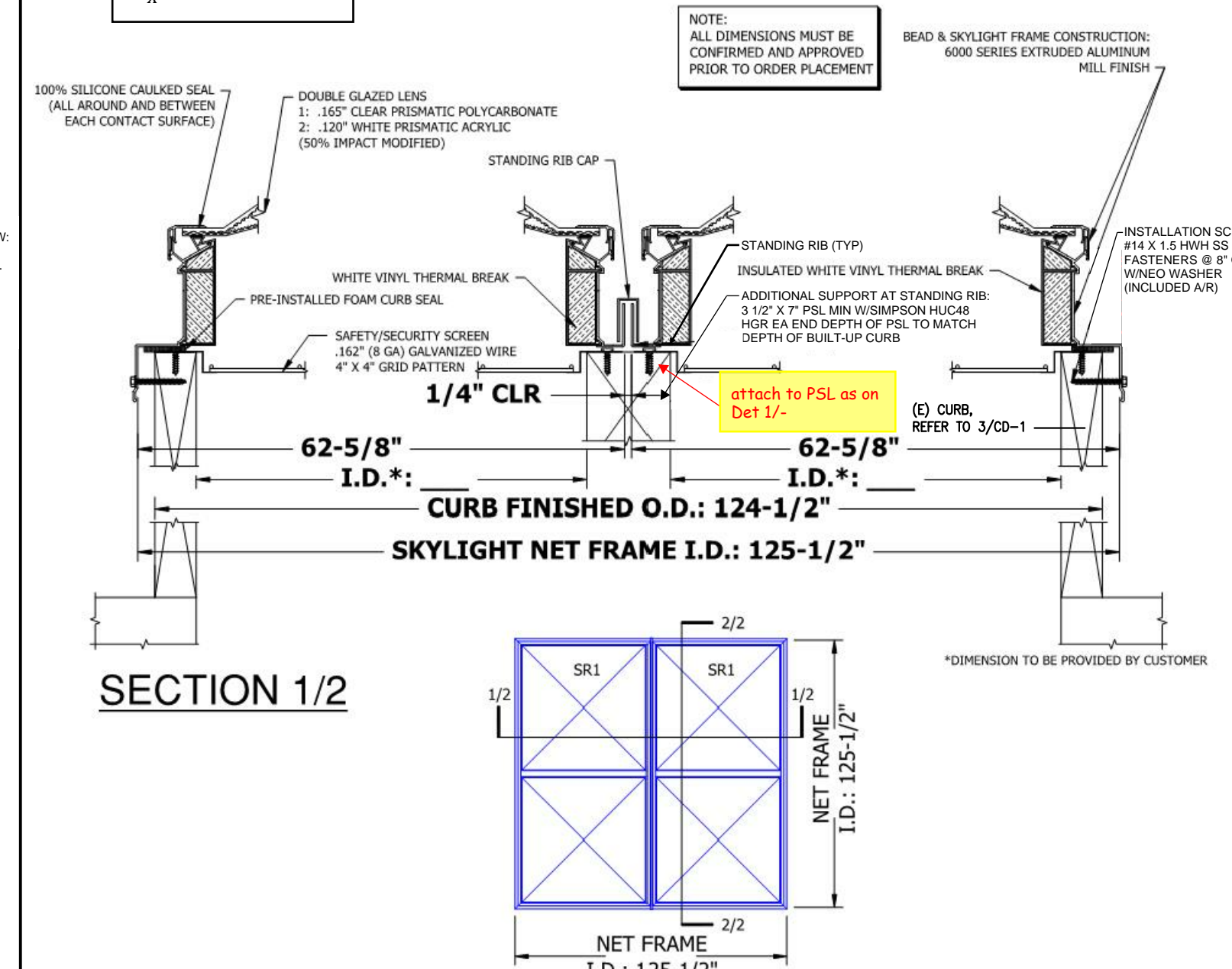
5



SKYLIGHT TYPE #3 (DOUBLE HIP)

MANUFACTURER: SUNOPTICS 3/8\"/>

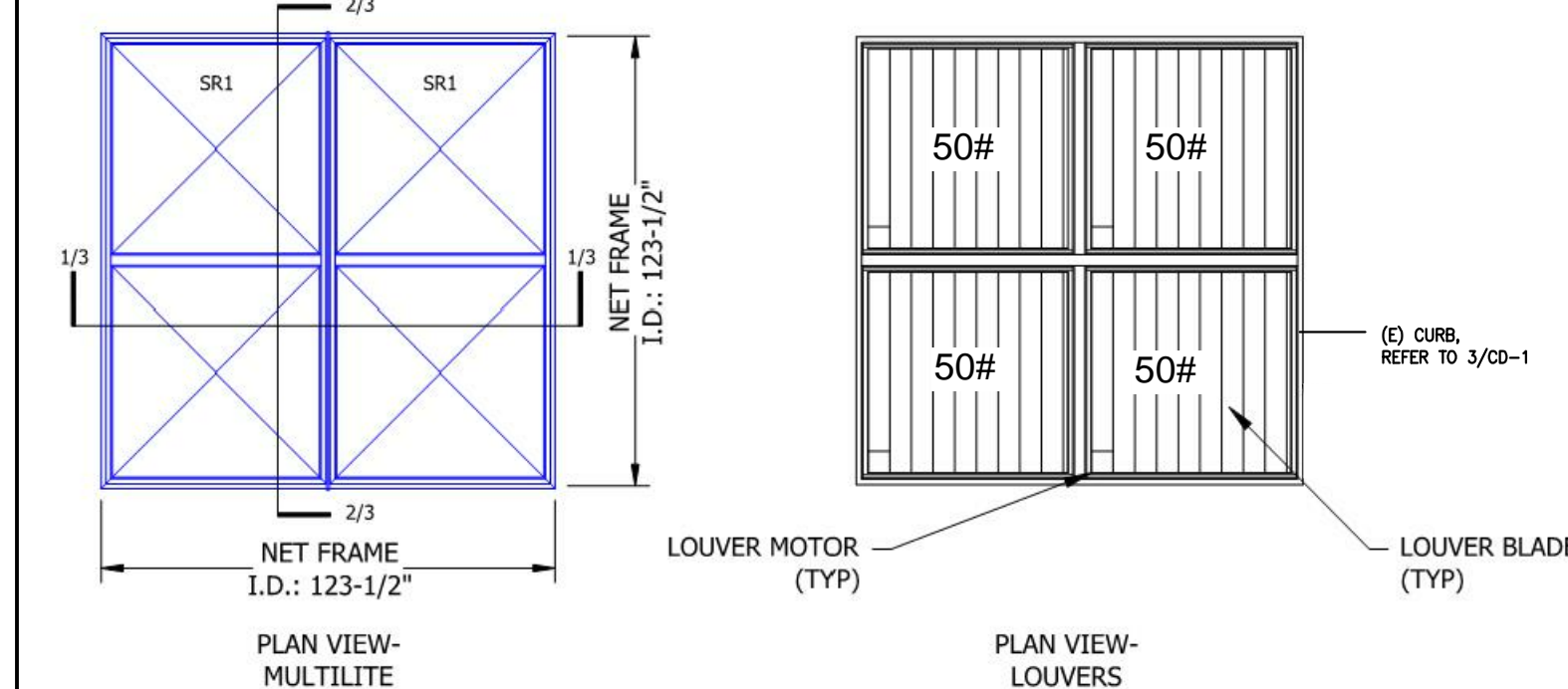
4



SKYLIGHT TYPE #2 (DOUBLE HIP)

MANUFACTURER: SUNOPTICS 3/8\"/>

2



SKYLIGHT TYPE #1 (DOUBLE HIP)

MANUFACTURER: SUNOPTICS 3/8\"/>

1

Key Plan

APPROVED  
DIV OF THE STATE ARCHITECT  
SACRAMENTO REGIONAL  
AC N/A FILS GC SS GVL  
APP # 02-114292 DATE 01/08/2016  
DOC NAME: CD# 001

Agency Approval

FILE NO. 57-11  
IDENTIFICATION STAMP  
DIV. OF THE STATE ARCHITECT  
OFFICE OF REGULATION SERVICES  
APPL. 02-114292  
AC \_\_\_\_\_ FILS \_\_\_\_\_ SS \_\_\_\_\_  
DATE \_\_\_\_\_

Project Title: R.W. EMERSON JR. HIGH SCHOOL /  
DA VINCI CHARTER SCHOOL  
DAVIS JOINT USD  
RE-ROOFING

2121 CALAVERAS AVENUE  
DAVIS, CA. 95616  
(916) 643.7400

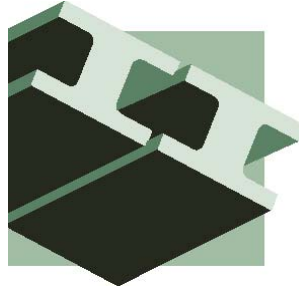
No.	Description	Date	No.	Description	Date

Drawing Title: SKYLIGHT DETAILS  
SUNOPTICS:  
BLDG A DOUBLE HIP & PYRAMID

Architect's Seal: [Seal]  
Designed: RC Project No. 3447010.000  
Drawn: MZ Scale: AS NOTED  
QA/QC: MZ  
Date: 7-6-2015  
CD-1



# POINT 2



## STRUCTURAL ENGINEERS INC.

### Skylight Structural Calculations

for

***Emerson Jr High  
Davis, CA***

11/30/15



**POINT 2 Job No. 2015-111**

**October 2015**

3701 Business Drive, Suite 100, Sacramento, CA 95820  
Tel: 916-452-8200 Fax: 916-452-8212

---

## POINT 2 STRUCTURAL ENGINEERS INC.

---

*These documents are for the design and construction of skylight connections to the supporting structure only. There has been no investigation of the supporting structure. It is the responsibility of the Structural Engineer of Record for the building to verify adequacy of the support structure for the loads given in these calculations.*

## CONTENTS

TABLE OF CONTENTS .....	2
DESIGN CRITERIA.....	3-7
SKYLIGHT ELEMENTS 10.5X10.5.....	8-16
SKYLIGHT ELEMENTS 4.33X4.33.....	17-18
SKYLIGHT CENTER SUPPORT .....	19-21

---

## POINT 2 STRUCTURAL ENGINEERS INC.

3701 Business Drive, Suite 100, Sacramento, CA 95820  
Tel: 916-452-8200 Fax: 916-452-8212

---

## POINT 2 STRUCTURAL ENGINEERS INC.

---

### **ASCE 7-10 – BASIC LOAD COMBINATIONS**

#### **2.3.2 STRENGTH DESIGN/ LOAD RESISTANCE FACTOR DESIGN**

1.  $1.4D$
2.  $1.2D + 1.6L + 0.5(Lr \text{ or } S \text{ or } R)$  or  
 $1.2D + 1.6L + 0.2Di + 0.5S$  (Section 2.3.4)
3.  $1.2D + 1.6(Lr \text{ or } S \text{ or } R) + (L \text{ or } 0.5W)$
4.  $1.2D + 1.0W + L + 0.5(Lr \text{ or } S \text{ or } R)$  or  
 $1.2D + L + Di + Wi + 0.5S$  (Section 2.3.4)
5.  $1.2D + 1.0E + L + 0.2S$
6.  $0.9D + 1.0W$  or  
 $0.9D + Di + Wi$  (Section 2.3.4)
7.  $0.9D + 1.0E$

#### **2.4.1 ALLOWABLE STRESS DESIGN/ WORKING STRESS DESIGN**

1.  $D$
2.  $D + L + 0.7Di$  (Section 2.4.3)
3.  $D + (Lr \text{ or } S \text{ or } R)$  or  
 $D + 0.7Di + 0.7Wi + S$  (Section 2.4.3)
4.  $D + 0.75L + 0.75(Lr \text{ or } S \text{ or } R)$
5.  $D + (.6W \text{ or } 0.7E)$
- 6a.  $D + 0.75L + 0.75(0.6W) + 0.75(Lr \text{ or } S \text{ or } R)$
- 6b.  $D + 0.75L + 0.75(.7E) + 0.75S$
7.  $0.6D + .6W$  or  
 $0.6D + 0.7Di + 0.7Wi$  (Section 2.4.3)
8.  $0.6D + 0.7E$

---

$D$  = Dead load

$L$  = Live load

$S$  = Snow load

$W$  = Wind load

$E$  = Earthquake load

---

$Di$  = Weight of ice

$Lr$  = Live load (roof)

$R$  = Rain Load

$Wi$  = Wind on ice

---



---

## POINT 2 STRUCTURAL ENGINEERS INC.

3701 Business Drive, Suite 100, Sacramento, CA 95820

Tel: 916-452-8200 Fax: 916-452-8212

---

**POINT 2 STRUCTURAL ENGINEERS INC.**

---

**STRUCTURAL DESIGN REFERENCES**

- *ASCE 7-10 Minimum Design Loads*
- *2013 California Building Code*


---

**POINT 2 STRUCTURAL ENGINEERS INC.**

*3701 Business Drive, Suite 100, Sacramento, CA 95820  
Tel: 916-452-8200 Fax: 916-452-8212*





 Point 2 Structural Engineers Inc 3701 Business Dr Suite 100 Sacramento, CA 95820	Project				Job Ref.	
	Section				Sheet no./rev. 2	
	Calc. by B	Date 10/19/2015	Chk'd by	Date	App'd by	Date

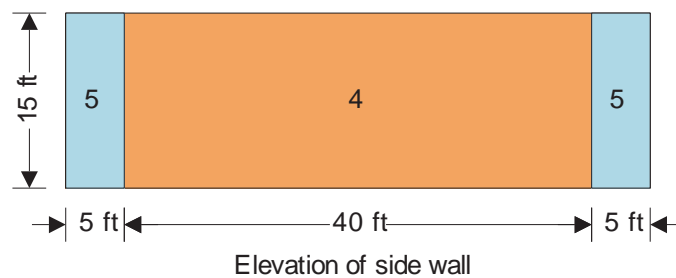
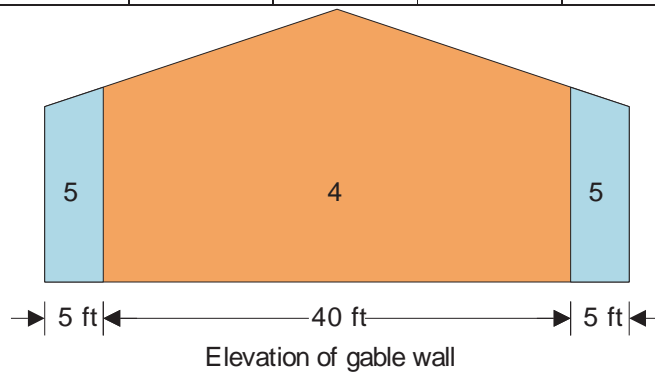
**Equations used in tables**

Net pressure

$$p = q_h \times [GC_p - GC_{pi}]$$


Components and cladding pressures - Wall (Figure 30.4-1)

Component	Zone	Length (ft)	Width (ft)	Eff. area (ft <sup>2</sup> )	+GC <sub>p</sub>	-GC <sub>p</sub>	Pres (+ve) (psf)	Pres (-ve) (psf)
Girt	4	25.0	3.0	208.3	0.77	-0.87	19.1	-21.1
Girt	5	25.0	3.0	208.3	0.77	-0.93	19.1	-22.4
Wall panel	4	6.7	3.0	20.0	0.95	-1.05	22.7	-24.7
Wall panel	5	6.7	3.0	20.0	0.95	-1.29	22.7	-29.7
Fastner	4	6.7	1.0	14.8	0.97	-1.07	23.2	-25.2
Fastner	5	6.7	1.0	14.8	0.97	-1.34	23.2	-30.6
<10 sf	4	5.0	2.0	10.0	1.00	-1.10	23.8	-25.8
<10 sf	5	5.0	2.0	10.0	1.00	-1.40	23.8	-31.8
>500 sf	4	25.0	20.0	500.0	0.70	-0.80	17.7	-19.7
>500 sf	5	25.0	20.0	500.0	0.70	-0.80	17.7	-19.7



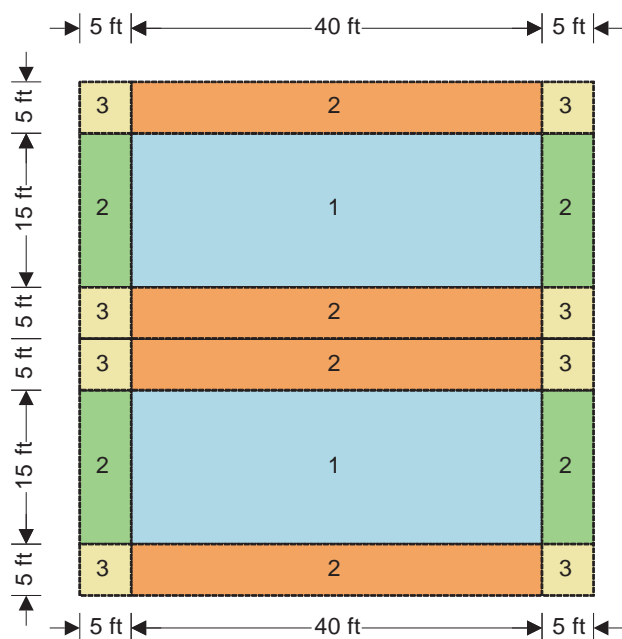
Components and cladding pressures - Roof (Figure 30.4-2B)

Component	Zone	Length (ft)	Width (ft)	Eff. area (ft <sup>2</sup> )	+GC <sub>p</sub>	-GC <sub>p</sub>	Pres (+ve) (psf)	Pres (-ve) (psf)
Purlin	1	25.0	5.0	208.3	0.30	-0.80	9.7 #	-19.7
Purlin	2	25.0	5.0	208.3	0.30	-1.20	9.7 #	-27.8
Purlin	3	25.0	5.0	208.3	0.30	-2.00	9.7 #	-43.9
Panel	1	5.0	2.0	10.0	0.50	-0.90	13.7 #	-21.8

 <b>Point 2 Structural Engineers Inc</b> 3701 Business Dr Suite 100 Sacramento, CA 95820	Project				Job Ref.	
	Section				Sheet no./rev. 3	
	Calc. by B	Date 10/19/2015	Chk'd by	Date	App'd by	Date

Panel	2	5.0	2.0	10.0	0.50	-1.70	13.7 #	-37.9
Panel	3	5.0	2.0	10.0	0.50	-2.60	13.7 #	-56.0
>100 sf	1	10.0	10.0	100.0	0.30	-0.80	9.7 #	-19.7
>100 sf	2	10.0	10.0	100.0	0.30	-1.20	9.7 #	-27.8
>100 sf	3	10.0	10.0	100.0	0.30	-2.00	9.7 #	-43.9

# The final net design wind pressure, including all permitted reductions, used in the design shall not be less than 16psf acting in either direction



Plan on roof







# POINT 2

STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165  
916-452-8200 P  
916-452-8212 F

Project: Emerson Jr High Davis CA

Client: HMC

Job #: 2015-111

Date: 10/19/2015 WPL

## Design Criteria

**Live:**  $L_r =$  200 lb per Table 1607.1

**Seismic:** Seismic does not govern relative to wind.

**Wind:** Design Criteria - Components & Cladding  
2013 CBC/ ASCE 7-10

$$p = q_h[(GC_p) - (GC_{pi})] \quad (\text{Eq. 6-22})$$

Input		
V =	115	mph for site (Fig. 6-1)
I =	1.15	1.15 for Occupancy III, Table 6-1
$K_{zt}$ =	1.00	Topographic, use 1.0 per Sec. 6.5.7.2
$K_d$ =	0.85	use 0.85 for roof and signs per Table 6-4
Exposure	B	for suburban area, per Sec. 6.5.6.3

### Notes:

1. Skylights are assumed to be located in Zone 1 roof area location.
2. Building height is less than 60'.
3. Slope  $\theta < 7^\circ$ , flat or gable roof.

$$q_h = 0.00256 * K_h * K_{zt} * K_d * V^2 * I \quad *.6 \text{ for ASD}$$

Height * (ft.)	$K_h$ (Table 6-3)	ASD $q_h$ (psf)
25	0.94	18.67

\* max skylight height assumed not to exceed this value.

### External Pressure Coefficient (Fig. 30.4-2A)

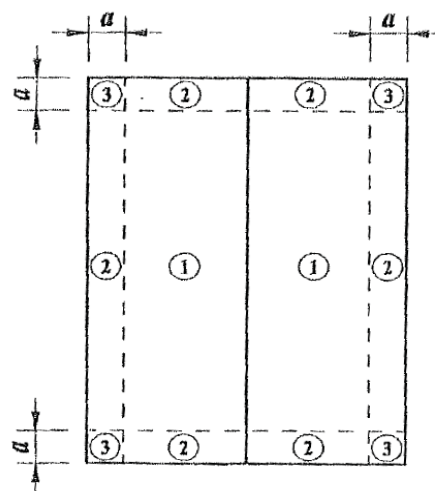
$GC_p$ Roof		
Zone 1	0.3	-1.0
Zone 2	0.3	-1.8
Zone 3	0.3	-2.8

### Internal Pressure Coefficient (Fig. 26.11-1)

$GC_{pi}$		
any zone	0.18	-0.18

### Design Wind Pressure, p (psf)

Max p at Roof (psf)		
	Downward	Upward
Zone 1	9.0	-22.0
Zone 2	8.96	-36.96
Zone 3	8.96	-55.62



Roof Plan with Wind Zones (ASCE Fig. 30.4-2A)

skylight is located in Zone 2

Use 37 psf for skylight design.





# POINT 2

STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165

916-452-8200 P  
916-452-8212 F

Project: Emerson Jr High Davis CA

Client: HMC

Project: 2015-111

Date: 10/19/2015

WPL

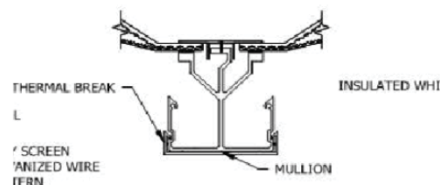
## Skylight Design

### Skylight Dimensions:

Type 800SB

Width, W = 10.5 ft  
Length, L = 10.5 ft

Trib to mullion, W/2 = 5.3 ft  
Trib to curb, L/4 = 2.6 ft



**D. CURB\*:**  
**CURB FINISHED O.D.: 124-1/2"**  
**LIGHT NET FRAME I.D.: 125-1/2"**

### Loading:

Table 1607.1

Lr = 200 lb point load  
Lr (equiv.) =  $Lr(point) / (width * trib length 4 ft)$   
= 4.8 psf  
DL = 6.0 psf  
W(up) = -37.0 psf (Zone 2)  
W(down) = 9.0 psf

### Load Combinations:

ASD -- ASCE7-05 Section 2.4.1

LC3 D + Lr = 10.8 psf  
LC5 D + W(down) = 15.0 psf  
LC6 D+.75W+.75Lr = 16.3 psf  
LC7 0.6D - W(up) = -33.4 psf (uplift)

### Load to Curb:

= psf \* trib. length to Curb

LC3 D + Lr = 28.3 plf OK  
LC5 D + W(down) = 39.3 plf OK  
LC6 D+.75W+.75Lr = 42.8 plf OK  
LC7 0.6D - W(up) = -87.7 plf

Down loads OK, curb bears on structure by others.  
Uplift, see fastener design on following pages.

### Load to Mullion:

= psf \* trib. length to Mullion

LC3 D + Lr = 57.0 plf  
LC5 D + W(down) = 79.3 plf  
LC6 D+.75W+.75Lr = 86.4 plf  
LC7 0.6D - W(up) = -177.0 plf

See following pages for mullion design.



## POINT 2

STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165  
916-452-8200 P  
916-452-8212 F

Project: Emerson Jr High Davis CA  
Client: HMC  
Project: 2015-111  
Date: 10/19/2015 WPL

## Interior Skylight Frame Mullion

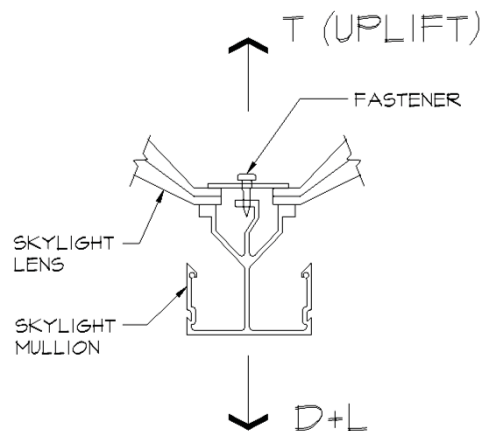
### Mullion Loads:

Max Uplift	=	33.4 psf, per Load Comb
Max Download	=	16.3 psf, per Load Comb
Trib width	=	2.6 ft
Mullion Span	=	10.5 ft

M(max) Uplift	=	1208 ft-lb
M(max) Down	=	590 ft-lb
V(max) Uplift	=	460 lb
V(max) Down	=	225 lb

### Section Properties for Aluminum Extrusion

A	=	1.950 in <sup>2</sup>
I <sub>x</sub>	=	3.211 in <sup>4</sup>
S <sub>x</sub> (top)	=	2.010 in <sup>3</sup>
S <sub>x</sub> (bot)	=	1.584 in <sup>3</sup>
r <sub>y</sub>	=	2.014
b (top)	=	1.69 in (net)
t (top)	=	0.19 in (min)
b (bottom)	=	3.50 in
t (bottom)	=	0.13 in
h (web)	=	3.30 in
t (web)	=	0.13 in



SKYLIGHT MULLION SECTION

Aluminum T6063-T5

### End Connection to Exterior Mullion:

7.5" of 1/4" Fillet Weld

V (allow) = 14,582 lb OK

### Applied Stress in Beam:

	<u>Uplift</u>
f <sub>v</sub>	= 0.24 ksi
f <sub>b</sub> (top)	= 7.21 ksi (Tension)
f <sub>b</sub> (bot)	= 9.15 ksi (Compression)

### Downward

0.12 ksi
3.52 ksi (Compression)
4.47 ksi (Tension)

### Allowable Stress in Beam:

Overall beam, S=L/r	=	5.2 slenderness
Bot. element, S=b/t	=	28.0 slenderness
Top Element, S=b/t	=	9.0 slenderness
Web, S=h/t	=	26.4 slenderness

### double-check:

max applied:	9.15 ksi
min. allowable:	5.5 ksi

F <sub>v</sub>	=	5.5 ksi
F <sub>b</sub> (tension, beam)	=	9.5 ksi
F <sub>b</sub> (compr. beam)	=	9.5 ksi
F <sub>b</sub> (compr, Bot. element)	=	9.5 ksi
F <sub>b</sub> (compr, Top element)	=	9.5 ksi
F <sub>b</sub> (compr, Web)	=	12.5 ksi

OK	Ref. Alum. Assoc. Design Manual 2005, Table 2-23
OK	ADM Section 3.4.20, for S < S <sub>1</sub> =44
OK	ADM Section 3.4.2, for all values S
OK	ADM Section 3.4.11 for S < S <sub>1</sub> =23
OK	ADM Section 3.4.16, for S > S <sub>1</sub> =26, but < S <sub>2</sub> =50
OK	ADM Section 3.4.16, for S < S <sub>1</sub> =26
OK	ADM Section 3.4.18, for S < S <sub>1</sub> =61

### Deflection:

(5/384) P L <sup>4</sup> / E I	=	0.3645 in
	=	L/346 OK
		< L/180

E (alum) = 10,000 ksi

### Fasteners:

Type:	#10 SDST @ 12" o.c.
T (allowable) =	204 lb each
T (actual) =	88 lb ea. OK
Utilization =	43%



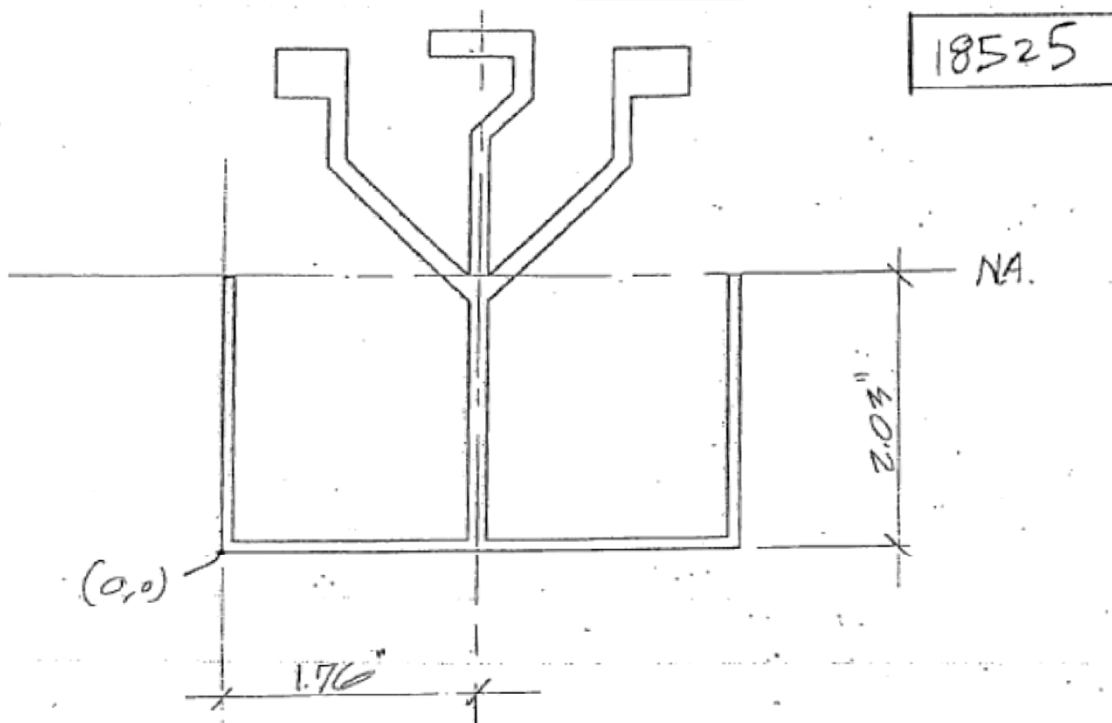


# POINT 2

STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165  
916-452-8200 P  
916-452-8212 F

Project: Emerson Jr High Davis CA  
Client: HMC  
Project: 2015-111  
Date: 10/19/2015 WPL



## REGIONS

EXTRUSION 18525

Area: 1.9497 sq in  
Perimeter: 33.2483 in  
Bounding box: X: 0.0000 -- 3.5000 in  
Y: 0.0000 -- 3.7500 in  
Centroid: X: 1.7585 in  
Y: 2.0269 in  
Moments of inertia: X: 11.2206 sq in sq in  
Y: 7.9076 sq in sq in  
Product of inertia: XY: 6.9709 sq in sq in  
Radii of gyration: X: 2.3990 in  
Y: 2.0139 in  
Principal moments (sq in sq in) and X-Y directions about centroid:  
I: 1.8780 along [0.0162 0.9999]  
J: 3.2113 along [-0.9999 0.0162]

$$I_x (\text{AT CENTROID}) = I_x - A d^2$$

$$= 11.2206 - 1.9497 (2.0269)^2$$

$$= 3.2106 \text{ in}^4$$

$$S_x (\text{BOT}) = \frac{3.2106}{2.0269} = 1.584 \text{ in}^3$$

$$S_x (\text{TOP}) = \frac{3.2106}{(3.625 - 2.0269)} = 2.01 \text{ in}^3$$

## Section Properties:

$$A = 1.9497 \text{ in}^2$$

$$I_{xx} = 3.2106 \text{ in}^4$$

$$I_{yy} = 1.8785 \text{ in}^4$$

$$S_{xx} (\text{Top}) = 2.010 \text{ in}^3$$

$$S_{xx} (\text{Bot}) = 1.584 \text{ in}^3$$

$$S_{yy} = 1.0682 \text{ in}^3$$



**POINT 2**  
STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165  
916-452-8200 P  
916-452-8212 F

**Project:** Emerson Jr High Davis CA  
**Client:** HMC  
**Project:** 2015-111  
**Date:** 10/19/2015 WPL

**WPL**

[illegible]





## POINT 2

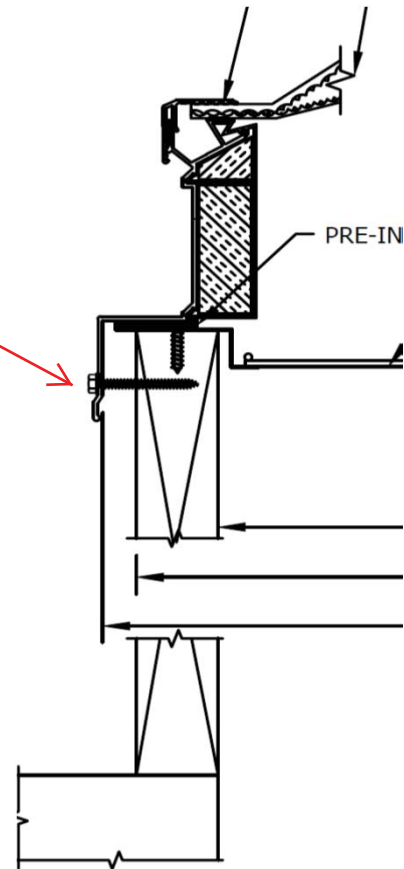
STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165  
916-452-8200 P  
916-452-8212 F

Project: Emerson Jr High Davis CA  
Client: HMC  
Project: 2015-111  
Date: 10/19/2015 WPL

### Exterior Fasteners

#14X 1.5 HWH SS  
FASTENERS @ 8"  
OC



### Fastener Connection, Frame to Curb:

#### Inputs:

Uplift = (87.7) plf max load to curb, see previous pages  
Spacing = 8 in. o.c.  
Max. "T" load = (58) lb per fastener = Uplift (plf) \* spacing (ft)  
Gap distance = 0.500 in. (includes gap)  
Moment = -29 lb-in  
Fastener: #14 SMS

#### Shear:

$V_{allow}$  = 250 lb per fastener OK utilization: -23%

#### Pull-out:

n/a, no pullout loads

#### Bending in Screw

Dia = 0.206 in (minor. diameter)  
S = 0.00086 in<sup>3</sup>  
fb = M / S = -33.8 ksi OK utilization: -91%  
Fb = .66Fy = 37.0 ksi (screw grade 1018 steel, Fy 56 ksi)



High Performance Prismatic Daylighting  
An Acuity Brands Company  
6201 27th Street  
Sacramento, California, USA 95822  
(916) 395-4700 Telephone  
(800) 289-4700 Toll Free  
(916) 395-9015 Fax

### -Customer Cut Sheet-

Notes:

SKYLIGHT QTY: **1**

LENS TYPE: **PYRAMID**

APPROVALS:

SAFETY/SECURITY GUARD QTY: **1**

CURB QTY: **0**

©2015 Acuity Brands Lighting, Inc.  
The information contained in these materials is proprietary, and may not be used, reproduced or distributed without the express written permission of Acuity Brands Lighting, Inc.

ABL Agent:

**MARSHALL DENTON**

Customer Name:

**ABIDE BUILDERS, EMERSON MIDDLE SCHOOL**

Item Nomenclature:

**PY 4040 W51.250 L51.250 DGZ**

**CC1 LENSCLWH 800MD MI**

**GUARD CUST W46.500 L46.500 CLPOG**

Title:

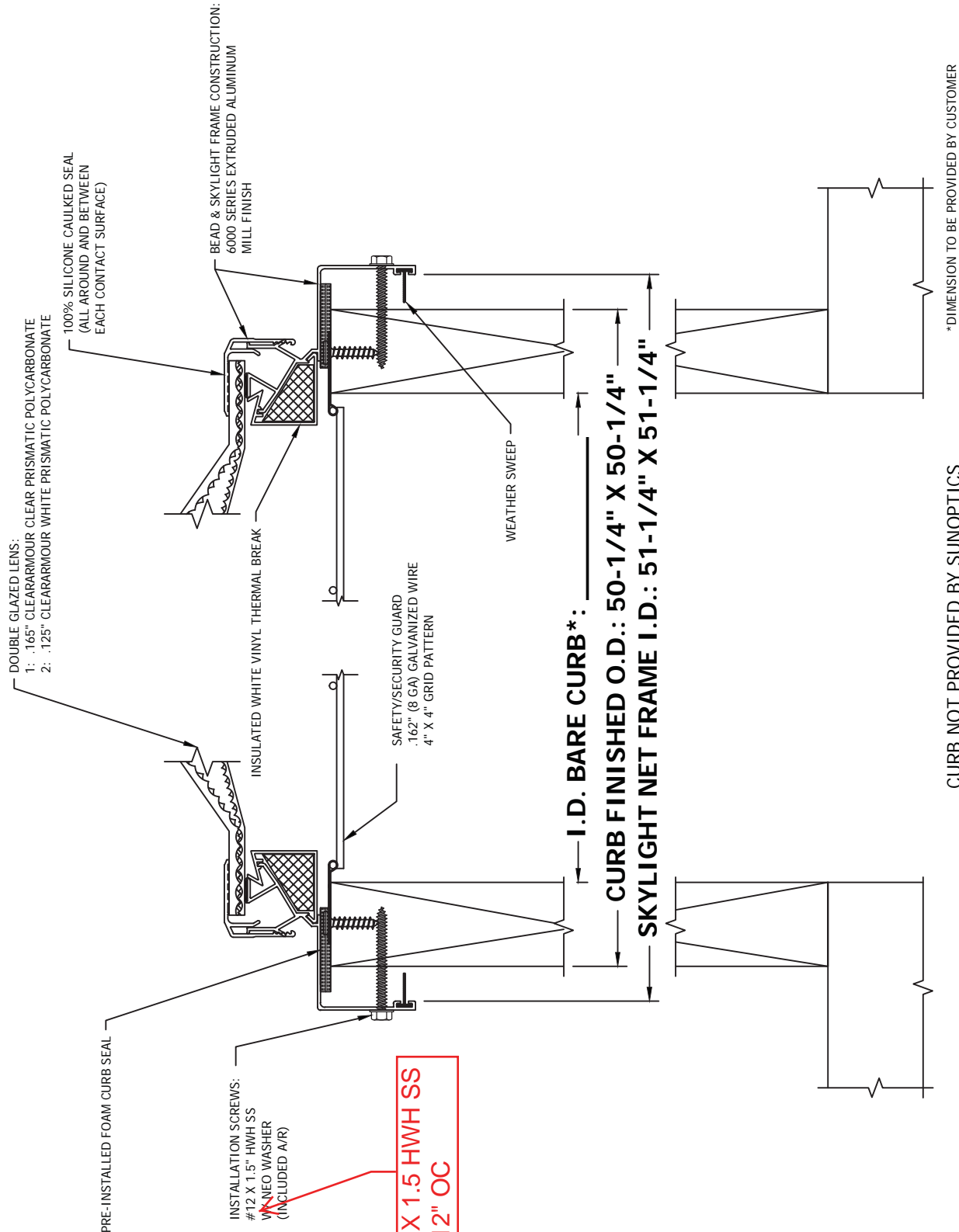
**800MD SKYLIGHT  
4040 PYRAMID  
W/ SSG**

Drawn By: **CAM** Sheet Size: **A**

Drawn Date: **8/21/15** Sheet: **1/1**

Scale: **3/8:1**

Cut Sheet Number:  
**389-15-12204-1 CS4**



**#14 X 1.5 HWH SS  
AT 12" OC**

APPROVED BY: \_\_\_\_\_

DATE: \_\_\_\_\_





# POINT 2

STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165  
916-452-8200 P  
916-452-8212 F

Project: Emerson Jr High Davis CA

Client: HMC

Job #: 2015-111

Date: 10/19/2015 WPL

## Design Criteria

**Live:**  $L_r =$  200 lb per Table 1607.1

**Seismic:** Seismic does not govern relative to wind.

**Wind:** Design Criteria - Components & Cladding  
2013 CBC/ ASCE 7-10

$$p = q_h[(GC_p) - (GC_{pi})] \quad (\text{Eq. 6-22})$$

Input		
V =	115	mph for site (Fig. 6-1)
I =	1.15	1.15 for Occupancy III, Table 6-1
$K_{zt}$ =	1.00	Topographic, use 1.0 per Sec. 6.5.7.2
$K_d$ =	0.85	use 0.85 for roof and signs per Table 6-4
Exposure	B	for suburban area, per Sec. 6.5.6.3

### Notes:

1. Skylights are assumed to be located in Zone 1 roof area location.
2. Building height is less than 60'.
3. Slope  $\theta < 7^\circ$ , flat or gable roof.

$$q_h = 0.00256 * K_h * K_{zt} * K_d * V^2 * I \quad *.6 \text{ for ASD}$$

Height * (ft.)	$K_h$ (Table 6-3)	ASD $q_h$ (psf)
25	0.94	18.67

\* max skylight height assumed not to exceed this value.

### External Pressure Coefficient (Fig. 30.4-2A)

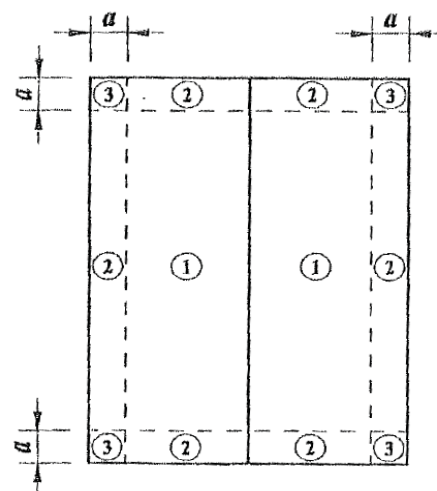
$GC_p$ Roof		
Zone 1	0.3	-1.0
Zone 2	0.3	-1.8
Zone 3	0.3	-2.8

### Internal Pressure Coefficient (Fig. 26.11-1)

$GC_{pi}$		
any zone	0.18	-0.18

### Design Wind Pressure, p (psf)

Max p at Roof (psf)		
	Downward	Upward
Zone 1	9.0	-22.0
Zone 2	8.96	-36.96
Zone 3	8.96	-55.62



Roof Plan with Wind Zones (ASCE Fig. 30.4-2A)

skylight is located in Zone 2

Use 37 psf for skylight design.



## POINT 2

STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165

916-452-8200 P  
916-452-8212 F

## Skylight Design

### Skylight Dimensions:

Type 800MB

Width, W = 4.3 ft max  
Length, L = 4.3 ft max

Trib to Curb =  $W/2$  = 2.2 ft  
Trib. to Mullion =  $L/3$  = 1.4 ft

### Loading:

Table 1607.1

Lr = 200 lb point load  
Snow Lr (equiv.) = 21.3 psf (max trib L = 8')  
DL = 6.0 psf  
W(up) = 21.5 psf (up)  
W(down) = 8.8 psf

### Load Comb.:

ASD -- ASCE7-05 Section 2.4.1

LC3 D + Lr(S) = 27 psf  
LC5 D + W(down) = 15 psf  
LC6 D + .75W + .75Lr(S) = 29 psf  
LC7 0.6D - W(up) = -18 psf (uplift)

### Load to Curb:

= psf \* Tributary width of skylight to curb

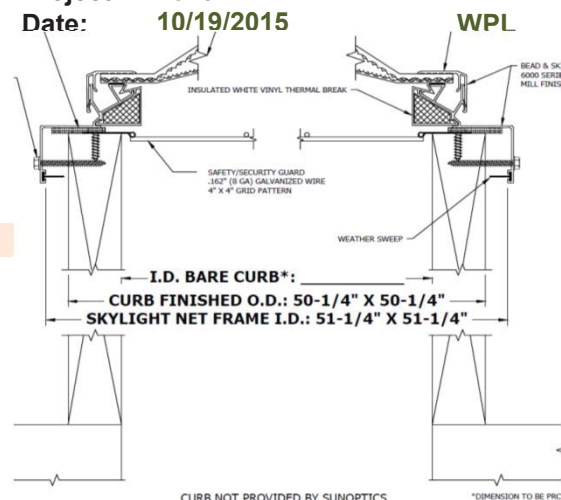
LC3 D + Lr = 60 plf OK  
LC5 D + W(down) = 32 plf OK  
LC6 D + .75W + .75Lr = 63 plf OK  
LC7 0.6D - W(up) = -39.4 plf (up)

Project: Emerson Jr High Davis CA

Client: HMC

Project: 2015-111

Date: 10/19/2015



CURB NOT PROVIDED BY SUNOPTICS

\*DIMENSION TO BE PRC

Down loads OK, curb bears on structure by others.

Uplift, see fastener design next page.





# POINT 2

STRUCTURAL ENGINEERS, INC.

3701 BUSINESS DRIVE  
SUITE 100  
SACRAMENTO, CA. 95820-2165  
916-452-8200 P  
916-452-8212 F

Project: Emerson Jr High Davis CA

Client: HMC

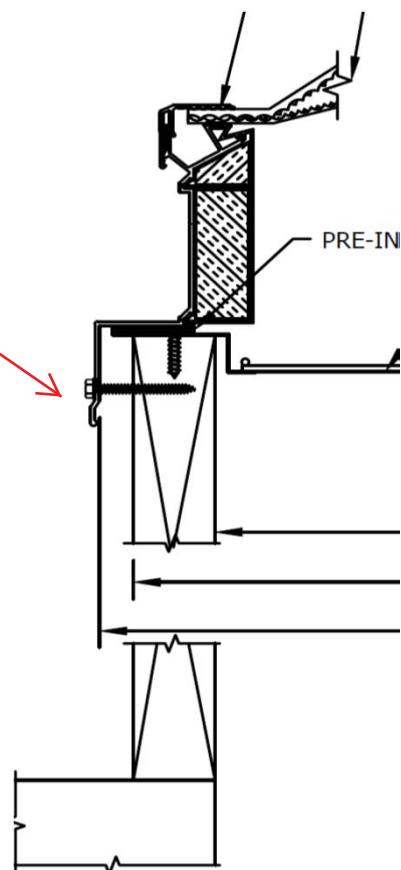
Project: 2015-111

Date: 10/19/2015

WPL

## Exterior Fasteners

#14 X 1.5 HWH SS  
FASTENERS @  
12" OC



### Fastener Connection, Frame to Curb:

#### Inputs:

Uplift = (39.4) plf max load to curb, see previous pages  
 Spacing = 12 in. o.c.  
 Max. "T" load = (39) lb per fastener = Uplift (plf) \* spacing (ft)  
 Gap distance = 0.500 in. (includes gap)  
 Moment = -19.5 lb-in  
 Fastener: #14 SMS

#### Shear:

$V_{allow}$  = 250 lb per fastener OK utilization: -16%

#### Pull-out:

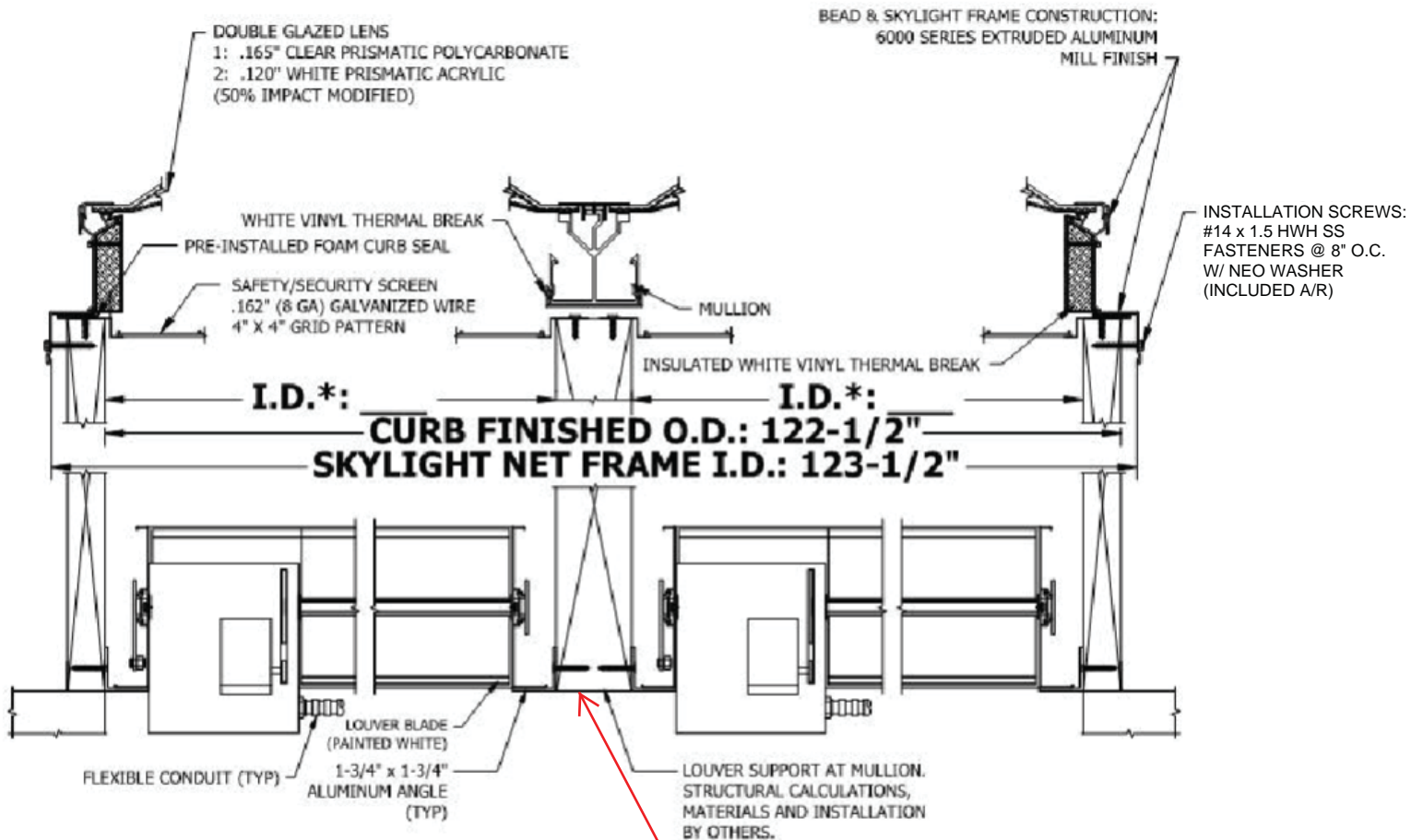
n/a, no pullout loads

#### Bending in Screw

Dia = 0.206 in (minor. diameter)  
 S = 0.00086 in<sup>3</sup>  
 fb = M / S = -22.7 ksi OK utilization: -61%  
 Fb = .66Fy = 37.0 ksi (screw grade 1018 steel, Fy 56 ksi)

center support member

CONFIRMED AND APPROVED  
PRIOR TO ORDER PLACEMENT



SECTION 2/3

3 1/2 x 7 1/4 PSL  
with Simpson  
HUC48 Hanger ea  
end

916-452-8200

Printed: 30 NOV 2015, 12:45PM

## Wood Beam

File = J:\P2015\2015-111 Emerson Jr HS Skylights\enerc\2015-111.ec6  
ENERCALC, INC. 1983-2015, Build:6.15.10.6, Ver:6.15.10.6

Lic. # : KW-06004153

Licensee : POINT 2 STRUCTURAL ENGINEERING

Description : skylight interior beam

### CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

Load Combination Set : ASCE 7-10

### Material Properties

Analysis Method : Allowable Stress Design

Load Combination ASCE 7-10

Wood Species : iLevel Truss Joist

Wood Grade : Parallam PSL 2.0E

Beam Bracing : Beam is Fully Braced against lateral-torsion buckling

Fb - Tension 2,900.0 psi

Fb - Compr 2,900.0 psi

Fc - Prll 2,900.0 psi

Fc - Perp 750.0 psi

Fv 290.0 psi

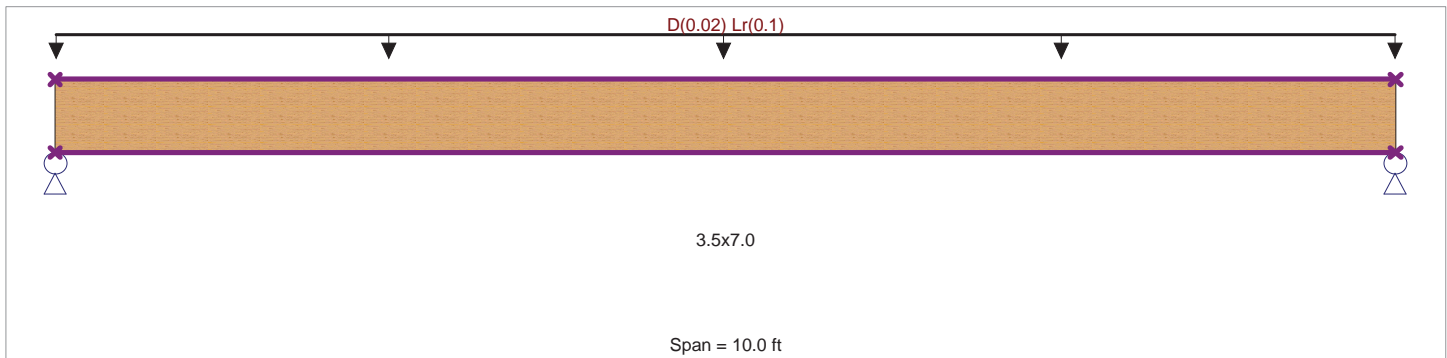
Ft 2,025.0 psi

E : Modulus of Elasticity

Ebend- xx 2,000.0ksi

Eminbend - xx 1,016.54ksi

Density 45.050pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Uniform Load : D = 0.0040, Lr = 0.020 ksf, Tributary Width = 5.0 ft, (roof)

### DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio		=	0.174	1	Maximum Shear Stress Ratio		=	0.090	: 1
Section used for this span			3.5x7.0		Section used for this span			3.5x7.0	
fb : Actual		=	629.74psi		fv : Actual		=	32.71 psi	
FB : Allowable		=	3,625.00psi		Fv : Allowable		=	362.50 psi	
Load Combination			+D+Lr+H		Load Combination			+D+Lr+H	
Location of maximum on span		=	5.000ft		Location of maximum on span		=	0.000 ft	
Span # where maximum occurs		=	Span # 1		Span # where maximum occurs		=	Span # 1	
Maximum Deflection									
Max Downward Transient Deflection			0.113	in	Ratio =	1060			
Max Upward Transient Deflection			0.000	in	Ratio =	0	<360		
Max Downward Total Deflection			0.136	in	Ratio =	884			
Max Upward Total Deflection			0.000	in	Ratio =	0	<180		

### Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
		M	V	C <sub>d</sub>	C <sub>F/V</sub>	C <sub>i</sub>	C <sub>r</sub>	C <sub>m</sub>	C <sub>t</sub>	C <sub>L</sub>	M	fb	F'b	V	fv	F'v	
+D+H Length = 10.0 ft	1	0.040	0.021	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	2610.00	0.00	0.00	0.00	
+D+L+H Length = 10.0 ft	1	0.036	0.019	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	2900.00	0.00	0.00	0.00	
+D+Lr+H Length = 10.0 ft	1	0.174	0.090	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.50	629.74	3625.00	0.00	0.00	0.00	
+D+S+H Length = 10.0 ft	1	0.031	0.016	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	3335.00	0.00	0.00	0.00	
+D+0.750Lr+0.750L+H Length = 10.0 ft	1	0.138	0.071	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.19	498.54	3625.00	0.00	0.00	0.00	
+D+0.750L+0.750S+H Length = 10.0 ft	1	0.031	0.016	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	3335.00	0.00	0.00	0.00	



916-452-8200

Printed: 30 NOV 2015, 12:45PM

## Wood Beam

File = J:\P22015\2015-111 Emerson Jr HS Skylights\enerc\2015-111.ec6  
ENERCALC, INC. 1983-2015, Build:6.15.10.6, Ver:6.15.10.6

Lic. # : KW-06004153

Licensee : POINT 2 STRUCTURAL ENGINEERING

Description : skylight interior beam

Load Combination Segment Length	Span #	Max Stress Ratios		C <sub>d</sub>	C <sub>F/V</sub>	C <sub>i</sub>	C <sub>r</sub>	C <sub>m</sub>	C <sub>t</sub>	C <sub>L</sub>	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+0.60W+H Length = 10.0 ft	1	0.023	0.012	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	4640.00	0.09	5.45	464.00
+D+0.70E+H Length = 10.0 ft	1	0.023	0.012	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	4640.00	0.09	5.45	464.00
+D+0.750Lr+0.750L+0.450W+H Length = 10.0 ft	1	0.107	0.056	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.19	498.54	4640.00	0.42	25.90	464.00
+D+0.750L+0.750S+0.450W+H Length = 10.0 ft	1	0.023	0.012	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	4640.00	0.09	5.45	464.00
+D+0.750L+0.750S+0.5250E+H Length = 10.0 ft	1	0.023	0.012	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.25	104.96	4640.00	0.09	5.45	464.00
+0.60D+0.60W+0.60H Length = 10.0 ft	1	0.014	0.007	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.15	62.97	4640.00	0.05	3.27	464.00
+0.60D+0.70E+0.60H Length = 10.0 ft	1	0.014	0.007	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.15	62.97	4640.00	0.05	3.27	464.00

### Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H	1	0.1357	5.036		0.0000	0.000

### Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	0.600	0.600
Overall MINimum	0.060	0.060
+D+H	0.100	0.100
+D+L+H	0.100	0.100
+D+Lr+H	0.600	0.600
+D+S+H	0.100	0.100
+D+0.750Lr+0.750L+H	0.475	0.475
+D+0.750L+0.750S+H	0.100	0.100
+D+0.60W+H	0.100	0.100
+D+0.70E+H	0.100	0.100
+D+0.750Lr+0.750L+0.450W+H	0.475	0.475
+D+0.750L+0.750S+0.450W+H	0.100	0.100
+D+0.750L+0.750S+0.5250E+H	0.100	0.100
+0.60D+0.60W+0.60H	0.060	0.060
+0.60D+0.70E+0.60H	0.060	0.060
D Only	0.100	0.100
Lr Only	0.500	0.500
L Only		
S Only		
W Only		
E Only		
H Only		

**SECTION 08 62 00**

**CURB MOUNT SKYLIGHTS**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Prefabricated Fixed Skylights.

**1.2 RELATED SECTIONS**

- A. Section 07 41 13 – Metal Roof Panels.

**1.3 REFERENCES**

- A. Aluminum Association (AA):  
Specifications for Aluminum Structures.
- B. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).  
ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- C. ASTM International (ASTM):  
ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. Factory Mutual System (FM Global):  
FM - Approval Guide, Chapter 18 - Building Materials.  
FM Standard 4430 - Test Criteria for Heat and Smoke Vents.
- E. National Fenestration Rating Council (NFRC):  
NFRC 100 - Procedure for Determining Fenestration Product U-Factors.  
NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance of Normal Incidence.
- F. North American Fenestration Standard (NAFS):  
AAMA\WDMA\CSA\101\I.S.2\A440 - The Voluntary Performance Specification for Windows, Skylights, and Glass Doors.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Skylights must conform with all federal, state and local code bodies having jurisdiction, and be designed to withstand all forces of nature deemed necessary by those code bodies for the specified project location.
- B. Plastic unit skylights shall conform to recommendations of the AA Specifications for Aluminum Structures.
- C. Skylights must be designed to carry a minimum 30 psf tributary roof load or greater

per site as specified in the current International Building Code or prevailing model code.

- D. Skylights must tested and labeled in accordance to AAMA\WDMA\CSA\101\I.S.2\A440 as required by Section 2405.5 of the 2003 International Building Code.
- E. Drop Test:
  - A 200 lb (91 kg) drop test from a height of 24 inches (610mm) above the center (highest point) of dome shape and at mid points of both the 5 foot (1524mm) and 6 foot (1829mm) side (approximately 15 inches (381mm) and 18 inches (457mm) from center).
  - The 200 lb (91 kg) load must be contained within a flexible bladder or sack having approximate dimensions no larger than 30 inches long, 20 inches wide, and 8 inches high (762mm x 508mm x 203mm), filled with course sand or pea gravel.
  - The dome must withstand the sack drop without inverting or breaking.
  - Finished skylight domes sealed in frame must also handle 500 lb (227 kg) on 1 square foot (.09 sm) point loading without inverting.
  - The drop test must be witnessed and certified by the test laboratory which provides the NAFS certification.
- F. Skylights must be certified by the NFRC.
- G. Skylights must be certified by the NAFS.

## 1.5 SUBMITTALS

- A. Submit under provisions of Division 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - Preparation instructions and recommendations.
  - Storage and handling requirements and recommendations.
  - Installation methods.
- C. Shop Drawings: Submit plan, section, elevation, and perspective drawings as necessary to depict each specified skylight. Include all flashing, connection, and termination details necessary for a proper and complete installation.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

## 1.7 DELIVERY, STORAGE, AND HANDLING



- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

## 1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 1.9 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sunoptics Prismatic Skylights; 6201 27th Street, Sacramento, CA 95822. ASD. Toll Free Tel: 916-521-8757. Fax: (916) 358-9817. Email: marshall@haveskylights.com. Web: <http://www.sunoptics.com>.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Division 00.

### 2.2 SKYLIGHT UNITS

- A. Glazing Panels:
  - Configuration: Double Hip – Double Glazed.
  - a. Outer Lens: SR 60 - 50 percent impact modified clear prismatic acrylic of sufficient thickness recommended to meet the specified performance requirements.
  - b. Inner lens: SR25 White Prismatic Acrylic Lens.
    - Energy Requirements: Glazing material must have a maximum light distribution characteristic that maximizes the shading factor. Per Addendum D of ASHRAE 90.1 – 2007, the diffusing qualities of glazing must have a minimum haze factor of 90 percent or greater. The combined inner/outer lens target values shall be as follows:
  - c. Light Transmittance: 67.8 percent minimum – 100 percent Class 1 and Class 3 Acrylic outer dome.
  - d. Diffusion / Haze Factor: 100 percent min.
  - e. Solar Heat Gain Coefficient (SHGC): 0.52 maximum. NFRC 200
  - f. "U" Value: 0.82 or lower (glazing and framing) in accordance with NFRC 100 or "unlabeled skylight" default requirements of ASHRAE 90.1 - 2004

Hail Resistance Level: Class 1 as tested by certified engineering firm.

B. Frame:

ASTM B 221 alloy 6063-T5 extruded aluminum frame with extruded aluminum dome retaining angle, Insulated thermal break, and integral condensate gutter. Finish: Manufacturer's standard mill finish.

Provide pre-installed 1 1/2 inch (38mm) x 1/4 inch (6mm) foam rubber gasket between frame and curb.

Provide weather sweep attached to frame.

Curb Dimensions: Determined by skylight manufacturers inside dimension of extruded aluminum. Recommend a 1/2 inch (13mm) surround around finished and final flashed curb.

## 2.3 ACCESSORIES

A. Fasteners (For anchorage of skylight to roof curb): #12 x 1 1/2 inch (38mm) 300 series stainless steel screws with washers. Provide fasteners in sufficient quantity for complete installation.

B. Washers: Neoprene/stainless steel bonded washers.

## 2.4 FABRICATION

A. Skylights must be factory assembled and glazed ready for installation.

B. Fabricate skylights weather tight and free of visual distortions and defects.

C. Protect exterior drip / counter flashing and drainage ports from weather and air-borne debris.

D. Miter and full penetration weld all corners of curb and retaining frames.

E. Retaining frames that secure the glazing panels along each side under spring tension need not be welded and must be sealed with a silicone sealant along the full perimeter of the retaining frame. Skylight frames must be pre-drilled for anchorage to roof curbs.

F. Seal glazing panels to base frame allowing for sufficient expansion and contraction. Provide exterior weep hole arrangement.

## PART 3 EXECUTION

### 3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

3447010

R.W. Emerson Jr. HS - Da Vinci Charter School Re-Roofing

CURB MOUNTED SKYLIGHTS

08 62 00 - 4

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

### 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION