Renaissance Infrastructure Consulting

5015 NW Canal St Suite 100
Riverside, MO 64150
P: 816.800.0950
ric-consult.com

November 30, 2023

Independence Public Works
Attn: Mr. Rich Kemple
Deputy Director Municipal Services
111 E. Maple Ave.
Independence, MO 64050

Re: **Structural Inspection Cracked and Dislodged Bick Tile Veneer at Front Entrance**

Dear Mr. Kemple,

In late August this year, at your request, we inspected cracked and dislodged brick tile veneer near the front entrance of the Independence City Hall building. This inspection follows our previous inspection of several cracked windowpanes located throughout the building's perimeter façade. This previous inspection took place in November 2020 and is attached for reference (less Exhibit B – Structural Analysis). The current matter with the cracking of the brick tile veneer is attributed to a couple of issues, as described below.

One matter we identified is the minimal or lack of sufficient control joints near the corner of the where the cracked brick veneer has taken place. Additionally, 'Creep' remains a part of the current issue. With Creep, *the time-dependent deformation in concrete due to sustained loads*, a slight translation at the beam – to – column structural interface can place undue stress on non-structural components (brick veneer). This undue stress on the non-structural components will occur if there is a lack of control joints – as we have in this case.

There is no indication that the structural framing of the building is compromised. The ongoing issue with the concrete 'creep' will need to be addressed with respect to the windows. Please note the following recommendation as presented in the November 2020 report:

> *Our recommendation for permanent repairs is the replacement of the window system where the distress/cracks in glazing is present. The replacement should comprise the entire bank of windows where a new head receptor would allow for the current parabolic profile of the deflected wall system above.*

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We've estimated the costs to replace all the windows in the building to be $1,200,000.00.

We recommend the repairs of the cracked brick tile veneer include placement of wider control joints.

Please do not hesitate to call or email us if you have any questions or require further information.

Very truly yours,

Gerald L. Charlton

Enc.

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November 3, 2020

Independence Public Works
Attn: Mr. Michael Schott
Facilities/Fleet Manager
111 E. Maple Ave.
Independence, MO 64050

Re: **Structural Inspection Report and Repair Recommendation of Cracked Glazing**

Dear Mr. Schott,

We have completed our Structural Analysis of the City Hall Building, located at 111E. Maple Avenue. The structural analysis was performed as part of the City of Independence Purchase Order # 20001086. The work was described in Exhibit 'A' of our proposal for Professional Services, dated July 10, 2010 and further outlined under Phase 100; specifically:

***Task 101: Structural Inspection***

*RIC will perform a structural inspection of the City Hall office building, limited to the cause of the distress/cracking of the glazing describe in the introduction of this letter agreement. As part of the inspection, RIC will take physical measurements of the structural framing system at the buildings perimeter. The measurements will allow us to examine whether concrete 'creep' is causing a serviceability issue. Our findings will be presented in a report.*

In order to perform and model the above described analysis, a thorough survey was performed for creation of a structural framing plan for each elevated floor. The framing plans are presented in Exhibit 'A' and are comprised of the following:

1. 2nd Floor Framing Plan
2. 3rd Floor Framing Plan
3. Roof Framing Plan

The structure can be described as a cast-in-place concrete column and concrete pan joist framing system. A waffle slab framing system was incorporated in areas of each floor for an aesthetic appearance. These areas are located as follows and are shown in Exhibit 'A' Framing Plans:

- 2nd Floor Waffle Slab appears in ceiling of the Court Room area & north ground floor lobby
- 3rd Floor Waffle Slab appears in ceiling of 2nd floor main lobby
- Roof Waffle Slab appears in ceiling of 3rd floor lobby

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The perimeter concrete beams supporting the integral pan joist floor system were examined for the purpose of locating cracked sections as part of our structural analysis. No cracked sections were discovered.

Our analysis focused on the perimeter framing system in order to determine serviceable deflections. Structural framing systems are designed to avoid excessive deformation/deflection which may lead to serviceable issues, such as – unsightly sagging of floors and roofs, cracking and other forms of distress to nonstructural components. Buildings with brick veneer exterior walls are typically limited to deflections having a ratio of ℓ/600, with ℓ = span length or column height.

The analysis results are part of Exhibit 'B'. In addition to the Elevated Floor Framing Plans presented in Exhibit 'A', we included Building Elevations to better present the Serviceability Deflections that were derived from our analysis.

Additionally, we have identified creep as being a probable issue that has led to the distress/cracking in the glazing. During our initial inspection, we noticed that some window mullions presented significant bowing. This is typical of a compressive load. The original window installation was completed in a static environment – that being no external forces other than nominal wind loads. For the mullions to bow or deflect sideways dynamic forces are taking place. As mentioned earlier, we identified creep as a probable cause. Creep is the time-dependent deformation in concrete due to sustained loads. Long term creep is typically 2x's the serviceability deflection of dead load.

The worst case serviceability deflection was located in the 2nd Floor perimeter beam supporting the east face brick veneer wall system – between Grid Line (B-C). The cracked window in the east face is located below this beam. The deflection measured in this beam is approximately 0.75 inches. The serviceable deflection in this beam is 0.5 inches. The total deflection supports our overview that long term creep is presenting the dynamic forces that is leading to the distress in the glazing. A total deflection of 0.75 inches indicates that the deflection due to creep is approximately 0.25 inches. The dynamic force present is a result of the above beam/wall system having a deflection greater than the allowable space in the window frames head receptor. We want to point out that the total serviceable + long-term creep deflection of 0.75 is within the ℓ/600 criteria.

***Task 102: <u>Repair Recommendation</u>***

*RIC will discuss our assessment with a glazing contractor/supplier in order to recommend necessary repairs/replacement. These recommendations will include preventative measures to minimize the possible distress in other perimeter glazing elements.*

Other than the window cracking and bowed mullions, there does not appear to be any further distress in non-structural building components.

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Temporarily, we recommend the City avoid storing heavy loads, such as filing cabinets or stacks of boxed hard copy documents near the perimeter of the building. This recommendation is for future office arrangements. Current office arrangements are fine.

Our recommendation for permanent repairs is the replacement of the window system where the distress/cracks in glazing is present. The replacement should comprise the entire bank of windows where a new head receptor would allow for the current parabolic profile of the deflected wall system above.

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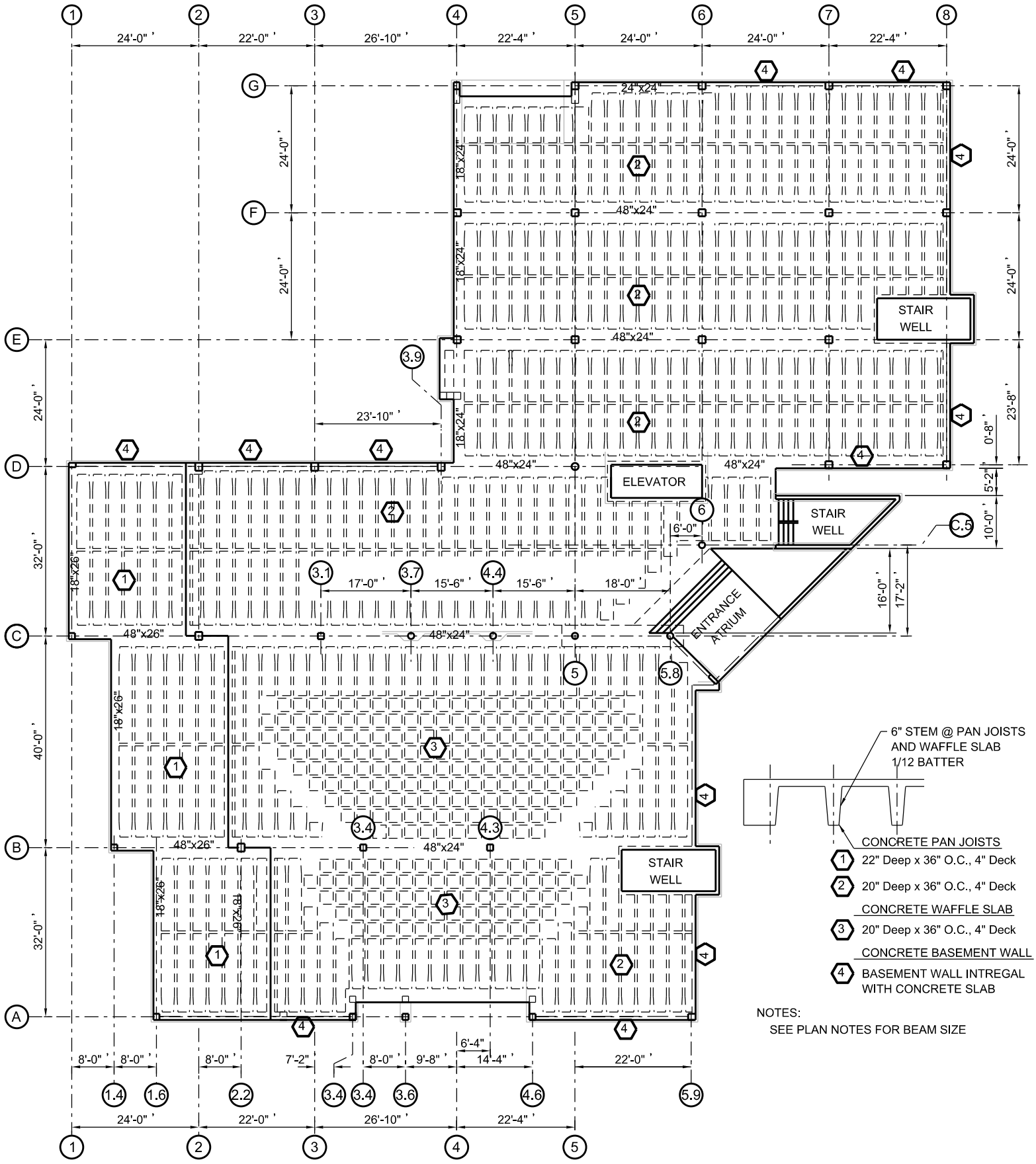
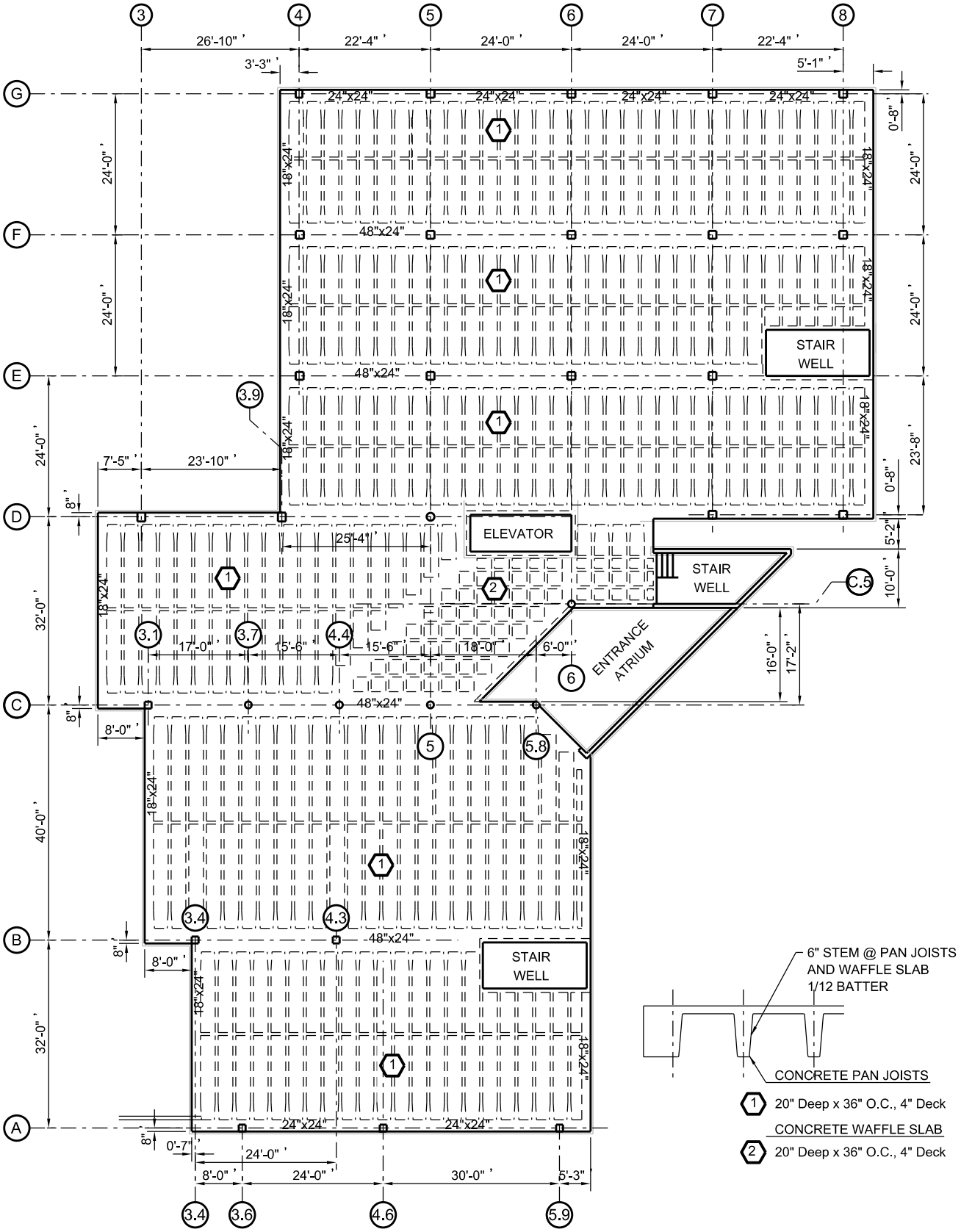
# Appendix ‘A’




# INDEPENDENCE CITY HALL

## 2nd FLOOR FRAMING PLAN

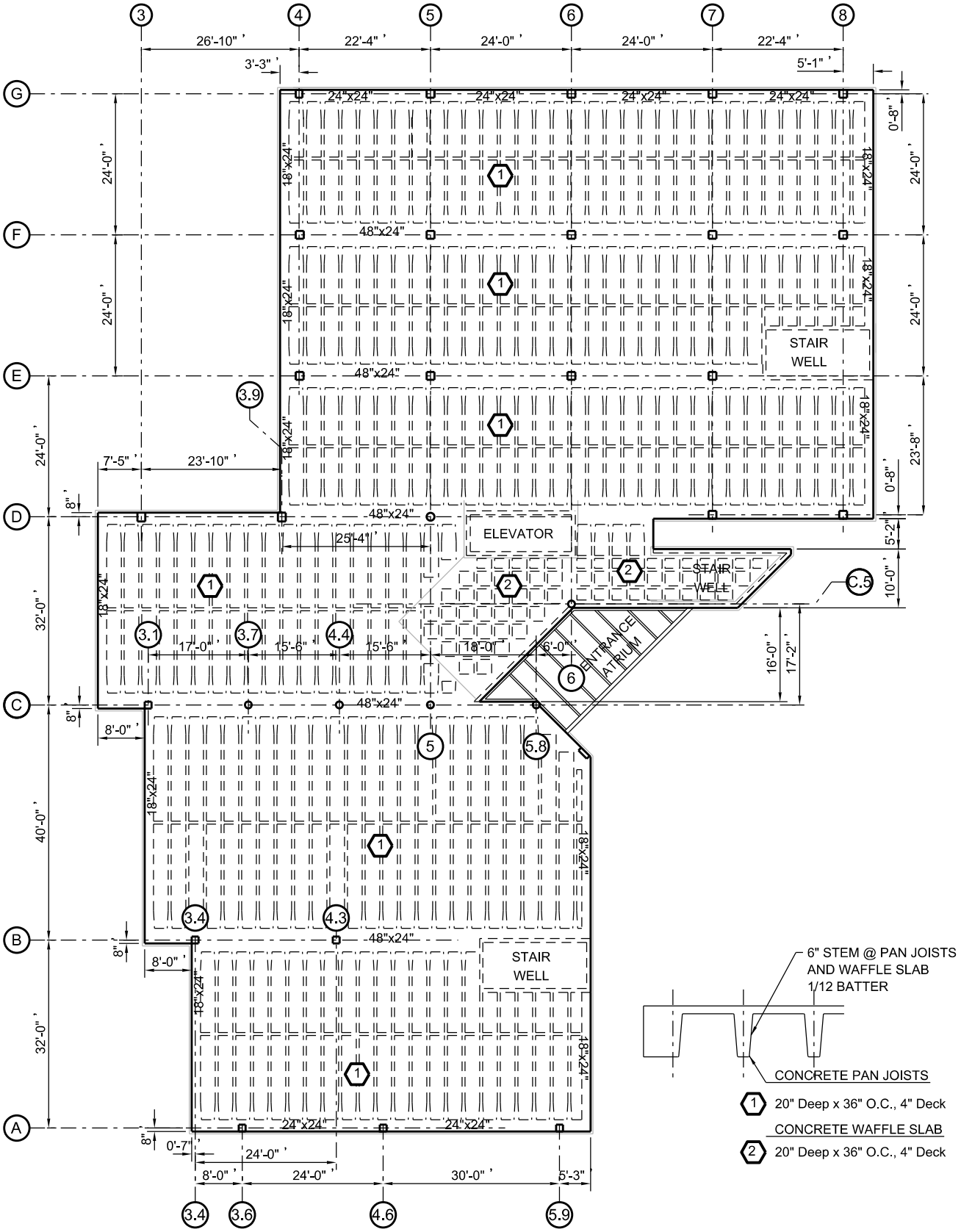






# INDEPENDENCE CITY HALL

## 3rd FLOOR FRAMING PLAN



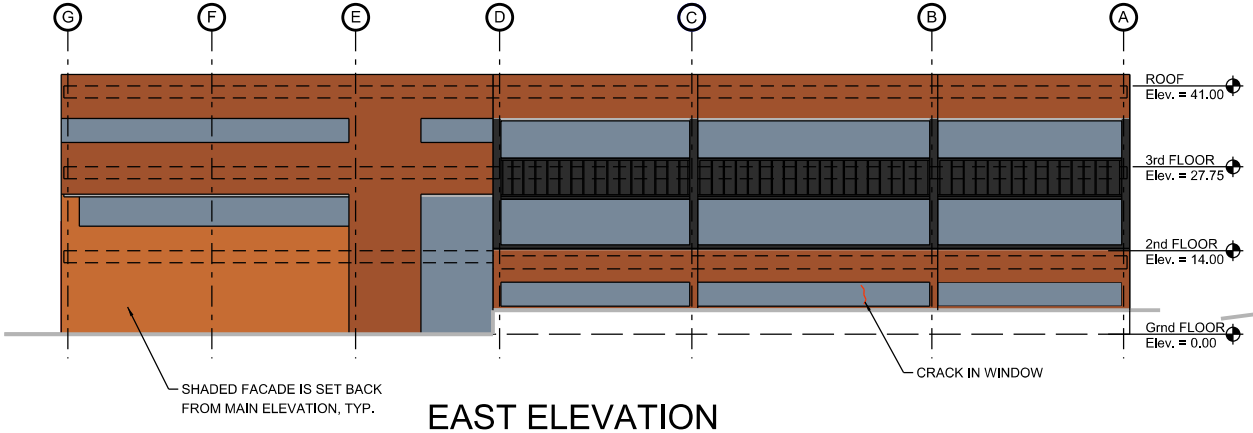




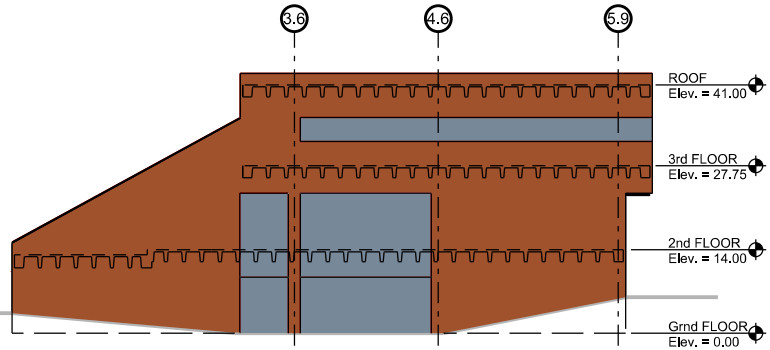
NOTES:
SEE PLAN NOTES FOR BEAM SIZE

# INDEPENDENCE CITY HALL

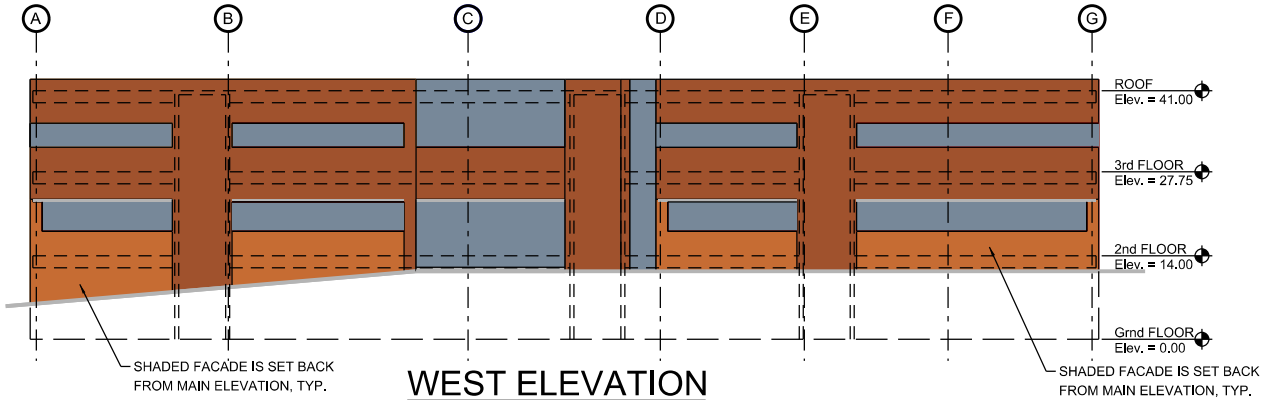
## ROOF FRAMING PLAN



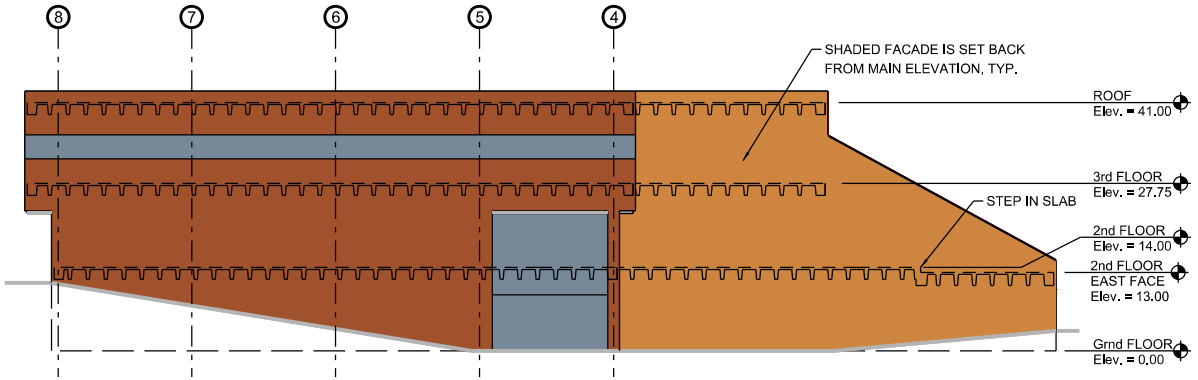

EAST ELEVATION




NORTH ELEVATION




WEST ELEVATION




SOUTH ELEVATION

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# Appendix ‘B’

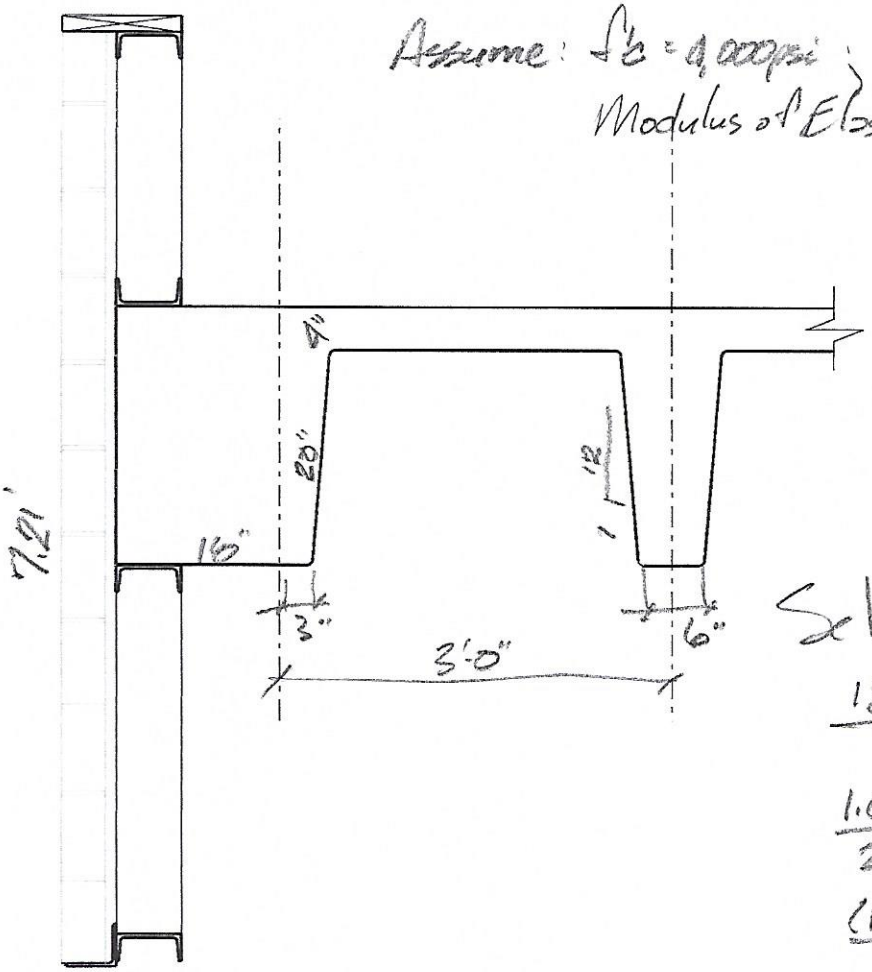
# Roof Framing - East & West Face

Assume: $f'_c = 4{,}000$ psi ; $\gamma = 150$ pcf

Modulus of Elasticity: $E_c = 33 \times \gamma^{1.5} \sqrt{f'_c}$

$E_c = 33 \times 150^{1.5} \sqrt{4{,}000}$

$E_c = 3{,}834{,}253$ psi




$I = \frac{bd^3}{12} =$

$I = \frac{18 \times 24^3}{12} = 20{,}736$ in$^4$

## Self Wt.

| | | |
|---|---|---|
| $\frac{18 \times 24}{144} \times 150 =$ | | 450 plf |
| $\frac{1.67 \times 20}{2 \times 144} \times 150 =$ | | 17 plf |
| $\frac{(18-3) \times 4}{144} \times 150 =$ | | 15 plf |
| | | 485 plf |

| | |
|---|---|
| Wt. Brick Facade: $7.21 \times 40 =$ | 288 |
| Back-Up Framing: $(7.21 - 2) \times 10 =$ | 52 |
| Ceiling/MEP: $3 \times 6$ psf $=$ | 18 |
| | 843 plf |

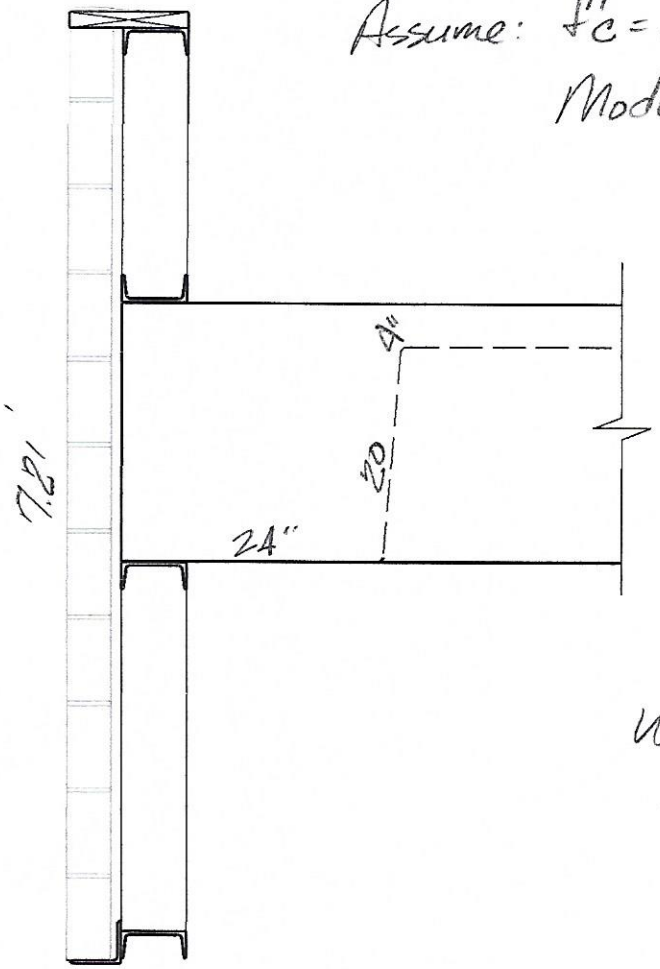
# Roof Framing - North & South Face

Assume: $f'_c = 4{,}000$ psi ; $\gamma = 150$ pcf

Modulus of Elasticity: $E_c = 33 \times \gamma^{1.5} \sqrt{f'_c}$

$E_c = 33 \times 150^{1.5} \sqrt{4000}$

$E_c = 3{,}824{,}253$ psi




$I = \frac{24 \times 24^3}{12} = 27{,}648$ in$^4$

Self wt.:

$\frac{24 \times 24}{144} \times 150 = 600$ plf

Wt. Brick Facade: $7.21 \times 40 = 288$ plf

Back-Up Frame: $(7.21 - 2) \times 10 = 52$ plf

Ceiling/MEP 2x6 = 12

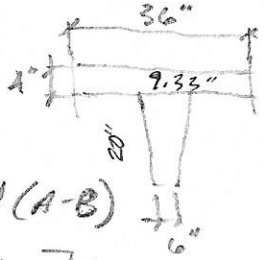
952 plf

---

Tributary Loading:

20.6667'
28.5833'

South Face Grid (F.G)




$\frac{(9.33 + 6) \times 20}{144} \times 150 = 160.0$ plf

$\frac{4 \times 36}{144} \times 150 = 150.0$ plf

328

Cross Beam $4^{\text{@}} \times .5 \times 150 = 300$ lb

Ceiling/MEP $3 \times 4 = 18$ plf

North Face Grid (A-B)

$w = \left[328 \times \frac{28.58}{2} + \frac{300}{2}\right] \div 3$

$w = 1{,}613$ plf

$+ \ 952$

$2{,}565$ plf

or 213.75 lb/in

$w = \left[328 \times \frac{20.67}{2} + \frac{300}{2}\right] \div 3 = 1{,}180$ plf

$+ \ 952$

$2{,}132$ plf or

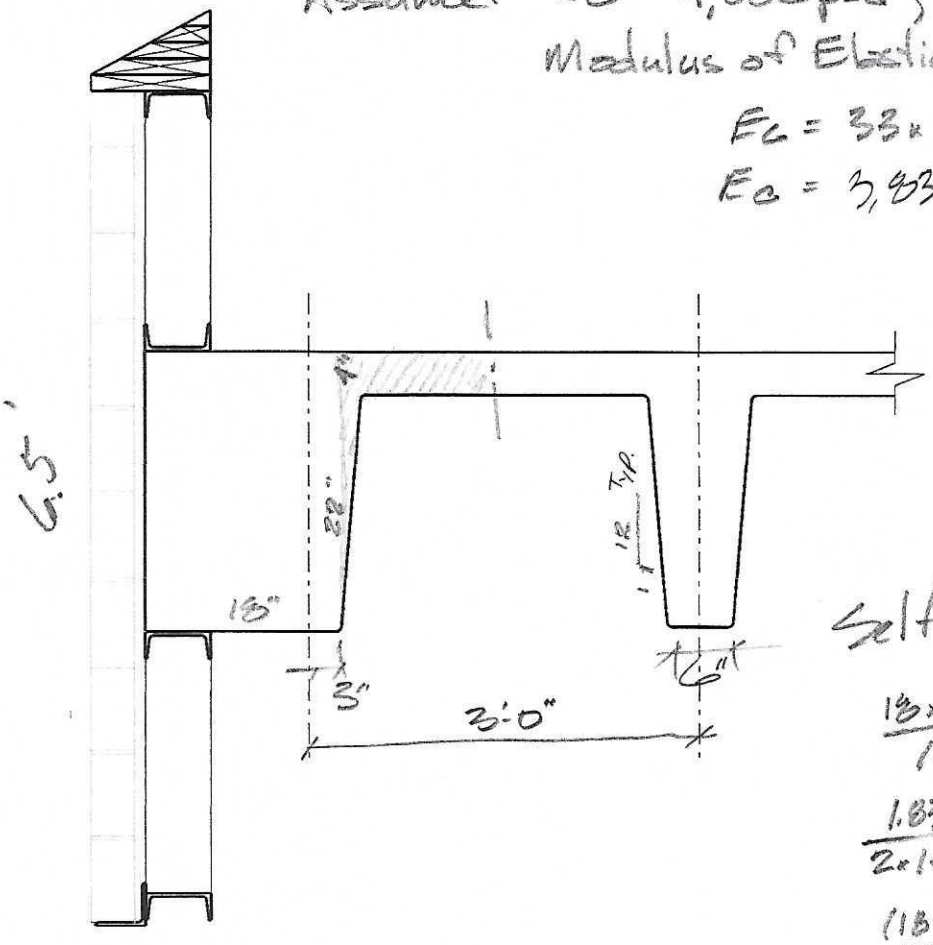
# 2nd Floor - East Face

Assume: $f'_c = 4{,}000$ psi ; $\gamma = 150$ pcf

Modulus of Elasticity: $E_c = 33 \times \gamma^{1.5} \sqrt{f'_c}$

$E_c = 33 \times 150^{1.5} \times \sqrt{4{,}000}$

$E_c = 3{,}834{,}253$ psi




$I = \frac{bd^3}{12}$

$I = \frac{18 \times 26^3}{12}$

$I = 26{,}364 \text{ in}^4$

Self wt.:

| | | |
|---|---|---|
| $\frac{18 \times 24}{144} \times 150$ | = | 487.5 pcf |
| $\frac{1.63 \times 22}{2 \times 144} \times 150$ | = | 21.0 pcf |
| $\frac{(18-3) \times 9}{144} \times 150$ | = | 62.5 pcf |
| | | 571 pcf |

| | | |
|---|---|---|
| Wt. Brick Facade: $6.5 \times 40$ psf | = | 260 pcf |
| Back up Framing: $(6.5 - 2.17)10$ | = | 43 pcf |
| Ceiling MEP : $3 \times 6$ psf | = | 18 pcf |
| | | 892 pcf |

**********

2nd Floor Framing – East Face: 1 Span (40ft); Supports (Pinned, Pinned)

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 26,364 in$^3$

w = 892 lb/ft or 74.33 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

**********

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 17839.20000 | 0.00000 |
| 2 | 0.00000 | 17839.20000 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 17839.20000 | 0.00000 |
| 1 | 0.00000 | 14271.36000 | 770653.44000 |
| 2 | 0.00000 | 10703.52000 | 1370050.56000 |
| 3 | 0.00000 | 7135.68000 | 1798191.36000 |
| 4 | 0.00000 | 3567.84000 | 2055075.84000 |
| 5 | 0.00000 | 0.00000 | 2140704.00000 |

| | | | |
|---|---|---|---|
| 6 | 0.00000 | -3567.84000 | 2055075.84000 |
| 7 | 0.00000 | -7135.68000 | 1798191.36000 |
| 8 | 0.00000 | -10703.52000 | 1370050.56000 |
| 9 | 0.00000 | -14271.36000 | 770653.44000 |
| 10 | 0.00000 | -17839.20000 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | -0.003388321 |
| 2 | 0.000000000 | 0.000000000 | 0.003388321 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.003388321 |
| 1 | 0.000000000 | -0.159549254 | -0.003198575 |
| 2 | 0.000000000 | -0.301858732 | -0.002683550 |
| 3 | 0.000000000 | -0.413266723 | -0.001924566 |
| 4 | 0.000000000 | -0.484014863 | -0.001002943 |
| 5 | 0.000000000 | -0.508248135 | 0.000000000 |
| 6 | 0.000000000 | -0.484014863 | 0.001002943 |
| 7 | 0.000000000 | -0.413266723 | 0.001924566 |
| 8 | 0.000000000 | -0.301858732 | 0.002683550 |
| 9 | 0.000000000 | -0.159549254 | 0.003198575 |
| 10 | 0.000000000 | 0.000000000 | 0.003388321 |

MAXIMUM / MINIMUM SPAN SHEARS

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|
| 1 | 17839.20000 | 0.0000 | -17839.20000 | 480.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 2140704.00000 | 240.0000 | 0.00000 | 0.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.508248135 | 240.0000 000 |

**********

2nd Floor Framing

Perimeter Beam – East Face between (A-B) & (C-D)

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 14592.00000 | 0.00000 |
| 2 | 0.00000 | 14592.00000 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 14592.00000 | 0.00000 |
| 1 | 0.00000 | 11673.60000 | 504299.52000 |
| 2 | 0.00000 | 8755.20000 | 896532.48000 |
| 3 | 0.00000 | 5836.80000 | 1176698.88000 |
| 4 | 0.00000 | 2918.40000 | 1344798.72000 |
| 5 | 0.00000 | 0.00000 | 1400832.00000 |
| 6 | 0.00000 | -2918.40000 | 1344798.72000 |
| 7 | 0.00000 | -5836.80000 | 1176698.88000 |
| 8 | 0.00000 | -8755.20000 | 896532.48000 |
| 9 | 0.00000 | -11673.60000 | 504299.52000 |

| | | | |
|---|---|---|---|
| 10 | 0.00000 | -14592.00000 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | -0.002255227 |
| 2 | 0.000000000 | 0.000000000 | 0.002255227 |

MEMBER DISPLACEMENTS (at even intervals along span length)

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.002255227 |
| 1 | 0.000000000 | -0.084955305 | -0.002128934 |
| 2 | 0.000000000 | -0.160730934 | -0.001786140 |
| 3 | 0.000000000 | -0.220052427 | -0.001280969 |
| 4 | 0.000000000 | -0.257723740 | -0.000667547 |
| 5 | 0.000000000 | -0.270627247 | 0.000000000 |
| 6 | 0.000000000 | -0.257723740 | 0.000667547 |
| 7 | 0.000000000 | -0.220052427 | 0.001280969 |
| 8 | 0.000000000 | -0.160730934 | 0.001786140 |
| 9 | 0.000000000 | -0.084955305 | 0.002128934 |
| 10 | 0.000000000 | 0.000000000 | 0.002255227 |

MAXIMUM / MINIMUM SPAN SHEARS

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | 14592.00000 | 0.0000 | -14592.00000 | 384.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 1400832.00000 | 192.0000 | 0.00000 | 384.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.270627247 | 192.0000 |

**********

Roof Framing – East Face: 3 Spans @ 24ft

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 20,736 in$^3$

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 8092.80000 | 0.00000 |
| 2 | 0.00000 | 22255.20000 | 0.00000 |
| 3 | 0.00000 | 22255.20000 | 0.00000 |
| 4 | 0.00000 | 8092.80000 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 8092.80000 | 0.00000 |
| 1 | 0.00000 | 6069.60000 | 203938.56000 |
| 2 | 0.00000 | 4046.40000 | 349608.96000 |
| 3 | 0.00000 | 2023.20000 | 437011.20000 |
| 4 | 0.00000 | 0.00000 | 466145.28000 |
| 5 | 0.00000 | -2023.20000 | 437011.20000 |

| | | | |
|---|---|---|---|
| 6 | 0.00000 | -4046.40000 | 349608.96000 |
| 7 | 0.00000 | -6069.60000 | 203938.56000 |
| 8 | 0.00000 | -8092.80000 | 0.00000 |
| 9 | 0.00000 | -10116.00000 | -262206.72000 |
| 10 | 0.00000 | -12139.20000 | -582681.60000 |

SPAN 2

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 10116.00000 | -582681.60000 |
| 1 | 0.00000 | 8092.80000 | -320474.88000 |
| 2 | 0.00000 | 6069.60000 | -116536.32000 |
| 3 | 0.00000 | 4046.40000 | 29134.08000 |
| 4 | 0.00000 | 2023.20000 | 116536.32000 |
| 5 | 0.00000 | 0.00000 | 145670.40000 |
| 6 | 0.00000 | -2023.20000 | 116536.32000 |
| 7 | 0.00000 | -4046.40000 | 29134.08000 |
| 8 | 0.00000 | -6069.60000 | -116536.32000 |
| 9 | 0.00000 | -8092.80000 | -320474.88000 |
| 10 | 0.00000 | -10116.00000 | -582681.60000 |

SPAN 3

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 12139.20000 | -582681.60000 |
| 1 | 0.00000 | 10116.00000 | -262206.72000 |
| 2 | 0.00000 | 8092.80000 | 0.00000 |
| 3 | 0.00000 | 6069.60000 | 203938.56000 |
| 4 | 0.00000 | 4046.40000 | 349608.96000 |
| 5 | 0.00000 | 2023.20000 | 437011.20000 |
| 6 | 0.00000 | 0.00000 | 466145.28000 |
| 7 | 0.00000 | -2023.20000 | 437011.20000 |
| 8 | 0.00000 | -4046.40000 | 349608.96000 |
| 9 | 0.00000 | -6069.60000 | 203938.56000 |
| 10 | 0.00000 | -8092.80000 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | -0.000527665 |
| 2 | 0.000000000 | 0.000000000 | 0.000175888 |
| 3 | 0.000000000 | 0.000000000 | -0.000175888 |
| 4 | 0.000000000 | 0.000000000 | 0.000527665 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.000527665 |
| 1 | 0.000000000 | -0.014816825 | -0.000488969 |
| 2 | 0.000000000 | -0.027556762 | -0.000386954 |
| 3 | 0.000000000 | -0.036700136 | -0.000242726 |
| 4 | 0.000000000 | -0.041335143 | -0.000077391 |
| 5 | 0.000000000 | -0.041157847 | 0.000087944 |
| 6 | 0.000000000 | -0.036472185 | 0.000232172 |
| 7 | 0.000000000 | -0.028189960 | 0.000334188 |
| 8 | 0.000000000 | -0.017830846 | 0.000372883 |
| 9 | 0.000000000 | -0.007522388 | 0.000327152 |
| 10 | 0.000000000 | 0.000000000 | 0.000175888 |
| SPAN 2 | | | |
| 0 | 0.000000000 | 0.000000000 | 0.000175888 |
| 1 | 0.000000000 | 0.002507463 | 0.000014071 |
| 2 | 0.000000000 | 0.001620986 | -0.000063320 |

| | | | |
|---|---|---|---|
| 3 | 0.000000000 | -0.000531886 | -0.000077391 |
| 4 | 0.000000000 | -0.002431479 | -0.000049249 |
| 5 | 0.000000000 | -0.003165988 | 0.000000000 |
| 6 | 0.000000000 | -0.002431479 | 0.000049249 |
| 7 | 0.000000000 | -0.000531886 | 0.000077391 |
| 8 | 0.000000000 | 0.001620986 | 0.000063320 |
| 9 | 0.000000000 | 0.002507463 | -0.000014071 |
| 10 | 0.000000000 | 0.000000000 | -0.000175888 |

SPAN 3

| | | | |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.000175888 |
| 1 | 0.000000000 | -0.007522388 | -0.000327152 |
| 2 | 0.000000000 | -0.017830846 | -0.000372883 |
| 3 | 0.000000000 | -0.028189960 | -0.000334188 |
| 4 | 0.000000000 | -0.036472185 | -0.000232172 |
| 5 | 0.000000000 | -0.041157847 | -0.000087944 |
| 6 | 0.000000000 | -0.041335143 | 0.000077391 |
| 7 | 0.000000000 | -0.036700136 | 0.000242726 |
| 8 | 0.000000000 | -0.027556762 | 0.000386954 |
| 9 | 0.000000000 | -0.014816825 | 0.000488969 |
| 10 | 0.000000000 | 0.000000000 | 0.000527665 |

MAXIMUM / MINIMUM SPAN SHEARS

==========

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|
| 1 | 8092.80000 | 0.0000 | -12139.20000 | 288.0000 |
| 2 | 10116.00000 | 0.0000 | -10116.00000 | 288.0000 |
| 3 | 12139.20000 | 0.0000 | -8092.80000 | 288.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

==========

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 466145.28000 | 115.2000 | -582681.60000 | 288.0000 |
| 2 | 145670.40000 | 144.0000 | -582681.60000 | 0.0000 |
| 3 | 466145.28000 | 172.8000 | -582681.60000 | 0.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

==========

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.041846955 | 128.6400 |
| 2 | 0.002532784 | 32.5161 | -0.003165988 | 144.0000 |
| 3 | 0.000000000 | 0.0000 | -0.041846955 | 159.3600 |

**********

Roof Framing – East Face: 1 Span (32ft); Supports (Pinned, Pinned)

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 20,736 in$^3$

w = 843 lb/ft or 70.25 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

**********

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 13488.00000 | 0.00000 |
| 2 | 0.00000 | 13488.00000 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 13488.00000 | 0.00000 |
| 1 | 0.00000 | 10790.40000 | 466145.28000 |
| 2 | 0.00000 | 8092.80000 | 828702.72000 |
| 3 | 0.00000 | 5395.20000 | 1087672.32000 |
| 4 | 0.00000 | 2697.60000 | 1243054.08000 |
| 5 | 0.00000 | 0.00000 | 1294848.00000 |

| | | | |
|---|---|---|---|
| 6 | 0.00000 | -2697.60000 | 1243054.08000 |
| 7 | 0.00000 | -5395.20000 | 1087672.32000 |
| 8 | 0.00000 | -8092.80000 | 828702.72000 |
| 9 | 0.00000 | -10790.40000 | 466145.28000 |
| 10 | 0.00000 | -13488.00000 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | -0.002084600 |
| 2 | 0.000000000 | 0.000000000 | 0.002084600 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.002084600 |
| 1 | 0.000000000 | -0.078527704 | -0.001967862 |
| 2 | 0.000000000 | -0.148570254 | -0.001651003 |
| 3 | 0.000000000 | -0.203403564 | -0.001184053 |
| 4 | 0.000000000 | -0.238224718 | -0.000617042 |
| 5 | 0.000000000 | -0.250151963 | 0.000000000 |
| 6 | 0.000000000 | -0.238224718 | 0.000617042 |
| 7 | 0.000000000 | -0.203403564 | 0.001184053 |
| 8 | 0.000000000 | -0.148570254 | 0.001651003 |
| 9 | 0.000000000 | -0.078527704 | 0.001967862 |
| 10 | 0.000000000 | 0.000000000 | 0.002084600 |

MAXIMUM / MINIMUM SPAN SHEARS

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|
| 1 | 13488.00000 | 0.0000 | -13488.00000 | 384.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 1294848.00000 | 192.0000 | 0.00000 | 384.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.250151963 | 192.0000 |

**********

Roof Framing – North Face: Grid 3.4 – 5.9

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 27,648 in$^3$

w = 2,565 lb/ft or 213.8 lb/in & 2,174 lb/ft or 181.2 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

**********

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 0.00000 | 0.00000 |
| 2 | 0.00000 | 64415.19943 | 0.00000 |
| 3 | 0.00000 | 69991.74021 | 0.00000 |
| 4 | 0.00000 | 35805.40236 | 0.00000 |
| 5 | 0.00000 | 0.00000 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 0.00000 | 0.00000 |
| 1 | 0.00000 | -15454.96000 | -133002.73600 |
| 2 | 0.00000 | -17421.92000 | -284236.38400 |

| | | | |
|---|---|---|---|
| 3 | 0.00000 | -19388.88000 | -453566.06400 |
| 4 | 0.00000 | -21355.84000 | -640991.77600 |
| 5 | 0.00000 | -23322.80000 | -846513.52000 |
| 6 | 0.00000 | -25289.76000 | -1070131.29600 |
| 7 | 0.00000 | -27256.72000 | -1311845.10400 |
| 8 | 0.00000 | -29223.68000 | -1571654.94400 |
| 9 | 0.00000 | -31190.64000 | -1849560.81600 |
| 10 | 0.00000 | -33157.60000 | -2145562.72000 |
| SPAN 2 | | | |
| 0 | 0.00000 | 31257.59943 | -2145562.72000 |
| 1 | 0.00000 | 25100.15943 | -1334010.99242 |
| 2 | 0.00000 | 18942.71943 | -699793.53684 |
| 3 | 0.00000 | 12785.27943 | -242910.35325 |
| 4 | 0.00000 | 6627.83943 | 36638.55833 |
| 5 | 0.00000 | 470.39943 | 138853.19791 |
| 6 | 0.00000 | -5687.04057 | 63733.56549 |
| 7 | 0.00000 | -11844.48057 | -188720.33892 |
| 8 | 0.00000 | -18001.92057 | -618508.51534 |
| 9 | 0.00000 | -24159.36057 | -1225630.96376 |
| 10 | 0.00000 | -30316.80057 | -2010087.68418 |
| SPAN 3 | | | |
| 0 | 0.00000 | 39674.93964 | -2010087.68418 |
| 1 | 0.00000 | 31980.27764 | -720255.29998 |
| 2 | 0.00000 | 24283.47764 | 292492.29491 |
| 3 | 0.00000 | 16586.67764 | 1028155.08979 |
| 4 | 0.00000 | 8889.87764 | 1486733.08468 |
| 5 | 0.00000 | 1193.07764 | 1668226.27957 |
| 6 | 0.00000 | -5721.32236 | 1582023.47445 |
| 7 | 0.00000 | -12244.52236 | 1258638.26934 |

| | | | |
|---|---|---|---|
| 8 | 0.00000 | -18749.60236 | 700418.77023 |
| 9 | 0.00000 | -18749.60236 | 25433.08511 |
| 10 | 0.00000 | -18749.60236 | -649552.60000 |

SPAN 4

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 17055.80000 | -649552.60000 |
| 1 | 0.00000 | 16077.32000 | -560093.17600 |
| 2 | 0.00000 | 15098.84000 | -475917.54400 |
| 3 | 0.00000 | 14120.36000 | -397025.70400 |
| 4 | 0.00000 | 13141.88000 | -323417.65600 |
| 5 | 0.00000 | 12163.40000 | -255093.40000 |
| 6 | 0.00000 | 11184.92000 | -192052.93600 |
| 7 | 0.00000 | 10206.44000 | -134296.26400 |
| 8 | 0.00000 | 9227.96000 | -81823.38400 |
| 9 | 0.00000 | 8249.48000 | -34634.29600 |
| 10 | 0.00000 | 0.00000 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | -0.128888765 | 0.001645827 |
| 2 | 0.000000000 | 0.000000000 | 0.000845747 |
| 3 | 0.000000000 | 0.000000000 | -0.000784405 |
| 4 | 0.000000000 | 0.000000000 | 0.001309902 |
| 5 | 0.000000000 | 0.064770736 | 0.001151526 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | -0.128888765 | 0.001645827 |
| 1 | 0.000000000 | -0.113764219 | 0.001640192 |
| 2 | 0.000000000 | -0.098747069 | 0.001622218 |
| 3 | 0.000000000 | -0.083958063 | 0.001590334 |
| 4 | 0.000000000 | -0.069532397 | 0.001542969 |
| 5 | 0.000000000 | -0.055619715 | 0.001478554 |
| 6 | 0.000000000 | -0.042384110 | 0.001395517 |
| 7 | 0.000000000 | -0.030004123 | 0.001292288 |
| 8 | 0.000000000 | -0.018672743 | 0.001167297 |
| 9 | 0.000000000 | -0.008597407 | 0.001018974 |
| 10 | 0.000000000 | 0.000000000 | 0.000845747 |
| SPAN 2 | | | |
| 0 | 0.000000000 | 0.000000000 | 0.000845747 |
| 1 | 0.000000000 | 0.017079938 | 0.000377107 |
| 2 | 0.000000000 | 0.023606668 | 0.000104855 |
| 3 | 0.000000000 | 0.024542442 | -0.000019184 |
| 4 | 0.000000000 | 0.023462010 | -0.000043188 |
| 5 | 0.000000000 | 0.022552620 | -0.000015335 |
| 6 | 0.000000000 | 0.022614022 | 0.000016198 |
| 7 | 0.000000000 | 0.023058463 | 0.000003235 |
| 8 | 0.000000000 | 0.021910692 | -0.000102402 |
| 9 | 0.000000000 | 0.015807955 | -0.000348889 |
| 10 | 0.000000000 | 0.000000000 | -0.000784405 |
| SPAN 3 | | | |
| 0 | 0.000000000 | 0.000000000 | -0.000784405 |
| 1 | 0.000000000 | -0.037756315 | -0.001240165 |
| 2 | 0.000000000 | -0.084600275 | -0.001304957 |
| 3 | 0.000000000 | -0.128150708 | -0.001072874 |

| | | | |
|---|---|---|---|
| 4 | 0.000000000 | -0.159413896 | -0.000638015 |
| 5 | 0.000000000 | -0.172783573 | -0.000094473 |
| 6 | 0.000000000 | -0.166036672 | 0.000464363 |
| 7 | 0.000000000 | -0.140188527 | 0.000953342 |
| 8 | 0.000000000 | -0.099192361 | 0.001292628 |
| 9 | 0.000000000 | -0.049751644 | 0.001415875 |
| 10 | 0.000000000 | 0.000000000 | 0.001309902 |

SPAN 4

| | | | |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | 0.001309902 |
| 1 | 0.000000000 | 0.006977929 | 0.001275368 |
| 2 | 0.000000000 | 0.013782905 | 0.001245795 |
| 3 | 0.000000000 | 0.020440902 | 0.001220881 |
| 4 | 0.000000000 | 0.026976260 | 0.001200323 |
| 5 | 0.000000000 | 0.033411693 | 0.001183821 |
| 6 | 0.000000000 | 0.039768280 | 0.001171071 |
| 7 | 0.000000000 | 0.046065473 | 0.001161773 |
| 8 | 0.000000000 | 0.052321094 | 0.001155624 |
| 9 | 0.000000000 | 0.058551332 | 0.001152322 |
| 10 | 0.000000000 | 0.064770736 | 0.001151526 |

MAXIMUM / MINIMUM SPAN SHEARS

==========

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|
| 1 | 0.00000 | 0.0000 | -33157.60000 | 92.0000 |
| 2 | 31257.59943 | 0.0000 | -30316.80057 | 288.0000 |
| 3 | 39674.93964 | 0.0000 | -18749.60236 | 302.4000 |
| 4 | 17055.80000 | 0.0000 | 0.00000 | 54.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

==========

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 0.00000 | 0.0000 | -2145562.72000 | 92.0000 |
| 2 | 139364.69907 | 145.9636 | -2145562.72000 | 0.0000 |
| 3 | 1671544.86108 | 185.8909 | -2010087.68418 | 0.0000 |
| 4 | 0.00000 | 54.0000 | -649552.60000 | 0.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

==========

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 92.0000 | -0.128888765 | 0.0000 |
| 2 | 0.024613445 | 79.2000 | 0.000000000 | 0.0000 |
| 3 | 0.000000000 | 0.0000 | -0.173066770 | 185.8909 |
| 4 | 0.064770736 | 54.0000 | 0.000000000 | 0.0000 0.0000 3 192.0000 |

**********

Roof Framing – South Face: Grid 4-8

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 27,648 in$^3$

w = 2,565 lb/ft or 213.8 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

**********

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

**********

These results are stored in the files named:

C:\Program Files (x86)\DTBeam\DTBeam.dtb.txt

C:\Program Files (x86)\DTBeam\DTBeam.dtb.bmp

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 0.00000 | 0.00000 |
| 2 | 0.00000 | 38500.48382 | 0.00000 |

| | | | |
|---|---|---|---|
| 3 | 0.00000 | 64170.30012 | 0.00000 |
| 4 | 0.00000 | 67323.53636 | 0.00000 |
| 5 | 0.00000 | 64194.68112 | 0.00000 |
| 6 | 0.00000 | 44632.19858 | 0.00000 |
| 7 | 0.00000 | 0.00000 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 0.00000 | 0.00000 |
| 1 | 0.00000 | -8734.40000 | -25160.17000 |
| 2 | 0.00000 | -9375.80000 | -52325.47000 |
| 3 | 0.00000 | -10017.20000 | -81414.97000 |
| 4 | 0.00000 | -10658.60000 | -112428.67000 |
| 5 | 0.00000 | -11300.00000 | -145366.57000 |
| 6 | 0.00000 | -11941.40000 | -180228.67000 |
| 7 | 0.00000 | -12582.80000 | -217014.97000 |
| 8 | 0.00000 | -13224.20000 | -255725.47000 |
| 9 | 0.00000 | -13865.60000 | -296360.17000 |
| 10 | 0.00000 | -14507.00000 | -338919.07000 |
| SPAN 2 | | | |
| 0 | 0.00000 | 23993.48382 | -338919.07000 |
| 1 | 0.00000 | 18263.64382 | 227326.44047 |
| 2 | 0.00000 | 12533.80382 | 640012.23894 |
| 3 | 0.00000 | 6803.96382 | 899138.32541 |
| 4 | 0.00000 | 1074.12382 | 1004704.69989 |
| 5 | 0.00000 | -4655.71618 | 956711.36236 |
| 6 | 0.00000 | -10385.55618 | 755158.31283 |

| | | | |
|---|---|---|---|
| 7 | 0.00000 | -16115.39618 | 400045.55130 |
| 8 | 0.00000 | -21845.23618 | -108626.92223 |
| 9 | 0.00000 | -27575.07618 | -770859.10776 |
| 10 | 0.00000 | -33304.91618 | -1586651.00528 |

SPAN 3

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 30865.38395 | -1586651.00528 |
| 1 | 0.00000 | 24707.94395 | -786395.08359 |
| 2 | 0.00000 | 18550.50395 | -163473.43390 |
| 3 | 0.00000 | 12393.06395 | 282113.94380 |
| 4 | 0.00000 | 6235.62395 | 550367.04949 |
| 5 | 0.00000 | 78.18395 | 641285.88319 |
| 6 | 0.00000 | -6079.25605 | 554870.44488 |
| 7 | 0.00000 | -12236.69605 | 291120.73457 |
| 8 | 0.00000 | -18394.13605 | -149963.24773 |
| 9 | 0.00000 | -24551.57605 | -768381.50204 |
| 10 | 0.00000 | -30709.01605 | -1564134.02834 |

SPAN 4

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 36614.52030 | -1564134.02834 |
| 1 | 0.00000 | 30457.08030 | -598302.97961 |
| 2 | 0.00000 | 17028.64030 | 156747.19712 |
| 3 | 0.00000 | 10871.20030 | 558504.90185 |
| 4 | 0.00000 | 4713.76030 | 782928.33458 |
| 5 | 0.00000 | -1443.67970 | 830017.49531 |
| 6 | 0.00000 | -7601.11970 | 699772.38404 |
| 7 | 0.00000 | -13758.55970 | 392193.00077 |
| 8 | 0.00000 | -19915.99970 | -92720.65450 |
| 9 | 0.00000 | -26073.43970 | -754968.58177 |
| 10 | 0.00000 | -32230.87970 | -1594550.78104 |

SPAN 5

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 31963.80142 | -1594550.78104 |
| 1 | 0.00000 | 26233.96142 | -814700.75894 |
| 2 | 0.00000 | 20504.12142 | -188410.44884 |
| 3 | 0.00000 | 14774.28142 | 284320.14927 |
| 4 | 0.00000 | 9044.44142 | 603491.03537 |
| 5 | 0.00000 | 3314.60142 | 769102.20948 |
| 6 | 0.00000 | -2415.23858 | 781153.67158 |
| 7 | 0.00000 | -8145.07858 | 639645.42169 |
| 8 | 0.00000 | -13874.91858 | 344577.45979 |
| 9 | 0.00000 | -19604.75858 | -104050.21410 |
| 10 | 0.00000 | -25334.59858 | -706237.60000 |

SPAN 6

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 19297.60000 | -706237.60000 |
| 1 | 0.00000 | 18185.84000 | -608780.65600 |
| 2 | 0.00000 | 17074.08000 | -517104.86400 |
| 3 | 0.00000 | 15962.32000 | -431210.22400 |
| 4 | 0.00000 | 14850.56000 | -351096.73600 |
| 5 | 0.00000 | 13738.80000 | -276764.40000 |
| 6 | 0.00000 | 12627.04000 | -208213.21600 |
| 7 | 0.00000 | 11515.28000 | -145443.18400 |
| 8 | 0.00000 | 10403.52000 | -88454.30400 |
| 9 | 0.00000 | 9291.76000 | -37246.57600 |
| 10 | 0.00000 | 0.00000 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.019011395 | -0.000620004 |

| | | | |
|---|---|---|---|
| 2 | 0.000000000 | 0.000000000 | -0.000663411 |
| 3 | 0.000000000 | 0.000000000 | 0.000137684 |
| 4 | 0.000000000 | 0.000000000 | -0.000127489 |
| 5 | 0.000000000 | 0.000000000 | 0.000023741 |
| 6 | 0.000000000 | 0.000000000 | 0.000350546 |
| 7 | 0.000000000 | 0.012872869 | 0.000202933 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.019011395 | -0.000620004 |
| 1 | 0.000000000 | 0.017151035 | -0.000620355 |
| 2 | 0.000000000 | 0.015288525 | -0.000621447 |
| 3 | 0.000000000 | 0.013421559 | -0.000623334 |
| 4 | 0.000000000 | 0.011547668 | -0.000626073 |
| 5 | 0.000000000 | 0.009664218 | -0.000629716 |
| 6 | 0.000000000 | 0.007768414 | -0.000634318 |
| 7 | 0.000000000 | 0.005857294 | -0.000639935 |
| 8 | 0.000000000 | 0.003927737 | -0.000646619 |
| 9 | 0.000000000 | 0.001976455 | -0.000654427 |
| 10 | 0.000000000 | 0.000000000 | -0.000663411 |
| SPAN 2 | | | |
| 0 | 0.000000000 | 0.000000000 | -0.000663411 |
| 1 | 0.000000000 | -0.018244788 | -0.000674282 |
| 2 | 0.000000000 | -0.035036085 | -0.000561412 |
| 3 | 0.000000000 | -0.047577840 | -0.000363622 |
| 4 | 0.000000000 | -0.054114413 | -0.000119734 |
| 5 | 0.000000000 | -0.053930564 | 0.000131432 |

| | | | |
|---|---|---|---|
| 6 | 0.000000000 | -0.047351460 | 0.000351054 |
| 7 | 0.000000000 | -0.035742672 | 0.000500311 |
| 8 | 0.000000000 | -0.021510178 | 0.000540383 |
| 9 | 0.000000000 | -0.008100359 | 0.000432447 |
| 10 | 0.000000000 | 0.000000000 | 0.000137684 |

SPAN 3

| | | | |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | 0.000137684 |
| 1 | 0.000000000 | -0.001140471 | -0.000180649 |
| 2 | 0.000000000 | -0.008549488 | -0.000305661 |
| 3 | 0.000000000 | -0.017353180 | -0.000285531 |
| 4 | 0.000000000 | -0.024065178 | -0.000168434 |
| 5 | 0.000000000 | -0.026586614 | -0.000002549 |
| 6 | 0.000000000 | -0.024206120 | 0.000163948 |
| 7 | 0.000000000 | -0.017599828 | 0.000282880 |
| 8 | 0.000000000 | -0.008831372 | 0.000306069 |
| 9 | 0.000000000 | -0.001351884 | 0.000185339 |
| 10 | 0.000000000 | 0.000000000 | -0.000127489 |

SPAN 4

| | | | |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.000127489 |
| 1 | 0.000000000 | -0.008473437 | -0.000417213 |
| 2 | 0.000000000 | -0.021744859 | -0.000469360 |
| 3 | 0.000000000 | -0.034067495 | -0.000368187 |
| 4 | 0.000000000 | -0.042135896 | -0.000181956 |
| 5 | 0.000000000 | -0.044194127 | 0.000041156 |
| 6 | 0.000000000 | -0.039873751 | 0.000252973 |
| 7 | 0.000000000 | -0.030193835 | 0.000405317 |
| 8 | 0.000000000 | -0.017560944 | 0.000450011 |
| 9 | 0.000000000 | -0.005769143 | 0.000338878 |
| 10 | 0.000000000 | 0.000000000 | 0.000023741 |

SPAN 5

| | | | |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | 0.000023741 |
| 1 | 0.000000000 | -0.003841507 | -0.000277562 |
| 2 | 0.000000000 | -0.013289513 | -0.000401124 |
| 3 | 0.000000000 | -0.024100746 | -0.000385766 |
| 4 | 0.000000000 | -0.033072341 | -0.000270308 |
| 5 | 0.000000000 | -0.038041836 | -0.000093572 |
| 6 | 0.000000000 | -0.037887174 | 0.000105622 |
| 7 | 0.000000000 | -0.032526703 | 0.000288451 |
| 8 | 0.000000000 | -0.022919178 | 0.000416096 |
| 9 | 0.000000000 | -0.011063756 | 0.000449734 |
| 10 | 0.000000000 | 0.000000000 | 0.000350546 |

SPAN 6

| | | | |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | 0.000350546 |
| 1 | 0.000000000 | 0.001736973 | 0.000318317 |
| 2 | 0.000000000 | 0.003318541 | 0.000290727 |
| 3 | 0.000000000 | 0.004768087 | 0.000267493 |
| 4 | 0.000000000 | 0.006107521 | 0.000248329 |
| 5 | 0.000000000 | 0.007357277 | 0.000232954 |
| 6 | 0.000000000 | 0.008536315 | 0.000221083 |
| 7 | 0.000000000 | 0.009662121 | 0.000212433 |
| 8 | 0.000000000 | 0.010750706 | 0.000206720 |
| 9 | 0.000000000 | 0.011816606 | 0.000203660 |
| 10 | 0.000000000 | 0.012872869 | 0.000202933 |

MAXIMUM / MINIMUM SPAN SHEARS

==========

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | 0.00000 | 0.0000 | -14507.00000 | 30.0000 |
| 2 | 23993.48382 | 0.0000 | -33304.91618 | 268.0000 |
| 3 | 30865.38395 | 0.0000 | -30709.01605 | 288.0000 |
| 4 | 36614.52030 | 0.0000 | -32230.87970 | 288.0000 |
| 5 | 31963.80142 | 0.0000 | -25334.59858 | 268.0000 |
| 6 | 19297.60000 | 0.0000 | 0.00000 | 52.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

==========

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 0.00000 | 0.0000 | -338919.07000 | 30.0000 |
| 2 | 1007402.48259 | 112.1630 | -1586651.00528 | 268.0000 |
| 3 | 641285.88319 | 144.0000 | -1586651.00528 | 0.0000 |
| 4 | 834887.45882 | 137.0483 | -1594550.78104 | 288.0000 |
| 5 | 794780.51714 | 149.8815 | -1594550.78104 | 0.0000 |
| 6 | 0.00000 | 52.0000 | -706237.60000 | 0.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

==========

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.019011395 | 0.0000 | 0.000000000 | 30.0000 |
| 2 | 0.000000000 | 0.0000 | -0.054869096 | 120.1037 |
| 3 | 0.000675989 | 9.9310 | -0.026586614 | 144.0000 |
| 4 | 0.000000000 | 0.0000 | -0.044301735 | 139.0345 |
| 5 | 0.000017884 | 1.9852 | -0.038636390 | 146.9037 |
| 6 | 0.012872869 | 52.0000 | 0.000000000 | 0.0000 |

**********

Roof Framing – West Face: 2 Spans (16ft, 24ft); Supports (Fixed, Pinned, Pinned)

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 20,736 in$^3$

w = 843 lb/ft or 70.25 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 4074.50000 | 44960.00000 |
| 2 | 0.00000 | 21465.27778 | 0.00000 |
| 3 | 0.00000 | 8180.22222 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 4074.50000 | -44960.00000 |
| 1 | 0.00000 | 2725.70000 | 20321.92000 |
| 2 | 0.00000 | 1376.90000 | 59706.88000 |
| 3 | 0.00000 | 28.10000 | 73194.88000 |
| 4 | 0.00000 | -1320.70000 | 60785.92000 |
| 5 | 0.00000 | -2669.50000 | 22480.00000 |

| | | | |
|---|---|---|---|
| 6 | 0.00000 | -4018.30000 | -41722.88000 |
| 7 | 0.00000 | -5367.10000 | -131822.72000 |
| 8 | 0.00000 | -6715.90000 | -247819.52000 |
| 9 | 0.00000 | -8064.70000 | -389713.28000 |
| 10 | 0.00000 | -9413.50000 | -557504.00000 |

SPAN 2

| | | | |
|---|---|---|---|
| 0 | 0.00000 | 12051.77778 | -557504.00000 |
| 1 | 0.00000 | 10028.57778 | -239546.88000 |
| 2 | 0.00000 | 8005.37778 | 20142.08000 |
| 3 | 0.00000 | 5982.17778 | 221562.88000 |
| 4 | 0.00000 | 3958.97778 | 364715.52000 |
| 5 | 0.00000 | 1935.77778 | 449600.00000 |
| 6 | 0.00000 | -87.42222 | 476216.32000 |
| 7 | 0.00000 | -2110.62222 | 444564.48000 |
| 8 | 0.00000 | -4133.82222 | 354644.48000 |
| 9 | 0.00000 | -6157.02222 | 206456.32000 |
| 10 | 0.00000 | -8180.22222 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | 0.000000000 |
| 2 | 0.000000000 | 0.000000000 | -0.000206289 |
| 3 | 0.000000000 | 0.000000000 | 0.000542865 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | 0.000000000 |
| 1 | 0.000000000 | -0.000048780 | -0.000002454 |
| 2 | 0.000000000 | -0.000013341 | 0.000007730 |
| 3 | 0.000000000 | 0.000288926 | 0.000024299 |
| 4 | 0.000000000 | 0.000920560 | 0.000040997 |
| 5 | 0.000000000 | 0.001824026 | 0.000051572 |
| 6 | 0.000000000 | 0.002821716 | 0.000049770 |
| 7 | 0.000000000 | 0.003615949 | 0.000029336 |
| 8 | 0.000000000 | 0.003788971 | -0.000015982 |
| 9 | 0.000000000 | 0.002802955 | -0.000092439 |
| 10 | 0.000000000 | 0.000000000 | -0.000206289 |
| SPAN 2 | | | |
| 0 | 0.000000000 | 0.000000000 | -0.000206289 |
| 1 | 0.000000000 | -0.008270968 | -0.000348888 |
| 2 | 0.000000000 | -0.019091613 | -0.000386867 |
| 3 | 0.000000000 | -0.029752785 | -0.000341332 |
| 4 | 0.000000000 | -0.038153207 | -0.000233388 |
| 5 | 0.000000000 | -0.042799471 | -0.000084144 |
| 6 | 0.000000000 | -0.042806037 | 0.000085295 |
| 7 | 0.000000000 | -0.037895238 | 0.000253822 |
| 8 | 0.000000000 | -0.028397273 | 0.000400330 |
| 9 | 0.000000000 | -0.015250214 | 0.000503714 |
| 10 | 0.000000000 | 0.000000000 | 0.000542865 |

MAXIMUM / MINIMUM SPAN SHEARS

==========

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | 4074.50000 | 0.0000 | -9413.50000 | 192.0000 |
| 2 | 12051.77778 | 0.0000 | -8180.22222 | 288.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

==========

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 73195.74323 | 58.3680 | -557504.00000 | 192.0000 |
| 2 | 476267.28999 | 171.2432 | -557504.00000 | 0.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

==========

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.003832005 | 148.2240 | -0.000057831 | 26.1120 |
| 2 | 0.000000000 | 0.0000 | -0.043414115 | 158.7892 |

**********

Roof Framing – West Face: 1 Span (23ft); Supports (Pinned, Fixed)

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 20,736 in$^3$

w = 843 lb/ft or 70.25 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

**********

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 7270.87500 | 0.00000 |
| 2 | 0.00000 | 12118.12500 | -668920.50000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 7270.87500 | 0.00000 |
| 1 | 0.00000 | 5331.97500 | 173919.33000 |
| 2 | 0.00000 | 3393.07500 | 294325.02000 |
| 3 | 0.00000 | 1454.17500 | 361217.07000 |
| 4 | 0.00000 | -484.72500 | 374595.48000 |
| 5 | 0.00000 | -2423.62500 | 334460.25000 |

| | | | |
|---|---|---|---|
| 6 | 0.00000 | -4362.52500 | 240811.38000 |
| 7 | 0.00000 | -6301.42500 | 93648.87000 |
| 8 | 0.00000 | -8240.32500 | -107027.28000 |
| 9 | 0.00000 | -10179.22500 | -361217.07000 |
| 10 | 0.00000 | -12118.12500 | -668920.50000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | -0.000387014 |
| 2 | 0.000000000 | 0.000000000 | 0.000000000 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.000387014 |
| 1 | 0.000000000 | -0.010382500 | -0.000355279 |
| 2 | 0.000000000 | -0.019141399 | -0.000272458 |
| 3 | 0.000000000 | -0.025123086 | -0.000157128 |
| 4 | 0.000000000 | -0.027686666 | -0.000027865 |
| 5 | 0.000000000 | -0.026703961 | 0.000096753 |
| 6 | 0.000000000 | -0.022559506 | 0.000198151 |
| 7 | 0.000000000 | -0.016150555 | 0.000257751 |
| 8 | 0.000000000 | -0.008887078 | 0.000256977 |
| 9 | 0.000000000 | -0.002691759 | 0.000177252 |
| 10 | 0.000000000 | 0.000000000 | 0.000000000 |

MAXIMUM / MINIMUM SPAN SHEARS

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|
| 1 | 7270.87500 | 0.0000 | -12118.12500 | 276.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 376260.34880 | 103.9600 | -668920.50000 | 276.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.027768906 | 115.9200 |

**********

Roof Framing – West Face: 1 Span (24ft); Supports (Pinned, Fixed)

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 20,736 in$^3$

w = 843 lb/ft or 70.25 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 7587.00000 | 0.00000 |
| 2 | 0.00000 | 12645.00000 | -728352.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 7587.00000 | 0.00000 |
| 1 | 0.00000 | 5563.80000 | 189371.52000 |
| 2 | 0.00000 | 3540.60000 | 320474.88000 |
| 3 | 0.00000 | 1517.40000 | 393310.08000 |
| 4 | 0.00000 | -505.80000 | 407877.12000 |
| 5 | 0.00000 | -2529.00000 | 364176.00000 |
| 6 | 0.00000 | -4552.20000 | 262206.72000 |

| | | | |
|---|---|---|---|
| 7 | 0.00000 | -6575.40000 | 101969.28000 |
| 8 | 0.00000 | -8598.60000 | -116536.32000 |
| 9 | 0.00000 | -10621.80000 | -393310.08000 |
| 10 | 0.00000 | -12645.00000 | -728352.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | -0.000439721 |
| 2 | 0.000000000 | 0.000000000 | 0.000000000 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.000439721 |
| 1 | 0.000000000 | -0.012309362 | -0.000403664 |
| 2 | 0.000000000 | -0.022693804 | -0.000309563 |
| 3 | 0.000000000 | -0.029785618 | -0.000178527 |
| 4 | 0.000000000 | -0.032824966 | -0.000031660 |
| 5 | 0.000000000 | -0.031659883 | 0.000109930 |
| 6 | 0.000000000 | -0.026746269 | 0.000225137 |
| 7 | 0.000000000 | -0.019147897 | 0.000292854 |
| 8 | 0.000000000 | -0.010536409 | 0.000291974 |
| 9 | 0.000000000 | -0.003191316 | 0.000201392 |
| 10 | 0.000000000 | 0.000000000 | 0.000000000 |

MAXIMUM / MINIMUM SPAN SHEARS

==========

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|
| 1 | 7587.00000 | 0.0000 | -12645.00000 | 288.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

==========

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 409689.90720 | 108.4800 | -728352.00000 | 288.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

==========

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.032922469 | 120.9600.043414115 | 158.7892 |

**********

Roof Framing – West Face: 1 Span (31ft); Supports (Fixed, Fixed)

**********

F'c = 4,000 psi

Ec = 3,834,253 psi

$\delta$ = 150 lb/ft$^3$ or 0.0868 lb/in$^3$

I = 20,736 in$^3$

w = 843 lb/ft or 70.25 lb/in

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

**********

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 13066.50000 | 810123.00000 |
| 2 | 0.00000 | 13066.50000 | -810123.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 13066.50000 | -810123.00000 |
| 1 | 0.00000 | 10453.20000 | -372656.58000 |
| 2 | 0.00000 | 7839.90000 | -32404.92000 |
| 3 | 0.00000 | 5226.60000 | 210631.98000 |
| 4 | 0.00000 | 2613.30000 | 356454.12000 |
| 5 | 0.00000 | 0.00000 | 405061.50000 |

| | | | |
|---|---|---|---|
| 6 | 0.00000 | -2613.30000 | 356454.12000 |
| 7 | 0.00000 | -5226.60000 | 210631.98000 |
| 8 | 0.00000 | -7839.90000 | -32404.92000 |
| 9 | 0.00000 | -10453.20000 | -372656.58000 |
| 10 | 0.00000 | -13066.50000 | -810123.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

==========

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | 0.000000000 |
| 2 | 0.000000000 | 0.000000000 | 0.000000000 |

MEMBER DISPLACEMENTS (at even intervals along span length)

==========

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | 0.000000000 |
| 1 | 0.000000000 | -0.005710658 | -0.000272911 |
| 2 | 0.000000000 | -0.018048498 | -0.000363881 |
| 3 | 0.000000000 | -0.031091358 | -0.000318396 |
| 4 | 0.000000000 | -0.040609120 | -0.000181941 |
| 5 | 0.000000000 | -0.044063715 | 0.000000000 |
| 6 | 0.000000000 | -0.040609120 | 0.000181941 |
| 7 | 0.000000000 | -0.031091358 | 0.000318396 |
| 8 | 0.000000000 | -0.018048498 | 0.000363881 |
| 9 | 0.000000000 | -0.005710658 | 0.000272911 |
| 10 | 0.000000000 | 0.000000000 | 0.000000000 |

MAXIMUM / MINIMUM SPAN SHEARS

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|
| 1 | 13066.50000 | 0.0000 | -13066.50000 | 372.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 405061.50000 | 186.0000 | -810123.00000 | 372.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.044063715 | 186.0000 |

**********

Roof Framing

Perimeter Beam – West Face between Col. Line D-E

**********

Force = [lb] or [lb*in]

Displacement = [in] or [rad]

Location = [in]

SUPPORT JOINT REACTIONS (in direction of rotated joint axes)

==========

| JOINT | X-REACTION | Y-REACTION | Z-MOMENT |
|---|---|---|---|
| 1 | 0.00000 | 10944.00000 | 0.00000 |
| 2 | 0.00000 | 10944.00000 | 0.00000 |

MEMBER INTERNAL FORCES (at even intervals along span length)

==========

| SPAN 1 | AXIAL | SHEAR | MOMENT |
|---|---|---|---|
| 0 | 0.00000 | 10944.00000 | 0.00000 |
| 1 | 0.00000 | 8755.20000 | 283668.48000 |
| 2 | 0.00000 | 6566.40000 | 504299.52000 |
| 3 | 0.00000 | 4377.60000 | 661893.12000 |
| 4 | 0.00000 | 2188.80000 | 756449.28000 |
| 5 | 0.00000 | 0.00000 | 787968.00000 |
| 6 | 0.00000 | -2188.80000 | 756449.28000 |
| 7 | 0.00000 | -4377.60000 | 661893.12000 |
| 8 | 0.00000 | -6566.40000 | 504299.52000 |
| 9 | 0.00000 | -8755.20000 | 283668.48000 |

| | | | |
|---|---|---|---|
| 10 | 0.00000 | -10944.00000 | 0.00000 |

SUPPORT JOINT DISPLACEMENTS (in direction of rotated joint axes)

| JOINT | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 1 | 0.000000000 | 0.000000000 | -0.000951424 |
| 2 | 0.000000000 | 0.000000000 | 0.000951424 |

MEMBER DISPLACEMENTS (at even intervals along span length)

| SPAN 1 | X-DISPLACEMENT | Y-DISPLACEMENT | Z-ROTATION |
|---|---|---|---|
| 0 | 0.000000000 | 0.000000000 | -0.000951424 |
| 1 | 0.000000000 | -0.026880390 | -0.000898144 |
| 2 | 0.000000000 | -0.050856272 | -0.000753528 |
| 3 | 0.000000000 | -0.069625963 | -0.000540409 |
| 4 | 0.000000000 | -0.081545402 | -0.000281621 |
| 5 | 0.000000000 | -0.085628152 | 0.000000000 |
| 6 | 0.000000000 | -0.081545402 | 0.000281621 |
| 7 | 0.000000000 | -0.069625963 | 0.000540409 |
| 8 | 0.000000000 | -0.050856272 | 0.000753528 |
| 9 | 0.000000000 | -0.026880390 | 0.000898144 |
| 10 | 0.000000000 | 0.000000000 | 0.000951424 |

MAXIMUM / MINIMUM SPAN SHEARS

| SPAN | MAX SHEAR | LOCATION | MIN SHEAR | LOCATION |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | 10944.00000 | 0.0000 | -10944.00000 | 288.0000 |

MAXIMUM / MINIMUM SPAN MOMENTS

| SPAN | MAX MOMENT | LOCATION | MIN MOMENT | LOCATION |
|---|---|---|---|---|
| 1 | 787968.00000 | 144.0000 | 0.00000 | 288.0000 |

MAXIMUM / MINIMUM VERTICAL SPAN DEFLECTIONS

| SPAN | MAX DEFLECTION | LOCATION | MIN DEFLECTION | LOCATION |
|---|---|---|---|---|
| 1 | 0.000000000 | 0.0000 | -0.085628152 | 144.0000 |