EVERSOURCE ENERGY

56 Prospect Street,
P.O. Box 270
Hartford, CT 06103

Kathleen M. Shanley
Manager – Transmission Siting
Tel: (860) 728-4527

November 4, 2020

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification**
Eversource Site Danielson AWC
173 Mechanic Street, Killingly, CT 06239
Latitude: 41-48-40.6 N / Longitude: 71-53-1.6 W

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") currently maintains multiple antennas mounted at 77-feet above ground level ("AGL") on an existing tower located on the rooftop of the Eversource Danielson Area Work Center at 173 Mechanic Street in Killingly, CT. See Attachment A, Parcel Map and Property Card. The building and property are owned by Eversource. Eversource plans to install one 18-foot 6-inch tall omni-directional antenna on the existing tower; the top of the antenna will extend to approximately 95-feet 1-inch AGL. Two 7/8-inch diameter coaxial cables will be routed from the antenna into the existing building where it will terminate in an existing communications room. There will be no ground disturbance and no changes to the building, tower or the existing antennas and equipment. The existing and proposed antennas on the tower are depicted on Attachment B, Construction Drawings, dated October 1, 2020. The tower was approved by the Connecticut Siting Council on July 20, 2017 under Petition No. 1308.

The proposed installation is part of Eversource's program to update the current obsolete analog voice radio communications system to a modern digital voice communications system. The new system will enable the highest level of voice communications under all operating conditions, including during critical emergency and storm restoration activities. The new radio system will also provide for remote control of distribution safety equipment.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies ("R.C.S.A.") §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being delivered to Jason Anderson, Town Council Chairman for the Town of Killingly, Mary Calorio, Town Manager for the Town of Killingly, and Ann-Marie L. Aubrey, Director of Planning and Development for the Town of Killingly via private carrier. Proof of delivery is attached. See Attachment C, Proof of Delivery of Notice.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2):

1. There will be no change to the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the new antenna will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard as shown in the attached Radio Frequency Emissions Report, dated October 6, 2020 (Attachment D – Power Density Report).
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing tower and building can support the proposed loading as shown in the attached Structural Analyses. (Attachment E – Structural Analysis of Existing Building and Attachment F – Structural Analysis of Existing Tower).

For the foregoing reasons, Eversource respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Two copies of this notice and a check in the amount of $625 are enclosed.

Communications regarding this Notice of Exempt Modification should be directed to Kathleen Shanley at (860) 728-4527.

By: _____

Kathleen M. Shanley
Manager – Transmission Siting

cc: Honorable Jason Anderson, Town Council Chairman, Town of Killingly
Mary Calorio, Town Manager, Town of Killingly
Ann-Marie L. Aubrey, Director of Planning and Development, Town of Killingly

Attachments

A. Parcel Map and Property Card
B. Construction Drawings
C. Proof of Delivery of Notice
D. Power Density Report
E. Structural Analysis of Existing Building
F. Structural Analysis of Existing Tower

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD

Killingly, CT

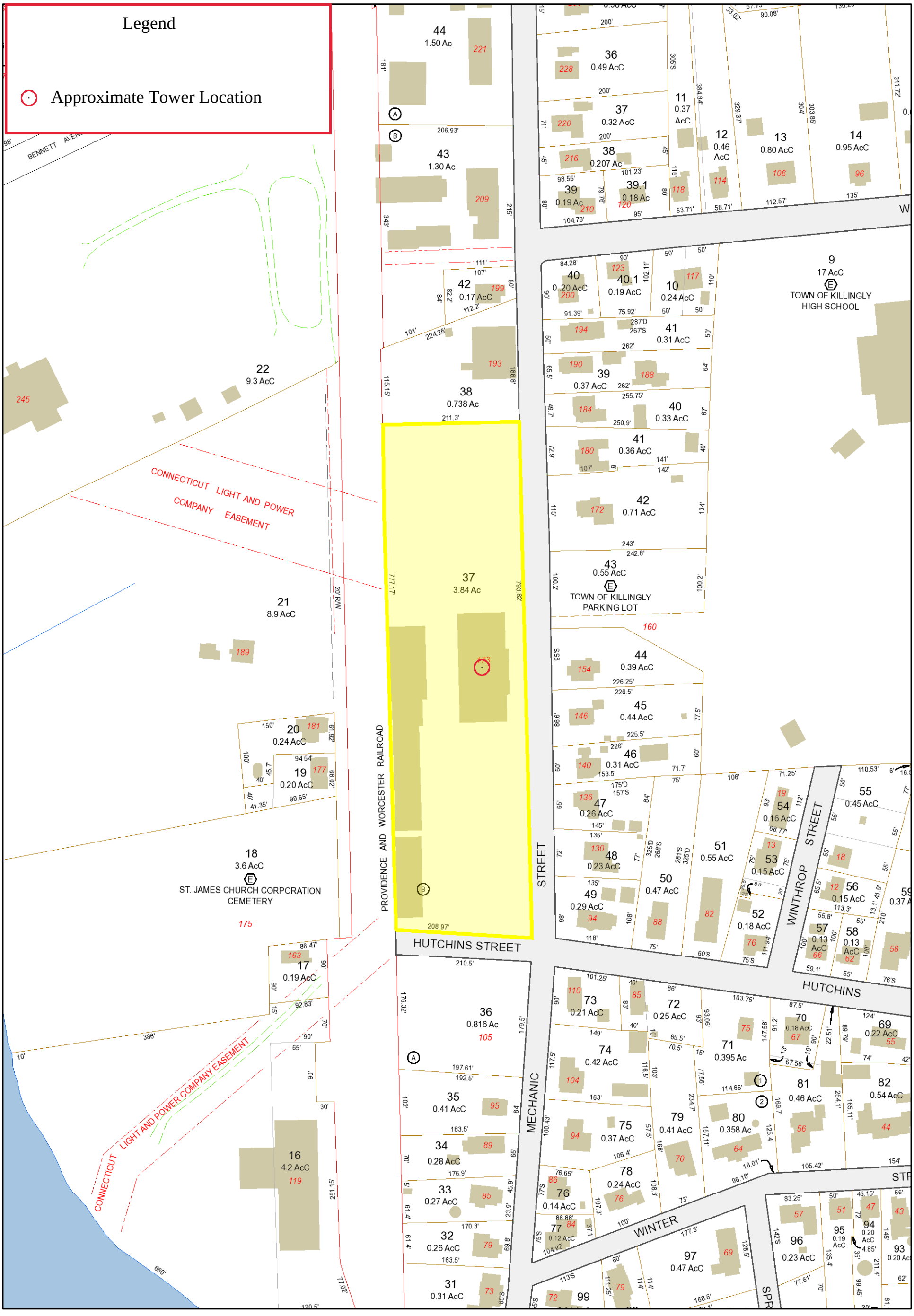
1 inch = 140 Feet

0 140 280 421

April 24, 2020

Legend

Approximate Tower Location



tyler clt division

COMMERCIAL PROPERTY RECORD CARD 2020

TOWN OF KILLINGLY

Situs : 173 MECHANIC ST | **Map ID: 001180** | **Class: General Office** | Card: 1 of 2 | Printed: February 19, 2020

CURRENT OWNER

YANKEE GAS SERVICES CO
PO BOX 270
HARTFORD CT 06141-0270

GENERAL INFORMATION

Living Units	
Neighborhood	305
Alternate Id	181-37
Vol / Pg	464/149
District	8
Zoning	BORO GENERAL COMMER
Class	UTILITIES

Property Notes

Land Information

Type		Size	Influence Factors	Influence %	Value
Primary	AC	3.8400			230,400

Total Acres: 3.84
Spot: Location:

Assessment Information

	Assessed	Appraised	Cost	Income	Market
Land	161,280	230,400	230,400	230,400	0
Building	677,670	968,100	943,300	968,100	0
Total	838,950	1,198,500	1,173,700	1,198,500	0

Manual Override Reason
Base Date of Value 10/01/2019
Value Flag INCOME APPROACH **Effective Date of Value** 10/01/2020
Gross Building:

Entrance Information

Date	ID	Entry Code	Source
12/13/06	LA	Complete	Tenant

Permit Information

Date Issued	Number	Price	Purpose		% Complete
11/09/17	25669	25,000	BLDG	Nvc Repl Retaining Wall	997
10/24/17	25638	117,350	83 CROF	Nvc Roof Repr	997
07/23/14	23070	85,679	89 CA/C	Hvac Upgrade To Existing Bldg & A	997
06/27/14	23024	96,000	81 CELE	Nvc New Elec Svc On Rear Bldg	997
06/04/14	22966	31,000	85 CPLM	Plumbing Per Plan Specs For Reno	996

Sales/Ownership History

Transfer Date	Price	Type	Validity	Deed Reference	Deed Type	Grantee

Inspection Witnessed By _____

tyler
clt division

COMMERCIAL PROPERTY RECORD CARD 2020

TOWN OF KILLINGLY

Situs : 173 MECHANIC ST	Parcel Id: 001180	Class: General Office	Card: 1 of 2	Printed: February 19, 2020

Building Information

Year Built/Eff Year	1955 /
Building #	1
Structure Type	Office Bldg L/R 1-4s
Identical Units	1
Total Units	1
Grade	C+
# Covered Parking	
# Uncovered Parking	
DBA	

Building Other Features

Line	Type	+/-	Meas1	Meas2	# Stops	Ident Units	Line	Type	+/-	Meas1	Meas2	# Stops	Ident Units
3	Canopy Only		202	1		1							
3	Load Dock,St Or Conc		112	1		1							
3	Porch, Open		45	1		2							
1	Load Dock,St Or Conc		1	112		1							

Interior/Exterior Information

Line	Level From	To	Int Fin	Area	Perim	Use Type	Wall Height	Ext Walls	Construction	Partitions	Heating	Cooling	Plumbing	Physical	Functional
1	B1	B1	100	1,750	120	Multi-Use Office	8	None	Wood Frame/Joist/B	Normal	Hot Air	Central	Normal	3	2
2	B1	B1	100	1,750	120	Support Area	8	None	Wood Frame/Joist/B	Normal	None	None	Normal	3	3
3	01	01	100	11,048	391	Offices	12	Brick Venee	Wood Frame/Joist/B	Normal	Hot Air	Central	Normal	3	3
4	01	01	100	1,590	166	Offices	14	Brick Venee	Wood Frame/Joist/B	Normal	Hot Air	Central	Normal	3	3

Interior/Exterior Valuation Detail

Line	Area	Use Type	% Good	% Complete	Use Value/RCNLD
1	1,750	Multi-Use Office	40		57,630
2	1,750	Support Area	45		26,970
3	11,048	Offices	45		551,890
4	1,590	Offices	45		99,540

Outbuilding Data

Line	Type	Yr Blt	Meas1	Meas2	Qty	Area	Grade	Phy	Fun	Value
1	Gar Fin At	1985	40	125	1	5,000	C	3	3	98,050
2	Asph Pav	1955			1	60,000	C	3	3	64,800
3	Fence Chai	1955			1	11,200	C	3	3	13,860

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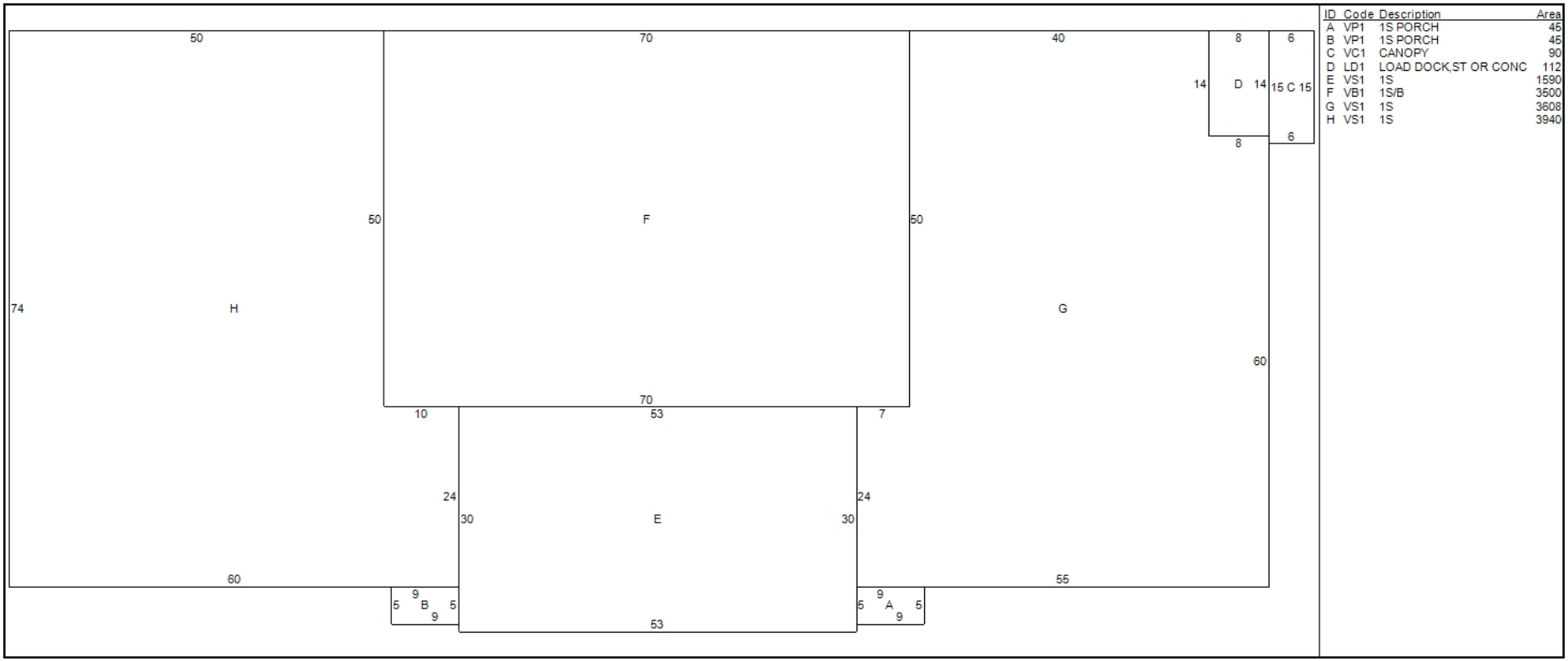
COMMERCIAL PROPERTY RECORD CARD 2020

TOWN OF KILLINGLY

Situs : 173 MECHANIC ST	Parcel Id: 001180	Class: General Office	Card: 1 of 2	Printed: February 19, 2020



ID	Code	Description	Area
A	VP1	1S PORCH	45
B	VP1	1S PORCH	45
C	VC1	CANOPY	90
D	LD1	LOAD DOCK,ST OR CONC	112
E	VS1	1S	1590
F	VB1	1S/B	3500
G	VS1	1S	3608
H	VS1	1S	3940

Addtional Property Photos

tyler clt division

COMMERCIAL PROPERTY RECORD CARD 2020

TOWN OF KILLINGLY

Situs : 173 MECHANIC ST	Parcel Id: 001180	Class: General Office	Card: 1 of 2	Printed: February 19, 2020

Income Detail (Includes all Buildings on Parcel)

Use Grp	Mod Type	Inc Mod	Model Description	Units	Net Area	Income Rate	Econ Adjust	Potential Gross Income	Vac Model	Vac Adj	Additional Income	Effective Gross Income	Expense Model %	Expense Adj %	Expense Adj	Other Expenses	Total Expenses	Net Operating Income
00	S	001	Support Or Municipal Prope	0	1,750						0							
04	S	001	General Office	0	12,638	12.00	75	113,742	15		0	96,681	30			29,004	29,004	67,677
07	S	003	Light Manuf/Warehouse	0	13,952	4.50		62,784	15		0	53,366	15			8,005	8,005	45,361
22	S	001	Multi Use Office	0	2,400	8.50		20,400	12.5		0	17,850	35			6,248	6,248	11,602

Apartment Detail - Building 1 of 2

Line	Use Type	Per Bldg	Beds	Baths	Units	Rent	Income

Building Cost Detail - Building 1 of 2

Total Gross Building Area	16,138
Replace, Cost New Less Depr	736,030
Percent Complete	100
Number of Identical Units	1
Economic Condition Factor	75
Final Building Value	552,023
Value per SF	34.21

Notes - Building 1 of 2

Income Summary (Includes all Building on Parcel)

Total Net Income	124,640
Capitalization Rate	0.104000
Sub total	1,198,460
Residual Land Value	
Final Income Value	1,198,460
Total Gross Rent Area	28,990
Total Gross Building Area	30,740

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COMMERCIAL PROPERTY RECORD CARD 2020

TOWN OF KILLINGLY

Situs : 173 MECHANIC ST	Map ID: 001180	Class: General Office	Card: 2 of 2	Printed: February 19, 2020

CURRENT OWNER

YANKEE GAS SERVICES CO
PO BOX 270
HARTFORD CT 06141-0270

GENERAL INFORMATION

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Alternate Id	181-37
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Total	838,950	1,198,500	1,173,700	1,198,500	0

Value Flag: INCOME APPROACH
Gross Building:
Manual Override Reason
Base Date of Value: 10/01/2019
Effective Date of Value: 10/01/2020

Entrance Information

Date	ID	Entry Code	Source
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07/23/14	23070	85,679	89 CA/C	Hvac Upgrade To Existing Bldg & A	997
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Inspection Witnessed By _____

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COMMERCIAL PROPERTY RECORD CARD 2020

TOWN OF KILLINGLY

Situs : 173 MECHANIC ST	Parcel Id: 001180	Class: General Office	Card: 2 of 2	Printed: February 19, 2020

Building Information

Year Built/Eff Year	1955 /
Building #	2
Structure Type	Truck Terminal
Identical Units	1
Total Units	1
Grade	C
# Covered Parking	
# Uncovered Parking	
DBA	

Building Other Features

Line	Type	+/-	Meas1	Meas2	# Stops	Ident Units
1	Canopy Only		312	1		1
1	Load Dock,St Or Conc		2,080	1		1
1	Loading Dock, Wood		312	1		1
1	Dock Levelers					1
1	Overhead Dr-Wood/Mtl		8	8		1
1	Overhead Dr-Wood/Mtl		10	12		3
1	Load Dock,St Or Conc		1	312		1

Line	Type	+/-	Meas1	Meas2	# Stops	Ident Units
1	Load Dock,St Or Conc		1	2,080		1

Interior/Exterior Information

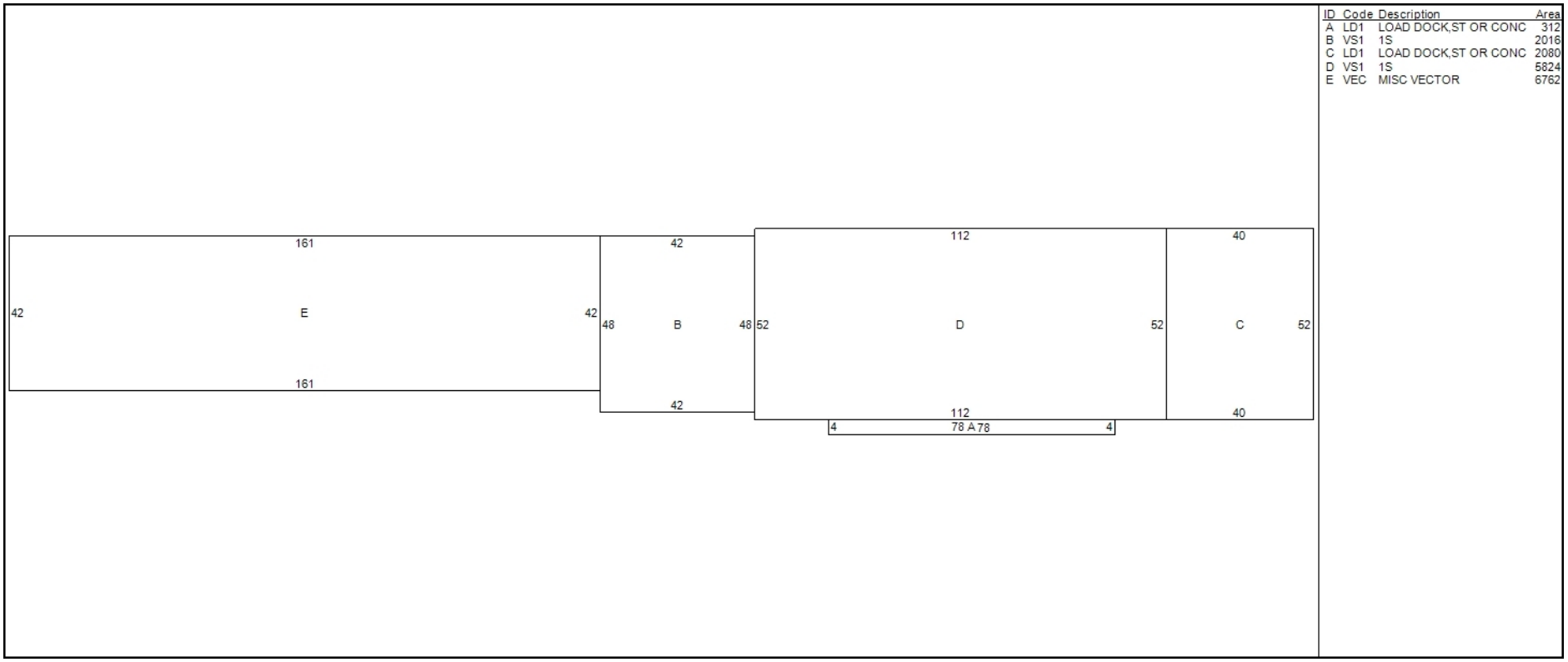
Line	Level	From - To	Int Fin	Area	Perim	Use Type	Wall Height	Ext Walls	Construction	Partitions	Heating	Cooling	Plumbing	Physical	Functional
1	01	01	100	6,762	364	Warehouse	12	Concrete Bl	Wood Frame/Joist/B	Normal	None	None	Normal	3	3
2	01	01	100	2,016	180	Warehouse	16	Brick Venee	Wood Frame/Joist/B	Normal	None	None	Normal	3	3
3	01	01	100	650	31	Multi-Use Office	10	Frame	Wood Frame/Joist/B	Normal	None	None	Normal	2	3
4	01	01	100	5,174	245	Warehouse	10	Frame	Wood Frame/Joist/B	Normal	None	None	Normal	3	3

Interior/Exterior Valuation Detail

Line	Area	Use Type	% Good	% Complete	Use Value/RCNLD
1	6,762	Warehouse	45		176,910
2	2,016	Warehouse	45		57,230
3	650	Multi-Use Office	40		19,370
4	5,174	Warehouse	45		90,670

Outbuilding Data

Line	Type	Yr Blt	Meas1	Meas2	Qty	Area	Grade	Phy	Fun	Value
1	Br/St Shed	1955	1	121	1	121	C	3	3	870



ID	Code	Description	Area
A	LD1	LOAD DOCK,ST OR CONC	312
B	VS1	1S	2016
C	LD1	LOAD DOCK,ST OR CONC	2080
D	VS1	1S	5824
E	VEC	MISC VECTOR	6762

Addtional Property Photos

tyler clt division

COMMERCIAL PROPERTY RECORD CARD 2020

TOWN OF KILLINGLY

Situs : 173 MECHANIC ST	Parcel Id: 001180	Class: General Office	Card: 2 of 2	Printed: February 19, 2020

Income Detail (Includes all Buildings on Parcel)

Use Grp	Mod Type	Inc Mod	Model Description	Units	Net Area	Income Rate	Econ Adjust	Potential Gross Income	Vac Model	Vac Adj	Additional Income	Effective Gross Income	Expense Model %	Expense Adj %	Expense Adj	Other Expenses	Total Expenses	Net Operating Income
00	S	001	Support Or Municipal Prope	0	1,750						0							
04	S	001	General Office	0	12,638	12.00	75	113,742	15		0	96,681	30			29,004	29,004	67,677
07	S	003	Light Manuf/Warehouse	0	13,952	4.50		62,784	15		0	53,366	15			8,005	8,005	45,361
22	S	001	Multi Use Office	0	2,400	8.50		20,400	12.5		0	17,850	35			6,248	6,248	11,602

Apartment Detail - Building 2 of 2

Line	Use Type	Per Bldg	Beds	Baths	Units	Rent	Income

Building Cost Detail - Building 2 of 2

Total Gross Building Area	14,602
Replace, Cost New Less Depr	344,180
Percent Complete	100
Number of Identical Units	1
Economic Condition Factor	75
Final Building Value	258,135
Value per SF	17.68

Notes - Building 2 of 2

Income Summary (Includes all Building on Parcel)

Total Net Income	124,640
Capitalization Rate	0.104000
Sub total	1,198,460
Residual Land Value	
Final Income Value	1,198,460
Total Gross Rent Area	28,990
Total Gross Building Area	30,740

ATTACHMENT B – CONSTRUCTION DRAWINGS

EVERSOURCE ENERGY

DANIELSON WORK CENTER
173 MECHANIC STREET
KILLINGLY, CT 06239

PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. REMOVE EXISTING OMNI/WHIP ANTENNA AT ELEVATION 97'–0" AGL
2. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 95'–1"± AGL
3. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING TELECOM ROOM

GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)
2017 NATIONAL ELECTRIC CODE
TIA–222–H

GENERAL NOTES

A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SITE INFORMATION

SITE NAME:	DANIELSON WORK CENTER
SITE ADDRESS:	173 MECHANIC STREET KILLINGLY, CT 06239
MAP:	181
LOT: ZONE:	037 BORO GENERAL COMMER
LATITUDE: LONGITUDE: ELEVATION:	41° 48' 40.6" N 71° 53' 1.6" W 239'± AMSL
FEMA/FIRM DESIGNATION: ACREAGE:	C 3.84± AC (BOOK: 464, PAGE: 149)

CONTACT INFORMATION

APPLICANTS:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

PROPERTY OWNER:
EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037

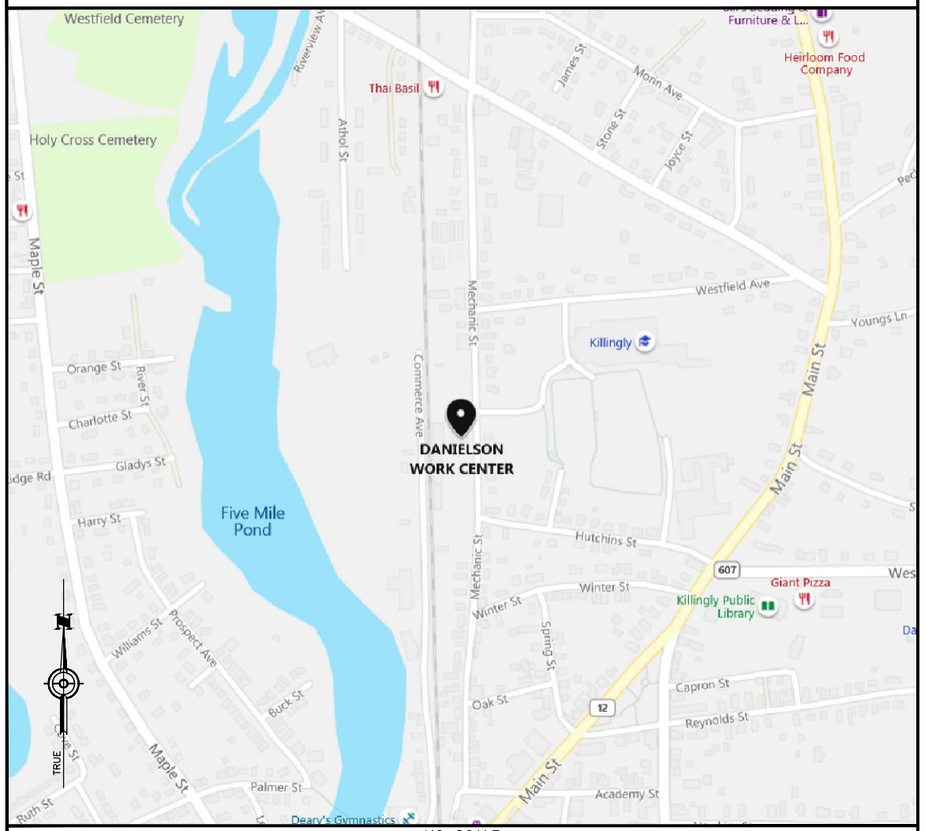
EVERSOURCE ENERGY
PROJECT MANAGER:
NIKOLL PRECI
(860) 655–3079

POWER PROVIDER:
EVERSOURCE ENERGY
(800) 286–2000

TELCO PROVIDER:
FRONTIER
(800) 921–8102

CALL BEFORE YOU DIG:
(800) 922–4455

LOCATION MAP



NO SCALE

DESIGN TYPE

SITE UPGRADE
MONOPOLE

DRAWING INDEX

SHEET NO:	SHEET TITLE
T–1	TITLE SHEET
C–1	ROOFTOP PLAN
C–2	TOWER ELEVATION
G–1	GROUNDING DETAILS
N–1	NOTES & SPECIFICATIONS
N–2	NOTES & SPECIFICATIONS
N–3	NOTES & SPECIFICATIONS

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

UNDERGROUND SERVICE ALERT

UTILITIES PROTECTION CENTER, INC.
811

48 HOURS BEFORE YOU DIG

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286–2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458–3595

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	CAG

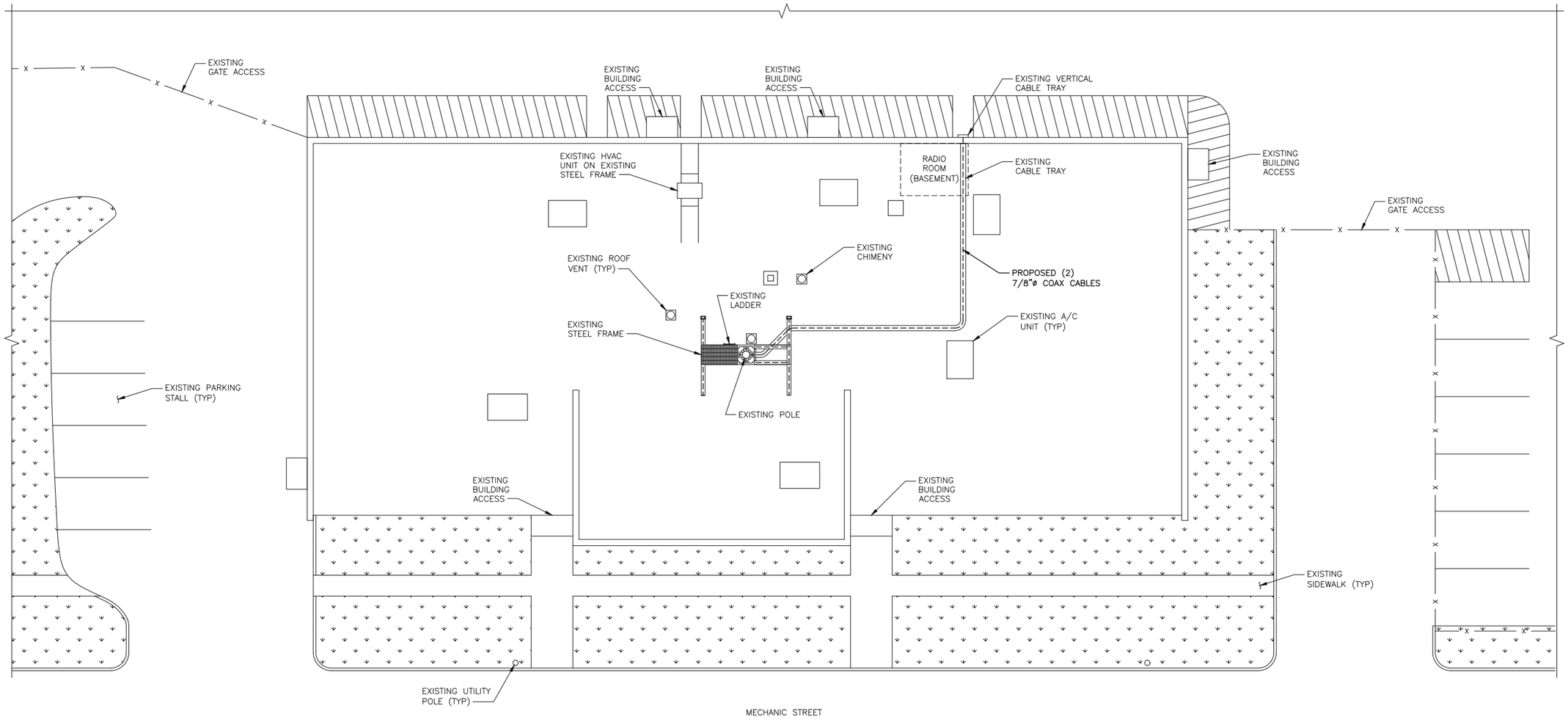
REV	DATE	DESCRIPTION
0	10/01/20	ISSUED FOR FILING

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
10/01/2020

DANIELSON WORK CENTER
173 MECHANIC STREET
KILLINGLY, CT 06239

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



ROOFTOP PLAN

NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
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STATE OF CONNECTICUT
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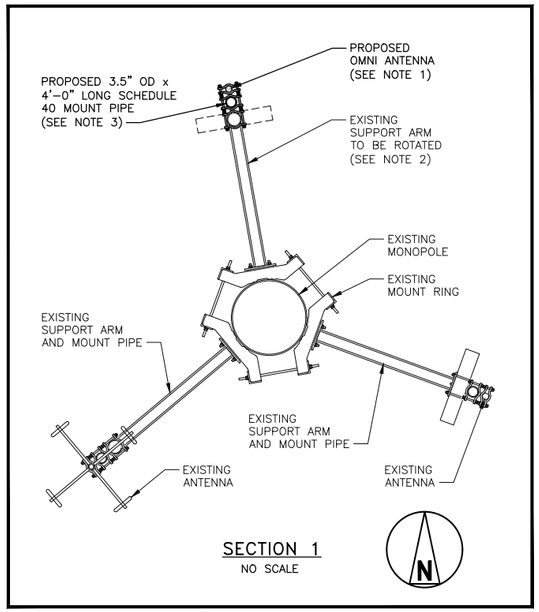
DANIELSON WORK CENTER
173 MECHANIC STREET
KILLINGLY, CT 06239

SHEET TITLE

ROOFTOP PLAN

SHEET NUMBER

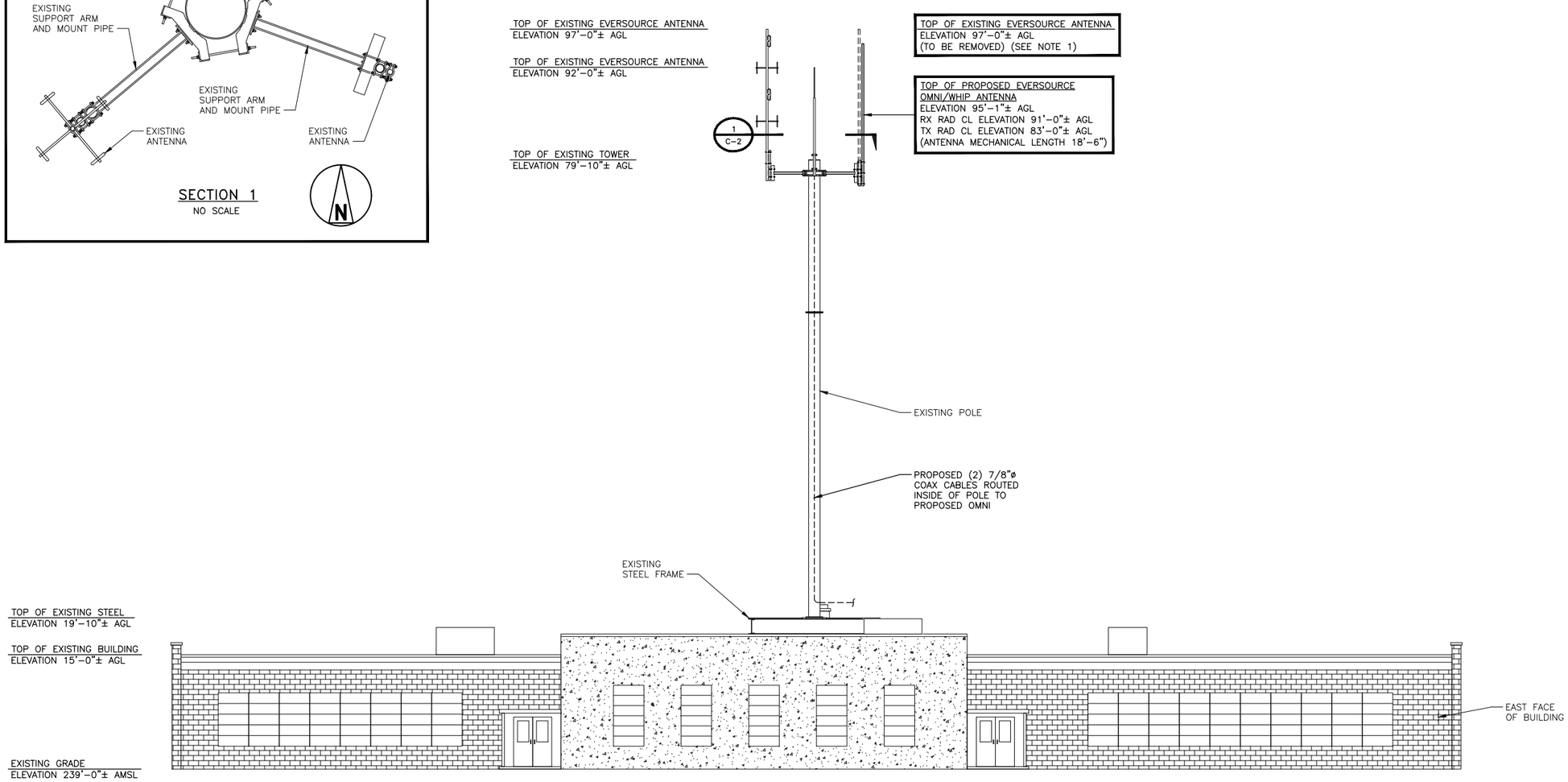
C-1



SECTION 1
NO SCALE

NOTES

1. REMOVE (1) EXISTING OMNI ANTENNA AT THE 97'-0"± ELEVATION, ITS ASSOCIATED MOUNT PIPE, CLAMPING HARDWARE, AND FEEDLINES.
2. ROTATE EXISTING SUPPORT ARM 90°, ALIGNING ITS PIPE MEMBER VERTICALLY. THIS CONFIGURATION WILL PROVIDE TWO CONNECTION POINTS FOR THE VERTICAL PROPOSED MOUNT PIPE. EXISTING FASTENERS CANNOT BE REUSED AND MUST BE REPLACED WITH NEW HEX BOLTS, WASHERS, AND HEX NUTS.
3. ATTACH PROPOSED MOUNT PIPE TO PROPOSED SUPPORT ARM USING CLAMP SET SITE PRO 1 DCP12K (TOTAL OF 1 SET).



TOWER ELEVATION
NO SCALE

EVERSOURCE ENERGY
107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-3595

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	CAG

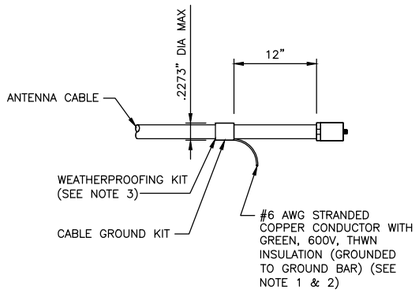
REV	DATE	DESCRIPTION
0	10/01/20	ISSUED FOR FILING

10/01/2020

DANIELSON WORK CENTER
173 MECHANIC STREET
KILLINGLY, CT 06239

SHEET TITLE
TOWER ELEVATION

SHEET NUMBER
C-2

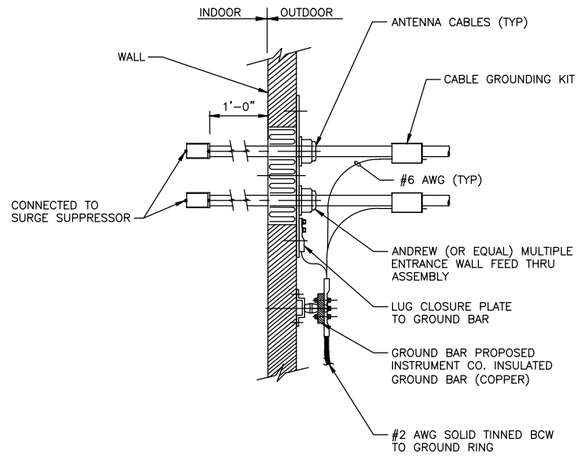


NOTES

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NO SCALE



CABLE INSTALLATION WITH WALL FEED THRU ASSEMBLY

NO SCALE

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PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	10/01/20	ISSUED FOR FILING

10/01/2020

DANIELSON WORK CENTER
173 MECHANIC STREET
KILLINGLY, CT 06239

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

G-1

DESIGN BASIS

1. GOVERNING CODE: 2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS).

GENERAL CONDITIONS

1. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL BUILDING CODES, PERMIT CONDITIONS AND SAFETY CODES DURING CONSTRUCTION.

2. THE ENGINEER IS NOT: A GUARANTOR OF THE INSTALLING CONTRACTOR'S WORK; RESPONSIBLE FOR SAFETY IN, ON OR ABOUT THE WORK SITE; IN CONTROL OF THE SAFETY OR ADEQUACY OF ANY BUILDING COMPONENT, SCAFFOLDING OR SUPERINTENDING THE WORK.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL PERMITS, INSPECTIONS, TESTING AND CERTIFICATES NEEDED FOR LEGAL OCCUPANCY OF THE FINISHED PROJECT.

4. THE CONTRACTOR IS RESPONSIBLE TO REVIEW THIS COMPLETE PLAN SET AND VERIFY THE EXISTING CONDITIONS SHOWN IN THESE PLANS AS THEY RELATE TO THE WORK PRIOR TO SUBMITTING PRICE. SIGNIFICANT DEVIATIONS FROM WHAT IS SHOWN AFFECTING THE WORK SHALL BE REPORTED IMMEDIATELY TO THE CONSTRUCTION MANAGER.

5. DETAILS INCLUDED IN THIS PLAN SET ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS.

6. EXISTING ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING, AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.

7. THE CONTRACTOR SHALL DILIGENTLY PROTECT THE EXISTING BUILDING/SITE CONDITIONS AND THOSE OF ANY ADJOINING BUILDING/SITES AND RESTORE ANY DAMAGE CAUSED BY HIS ACTIVITIES TO THE PRE-CONSTRUCTION CONDITION.

8. THE CONTRACTOR SHALL SAFEGUARD AGAINST: CREATING A FIRE HAZARD, AFFECTING TENANT EGRESS OR COMPROMISING BUILDING SITE SECURITY MEASURES.

9. THE CONTRACTOR SHALL REMOVE ALL DEBRIS AND CONSTRUCTION WASTE FROM THE SITE EACH DAY. WORK AREAS SHALL BE SWEPT AND MADE CLEAN AT THE END OF EACH WORK DAY.

10. THE CONTRACTOR'S HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY OWNER.

11. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER IF ASBESTOS IS ENCOUNTERED DURING THE EXECUTION OF HIS WORK. THE CONTRACTOR SHALL CEASE ALL ACTIVITIES WHERE THE ASBESTOS MATERIAL IS FOUND UNTIL NOTIFIED BY THE CONSTRUCTION MANAGER TO RESUME OPERATIONS.

THERMAL & MOISTURE PROTECTION

1. FIRE-STOP ALL PENETRATIONS FOR ELECTRICAL CONDUITS OR WAVEGUIDE CABLING THROUGH BUILDING WALLS, FLOORS, AND CEILINGS SHALL BE FIRESTOPPED WITH ACCEPTED MATERIALS TO MAINTAIN THE FIRE RATING OF THE EXISTING ASSEMBLY. ALL FILL MATERIAL SHALL BE SHAPED, FITTED, AND PERMANENTLY SECURED IN PLACE. FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH ASTM E814.

2. HILTI CP620 FIRE FOAM OR 3M FIRE BARRIER FILL, VOID OR CAVITY MATERIAL OR ACCEPTED EQUAL SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ASSOCIATED UNDERWRITERS LABORATORIES (UL) SYSTEM NUMBER.

3. FIRESTOPPING SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER PENETRATIONS ARE MADE AND EQUIPMENT INSTALLED.

4. FIRESTOPPED PENETRATIONS SHALL BE LEFT EXPOSED AND MADE AVAILABLE FOR INSPECTION BEFORE CONCEALING SUCH PENETRATIONS. FIRESTOPPING MATERIAL CERTIFICATES SHALL BE MADE AVAILABLE AT THE TIME OF INSPECTION.

5. ANY BUILDING ROOF PENETRATION AND/OR RESTORATION SHALL BE PERFORMED SO THAT THE ROOF WARRANTY IN PLACE IS NOT COMPROMISED. CONTRACTOR SHALL ARRANGE FOR OWNER'S ROOFING CONTRACTOR TO PERFORM ANY AND ALL ROOFING WORK IF SO REQUIRED BY EXISTING ROOF WARRANTY. OTHERWISE, ROOF SHALL BE MADE WATERTIGHT WITH LIKE CONSTRUCTION AS SOON AS PRACTICABLE AND AT COMPLETION OF CONSTRUCTION.

6. ALL PENETRATIONS INTO AND/OR THROUGH BUILDING EXTERIOR WALLS SHALL BE SEALED WITH SILICONE SEALER.

7. WHERE CONDUIT AND CABLES PENETRATES FIRE RATED WALLS AND FLOORS, FIRE GROUT ALL PENETRATIONS IN ORDER TO MAINTAIN THE FIRE RATING USING A LISTED FIRE SEALING DEVICE OR GROUT.

8. CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

SUBMITTALS

1. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.

2. CONTRACTOR TO NOTIFY ENGINEER FOR INSPECTION PRIOR TO CLOSING PENETRATIONS.

3. CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

4. ALL STEEL MATERIAL EXPOSED TO WEATHER SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 " ZINC (HOT-DIPPED GALVANIZED) COATINGS" ON IRON AND STEEL PRODUCTS.

5. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS FOR REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

STEEL

1. MATERIAL:

WIDE FLANGE:	ASTM A572, GR 50
TUBING:	ASTM A500, GR C
PIPE:	ASTM A53, GR B AND ASTM A572, GR 50
ANGLE:	ASTM A570, GR 50 AND ASTM A36
BOLTS:	ASTM A325
GRATING:	TYPE GW-2 (1"x3/16" BARS)
MISC. MATERIAL:	ASTM A36

ALL STEEL SHAPES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 WITH A COATING WEIGHT OF 2 OZ/SF.

2. DAMAGED GALVANIZED SURFACES SHALL BE CLEANED WITH A WIRE BRUSH AND PAINTED WITH TWO COATS OF COLD ZINC, "GALVANOX", "DRY GALV", "ZINC IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. TOUCH UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT IN SHOP OR FIELD.

3. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.

4. THE STEEL STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.

5. ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.

6. TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

CONNECTIONS

1. CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND CONSTRUCTED IN ACCORDANCE WITH THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION. CONNECTIONS SHALL BE PROVIDED TO CONFORM TO THE REQUIREMENTS OF TYPE 2 CONSTRUCTION UNLESS OTHERWISE DETAILED. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.

2. DESIGN CONNECTIONS AT BEAM ENDS FOR 10 KIPS (MIN).

3. ALL BUILDING CONNECTION POINTS ARE TO BE CENTERED OVER BEARING WALLS

4. CONNECTIONS SHALL BE MADE USING ASTM A325 BOLTS (SNUG TIGHT OR SLIP CRITICAL) OR WELDS. IF TENSION CONTROL BOLTS ARE USED, CONNECTIONS SHALL BE DESIGNED FOR SLIP CRITICAL BOLT ALLOWABLE LOAD VALUES.

5. NUT LOCKING DEVICES ARE REQUIRED FOR ALL BOLT ASSEMBLIES.

6. GRATING SHALL BE ATTACHED USING FOR GRATING CLAMPS OR 1/4 INCH FILLET WELDS. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY BE 5/8" DIAMETER GALVANIZED ASTM A307 BOLTS UNLESS OTHERWISE NOTED.

7. ALL BOLTS, ANCHORS, AND MISCELLANEOUS HARDWARE EXPOSED TO WEATHER SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE."

SITE GENERAL

1. CONTRACTOR SHALL FOLLOW CONDITIONS OF ALL APPLICABLE PERMITS AND WORK IN ACCORDANCE WITH OSHA REGULATIONS.

2. THESE PLANS DEPICT KNOWN UNDERGROUND STRUCTURES, CONDUITS, AND/OR PIPELINES. THE LOCATIONS FOR THESE ELEMENTS ARE BASED UPON THE VARIOUS RECORD DRAWINGS AVAILABLE. THE CONTRACTOR IS HEREBY ADVISED THAT THESE DRAWINGS MAY NOT ACCURATELY DEPICT AS-BUILT LOCATIONS AND OTHER UNKNOWN STRUCTURES. THE CONTRACTOR SHALL THEREFORE DETERMINE THE EXACT LOCATION OF EXISTING UNDERGROUND ELEMENTS AND EXCAVATE WITH CARE AFTER CALLING MARKOUT SERVICE AT 1-800-272-4480 48 HOURS BEFORE DIGGING, DRILLING OR BLASTING.

3. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UTILITIES WHERE ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION, SHALL BE RELOCATED AS DIRECTED BY ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL HAND DIG UTILITIES AS NEEDED. CONTRACTOR SHALL PROVIDE, BUT IS NOT LIMITED TO, APPROPRIATE A) FALL PROTECTION, B) CONFINED SPACE ENTRY, C) ELECTRICAL SAFETY, AND D) TRENCHING AND EXCAVATION.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, OR OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF THE CONSTRUCTION MANAGER.

6. CONTRACTOR IS RESPONSIBLE FOR REPAIRING OR REPLACING STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION.

7. CONTRACTOR SHALL PROTECT EXISTING PAVED AND GRAVEL SURFACES, CURBS, LANDSCAPE AND STRUCTURES AND RESTORE SITE OR PRE-CONSTRUCTION CONDITION WITH AS GOOD, OR BETTER, MATERIALS. NEW MATERIALS SHALL MATCH EXISTING THICKNESS AND TYPE.

8. THE CONTRACTOR SHALL SHORE ALL TRENCH EXCAVATIONS GREATER THAN 5 FEET IN DEPTH OR LESS WHERE SOIL CONDITIONS ARE DEEMED UNSTABLE. ALL SHEETING AND/OR SHORING METHODS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.

9. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING GROUNDWATER LEVELS IN THE VICINITY OF EXCAVATIONS TO PROTECT ADJACENT PROPERTIES AND NEW WORK. GROUNDWATER SHALL BE DRAINED IN ACCORDANCE WITH LOCAL SEDIMENTATION AND EROSION CONTROL GUIDELINES.

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LICENSED PROFESSIONAL ENGINEER
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ELECTRICAL

1. CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.
2. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION. WHERE A CONFLICT EXISTS BETWEEN CODES, PLAN AND SPECIFICATIONS, OR AUTHORITIES HAVING JURISDICTION, THE MORE STRINGENT AUTHORITIES SHALL APPLY.
3. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC, FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.
4. ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.
5. CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.
6. ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.
7. PROVIDE FLEXIBLE STEEL CONDUIT OR LIQUID TIGHT FLEXIBLE STEEL CONDUIT TO ALL VIBRATING EQUIPMENT, INCLUDING HVAC UNITS, TRANSFORMERS, MOTORS, ETC, OR WHERE EQUIPMENT IS PLACED UPON A SLAB ON GRADE.
8. ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.
9. CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.
10. ELECTRICAL MATERIALS INSTALLED ON ROOFTOP SHALL BE LISTED FOR NEMA 3R USE. –AND ALL WIRING WITHIN A VENTILATION DUCT SHALL BE LISTED FOR SUCH USE. IN GENERAL WIRING METHODS WITHIN A DUCT SHALL BE AN MC CABLE WITH SMOOTH OR CORRUGATED METAL JACKET AND HAVE NO OUTER COVERING OVER THE METAL JACKET. INTERLOCKED ARMOR TYPE OF MC CABLE IS NOT ACCEPTABLE FOR THIS APPLICATION. CONTRACTOR CAN ALSO USE TYPE MI CABLE IN THE VENTILATION DUCT PROVIDED IT DOES NOT HAVE ANY OUTER COVERINGS OVER THE METAL EXTERIOR.
11. WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.
12. GROUNDING SYSTEM RESISTANCE SHALL BE MEASURED, RECORDED, AND DATED USING MEGGER DET14 OR SIMILAR INSTRUMENT. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION.
13. COORDINATE WITH BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK INVOLVING EXISTING SYSTEMS OR EQUIPMENT IN ORDER TO DETERMINE THE EFFECT, IF ANY, ON OTHER TENANTS WITHIN THE BUILDING, AND TO DETERMINE THE APPROPRIATE TIME FOR PERFORMING THIS WORK.
14. THE CONTRACTOR SHALL BE REQUIRED TO VISIT THE SITE PRIOR TO SUBMITTING BID IN ORDER TO DETERMINE THE EXTENT OF THE EXISTING CONDITIONS.
15. ALL CONDUCTOR ENDS SHALL BE TAGGED AND ELECTRICAL EQUIPMENT LABELED WITH ENGRAVED IDENTIFICATION PLATES.
16. CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL WIRING AND ALARM TIE–INS.

GROUNDING

1. #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
2. #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
3. #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.
4. ALL LUGS SHALL BE 2–HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE OR EQUIVALENT (IE #2 THWN – 54856BE, #2 SOLID – 54856BE, AND #6 THWN – 54852BE).
5. ALL HARDWARE, BOLTS, NUTS, AND WASHERS SHALL BE 18–8 STAINLESS STEEL. EVERY CONNECTION SHALL BE BOLT–FLAT WASHER–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT IN THAT EXACT ORDER. BACK–TO–BACK LUGGING, BOLT–FLAT WASHER–LUG–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT, IN THAT EXACT ORDER, IS ACCEPTED WHERE NECESSARY TO CONNECT MANY LUGS TO A BUSS BAR. STACKING OF LUGS, BUSS–LUG–LUG, IS NOT ACCEPTABLE.
6. WHERE CONNECTIONS ARE MADE TO STEEL OR DISSIMILAR METALS, A THOMAS AND BETTS DRAGON TOOTH WASHER MODEL DTWXXX SHALL BE USED BETWEEN THE LUG AND THE STEEL, BOLT–FLAT WASHER–STEEL–DRAGON TOOTH WASHER–LUG–FLAT WASHER–BELEVILE WASHER–NUT.
7. ALL CONNECTIONS, INTERIOR AND EXTERIOR, SHALL BE MADE WITH THOMAS AND BETTS KPOR–SHIELD. COAT ALL WIRES BEFORE LUGGING AND COAT ALL SURFACES BEFORE CONNECTING.
8. THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.
9. ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.
10. BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.
11. GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2–HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.
12. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.
13. GROUND BARS SHALL BE FURNISHED AND INSTALLED WITH PRE–DRILLED HOLE DIAMETERS AND SPACINGS. GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED. GROUND LUGS SHALL MATCH THE SPACING ON THE BAR. HARDWARE DIAMETER SHALL BE MINIMUM 3.8 INCH.
14. MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.
15. ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

CABLE TRAY

1. CABLE TRAY SHALL BE MADE OF EITHER CORROSION RESISTANT METAL OR WITH A CORROSION RESISTANT FINISH.
2. CABLE TRAY SHALL BE OF LADDER TRAY TYPE WITH FLAT COVER CLAMPED TO SIDE RAILS.
3. CABLE LADDER SHALL BE SIZED TO FIT ALL CABLES IN ACCORD WITH NEC AND NEMA 11–15–84.
4. CABLE LADDER TRAYS SHALL BE NEMA CLASS 12A BY PW INDUSTRIES, INC OR EQUAL.
5. CABLE LADDER TRAY SHALL BE SUPPORTED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
6. ALL WORKMANSHIP SHALL CONFORM TO THESE REQUIREMENTS AND ALL LOCAL CODES AND STANDARDS TO ENSURE SAFE AND ADEQUATE GROUNDING SYSTEM.

ANTENNA & CABLE NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNTS AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE UPON DELIVERY. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER COORDINATE LENGTH OF JUMP CABLES WITH EVERSOURCE. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH EVERSOURCE PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.
2. AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE PIM/SWEEP TESTED FOR PROPER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR TO OBTAIN LATEST TESTING PROCEDURES FROM EVERSOURCE PRIOR TO BIDDING.
3. ANTENNA CABLES SHALL BE COLOR CODED AT THE FOLLOWING LOCATIONS:
   – AT THE ANTENNAS.
   – AT THE WAVEGUIDE ENTRY PLATE ON BOTH SIDES OF THE EQUIPMENT SHELTER WALL.
   – JUMPER CABLES AT THE EQUIPMENT ENTER.
4. SYSTEM INSTALLATION:
   THE CONTRACTOR SHALL INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURER'S SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROCUREMENT AND INSTALLATION OF THE FOLLOWING:
   – ALL CONNECTORS, ASSOCIATED CABLE MOUNTING, AND GROUNDING HARDWARE.
   – WALL MOUNTS, STANDOFFS, AND ASSOCIATED HARDWARE.
   – 1/2 INCH HELIAX ANTENNA JUMPERS OF APPROPRIATE LENGTHS.
5. MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
   – 7/8 INCH, RMIN = 15 INCHES
   – 1 5/8 INCH, RMIN = 25 INCHES
6. CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.
7. ALL CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.
8. CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
9. CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.

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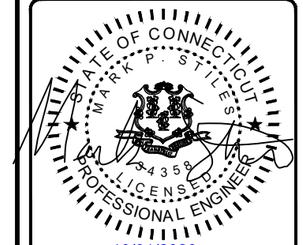

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SYMBOLS

●	EXOTHERMIC CONNECTION
■	COMPRESSION CONNECTION
⏚●	5/8"ø x 10'-0" COPPER CLAD STEEL GROUND ROD.
⏚◉	TEST GROUND ROD WITH INSPECTION SLEEVE
– – –	GROUNDING CONDUCTOR
(A)	KEY NOTES
CHAINLINK FENCE	X X X X X
WOOD FENCE	
LEASE AREA	
ICE BRIDGE	
CABLE TRAY	
GAS LINE	G G G G G
UNDERGROUND ELECTRICAL/TELCO	E/T E/T E/T E/T
UNDERGROUND ELECTRICAL/CONTROL	E/C E/C E/C E/C
UNDERGROUND ELECTRICAL	E E E E E
UNDERGROUND TELCO	T T T T T
PROPERTY LINE (PL)	

ABBREVIATIONS

AC	ALTERNATING CURRENT	MGB	MASTER GROUNDING BAR
AIC	AMPERAGE INTERRUPTION CAPACITY	MIN	MINIMUM
ANI	AUXILIARY NETWORK INTERFACE	MW	MICROWAVE
ATM	ASYNCHRONOUS TRANSFER MODE	MTS	MANUAL TRANSFER SWITCH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	OC	ON CENTER
AWS	ADVANCED WIRELESS SERVICES	PP	POLARIZING PRESERVING
BATT	BATTERY	PCU	PRIMARY CONTROL UNIT
BBU	BASEBAND UNIT	PDU	PROTOCOL DATA UNIT
BTC	BARE TINNED COPPER CONDUCTOR	PWR	POWER
BTS	BASE TRANSCEIVER STATION	RECT	RECTIFIER
CCU	CLIMATE CONTROL UNIT	RET	REMOTE ELECTRICAL TILT
CDMA	CODE DIVISION MULTIPLE ACCESS	RMC	RIGID METALLIC CONDUIT
CHG	CHARGING	RF	RADIO FREQUENCY
CLU	CLIMATE UNIT	RUC	RACK USER COMMISSIONING
COMM	COMMON	RRH	REMOTE RADIO HEAD
DC	DIRECT CURRENT	RRU	REMOTE RADIO UNIT
DIA	DIAMETER	RWY	RACEWAY
DWG	DRAWING	SFP	SMALL FORM-FACTOR PLUGGABLE
EC	ELECTRICAL CONDUCTOR	SIAD	SMART INTEGRATED ACCESS DEVICE
EMT	ELECTRICAL METALLIC TUBING	SSC	SITE SOLUTIONS CABINET
FIF	FACILITY INTERFACE FRAME	T1	1544KBPS DIGITAL LINE
GEN	GENERATOR	TDMA	TIME-DIVISION MULTIPLE ACCESS
GPS	GLOBAL POSITIONING SYSTEM	TMA	TOWER MOUNT AMPLIFIER
GSM	GLOBAL SYSTEM FOR MOBILE	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
HVAC	HEAT/VENTILATION/AIR CONDITIONING	TYP	TYPICAL
ICF	INTERCONNECTION FRAME	UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
IGR	INTERIOR GROUNDING RING (HALO)	UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)
LTE	LONG TERM EVOLUTION		

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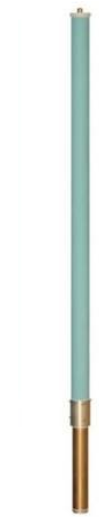
REFERENCE CUTSHEETS

VHF Omni Antennas (160-222 MHz)

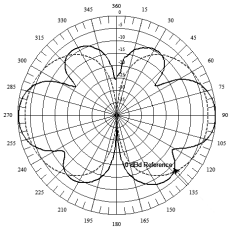
		160-174 MHz						217-222 MHz									
	Model Number	**DS1G03F36U-N**	**DS1G03F36U-D**	**DS1G06F36U-N**	**DS1G06F36U-D**	**DS1G03F36D-N**	**DS1G03F36D-D**	**DS2C00F36U-N**	**DS2C00F36U-D**	**DS2C03F36U-N**	**DS2C03F36U-D**	**DS2C06F36U-N**	**DS2C06F36U-D**	**DS2C00F36D-N**	**DS2C00F36D-D**	**DS2C03F36D-N**	**DS2C03F36D-D**
	Input Connector	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN	N(F)	7/16 DIN
	Type	Single		Single		Dual		Single		Single		Single		Dual		Dual	
ELECTRICAL	**Bandwidth**, MHz	14		14		14		5		5		5		5		5	
ELECTRICAL	**Power**, Watts	500		500		350		500		500		500		350		350	
ELECTRICAL	**Gain**, dBd	3		6		3		0		3		6		0		3	
ELECTRICAL	**Horizontal Beamwidth**, degrees	360		360		360		360		360		360		360		360	
ELECTRICAL	**Vertical Beamwidth**, degrees	30		16		30		60		30		16		60		30	
ELECTRICAL	**Beam Tilt**, degrees	0		0		0		0		0		0		0		0	
ELECTRICAL	**Isolation (minimum)**, dB	N/A		N/A		30		N/A		N/A		N/A		30		30	
MECHANICAL	**Number of Connectors**	1		1		2		1		1		1		2		2	
MECHANICAL	**Flat Plate Area**, ft^2	2.10		3.63		3.69		1.28		1.64		2.58		2.09		3.08	
MECHANICAL	**Lateral Windload Thrust**lbf	88		152		155		54		69		109		88		129	
MECHANICAL	**Wind Speed Rating without ice**, mph	190		150		150		250		225		175		190		160	
MECHANICAL	**Mounting Hardware** included	DSH3V3R		DSH3V3N		DSH3V3N		DSH2V3R		DSH2V3R		DSH3V3N		DSH3V3R		DSH3V3N	
DIMENSIONS	**Length**, ft(m)	12.7 (3.9)		21.9 (6.7)		22.3 (6.8)		7.7 (2.3)		9.9 (3)		15.6 (4.8)		12.6 (3.8)		18.6 (5.7)	
DIMENSIONS	**Radome O.D.**, in(cm)	3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)		3 (7.6)	
DIMENSIONS	**Mast O.D.**, in(cm)	2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)		2.5 (6.4)	
DIMENSIONS	**Net Weight** w/o bracket, lb(kg)	37 (16.8)		60 (27.2)		63 (28.6)		19 (8.6)		26 (11.8)		47 (21.3)		40 (18.1)		70 (31.8)	
DIMENSIONS	**Shipping Weight**, lb(kg)	67 (30.4)		90 (40.8)		93 (42.2)		39 (17.7)		56 (25.4)		77 (34.9)		70 (31.8)		100 (45.4)	



DS2C03F36D-D

VERTICAL PATTERNS

DS1G03F36U-N
DS1G03F36U-D



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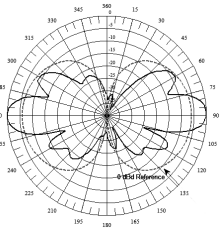

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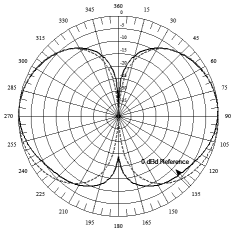

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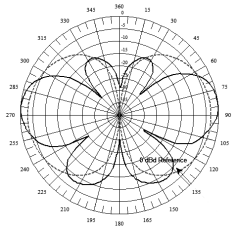

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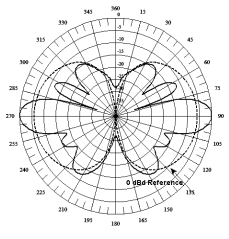

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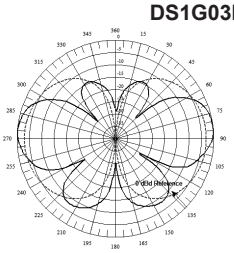

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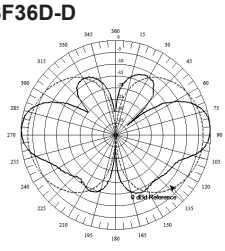

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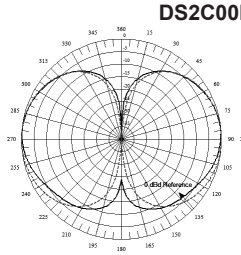

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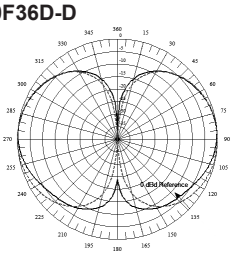

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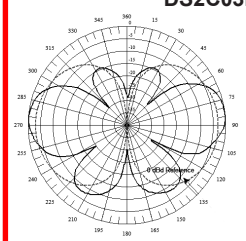

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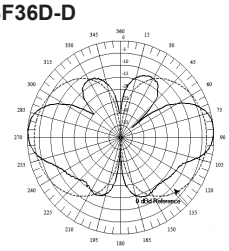
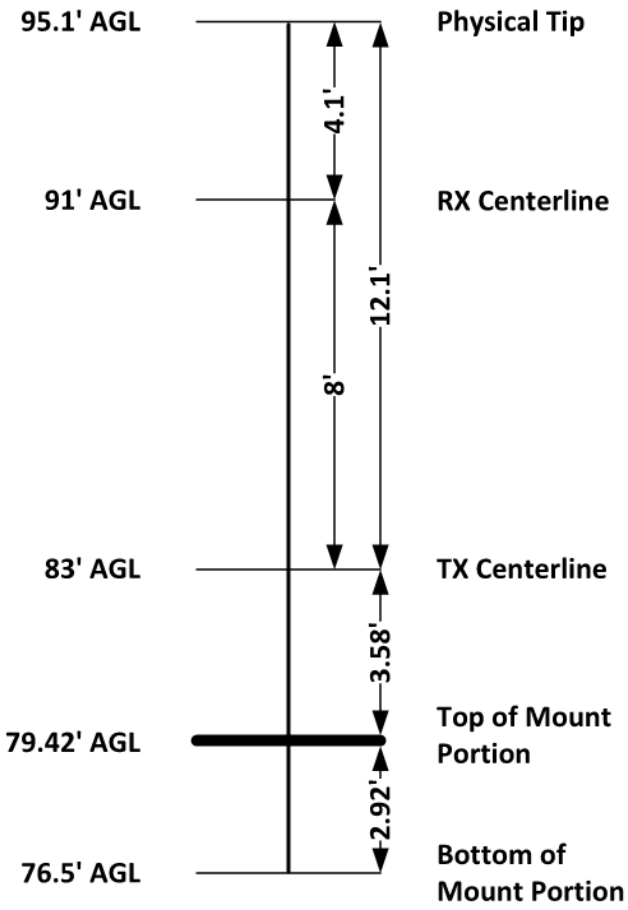


Bottom

dBSpectra DS2C03F36 (18.6' Total)

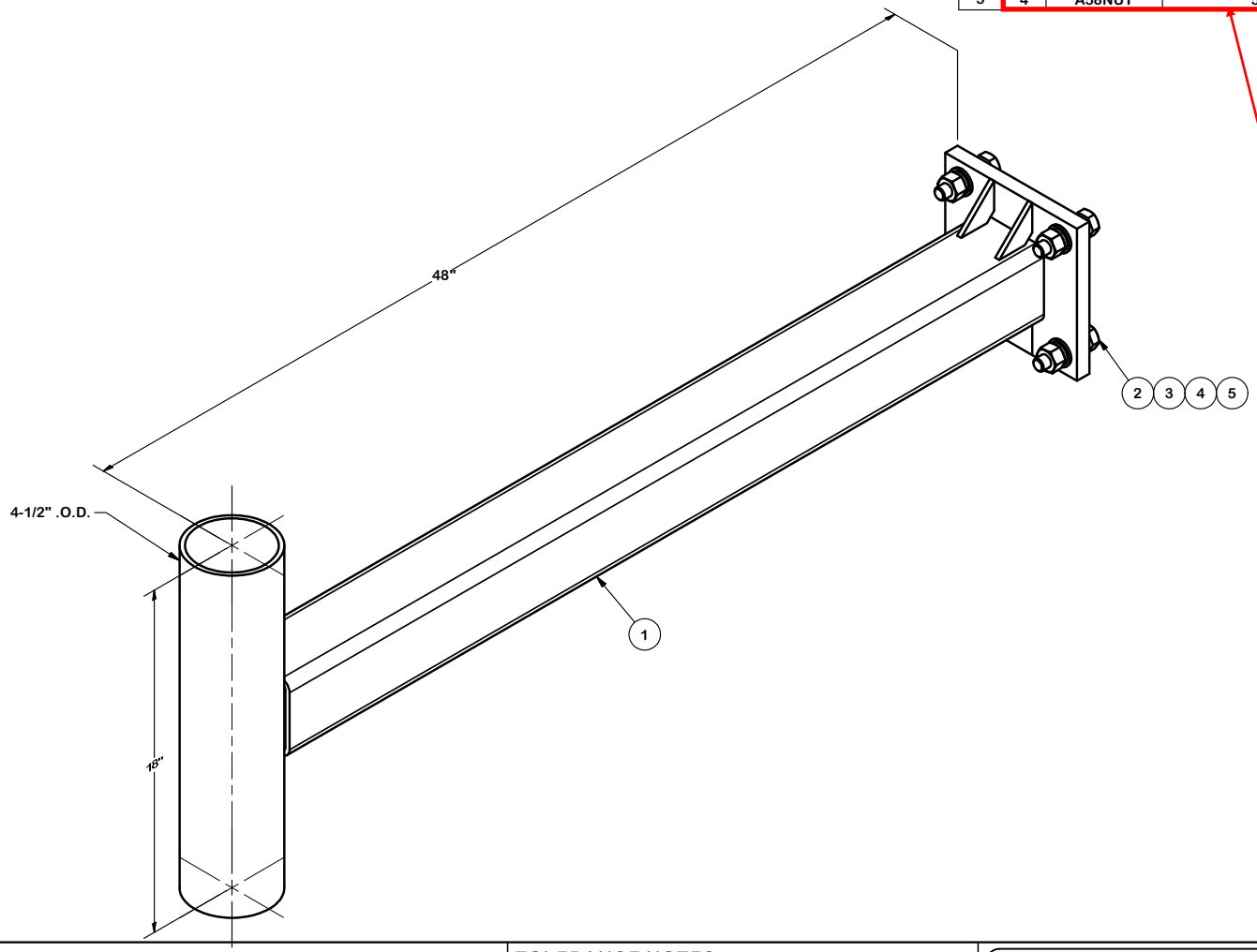


ROTATE (1) EXISTING SUPPORT ARM (REF. CONSTRUCTION DRAWINGS) AND REPLACE HEX BOLTS, WASHERS, AND HEX NUTS.

PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-SV197-48	SUPPORT ARM WELDMENT - 48"		76.32	76.32
2	4	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT		0.36	1.42
3	4	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.14
4	4	G58LW	5/8" HDG LOCKWASHER		0.03	0.10
5	4	A58NUT	5/8" HDG A325 HEX NUT		0.13	0.52
					TOTAL WT. #	78.50

SUPPORT ARM (SV197-48) FASTENER REPLACEMENT PARTS SET



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: 48" SUPPORT ARM

SITE PRO 1 — A valmont COMPANY

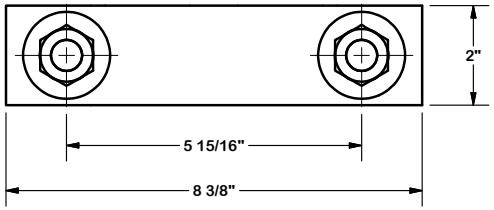
Engineering Support Team: 1-888-753-7446

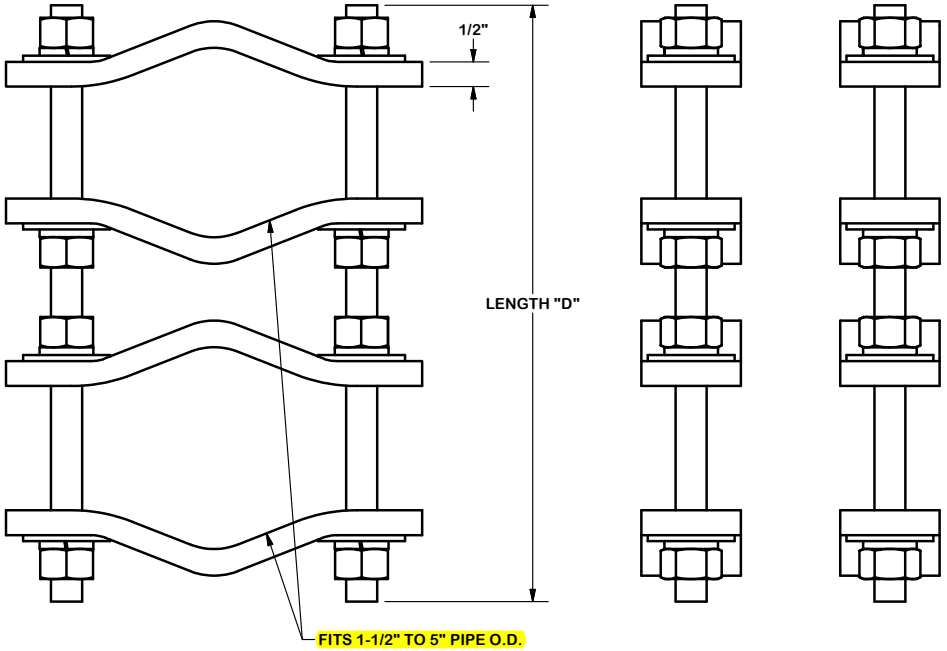
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	
4470	CEK 4/14/2011		ORDER FASTENER PARTS ONLY

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 4/14/2011	SV197-48

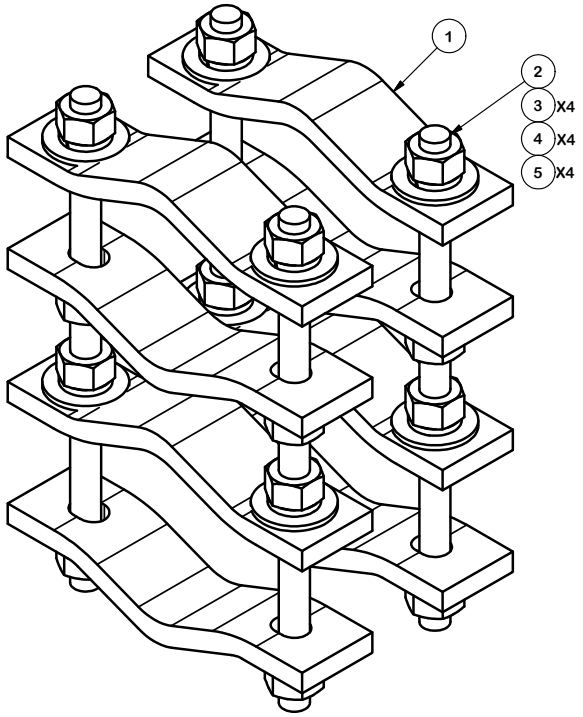
(1) PROPOSED 3.5" O.D. X 4'-0" LONG SCHEDULE 40 MOUNT PIPE.
ATTACH PROPOSED MOUNT PIPE TO PROPOSED SUPPORT ARM
USING CLAMP SET SITE PRO 1 DCP12K (TOTAL OF 1 SET).





PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE						
ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: PIPE TO PIPE CLAMP SET
1-1/2" TO 5" PIPE
1/2" THICK CLAMP

SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	KC8 8/21/2012		SEE ASSEMBLY "A"	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	CEK 1/22/2013	DCPxxK

ATTACHMENT C – PROOF OF DELIVERY OF NOTICE

Ref: CT587100-ES-153 Date: 03Nov20
Dep: BL GRAPHICS Wgt: 1.80 LBS

DV: 0.00

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRCK: 9151 3346 6739

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 03NOV20
ACTWGT: 1.80 LB
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **HONORABLE JASON ANDERSON**
TOWN OF KILLINGLY
172 MAIN STREET

KILLINGLY CT 06239

REF: CT587100-ES-153

DEPT: BL GRAPHICS

56BC3/51D8/05A2

FedEx Express

J2010191106G1av

WED - 04 NOV 12:00P
PRIORITY OVERNIGHT

TRK# 0201 **9151 3346 6739**

00 GONA

06239
CT-US **BDL**

Part # 156148-434 RIT EXP 09/21

Ref: CT587100-ES-153 Date: 03Nov20
Dep: BL GRAPHICS Wgt: 1.80 LBS

DV: 0.00

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRCK: 9151 3346 6740

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 03NOV20
ACTWGT: 1.80 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **MARY CLORIO, TOWN MANAGER**
TOWN OF KILLINGLY
172 MAIN STREET

KILLINGLY CT 06239

REF: CT587100-ES-153

DEPT: BL GRAPHICS

56BC3/51DB/0562

FedEx Express

J2010191106011m

WED - 04 NOV 12:00P
PRIORITY OVERNIGHT

TRK# 0201 **9151 3346 6740**

00 GONA

06239
CT-US **BDL**

Part # 156148-434 RIT EXP 09/21 **

Ref: CT587100-ES-153 Date: 03Nov20
Dep: BL GRAPHICS Wgt: 1.80 LBS

DV: 0.00

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRCK: 9151 3346 6761

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 03NOV20
ACTWGT: 1.80 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO

CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051

REF: CT587100-ES-153

DEPT: BL GRAPHICS

56DC3/51DB/05A2

FedEx Express

J2010191106011av

TRK# 0201 **9151 3346 6761**

WED - 04 NOV 10:30A
PRIORITY OVERNIGHT

00 BDLA

06051
CT-US **BDL**

Part # 156148-434 RIT EXP 09/21

Ref: CT587100-ES-153 Date: 03Nov20
Dep: BL GRAPHICS Wgt: 1.80 LBS

DV:

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
0.00 TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRCK: 9151 3346 6750

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 03NOV20
ACTWGT: 1.80 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO **ANN-MARIE L. AUBREY**
TOWN OF KILLINGLY
172 MAIN STREET

KILLINGLY CT 06239

REF: CT587100-ES-153

DEPT: BL GRAPHICS

56DC3/51DB/05A2

FedEx Express

J2010191106031uv

TRK# 0201 **9151 3346 6750**

WED - 04 NOV 12:00P
PRIORITY OVERNIGHT

00 GONA

06239
CT-US **BDL**

Part # 156148-434 RIT EXP 09/21

ATTACHMENT D – POWER DENSITY REPORT

C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
603-644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report

ES-153

Danielson Area Work Center

173 Mechanic Street

Killingly, CT 06239

October 6, 2020

Table of Contents

List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Eversource installation on the monopole tower on the rooftop of the building located at 173 Mechanic Street in Killingly, CT. Eversource is proposing to install one omnidirectional antenna as part of its 220 MHz communications system.

This report considers the proposed antenna configuration as detailed by Eversource along with power density information for the existing antennas to calculate the cumulative % MPE (Maximum Permissible Exposure) of the facility at ground level.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached “FCC Limits for Maximum Permissible Exposure (MPE)” in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. Power Density Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65, and Connecticut Siting Council recommendations:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2}\right) \text{X Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power = 1.64 x ERP

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and full power, and that all antenna channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual levels will be from the final installation.

4. Calculated % MPE Results

Table 1 below outlines the power density information for the site. The proposed Eversource omnidirectional transmit antenna has vertical beamwidth of 30°; therefore, the majority of the RF power is focused out towards the horizon. Please refer to Attachment C, for the vertical patterns of all Eversource antennas. Likewise, the other transmit antennas exhibit similar directionality of varying vertical beamwidths. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the facility. The calculated results in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the proposed 220 MHz and existing 150 MHz antennas, and 3 dB off-beam pattern loss for the existing 47 MHz antenna. Any inactive or receive-only antennas are not included in the table, as they are irrelevant in terms of the % MPE calculations. The blue shaded entry represents the proposed antenna, whereas the green shaded entries represent the existing Eversource transmit antennas on the tower.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Eversource	84.5	47.74	1	120	0.0035	0.2000	1.76%
Eversource	87	154.46375	1	331	0.0018	0.2000	0.91%
Eversource	87	158.4225	1	100	0.0005	0.2000	0.27%
Eversource	87	173.25	1	380	0.0021	0.2000	1.04%
Eversource	83	217	4	124	0.0030	0.2000	1.50%
						Total	**5.48%**

Table 1: Proposed Facility % MPE [1] [2]

[1] Antenna heights listed are based upon the Black & Veatch Structural Analysis Report dated June 24, 2020, as well as the Black & Veatch site drawing dated October 1, 2020 (Rev. 0). The proposed antenna consists of one internal receive-only antenna in the upper section and a transmit-only antenna in the bottom portion. The antenna height listed is in reference to the center of the lower transmit section, rather than the physical antenna centerline.

[2] Please note that % MPE values listed are rounded to two decimal points and the total % MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not identically match the total value reflected in the table.

5. Conclusion

The above analysis concludes that RF exposure at ground level with the proposed antenna installation will be below the maximum power density limits as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods discussed herein, the highest composite percent of Maximum Permissible Exposure expected at ground level with the proposed installation is **5.48% of the FCC General Population/Uncontrolled limit**.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual levels will be from the finished installation.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, and IEEE Std. C95.3.

Marc Salas — October 5, 2020

Report Prepared By: Marc Salas
RF Engineer
C Squared Systems, LLC — Date

Keith Vellante — October 6, 2020

Reviewed/Approved By: Keith Vellante
Director of RF Services
C Squared Systems, LLC — Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[3]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[3] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

[4] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

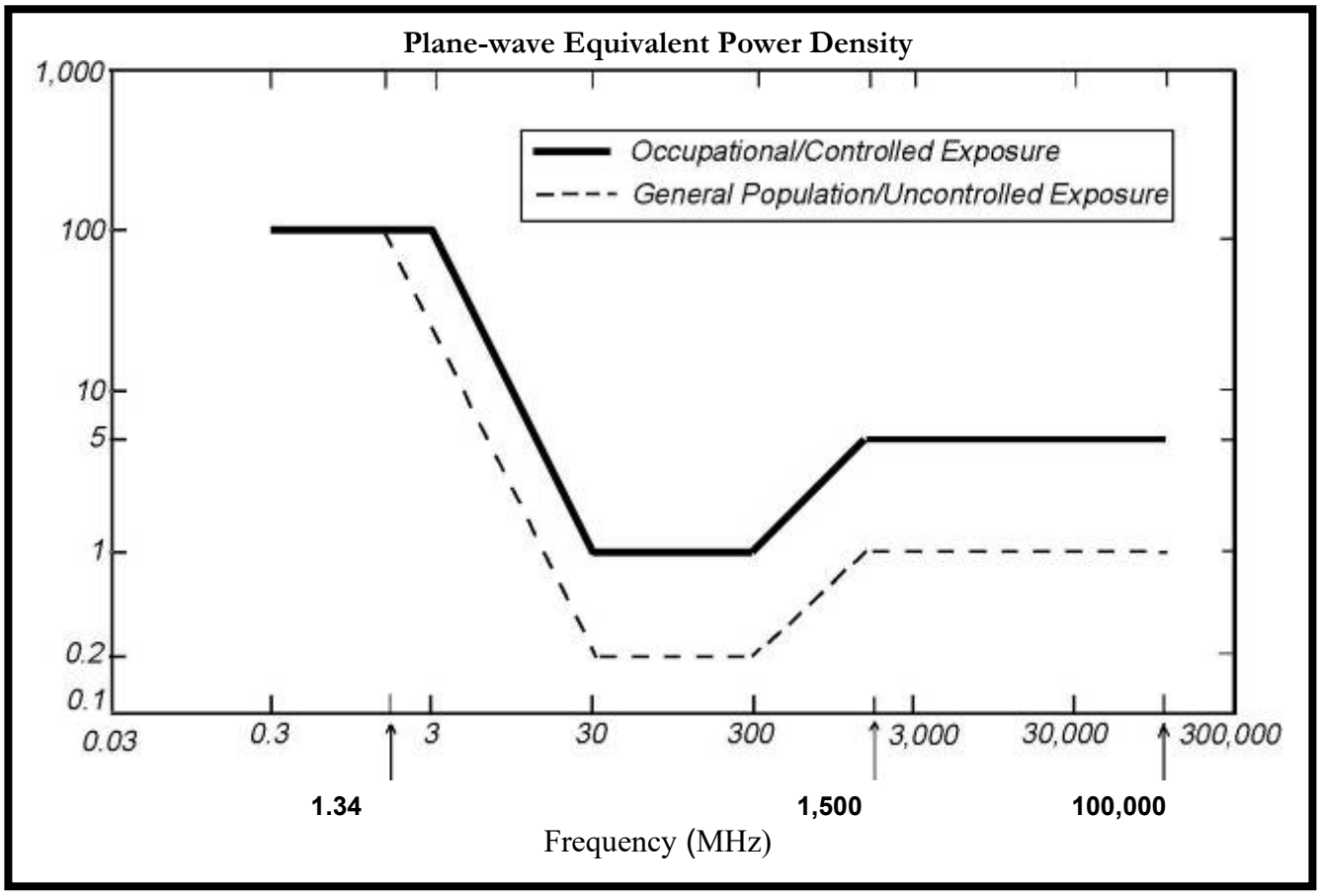
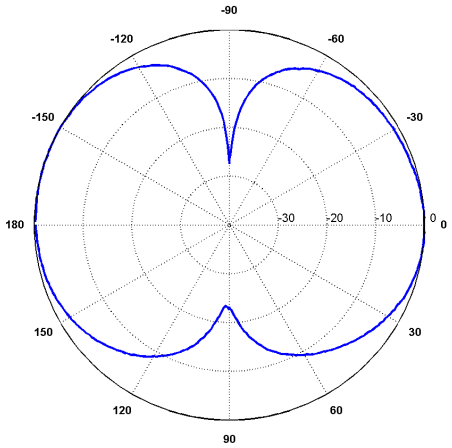


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheet and Electrical Patterns

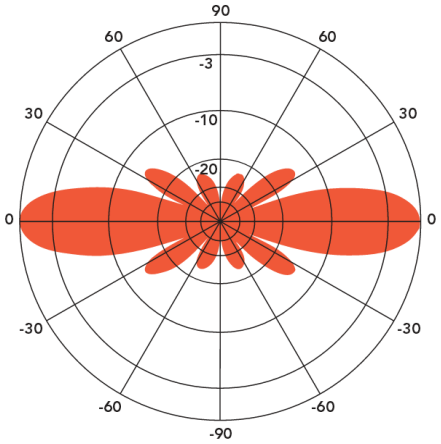
47 MHz

Manufacturer:	Kreco
Model #:	CO-36A
Frequency Band:	30-50 MHz
Gain:	2.1 dBi
Vertical Beamwidth:	N/A
Horizontal Beamwidth:	360°
Polarization:	Vertical
Length:	15.0’



154/158/173 MHz

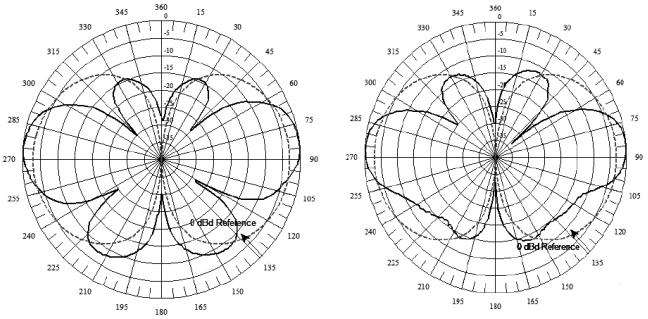
Manufacturer:	Telewave
Model #:	ANT150F6
Frequency Band:	138-175 MHz
Gain:	8.1 dBi
Vertical Beamwidth:	20°
Horizontal Beamwidth:	360°
Polarization:	Vertical
Length:	20.3’



217 MHz

Manufacturer:	dbSpectra
Model #:	DS2C03F36D
Frequency Band:	217 - 222 MHz
Gain:	3 dBd
Vertical Beamwidth:	30°
Horizontal Beamwidth:	360°
Polarization:	Vertical-Polarization
Length:	18.6’

DS2C03F36D-N
DS2C03F36D-D



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ATTACHMENT E – STRUCTURAL ANALYSIS OF EXISTING BUILDING

STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING STRUCTURE

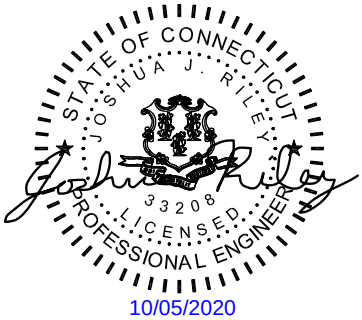
DANIELSON WORK CENTER
173 MECHANIC STREET
KILLINGLY, CT 06239

B&V PROJECT NO. 403093.2000.2200
PROJECT NAME: LMR EPC PHASE 2.1

PREPARED FOR

EVERSOURCE ENERGY

107 SELDEN STREET
BERLIN, CT 06037



10/05/2020

Joshua J. Riley, P.E.
Professional Engineer

BLACK & VEATCH
Building a world of difference.

BLACK & VEATCH CORPORATION
6800 WEST 115TH ST, SUITE 2292
OVERLAND PARK, KANSAS 66211

May 29, 2020

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Owner:	EVERSOURCE	Computed By:	T. Chalermyan
Site Name:	DANIELSON WORK CENTER	Date:	5/29/2020
Project No.	403093.2000.2200	Verified By:	L. Meyer
Title:	STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING STRUCTURE	Date:	6/11/2020

1. PURPOSE

The purpose of this calculation is to evaluate the existing steel frame and the existing building structure under existing and proposed loading configuration.

2. REFERENCES

A. 2018 Connecticut State Building Code

B. International Building Code, IBC 2015

C. Structural Standard for Antenna Supporting Structures and Antennas, TIA-222-H

D. American Society of Civil Engineers, ASCE 7-10

E. American Institute of Steel Construction, 14th Edition

F. American Concrete Institute, ACI 318-14

G. American Concrete Institute for Masonry Structures, ACI 530-13

H. Original Building Drawings Completed by Chandler & Paler Arch., in Oct. 1955

I. Construction Drawings (Rev. 3) Completed by Centek Engineering, dated 4/7/2017

J. Shop Drawings (Rev. B) Completed by Eastern Inc., dated 10/25/2017

K. Site Survey Report Completed by Black & Veatch Corp., dated 10/16/2018

L. Structural Analysis Completed by Black & Veatch Corp., dated 06/24/2020

M. Construction Drawings (Rev. A) Completed by Black & Veatch Corporation, dated 2/13/2020

N. Site Photos

3. ASSUMPTIONS

- Grating Dead Load and live load are assummed to be 14.3 psf. and 40 psf.

- The material of steel grade is assumed to be A9 (Building) (fy = 33 ksi, fu = 60 ksi) for original building drawings.

- Any splices in the platform W-section shall be assumed to take the full capacity of the respective W-section

- The existing Anchorage bolts of Hilti HY-200 are assumed to be HAS-V-36 (ASTM F1554 Gr. 36) with effective embedment depth, $h_{ef,\ act}$ = 6.75" and water saturated for installation condition.

- The existing steel Joist #103, #203 and #181 are assumed weight of Joist 20.7 plf.

- The existing column and foundation of building are adequate to support the final loading configuration. Therefore, the proposed equipment on the existing columns of steel frame will not have significant adverse effect on the existing column and foundation of building.

4. CONCLUSION

Design Criteria based on: **2018 Connecticut State Building Code**

Wind			**Ice**		
Wind Speed:	140	mph	Ice Thickness:	0.75	inch
Exposure Category:	B		Ice Wind:	50	mph
Topographic Factor K_{zt}:	1.00				
Risk Category:	III		**Seismic**	(Neglect)	
Snow			Seismic Importance Factor:	1.25	
Ground Snow Load:	40	psf	Seismic S_{DS}:	0.183g	
Importance Factor, Is:	1.10		Seismic Design Category:	B	

4.1 Structural Analysis of Existing Steel Frame

Governing Load Combination:	1.2DL + 1.0WL (240 DEG) + 1.0LL + 0.5RLL
Max Stress Ratio on Square Post: HSS6x6x1/4:	5.5%
Governing Load Combination:	1.2DL + 1.0WL (60 DEG) + 1.0LL + 0.5RLL
Max Stress Ratio on Beam: W24x76:	44.6%
Governing Load Combination:	1.2DL + 1.0WL (90 DEG) + 1.0LL + 0.5SL
Max Stress Ratio on Ladder Post: HSS 2 1/2x2 1/2x1/4:	4.9%
Governing Load Combination:	1.2DL + 1.0WL (120 DEG) + 1.0LL + 0.5SL
Max Stress Ratio on Ladder Rail: SR 1:	7.4%
Governing Load Combination:	1.2DL + 1.0WL (330 DEG) + 1.0LL + 0.5RLL
Max Stress Ratio on Standoff Ladder : PL 3/8x8:	7.3%
Governing Load Combination:	Envelope
Max Stress Ratio on 3/4"ϕ A325 Thru - Bolts :	3.0%
Governing Load Combination:	0.9DL + 1.0WL (300 DEG)
Max Stress Ratio on 3/4"ϕ Anchorage Bolts Hilti HY-200 :	98.0%
The Existing Steel Frame Result:	**SUFFICIENT**

4.2 Structural Analysis of Existing Head Cap Beam and CMU Bearing Wall

Governing Load Combination:	1.2DL + 1.0WL (120 DEG) + 1.0LL + 0.5SL
Max Stress Ratio on Existing Head Cap Concrete Block :	20.1%
Governing Load Combination:	0.9DL + 1.0WL (0 DEG)
Max Stress Ratio on Existing Masonry CMU Bearing Wall	12.2%
The Existing Head Cap Beam and CMU Bearing Wall Result:	**SUFFICIENT**

4. CONCLUSION (CONTINUED)

4.3 Structural Analysis of Existing Building Rooftop

Governing Load Combination:	1.2DL + 1.6SL + 0.5WL (240 DEG)
Max Stress Ratio Bending Stress on Existing Building Beam : W14x30	93.7%
Governing Load Combination:	1.2DL + 1.6SL + 0.5WL (240 DEG)
Max Stress Ratio Shear Stress on Existing Building Beam : W14x30	49.6%
The Existing Building Beam Result:	**SUFFICIENT**

4.4 Disclaimers

This calculation is based on the loading and equipment position provided by client. If the installed loading and/or equipment position are different from the calculation, the calculation is considered invalid.

This certification assumes that all structural members are in good condition. Contractor shall inspect the condition of all relevant members and connectors and report any perceived deficiencies to the engineer prior to installation of any new equipment.

The contractor shall be responsible for the means and methods of construction. It is contractor's responsibility to provide necessary intermediate or temporary support during construction.

This calculation is based on the validity of the assumption made here within. The contractor shall verify the assumptions. If any of the assumption are found to be invalid, the contractor shall contact the EOR immediately.

Owner:	EVERSOURCE	Computed By:	T. Chalermyan
Site Name:	DANIELSON WORK CENTER	Date:	5/29/2020
Project No.	403093.2000.2200	Verified By:	L. Meyer
Title:	STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING STRUCTURE	Date:	6/11/2020

BLACK & VEATCH

Wind Pressure per ASCE 7-10 / IBC 2012 & IBC 2015

ASCE 7-10 Section #

a. Ultimate Velocity Pressure, q_z or q_h — Sec. 29.3.2

Basic Wind Speed, Vult = **140** mph — Fig. 26.5-1A

$qz = 0.00256\ Kz\ Kzt\ Kd\ V^2$

$= 0.00256 \times 0.62 \times 1.00 \times 0.85 \times 140^2$

$qz =$ 26.61 psf

b. Velocity Pressure Coefficient, Kz — Sec. 29.3.1

$Kz = 2.01\ (z/z_g)^{2/\alpha}$

$= 2.01\ (20 / 1{,}200)^{(2/7.0)}$

$Kz =$ 0.62

$\alpha =$ 7.00

Exposure Category = **B**

Height above Ground Level, z = **20** ft — Table 29.3-1

$z_g =$ 1200 ft

c. Topographic Factor, Kzt — Sec. 26.8.2

H = **15** ft

$\mu =$ 0.00

$\gamma =$ 0.00 — Fig. 26.8-1

Hill Shape: **Flat Terrain**

$K_1 =$ 0.00

Crest Type: **Upwind**

$K_2 = (1-x/\mu H)$

$= [1 - 15 / (0.0 \times 15)]$

$K_2 =$ 0.00

Distance Upwind of Crest, Lh = **15** ft

Distance Upwind to Bldg Site, x = **15** ft

$K_3 = e^{-(\gamma z/H)}$

$= e^{-(0.0 \times 20 / 15)}$

$K_3 =$ 0.00

$Kzt = [\ 1 + K_1 K_2\ K_3\ ]^2$ — Eq. 26.8-1

$= [1 + 0.00 \times 0.00 \times 0.00]^2$

$Kzt =$ 1.00

d. Wind Directionality Factor, Kd — Table 26.6-1

(9) Open Signs & lattice Framework

Kd = 0.85

g. Structure Risk Category: **III** — Table 1.5-1

h. Gust Effect Factor, G

GCr = **1.90** — Sec. 29.4.1

Wind Load

Wind Velocity Pressure @ z = 20 ft Q_z = 26.61 psf **(based on 140 mph wind)**

Gust Factor: GCr = 1.90

Wind Load on Members:

Square Post: HSS6x6x1/4

Depth: Dp= 6.00 in.

Wind Load: Pp= Qz*GCr*Dp = **25.3 plf**

Beam: W24x76

Depth: Dp= 23.90 in.

Wind Load: Pp= Qz*GCr*Dp = **100.7 plf**

Ladder Post: HSS 2 1/2x2 1/2x1/4

Depth: Dp= 2.50 in.

Wind Load: Pp= Qz*GCr*Dp = **10.5 plf**

Ladder Rail: SR 1

Depth: Dp= 1.00 in.

Wind Load: Pp= Qz*GCr*Dp = **4.2 plf**

Standoff Ladder : PL 3/8x8

Depth: Dp= 8.00 in.

Wind Load: Pp= Qz*GCr*Dp = **33.7 plf**

Owner:	EVERSOURCE	Computed By:	T. Chalermyan
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Ice Dead Load

TIA-222-H / ASCE 7-10 Section #

Design Ice Thickness @ z = 33ft t_i = 0.75 **in.** — Fig. 10.2, ASCE7 Hazard Tool

Note: The design ice thickness shall be escalated with height when calculating the ice weight and wind force on the ice.

Height above Ground Level, z = 20 ft

Factored Ice Thickness, t_{iz} at z for Ice Weight Calculations: — Sec. 10.4.6

$t_{iz} = 2*t_i*I_i*f_z*(K_{zt})^{0.35}$

t_{iz} = 2 x 0.75 x 1.25 x 0.95 x 1.00 → t_{iz} = **1.783 in**

where,

Importance Factor for Ice Thickness, I_i — Sec. 10.4.4

Structure Risk Category = III

I_i = 1.25 (Multiplier on ice thickness)

Height Factor, f_z

fz = min. [(z/33) ^0.10), 1.4] = min.[(20/33) ^0.10, 1.4] = 0.951 ; when 0 ft < z < 900 ft — Eq. 10.4-4

Topographic Factor, K_{zt} — Sec. 26.8.2

$K_{zt} = [1 + K_1 K_2 K_3]^2$ = [1 + 0.00 x 0.00 x 0.00] ^2 = 1.00

K_1 = 0.00 μ = 0.00 γ = 0.00 — Fig. 26.8-1

			(Use same values from wind calcs)
Exposure Category =	B		
Hill Shape =	Flat Terrain		
Crest Type =	Upwind		
Hill Height, H =	15	ft	
Distance Upwind of crest, Lh =	15	ft	
Distance Upwind to Bldg Site, x =	15	ft	

$K_2 = (1 - x / \mu L_h)$ = [1 - 15 / (0.0 x 15)] = 0.00 — Fig. 26.8-1

$K_3 = e^{-(\gamma z / Lh)}$ = e^-(0.0 x 20 / 15) = 0.00 — Fig. 26.8-1

Ice Topographic Factor, $(K_{zt})^{0.35}$ = (1.00) ^ 0.35 = 1.00 — Sec. 10.4.5

The weight of ice shall be based on a unit weight of 56 pcf. — Sec. 10.4.1

Therefore ;

W_{ice} = 56 pcf * t_{iz} /12 = **8.32 psf**

Screen Wall

Volume of Ice

$V_i = \pi*t_{iz}*A_s / A_s$ = 3.14 x 1.783 x 1 / 1 = 5.60 in^3 / in^2 — Eq. 10.4-2

Weight = V_i * 56 pcf = 5.6 x 56 = 26.13 psf

Ice Dead Load (Continued)

Design Ice Thickness @ z = 33 ft t_i = 0.75 in.

Factored ice thickness @ z = 20 ft t_{iz} = 1.78 in.

Ice Dead Load on Members:

Square Post: HSS6x6x1/4

Dimensions: B= 6 in. Dc= 8.49 in.
W= 6 in.

Ice cross sectional area: Aiz= π tiz (Dc + tiz) = 57.52 in^2

DL ice= Aiz * 56pcf / 144 = **22.4** **plf**

Beam: W24x76

Dimensions: B= 23.9 in. Dc= 25.53 in.
W= 8.99 in.

Ice cross sectional area: Aiz= π tiz (Dc + tiz) = 153.02 in^2

DL ice= Aiz * 56pcf / 144 = **59.5** **plf**

Ladder Post: HSS 2 1/2x2 1/2x1/4

Dimensions: B= 2.5 in. Dc= 3.54 in.
W= 2.5 in.

Ice cross sectional area: Aiz= π tiz (Dc + tiz) = 29.79 in^2

DL ice= Aiz * 56pcf / 144 = **11.6** **plf**

Ladder Rail: SR 1

Dimensions: Dia= 1 in. Dc= 1.00 in.

Ice cross sectional area: Aiz= π tiz (Dc + tiz) = 15.59 in^2

DL ice= Aiz * 56pcf / 144 = **6.1** **plf**

Standoff Ladder : PL 3/8x8

Dimensions: B= 8 in. Dc= 8.01 in.
W= 0.375 in.

Ice cross sectional area: Aiz= π tiz (Dc + tiz) = 54.85 in^2

DL ice= Aiz * 56pcf / 144 = **21.3** **plf**

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Title:	STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING STRUCTURE	Date:	6/11/2020

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Ice Wind Pressure per ASCE 7-10 / IBC 2012 / IBC 2015

TIA-222-H / ASCE 7-10 Section #

a. Ultimate Velocity Pressure, $q_{z \text{ or } } q_h$ — Sec. 29.3.2

Basic Wind Speed, Vult = **50** mph — Fig. 26.5-1A

$qz = 0.00256\ Kz\ Kzt\ Kd\ V^2$

$= 0.00256 \times 0.62 \times 1.00 \times 0.85 \times 50^2$

$qz = 3.39$ psf

b. Velocity Pressure Coefficient, Kz — Sec. 29.3.1

$Kz = 2.01\ (z/z_g)^{2/\alpha}$

$= 2.01\ (20 / 1{,}200)^{(2/7.0)}$

$Kz = 0.62$

$\alpha = 7.00$

Exposure Category = B

Height above Ground Level, z = 20 ft — Table 29.3-1

$z_g = 1200.00$ ft

c. Topographic Factor, Kzt — Sec. 26.8.2

H = 15 ft

$\mu = 0.00$

$\gamma = 0.00$ — Fig. 26.8-1

$K_1 = 0.00$

$K_2 = (1\text{-}x/\mu H)$

$= [1 - 15 / (0.0 \times 15)]$

$K_2 = 0.00$

$K_3 = e^{-(\gamma z / Lh)}$

$= e^{-(0.0 \times 20 / 15)}$

$K_3 = 0.00$

Hill Shape: Flat Terrain

Crest Type: Upwind

Distance Upwind of crest, Lh = 15 ft

Distance Upwind to Bldg Site, x = 15 ft

$Kzt = [\ 1 + K_1 K_2\ K_3\ ]^2$ — Eq. 26.8-1

$= [1 + 0.00 \times 0.00 \times 0.00]^2$

$Kzt = 1.00$

d. Wind Directionality Factor, Kd — Table 26.6-1

(9) Open Signs & lattice Framework

Kd = 0.85

g. Structure Risk Category: III — Table 1.5-1

h. Gust Effect Factor, G

GCr = 1.90 — Sec. 29.4.1

Ice Wind Load

Wind Velocity Pressure @ z = 20 ft $Q_{z\ ice}$ = 3.39 psf **(based on 50 mph wind)**
Gust factor: GCr = 1.90

Ice Wind Load on Members:

Square Post: HSS6x6x1/4

Member Depth: Dp= 6 in. + 2 Tiz = 9.57 in.
Ice wind load: Pp= Qz ice*GCr*Dp = **5.1 plf**

Beam: W24x76

Member Depth: Dp= 23.9 in. + 2 Tiz = 27.47 in.
Ice wind load: Pp= Qz ice*GCr*Dp = **14.8 plf**

Ladder Post: HSS 2 1/2x2 1/2x1/4

Member Depth: Dp= 2.5 in. + 2 Tiz = 6.07 in.
Ice wind load: Pp= Qz ice*GCr*Dp = **3.3 plf**

Ladder Rail: SR 1

Member Depth: Dp= 1 in. + 2 Tiz = 4.57 in.
Ice wind load: Pp= Qz ice*GCr*Dp = **2.5 plf**

Standoff Ladder : PL 3/8x8

Member Depth: Dp= 8 in. + 2 Tiz = 11.57 in.
Ice wind load: Pp= Qz ice*GCr*Dp = **6.2 plf**

BLACK & VEATCH	Owner:	EVERSOURCE		Computed By:	T. Chalermyan
	Site Name:	DANIELSON WORK CENTER		Date:	5/29/2020
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	Title:	STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING STRUCTURE		Date:	6/11/2020

Snow Load per ASCE 7-10

	ASCE 7-10 Section #
a. Flat Roof Snow Load Calculation, Pf	7.3
Pf = 0.7 · Ce · Ct · Is · Pg	Eq. 7.3-1
= 0.7 x 0.90 x 1.00 x 1.10 x 40.0	
Pf = **27.7** psf Control	
b. Exposure Factor, Ce	7.3.1 Table 7-2
Terrain Category = **B**	
Exposure of Roof = **Fully**	
Ce = **0.9**	
c. Thermal Factor, Ct	7.3.2 Table 7-3
Thermal Condition **All Structure**	
Ct = **1.0**	
d. Importance Factor, Is	7.3.3
Structure Risk Category III	Table 1.5-1
Is = **1.1**	Table 1.5-2
f. Ground Snow Load, Pg	7.2
Pg = **40.0** psf	Fig. 7-1
g. Minimum Snow Load for Low-slope Roofs, Pm	
Pm = 20 x Is	7.3.4
Pm = 22.0 psf	

- LOAD ACTING ROOF SLAB

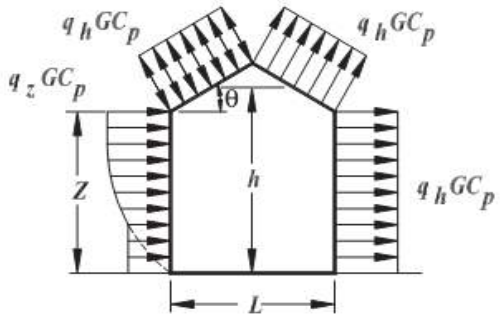
	Unit weight of concrete slab (Assumed)	=	145.0	pcf
	0.060 EPDM	=	1.0	psf
	3" Rigid	=	4.5	psf
	5-1/2" Concrete Slab	=	66.5	psf
	M/E/P	=	4.0	psf
	Finishing	=	1.0	psf
	Total Dead Load	=	**77.0**	psf
Roof Live Load of Slab, RLL		=	**20.0**	psf
Snow Load of Slab, Pf	(see ASCE7-10 Snow Calc.)	=	**27.7**	psf

- WIND LOADS ON BUILDINGS - MWFRS (DIRECTIONAL PROCEDURE)

Basic Wind Speed, V	=	140	mph
Exposure Category	=	B	
Velocity Pressure Exposure Coefficient, Kz = 2.01 $(z/z_g)^{2/\alpha}$	=	0.57	
Topographic Factor, Kzt	=	1.00	
Wind Directionality Factor, Kd	=	0.85	
$q_z = q_h$ = 0.00256 Kz Kzt Kd V^2	=	24.51	psf
Gust Effect Factor, G	=	0.85	
Angle of Roof	=	0	degree
Height of building, z or h	=	15.0	ft
Width of Building, B	=	72.3	ft
Length of Building, L	=	168.7	ft

- ENCLOSED AND PARTIALLY ENCLOSED RIGID BUILDING : WALL & ROOFS

h/L		=	0.09	< 0.50
External Pressure Coefficient, Cp (Windward Wall)		=	0.80	All values
External Pressure Coefficient, Cp (Leeward Wall)		=	-0.50	L/B
Roof Pressure Coefficient for θ < 10				
External Pressure Coefficient, Cp	(Fig. 27.4.1)	=	-0.90	
		=	-0.18	
Internal Pressure Coefficient, GCpi	(Table 26.11-1)	=	0.18	Internal (+)
		=	-0.18	Internal (-)



ELEVATION

Owner:	EVERSOURCE	Computed By:	T. Chalermyan
Project:	DANIELSON WORK CENTER	Date:	5/29/2020
Project No.	403093.2000.2200	Verified By:	L. Meyer
Title:	STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING STRUCTURE	Date:	6/11/2020

BLACK & VEATCH

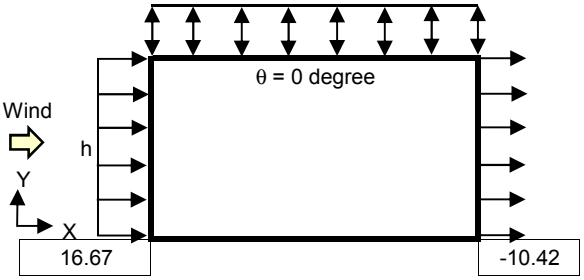
Case I) Wind Apply to Risa

p = q*G*Cp - qi*(GCpi)

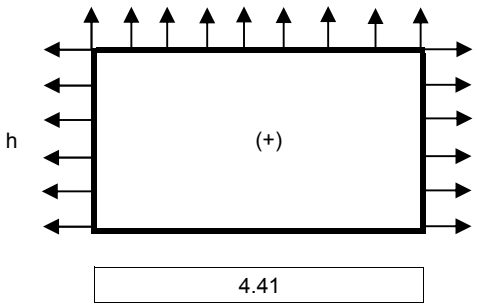
p1	= 24.51*0.85*0.8 - 24.51*0.18	=	12.26	psf
p2	= 24.51*0.85*-0.5 - 24.51*0.18	=	-14.83	psf
p uplift	= 24.51*0.85*-0.9 - 24.51*0.18	=	-23.16	psf
p uplift	= 24.51*0.85*-0.18 - 24.51*0.18	=	-8.16	psf

q*G*Cp = -18.75 Cp = -0.90

q*G*Cp = -3.75 Cp = -0.18



External Wind



Internal Wind - Positive

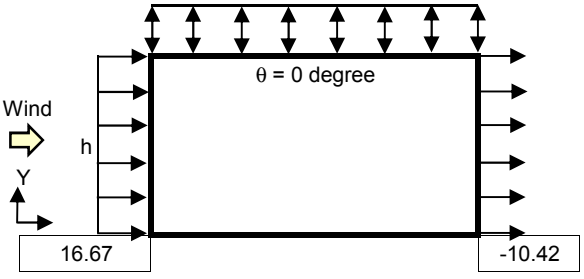
Case II) Wind Apply to Risa

p = q*G*Cp - qi*(GCpi)

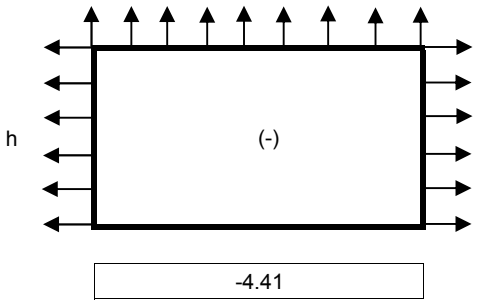
p1	=24.51*0.85*0.8 - 24.51*-0.18	=	21.08	psf
p2	=24.51*0.85*-0.5 - 24.51*-0.18	=	-6.00	psf
p uplift	= 24.51*0.85*-0.9 - 24.51*-0.18	=	-14.34	psf
p uplift	= 24.51*0.85*-0.18 - 24.51*-0.18	=	0.66	psf

q*G*Cp = -18.75 Cp = -0.90

q*G*Cp = -3.75 Cp = -0.18



External Wind



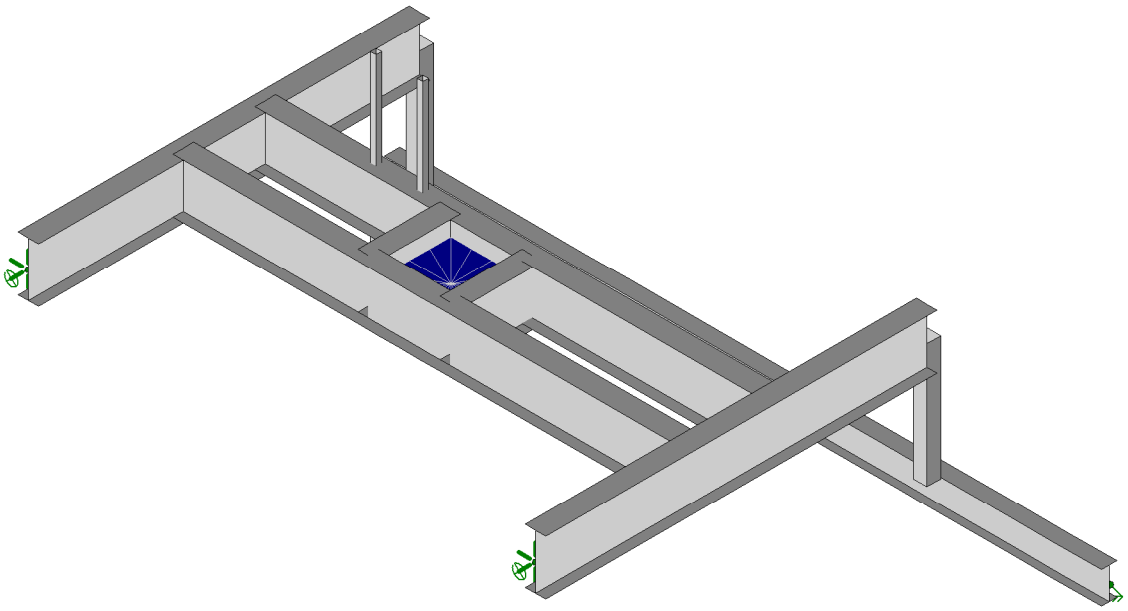
Internal Wind - Negative

The Wind Pressure for Acting to Rooftop

Max. Positive Wind Pressure =	=	**0.66**	psf
Min. Negative Wind Uplift Pressure =	=	**-23.16**	psf

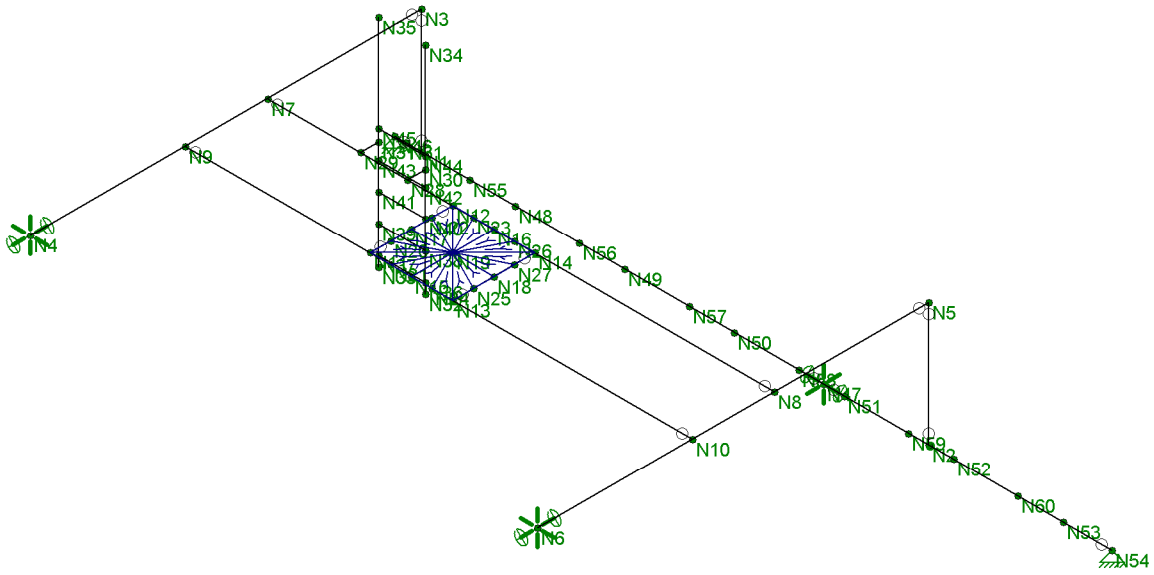
- DETERMINED POINT LOAD ACTING TO EXISTING BEAM W14x30

Tributary Width :	Spacing Joist #203 & #103	=	4.0	ft
Dead Load of Total, DL =	77 psf x 4 ft	=	308.0	plf
Dead Load of Joist =	# 203 & #103 (Assumed)	=	20.7	plf
Roof Live Load of Slab, RLL =	20 psf x 4 ft	=	80.0	plf
Snow Load of Slab, Pf =	27.72 psf x 4 ft	=	110.9	plf
Pos. Wind Pressure Acting Joist =	0.66 psf x 4 ft	=	2.64	plf
Neg. Wind Uplift Pressure Acting Joist =	-23.16 psf x 4 ft	=	-92.64	plf
Span length of Joist #203		=	33.58	ft
Point Load from Dead Load Total =	(308 + 20.7) plf x 33.58 ft / 2	=	**5519**	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 33.58 ft / 2	=	**1343**	lbs.
Point Load from Snow Load Slab =	110.9 plf x 33.58 ft / 2	=	**1862**	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 33.58 ft / 2	=	**44**	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 33.58 ft / 2	=	**-1555**	lbs.
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Slab =	(308 + 20.7) plf x 13.75 ft / 2	=	**2260**	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 13.75 ft / 2	=	**550**	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	**762**	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 13.75 ft / 2	=	**18**	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 13.75 ft / 2	=	**-637**	lbs.



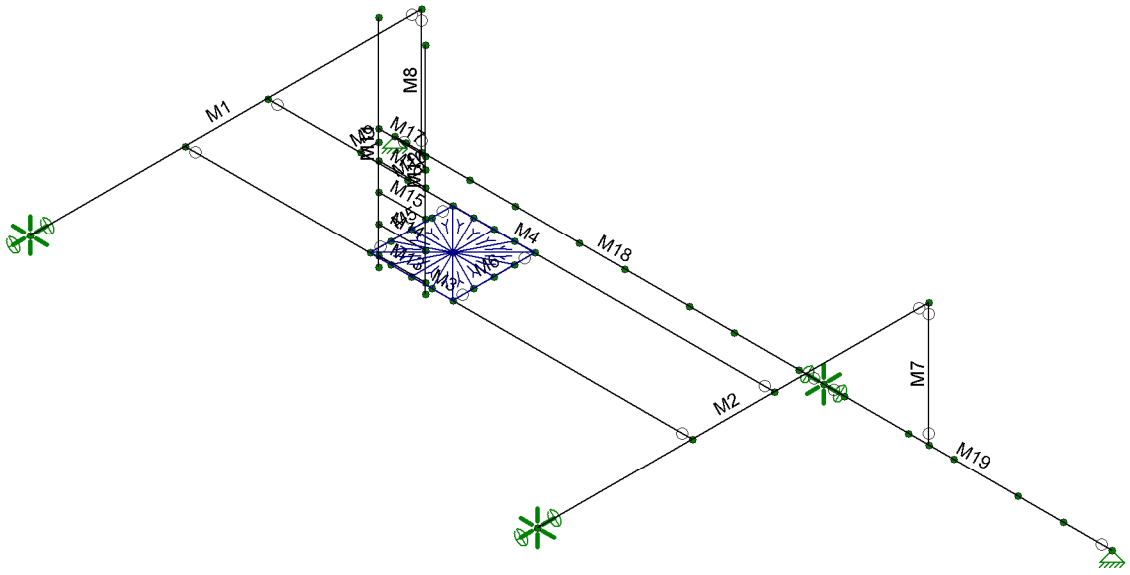
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 1
T. Chalermyan		June 25, 2020 at 11:06 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



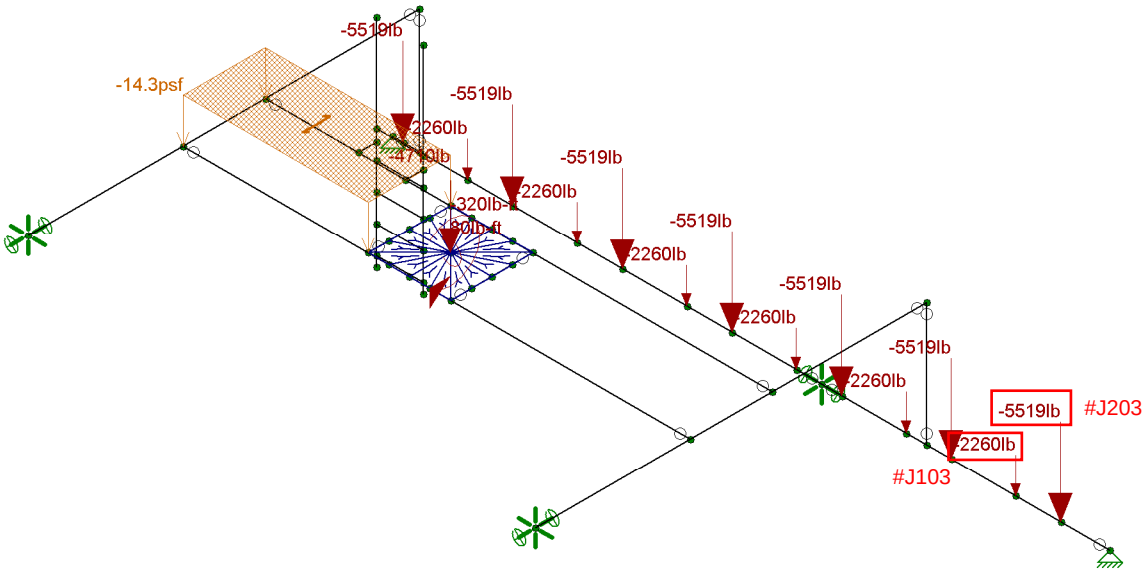
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 2
T. Chalermyan		June 25, 2020 at 11:06 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



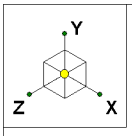
Envelope Only Solution

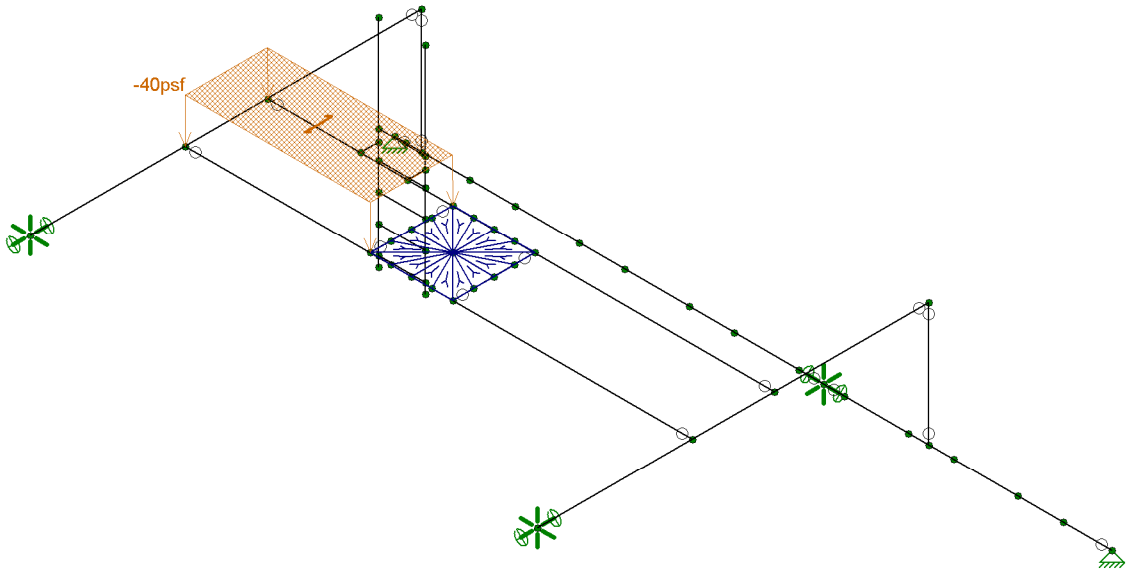
Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 3
T. Chalermyan		June 25, 2020 at 11:07 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



Span length of Joist #203		=	33.58	ft
Point Load from Dead Load Total =	(308 + 20.7) plf x 33.58 ft / 2	=	5519	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 33.58 ft / 2	=	1343	lbs.
Point Load from Snow Load Slab =	110.9 plf x 33.58 ft / 2	=	1862	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 33.58 ft / 2	=	44	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 33.58 ft / 2	=	-1555	lbs.
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Slab =	(308 + 20.7) plf x 13.75 ft / 2	=	2260	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 13.75 ft / 2	=	550	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	762	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 13.75 ft / 2	=	18	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 13.75 ft / 2	=	-637	lbs.

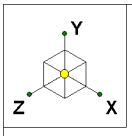
Loads: BLC 1, DL
Envelope Only Solution

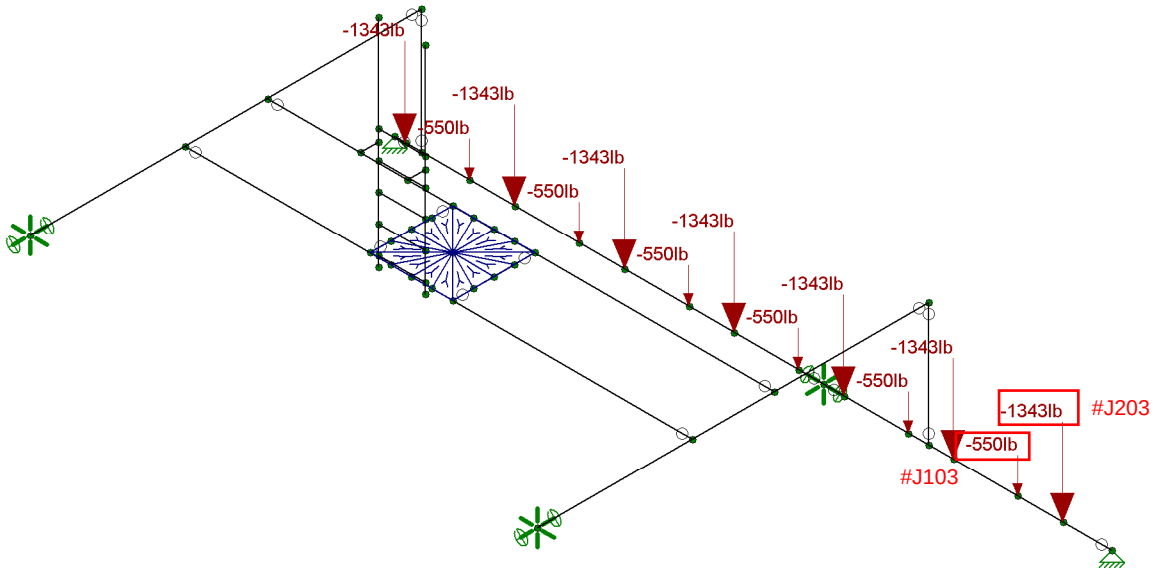




Loads: BLC 2, LL
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 5
T. Chalermyan		June 25, 2020 at 11:08 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...

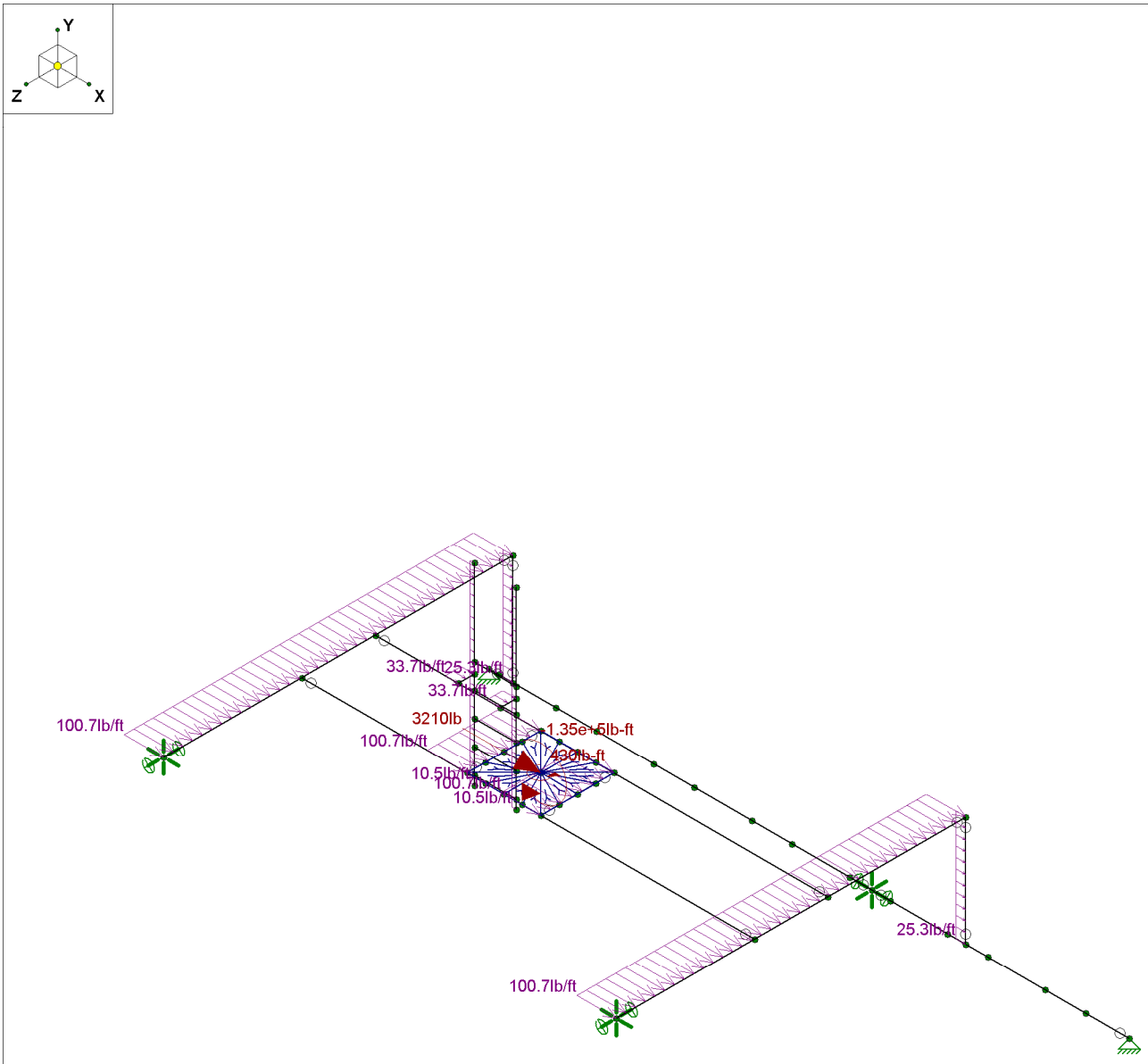




Span length of Joist #203		=	33.58	ft
Point Load from Dead Load Total =	(308 + 20.7) plf x 33.58 ft / 2	=	5519	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 33.58 ft / 2	=	1343	lbs.
Point Load from Snow Load Slab =	110.9 plf x 33.58 ft / 2	=	1862	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 33.58 ft / 2	=	44	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 33.58 ft / 2	=	-1555	lbs.

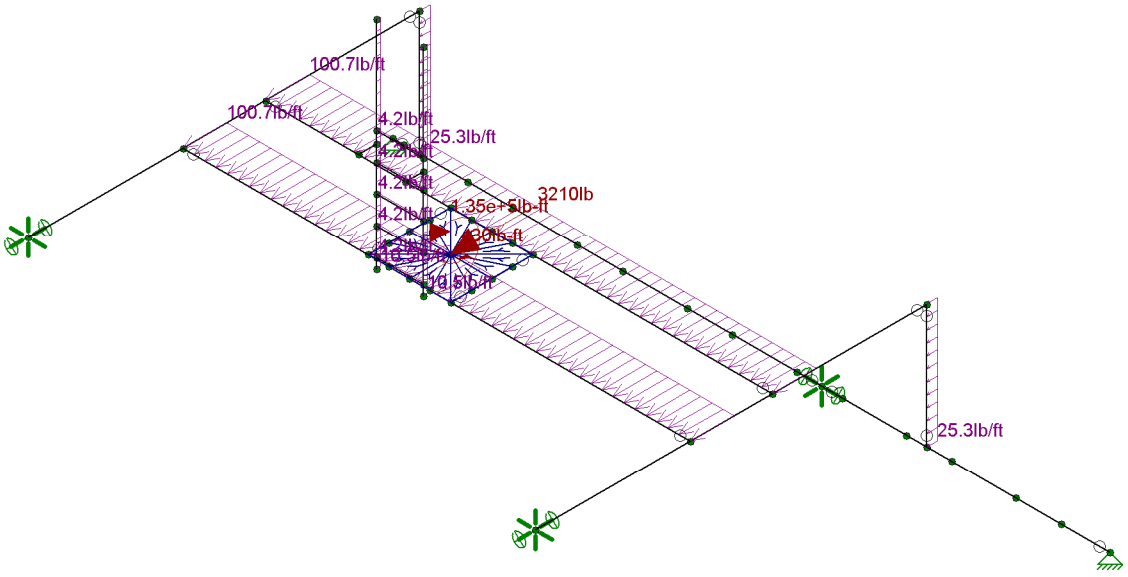
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Slab =	(308 + 20.7) plf x 13.75 ft / 2	=	2260	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 13.75 ft / 2	=	550	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	762	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 13.75 ft / 2	=	18	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 13.75 ft / 2	=	-637	lbs.

Loads: BLC 3, Roof LL
Envelope Only Solution



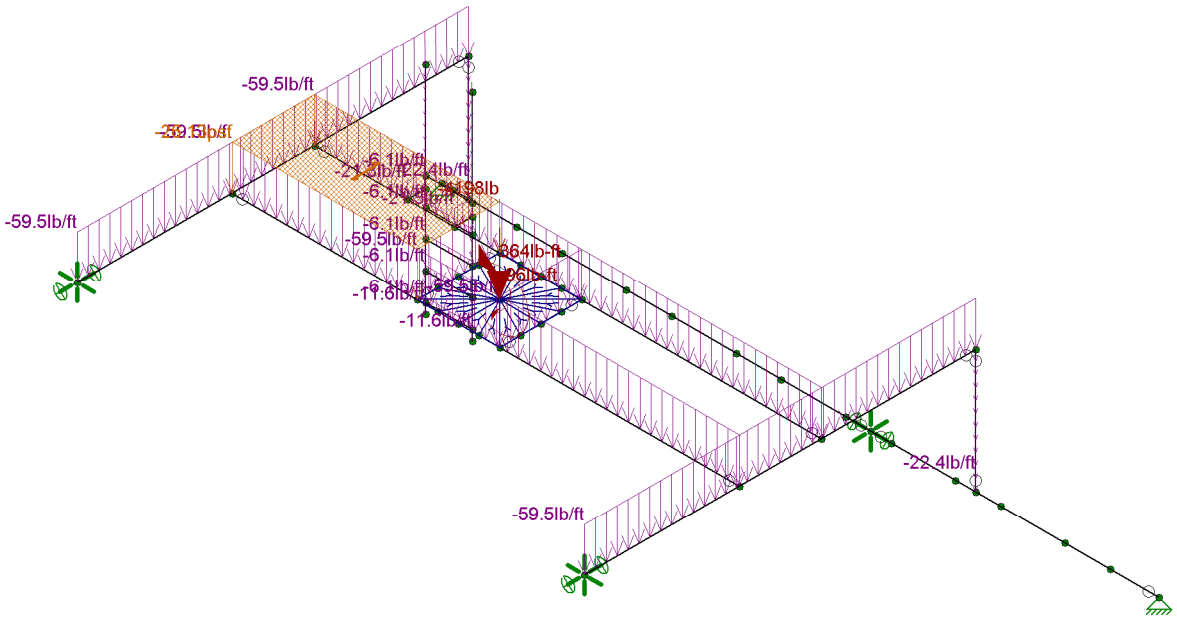
Loads: BLC 4, Wind - 0 Deg (+X)
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 7
T. Chalermyan		June 25, 2020 at 11:08 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



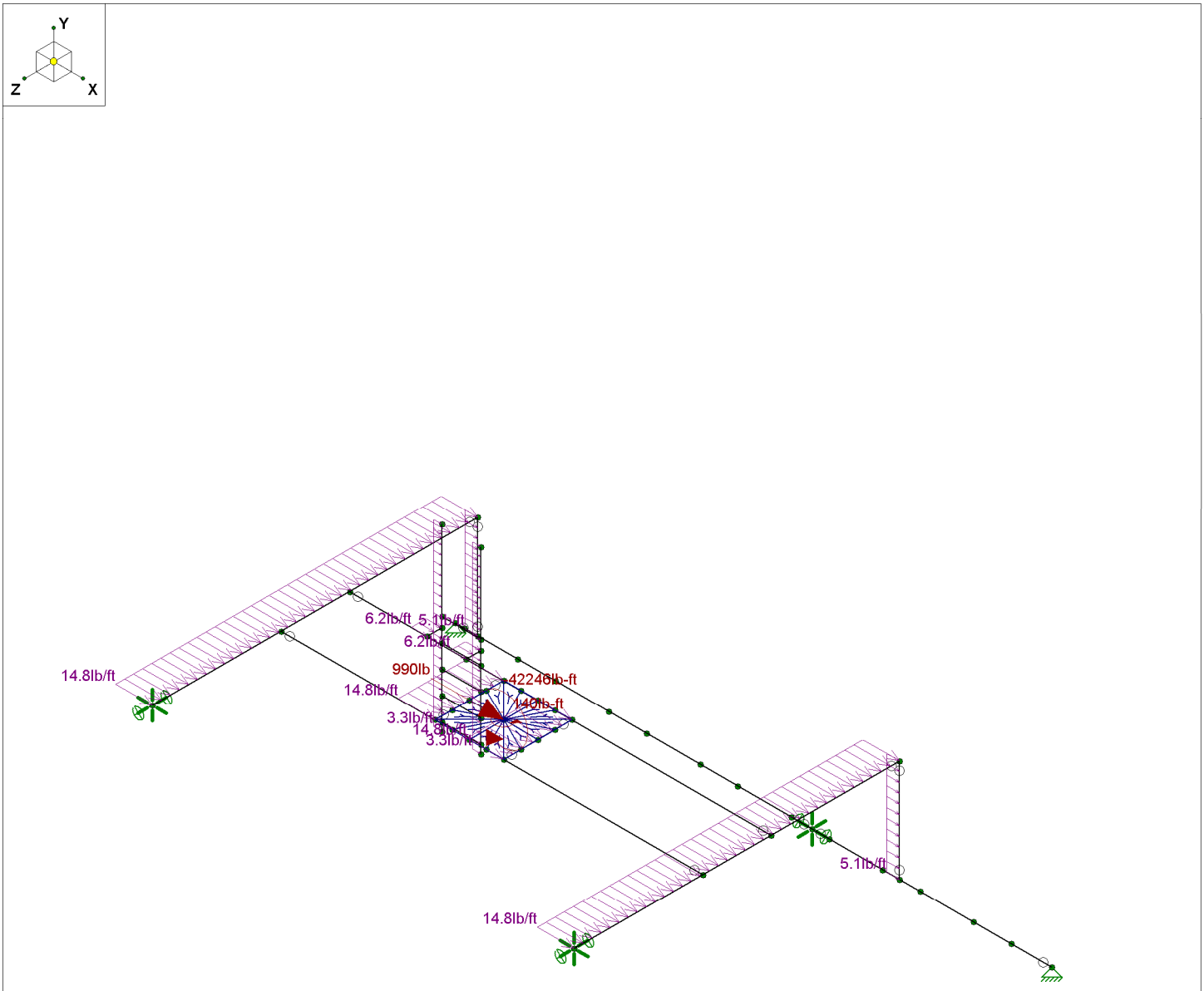
Loads: BLC 5, Wind - 90 Deg (+Z)
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 8
T. Chalermyan		June 25, 2020 at 11:08 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



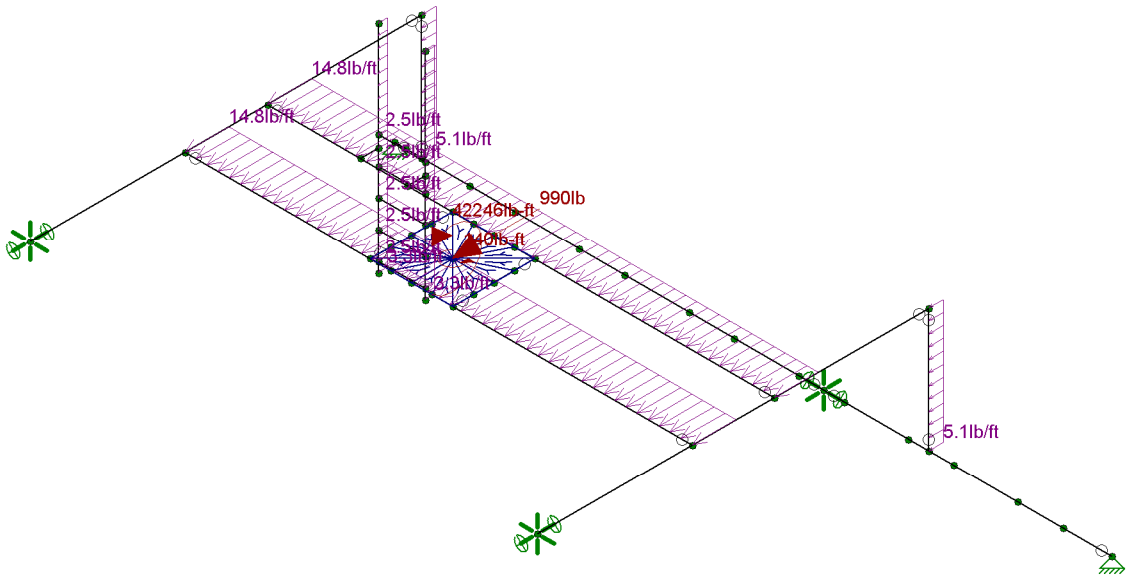
Loads: BLC 6, Ice DL
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 9
T. Chalermyan		June 25, 2020 at 11:08 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



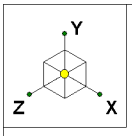
Loads: BLC 7, Ice Wind - 0 Deg (+X)
Envelope Only Solution

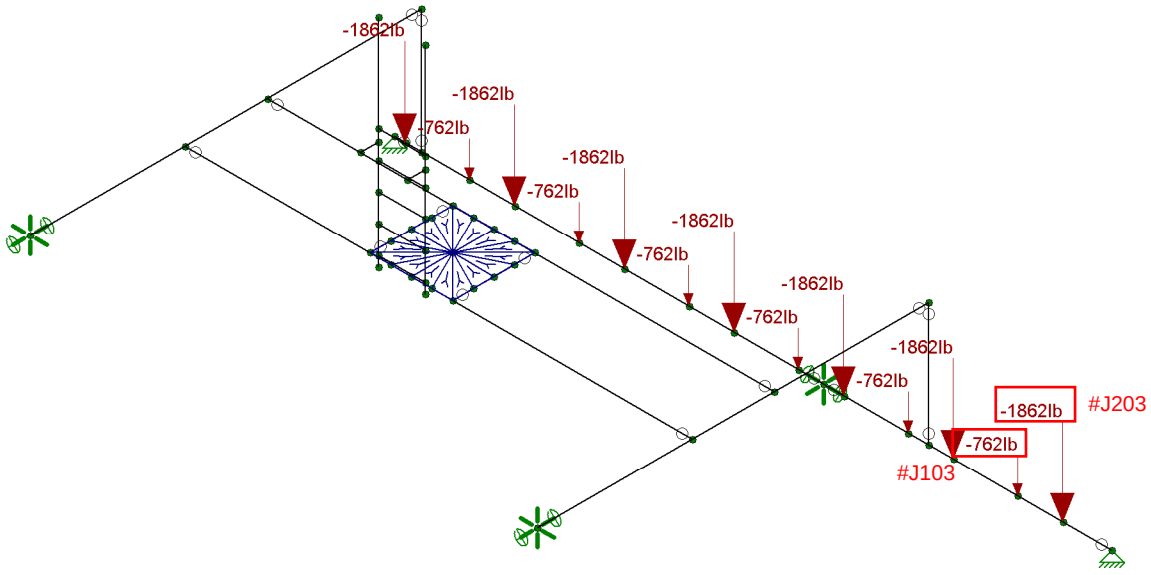
Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 10
T. Chalermyan		June 25, 2020 at 11:08 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



Loads: BLC 8, Ice Wind - 90 Deg (+Z)
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 11
T. Chalermyan		June 25, 2020 at 11:08 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...

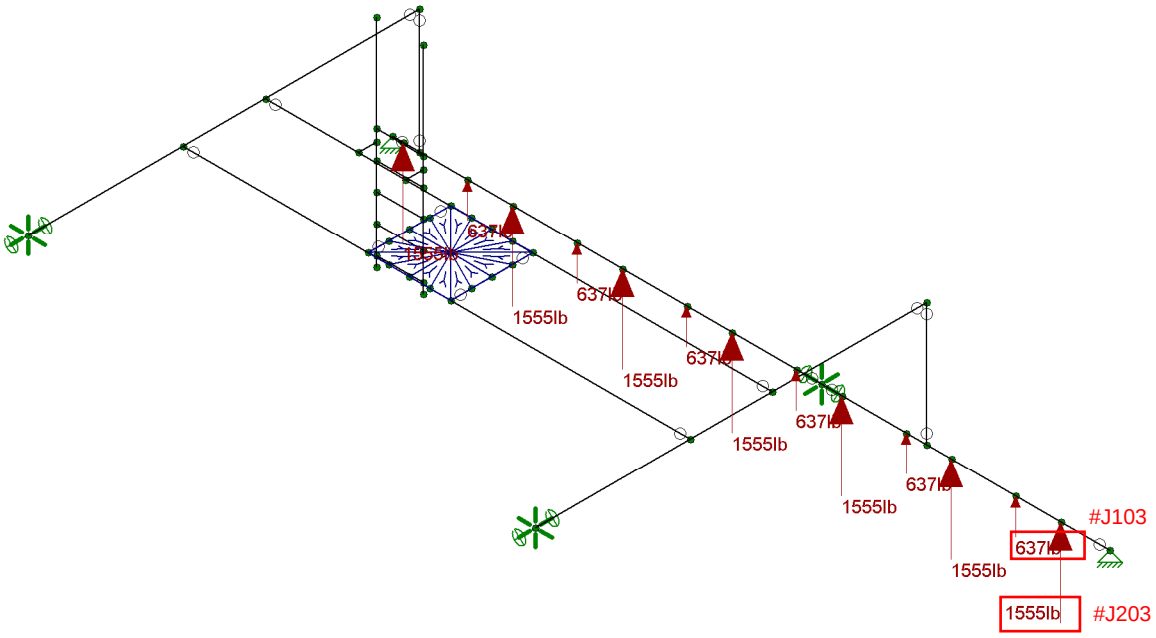




Span length of Joist #203		=	33.58	ft
Point Load from Dead Load Total =	(308 + 20.7) plf x 33.58 ft / 2	=	5519	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 33.58 ft / 2	=	1343	lbs.
Point Load from Snow Load Slab =	110.9 plf x 33.58 ft / 2	=	1862	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 33.58 ft / 2	=	44	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 33.58 ft / 2	=	-1555	lbs.

Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Slab =	(308 + 20.7) plf x 13.75 ft / 2	=	2260	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 13.75 ft / 2	=	550	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	762	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 13.75 ft / 2	=	18	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 13.75 ft / 2	=	-637	lbs.

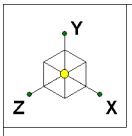
Loads: BLC 9, Snow - Pf
Envelope Only Solution

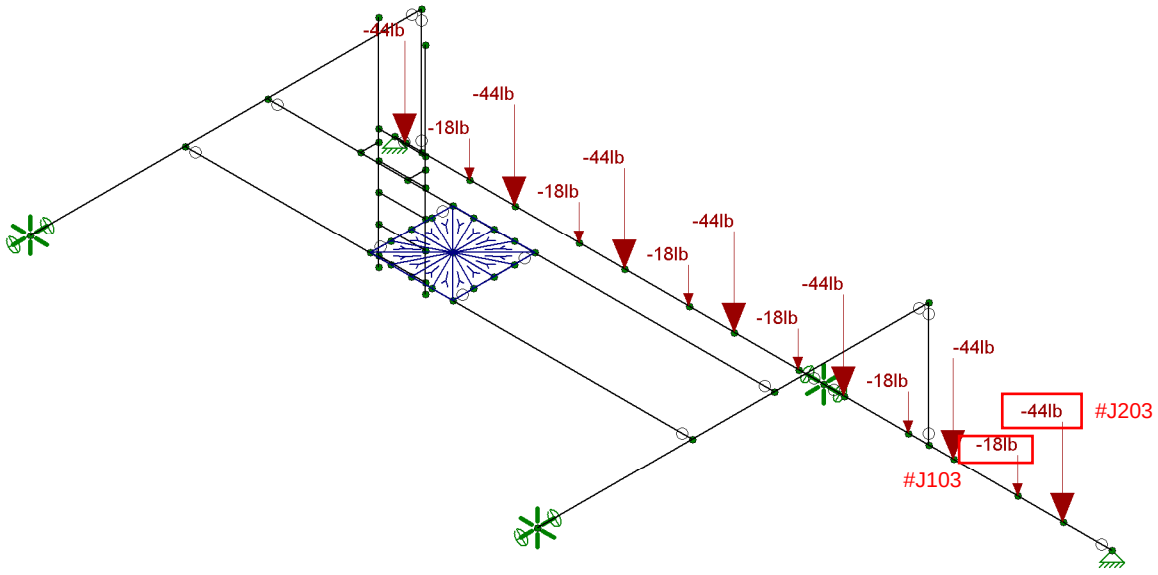


Span length of Joist #203		=	33.58	ft
Point Load from Dead Load Total =	(308 + 20.7) plf x 33.58 ft / 2	=	5519	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 33.58 ft / 2	=	1343	lbs.
Point Load from Snow Load Slab =	110.9 plf x 33.58 ft / 2	=	1862	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 33.58 ft / 2	=	44	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 33.58 ft / 2	=	-1555	lbs.

Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Slab =	(308 + 20.7) plf x 13.75 ft / 2	=	2260	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 13.75 ft / 2	=	550	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	762	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 13.75 ft / 2	=	18	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 13.75 ft / 2	=	-637	lbs.

Loads: BLC 10, Wind Building (+Y)
Envelope Only Solution

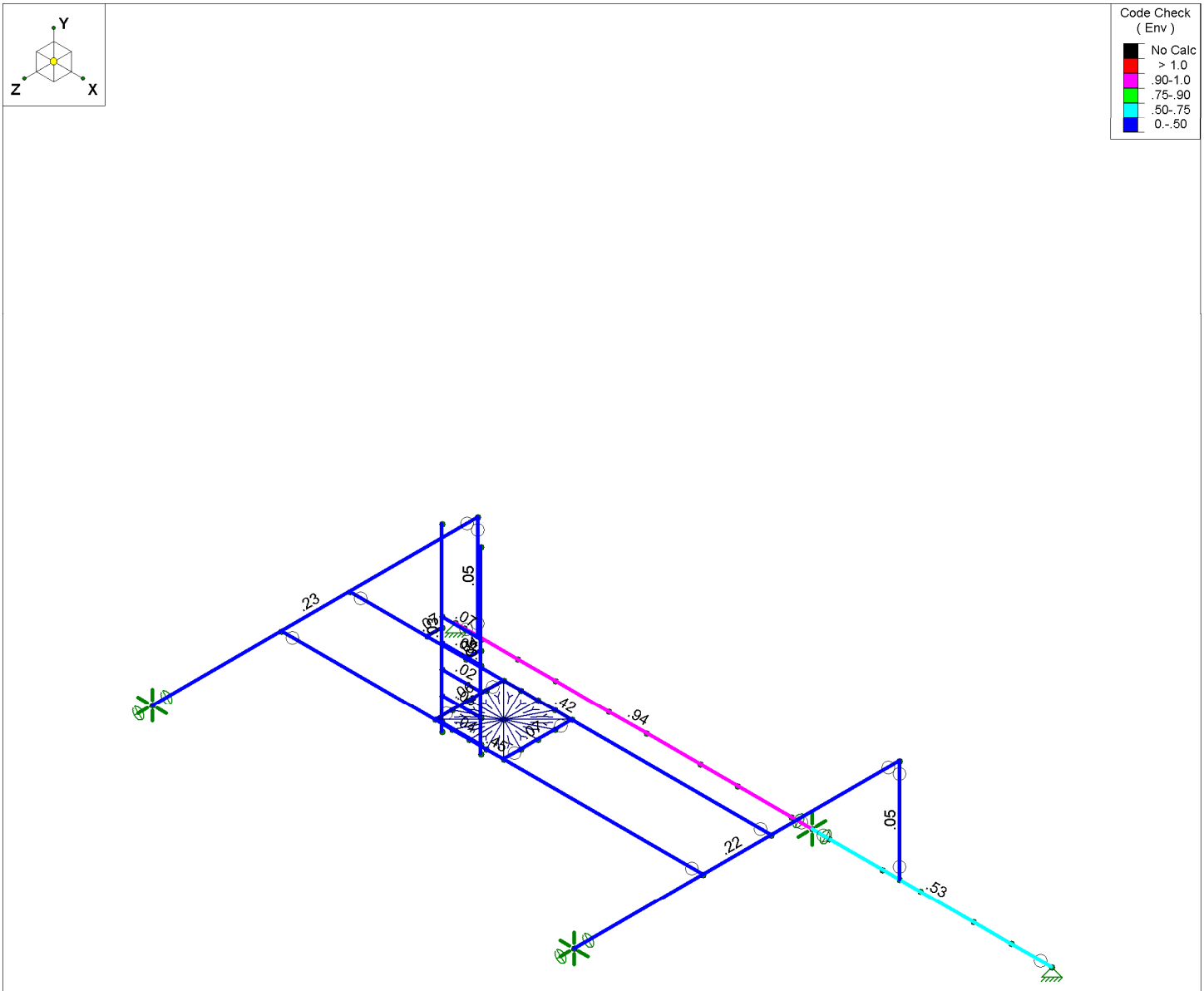




Span length of Joist #203		=	33.58	ft
Point Load from Dead Load Total =	(308 + 20.7) plf x 33.58 ft / 2	=	5519	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 33.58 ft / 2	=	1343	lbs.
Point Load from Snow Load Slab =	110.9 plf x 33.58 ft / 2	=	1862	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 33.58 ft / 2	=	44	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 33.58 ft / 2	=	-1555	lbs.

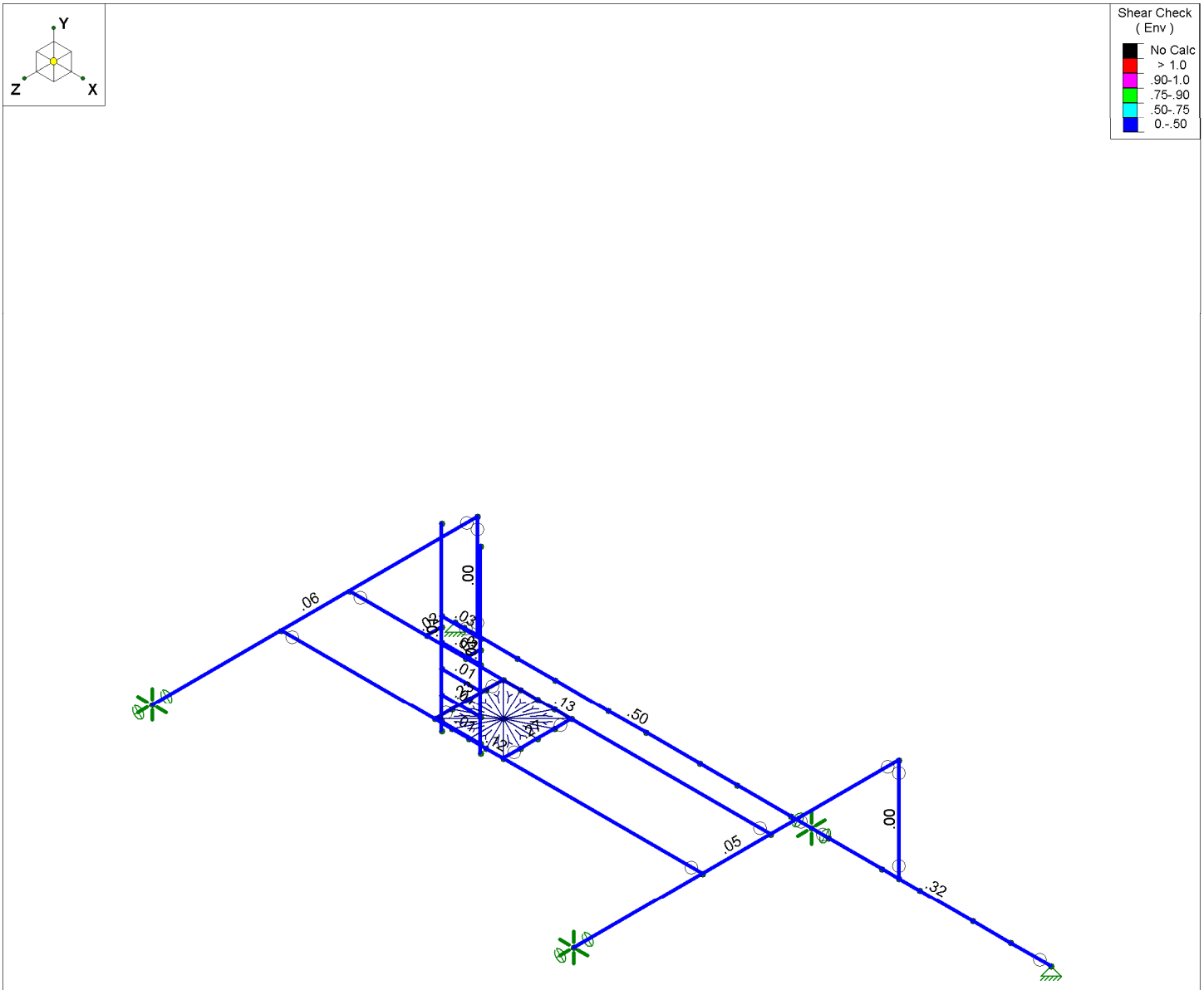
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Slab =	(308 + 20.7) plf x 13.75 ft / 2	=	2260	lbs.
Point Load from Roof Live Load of Slab =	80 plf x 13.75 ft / 2	=	550	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	762	lbs.
Point Load from Pos. Wind Pressure =	2.64 plf x 13.75 ft / 2	=	18	lbs.
Point Load from Neg. Wind Uplift =	-92.64 plf x 13.75 ft / 2	=	-637	lbs.

Loads: BLC 11, Wind Building (-Y)
Envelope Only Solution



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 15
T. Chalermyan		June 25, 2020 at 11:09 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Black & Veatch Corp.	Danielson Work Center - Existing Rooftop Frame	SK - 16
T. Chalermyan		June 25, 2020 at 11:09 AM
403093.2000.2200		DanielsonAWC - Existing Rooftop Fr...

(Global) Model Settings

Display Sections for Member Calcs	3
Max Internal Sections for Member Calcs	99
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	None
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A500 Gr. B	29000	11154	.3	.65	.49	42	1.6	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.5	65	1.2
4	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	60	1.2
5	A572 Gr. 50	29000	11154	.3	.65	.49	50	1.5	65	1.2
6	A9 Gr.33	29000	11154	.3	.65	.49	33	1.5	60	1.2

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]
1	RIGID	1e+6		.3	0	0
2	A572 - 50	29000	11154	.3	.65	.49

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Square Post	HSS6X6X4	Column	None	A500 Gr. B	Typical	5.24	28.6	28.6	45.6
2	Beam	W24X76	Beam	None	A992	Typical	22.4	82.5	2100	2.68
3	Ladder Post	HSS2.5X2.5X4	Column	None	A500 Gr. B	Typical	1.97	1.63	1.63	2.79
4	Ladder Rail	SR1	Beam	None	A36 Gr.36	Typical	.785	.049	.049	.098
5	Existing Beam	W14X30	Beam	None	A9 Gr.33	Typical	8.85	19.6	291	.38
6	Standoff Ladder	PL8x3/8	Beam	None	A36 Gr.36	Typical	3	.035	16	.136

General Section Sets

	Label	Shape	Type	Material	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	RIGID		None	RIGID	1e+6	1e+6	1e+6	1e+6

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	0	0	.875	0	
2	N2	18.5	0	.875	0	
3	N3	0	4.5	.875	0	
4	N4	0	4.5	15.145833	0	
5	N5	18.5	4.5	.875	0	
6	N6	18.5	4.5	15.145833	0	
7	N7	0	4.5	6.5	0	
8	N8	18.5	4.5	6.5	0	
9	N9	0	4.5	9.5	0	
10	N10	18.5	4.5	9.5	0	
11	N11	6.75	4.5	9.5	0	
12	N12	6.75	4.5	6.5	0	
13	N13	9.75	4.5	9.5	0	
14	N14	9.75	4.5	6.5	0	
15	N15	8.25	4.5	9.5	0	
16	N16	8.25	4.5	6.5	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
17	N17	6.75	4.5	8	0	
18	N18	9.75	4.5	8	0	
19	N19	8.25	4.5	8	0	
20	N20	6.75	4.5	8.75	0	
21	N21	7.5	4.5	9.5	0	
22	N22	6.75	4.5	7.25	0	
23	N23	7.5	4.5	6.5	0	
24	N24	9	4.5	9.5	0	
25	N25	9.75	4.5	8.75	0	
26	N26	9	4.5	6.5	0	
27	N27	9.75	4.5	7.25	0	
28	N28	5.10415	4.5	6.5	0	
29	N29	3.39585	4.5	6.5	0	
30	N30	5.10415	4.5	5.854163	0	
31	N31	3.39585	4.5	5.854163	0	
32	N32	5.10415	0.553333	5.854163	0	
33	N33	3.39585	0.553333	5.854163	0	
34	N34	5.10415	8.42833	5.854163	0	
35	N35	3.39585	8.42833	5.854163	0	
36	N36	5.10415	0.9075	5.854163	0	
37	N37	3.39585	0.9075	5.854163	0	
38	N38	5.10415	1.928333	5.854163	0	
39	N39	3.39585	1.928333	5.854163	0	
40	N40	5.10415	2.928333	5.854163	0	
41	N41	3.39585	2.928333	5.854163	0	
42	N42	5.10415	3.928333	5.854163	0	
43	N43	3.39585	3.928333	5.854163	0	
44	N44	5.10415	4.928333	5.854163	0	
45	N45	3.39585	4.928333	5.854163	0	
46	N46	-1	0	.875	0	
47	N47	14.67	0	.875	0	
48	N48	3.4	0	.875	0	
49	N49	7.4	0	.875	0	
50	N50	11.4	0	.875	0	
51	N51	15.4	0	.875	0	
52	N52	19.4	0	.875	0	
53	N53	23.4	0	.875	0	
54	N54	25.17	0	.875	0	
55	N55	1.75	0	.875	0	
56	N56	5.75	0	.875	0	
57	N57	9.75	0	.875	0	
58	N58	13.75	0	.875	0	
59	N59	17.75	0	.875	0	
60	N60	21.75	0	.875	0	
61	N61	-.6	0	.875	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N4	Reaction	Reaction	Reaction			Reaction
2	N6	Reaction	Reaction	Reaction			Reaction
3	N1						
4	N2						
5	N46	Reaction	Reaction	Reaction			
6	N47	Reaction	Reaction	Reaction	Reaction		
7	N48						
8	N49						
9	N50						
10	N51						
11	N52						
12	N53						

Joint Boundary Conditions (Continued)

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
13	N54	Reaction	Reaction	Reaction			
14	N55						
15	N56						
16	N57						
17	N58						
18	N59						
19	N60						
20	N61						

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N4	N3			Beam	Beam	None	A992	Typical
2	M2	N6	N5			Beam	Beam	None	A992	Typical
3	M3	N9	N10			Beam	Beam	None	A992	Typical
4	M4	N7	N8			Beam	Beam	None	A992	Typical
5	M5	N11	N12			Beam	Beam	None	A992	Typical
6	M6	N13	N14			Beam	Beam	None	A992	Typical
7	M7	N2	N5			Square Post	Column	None	A500 Gr. B	Typical
8	M8	N1	N3			Square Post	Column	None	A500 Gr. B	Typical
9	M9	N29	N31			Standoff Ladder	Beam	None	A36 Gr.36	Typical
10	M10	N28	N30			Standoff Ladder	Beam	None	A36 Gr.36	Typical
11	M11	N33	N35			Ladder Post	Column	None	A500 Gr. B	Typical
12	M12	N32	N34			Ladder Post	Column	None	A500 Gr. B	Typical
13	M13	N37	N36			Ladder Rail	Beam	None	A36 Gr.36	Typical
14	M14	N39	N38			Ladder Rail	Beam	None	A36 Gr.36	Typical
15	M15	N41	N40			Ladder Rail	Beam	None	A36 Gr.36	Typical
16	M16	N43	N42			Ladder Rail	Beam	None	A36 Gr.36	Typical
17	M17	N45	N44			Ladder Rail	Beam	None	A36 Gr.36	Typical
18	M18	N47	N46			Existing Beam	Beam	None	A9 Gr.33	Typical
19	M19	N54	N47			Existing Beam	Beam	None	A9 Gr.33	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1		BenPIN				Yes				None
2	M2		BenPIN				Yes				None
3	M3	BenPIN	BenPIN				Yes	Default			None
4	M4	BenPIN	BenPIN				Yes				None
5	M5	BenPIN	BenPIN				Yes				None
6	M6	BenPIN	BenPIN				Yes				None
7	M7	BenPIN	BenPIN				Yes	** NA **			None
8	M8	BenPIN	BenPIN				Yes	** NA **			None
9	M9						Yes				None
10	M10						Yes				None
11	M11						Yes	** NA **			None
12	M12						Yes	** NA **			None
13	M13						Yes				None
14	M14						Yes				None
15	M15						Yes				None
16	M16						Yes				None
17	M17						Yes				None
18	M18	BenPIN	BenPIN				Yes	Default			None
19	M19	BenPIN	BenPIN				Yes				None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	L-torque[ft]	Kyy	Kzz	Cb	Func...
1	M1	Beam	14.271	5.646	5.646							Lateral
2	M2	Beam	14.271	5.646	5.646							Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	L-torque[ft]	Kyy	Kzz	Cb	Func...
3	M3	Beam	18.5	8.75	8.75							Lateral
4	M4	Beam	18.5	8.75	8.75							Lateral
5	M5	Beam	3									Lateral
6	M6	Beam	3									Lateral
7	M7	Square Post	4.5									Lateral
8	M8	Square Post	4.5									Lateral
9	M9	Standoff Ladder	.646									Lateral
10	M10	Standoff Ladder	.646									Lateral
11	M11	Ladder Post	7.875									Lateral
12	M12	Ladder Post	7.875									Lateral
13	M13	Ladder Rail	1.708									Lateral
14	M14	Ladder Rail	1.708									Lateral
15	M15	Ladder Rail	1.708									Lateral
16	M16	Ladder Rail	1.708									Lateral
17	M17	Ladder Rail	1.708									Lateral
18	M18	Existing Beam	15.67		4	4						Lateral
19	M19	Existing Beam	10.5		4	4						Lateral

Plate Primary Data

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness[in]
1	P1	N11	N20	N19		A572 - 50	2
2	P2	N20	N17	N19		A572 - 50	2
3	P3	N17	N22	N19		A572 - 50	2
4	P4	N22	N12	N19		A572 - 50	2
5	P5	N12	N23	N19		A572 - 50	2
6	P6	N23	N16	N19		A572 - 50	2
7	P7	N16	N26	N19		A572 - 50	2
8	P8	N19	N26	N14		A572 - 50	2
9	P9	N19	N14	N27		A572 - 50	2
10	P10	N19	N27	N18		A572 - 50	2
11	P11	N18	N25	N19		A572 - 50	2
12	P12	N13	N19	N25		A572 - 50	2
13	P13	N24	N19	N13		A572 - 50	2
14	P14	N15	N19	N24		A572 - 50	2
15	P15	N21	N19	N15		A572 - 50	2
16	P16	N11	N19	N21		A572 - 50	2

Plate Advanced Data

	Label	A Release	B Release	C Release	D Release	Inactive	Plane Stress	Axis Rotate
1	P1							NA
2	P2							NA
3	P3							NA
4	P4							NA
5	P5							NA
6	P6							NA
7	P7							NA
8	P8							NA
9	P9							NA
10	P10							NA
11	P11							NA
12	P12							NA
13	P13							NA
14	P14							NA
15	P15							NA
16	P16							NA

Joint Loads and Enforced Displacements (BLC 1 : DL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N19	L	Y	-4710
2	N19	L	Mx	-320
3	N19	L	Mz	80
4	N55	L	Y	-2260
5	N56	L	Y	-2260
6	N57	L	Y	-2260
7	N58	L	Y	-2260
8	N59	L	Y	-2260
9	N60	L	Y	-2260
10	N48	L	Y	-5519
11	N49	L	Y	-5519
12	N50	L	Y	-5519
13	N51	L	Y	-5519
14	N52	L	Y	-5519
15	N53	L	Y	-5519
16	N61	L	Y	-5519

Joint Loads and Enforced Displacements (BLC 3 : Roof LL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N55	L	Y	-550
2	N56	L	Y	-550
3	N57	L	Y	-550
4	N58	L	Y	-550
5	N59	L	Y	-550
6	N60	L	Y	-550
7	N48	L	Y	-1343
8	N49	L	Y	-1343
9	N50	L	Y	-1343
10	N51	L	Y	-1343
11	N52	L	Y	-1343
12	N53	L	Y	-1343
13	N61	L	Y	-1343

Joint Loads and Enforced Displacements (BLC 4 : Wind - 0 Deg (+X))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N19	L	X	3210
2	N19	L	Mz	-1.35e+5
3	N19	L	My	430

Joint Loads and Enforced Displacements (BLC 5 : Wind - 90 Deg (+Z))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N19	L	Z	3210
2	N19	L	Mx	1.35e+5
3	N19	L	My	430

Joint Loads and Enforced Displacements (BLC 6 : Ice DL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N19	L	Y	-4198
2	N19	L	Mx	-96
3	N19	L	Mz	364

Joint Loads and Enforced Displacements (BLC 7 : Ice Wind - 0 Deg (+X))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N19	L	X	990
2	N19	L	Mz	-42246
3	N19	L	My	140

Joint Loads and Enforced Displacements (BLC 8 : Ice Wind - 90 Deg (+Z))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N19	L	Z	990
2	N19	L	Mx	42246
3	N19	L	My	140

Joint Loads and Enforced Displacements (BLC 9 : Snow - Pf)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N55	L	Y	-762
2	N56	L	Y	-762
3	N57	L	Y	-762
4	N58	L	Y	-762
5	N59	L	Y	-762
6	N60	L	Y	-762
7	N48	L	Y	-1862
8	N49	L	Y	-1862
9	N50	L	Y	-1862
10	N51	L	Y	-1862
11	N52	L	Y	-1862
12	N53	L	Y	-1862
13	N61	L	Y	-1862

Joint Loads and Enforced Displacements (BLC 10 : Wind Building (+Y))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N55	L	Y	637
2	N56	L	Y	637
3	N57	L	Y	637
4	N58	L	Y	637
5	N59	L	Y	637
6	N60	L	Y	637
7	N48	L	Y	1555
8	N49	L	Y	1555
9	N50	L	Y	1555
10	N51	L	Y	1555
11	N52	L	Y	1555
12	N53	L	Y	1555
13	N61	L	Y	1555

Joint Loads and Enforced Displacements (BLC 11 : Wind Building (-Y))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N55	L	Y	-18
2	N56	L	Y	-18
3	N57	L	Y	-18
4	N58	L	Y	-18
5	N59	L	Y	-18
6	N60	L	Y	-18
7	N48	L	Y	-44
8	N49	L	Y	-44
9	N50	L	Y	-44
10	N51	L	Y	-44
11	N52	L	Y	-44
12	N53	L	Y	-44
13	N61	L	Y	-44

Member Distributed Loads (BLC 4 : Wind - 0 Deg (+X))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	PX	25.3	25.3	0	0
2	M8	PX	25.3	25.3	0	0
3	M1	PX	100.7	100.7	0	0
4	M2	PX	100.7	100.7	0	0

Member Distributed Loads (BLC 4 : Wind - 0 Deg (+X)) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
5	M3	PX	100.7	100.7	0	0
6	M4	PX	100.7	100.7	0	0
7	M5	PX	100.7	100.7	0	0
8	M6	PX	100.7	100.7	0	0
9	M11	PX	10.5	10.5	0	0
10	M12	PX	10.5	10.5	0	0
11	M13	PX	4.2	4.2	0	0
12	M14	PX	4.2	4.2	0	0
13	M15	PX	4.2	4.2	0	0
14	M16	PX	4.2	4.2	0	0
15	M17	PX	4.2	4.2	0	0
16	M9	PX	33.7	33.7	0	0
17	M10	PX	33.7	33.7	0	0

Member Distributed Loads (BLC 5 : Wind - 90 Deg (+Z))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	PZ	25.3	25.3	0	0
2	M8	PZ	25.3	25.3	0	0
3	M1	PZ	100.7	100.7	0	0
4	M2	PZ	100.7	100.7	0	0
5	M3	PZ	100.7	100.7	0	0
6	M4	PZ	100.7	100.7	0	0
7	M5	PZ	100.7	100.7	0	0
8	M6	PZ	100.7	100.7	0	0
9	M11	PZ	10.5	10.5	0	0
10	M12	PZ	10.5	10.5	0	0
11	M13	PZ	4.2	4.2	0	0
12	M14	PZ	4.2	4.2	0	0
13	M15	PZ	4.2	4.2	0	0
14	M16	PZ	4.2	4.2	0	0
15	M17	PZ	4.2	4.2	0	0
16	M9	PZ	33.7	33.7	0	0
17	M10	PZ	33.7	33.7	0	0

Member Distributed Loads (BLC 6 : Ice DL)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	Y	-22.4	-22.4	0	0
2	M8	Y	-22.4	-22.4	0	0
3	M1	Y	-59.5	-59.5	0	0
4	M2	Y	-59.5	-59.5	0	0
5	M3	Y	-59.5	-59.5	0	0
6	M4	Y	-59.5	-59.5	0	0
7	M5	Y	-59.5	-59.5	0	0
8	M6	Y	-59.5	-59.5	0	0
9	M13	Y	-6.1	-6.1	0	0
10	M14	Y	-6.1	-6.1	0	0
11	M15	Y	-6.1	-6.1	0	0
12	M16	Y	-6.1	-6.1	0	0
13	M17	Y	-6.1	-6.1	0	0
14	M9	Y	-21.3	-21.3	0	0
15	M10	Y	-21.3	-21.3	0	0
16	M11	Y	-11.6	-11.6	0	0
17	M12	Y	-11.6	-11.6	0	0

Member Distributed Loads (BLC 7 : Ice Wind - 0 Deg (+X))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	PX	5.1	5.1	0	0
2	M8	PX	5.1	5.1	0	0
3	M1	PX	14.8	14.8	0	0
4	M2	PX	14.8	14.8	0	0

Member Distributed Loads (BLC 7 : Ice Wind - 0 Deg (+X)) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
5	M3	PX	14.8	14.8	0	0
6	M4	PX	14.8	14.8	0	0
7	M5	PX	14.8	14.8	0	0
8	M6	PX	14.8	14.8	0	0
9	M11	PX	3.3	3.3	0	0
10	M12	PX	3.3	3.3	0	0
11	M13	PX	2.5	2.5	0	0
12	M14	PX	2.5	2.5	0	0
13	M15	PX	2.5	2.5	0	0
14	M16	PX	2.5	2.5	0	0
15	M17	PX	2.5	2.5	0	0
16	M9	PX	6.2	6.2	0	0
17	M10	PX	6.2	6.2	0	0

Member Distributed Loads (BLC 8 : Ice Wind - 90 Deg (+Z))

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M7	PZ	5.1	5.1	0	0
2	M8	PZ	5.1	5.1	0	0
3	M1	PZ	14.8	14.8	0	0
4	M2	PZ	14.8	14.8	0	0
5	M3	PZ	14.8	14.8	0	0
6	M4	PZ	14.8	14.8	0	0
7	M5	PZ	14.8	14.8	0	0
8	M6	PZ	14.8	14.8	0	0
9	M11	PZ	3.3	3.3	0	0
10	M12	PZ	3.3	3.3	0	0
11	M13	PZ	2.5	2.5	0	0
12	M14	PZ	2.5	2.5	0	0
13	M15	PZ	2.5	2.5	0	0
14	M16	PZ	2.5	2.5	0	0
15	M17	PZ	2.5	2.5	0	0
16	M9	PZ	6.2	6.2	0	0
17	M10	PZ	6.2	6.2	0	0

Member Distributed Loads (BLC 12 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M3	Y	-21.45	-21.45	4.441e-16	6.75
2	M4	Y	-21.45	-21.45	4.441e-16	6.75

Member Distributed Loads (BLC 13 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M3	Y	-60	-60	4.441e-16	6.75
2	M4	Y	-60	-60	4.441e-16	6.75

Member Distributed Loads (BLC 14 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M3	Y	-39.195	-39.195	4.441e-16	6.75
2	M4	Y	-39.195	-39.195	4.441e-16	6.75

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut..	Area(M...	Surface...
1	DL	DL		-1		16			1	
2	LL	LL							1	
3	Roof LL	RLL				13				
4	Wind - 0 Deg (+X)	WLX				3		17		
5	Wind - 90 Deg (+Z)	WLZ				3		17		
6	Ice DL	NL				3		17	1	
7	Ice Wind - 0 Deg (+X)	NLX				3		17		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut..	Area(M...	Surface...
8	Ice Wind - 90 Deg (+Z)	NLZ				3		17		
9	Snow - Pf	SL				13				
10	Wind Building (+Y)	WL+X				13				
11	Wind Building (-Y)	WL-Y				13				
12	BLC 1 Transient Area Loads	None						2		
13	BLC 2 Transient Area Loads	None						2		
14	BLC 6 Transient Area Loads	None						2		

Load Combinations

	Description	Solve	PD...	S...	BLC	Fact..	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac..	BLC	Fa...	B...	F...	...	F.....	F.....	F...
1	LOAD COMBINATION USI...																					
2	WIND LOAD COMBINATI...																					
3	1.4DL	Yes	Y		DL	1.4																
4	1.2DL + 1.6LL + 0.5RLL	Yes	Y		DL	1.2	LL	1.6	RLL	.5												
5	1.2DL + 1.6LL + 0.5SL	Yes	Y		DL	1.2	LL	1.6	SL	.5												
6	1.2DL + 1.6LL + 0.5SL + 0...	Yes	Y		DL	1.2	LL	1.6	SL	.5	NL	.2										
7	1.2DL + 1.6RLL + 1.0LL	Yes	Y		DL	1.2	LL	1	RLL	1.6												
8	1.2DL + 1.6SL + 1.0LL	Yes	Y		DL	1.2	LL	1	SL	1.6												
9	1.2DL + 1.6RLL + 0.5WL (0...	Yes	Y		DL	1.2	RLL	1.6	WLX	.5	WLZ		WL...	.5								
10	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	.25	WL...	.5								
11	1.2DL + 1.6RLL + 0.5WL (6...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	.433	WL...	.5								
12	1.2DL + 1.6RLL + 0.5WL (9...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	.5	WL...	.5								
13	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	.433	WL...	.5								
14	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	.25	WL...	.5								
15	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.5	WLZ		WL...	.5								
16	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	-.25	WL...	.5								
17	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	-.433	WL...	.5								
18	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	-.5	WL...	.5								
19	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	-.433	WL...	.5								
20	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	-.25	WL...	.5								
21	1.2DL + 1.6RLL + 0.5WL (0...	Yes	Y		DL	1.2	RLL	1.6	WLX	.5	WLZ		WL-Y	.5								
22	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	.25	WL-Y	.5								
23	1.2DL + 1.6RLL + 0.5WL (6...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	.433	WL-Y	.5								
24	1.2DL + 1.6RLL + 0.5WL (9...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	.5	WL-Y	.5								
25	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	.433	WL-Y	.5								
26	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	.25	WL-Y	.5								
27	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.5	WLZ		WL-Y	.5								
28	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	-.25	WL-Y	.5								
29	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	-.433	WL-Y	.5								
30	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	-.5	WL-Y	.5								
31	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	-.433	WL-Y	.5								
32	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	-.25	WL-Y	.5								
33	1.2DL + 1.6SL + 0.5WL (0 ...	Yes	Y		DL	1.2	SL	1.6	WLX	.5	WLZ		WL...	.5								
34	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	.25	WL...	.5								
35	1.2DL + 1.6SL + 0.5WL (60...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	.433	WL...	.5								
36	1.2DL + 1.6SL + 0.5WL (90...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	.5	WL...	.5								
37	1.2DL + 1.6SL + 0.5WL (12...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	.433	WL...	.5								
38	1.2DL + 1.6SL + 0.5WL (15...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	.25	WL...	.5								
39	1.2DL + 1.6SL + 0.5WL (18...	Yes	Y		DL	1.2	SL	1.6	WLX	-.5	WLZ		WL...	.5								
40	1.2DL + 1.6SL + 0.5WL (21...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	-.25	WL...	.5								
41	1.2DL + 1.6SL + 0.5WL (24...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	-.433	WL...	.5								
42	1.2DL + 1.6SL + 0.5WL (27...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	-.5	WL...	.5								
43	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	-.433	WL...	.5								
44	1.2DL + 1.6SL + 0.5WL (33...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	-.25	WL...	.5								
45	1.2DL + 1.6SL + 0.5WL (0 ...	Yes	Y		DL	1.2	SL	1.6	WLX	.5	WLZ		WL-Y	.5								
46	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	.25	WL-Y	.5								
47	1.2DL + 1.6SL + 0.5WL (60...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	.433	WL-Y	.5								
48	1.2DL + 1.6SL + 0.5WL (90...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	.5	WL-Y	.5								
49	1.2DL + 1.6SL + 0.5WL (12...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	.433	WL-Y	.5								
50	1.2DL + 1.6SL + 0.5WL (15...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	.25	WL-Y	.5								

Load Combinations (Continued)

	Description	Solve	PD...	S...	BLC	Fact...	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fa...	B...	F...	...	F.....	F.....	F...
51	1.2DL + 1.6SL + 0.5WL (18...	Yes	Y		DL	1.2	SL	1.6	WLX	-.5	WLZ		WL-Y	.5								
52	1.2DL + 1.6SL + 0.5WL (21...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	-.25	WL-Y	.5								
53	1.2DL + 1.6SL + 0.5WL (24...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	-.433	WL-Y	.5								
54	1.2DL + 1.6SL + 0.5WL (27...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	-.5	WL-Y	.5								
55	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	-.433	WL-Y	.5								
56	1.2DL + 1.6SL + 0.5WL (33...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	-.25	WL-Y	.5								
57	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL...	1	RLL	.5						
58	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL...	1	RLL	.5						
59	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL...	1	RLL	.5						
60	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL...	1	RLL	.5						
61	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL...	1	RLL	.5						
62	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL...	1	RLL	.5						
63	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL...	1	RLL	.5						
64	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL...	1	RLL	.5						
65	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL...	1	RLL	.5						
66	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL...	1	RLL	.5						
67	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL...	1	RLL	.5						
68	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL...	1	RLL	.5						
69	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL-Y	1	RLL	.5						
70	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL-Y	1	RLL	.5						
71	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL-Y	1	RLL	.5						
72	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL-Y	1	RLL	.5						
73	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL-Y	1	RLL	.5						
74	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL-Y	1	RLL	.5						
75	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL-Y	1	RLL	.5						
76	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL-Y	1	RLL	.5						
77	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL-Y	1	RLL	.5						
78	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL-Y	1	RLL	.5						
79	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL-Y	1	RLL	.5						
80	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL-Y	1	RLL	.5						
81	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL...	1	SL	.5						
82	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL...	1	SL	.5						
83	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL...	1	SL	.5						
84	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL...	1	SL	.5						
85	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL...	1	SL	.5						
86	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL...	1	SL	.5						
87	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL...	1	SL	.5						
88	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL...	1	SL	.5						
89	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL...	1	SL	.5						
90	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL...	1	SL	.5						
91	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL...	1	SL	.5						
92	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL...	1	SL	.5						
93	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL-Y	1	SL	.5						
94	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL-Y	1	SL	.5						
95	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL-Y	1	SL	.5						
96	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL-Y	1	SL	.5						
97	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL-Y	1	SL	.5						
98	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL-Y	1	SL	.5						
99	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL-Y	1	SL	.5						
100	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL-Y	1	SL	.5						
101	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL-Y	1	SL	.5						
102	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL-Y	1	SL	.5						
103	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL-Y	1	SL	.5						
104	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL-Y	1	SL	.5						
105	1.2DL + 1.0IWL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	NLX	1	NLZ		WL...	1	SL	.5	NL	1				
106	1.2DL + 1.0IWL (30 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	.5	WL...	1	SL	.5	NL	1				
107	1.2DL + 1.0IWL (60 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	.866	WL...	1	SL	.5	NL	1				
108	1.2DL + 1.0IWL (90 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	1	WL...	1	SL	.5	NL	1				
109	1.2DL + 1.0IWL (120 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	.866	WL...	1	SL	.5	NL	1				
110	1.2DL + 1.0IWL (150 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	.5	WL...	1	SL	.5	NL	1				
111	1.2DL + 1.0IWL (180 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-1	NLZ		WL...	1	SL	.5	NL	1				
112	1.2DL + 1.0IWL (210 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	-.5	WL...	1	SL	.5	NL	1				

Load Combinations (Continued)

	Description	Solve	PD...	S...	BLC	Fact...	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fa...	B...	F...	...	F.....	F.....	F...
113	1.2DL + 1.0IWL (240 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	-.866	WL...	1	SL	.5	NL	1				
114	1.2DL + 1.0IWL (270 DEG)...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	-1	WL...	1	SL	.5	NL	1				
115	1.2DL + 1.0IWL (300 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	-.866	WL...	1	SL	.5	NL	1				
116	1.2DL + 1.0IWL (330 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	-.5	WL...	1	SL	.5	NL	1				
117	1.2DL + 1.0IWL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	NLX	1	NLZ		WL-Y	1	SL	.5	NL	1				
118	1.2DL + 1.0IWL (30 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	.5	WL-Y	1	SL	.5	NL	1				
119	1.2DL + 1.0IWL (60 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	.866	WL-Y	1	SL	.5	NL	1				
120	1.2DL + 1.0IWL (90 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	1	WL-Y	1	SL	.5	NL	1				
121	1.2DL + 1.0IWL (120 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	.866	WL-Y	1	SL	.5	NL	1				
122	1.2DL + 1.0IWL (150 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	.5	WL-Y	1	SL	.5	NL	1				
123	1.2DL + 1.0IWL (180 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-1	NLZ		WL-Y	1	SL	.5	NL	1				
124	1.2DL + 1.0IWL (210 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	-.5	WL-Y	1	SL	.5	NL	1				
125	1.2DL + 1.0IWL (240 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	-.866	WL-Y	1	SL	.5	NL	1				
126	1.2DL + 1.0IWL (270 DEG)...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	-1	WL-Y	1	SL	.5	NL	1				
127	1.2DL + 1.0IWL (300 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	-.866	WL-Y	1	SL	.5	NL	1				
128	1.2DL + 1.0IWL (330 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	-.5	WL-Y	1	SL	.5	NL	1				
129	0.9DL + 1.0WL (0 DEG)	Yes	Y		DL	.9	WLX	1	WLZ		WL...	1										
130	0.9DL + 1.0WL (30 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	.5	WL...	1										
131	0.9DL + 1.0WL (60 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	.866	WL...	1										
132	0.9DL + 1.0WL (90 DEG)	Yes	Y		DL	.9	WLX		WLZ	1	WL...	1										
133	0.9DL + 1.0WL (120 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	.866	WL...	1										
134	0.9DL + 1.0WL (150 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	.5	WL...	1										
135	0.9DL + 1.0WL (180 DEG)	Yes	Y		DL	.9	WLX	-1	WLZ		WL...	1										
136	0.9DL + 1.0WL (210 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	-.5	WL...	1										
137	0.9DL + 1.0WL (240 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	-.866	WL...	1										
138	0.9DL + 1.0WL (270 DEG)	Yes	Y		DL	.9	WLX		WLZ	-1	WL...	1										
139	0.9DL + 1.0WL (300 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	-.866	WL...	1										
140	0.9DL + 1.0WL (330 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	-.5	WL...	1										
141	0.9DL + 1.0WL (0 DEG)	Yes	Y		DL	.9	WLX	1	WLZ		WL-Y	1										
142	0.9DL + 1.0WL (30 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	.5	WL-Y	1										
143	0.9DL + 1.0WL (60 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	.866	WL-Y	1										
144	0.9DL + 1.0WL (90 DEG)	Yes	Y		DL	.9	WLX		WLZ	1	WL-Y	1										
145	0.9DL + 1.0WL (120 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	.866	WL-Y	1										
146	0.9DL + 1.0WL (150 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	.5	WL-Y	1										
147	0.9DL + 1.0WL (180 DEG)	Yes	Y		DL	.9	WLX	-1	WLZ		WL-Y	1										
148	0.9DL + 1.0WL (210 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	-.5	WL-Y	1										
149	0.9DL + 1.0WL (240 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	-.866	WL-Y	1										
150	0.9DL + 1.0WL (270 DEG)	Yes	Y		DL	.9	WLX		WLZ	-1	WL-Y	1										
151	0.9DL + 1.0WL (300 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	-.866	WL-Y	1										
152	0.9DL + 1.0WL (330 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	-.5	WL-Y	1										
153	0.9DL + 1.0IDL + 1.0IWL (0...	Yes	Y		DL	.9	NLX	1	NLZ		WL...	1	NL	1								
154	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	.5	WL...	1	NL	1								
155	0.9DL + 1.0IDL + 1.0IWL (6...	Yes	Y		DL	.9	NLX	.5	NLZ	.866	WL...	1	NL	1								
156	0.9DL + 1.0IDL + 1.0IWL (9...	Yes	Y		DL	.9	NLX		NLZ	1	WL...	1	NL	1								
157	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.5	NLZ	.866	WL...	1	NL	1								
158	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.866	NLZ	.5	WL...	1	NL	1								
159	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-1	NLZ		WL...	1	NL	1								
160	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.866	NLZ	-.5	WL...	1	NL	1								
161	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.5	NLZ	-.866	WL...	1	NL	1								
162	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX		NLZ	-1	WL...	1	NL	1								
163	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.5	NLZ	-.866	WL...	1	NL	1								
164	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	-.5	WL...	1	NL	1								
165	0.9DL + 1.0IDL + 1.0IWL (0...	Yes	Y		DL	.9	NLX	1	NLZ		WL-Y	1	NL	1								
166	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	.5	WL-Y	1	NL	1								
167	0.9DL + 1.0IDL + 1.0IWL (6...	Yes	Y		DL	.9	NLX	.5	NLZ	.866	WL-Y	1	NL	1								
168	0.9DL + 1.0IDL + 1.0IWL (9...	Yes	Y		DL	.9	NLX		NLZ	1	WL-Y	1	NL	1								
169	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.5	NLZ	.866	WL-Y	1	NL	1								
170	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.866	NLZ	.5	WL-Y	1	NL	1								
171	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-1	NLZ		WL-Y	1	NL	1								
172	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.866	NLZ	-.5	WL-Y	1	NL	1								
173	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.5	NLZ	-.866	WL-Y	1	NL	1								
174	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX		NLZ	-1	WL-Y	1	NL	1								

Load Combinations (Continued)

	Description	Solve	PD...	S...	BLC	Fact...	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fa...	B...	F...	...	F.....	F.....	F...	
175	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.5	NLZ	-.866	WL-Y	1	NL	1									
176	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	-.5	WL-Y	1	NL	1									
177																							

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Ch...	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt [...	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	M1	W24X76	.231	5.679	75	.063	5.679	y	78	840492....	1.008e+6	107250	702637.3...	1.211	H1-1b
2	M2	W24X76	.223	5.679	93	.050	5.679	y	102	840492....	1.008e+6	107250	701763.0...	1.209	H1-1b
3	M3	W24X76	.446	9.628	59	.119	0	y	96	760592....	1.008e+6	107250	648649.0...	1.339	H1-1b
4	M4	W24X76	.419	9.628	102	.127	0	y	66	760592....	1.008e+6	107250	634884.2...	1.31	H1-1b
5	M5	W24X76	.057	2.265	100	.228	3	y	100	883088....	1.008e+6	107250	750000	1.434	H1-1b
6	M6	W24X76	.069	2.265	104	.268	3	y	68	883088....	1.008e+6	107250	750000	1.63	H1-1b
7	M7	HSS6X6X4	.046	0	67	.001	4.5	z	150	191678....	198072	35280	35280	1.136	H1-1b*
8	M8	HSS6X6X4	.055	0	65	.001	4.5	z	150	191678....	198072	35280	35280	1.136	H1-1b*
9	M9	PL8x3/8	.073	0	68	.018	0	y	97	66208.8...	97200	759.375	16200	1.256	H1-1b
10	M10	PL8x3/8	.043	0	94	.031	0	y	66	66208.8...	97200	759.375	16200	1.198	H1-1b
11	M11	HSS2.5X2....	.026	4.018	61	.011	4.018	z	97	38376.8...	74466	5134.5	5134.5	1.865	H1-1b
12	M12	HSS2.5X2....	.049	3.937	96	.013	3.375	z	96	38376.8...	74466	5134.5	5134.5	1.752	H1-1b
13	M13	SR1	.039	1.708	96	.007	1.708		97	17861.1...	25446.9	424.115	424.115	2.409	H1-1b
14	M14	SR1	.031	1.708	96	.008	1.708		97	17861.1...	25446.9	424.115	424.115	2.406	H1-1b
15	M15	SR1	.021	1.708	95	.011	1.708		97	17861.1...	25446.9	424.115	424.115	2.588	H1-1b
16	M16	SR1	.026	0	98	.019	0		97	17861.1...	25446.9	424.115	424.115	2.392	H1-1b
17	M17	SR1	.074	0	97	.027	0		96	17861.1...	25446.9	424.115	424.115	2.727	H1-1b
18	M18	W14X30	.937	7.355	53	.496	15.67	y	53	121644....	262845	22250.25	117067.5	1	H1-1b
19	M19	W14X30	.534	5.786	55	.324	10.5	y	55	185978....	262845	22250.25	117067.5	1	H1-1b

Envelope Plate/Shell Principal Stresses

	Plate		Surface	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [k...	LC	Angle [rad]	LC	Von Mises [...	LC
1	P1	max	T	14.803	152	10.561	139	3.374	64	2.341	11	13.993	62
2		min		-11.067	97	-15.778	62	.142	8	-.744	167	.483	8
3		max	B	16.213	62	10.213	97	3.823	63	2.308	149	14.163	62
4		min		-9.72	139	-15.24	152	.142	8	-.723	114	.483	8
5	P2	max	T	7.745	140	2.526	141	4.336	66	2.341	144	7.693	97
6		min		-2.684	63	-8.156	98	.091	8	-.682	119	.24	8
7		max	B	8.062	63	2.581	99	3.929	66	2.355	102	7.206	64
8		min		-2.425	129	-7.589	141	.091	8	-.776	18	.24	8
9	P3	max	T	7.683	140	2.419	141	4.351	66	2.065	147	7.72	97
10		min		-2.577	63	-8.106	99	.091	8	-.778	110	.24	8
11		max	B	8.091	63	2.718	99	3.943	66	1.997	153	7.155	64
12		min		-2.56	129	-7.619	141	.091	8	-.772	152	.24	8
13	P4	max	T	14.358	130	9.724	142	4.156	98	2.337	119	13.468	100
14		min		-10.201	64	-15.266	100	.119	4	-.389	132	.449	7
15		max	B	15.176	100	10.443	64	3.566	98	1.664	137	13.45	100
16		min		-9.941	142	-14.28	130	.119	4	-.65	126	.449	7
17	P5	max	T	8.891	144	3.758	132	2.93	95	2.245	3	8.027	65
18		min		-4.094	102	-9.218	66	.006	3	-.757	6	.192	8
19		max	B	9.818	66	4.366	102	2.751	95	2.164	140	8.52	66
20		min		-4.025	132	-9.499	132	.006	3	-.712	103	.192	8
21	P6	max	T	9.23	144	3.788	132	2.991	95	2.334	111	8.298	66
22		min		-4.129	102	-9.552	66	.008	3	-.524	158	.193	8
23		max	B	9.421	66	4.527	102	2.909	64	2.332	141	8.161	66
24		min		-4.184	132	-9.099	144	.008	3	-.555	56	.193	8
25	P7	max	T	9.227	144	3.815	132	3.1	136	2.139	114	8.294	66
26		min		-4.158	102	-9.551	66	.011	8	-.783	149	.193	8
27		max	B	9.471	66	4.509	102	3.183	64	2.154	144	8.205	66
28		min		-4.167	132	-9.146	144	.011	8	-.756	107	.193	8
29	P8	max	T	10.312	144	4.141	132	3.13	66	2.101	142	9.349	66
30		min		-4.486	102	-10.747	66	.046	8	-.633	165	.24	8

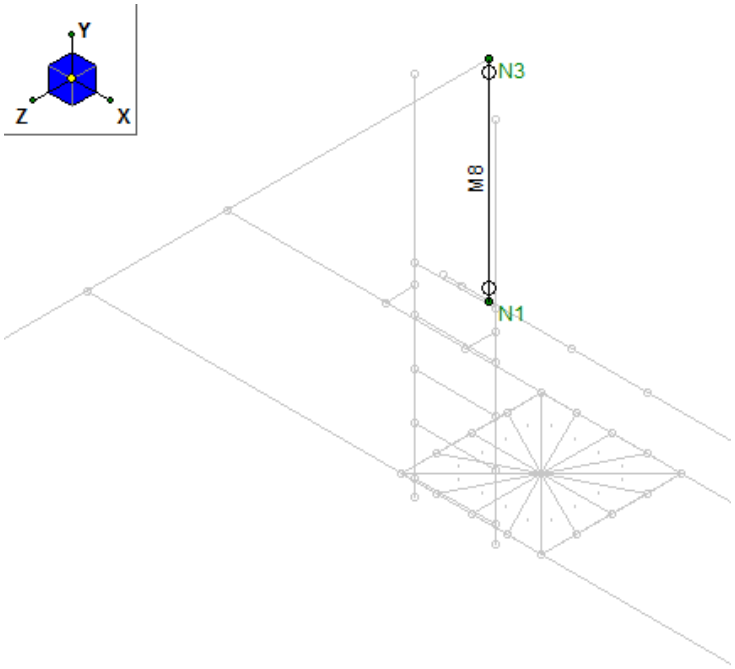
Envelope Plate/Shell Principal Stresses (Continued)

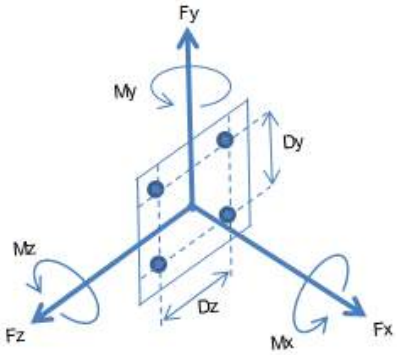
	Plate		Surface	Sigma1 [ksi]	LC	Sigma2 [ksi]	LC	Tau Max [k...	LC	Angle [rad]	LC	Von Mises [...	LC
31		max	B	11.856	66	4.538	103	4.046	65	2.338	159	10.395	66
32		min		-4.175	133	-11.399	144	.046	8	-.346	110	.24	8
33	P9	max	T	12.407	146	6.959	134	3.738	57	2.125	114	11.465	68
34		min		-7.318	104	-13.213	68	.048	174	-.501	3	.398	8
35		max	B	13.074	68	7.674	104	3.219	57	1.445	144	11.379	68
36		min		-7.292	134	-12.277	146	.124	8	-.476	145	.398	8
37	P10	max	T	7.552	148	2.294	135	3.769	59	2.272	109	7.34	58
38		min		-2.441	93	-7.953	58	.084	8	-.729	132	.222	8
39		max	B	7.728	93	2.62	57	3.35	60	2.351	174	6.813	58
40		min		-2.47	147	-7.29	135	.084	8	-.761	54	.222	8
41	P11	max	T	7.593	148	2.401	135	3.466	59	2.301	152	7.303	58
42		min		-2.547	93	-8.001	58	.084	8	-.579	115	.222	8
43		max	B	7.674	93	2.476	57	2.929	59	2.063	15	6.784	93
44		min		-2.328	147	-7.236	135	.084	8	-.773	146	.222	8
45	P12	max	T	15.713	136	10.47	148	2.996	93	2.271	127	14.618	94
46		min		-10.937	58	-16.603	94	.119	4	-.735	140	.442	7
47		max	B	17.099	94	9.946	59	3.629	93	2.112	133	14.867	94
48		min		-9.448	149	-16.213	136	.119	4	-.774	122	.442	7
49	P13	max	T	10.009	138	4.302	150	3.225	68	2.31	54	8.983	96
50		min		-4.63	60	-10.353	96	.004	4	-.552	161	.193	7
51		max	B	11.296	96	4.612	60	3.342	144	2.204	156	9.837	96
52		min		-4.282	150	-10.959	138	.004	4	-.761	47	.193	7
53	P14	max	T	10.192	138	4.123	150	3.182	67	2.275	5	9.141	96
54		min		-4.449	60	-10.513	96	.003	6	-.77	163	.187	8
55		max	B	10.426	96	4.81	60	3.008	67	2.143	158	9.038	96
56		min		-4.484	150	-10.104	138	.003	6	-.785	97	.187	8
57	P15	max	T	10.181	138	4.115	150	3.103	67	2.344	57	9.13	96
58		min		-4.441	60	-10.501	96	.009	8	-.727	6	.187	8
59		max	B	10.38	96	4.831	60	2.83	67	2.355	171	8.997	96
60		min		-4.507	150	-10.06	138	.009	8	-.527	98	.187	8
61	P16	max	T	9.847	138	4.136	150	3.031	68	2.215	107	8.826	96
62		min		-4.461	60	-10.166	96	.011	8	-.642	142	.188	8
63		max	B	10.864	60	4.654	96	3.107	132	2.252	149	9.441	60
64		min		-4.337	138	-10.534	150	.011	8	-.625	112	.188	8

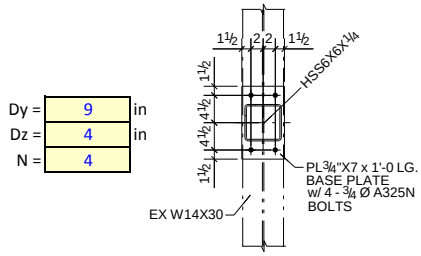
ENV. MEMBER END REACTION FOR EXISTING THRU - BOLTS OF HSS6x6x1/4

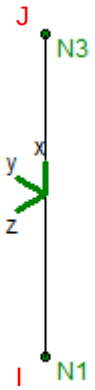
Envelope Member End Reactions

	Memb..	Memb...		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[lb-ft]	LC	y-y Moment[l...	LC	z-z Moment[...	LC
1	M7	I	max	8779.361	67	56.925	141	56.925	150	0	176	0	176	0	176
2			min	-3015.091	133	-56.925	63	-56.925	60	0	3	0	3	0	3
3		J	max	8683.076	67	56.925	147	56.925	144	0	176	0	176	0	176
4			min	-3087.305	133	-56.925	57	-56.925	66	0	3	0	3	0	3
5	M8	I	max	10528.565	65	56.925	141	56.925	150	0	176	0	176	0	176
6			min	-3521.712	131	-56.925	63	-56.925	60	0	3	0	3	0	3
7		J	max	10432.28	65	56.925	147	56.925	144	0	176	0	176	0	176
8			min	-3593.926	131	-56.925	57	-56.925	66	0	3	0	3	0	3









ENV. REACTION INPUT TO TEMPLATE

Fy = 57 lbs.
Fx = 3522 lbs.
Fz = 57 lbs.

My = 0 lbs.-ft
Mx = 0 lbs.-ft
Mz = 0 lbs.-ft

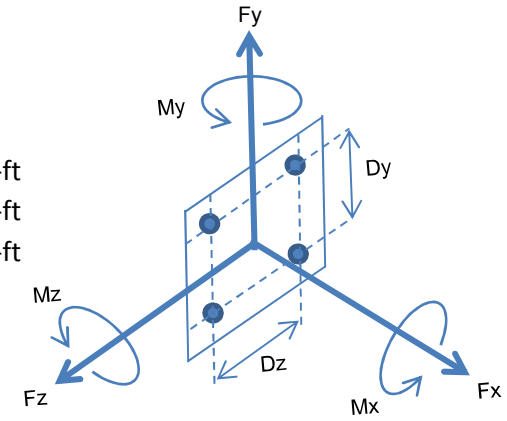
Owner:	EVERSOURCE	Prepared By:	T. Chalermyan
Plant:	DANIELSON WORK CENTER	Date:	5/29/2020
Project No.	403093.2000.2200	Verified By:	L. Meyer
Title:	STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING ROOFTOP STRUCTURE	Date:	5/29/2020

BLACK & VEATCH

Wall Anchor Check (LRFD) - Bolted Thru Wall

AISC 14th Ed.

Load Inputs:		Envelope	
Vertical Force	Fy =	57	lbs
Horizontal Force (Tension)	Fx =	3,522	lbs
Horizontal Force	Fz =	57	lbs
Moment about Y-Axis	My =	0	lbs-ft
Moment about X-Axis	Mx =	0	lbs-ft
Moment about Z-Axis	Mz =	0	lbs-ft
Force Couple Y-Axis	Dy =	9	in
Force Couple Z-Axis	Dz =	4	in
Number of Anchors	N =	4	



Shear from Fy	Sy =	14	lbs	Sy = Fy / N
Tension from Fx	Tx =	881	lbs	Tx = Fx / N
Shear from Fz	Sz =	14	lbs	Sz = Fz / N
Tension from My	Tmy =	0	lbs	Tmy = My / Dz / (N/2)
Shear from Mx	Smx =	0	lbs	Smx = Mx / Dz / (N/2)
Tension from Mz	Tmz =	0	lbs	Tmz = Mz / Dy / (N/2)
Total Shear	S =	20	lbs	$S = SQRT(Sx^2 + Sz^2 + Smy^2)$
Total Tension	T =	881	lbs	T = Ty + Tmx + Tmz

Owner:	EVERSOURCE	Prepared By:	T. Chalermyan
Plant:	DANIELSON WORK CENTER	Date:	5/29/2020
Project No.	403093.2000.2200	Verified By:	L. Meyer
Title:	STRUCTURAL ANALYSIS OF EXISTING STEEL FRAME AND EXISTING BUILDING ROOFTOP STRUCTURE	Date:	5/29/2020

BLACK & VEATCH

Wall Anchor Check (LRFD) - Bolted Thru Wall (Continued)

AISC 14th Ed. Section #

Thru Bolt Steel Analysis

Loads

Applied Shear Load	V_{ua} =	20	lbs	per bolt	
Applied Tensile Load	N_{ua} =	881	lbs	per bolt	

Parameters

Bolt Diameter	d_b =	3/4	in		
Bolt Gross Area	A_b =	0.442	in^2	$\pi d_b^2 / 4$	
Specified Yield Strength of Bolt	f_y =	92	ksi		
Specified Tensile Strength of Bolt	f_{uta} =	120	ksi	ASTM A325	

Results

Strength Resistance Factor	φ =	0.75				J3.2
Nominal Shear Strength	F_{nv} =	54.0	ksi	0.45 x f_{uta}	(ductile)	C-J3-4
Nominal Tensile Strength	F_{nt} =	90.0	ksi	0.75 x F_{ut}	(ductile)	C-J3-2
Design Shear Strength of Bolt	φ R_{nv} =	17,892	lbs	φ x F_{nv} x A_b		Eq. J3-1
Design Tensile Strength of Bolt	φ R_{nt} =	29,821	lbs	φ x F_{nt} x A_b		Eq. J3-1
Required Shear Stress for Bolt	f_v =	0.0	ksi	V_{ua} / A_b		
Required Tensile Stress for Bolt	f_t =	2.0	ksi	N_{ua} / A_b		

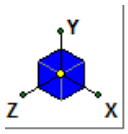
Combined Shear and Tension

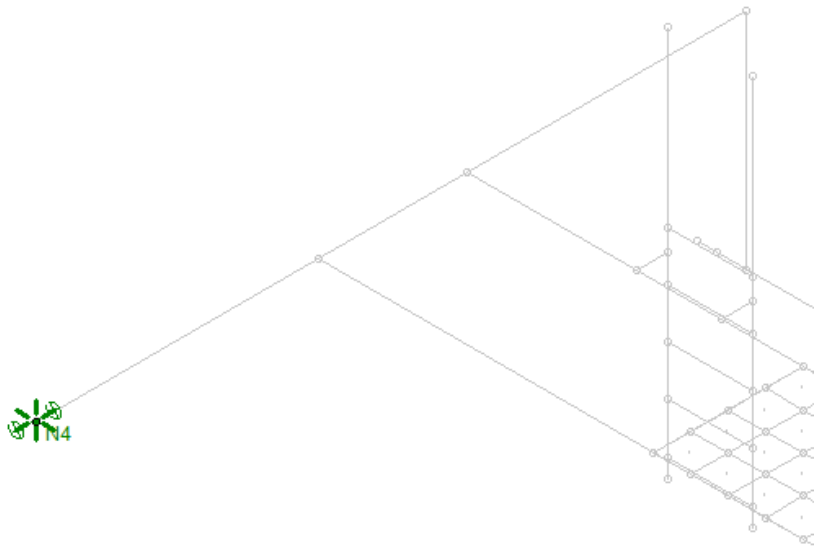
$F'_{nt} = 1.3*F_{nt} - F_{nt}*f_v / F_{nv} / \phi \leq F_{nt}$	F'_{nt} =	116.9	ksi > Fnt	Use Fnt for Eq. J3-2		Eq. J3-3a
Available Tensile Strength of Bolt	φ R_{nt} =	29,821	lbs	φ x Fnt x Ab		Eq. J3-2
Stress Ratio (Less than 1.0)	SR =	0.030		N_{ua} / φR_{nt}	OK	
Available Shear Strength of Bolt	φ R_{nv} =	17,892	lbs	φ x F_{nv} x A_b		J3.7
Stress Ratio (Less than 1.0)	SR =	0.0011		V_{ua} / φR_{nv}	OK	

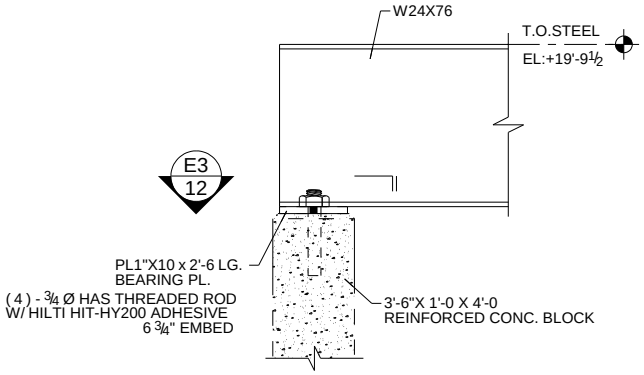
REACTION FOR EXISTING ANCHORAGE BOLT : HILTI HY-200

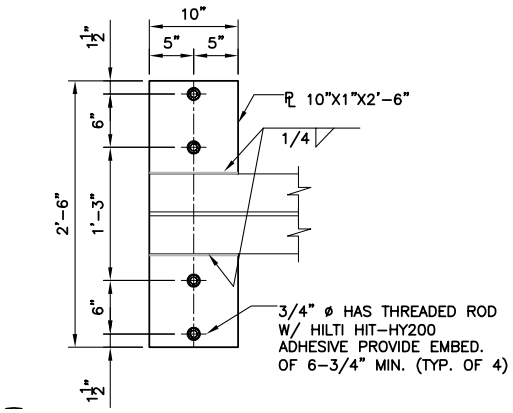
Joint Reactions (By Combination)

	LC	Joint Label	X [lb]	Y [lb]	Z [lb]	MX [lb-ft]	MY [lb-ft]	MZ [lb-ft]
1	139	N4	-1793.984	-3663.249	4765.571	0	0	0
2	139	N6	-1771.125	530.629	1513.25	0	0	0
3	139	COG (ft):	X: 10.97	Y: .796	Z: 2.123			









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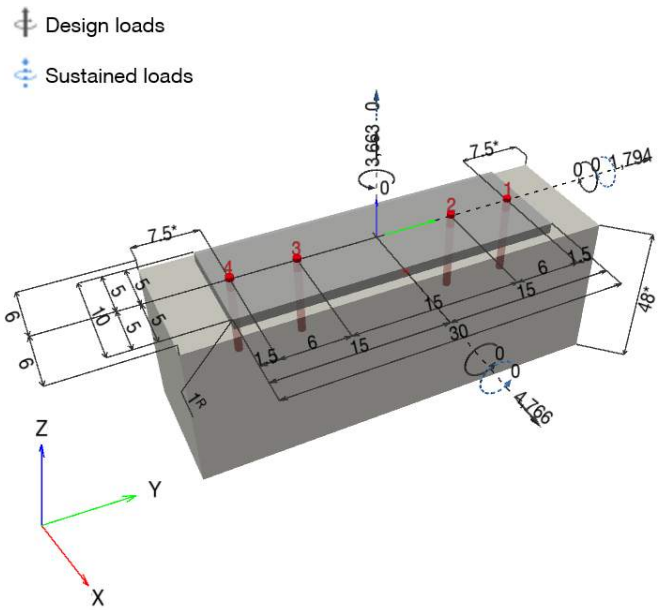
Specifier's comments: EXISTING ROOF FRAME ANCHORAGE - HY 200

1 Input data

Anchor type and diameter:	**HIT-HY 200 + HAS-V-36 (ASTM F1554 Gr.36) 3/4**
Item number:	2198030 HAS-V-36 3/4"x10" (element) / 2022793 HIT-HY 200-R (adhesive)
Effective embedment depth:	$h_{ef,act}$ = 6.750 in. ($h_{ef,limit}$ = - in.)
Material:	ASTM A 1554 Grade 36
Evaluation Service Report:	ESR-3187
Issued I Valid:	4/1/2020 | 3/1/2022
Proof:	Design Method ACI 318-14 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R]:	l_x x l_y x t = 10.000 in. x 30.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 48.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Water saturated**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, ft.lb]



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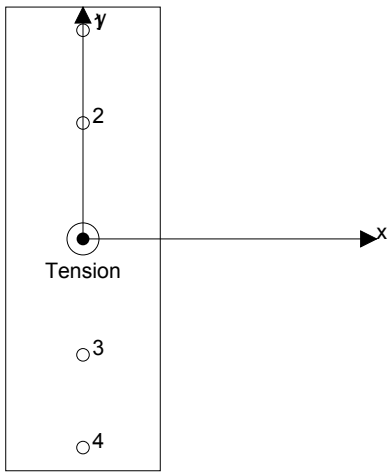
1.1 Design results

Case	Description	Forces [lb] / Moments [ft.lb]	Seismic	Max. Util. Anchor [%]
1	Load case: Design loads	N = 3,663; V_x = 4,766; V_y = 1,794; M_x = 0.000; M_y = 0.000; M_z = 0.000; N_{sus} = 0; $M_{x,sus}$ = 0.000; $M_{y,sus}$ = 0.000;	no	98

2 Load case/Resulting anchor forces



Anchor reactions [lb]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	916	1,273	1,191	448
2	916	1,273	1,191	448
3	916	1,273	1,191	448
4	916	1,273	1,191	448

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 3,663 [lb]
resulting compression force in (x/y)=(0.000/0.000): 0 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	916	14,550	7	OK
Bond Strength**	3,663	12,630	30	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	3,663	18,983	20	OK

* highest loaded anchor **anchor group (anchors in tension)

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3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ESR-3187
$\phi\ N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.33	58,000

Calculations

N_{sa} [lb]
19,400

Results

N_{sa} [lb]	ϕ_{steel}	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
19,400	0.750	14,550	916

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3.2 Bond Strength

$N_{ag} = \left(\frac{A_{Na}}{A_{Na0}}\right) \psi_{ec1,Na}\ \psi_{ec2,Na}\ \psi_{ed,Na}\ \psi_{cp,Na}\ N_{ba}$ ACI 318-14 Eq. (17.4.5.1b)

$\phi\ N_{ag} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Na} see ACI 318-14, Section 17.4.5.1, Fig. R 17.4.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ ACI 318-14 Eq. (17.4.5.1c)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ ACI 318-14 Eq. (17.4.5.1d)

$\psi_{ec,Na} = \left(\frac{1}{1 + \frac{e'_N}{c_{Na}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.5.3)

$\psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.5.4b)

$\psi_{cp,Na} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.5.5b)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \pi \cdot d_a \cdot h_{ef}$ ACI 318-14 Eq. (17.4.5.2)

Variables

$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]	$\alpha_{overhead}$	$\tau_{k,c}$ [psi]
2,327	0.750	6.750	6.000	1.000	1,321

$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	c_{ac} [in.]	λ_a
0.000	0.000	10.943	1.000

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\psi_{ed,Na}$
10.859	504.00	471.66	0.866

$\psi_{ec1,Na}$	$\psi_{ec2,Na}$	$\psi_{cp,Na}$	N_{ba} [lb]
1.000	1.000	1.000	21,004

Results

N_{ag} [lb]	ϕ_{bond}	$\phi\ N_{ag}$ [lb]	N_{ua} [lb]
19,431	0.650	12,630	3,663

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3.3 Concrete Breakout Failure

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\ \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ ACI 318-14 Eq. (17.4.2.1b)

$\phi\ N_{cbg} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e'_N}{3\ h_{ef}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ ACI 318-14 Eq. (17.4.2.2a)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
5.000	0.000	0.000	6.000	1.000

c_{ac} [in.]	k_c	λ_a	f'_c [psi]
10.943	17	1.000	4,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
504.00	225.00	1.000	1.000	0.940	1.000	12,021

Results

N_{cbg} [lb]	$\phi_{concrete}$	$\phi\ N_{cbg}$ [lb]	N_{ua} [lb]
25,311	0.750	18,983	3,663

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4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	1,273	7,566	17	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Bond Strength controls)**	5,092	27,204	19	OK
Concrete edge failure in direction y+**	5,092	5,631	91	OK

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-3187
$\phi V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.33	58,000

Calculations

V_{sa} [lb]
11,640

Results

V_{sa} [lb]	ϕ_{steel}	ϕV_{sa} [lb]	V_{ua} [lb]
11,640	0.650	7,566	1,273

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4.2 Pryout Strength (Bond Strength controls)

$V_{cpg} = k_{cp}\left[\left(\frac{A_{Na}}{A_{Na0}}\right) \psi_{ec1,Na}\ \psi_{ec2,Na}\ \psi_{ed,Na}\ \psi_{cp,Na}\ N_{ba}\right]$ ACI 318-14 Eq. (17.5.3.1b)

$\phi\ V_{cpg} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Na} see ACI 318-14, Section 17.4.5.1, Fig. R 17.4.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ ACI 318-14 Eq. (17.4.5.1c)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ ACI 318-14 Eq. (17.4.5.1d)

$\psi_{ec,Na} = \left(\frac{1}{1 + \frac{e'_N}{c_{Na}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.5.3)

$\psi_{ed,Na} = 0.7 + 0.3\left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.5.4b)

$\psi_{cp,Na} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.5.5b)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \pi \cdot d_a \cdot h_{ef}$ ACI 318-14 Eq. (17.4.5.2)

Variables

k_{cp}	$\alpha_{overhead}$	$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]	$\tau_{k,c}$ [psi]
2	1.000	2,327	0.750	6.750	6.000	1,321

$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	c_{ac} [in.]	λ_a
0.000	0.000	10.943	1.000

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\psi_{ed,Na}$
10.859	504.00	471.66	0.866

$\psi_{ec1,Na}$	$\psi_{ec2,Na}$	$\psi_{cp,Na}$	N_{ba} [lb]
1.000	1.000	1.000	21,004

Results

V_{cpg} [lb]	$\phi_{concrete}$	$\phi\ V_{cpg}$ [lb]	V_{ua} [lb]
38,863	0.700	27,204	5,092

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4.3 Concrete edge failure in direction y+

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ec,V}\ \psi_{ed,V}\ \psi_{c,V}\ \psi_{h,V}\ \psi_{parallel,V}\ V_b$ — ACI 318-14 Eq. (17.5.2.1b)

$\phi\ V_{cbg} \geq V_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Vc} see ACI 318-14, Section 17.5.2.1, Fig. R 17.5.2.1(b)

$A_{Vc0} = 4.5\ c_{a1}^2$ — ACI 318-14 Eq. (17.5.2.1c)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{2e'_v}{3c_{a1}}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.5)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.6b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ — ACI 318-14 Eq. (17.5.2.8)

$V_b = 9\ \lambda_a\ \sqrt{f'_c}\ c_{a1}^{1.5}$ — ACI 318-14 Eq. (17.5.2.2b)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
7.500	6.000	0.000	1.400	48.000

l_e [in.]	λ_a	d_a [in.]	f'_c [psi]	$\psi_{parallel,V}$
6.000	1.000	0.750	4,000	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [lb]
135.00	253.13	1.000	0.860	1.000	11,691

Results

V_{cbg} [lb]	$\phi_{concrete}$	$\phi\ V_{cbg}$ [lb]	V_{ua} [lb]
7,507	0.750	5,631	5,092

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.290	0.904	5/3	98	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

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6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2018, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-14, Section 17.8.1.

Fastening meets the design criteria!

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7 Installation data

Profile: no profile

Hole diameter in the fixture: d_f = 0.813 in.

Plate thickness (input): 1.000 in.

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

Anchor type and diameter: HIT-HY 200 + HAS-V-36 (ASTM F1554 Gr.36) 3/4

Item number: 2198030 HAS-V-36 3/4"x10" (element) / 2022793 HIT-HY 200-R (adhesive)

Installation torque: 100.000 ft.lb

Hole diameter in the base material: 0.875 in.

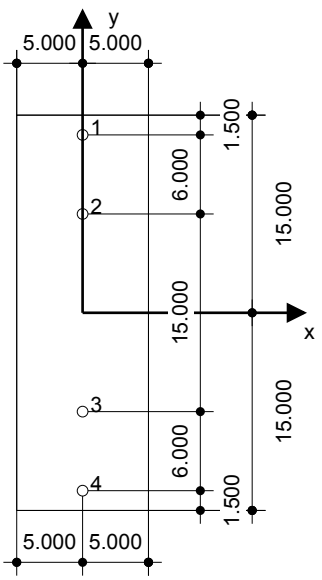
Hole depth in the base material: 6.750 in.

Minimum thickness of the base material: 8.500 in.

3/4 Hilti HAS Carbon steel threaded rod with Hilti HIT-HY 200 Safe Set System

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Compressed air with required accessories to blow from the bottom of the hole • Proper diameter wire brush	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor [in.]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	13.500	6.000	6.000	34.500	7.500
2	0.000	7.500	6.000	6.000	28.500	13.500
3	0.000	-7.500	6.000	6.000	13.500	28.500
4	0.000	-13.500	6.000	6.000	7.500	34.500

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8 Remarks; Your Cooperation Duties

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5.2 Structural Analysis of Existing Head Cap Beam and CMU Bearing Wall

- Determined Un - Factor Load From Steel Frame

Node		=	**N4**	
Dead Load, DL	Y direction	=	3026	lbs
Live Load, LL	Y direction	=	331	lbs
Ice Dead Load, IDL	Y direction	=	2527	lbs

Wind Load, WL

Wind Degree	X (lbs.)	Y (lbs.)	Z (lbs.)
0	-3528	-3645	2772
90	12	5263.0	-3865

Ice Wind Load, IWL

Ice Wind Degree	X (lbs.)	Y (lbs.)	Z (lbs.)
0	-795	-1141	627
90	1	1646	-891

Node		=	**N6**	
Dead Load, DL	Y direction	=	2588	lbs
Live Load, LL	Y direction	=	74	lbs
Ice Dead Load, IDL	Y direction	=	2045	lbs

Wind Load, WL

Wind Degree	X (lbs.)	Y (lbs.)	Z (lbs.)
0	-3484	3645	-2772
90	5	4194	-3386

Ice Wind Load, IWL

Ice Wind Degree	X (lbs.)	Y (lbs.)	Z (lbs.)
0	-789	1140	-627
90	0	1312	-743

- Determined Point Load Acting to Existing Head Cap & Masonry Wall

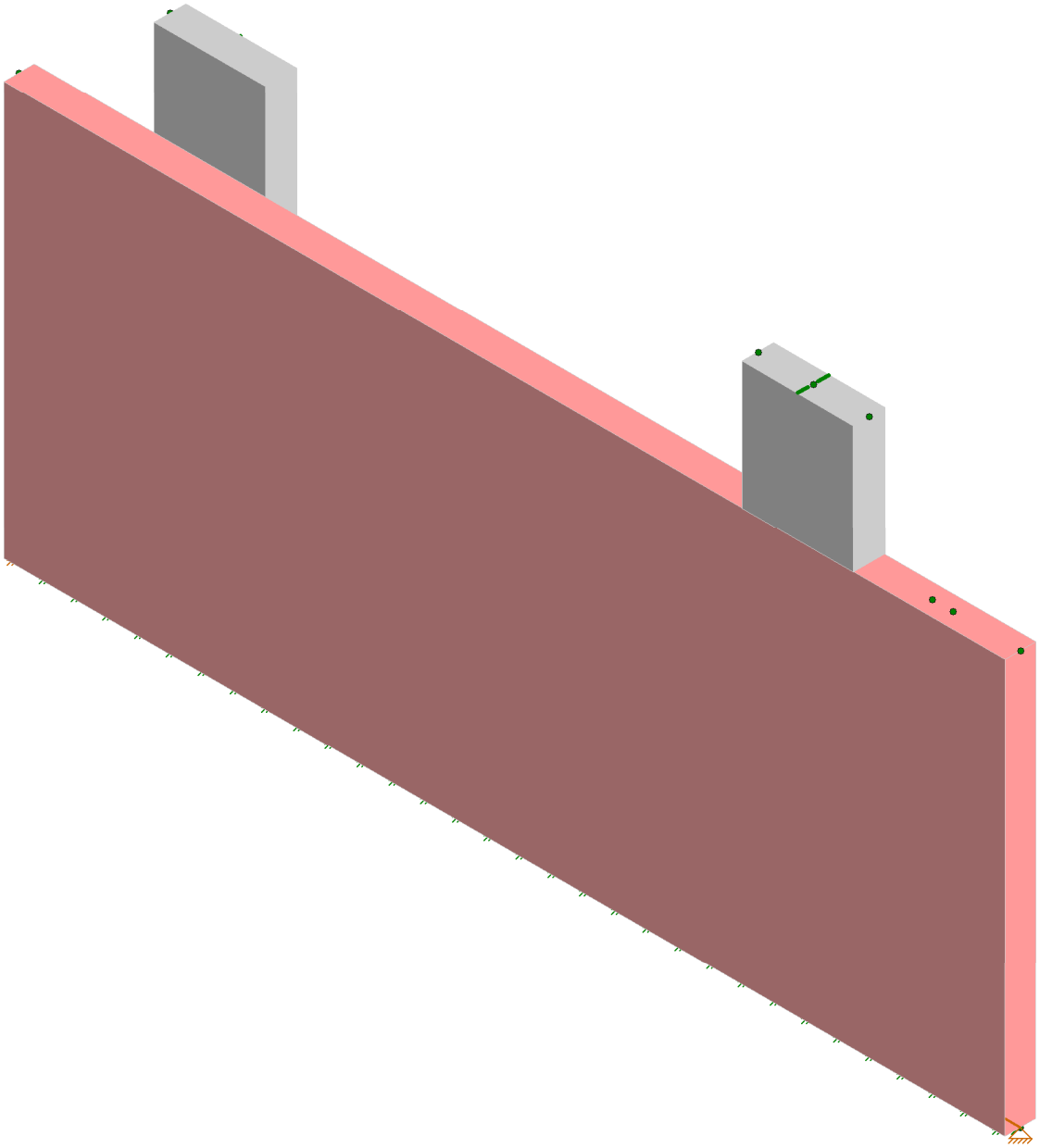
Dead Load, DL	=	77.00	psf
Roof Live Load of Slab, RLL	=	20.00	psf
Snow Load of Slab, Pf	=	27.72	psf
Max. Positive Wind Pressure for Acting to Rooftop =	=	0.66	psf
Min. Negative Wind Uplift Pressure for Acting to Rooftop =	=	-23.2	psf
Max. Positive Wind Pressure for Acting to Masonry Wall	=	21.08	psf

- JOIST #181

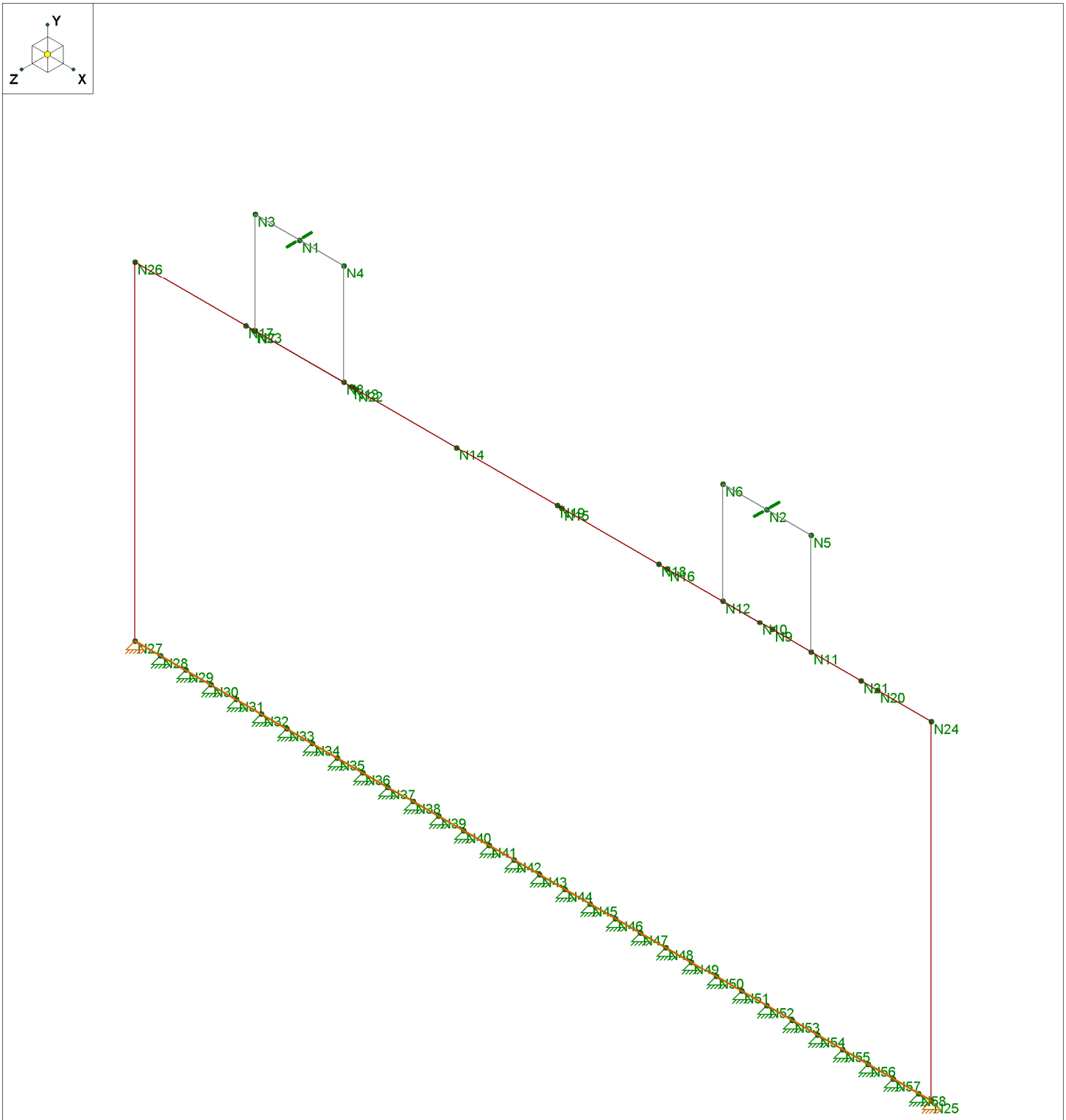
Tributary Width :	Spacing Joist #181	=	4.17	ft
Span length of Joist #181		=	28.0	ft
Dead Load of Total, DL =	77 psf x 4.17 ft	=	321.1	plf
Dead Load of Joist =	# 181 (Assumed)	=	20.7	plf
Roof Live Load of Slab, RLL =	20 psf x 4.17 ft	=	83.4	plf
Snow Load of Slab, Pf =	27.72 psf x 4.17 ft	=	115.6	plf
Pos. Wind Pressure Acting Joist =	0.66 psf x 4.17 ft	=	2.8	plf
Neg. Wind Uplift Pressure Acting Joist =	-23.16 psf x 4.17 ft	=	-96.6	plf
Point Load from Dead Load Total =	(321.1 + 20.7) plf x 28 ft / 2	=	**4785**	lbs.
Point Load from Roof Live Load of Slab =	83.4 plf x 28 ft / 2	=	**1168**	lbs.
Point Load from Snow Load Slab =	115.6 plf x 28 ft / 2	=	**1618**	lbs.
Point Load from Pos. Wind Pressure =	2.8 plf x 28 ft / 2	=	**39**	lbs.
Point Load from Neg. Wind Uplift =	-96.6 plf x 28 ft / 2	=	**-1352**	lbs.

- JOIST #103

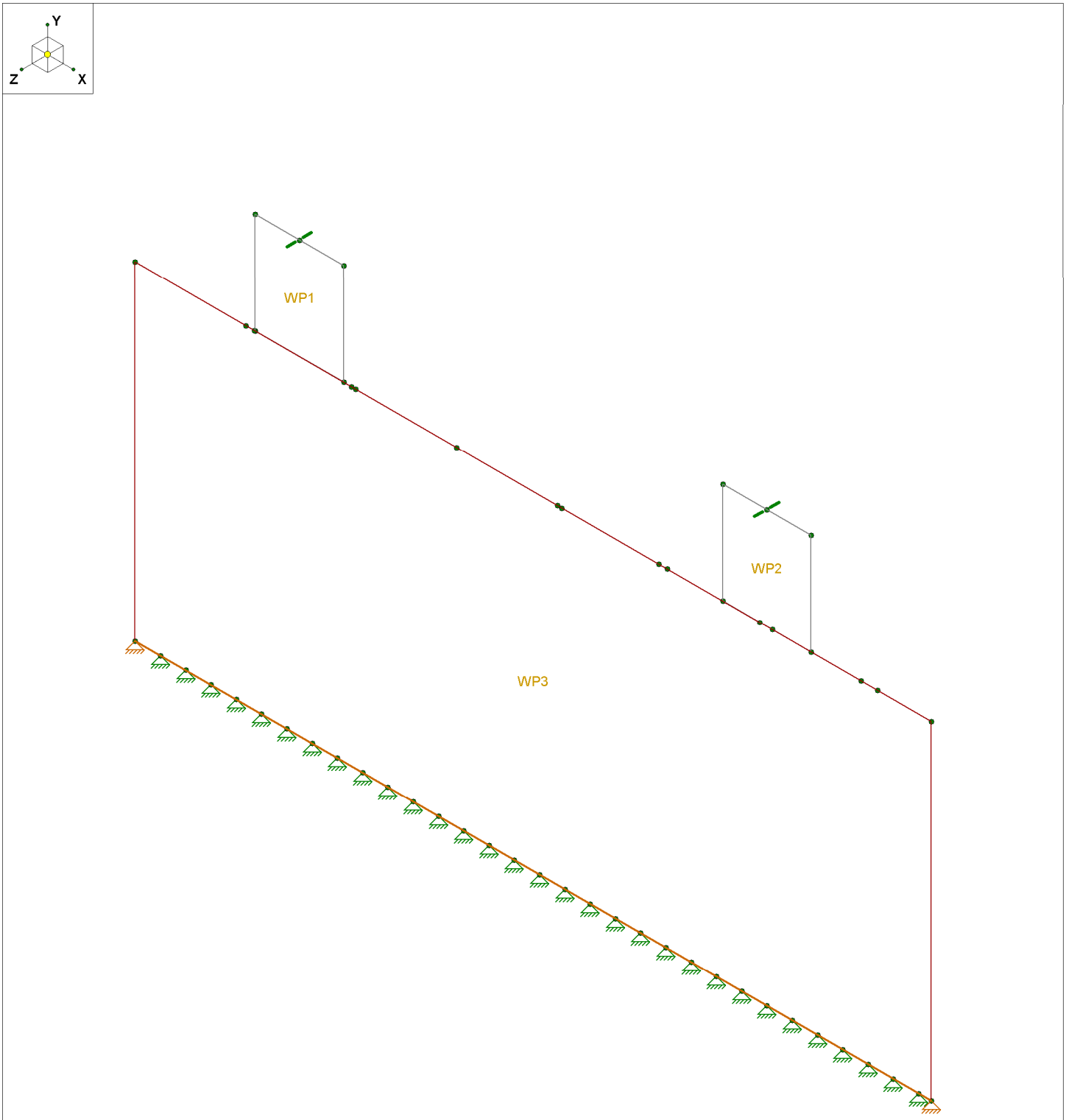
Tributary Width :	Spacing Joist #181	=	4.00	ft
Span length of Joist #103		=	13.75	ft
Dead Load of Total, DL =	77 psf x 4 ft	=	308.0	plf
Dead Load of Joist =	# 103 (Assumed)	=	20.7	plf
Roof Live Load of Slab, RLL =	20 psf x 4 ft	=	80.0	plf
Snow Load of Slab, Pf =	27.72 psf x 4 ft	=	110.9	plf
Pos. Wind Pressure Acting Joist =	0.66 psf x 4 ft	=	2.6	plf
Neg. Wind Uplift Pressure Acting Joist =	-23.16 psf x 4 ft	=	-92.6	plf
Point Load from Dead Load Total =	(308.0 + 20.7) plf x 13.75 ft / 2	=	**2260**	lbs.
Point Load from Roof Live Load of Slab =	80.0 plf x 13.75 ft / 2	=	**550**	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	**762**	lbs.
Point Load from Pos. Wind Pressure =	2.6 plf x 13.75 ft / 2	=	**18**	lbs.
Point Load from Neg. Wind Uplift =	-92.6 plf x 13.75 ft / 2	=	**-637**	lbs.



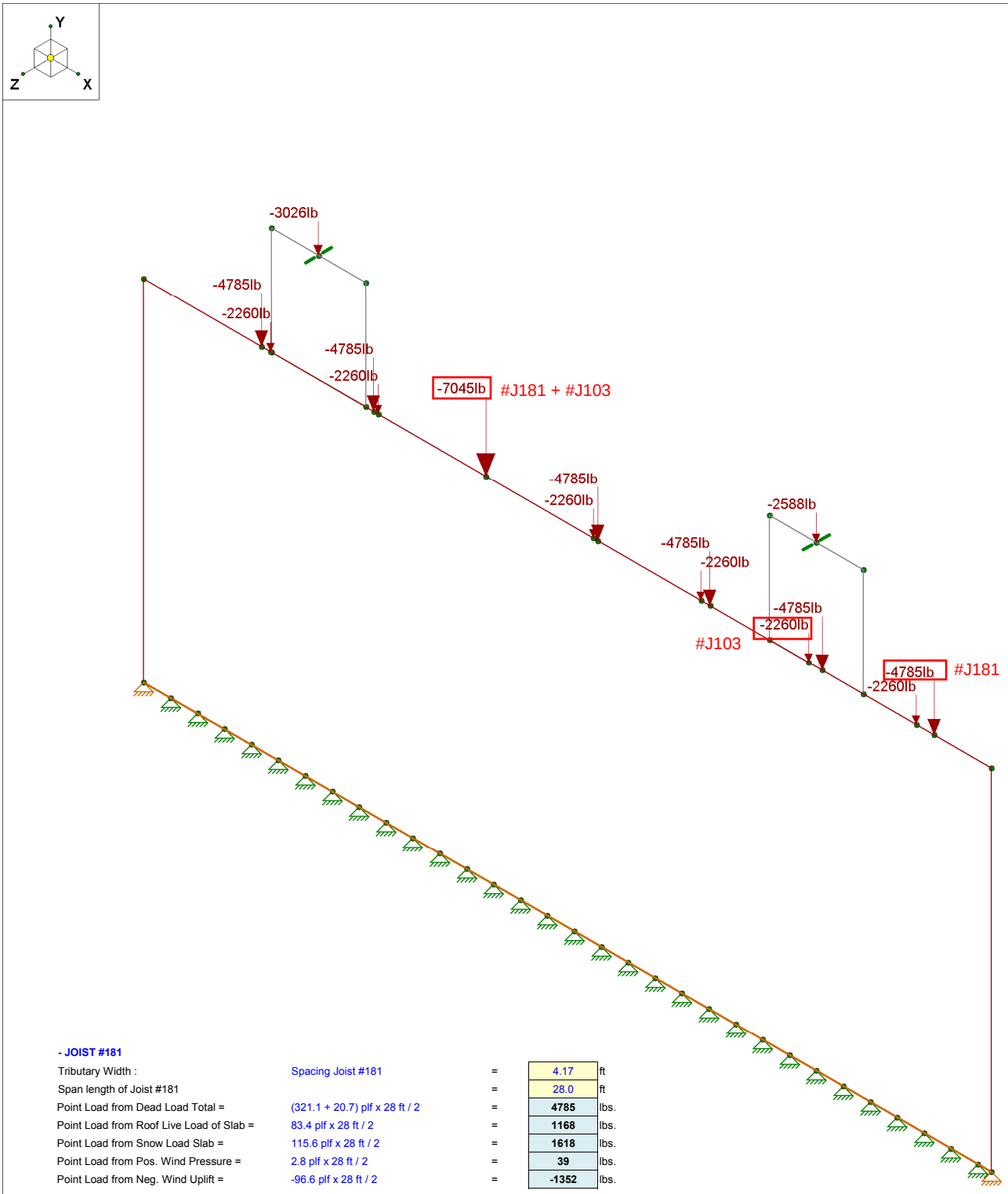
Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 1
T. Eakkalak		June 25, 2020 at 3:29 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 2
T. Eakkalak		June 25, 2020 at 3:29 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 3
T. Eakkalak		June 25, 2020 at 3:29 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



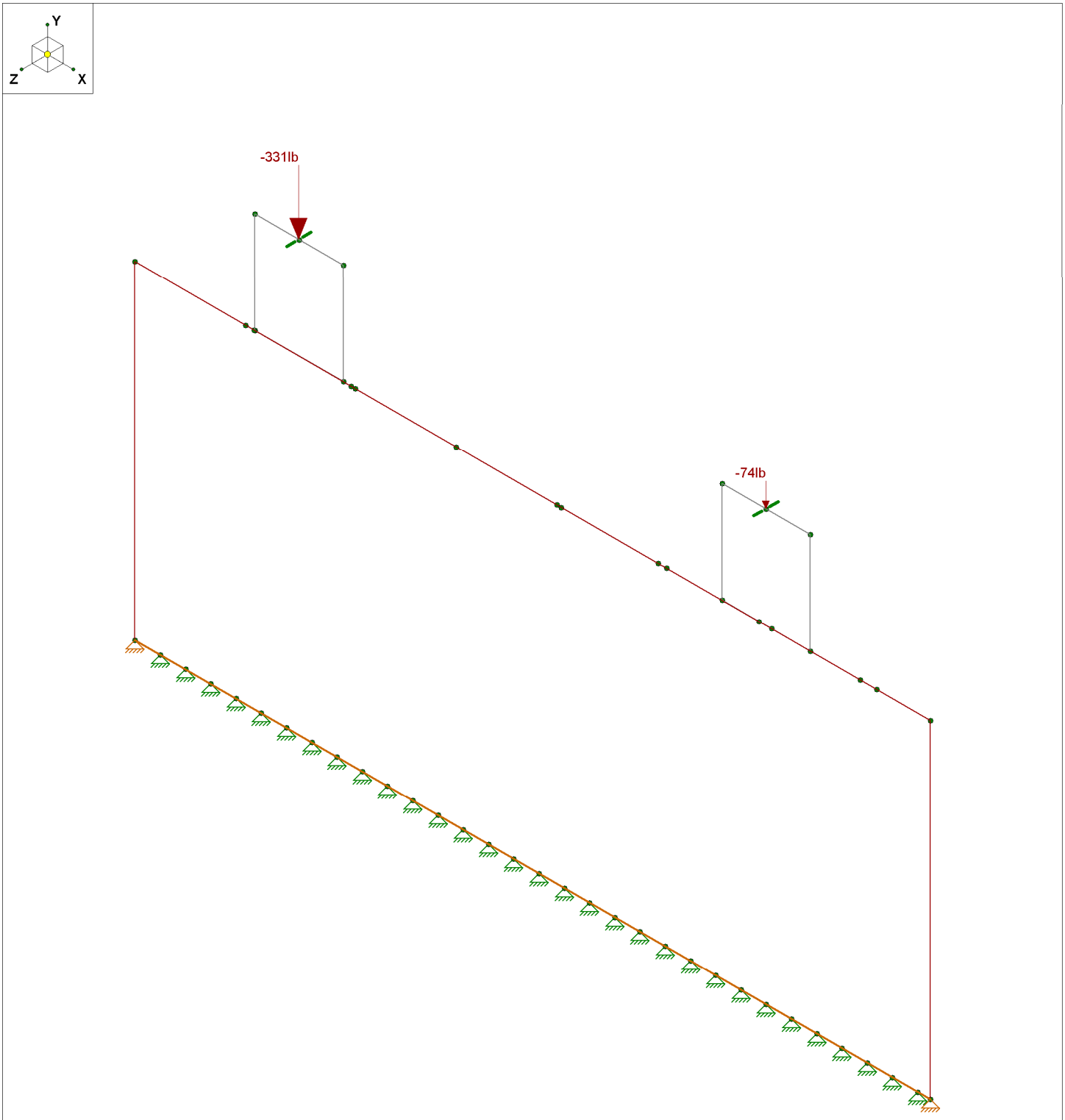
- JOIST #181

Tributary Width :	Spacing Joist #181	=	4.17	ft
Span length of Joist #181		=	28.0	ft
Point Load from Dead Load Total =	(321.1 + 20.7) plf x 28 ft / 2	=	**4785**	lbs.
Point Load from Roof Live Load of Slab =	83.4 plf x 28 ft / 2	=	**1168**	lbs.
Point Load from Snow Load Slab =	115.6 plf x 28 ft / 2	=	**1618**	lbs.
Point Load from Pos. Wind Pressure =	2.8 plf x 28 ft / 2	=	**39**	lbs.
Point Load from Neg. Wind Uplift =	-96.6 plf x 28 ft / 2	=	**-1352**	lbs.

- JOIST #103

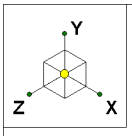
Tributary Width :	Spacing Joist #181	=	4.00	ft
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Total =	(308.0 + 20.7) plf x 13.75 ft / 2	=	**2260**	lbs.
Point Load from Roof Live Load of Slab =	80.0 plf x 13.75 ft / 2	=	**550**	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	**762**	lbs.
Point Load from Pos. Wind Pressure =	2.6 plf x 13.75 ft / 2	=	**18**	lbs.
Point Load from Neg. Wind Uplift =	-92.6 plf x 13.75 ft / 2	=	**-637**	lbs.

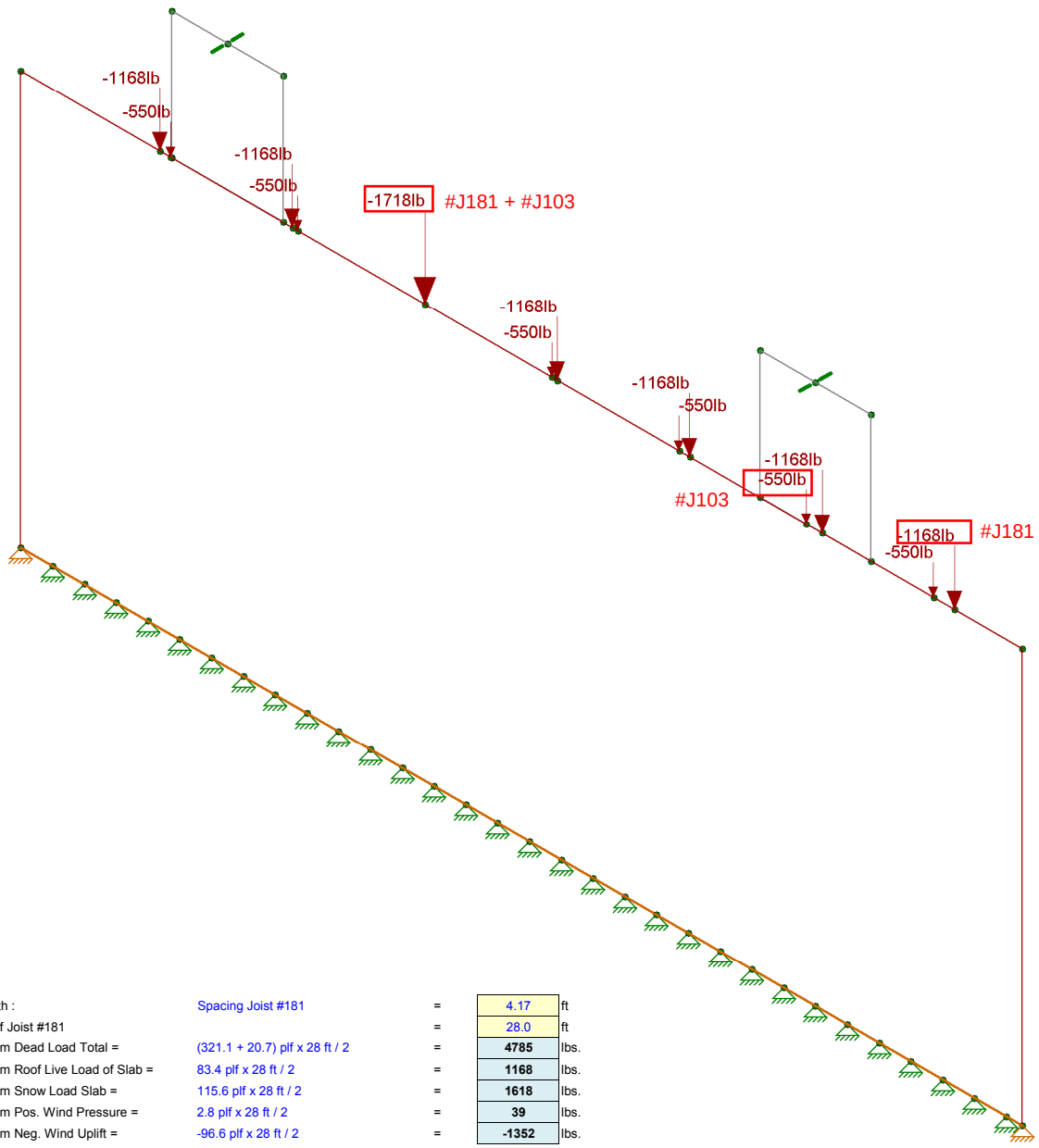
Loads: BLC 1, DL



Loads: BLC 2, LL

Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 5
T. Eakkalak		June 25, 2020 at 3:30 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....





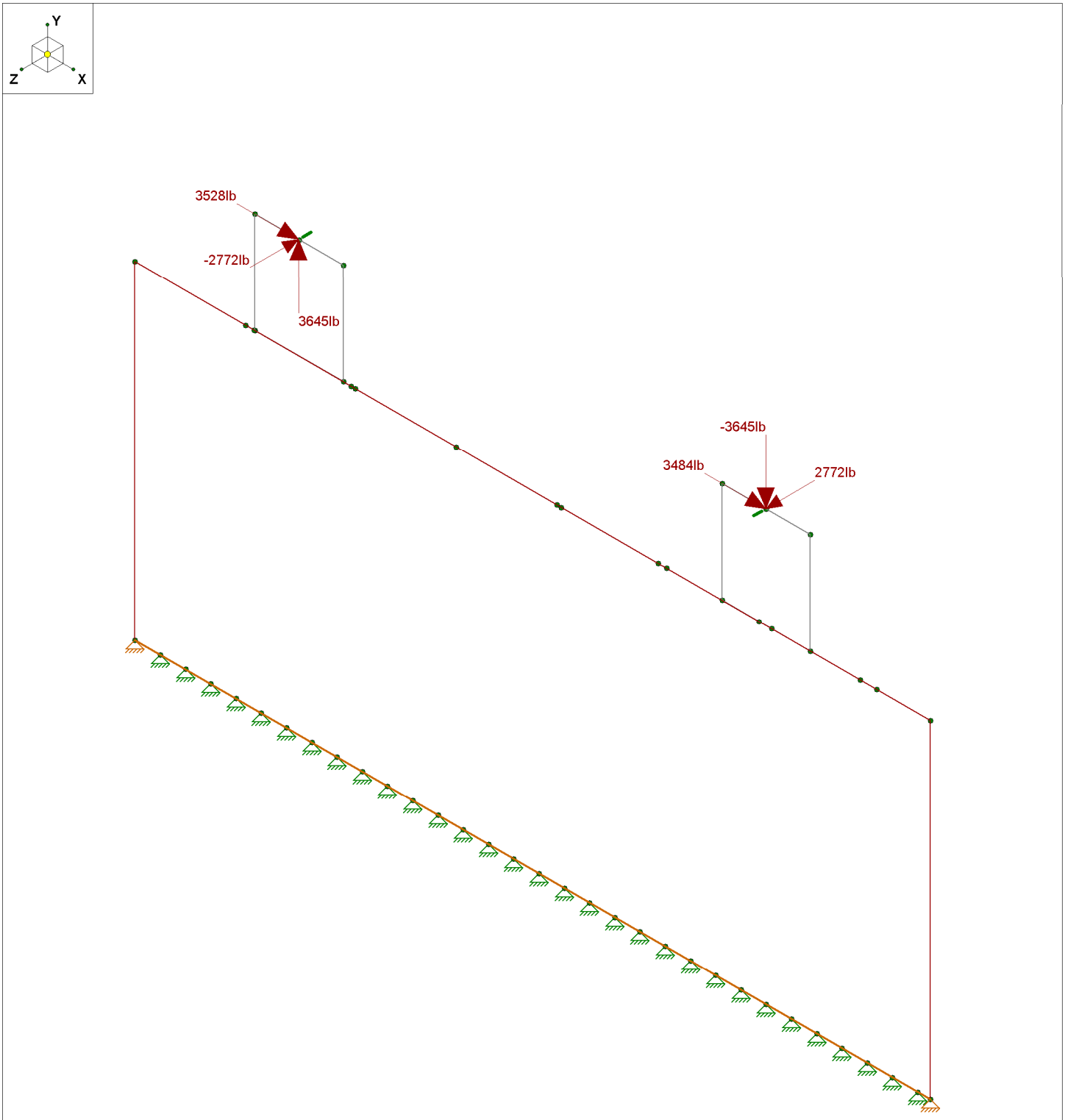
- JOIST #181

Tributary Width :	Spacing Joist #181	=	4.17	ft
Span length of Joist #181		=	28.0	ft
Point Load from Dead Load Total =	(321.1 + 20.7) plf x 28 ft / 2	=	4785	lbs.
Point Load from Roof Live Load of Slab =	83.4 plf x 28 ft / 2	=	1168	lbs.
Point Load from Snow Load Slab =	115.6 plf x 28 ft / 2	=	1618	lbs.
Point Load from Pos. Wind Pressure =	2.8 plf x 28 ft / 2	=	39	lbs.
Point Load from Neg. Wind Uplift =	-96.6 plf x 28 ft / 2	=	-1352	lbs.

- JOIST #103

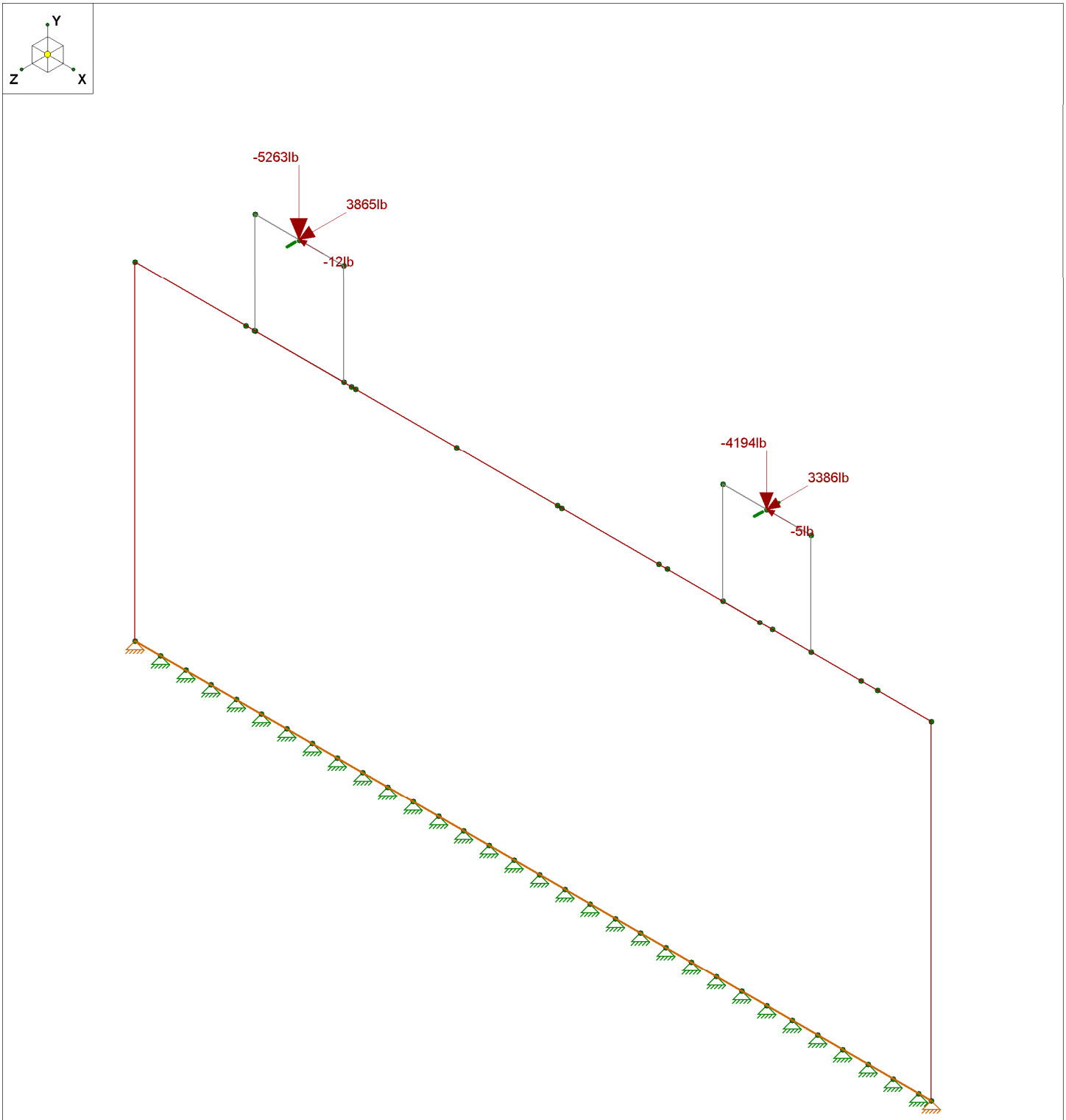
Tributary Width :	Spacing Joist #181	=	4.00	ft
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Total =	(308.0 + 20.7) plf x 13.75 ft / 2	=	2260	lbs.
Point Load from Roof Live Load of Slab =	80.0 plf x 13.75 ft / 2	=	550	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	762	lbs.
Point Load from Pos. Wind Pressure =	2.6 plf x 13.75 ft / 2	=	18	lbs.
Point Load from Neg. Wind Uplift =	-92.6 plf x 13.75 ft / 2	=	-637	lbs.

Loads: BLC 3, Roof LL



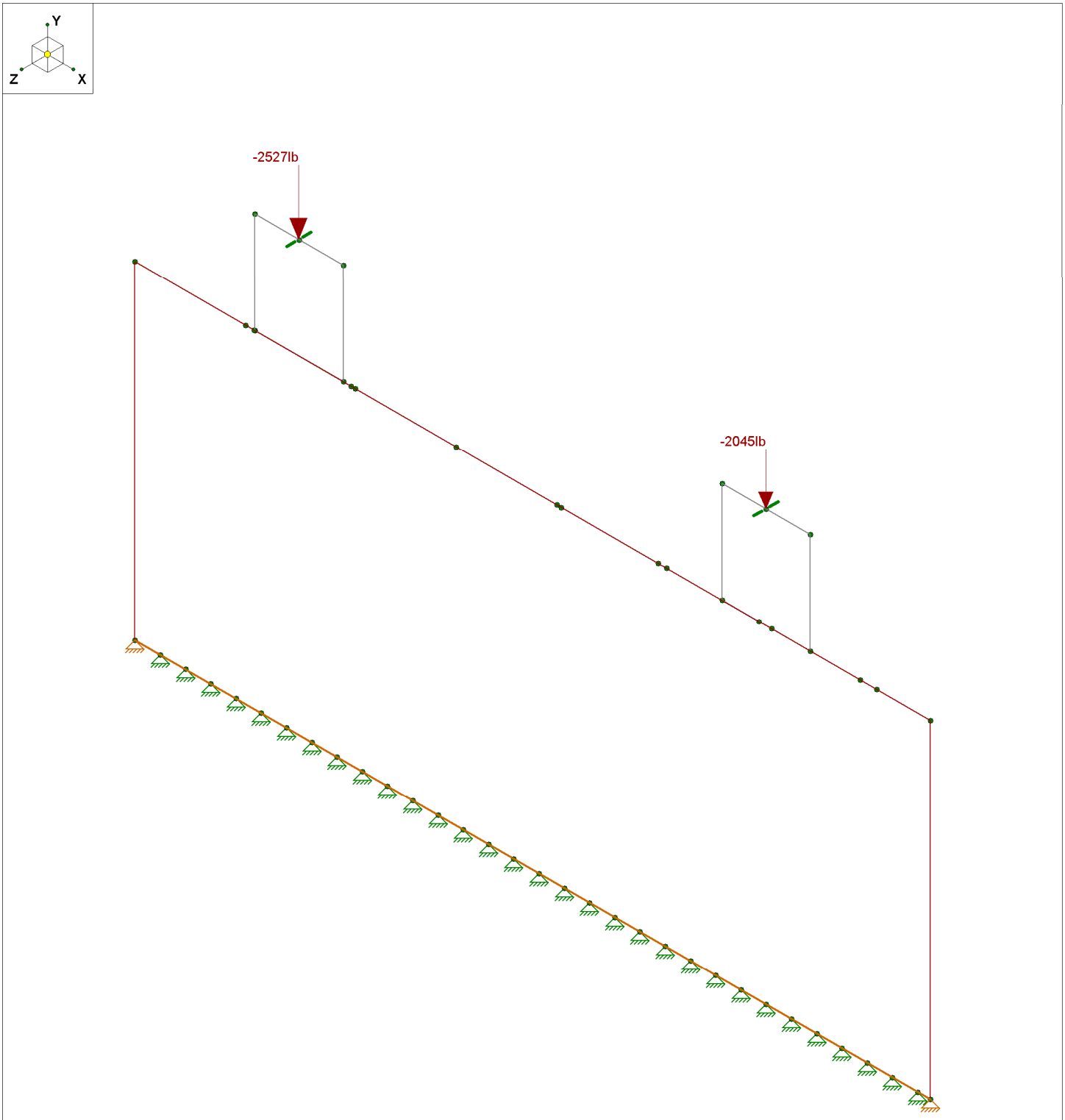
Loads: BLC 4, Wind - 0 Deg (+X)

Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 7
T. Eakkalak		June 25, 2020 at 3:30 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



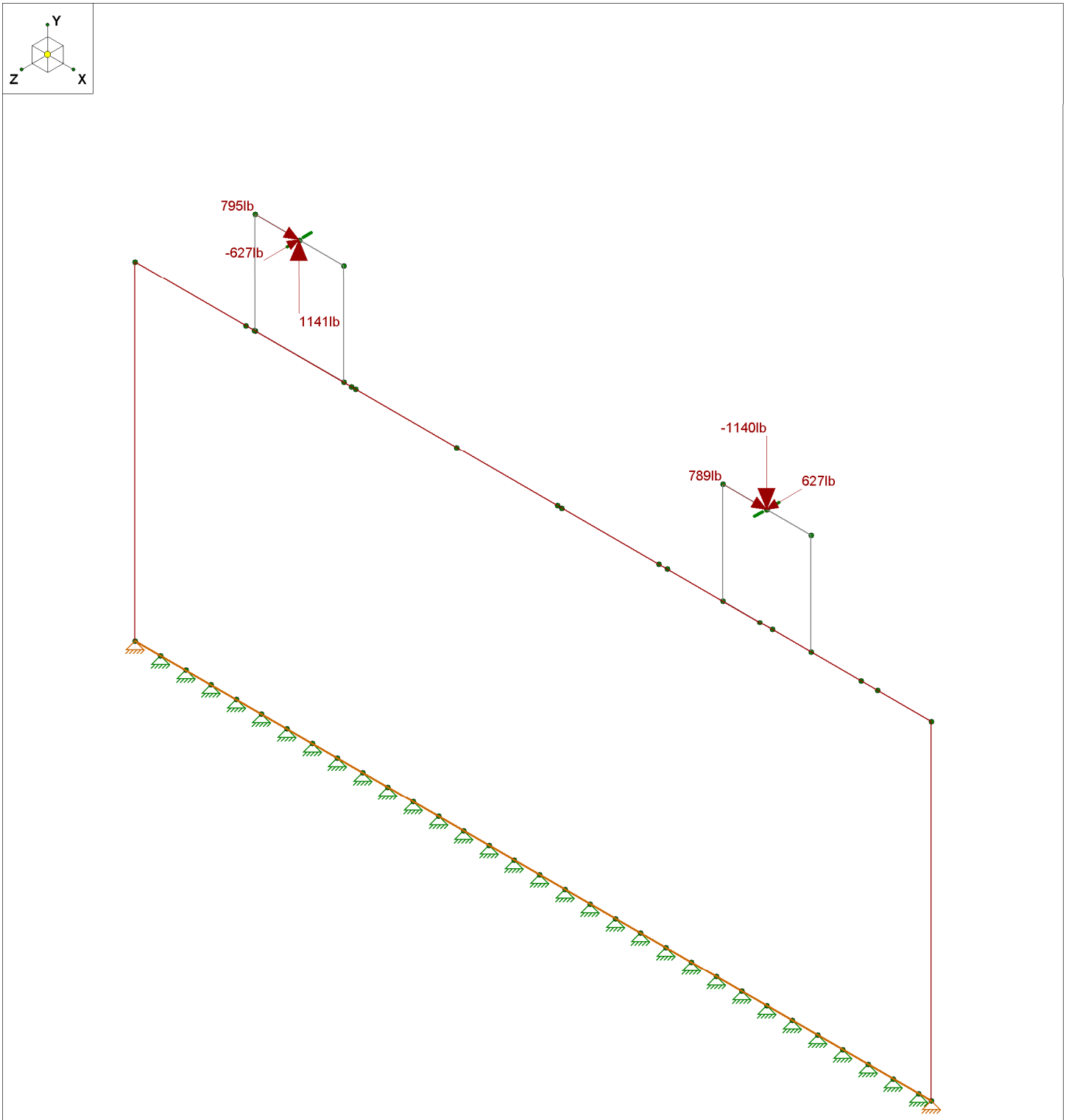
Loads: BLC 5, Wind - 90 Deg (+Z)

Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 8
T. Eakkalak		June 25, 2020 at 3:30 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



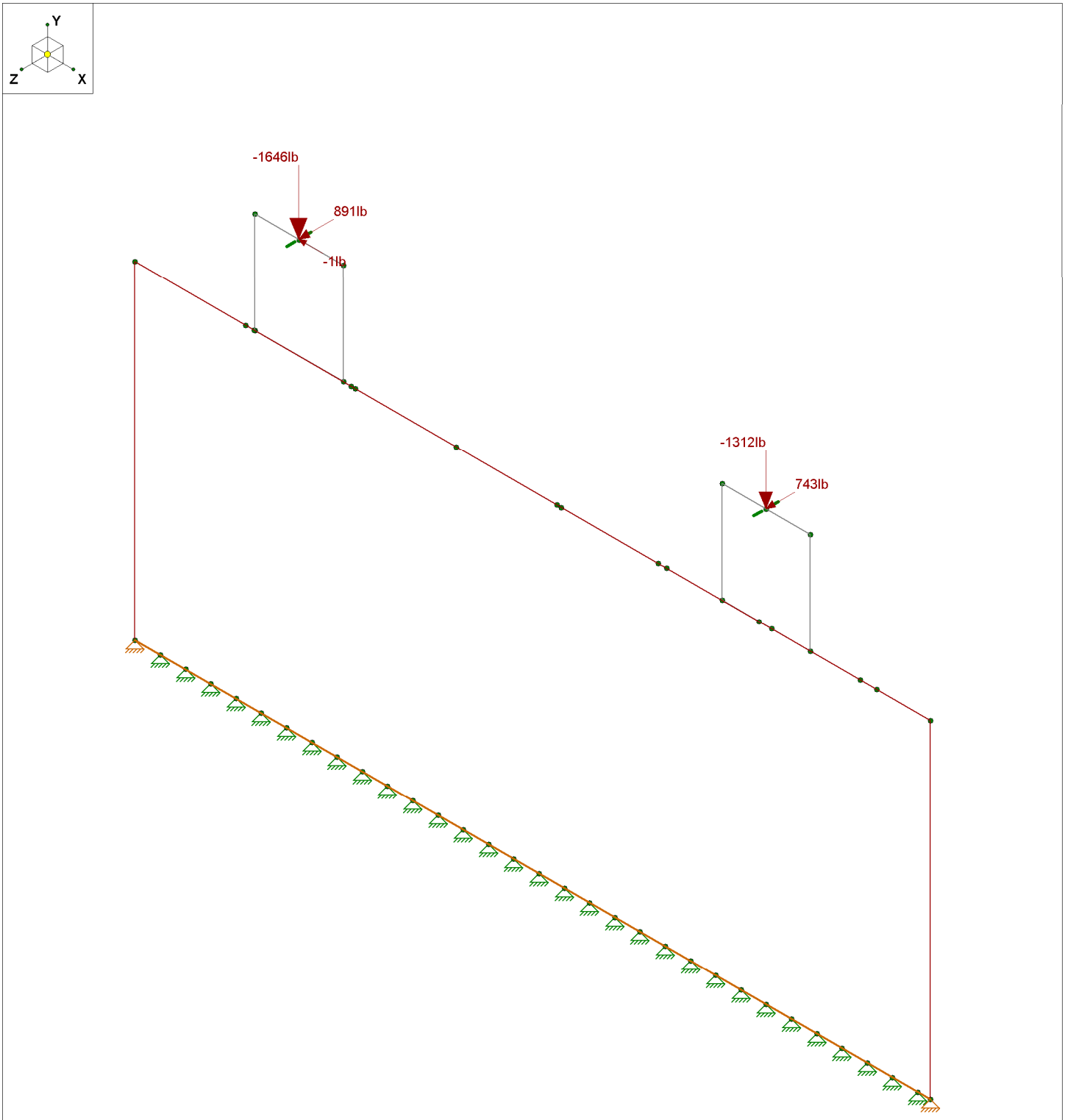
Loads: BLC 6, Ice DL

Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 9
T. Eakkalak		June 25, 2020 at 3:30 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



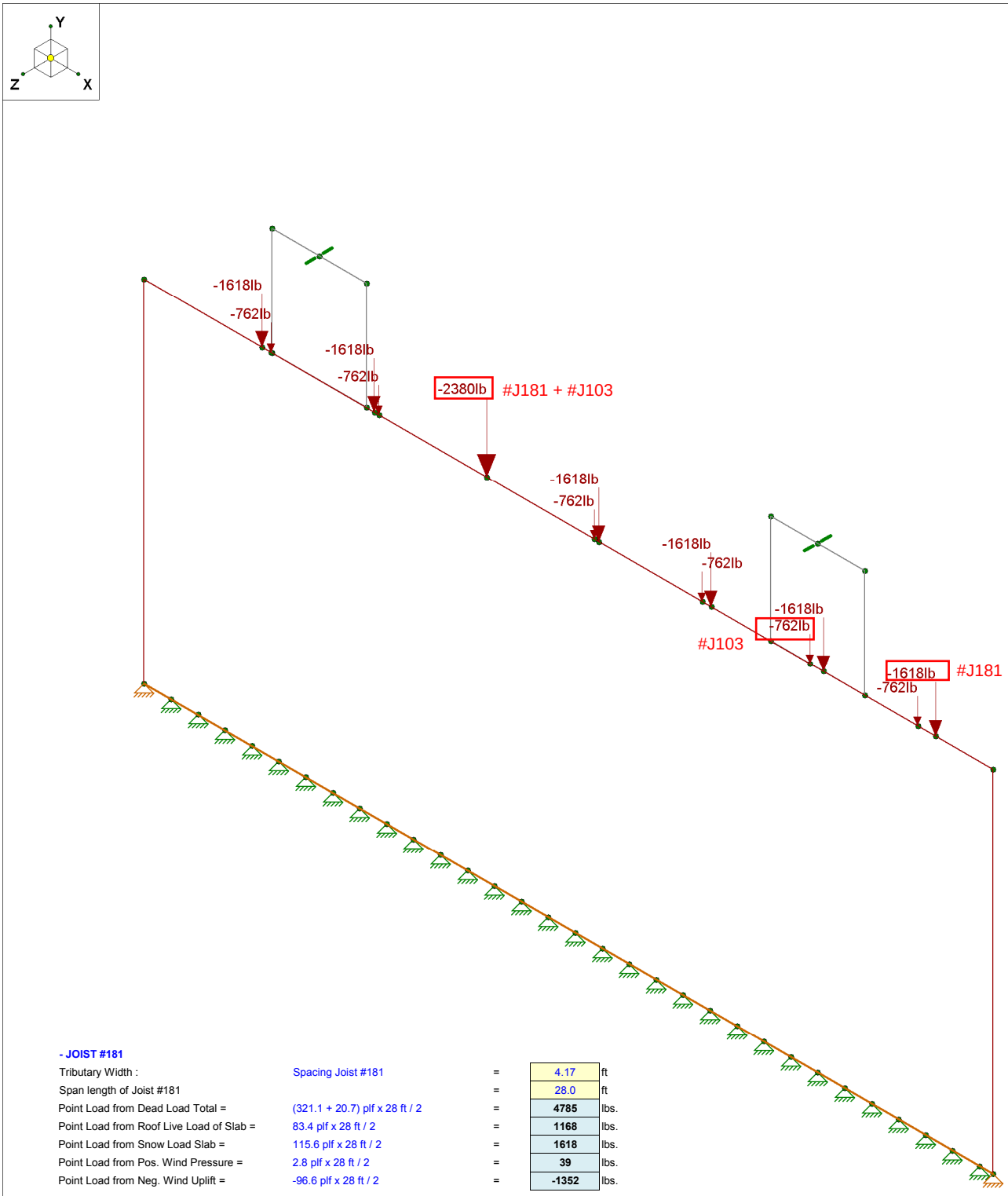
Loads: BLC 7, Ice Wind - 0 Deg (+X)

Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 10
T. Eakkalak		June 25, 2020 at 3:30 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



Loads: BLC 8, Ice Wind - 90 Deg (+Z)

Black & Veatch Corp.	DANIELSON WORK CENTER - Existing CMU Wall	SK - 11
T. Eakkalak		June 25, 2020 at 3:30 PM
403093.2000.2200		DanielsonAWC - Existing CMU Wall....



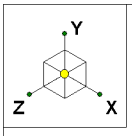
- JOIST #181

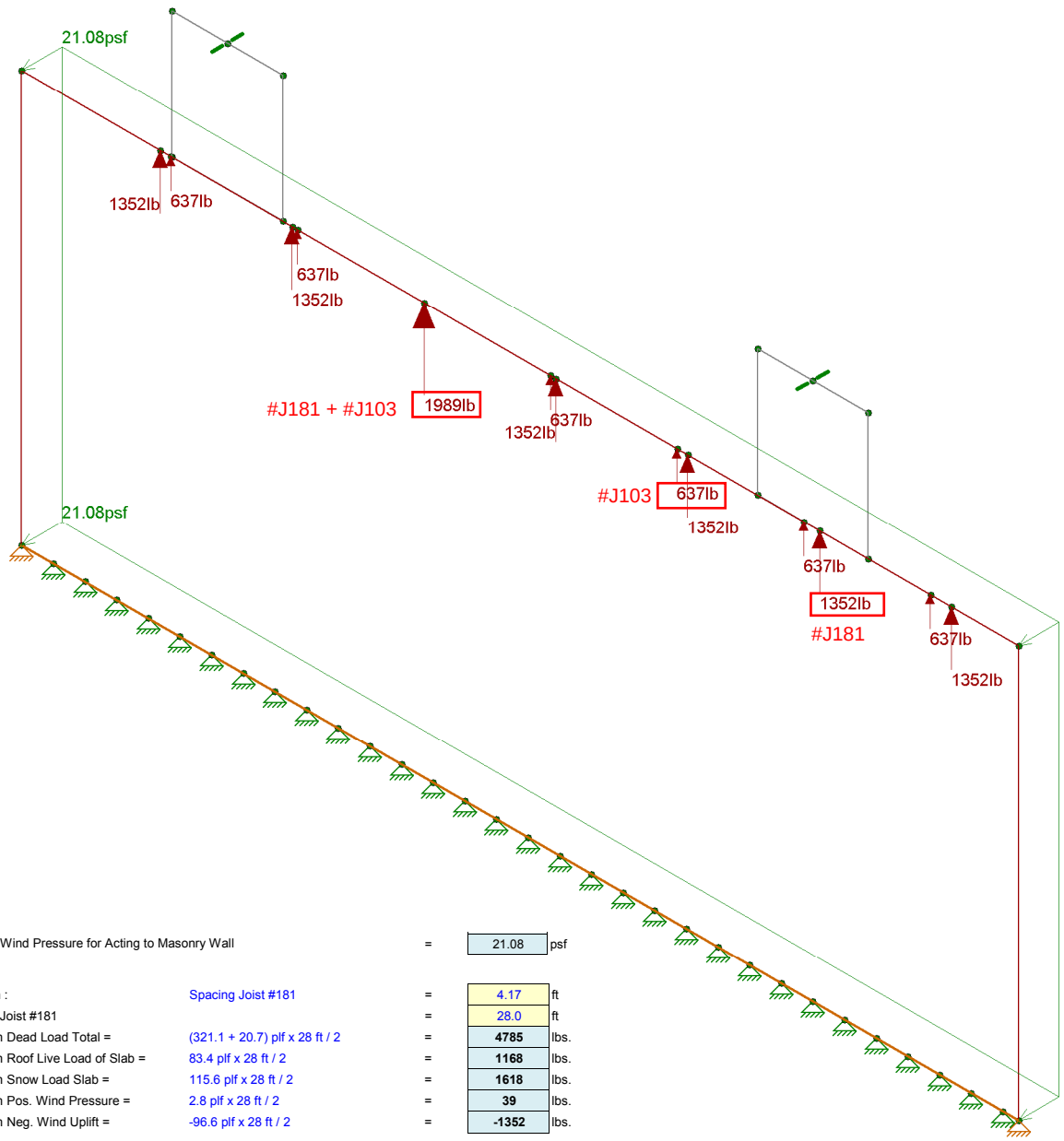
Tributary Width :	Spacing Joist #181	=	4.17	ft
Span length of Joist #181		=	28.0	ft
Point Load from Dead Load Total =	(321.1 + 20.7) plf x 28 ft / 2	=	**4785**	lbs.
Point Load from Roof Live Load of Slab =	83.4 plf x 28 ft / 2	=	**1168**	lbs.
Point Load from Snow Load Slab =	115.6 plf x 28 ft / 2	=	**1618**	lbs.
Point Load from Pos. Wind Pressure =	2.8 plf x 28 ft / 2	=	**39**	lbs.
Point Load from Neg. Wind Uplift =	-96.6 plf x 28 ft / 2	=	**-1352**	lbs.

- JOIST #103

Tributary Width :	Spacing Joist #181	=	4.00	ft
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Total =	(308.0 + 20.7) plf x 13.75 ft / 2	=	**2260**	lbs.
Point Load from Roof Live Load of Slab =	80.0 plf x 13.75 ft / 2	=	**550**	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	**762**	lbs.
Point Load from Pos. Wind Pressure =	2.6 plf x 13.75 ft / 2	=	**18**	lbs.
Point Load from Neg. Wind Uplift =	-92.6 plf x 13.75 ft / 2	=	**-637**	lbs.

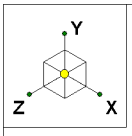
Loads: BLC 9, Snow - Pf

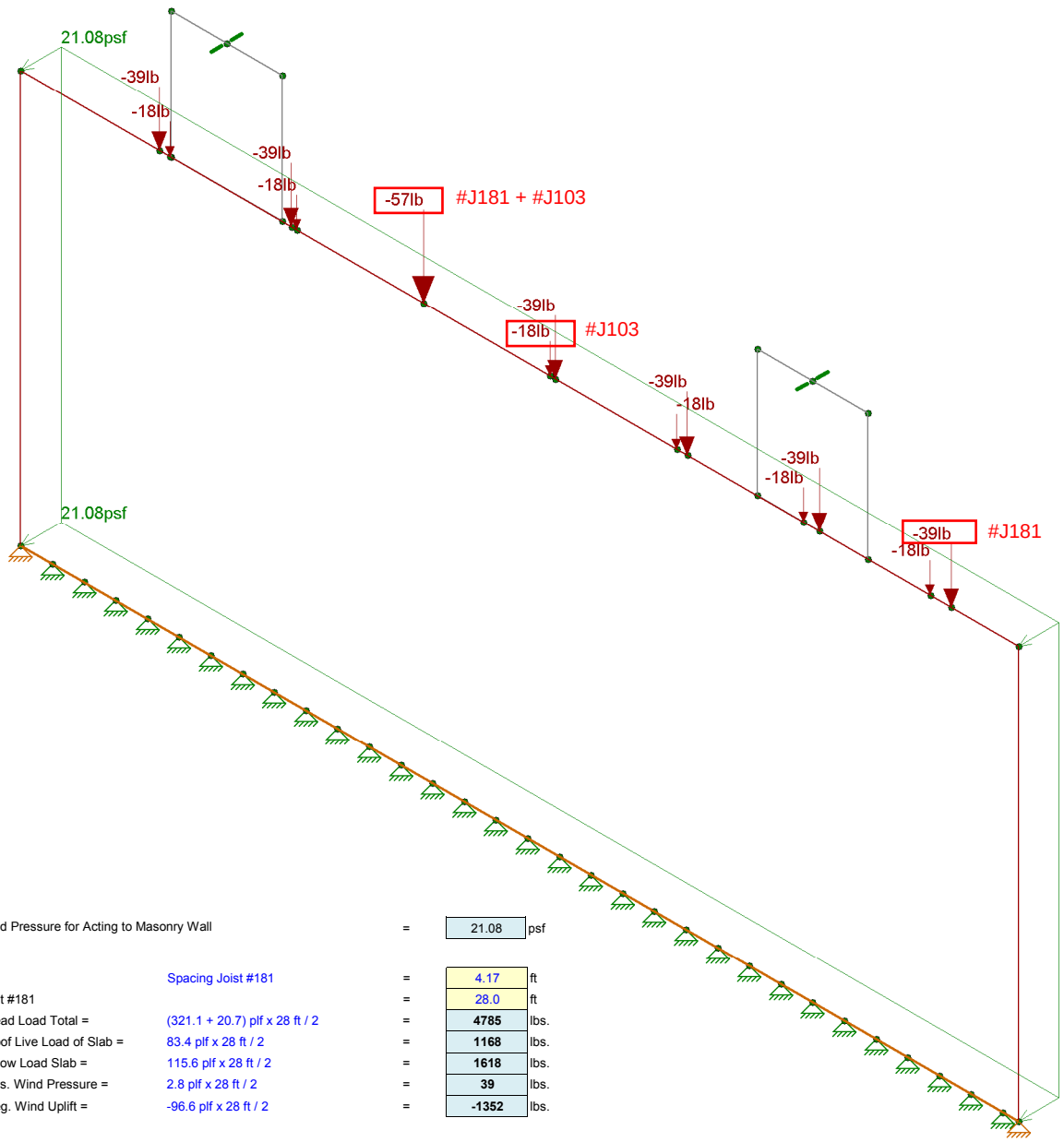




Max. Positive Wind Pressure for Acting to Masonry Wall		=	21.08	psf
- JOIST #181				
Tributary Width :	Spacing Joist #181	=	4.17	ft
Span length of Joist #181		=	28.0	ft
Point Load from Dead Load Total =	(321.1 + 20.7) plf x 28 ft / 2	=	**4785**	lbs.
Point Load from Roof Live Load of Slab =	83.4 plf x 28 ft / 2	=	**1168**	lbs.
Point Load from Snow Load Slab =	115.6 plf x 28 ft / 2	=	**1618**	lbs.
Point Load from Pos. Wind Pressure =	2.8 plf x 28 ft / 2	=	**39**	lbs.
Point Load from Neg. Wind Uplift =	-96.6 plf x 28 ft / 2	=	**-1352**	lbs.
- JOIST #103				
Tributary Width :	Spacing Joist #181	=	4.00	ft
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Total =	(308.0 + 20.7) plf x 13.75 ft / 2	=	**2260**	lbs.
Point Load from Roof Live Load of Slab =	80.0 plf x 13.75 ft / 2	=	**550**	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	**762**	lbs.
Point Load from Pos. Wind Pressure =	2.6 plf x 13.75 ft / 2	=	**18**	lbs.
Point Load from Neg. Wind Uplift =	-92.6 plf x 13.75 ft / 2	=	**-637**	lbs.

Loads: BLC 10, Wind Building (+Y)





Max. Positive Wind Pressure for Acting to Masonry Wall		=	21.08	psf
- JOIST #181				
Tributary Width :	Spacing Joist #181	=	4.17	ft
Span length of Joist #181		=	28.0	ft
Point Load from Dead Load Total =	(321.1 + 20.7) plf x 28 ft / 2	=	**4785**	lbs.
Point Load from Roof Live Load of Slab =	83.4 plf x 28 ft / 2	=	**1168**	lbs.
Point Load from Snow Load Slab =	115.6 plf x 28 ft / 2	=	**1618**	lbs.
Point Load from Pos. Wind Pressure =	2.8 plf x 28 ft / 2	=	**39**	lbs.
Point Load from Neg. Wind Uplift =	-96.6 plf x 28 ft / 2	=	**-1352**	lbs.
- JOIST #103				
Tributary Width :	Spacing Joist #181	=	4.00	ft
Span length of Joist #103		=	13.75	ft
Point Load from Dead Load Total =	(308.0 + 20.7) plf x 13.75 ft / 2	=	**2260**	lbs.
Point Load from Roof Live Load of Slab =	80.0 plf x 13.75 ft / 2	=	**550**	lbs.
Point Load from Snow Load Slab =	110.9 plf x 13.75 ft / 2	=	**762**	lbs.
Point Load from Pos. Wind Pressure =	2.6 plf x 13.75 ft / 2	=	**18**	lbs.
Point Load from Neg. Wind Uplift =	-92.6 plf x 13.75 ft / 2	=	**-637**	lbs.

Loads: BLC 11, Wind Building (-Y)

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: Strength
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	None
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (...	Density[k/ft^3]	f'c[ksi]	Lambda	Flex Steel[ksi]	Shear Steel[ksi]
1	Conc4000NW	3644	1584	.15	.6	.145	4	1	60	60

Masonry Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Self Weight[k/ft^3]	f'm[ksi]	Flex Steel[ksi]	Shear Steel[ksi]
1	Masonry	1350	540	.25	.6	Custom	1.5	60	60

Wall Panel U.C. Parameters

	Label	Max Bending Chk	Max Shear Chk
1	Typical	1	1

Masonry Wall Panel Parameters

	Label	Block Nom Width	Block Grouting	Reinforced	Wall Area Method
1	Typical	12"	Partially Grouted	Yes	NCMA

Masonry Wall Panel In Plane Parameters

	Label	Vert Bar Size	Bars Per Cell	Min Bound Zone Wi...	Max Bound Zone Wi...	Horz Bar Size	1.5x Shear I...	Transfer Lo...
1	Typical	#6	1	8	40	#4	Yes	

Masonry Wall Panel Out of Plane Parameters

	Label	Bar Size	Bar Space Min	Bar Space ...	Bar Placement	Cover[in]	Mortar Type	Cement Type	Transfer Load
1	Typical	#6	16"	16"	Center	Min	Type N	Portland, Lime/...	

Concrete Wall Panel Rebar Parameters

	Label	Vert Bar Si...	Max Vert Bar...	Min Vert Bar S...	Vert Bar ...	Horz Bar Size	Max Horz Bar ...	Min Horz Bar S...	Horz Bar I...	Group Wall
1	Typical	#6	16	16	2	#6	14	14	2	

Concrete Wall Panel Cover Parameters

	Label	Outer Bars	Location	Int Cover -z[in]	Ext Cover +z[in]	Edge Cover[in]	Transfer In	Transfer O...
1	Typical	Vertical	Centered	6	6	5	Yes	Yes

Wall Panel Data

	Label	A Joint	B Joint	C Joint	D Joint	Material Type	Material Set	Thicknes...	Design Rule	Panel/Spacing
1	WP1	N7	N3	N4	N8	Concrete	Conc4000NW	12	Typical	N/A
2	WP2	N12	N6	N5	N11	Concrete	Conc4000NW	12	Typical	N/A
3	WP3	N27	N26	N24	N25	Masonry	Masonry	12	Typical	16

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diaphragm
1	N1	0	17	0	0	
2	N2	18.5	17	0	0	
3	N3	-1.75	17	0	0	
4	N4	1.75	17	0	0	
5	N5	20.25	17	0	0	
6	N6	16.75	17	0	0	
7	N7	-1.75	13	0	0	
8	N8	1.75	13	0	0	
9	N9	18.718	13	0	0	
10	N10	18.217	13	0	0	
11	N11	20.25	13	0	0	
12	N12	16.75	13	0	0	
13	N13	2.05	13	0	0	
14	N14	6.217	13	0	0	
15	N15	10.384	13	0	0	
16	N16	14.551	13	0	0	
17	N17	-2.117	13	0	0	
18	N18	14.217	13	0	0	
19	N19	10.217	13	0	0	
20	N20	22.885	13	0	0	
21	N21	22.217	13	0	0	
22	N22	2.217	13	0	0	
23	N23	-1.783	13	0	0	
24	N24	25	13	0	0	
25	N25	25	0	0	0	
26	N26	-6.5	13	0	0	
27	N27	-6.5	0	0	0	
28	N28	-5.5	0	0	0	
29	N29	-4.5	0	0	0	
30	N30	-3.5	0	0	0	
31	N31	-2.5	0	0	0	
32	N32	-1.5	0	0	0	
33	N33	-.5	0	0	0	
34	N34	.5	0	0	0	
35	N35	1.5	0	0	0	
36	N36	2.5	0	0	0	
37	N37	3.5	0	0	0	
38	N38	4.5	0	0	0	
39	N39	5.5	0	0	0	
40	N40	6.5	0	0	0	
41	N41	7.5	0	0	0	
42	N42	8.5	0	0	0	
43	N43	9.5	0	0	0	
44	N44	10.5	0	0	0	
45	N45	11.5	0	0	0	
46	N46	12.5	0	0	0	
47	N47	13.5	0	0	0	
48	N48	14.5	0	0	0	
49	N49	15.5	0	0	0	
50	N50	16.5	0	0	0	
51	N51	17.5	0	0	0	
52	N52	18.5	0	0	0	
53	N53	19.5	0	0	0	
54	N54	20.5	0	0	0	
55	N55	21.5	0	0	0	
56	N56	22.5	0	0	0	
57	N57	23.5	0	0	0	
58	N58	24.5	0	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1			Reaction			
2	N2			Reaction			
3	N3						
4	N4						
5	N5						
6	N6						
7	N7						
8	N8						
9	N9						
10	N10						
11	N11						
12	N12						
13	N13						
14	N14						
15	N15						
16	N16						
17	N17						
18	N18						
19	N19						
20	N20						
21	N21						
22	N22						
23	N23						
24	N24						
25	N25						
26	N26						
27	N27						
28	N28	Reaction	Reaction	Reaction			
29	N29	Reaction	Reaction	Reaction			
30	N30	Reaction	Reaction	Reaction			
31	N31	Reaction	Reaction	Reaction			
32	N32	Reaction	Reaction	Reaction			
33	N33	Reaction	Reaction	Reaction			
34	N34	Reaction	Reaction	Reaction			
35	N35	Reaction	Reaction	Reaction			
36	N36	Reaction	Reaction	Reaction			
37	N37	Reaction	Reaction	Reaction			
38	N38	Reaction	Reaction	Reaction			
39	N39	Reaction	Reaction	Reaction			
40	N40	Reaction	Reaction	Reaction			
41	N41	Reaction	Reaction	Reaction			
42	N42	Reaction	Reaction	Reaction			
43	N43	Reaction	Reaction	Reaction			
44	N44	Reaction	Reaction	Reaction			
45	N45	Reaction	Reaction	Reaction			
46	N46	Reaction	Reaction	Reaction			
47	N47	Reaction	Reaction	Reaction			
48	N48	Reaction	Reaction	Reaction			
49	N49	Reaction	Reaction	Reaction			
50	N50	Reaction	Reaction	Reaction			
51	N51	Reaction	Reaction	Reaction			
52	N52	Reaction	Reaction	Reaction			
53	N53	Reaction	Reaction	Reaction			
54	N54	Reaction	Reaction	Reaction			
55	N55	Reaction	Reaction	Reaction			
56	N56	Reaction	Reaction	Reaction			
57	N57	Reaction	Reaction	Reaction			
58	N58	Reaction	Reaction	Reaction			

Joint Loads and Enforced Displacements (BLC 1 : DL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N1	L	Y	-3026
2	N2	L	Y	-2588
3	N9	L	Y	-4785
4	N13	L	Y	-4785
5	N14	L	Y	-4785
6	N15	L	Y	-4785
7	N16	L	Y	-4785
8	N17	L	Y	-4785
9	N20	L	Y	-4785
10	N10	L	Y	-2260
11	N14	L	Y	-2260
12	N18	L	Y	-2260
13	N19	L	Y	-2260
14	N21	L	Y	-2260
15	N22	L	Y	-2260
16	N23	L	Y	-2260

Joint Loads and Enforced Displacements (BLC 2 : LL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N1	L	Y	-331
2	N2	L	Y	-74

Joint Loads and Enforced Displacements (BLC 3 : Roof LL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N9	L	Y	-1168
2	N13	L	Y	-1168
3	N14	L	Y	-1168
4	N15	L	Y	-1168
5	N16	L	Y	-1168
6	N17	L	Y	-1168
7	N20	L	Y	-1168
8	N10	L	Y	-550
9	N14	L	Y	-550
10	N18	L	Y	-550
11	N19	L	Y	-550
12	N21	L	Y	-550
13	N22	L	Y	-550
14	N23	L	Y	-550

Joint Loads and Enforced Displacements (BLC 4 : Wind - 0 Deg (+X))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N1	L	X	3528
2	N1	L	Y	3645
3	N1	L	Z	-2772
4	N2	L	X	3484
5	N2	L	Y	-3645
6	N2	L	Z	2772

Joint Loads and Enforced Displacements (BLC 5 : Wind - 90 Deg (+Z))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N1	L	X	-12
2	N1	L	Y	-5263
3	N1	L	Z	3865
4	N2	L	X	-5
5	N2	L	Y	-4194
6	N2	L	Z	3386

Joint Loads and Enforced Displacements (BLC 6 : Ice DL)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N1	L	Y	-2527
2	N2	L	Y	-2045

Joint Loads and Enforced Displacements (BLC 7 : Ice Wind - 0 Deg (+X))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N1	L	X	795
2	N1	L	Y	1141
3	N1	L	Z	-627
4	N2	L	X	789
5	N2	L	Y	-1140
6	N2	L	Z	627

Joint Loads and Enforced Displacements (BLC 8 : Ice Wind - 90 Deg (+Z))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N1	L	X	-1
2	N1	L	Y	-1646
3	N1	L	Z	891
4	N2	L	X	0
5	N2	L	Y	-1312
6	N2	L	Z	743

Joint Loads and Enforced Displacements (BLC 9 : Snow - Pf)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N9	L	Y	-1618
2	N13	L	Y	-1618
3	N14	L	Y	-1618
4	N15	L	Y	-1618
5	N16	L	Y	-1618
6	N17	L	Y	-1618
7	N20	L	Y	-1618
8	N10	L	Y	-762
9	N14	L	Y	-762
10	N18	L	Y	-762
11	N19	L	Y	-762
12	N21	L	Y	-762
13	N22	L	Y	-762
14	N23	L	Y	-762

Joint Loads and Enforced Displacements (BLC 10 : Wind Building (+Y))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N9	L	Y	1352
2	N13	L	Y	1352
3	N14	L	Y	1352
4	N15	L	Y	1352
5	N16	L	Y	1352
6	N17	L	Y	1352
7	N20	L	Y	1352
8	N10	L	Y	637
9	N14	L	Y	637
10	N18	L	Y	637
11	N19	L	Y	637
12	N21	L	Y	637
13	N22	L	Y	637
14	N23	L	Y	637

Joint Loads and Enforced Displacements (BLC 11 : Wind Building (-Y))

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N9	L	Y	-39
2	N13	L	Y	-39

Joint Loads and Enforced Displacements (BLC 11 : Wind Building (-Y)) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
3	N14	L	Y	-39
4	N15	L	Y	-39
5	N16	L	Y	-39
6	N17	L	Y	-39
7	N20	L	Y	-39
8	N10	L	Y	-18
9	N14	L	Y	-18
10	N18	L	Y	-18
11	N19	L	Y	-18
12	N21	L	Y	-18
13	N22	L	Y	-18
14	N23	L	Y	-18

Wall Panel Surface Loads (BLC 10 : Wind Building (+Y))

	Wall Panel Label	Direction	Top Magnitude[psf,...	Bottom Magnitude[...	Start Location[ft]	Height[ft]
1	WP3	Z	21.08	21.08	0	13

Wall Panel Surface Loads (BLC 11 : Wind Building (-Y))

	Wall Panel Label	Direction	Top Magnitude[psf,...	Bottom Magnitude[...	Start Location[ft]	Height[ft]
1	WP3	Z	21.08	21.08	0	13

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut..	Area(M...	Surface...
1	DL	DL		-1		16				
2	LL	LL				2				
3	Roof LL	RLL				14				
4	Wind - 0 Deg (+X)	WLX				6				
5	Wind - 90 Deg (+Z)	WLZ				6				
6	Ice DL	NL				2				
7	Ice Wind - 0 Deg (+X)	NLX				6				
8	Ice Wind - 90 Deg (+Z)	NLZ				6				
9	Snow - Pf	SL				14				
10	Wind Building (+Y)	WL+Y				14				1
11	Wind Building (-Y)	WL-Y				14				1

Load Combinations

	Description	Solve	PD...	S...	BLC	Fact..	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fa...	B...	F...	...	F.....	F.....	F...
1	LRFD																					
2	1.4DL	Yes	Y		DL	1.4																
3	1.2DL + 1.6LL + 0.5RLL	Yes	Y		DL	1.2	LL	1.6	RLL	.5												
4	1.2DL + 1.6LL + 0.5SL	Yes	Y		DL	1.2	LL	1.6	SL	.5												
5	1.2DL + 1.6LL + 0.5SL + 0...	Yes	Y		DL	1.2	LL	1.6	SL	.5	NL	.2										
6	1.2DL + 1.6RLL + 1.0LL	Yes	Y		DL	1.2	LL	1	RLL	1.6												
7	1.2DL + 1.6SL + 1.0LL	Yes	Y		DL	1.2	LL	1	SL	1.6												
8	1.2DL + 1.6RLL + 0.5WL (0...	Yes	Y		DL	1.2	RLL	1.6	WLX	.5	WLZ		WL...	.5								
9	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	.25	WL...	.5								
10	1.2DL + 1.6RLL + 0.5WL (6...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	.433	WL...	.5								
11	1.2DL + 1.6RLL + 0.5WL (9...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	.5	WL...	.5								
12	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	.433	WL...	.5								
13	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	.25	WL...	.5								
14	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.5	WLZ		WL...	.5								
15	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	-.25	WL...	.5								
16	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	-.433	WL...	.5								
17	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	-.5	WL...	.5								
18	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	-.433	WL...	.5								
19	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	-.25	WL...	.5								

Load Combinations (Continued)

	Description	Solve	PD...	S...	BLC	Fact...	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fa...	B...	F...	...	F.....	F.....	F...	F...
20	1.2DL + 1.6RLL + 0.5WL (0...	Yes	Y		DL	1.2	RLL	1.6	WLX	.5	WLZ		WL-Y	.5										
21	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	.25	WL-Y	.5										
22	1.2DL + 1.6RLL + 0.5WL (6...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	.433	WL-Y	.5										
23	1.2DL + 1.6RLL + 0.5WL (9...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	.5	WL-Y	.5										
24	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	.433	WL-Y	.5										
25	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	.25	WL-Y	.5										
26	1.2DL + 1.6RLL + 0.5WL (1...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.5	WLZ		WL-Y	.5										
27	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.433	WLZ	-.25	WL-Y	.5										
28	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX	-.25	WLZ	-.433	WL-Y	.5										
29	1.2DL + 1.6RLL + 0.5WL (2...	Yes	Y		DL	1.2	RLL	1.6	WLX		WLZ	-.5	WL-Y	.5										
30	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.25	WLZ	-.433	WL-Y	.5										
31	1.2DL + 1.6RLL + 0.5WL (3...	Yes	Y		DL	1.2	RLL	1.6	WLX	.433	WLZ	-.25	WL-Y	.5										
32	1.2DL + 1.6SL + 0.5WL (0 ...	Yes	Y		DL	1.2	SL	1.6	WLX	.5	WLZ		WL...	.5										
33	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	.25	WL...	.5										
34	1.2DL + 1.6SL + 0.5WL (60...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	.433	WL...	.5										
35	1.2DL + 1.6SL + 0.5WL (90...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	.5	WL...	.5										
36	1.2DL + 1.6SL + 0.5WL (12...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	.433	WL...	.5										
37	1.2DL + 1.6SL + 0.5WL (15...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	.25	WL...	.5										
38	1.2DL + 1.6SL + 0.5WL (18...	Yes	Y		DL	1.2	SL	1.6	WLX	-.5	WLZ		WL...	.5										
39	1.2DL + 1.6SL + 0.5WL (21...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	-.25	WL...	.5										
40	1.2DL + 1.6SL + 0.5WL (24...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	-.433	WL...	.5										
41	1.2DL + 1.6SL + 0.5WL (27...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	-.5	WL...	.5										
42	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	-.433	WL...	.5										
43	1.2DL + 1.6SL + 0.5WL (33...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	-.25	WL...	.5										
44	1.2DL + 1.6SL + 0.5WL (0 ...	Yes	Y		DL	1.2	SL	1.6	WLX	.5	WLZ		WL-Y	.5										
45	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	.25	WL-Y	.5										
46	1.2DL + 1.6SL + 0.5WL (60...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	.433	WL-Y	.5										
47	1.2DL + 1.6SL + 0.5WL (90...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	.5	WL-Y	.5										
48	1.2DL + 1.6SL + 0.5WL (12...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	.433	WL-Y	.5										
49	1.2DL + 1.6SL + 0.5WL (15...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	.25	WL-Y	.5										
50	1.2DL + 1.6SL + 0.5WL (18...	Yes	Y		DL	1.2	SL	1.6	WLX	-.5	WLZ		WL-Y	.5										
51	1.2DL + 1.6SL + 0.5WL (21...	Yes	Y		DL	1.2	SL	1.6	WLX	-.433	WLZ	-.25	WL-Y	.5										
52	1.2DL + 1.6SL + 0.5WL (24...	Yes	Y		DL	1.2	SL	1.6	WLX	-.25	WLZ	-.433	WL-Y	.5										
53	1.2DL + 1.6SL + 0.5WL (27...	Yes	Y		DL	1.2	SL	1.6	WLX		WLZ	-.5	WL-Y	.5										
54	1.2DL + 1.6SL + 0.5WL (30...	Yes	Y		DL	1.2	SL	1.6	WLX	.25	WLZ	-.433	WL-Y	.5										
55	1.2DL + 1.6SL + 0.5WL (33...	Yes	Y		DL	1.2	SL	1.6	WLX	.433	WLZ	-.25	WL-Y	.5										
56	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL...	1	RLL	.5								
57	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL...	1	RLL	.5								
58	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL...	1	RLL	.5								
59	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL...	1	RLL	.5								
60	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL...	1	RLL	.5								
61	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL...	1	RLL	.5								
62	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL...	1	RLL	.5								
63	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL...	1	RLL	.5								
64	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL...	1	RLL	.5								
65	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL...	1	RLL	.5								
66	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL...	1	RLL	.5								
67	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL...	1	RLL	.5								
68	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL-Y	1	RLL	.5								
69	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL-Y	1	RLL	.5								
70	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL-Y	1	RLL	.5								
71	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL-Y	1	RLL	.5								
72	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL-Y	1	RLL	.5								
73	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL-Y	1	RLL	.5								
74	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL-Y	1	RLL	.5								
75	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL-Y	1	RLL	.5								
76	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL-Y	1	RLL	.5								
77	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL-Y	1	RLL	.5								
78	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL-Y	1	RLL	.5								
79	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL-Y	1	RLL	.5								
80	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL...	1	SL	.5								
81	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL...	1	SL	.5								

Load Combinations (Continued)

	Description	Solve	PD...	S...	BLC	Fact...	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fa...	B...	F...	...	F.....	F.....	F...
82	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL...	1	SL	.5						
83	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL...	1	SL	.5						
84	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL...	1	SL	.5						
85	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL...	1	SL	.5						
86	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL...	1	SL	.5						
87	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL...	1	SL	.5						
88	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL...	1	SL	.5						
89	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL...	1	SL	.5						
90	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL...	1	SL	.5						
91	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL...	1	SL	.5						
92	1.2DL + 1.0WL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	WLX	1	WLZ		WL-Y	1	SL	.5						
93	1.2DL + 1.0WL (30 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	.5	WL-Y	1	SL	.5						
94	1.2DL + 1.0WL (60 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	.866	WL-Y	1	SL	.5						
95	1.2DL + 1.0WL (90 DEG) +...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	1	WL-Y	1	SL	.5						
96	1.2DL + 1.0WL (120 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	.866	WL-Y	1	SL	.5						
97	1.2DL + 1.0WL (150 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	.5	WL-Y	1	SL	.5						
98	1.2DL + 1.0WL (180 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-1	WLZ		WL-Y	1	SL	.5						
99	1.2DL + 1.0WL (210 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.866	WLZ	-.5	WL-Y	1	SL	.5						
100	1.2DL + 1.0WL (240 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	-.5	WLZ	-.866	WL-Y	1	SL	.5						
101	1.2DL + 1.0WL (270 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX		WLZ	-1	WL-Y	1	SL	.5						
102	1.2DL + 1.0WL (300 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.5	WLZ	-.866	WL-Y	1	SL	.5						
103	1.2DL + 1.0WL (330 DEG) ...	Yes	Y		DL	1.2	LL	1	WLX	.866	WLZ	-.5	WL-Y	1	SL	.5						
104	1.2DL + 1.0IWL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	NLX	1	NLZ		WL...	1	SL	.5	NL	1				
105	1.2DL + 1.0IWL (30 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	.5	WL...	1	SL	.5	NL	1				
106	1.2DL + 1.0IWL (60 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	.866	WL...	1	SL	.5	NL	1				
107	1.2DL + 1.0IWL (90 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	1	WL...	1	SL	.5	NL	1				
108	1.2DL + 1.0IWL (120 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	.866	WL...	1	SL	.5	NL	1				
109	1.2DL + 1.0IWL (150 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	.5	WL...	1	SL	.5	NL	1				
110	1.2DL + 1.0IWL (180 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-1	NLZ		WL...	1	SL	.5	NL	1				
111	1.2DL + 1.0IWL (210 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	-.5	WL...	1	SL	.5	NL	1				
112	1.2DL + 1.0IWL (240 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	-.866	WL...	1	SL	.5	NL	1				
113	1.2DL + 1.0IWL (270 DEG)...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	-1	WL...	1	SL	.5	NL	1				
114	1.2DL + 1.0IWL (300 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	-.866	WL...	1	SL	.5	NL	1				
115	1.2DL + 1.0IWL (330 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	-.5	WL...	1	SL	.5	NL	1				
116	1.2DL + 1.0IWL (0 DEG) + ...	Yes	Y		DL	1.2	LL	1	NLX	1	NLZ		WL-Y	1	SL	.5	NL	1				
117	1.2DL + 1.0IWL (30 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	.5	WL-Y	1	SL	.5	NL	1				
118	1.2DL + 1.0IWL (60 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	.866	WL-Y	1	SL	.5	NL	1				
119	1.2DL + 1.0IWL (90 DEG) ...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	1	WL-Y	1	SL	.5	NL	1				
120	1.2DL + 1.0IWL (120 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	.866	WL-Y	1	SL	.5	NL	1				
121	1.2DL + 1.0IWL (150 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	.5	WL-Y	1	SL	.5	NL	1				
122	1.2DL + 1.0IWL (180 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-1	NLZ		WL-Y	1	SL	.5	NL	1				
123	1.2DL + 1.0IWL (210 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.866	NLZ	-.5	WL-Y	1	SL	.5	NL	1				
124	1.2DL + 1.0IWL (240 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	-.5	NLZ	-.866	WL-Y	1	SL	.5	NL	1				
125	1.2DL + 1.0IWL (270 DEG)...	Yes	Y		DL	1.2	LL	1	NLX		NLZ	-1	WL-Y	1	SL	.5	NL	1				
126	1.2DL + 1.0IWL (300 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.5	NLZ	-.866	WL-Y	1	SL	.5	NL	1				
127	1.2DL + 1.0IWL (330 DEG)...	Yes	Y		DL	1.2	LL	1	NLX	.866	NLZ	-.5	WL-Y	1	SL	.5	NL	1				
128	0.9DL + 1.0WL (0 DEG)	Yes	Y		DL	.9	WLX	1	WLZ		WL...	1										
129	0.9DL + 1.0WL (30 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	.5	WL...	1										
130	0.9DL + 1.0WL (60 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	.866	WL...	1										
131	0.9DL + 1.0WL (90 DEG)	Yes	Y		DL	.9	WLX		WLZ	1	WL...	1										
132	0.9DL + 1.0WL (120 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	.866	WL...	1										
133	0.9DL + 1.0WL (150 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	.5	WL...	1										
134	0.9DL + 1.0WL (180 DEG)	Yes	Y		DL	.9	WLX	-1	WLZ		WL...	1										
135	0.9DL + 1.0WL (210 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	-.5	WL...	1										
136	0.9DL + 1.0WL (240 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	-.866	WL...	1										
137	0.9DL + 1.0WL (270 DEG)	Yes	Y		DL	.9	WLX		WLZ	-1	WL...	1										
138	0.9DL + 1.0WL (300 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	-.866	WL...	1										
139	0.9DL + 1.0WL (330 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	-.5	WL...	1										
140	0.9DL + 1.0WL (0 DEG)	Yes	Y		DL	.9	WLX	1	WLZ		WL-Y	1										
141	0.9DL + 1.0WL (30 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	.5	WL-Y	1										
142	0.9DL + 1.0WL (60 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	.866	WL-Y	1										
143	0.9DL + 1.0WL (90 DEG)	Yes	Y		DL	.9	WLX		WLZ	1	WL-Y	1										

Load Combinations (Continued)

	Description	Solve	PD...	S...	BLC	Fact...	BLC	Fa...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fa...	B...	F...	...	F.....	F.....	F...
144	0.9DL + 1.0WL (120 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	.866	WL-Y	1										
145	0.9DL + 1.0WL (150 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	.5	WL-Y	1										
146	0.9DL + 1.0WL (180 DEG)	Yes	Y		DL	.9	WLX	-1	WLZ		WL-Y	1										
147	0.9DL + 1.0WL (210 DEG)	Yes	Y		DL	.9	WLX	-.866	WLZ	-.5	WL-Y	1										
148	0.9DL + 1.0WL (240 DEG)	Yes	Y		DL	.9	WLX	-.5	WLZ	-.866	WL-Y	1										
149	0.9DL + 1.0WL (270 DEG)	Yes	Y		DL	.9	WLX		WLZ	-1	WL-Y	1										
150	0.9DL + 1.0WL (300 DEG)	Yes	Y		DL	.9	WLX	.5	WLZ	-.866	WL-Y	1										
151	0.9DL + 1.0WL (330 DEG)	Yes	Y		DL	.9	WLX	.866	WLZ	-.5	WL-Y	1										
152	0.9DL + 1.0IDL + 1.0IWL (0...	Yes	Y		DL	.9	NLX	1	NLZ		WL...	1	NL	1								
153	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	.5	WL...	1	NL	1								
154	0.9DL + 1.0IDL + 1.0IWL (6...	Yes	Y		DL	.9	NLX	.5	NLZ	.866	WL...	1	NL	1								
155	0.9DL + 1.0IDL + 1.0IWL (9...	Yes	Y		DL	.9	NLX		NLZ	1	WL...	1	NL	1								
156	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.5	NLZ	.866	WL...	1	NL	1								
157	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.866	NLZ	.5	WL...	1	NL	1								
158	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-1	NLZ		WL...	1	NL	1								
159	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.866	NLZ	-.5	WL...	1	NL	1								
160	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.5	NLZ	-.866	WL...	1	NL	1								
161	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX		NLZ	-1	WL...	1	NL	1								
162	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.5	NLZ	-.866	WL...	1	NL	1								
163	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	-.5	WL...	1	NL	1								
164	0.9DL + 1.0IDL + 1.0IWL (0...	Yes	Y		DL	.9	NLX	1	NLZ		WL-Y	1	NL	1								
165	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	.5	WL-Y	1	NL	1								
166	0.9DL + 1.0IDL + 1.0IWL (6...	Yes	Y		DL	.9	NLX	.5	NLZ	.866	WL-Y	1	NL	1								
167	0.9DL + 1.0IDL + 1.0IWL (9...	Yes	Y		DL	.9	NLX		NLZ	1	WL-Y	1	NL	1								
168	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.5	NLZ	.866	WL-Y	1	NL	1								
169	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-.866	NLZ	.5	WL-Y	1	NL	1								
170	0.9DL + 1.0IDL + 1.0IWL (1...	Yes	Y		DL	.9	NLX	-1	NLZ		WL-Y	1	NL	1								
171	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.866	NLZ	-.5	WL-Y	1	NL	1								
172	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX	-.5	NLZ	-.866	WL-Y	1	NL	1								
173	0.9DL + 1.0IDL + 1.0IWL (2...	Yes	Y		DL	.9	NLX		NLZ	-1	WL-Y	1	NL	1								
174	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.5	NLZ	-.866	WL-Y	1	NL	1								
175	0.9DL + 1.0IDL + 1.0IWL (3...	Yes	Y		DL	.9	NLX	.866	NLZ	-.5	WL-Y	1	NL	1								

Wall Panel ACI 318-14: Concrete Code Checks (In Plane)

	Wall Panel	Region	Max UC	LC	Shear UC	LC	Pn*phi[lb]	Mn*phi[lb-ft]	Vn*phi[lb]
1	WP1	R1	.119	92	.033	98	NC	118688.744	110826.941
2	WP2	R1	.117	92	.031	92	NC	118688.744	110826.941

Wall Panel ACI 318-14: Concrete Code Checks (Out Plane)

	Wall Panel	Region	Max UC	LC	Shear UC	LC	Pn*phi[lb/ft]	Mn*phi[lb-ft/ft]	Vn*phi[lb/ft]
1	WP1	R1	.2 (Ext)	96	.078	95	NC	9749.735	6908.711
2	WP2	R1	.201 (Ext)	94	.071	99	NC	9749.735	6830.52

Wall Panel ACI 530-13: Strength Masonry Code Checks for Wall Regions (In Plane)

	Wall Pa...	Region	Design ...	Axial UC	LC	Bending UC	LC	Shear UC	LC	Pn*phi[lb]	Mn*phi[lb-ft]	Vn*phi[lb]
1	WP3	R1	Typical	.067	47	.122	128	.045	128	2.21438e+6	1.76567e+6	154433.223

Wall Panel ACI 530-13: Strength Masonry Code Checks for Wall Regions (Out of Plane)

	Wall Panel	Region	Design Rule	Axial UC	LC	Bending UC	LC	Pn*phi[lb-ft]	Mn*phi[lb-ft]
1	WP3	R1	Typical	.062	128	.083	128	27060	8091.614

Envelope Wall Panel Forces

	Wall Label	Elevation ...		Axial [lb]	LC	x Shear [lb]	LC	z Shear [lb]	LC	x-x Mo...	LC	z-z Mo...	LC
1	WP1	13	max	12778.443	72	3529.105	62	1702.279	96	6808.2...	96	14111....	92
2		13	min	-1829.869	150	-3528.196	92	0	7	0	7	-14114...	62
3	WP2	13	max	11070.104	58	3484.081	62	1711.592	94	6845.5...	94	13939....	92
4		13	min	-1298.304	136	-3484.976	92	0	7	0	7	-13933...	62
5	WP3	0	max	148562.4	47	7013.382	98	0	7	3.53	95	25280...	92
6		0	min	64353.8	137	-7014.21	92	-5365.812	95	0	7	-15738...	134

6. ATTACHMENTS

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	26	-3.22	134.75	0.40
			Max. Vx	2	-3.22	0.10	135.05
			Max. Torque	22			-0.65

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	49	9.85	0.70	0.70
	Max. H_x	27	4.24	3.21	0.00
	Max. H_z	3	4.24	0.00	3.21
	Max. M_x	2	135.05	0.00	3.21
	Max. M_z	10	134.55	-3.21	0.00
	Max. Torsion	6	0.65	-2.27	2.27
	Min. Vert	15	4.24	-2.27	-2.27
	Min. H_x	11	4.24	-3.21	0.00
	Min. H_z	19	4.24	0.00	-3.21
	Min. M_x	18	-134.25	0.00	-3.21
	Min. M_z	26	-134.75	3.21	0.00
	Min. Torsion	22	-0.65	2.27	-2.27

Tower Mast Reaction Summary

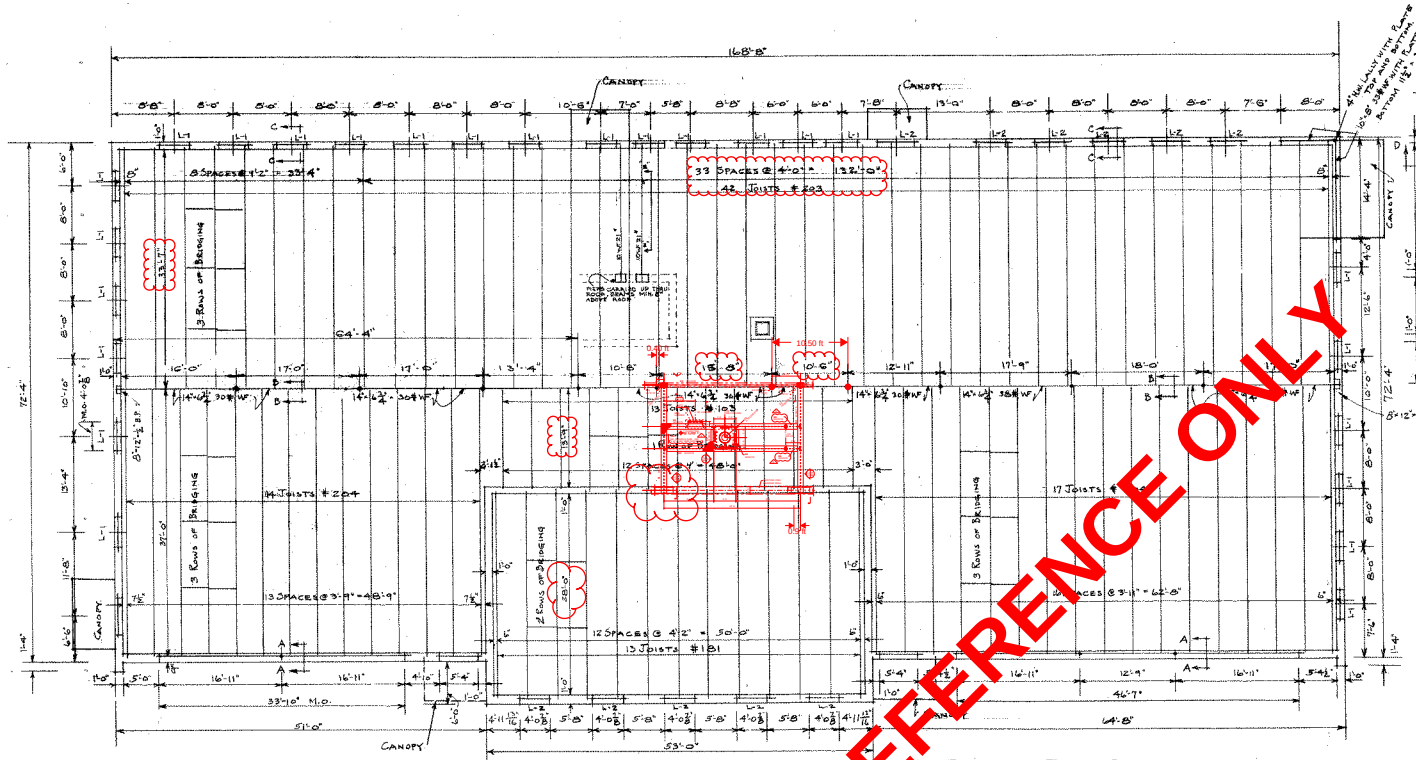
Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	4.71	0.00	0.00	-0.32	0.08	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	5.66	-0.00	-3.21	-135.05	0.10	-0.43
0.9 Dead+1.0 Wind 0 deg - No Ice	4.24	0.00	-3.21	-134.32	0.08	-0.43
1.2 Dead+1.0 Wind 30 deg - No Ice	5.66	1.61	-2.78	-117.01	-67.22	-0.61
0.9 Dead+1.0 Wind 30 deg - No Ice	4.24	1.61	-2.78	-116.36	-66.94	-0.61
1.2 Dead+1.0 Wind 45 deg - No Ice	5.66	2.27	-2.27	-95.61	-95.11	-0.65
0.9 Dead+1.0 Wind 45 deg - No Ice	4.24	2.27	-2.27	-95.07	-94.69	-0.65
1.2 Dead+1.0 Wind 60 deg - No Ice	5.66	2.78	-1.61	-67.72	-116.51	-0.63
0.9 Dead+1.0 Wind 60 deg - No Ice	4.24	2.78	-1.61	-67.31	-115.99	-0.63
1.2 Dead+1.0 Wind 90 deg - No Ice	5.66	3.21	-0.00	-0.40	-134.55	-0.48
0.9 Dead+1.0 Wind 90 deg - No Ice	4.24	3.21	0.00	-0.30	-133.95	-0.48
1.2 Dead+1.0 Wind 120 deg - No Ice	5.66	2.78	1.61	66.93	-116.51	-0.20
0.9 Dead+1.0 Wind 120 deg - No Ice	4.24	2.78	1.61	66.72	-115.99	-0.20
1.2 Dead+1.0 Wind 135 deg - No Ice	5.66	2.27	2.27	94.81	-95.11	-0.04
0.9 Dead+1.0 Wind 135 deg - No Ice	4.24	2.27	2.27	94.47	-94.69	-0.04
1.2 Dead+1.0 Wind 150 deg - No Ice	5.66	1.61	2.78	116.21	-67.22	0.13
0.9 Dead+1.0 Wind 150 deg - No Ice	4.24	1.61	2.78	115.77	-66.94	0.13
1.2 Dead+1.0 Wind 180 deg	5.66	-0.00	3.21	134.25	0.10	0.43

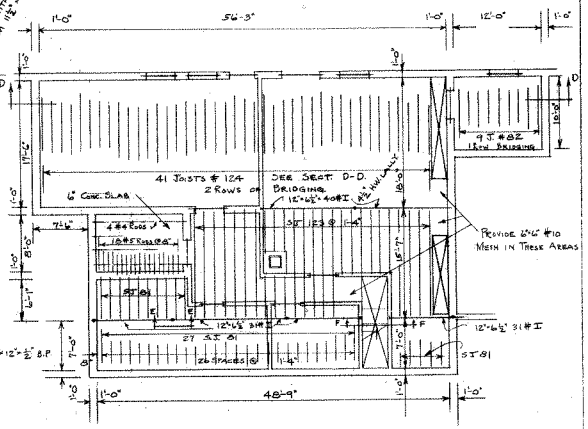
Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
- No Ice 0.9 Dead+1.0 Wind 180 deg	4.24	0.00	3.21	133.73	0.08	0.43
- No Ice 1.2 Dead+1.0 Wind 210 deg	5.66	-1.61	2.78	116.21	67.43	0.61
- No Ice 0.9 Dead+1.0 Wind 210 deg	4.24	-1.61	2.78	115.77	67.09	0.61
- No Ice 1.2 Dead+1.0 Wind 225 deg	5.66	-2.27	2.27	94.81	95.31	0.65
- No Ice 0.9 Dead+1.0 Wind 225 deg	4.24	-2.27	2.27	94.47	94.84	0.65
- No Ice 1.2 Dead+1.0 Wind 240 deg	5.66	-2.78	1.61	66.93	116.71	0.63
- No Ice 0.9 Dead+1.0 Wind 240 deg	4.24	-2.78	1.61	66.72	116.14	0.63
- No Ice 1.2 Dead+1.0 Wind 270 deg	5.66	-3.21	-0.00	-0.40	134.75	0.48
- No Ice 0.9 Dead+1.0 Wind 270 deg	4.24	-3.21	0.00	-0.30	134.10	0.48
- No Ice 1.2 Dead+1.0 Wind 300 deg	5.66	-2.78	-1.61	-67.72	116.71	0.20
- No Ice 0.9 Dead+1.0 Wind 300 deg	4.24	-2.78	-1.61	-67.31	116.14	0.20
- No Ice 1.2 Dead+1.0 Wind 315 deg	5.66	-2.27	-2.27	-95.61	95.31	0.04
- No Ice 0.9 Dead+1.0 Wind 315 deg	4.24	-2.27	-2.27	-95.07	94.84	0.04
- No Ice 1.2 Dead+1.0 Wind 330 deg	5.66	-1.61	-2.78	-117.01	67.43	-0.13
- No Ice 0.9 Dead+1.0 Wind 330 deg	4.24	-1.61	-2.78	-116.36	67.09	-0.13
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	9.85	-0.00	-0.00	-0.48	0.46	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	9.85	-0.00	-0.99	-42.63	0.47	-0.14
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	9.85	0.49	-0.85	-36.99	-20.60	-0.17
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	9.85	0.70	-0.70	-30.29	-29.33	-0.17
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	9.85	0.85	-0.49	-21.56	-36.03	-0.15
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	9.85	0.99	-0.00	-0.49	-41.68	-0.09
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	9.85	0.85	0.49	20.58	-36.03	-0.01
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	9.85	0.70	0.70	29.31	-29.33	0.03
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	9.85	0.49	0.85	36.01	-20.60	0.07
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	9.85	-0.00	0.99	41.65	0.47	0.14
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	9.85	-0.49	0.85	36.01	21.54	0.17
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	9.85	-0.70	0.70	29.31	30.27	0.17
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	9.85	-0.85	0.49	20.58	36.97	0.15
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	9.85	-0.99	-0.00	-0.49	42.61	0.09
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	9.85	-0.85	-0.49	-21.56	36.97	0.01
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	9.85	-0.70	-0.70	-30.29	30.27	-0.03
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	9.85	-0.49	-0.85	-36.99	21.54	-0.07
Dead+Wind 0 deg - Service	4.71	0.00	-0.53	-22.39	0.08	-0.07
Dead+Wind 30 deg - Service	4.71	0.26	-0.46	-19.44	-10.95	-0.10
Dead+Wind 45 deg - Service	4.71	0.37	-0.37	-15.93	-15.52	-0.11
Dead+Wind 60 deg - Service	4.71	0.46	-0.26	-11.36	-19.02	-0.10
Dead+Wind 90 deg - Service	4.71	0.53	0.00	-0.33	-21.98	-0.08

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 120 deg - Service	4.71	0.46	0.26	10.70	-19.02	-0.03
Dead+Wind 135 deg - Service	4.71	0.37	0.37	15.27	-15.52	-0.01
Dead+Wind 150 deg - Service	4.71	0.26	0.46	18.78	-10.95	0.02
Dead+Wind 180 deg - Service	4.71	0.00	0.53	21.73	0.08	0.07
Dead+Wind 210 deg - Service	4.71	-0.26	0.46	18.78	11.12	0.10
Dead+Wind 225 deg - Service	4.71	-0.37	0.37	15.27	15.68	0.11
Dead+Wind 240 deg - Service	4.71	-0.46	0.26	10.70	19.19	0.10
Dead+Wind 270 deg - Service	4.71	-0.53	0.00	-0.33	22.15	0.08
Dead+Wind 300 deg - Service	4.71	-0.46	-0.26	-11.36	19.19	0.03
Dead+Wind 315 deg - Service	4.71	-0.37	-0.37	-15.93	15.68	0.01
Dead+Wind 330 deg - Service	4.71	-0.26	-0.46	-19.44	11.12	-0.02

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-4.71	0.00	0.00	4.71	0.00	0.000%
2	0.00	-5.66	-3.21	0.00	5.66	3.21	0.000%
3	0.00	-4.24	-3.21	0.00	4.24	3.21	0.000%
4	1.61	-5.66	-2.78	-1.61	5.66	2.78	0.000%
5	1.61	-4.24	-2.78	-1.61	4.24	2.78	0.000%
6	2.27	-5.66	-2.27	-2.27	5.66	2.27	0.000%
7	2.27	-4.24	-2.27	-2.27	4.24	2.27	0.000%
8	2.78	-5.66	-1.61	-2.78	5.66	1.61	0.000%
9	2.78	-4.24	-1.61	-2.78	4.24	1.61	0.000%
10	3.21	-5.66	0.00	-3.21	5.66	0.00	0.000%
11	3.21	-4.24	0.00	-3.21	4.24	0.00	0.000%
12	2.78	-5.66	1.61	-2.78	5.66	-1.61	0.000%
13	2.78	-4.24	1.61	-2.78	4.24	-1.61	0.000%
14	2.27	-5.66	2.27	-2.27	5.66	-2.27	0.000%
15	2.27	-4.24	2.27	-2.27	4.24	-2.27	0.000%
16	1.61	-5.66	2.78	-1.61	5.66	-2.78	0.000%
17	1.61	-4.24	2.78	-1.61	4.24	-2.78	0.000%
18	0.00	-5.66	3.21	0.00	5.66	-3.21	0.000%
19	0.00	-4.24	3.21	0.00	4.24	-3.21	0.000%
20	-1.61	-5.66	2.78	1.61	5.66	-2.78	0.000%
21	-1.61	-4.24	2.78	1.61	4.24	-2.78	0.000%
22	-2.27	-5.66	2.27	2.27	5.66	-2.27	0.000%
23	-2.27	-4.24	2.27	2.27	4.24	-2.27	0.000%
24	-2.78	-5.66	1.61	2.78	5.66	-1.61	0.000%
25	-2.78	-4.24	1.61	2.78	4.24	-1.61	0.000%
26	-3.21	-5.66	0.00	3.21	5.66	0.00	0.000%
27	-3.21	-4.24	0.00	3.21	4.24	0.00	0.000%
28	-2.78	-5.66	-1.61	2.78	5.66	1.61	0.000%
29	-2.78	-4.24	-1.61	2.78	4.24	1.61	0.000%
30	-2.27	-5.66	-2.27	2.27	5.66	2.27	0.000%
31	-2.27	-4.24	-2.27	2.27	4.24	2.27	0.000%
32	-1.61	-5.66	-2.78	1.61	5.66	2.78	0.000%
33	-1.61	-4.24	-2.78	1.61	4.24	2.78	0.000%
34	0.00	-9.85	0.00	0.00	9.85	0.00	0.000%
35	0.00	-9.85	-0.99	0.00	9.85	0.99	0.000%
36	0.49	-9.85	-0.85	-0.49	9.85	0.85	0.000%
37	0.70	-9.85	-0.70	-0.70	9.85	0.70	0.000%
38	0.85	-9.85	-0.49	-0.85	9.85	0.49	0.000%

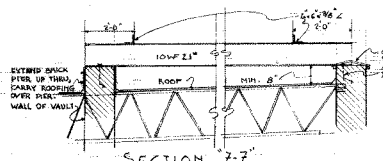




NOTE: INVERTED STEEL DECK FOR FORMS CEILING OF BASEMENT AREA.

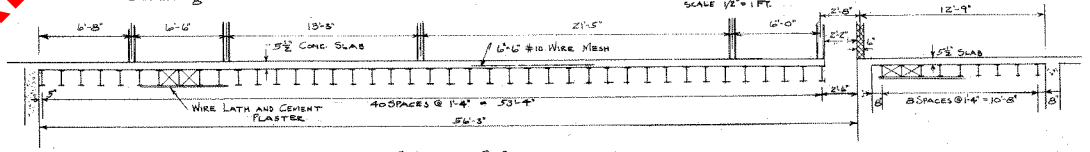
PLAN OF 1ST. FLOOR FRAMING OVER EXCAVATED PART
SCALE ½" = 1 FOOT.

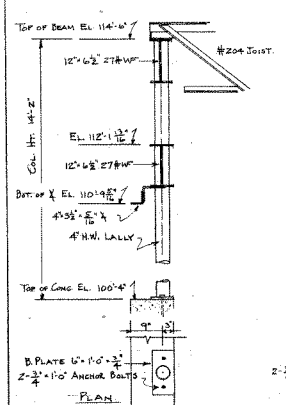
NOTE: PROVIDE SIMILAR SLAB AND REINFORCEMENT FOR CEILING OF VAULT ON MAIN FLOOR. PROVIDE CONCRETE LINTELS IN BASEMENT EACH TO HAVE 3 #6 RODS OF PROPER LENGTH.



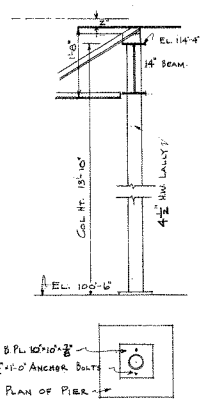
SECTION Z-Z
SCALE ½" = 1 FT.

PLAN OF ROOF STEEL
SCALE ½" = 1 FT.

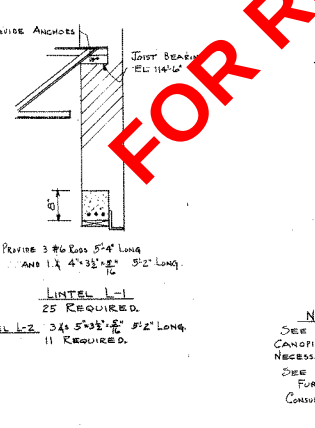




SECTION A-A
¾" = 1 FT.



SECTION B-B
¾" = 1 FT.

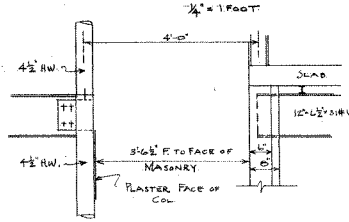


SECTION C-C
¾" = 1 FT.

LINTEL L-1
25 REQUIRED.

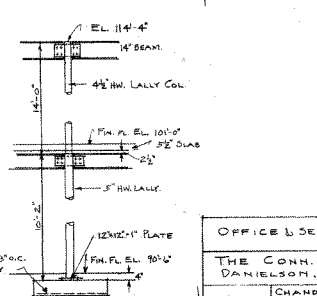
LINTEL L-2
3 #6 5'-4" LONG AND 1 4"×3½"×⅝" 5'-2" LONG.
11 REQUIRED.

NOTE:
SEE ARCH. DRAWINGS FOR ALL CANOPIES. FURNISH ALL STEEL AND NECESSARY COLS. PLATES AND SUPPORTS.
SEE DOOR BUCK SCHEDULE AND FURNISH ½ FOR LINTELS WHERE REQUIRED.
CONSULT ARCH PLANS FOR OTHER DETAILS.



SECTION D-D
¼" = 1 FOOT

SECTION F-F
¼" = 1 FOOT



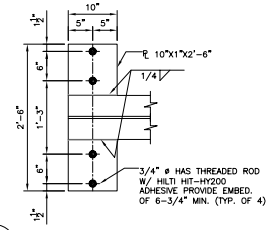
SECTION E-E
¼" = 1 FOOT.

OFFICE & SERVICE BUILDING FOR
THE CONN. LIGHT & POWER CO
DANIELSON, CONN.

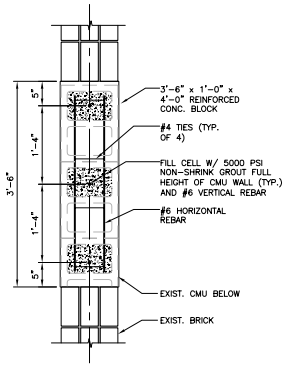
DEN BY B.H.P
CHKD BY G.F.

CHANDLER & PALMER ARCH.
THAYER BLDG.
NORWICH, CONN
OCT. 1955 | SHEET # 11 OF 16

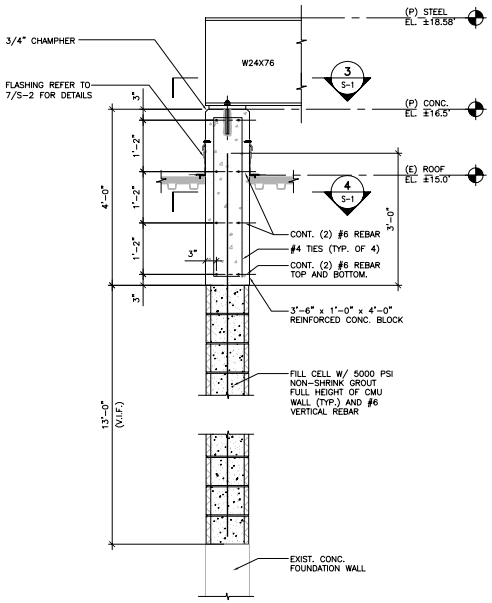
13441-T
16905-50002



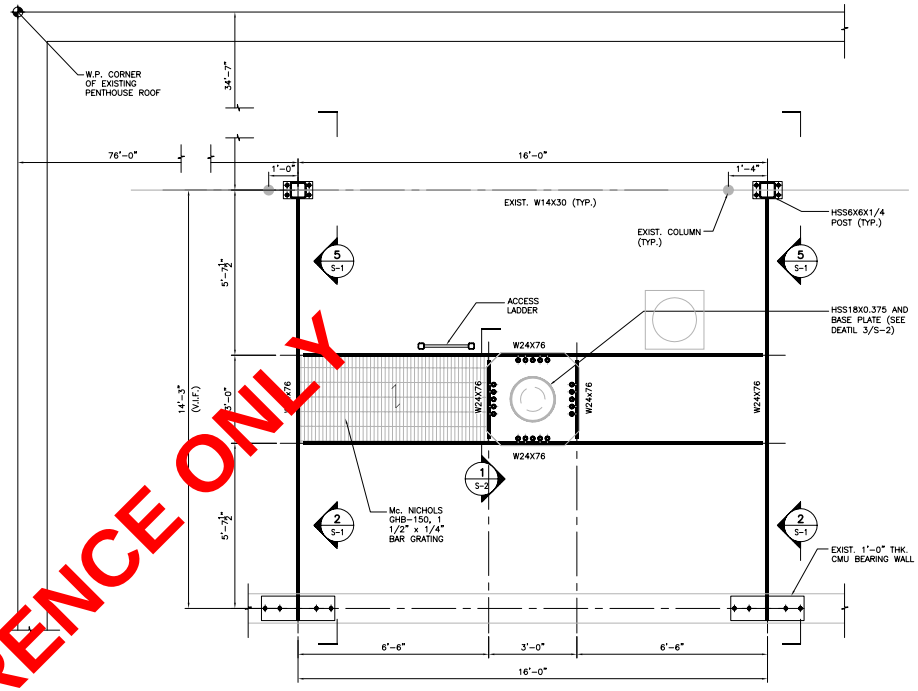
3 S-1 **POST BASE PLATE DETAIL**
SCALE: 1" = 1'-0"



4 S-1 **BEARING BLOCK DETAIL**
SCALE: 1" = 1'-0"

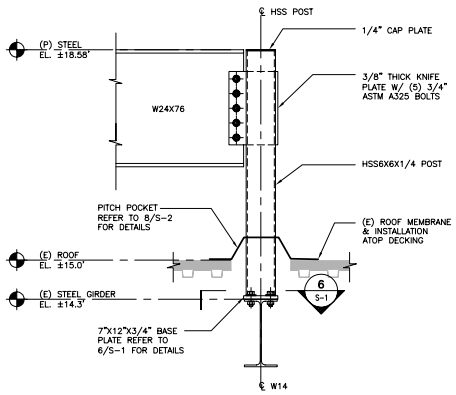


2 S-1 **POST CONNECTION TO BEARING WALL**
SCALE: 3/4" = 1'-0"

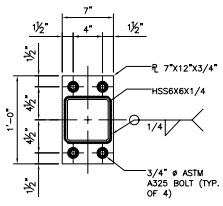


1 S-1 **FRAMING PLAN**
SCALE: 1/2" = 1'-0"

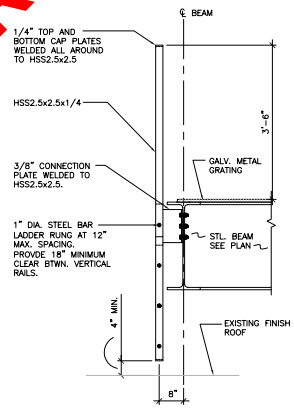
APPROXIMATE NORTH



5 S-1 **POST CONNECTION TO STEEL GIRDER**
SCALE: 1" = 1'-0"



6 S-1 **POST BASE PLATE DETAIL**
SCALE: 1-1/2" = 1'-0"



7 S-1 **TYP. LADDER DETAIL**
SCALE: 3/4" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	4/07/17	TJL	CFC	REVISED TOWER/SUPPORT FRAME LOCATION
1	12/02/16	TJL	CFC	UPDATED BUILDING CODE REFERENCE
0	05/04/16	TJL	CFC	ISSUED FOR CONSTRUCTION
	03/24/16	TJL	CFC	ISSUED FOR CLIENT REVIEW

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173 MECHANIC STREET
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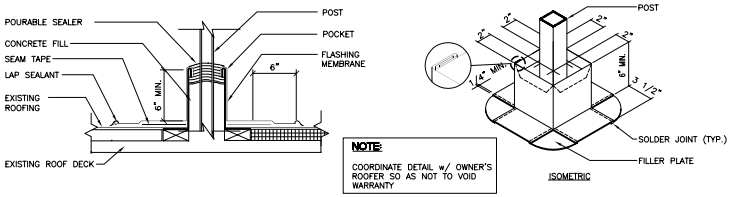
DATE: 03/10/16
SCALE: AS NOTED
JOB NO. 15277.000

DUNNAGE FRAME DETAILS

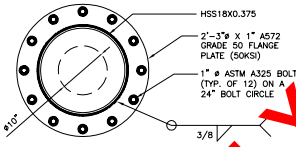
S-1

Sheet No. 4 of 8

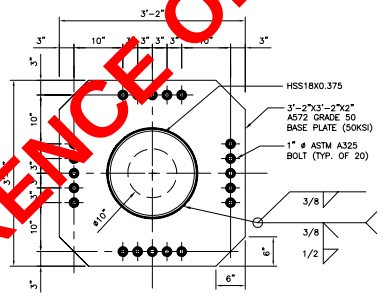


NOTE:
COORDINATE DETAIL w/ OWNER'S ROOFER SO AS NOT TO VOID WARRANTY

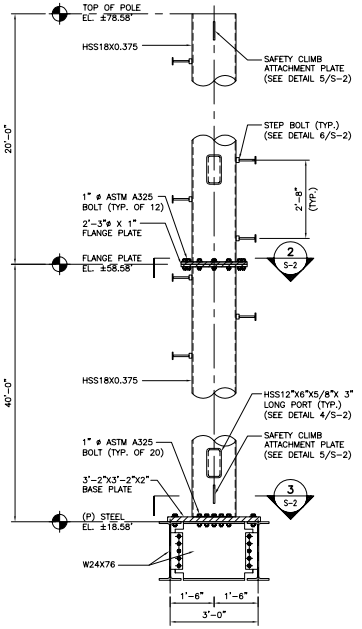
8 S-2 **TYP. PITCH POCKET DETAIL**
SCALE: NOT TO SCALE



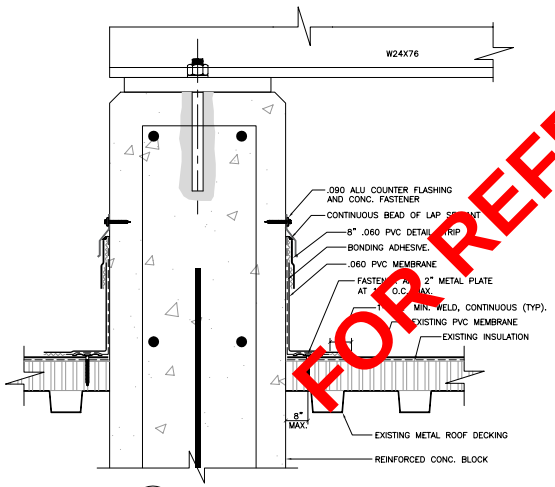
2 S-2 **POLE FLANGE PLATE DETAIL**
SCALE: 1" = 1'-0"



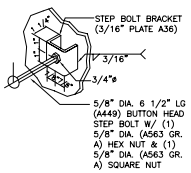
3 S-2 **POLE BASE PLATE DETAIL**
SCALE: 1" = 1'-0"



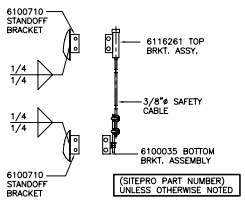
1 S-2 **POLE DETAIL**
SCALE: 1/2" = 1'-0"



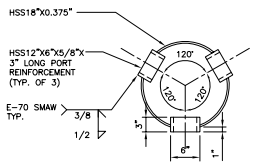
7 S-2 **FLASHING DETAIL**
SCALE: 3" = 1'-0"



6 S-2 **STEP BOLT DETAIL**
SCALE: 3/4" = 1'-0"



5 S-2 **SAFETY CLIMB DETAIL**
SCALE: 1/2" = 1'-0"



4 S-2 **PORT DETAIL**
SCALE: 1" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	4/07/17	T.L.	CFC	REVISED TOWER/SUPPORT FRAME LOCATION
2	12/02/16	T.L.	CFC	UPDATED BUILDING CODE REFERENCE
1	05/04/16	T.L.	CFC	ISSUED FOR CONSTRUCTION
0	03/24/16	T.L.	CFC	ISSUED FOR CLIENT REVIEW

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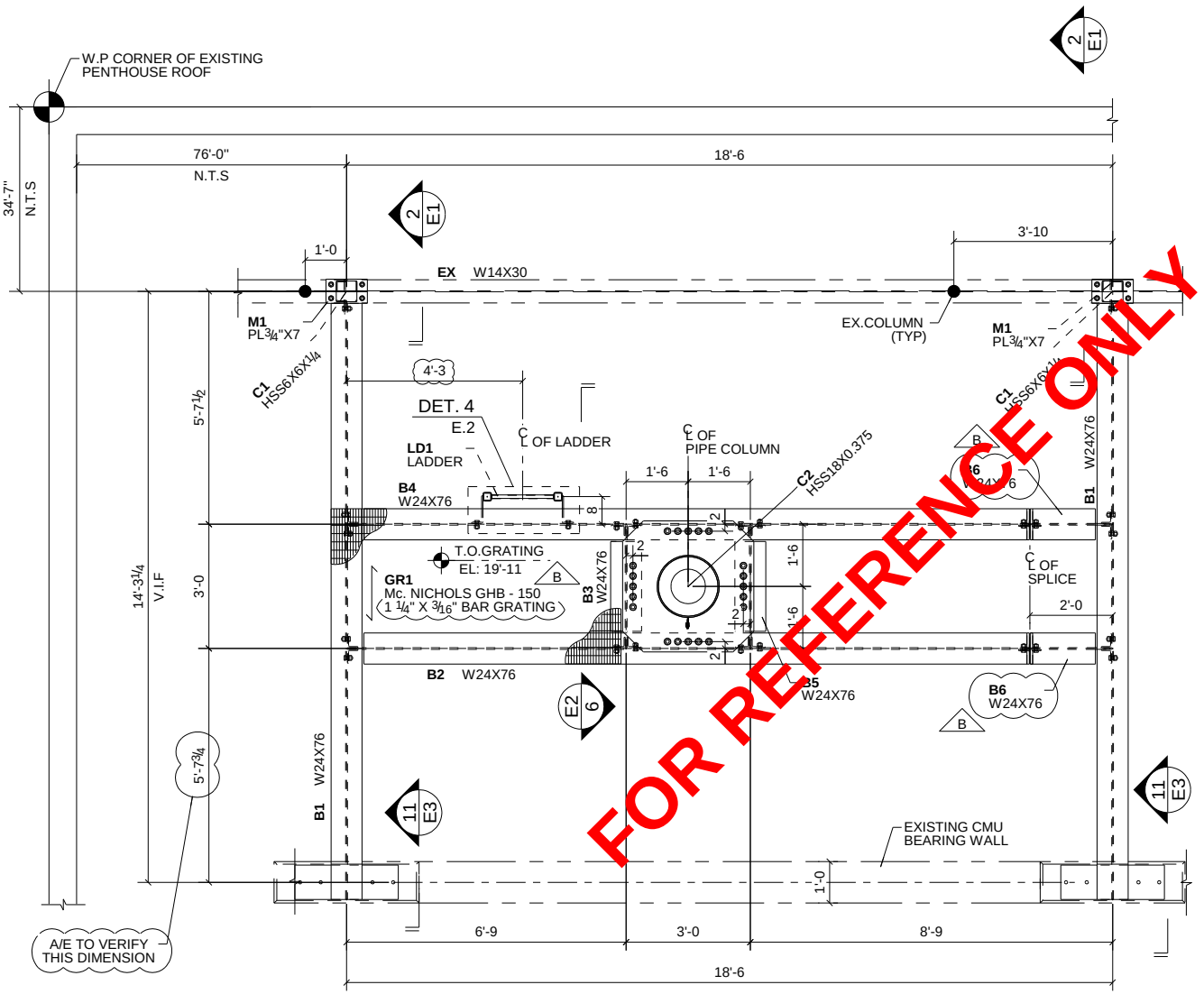
DATE: 03/10/16
SCALE: AS NOTED
JOB NO. 15277.000

MONOPOLE & ROOFING DETAILS

S-2

Sheet No. 5 of 8

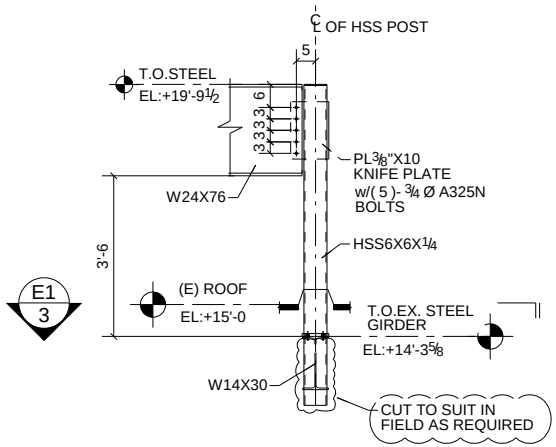


1 FRAMING PLAN

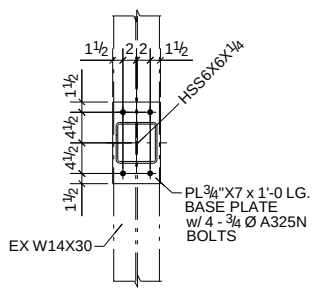
ALL T.O.STEEL EL:19'-9 ½" (U.N.O)

A/E TO VERIFY THIS TOP OF STEEL ELEVATION

A/E TO VERIFY LADDER FIXING LOCATION



2 SECTION



3 SECTION

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
B	10/25/17	SS	SN	REVISED AS MARKED
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

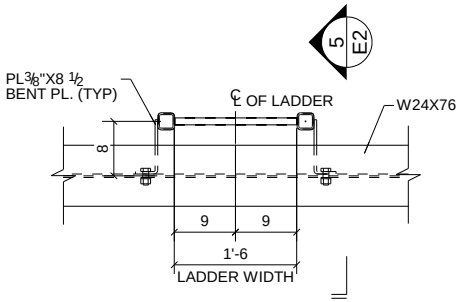
Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

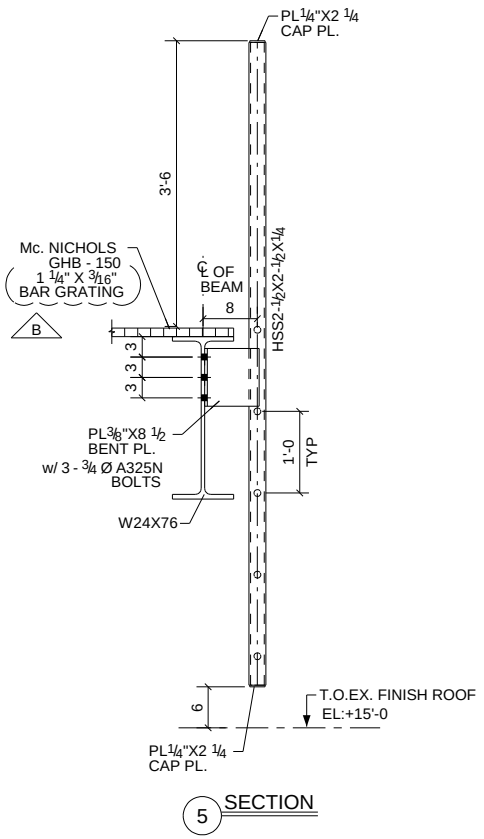
Contents: FRAMING PLAN

Ref.dwg. S-1 | Shop Paint: GALVANIZED

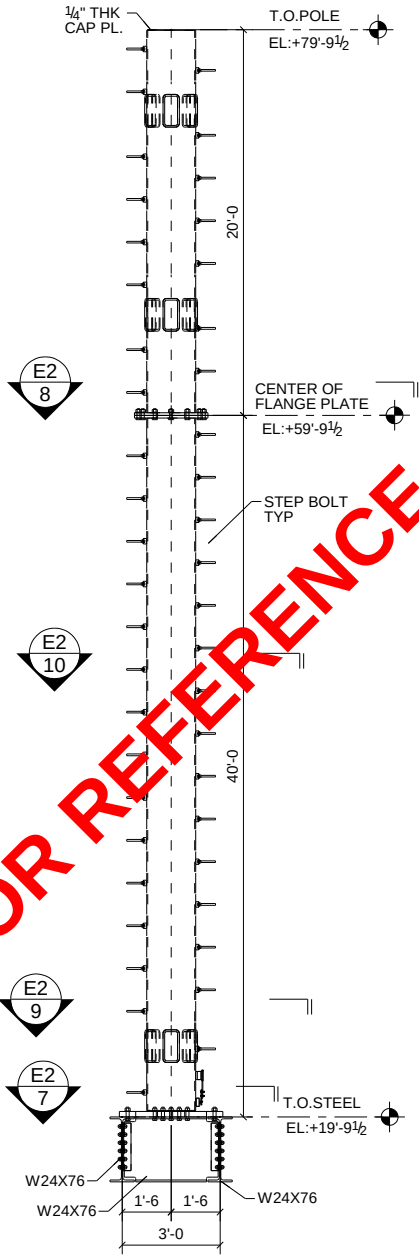
Holes: - | Bolts: - | DWG NO: E1



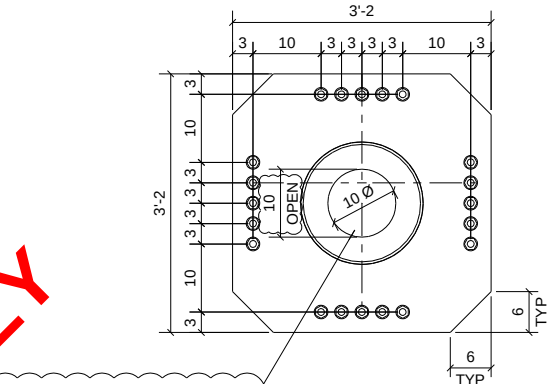
4 DETAIL E1



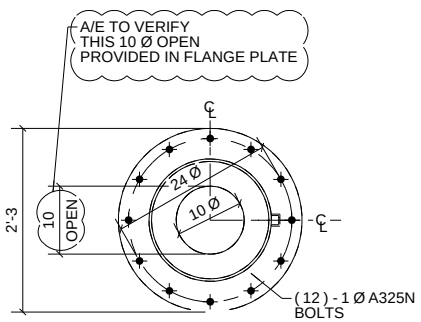
5 SECTION



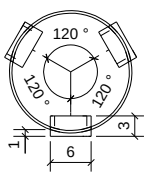
6 SECTION E1



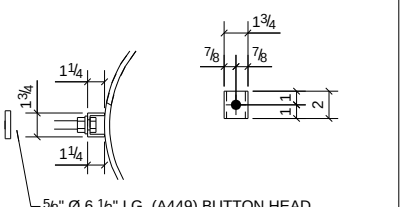
7 SECTION



8 SECTION



9 SECTION



10 SECTION E1

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
B	10/25/17	SS	SN	REVISED AS MARKED
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203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

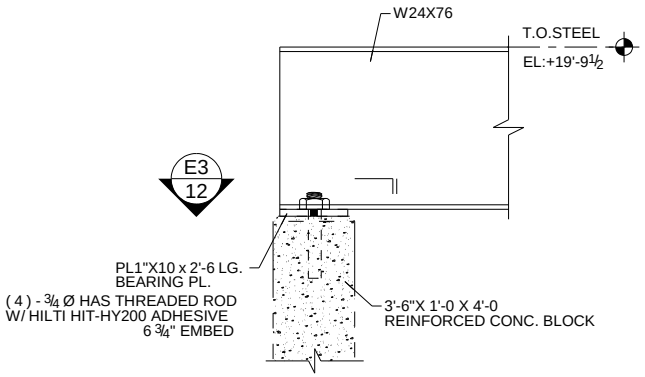
Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

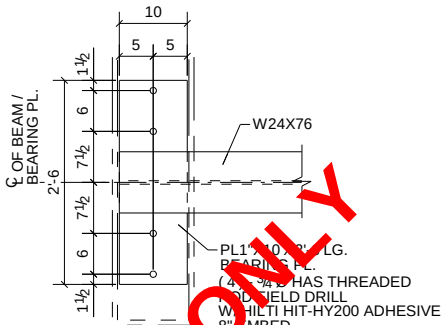
Contents: SECTIONS

Ref.dwg. S-1 | Shop Paint: GALVANIZED

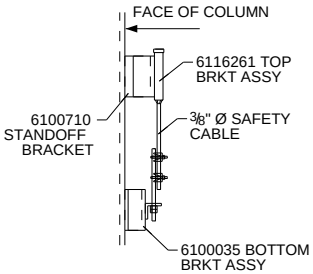
Holes: - | Bolts: - | DWG NO: E2



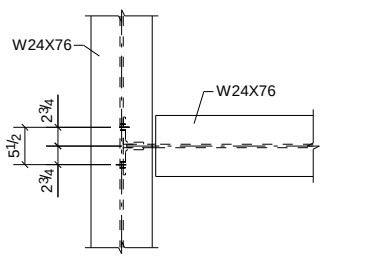
11 SECTION
E1

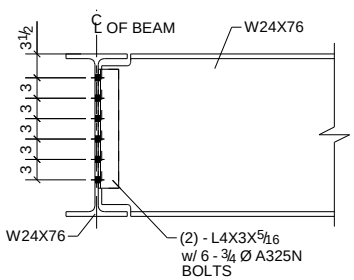


SECTION

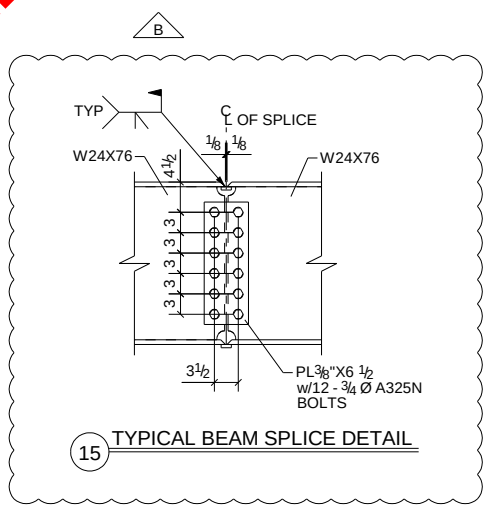


13 SAFETY CLIMB DETAIL
E1





14 TYPICAL BEAM TO BEAM
CLIP ANGLE CONN.



15 TYPICAL BEAM SPLICE DETAIL

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
B	10/25/17	SS	SN	REVISED AS MARKED
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents: SECTIONS

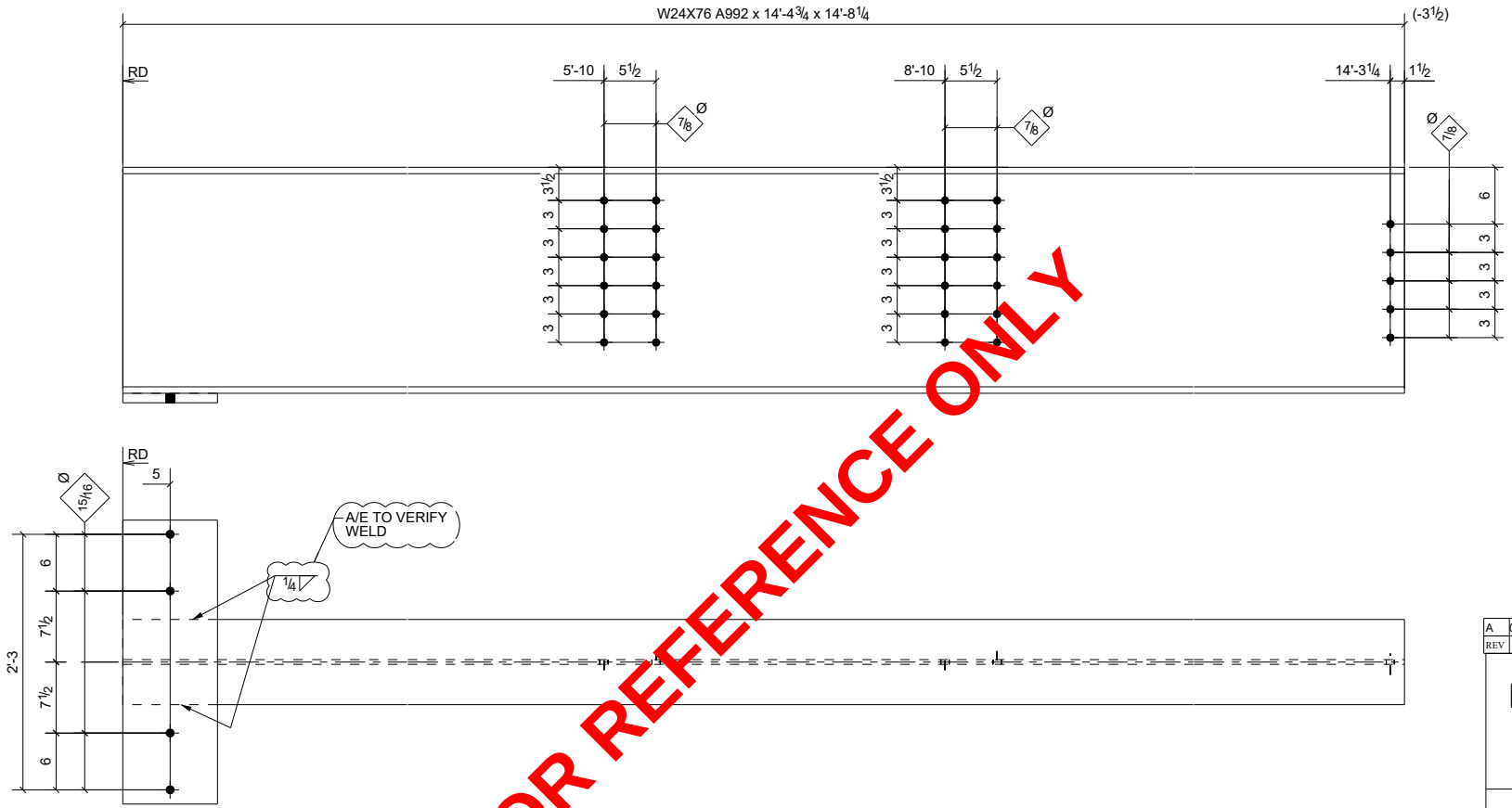
Ref.dwg. S-1 | Shop Paint: GALVANIZED

Holes: - | Bolts: - | DWG NO: E3

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
2	B1	BEAM			
2	w1	W24X76	14'-4 3/4"	A992	
2	p8	PL1"X10"	2'-6"	A36	
		FIELD BOLTS			
10		3/4" Ø A325N	0'-2 1/4"		
		3/4" Ø HAS THREADED ROD	8" EMBED		

HILTI HIT-HY200 ADHESIVE



2 - BEAMS - B1

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

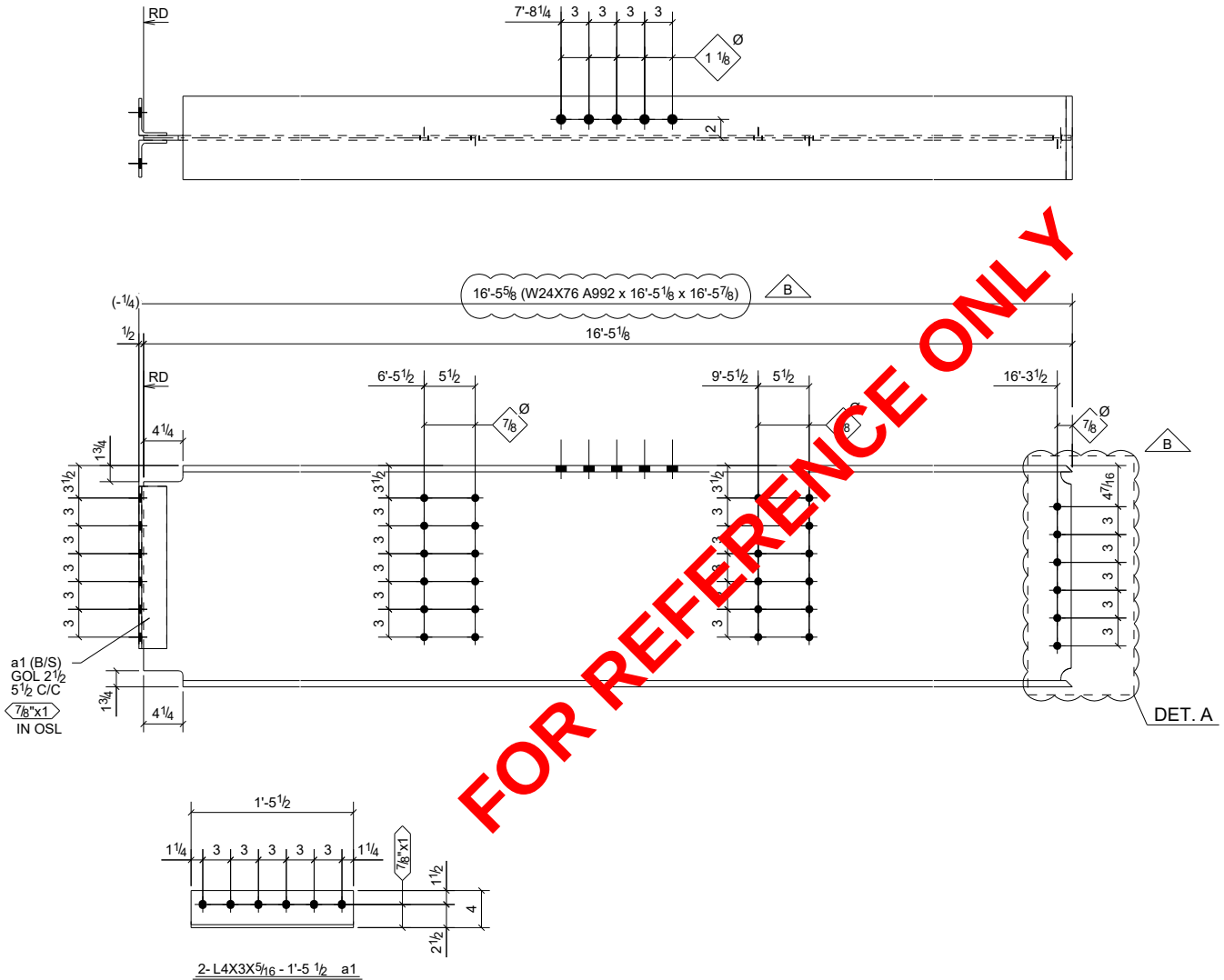
Ref.dwg.

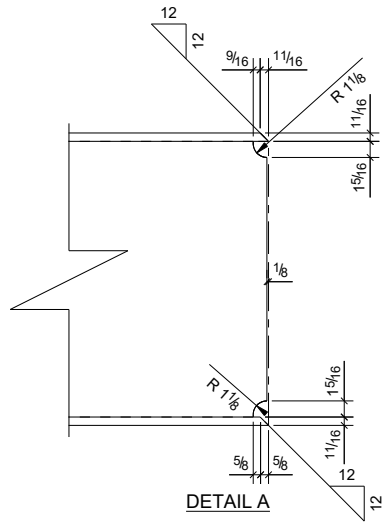
Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO) | Bolts: 3/4 Ø (UNO) | DWG NO: B1

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	B2	BEAM			
1	w3	W24X76	16'-5 1/8"	A992	
2	a1	L4X3X5/16	1'-5 1/2"	A36	
		FIELD BOLTS			
18		3/4" Ø A325N	0'-2"		





OTHER PARTS ARE NOT SHOWN FOR CLARITY

ONE - BEAM - B2

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
B	10/25/17	SS	SN	REVISED AS MARKED
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

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STEEL CONTRACTING
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203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

Ref.dwg.

Shop Paint: GALVANIZED

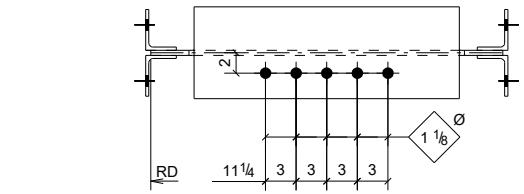
Holes: 7/8 Ø (UNO)

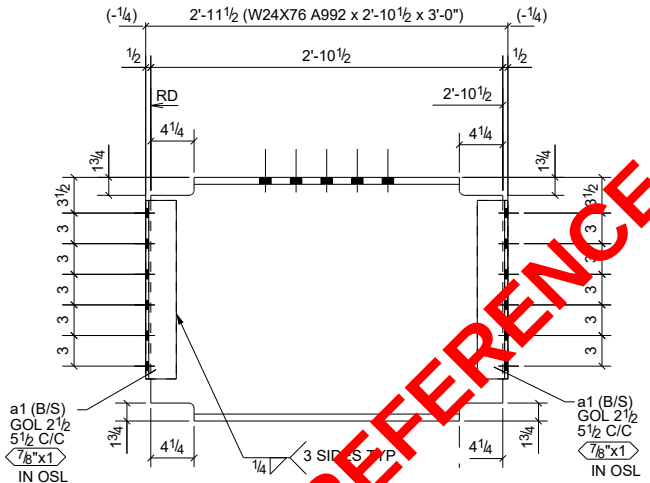
Bolts: 3/4 Ø (UNO)

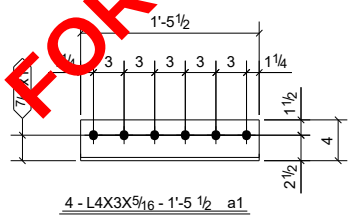
DWG NO: B2

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	B3	BEAM			
1	w4	W24X76	2'-10 1/2"	A992	
4	a1	L4X3X5/16	1'-5 1/2"	A36	
		FIELD BOLTS			
24		3/4" Ø A325N	0'-2"		







ONE - BEAM - B3

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

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203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

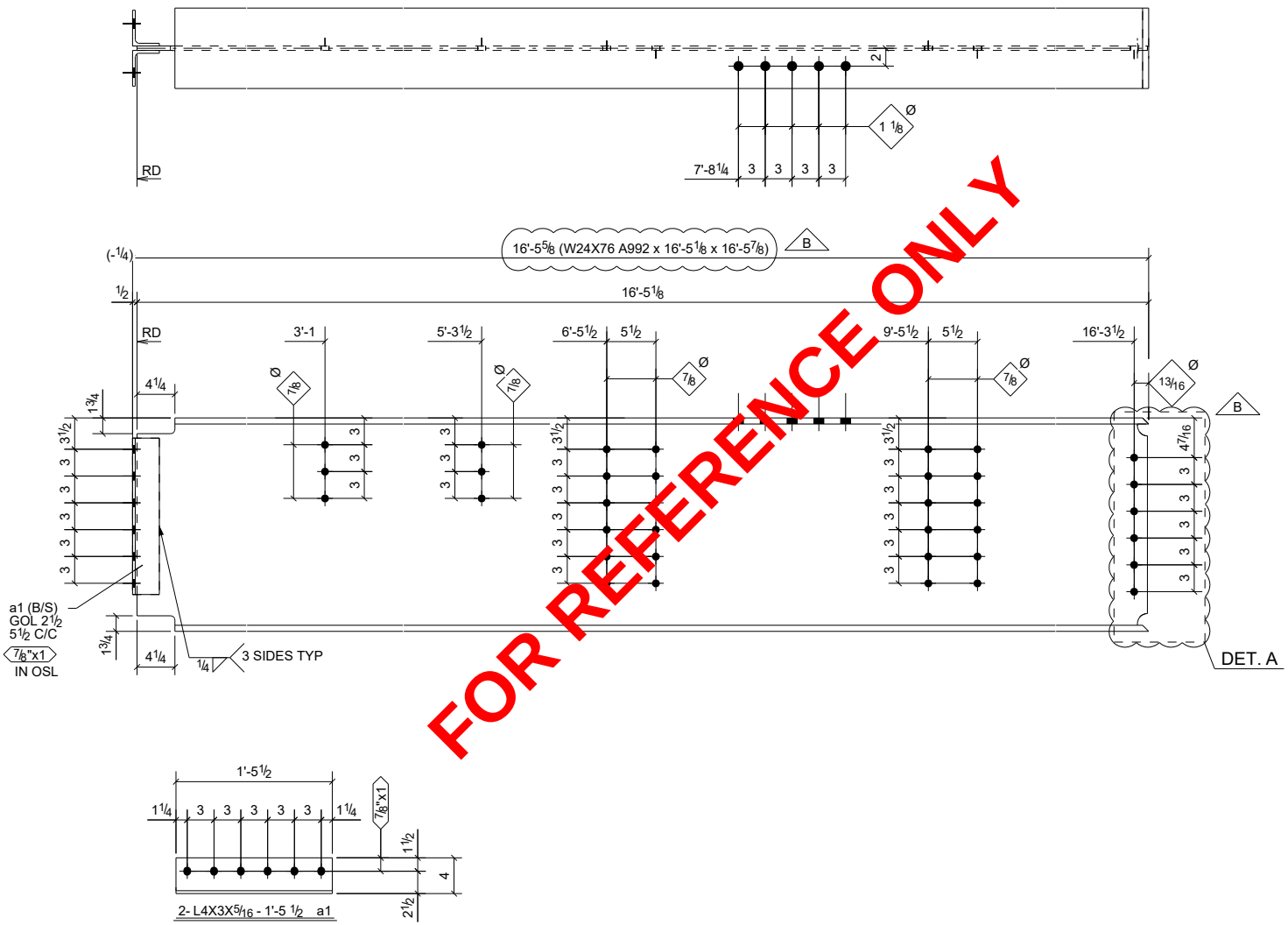
Ref.dwg.

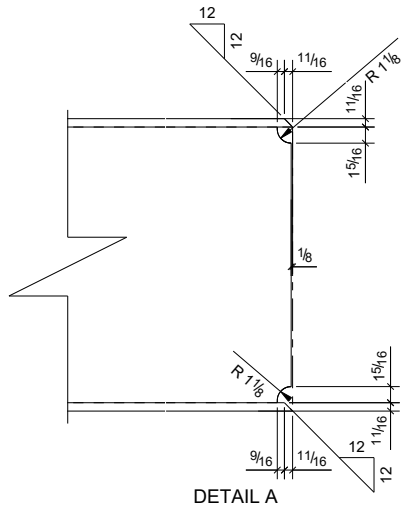
Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO)

Bolts: 3/4 Ø (UNO)

DWG NO: B3





DETAIL A

OTHER PARTS ARE NOT SHOWN FOR CLARITY

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	B4	BEAM			
1	w2	W24X76	16'-5 1/8"	A992	
2	a1	L4X3X5/16	1'-5 1/2"	A36	
		FIELD BOLTS			
18		3/4" Ø A325N	0'-2"		

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
B	10/25/17	SS	SN	REVISED AS MARKED
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

Ref.dwg.

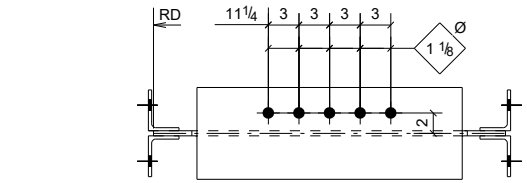
Shop Paint: GALVANIZED

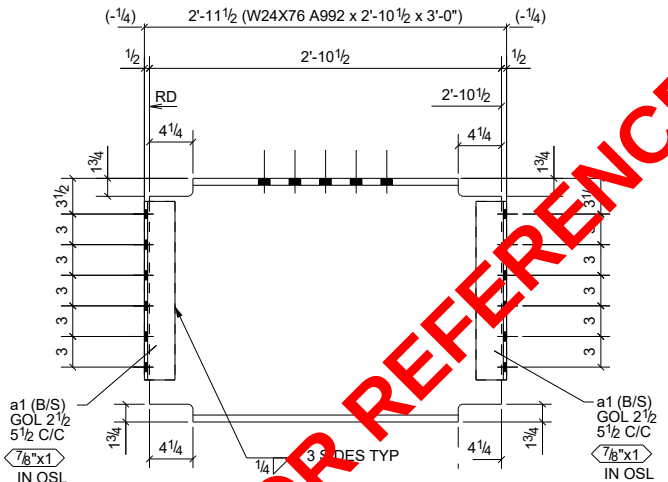
Holes: 7/8 Ø (UNO) | Bolts: 3/4 Ø (UNO) | DWG NO: B4

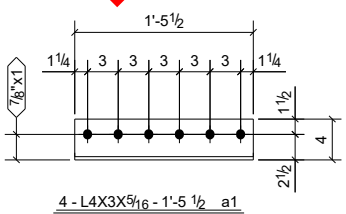
ONE - BEAM - B4

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	B5	BEAM			
1	w9	W24X76	2'-10 1/2"	A992	
4	a1	L4X3X5/16	1'-5 1/2"	A36	
		FIELD BOLTS			
24		3/4" Ø A325N	0'-2"		







ONE - BEAM - B5

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

Ref.dwg.

Shop Paint: GALVANIZED

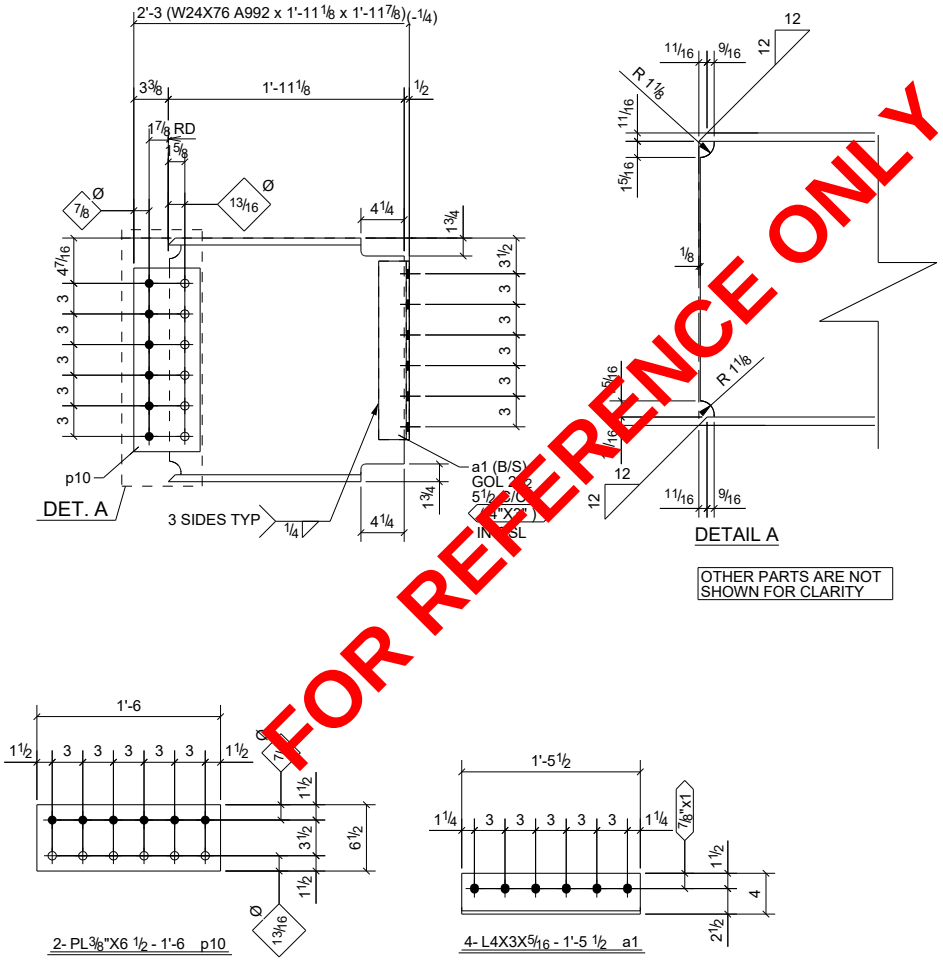
Holes: 7/8 Ø (UNO)

Bolts: 3/4 Ø (UNO)

DWG NO: B5

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
2	B6	BEAM			
2	w5	W24X76	1'-11 1/8"	A992	
4	a1	L4X3X5/16	1'-5 1/2"	A36	
2	p10	PL3/8"X6 1/2"	1'-6"	A36	
12		3/4" Ø A325N	0'-2"		
		FIELD BOLTS			
6		3/4" Ø A325N	0'-2"		



2 - BEAMS - B6

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	10/25/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

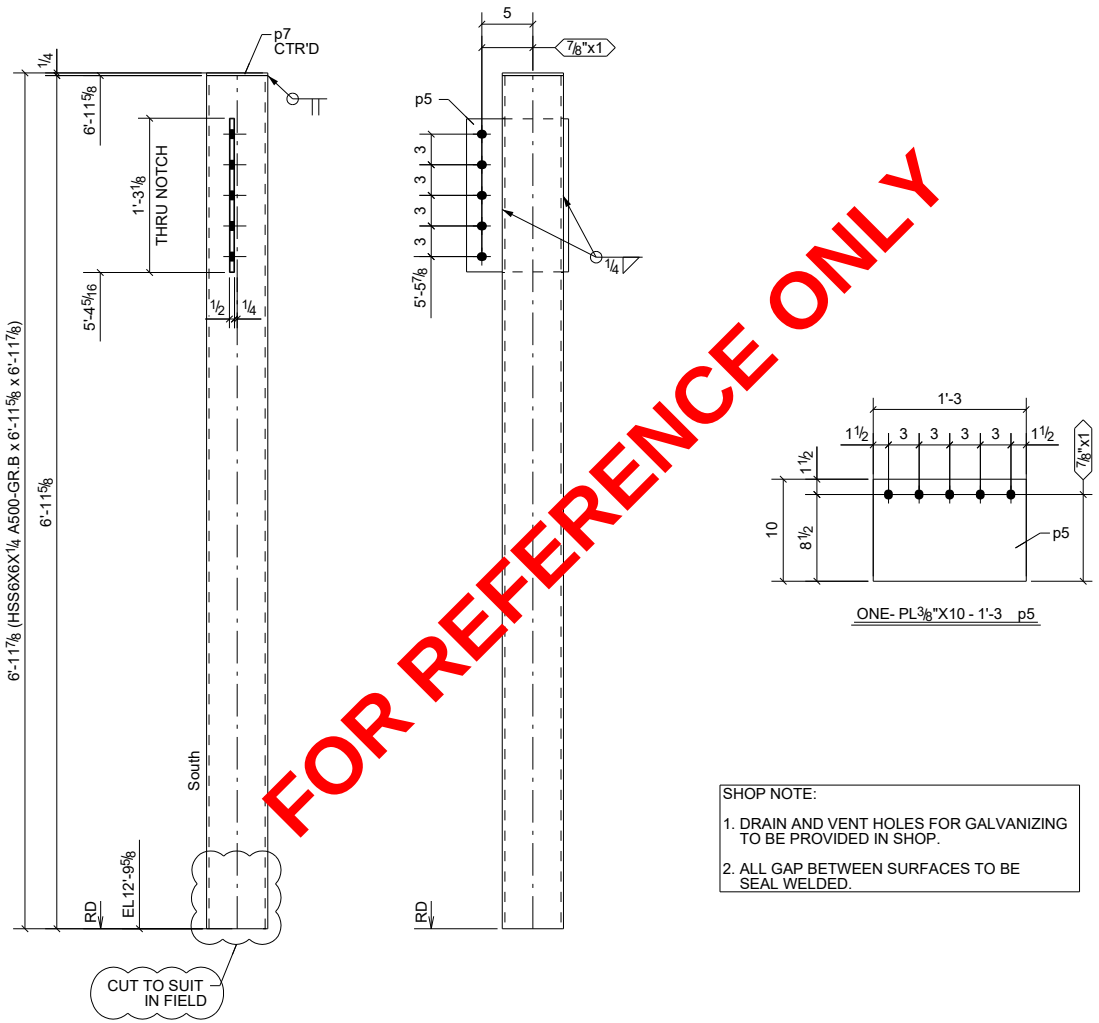
Ref.dwg.

Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO) | Bolts: 3/4 Ø (UNO) | DWG NO: B6

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
2	C1	COLUMN			
2	hs1	HSS6X6X1/4	6'-11 5/8"	A500-GR.B	
2	p5	PL3/8"X10"	1'-3"	A36	
2	p7	PL1/4"X6"	0'-6"	A36	PLAIN



ONE- PL3/8"X10 - 1'-3 p5

SHOP NOTE:

1. DRAIN AND VENT HOLES FOR GALVANIZING TO BE PROVIDED IN SHOP.
2. ALL GAP BETWEEN SURFACES TO BE SEAL WELDED.

2 - COLUMNS - C1

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
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203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

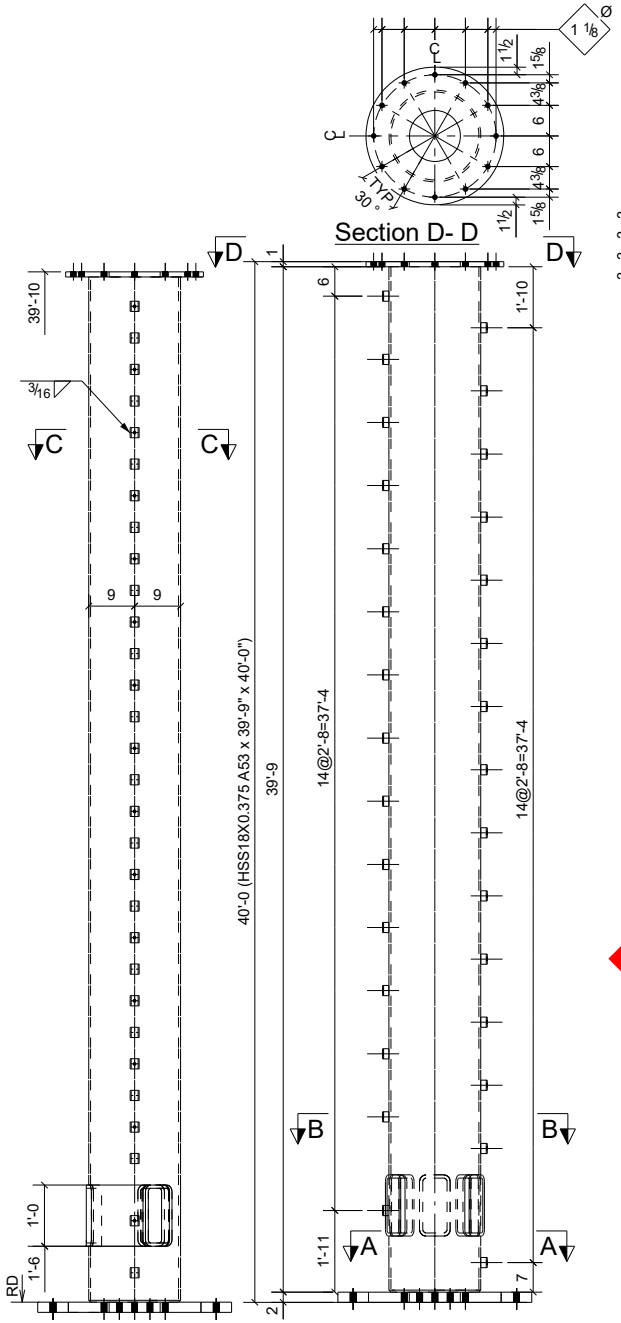
Ref.dwg.

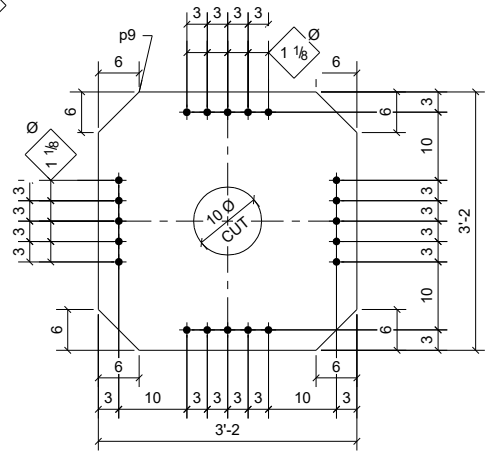
Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO) | Bolts: 3/4 Ø (UNO) | DWG NO: C1

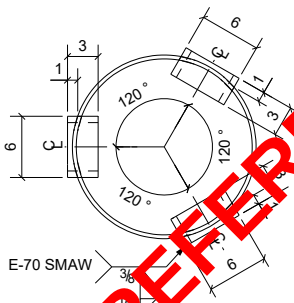
BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	C2	COLUMN			
1	hs3	HSS18X0.375	39'-9"	A53	
30	bpl2	PL3/16"X2"	0'-3 1/2"	A36	
3	hs6	HSS12X6X5/8	0'-3"	A500-GR.B	PLAIN
1	p3	PD27"X8 1/2"	0'-1"	A36	
1	p9	PL2"X38"	3'-2"	A572-GR.50	
		FIELD BOLTS			
12		1" Ø A325N	0'-3 1/2"		
20		1" Ø A325N	0'-4 1/4"		
30		5/8" Ø A449 BUTTON HEAD STEP BOLT	0'-6 1/2"		

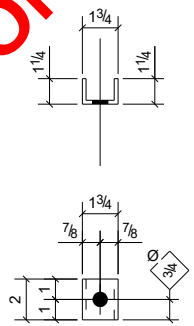




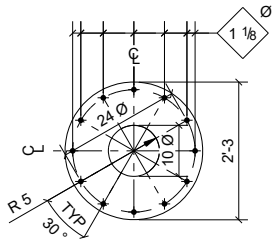
ONE - PL2"X38 - 3'-2 p9



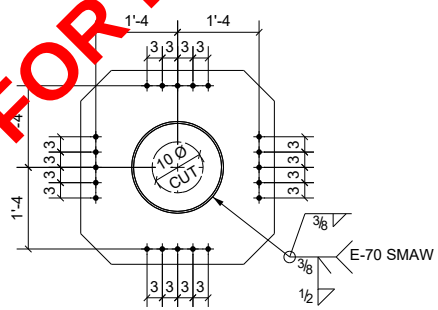
Section B - B



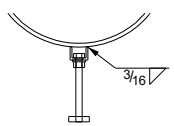
30 - PL 3/16"X2 - 0'-3 1/2 bpl2



ONE - PD27"X8 1/2 - 0'-1 p3



Section A - A



Section C - C

SHOP NOTE:

1. DRAIN AND VENT HOLES FOR GALVANIZING TO BE PROVIDED IN SHOP.
2. ALL GAP BETWEEN SURFACES TO BE SEAL WELDED.

ONE - COLUMN - C2

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

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STEEL CONTRACTING
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203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

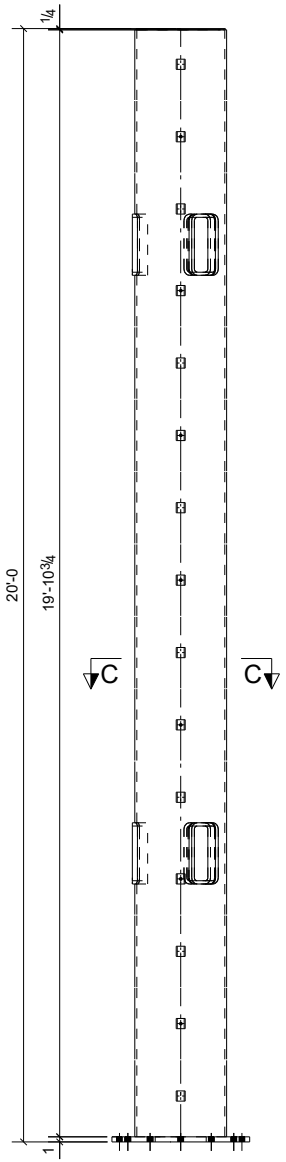
SITE NUMBER: -

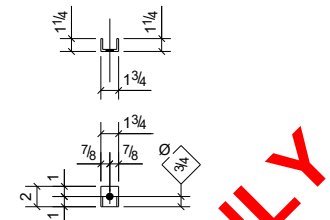
Contents:

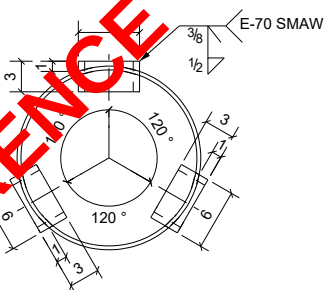
Ref.dwg.

Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO) Bolts: 3/4 Ø (UNO) DWG NO: C2







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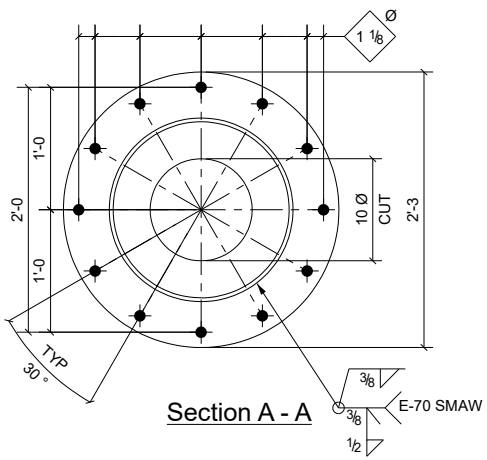
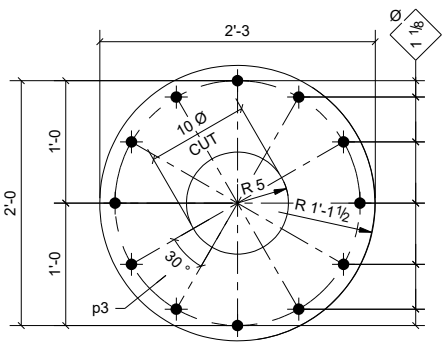
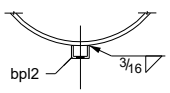


Section A - A



ONE- PD27"X8 1/2 - 0'-1 p3



Section C - C

FOR REFERENCE ONLY

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	C3	COLUMN			
1	hs5	HSS18X0.375	19'-10 3/4"	A53	
15	bpl2	PL3/16"X2"	0'-3 1/2"	A36	
6	hs6	HSS12X6X5/8	0'-3"	A500-GR.B	PLAIN
1	p2	PL1/4"X17 1/2"	1'-5 1/2"	A36	
1	p3	PD27"X8 1/2"	0'-1"	A36	
		FIELD BOLTS			
15		5/8" Ø A449 BUTTON HEAD STEP BOLT	0'-6 1/2"		

SHOP NOTE:

1. DRAIN AND VENT HOLES FOR GALVANIZING TO BE PROVIDED IN SHOP.
2. ALL GAP BETWEEN SURFACES TO BE SEAL WELDED.

ONE - COLUMN - C3

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

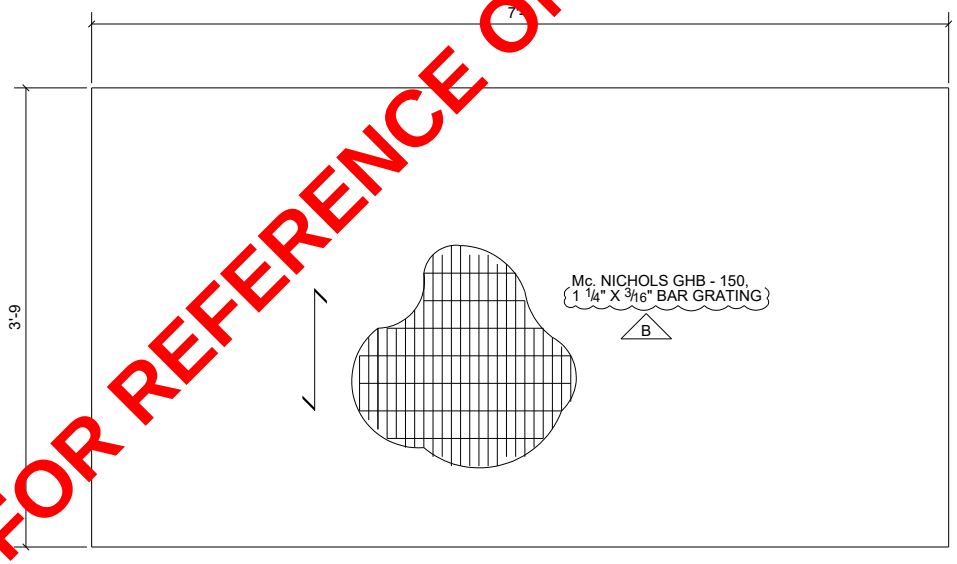
Ref.dwg.

Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO) Bolts: 3/4 Ø (UNO) DWG NO: C3

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	GR1	GRATING			
1		GRATING1 1/2"X45"	6'-4 1/2"	GRTA_1_1/2	



ONE - GRATING - GR1

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
B	10/25/17	SS	SN	REVISED AS MARKED
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

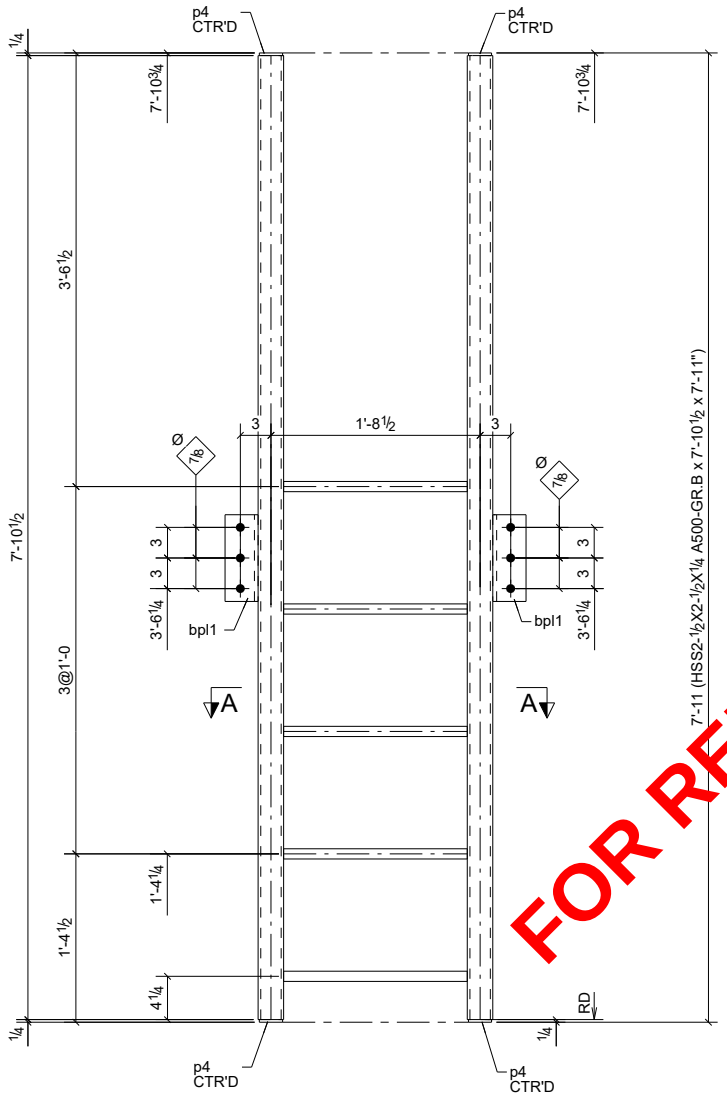
SITE NUMBER: -

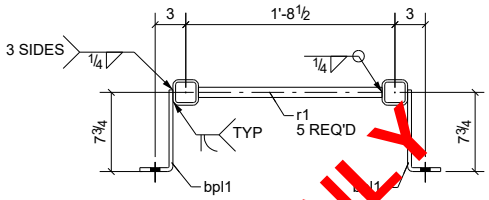
Contents:

Ref.dwg.

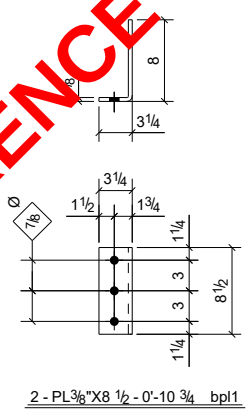
Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO) Bolts: 3/4 Ø (UNO) DWG NO: GR1





SECTION A - A



2 - PL⅜"X8 ½ - 0'-10 ¾ bpl1

ONE - LADDER - LD1

BILL OF MATERIAL

TOTAL QTY.	MARK	DESCRIPTION	LENGTH FT. IN.	STEEL GRADE	REMARKS
1	LD1	LADDER			
1	hs2	HSS2-1/2X2-1/2X1/4	7'-10 1/2"	A500-GR.B	
2	bpl1	PL3/8"X8 1/2"	0'-10 3/4"	A36	
1	hs4	HSS2-1/2X2-1/2X1/4	7'-10 1/2"	A500-GR.B	PLAIN
4	p4	PL1/4"X2 1/4"	0'-2 1/4"	A36	PLAIN
5	r1	RB1"	1'-6"	A36	
		FIELD BOLTS			
6		3/4" Ø A325N	0'-2"		

REV	DATE	MADE BY	CHKD BY	DESCRIPTION
A	08/19/17	SS	SN	ISSUED FOR APPROVAL

EASTERN Inc.
STEEL CONTRACTING
81 Stonebridge Road, Wilton, CT 06897
203-563-9535 I www.easterninc.com

Job Name: DANIELSON WORK CENTER

Location: 173 MECHANIC STREET KILLINGLY, CT 06239

SITE NUMBER: -

Contents:

Ref.dwg.

Shop Paint: GALVANIZED

Holes: 7/8 Ø (UNO) | Bolts: 3/4 Ø (UNO) | DWG NO: LD1

ADVANCED BILL OF MATERIAL

PROJECT NAME: DANIELSON WORK CENTER Date: 10/25/2017
JOB NUMBER: Time: 04:10:43pm

Qty	ABM Mark	Profile	Grade	Length	Weight(lbs)
2		HSS2-1/2X2-1/2X1/4	A500-GR.B	7'-10 1/2"	53
2		HSS6X6X1/4	A500-GR.B	6'-11 5/8"	124
9		HSS12X6X5/8	A500-GR.B	0'-3"	16
1		HSS18X0.375	A53	19'-10 3/4"	1314
1		HSS18X0.375	A53	39'-9"	2624
16		L4X3X5/16	A36	1'-5 1/2"	10
2		PD27"X8 1/2"	A36	0'-1"	140
1		PL1 1/4"X45"	GRTA_1_1/4	7'-0"	84
2		PL1"X10"	A36	2'-6"	85
4		PL1/4"X2 1/4"	A36	0'-2 1/4"	0
2		PL1/4"X6"	A36	0'-6"	3
1	A	PL1/4"X17 1/2"	A36	1'-5 1/2"	17
1		PL2"X38"	A572-GR.50	3'-2"	734
2		PL3/4"X7"	A36	1'-0"	18
2		PL3/8"X6 1/2"	A36	1'-6"	12
2	B	PL3/8"X8 1/2"	A36	0'-10 3/4"	10
2	B	PL3/8"X10"	A36	1'-3"	16
45		PL3/16"X2"	A36	0'-3 1/2"	0
5		RB1"	A36	1'-6"	4
2		W24X76	A992	1'-11 1/8"	147
2		W24X76	A992	2'-10 1/2"	219
2		W24X76	A992	14'-4 3/4"	1097
2		W24X76	A992	16'-5 1/8"	1252

Total weight for 110 members: 14[illegible]

END OF REPORT

Bolt_Summary

BOLT LIST

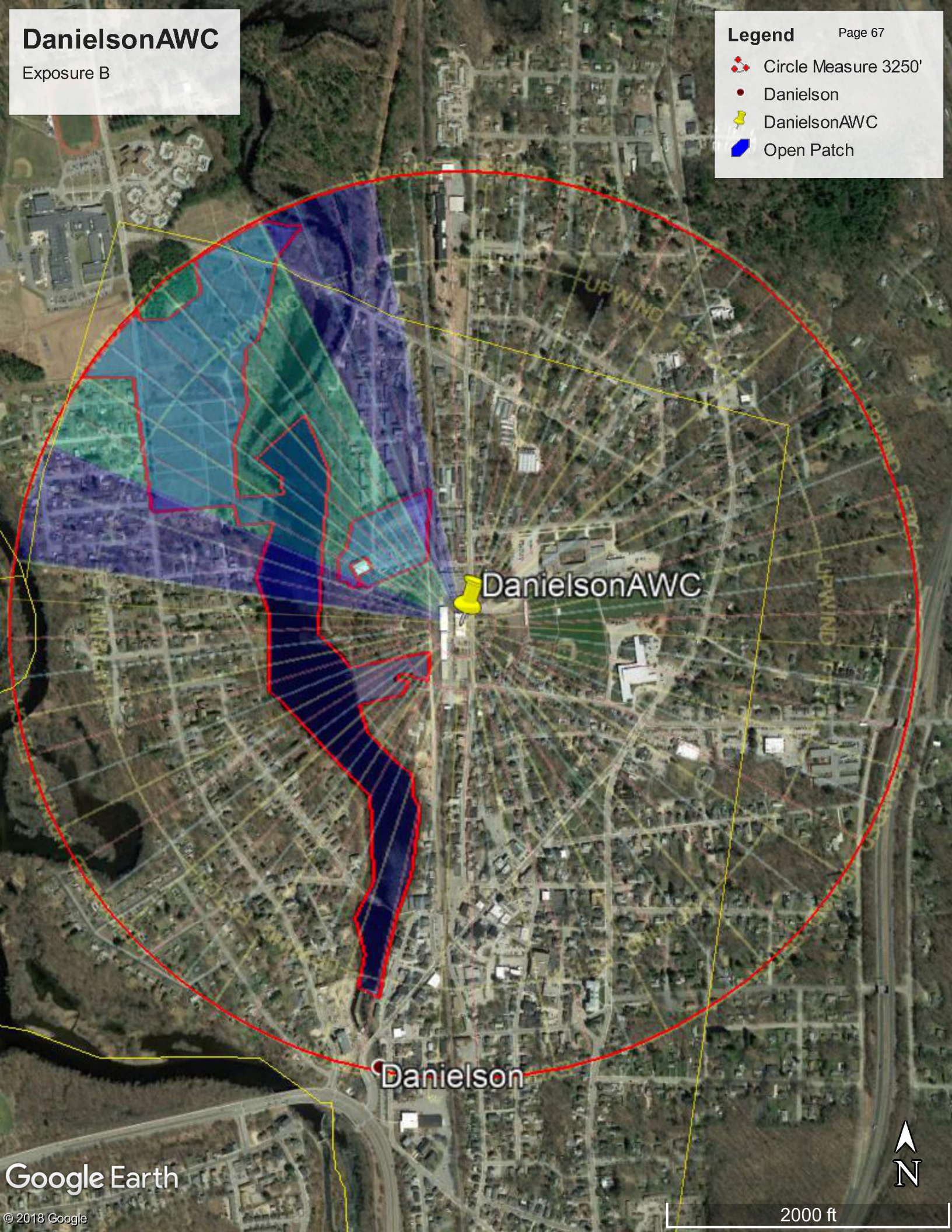
PROJECT NAME: DANIELSON WORK CENTER Date: 10/25/2017
JOB NUMBER: Time: 04:15:06pm

Total bolts

12-BOLT 1"DIA A325 3"1/2	18.1 lbs.
20-BOLT 1"DIA A325 4"1/4	33.6 lbs.
126-BOLT 3/4"DIA A325 2"	73.6 lbs.
8-BOLT 3/4"DIA HAS THREADED ROD W/HILTI HIT-HY200 ADHESIVE (8" EMBED)	5.2 lbs.
10-BOLT 3/4"DIA A325 2"1/4	6.2 lbs.
45-BOLT 5/8"DIA A449 6"1/2 BUTTON HEAD STEP BOLT	29.1 lbs.

lbs. of Bolts

END OF REPORT

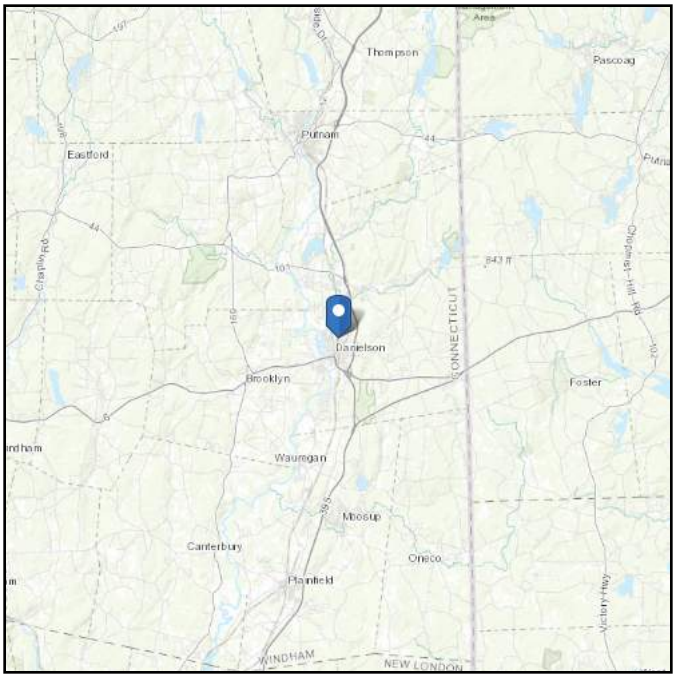

DanielsonAWC
Exposure B
Legend
Page 67
Circle Measure 3250'
Danielson
DanielsonAWC
Open Patch
DanielsonAWC
Danielson
Google Earth
© 2018 Google
N
2000 ft

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: III
Soil Class: D - Stiff Soil

Elevation: 239.28 ft (NAVD 88)
Latitude: 41.811278
Longitude: -71.883778



Wind

Results:

Wind Speed:	140 Vmph
10-year MRI	79 Vmph
25-year MRI	89 Vmph
50-year MRI	97 Vmph
100-year MRI	105 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1B and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Fri May 29 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

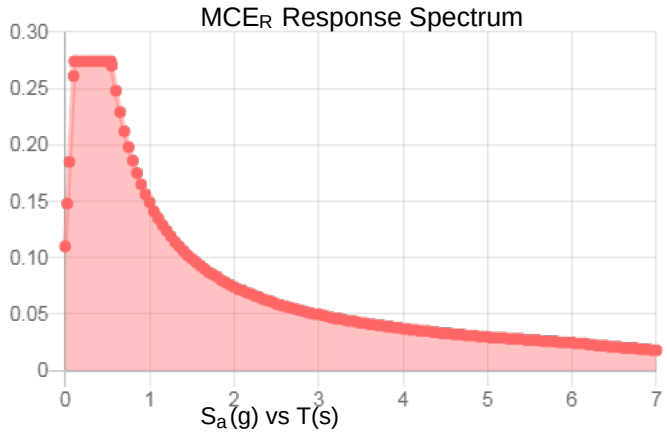
Seismic

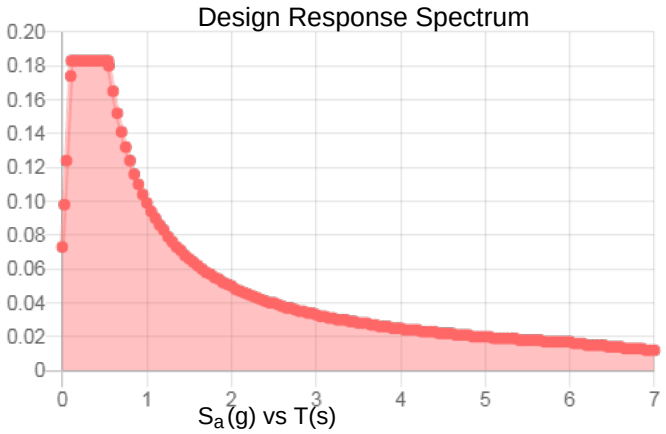
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.171	S_{DS} :	0.183
S_1 :	0.062	S_{D1} :	0.099
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.274	PGA_M :	0.137
S_{M1} :	0.149	F_{PGA} :	1.6
		I_e :	1.25

Seismic Design Category B





Data Accessed: Fri May 29 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri May 29 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

ATTACHMENT F – STRUCTURAL ANALYSIS OF EXISTING TOWER

Date: **June 24, 2020**

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-2522

Subject:	**Structural Analysis Report**	
Eversource Designation:	**Site Number:**	ES-153
	Site Name:	Danielson Work Center
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	405025
Site Data:	**173 Mechanic Street, Killingly, CT** **Latitude *41° 48' 40.6"*, Longitude *-71° 53' 1.6"*** **60.0 Foot - Monopole Tower on 19.96 Foot Building**	

Black & Veatch Corp. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Proposed Equipment Configuration **Sufficient Capacity – 46.0%**

This analysis utilizes an ultimate 3-second gust wind speed of 140 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 – Analysis Criteria.

Structural analysis prepared by: Patrick Davis / Cesar Garcia Godos

Respectfully submitted by:

Joshua J. Riley, P.E.
Professional Engineer

10/05/2020

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 60.0 ft Monopole manufactured by Eastern Inc. Steel Contracting in August of 2017.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	140 mph ultimate
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic Ss:	0.171
Seismic S1:	0.062
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
77.0	86.0	1	dbspectra	DS2C03F36D-D	2	7/8	–
	77.0	1	generic	3.5” OD X 4’-0” Long Mount Pipe			

Table 2 – Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
77.0	87.0	1	dbspectra	DS4C06F36D-D	2	1 1/4	2
		1	telewave	ANT150F6	1 1	1 1/4 7/8	1
	84.5	1	kreco	CO-36A			
	77.0	3	site pro 1	Support Arm SV197-48			
		1	site pro 1	Ring Mount LWRM			

Notes:
1) Existing Equipment
2) Existing Equipment to Be Removed

3) ANALYSIS PROCEDURE

Table 3 – Documents Provided

Document	Remarks	Reference	Source
TOWER MANUFACTURER DRAWINGS	Eastern Inc. Steel Contracting, dated 08/19/2017	Tower geometry	Eversource
SITE SURVEY PHOTOS	Dated 10/16/2018	Existing tower loading	Eversource

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis in included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts, and other appurtenances are as specified in Tables 1 and 2 are the referenced drawings.
3) Existing tower loading is based on 2018 drone mapping photos and owner-provided inventory.
4) This analysis was performed under the assumption that all information provided to Black & Veatch is current and correct. This is to include site data, appurtenance loading, and tower/foundation details.

This analysis may be affected if any assumptions are not valid or have been made in error. Black & Veatch Corp. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	79.7917 - 59.7917	Pole	HSS18x0.375	1	-2.37	640.09	11.0	Pass
L2	59.7917 - 19.7917	Pole	HSS18x0.375	2	-5.66	640.09	46.0	Pass
							Summary	
						Pole (L2)	46.0	Pass
						Rating =	46.0	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	59.79	8.9	Pass
	Flange Plates		22.1	Pass
	Anchor Rods	19.79	17.7	Pass
	Base Plate		13.8	Pass

Structure Rating (max from all components) =	46.0%

Note:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.

4.1) Recommendations

The tower has sufficient capacity to carry the existing and proposed loads. No modifications are required on the tower at this time.
Please notice that the adequacy of the tower roof frame is not part of the scope of this analysis; therefore, a sufficient structural analysis of the tower roof frame will be required before the proposed equipment configuration is installed.

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °	Check*
L1	79.7917 - 59.7917	1.904	51	0.22	0.003	OK
L2	59.7917 - 19.7917	1.012	51	0.199	0.0021	OK

*Limit State Deformation (TIA-222-H Section 2.8.2)

1) Maximum Rotation = 4 Degrees

2) Maximum Deflection = 0.03 * Tower Height = 22 in.

Maximum Tower Deflections - Design Wind

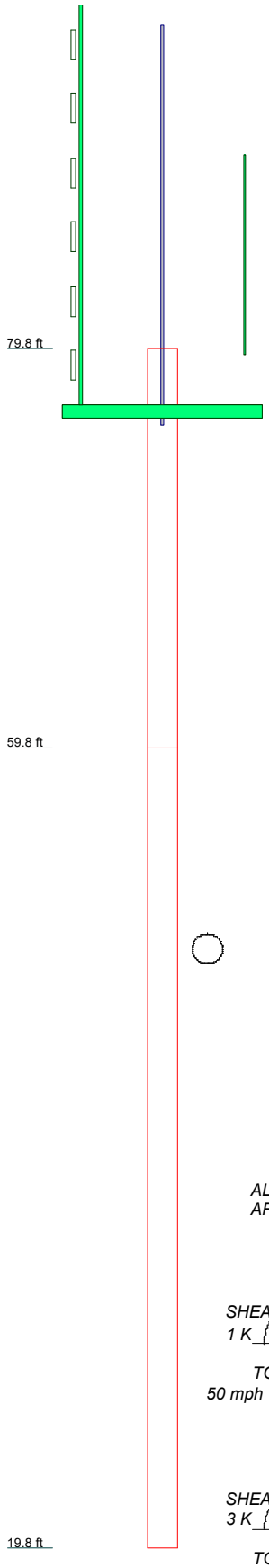
Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °	Combined Max	Check*
L1	79.7917 - 59.7917	6.109	51	0.7019	0.0097	0.702	OK **
L2	59.7917 - 19.7917	3.257	51	0.6383	0.0068	0.638	OK **

*Up to 0.5 degree is considered acceptable per SUB090 Section 7

**Deflection approved by Eversource Energy

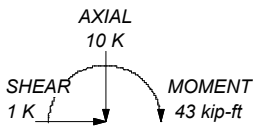
APPENDIX A

TNXTOWER OUTPUT

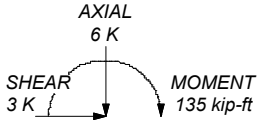


Section	Size	Length (ft)	Grade	Weight (K)
1	HSS18x0.375	20.00	A53-B-35	1.3
2	HSS18x0.375	40.00		2.6
				4.0

ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 1.5000 in ICE



TORQUE 1 kip-ft
REACTIONS - 140 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
CO-36A	77	Support Arm SV197-48	77
4'x2" Mount Pipe	77	DS2C03F36D-D	77
Support Arm SV197-48	77	4'x3" Mount Pipe	77
ANT150F6	77	Support Arm SV197-48	77
4'x2" Mount Pipe	77	Ring Mount LWRM	77

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 140 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 46%

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-2000
FAX: (913) 458-8136

Job:	***ES-153 Danielson Work Center***		
Project:	***405025***		
Client: Eversource	Drawn by: Cesar Garcia Godos		App'd:
Code: TIA-222-H	Date: 06/24/20		Scale: NTS
Path:			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Windham County, Connecticut.
2) Tower base elevation above sea level: 259.07 ft.
3) Basic wind speed of 140 mph.
4) Risk Category III.
5) Exposure Category B.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0.00 ft.
9) Nominal ice thickness of 1.5000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.05.
18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Pole Section Geometry

Section	*Elevation*	*Section Length*	*Pole Size*	*Pole Grade*	*Socket Length*
	ft	*ft*			*ft*
L1	79.79-59.79	20.00	HSS18x0.375	A53-B-35 (35 ksi)	
L2	59.79-19.79	40.00	HSS18x0.375	A53-B-35 (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 79.79-59.79				1	1	1			
L2 59.79-19.79				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	C	No	Surface Ar (CaAa)	79.63 - 19.79	1	1	0.100 0.120	0.3750		0.22

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
****									
LDF6-50A(1-1/4)	A	No	No	Inside Pole	76.83 - 19.79	1	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
							2" Ice	0.00	0.60
LDF5-50A(7/8)	A	No	No	Inside Pole	76.83 - 19.79	1	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33
********									
LDF5-50A(7/8")	A	No	No	Inside Pole	76.83 - 19.79	2	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
							2" Ice	0.00	0.33

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	79.79-59.79	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.744	0.000	0.00
L2	59.79-19.79	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.500	0.000	0.01

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	79.79-59.79	A	1.859	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	8.118	0.000	0.11
L2	59.79-19.79	A	1.761	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	15.586	0.000	0.19

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	79.79-59.79	-0.0832	0.3549	-0.3304	1.4085
L2	59.79-19.79	-0.0839	0.3578	-0.3216	1.3712

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	Safety Line 3/8	59.79 - 79.63	1.0000	1.0000
L2	1	Safety Line 3/8	19.79 - 59.79	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
CO-36A	B	From Leg	4.00 0.00 7.50	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.70 3.93 5.17 7.52	2.70 3.93 5.17 7.52	0.01 0.03 0.06 0.14
4'x2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.87 1.11 1.36 1.90	0.87 1.11 1.36 1.90	0.01 0.02 0.03 0.06
Support Arm SV197-48	B	From Leg	2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.68 0.95 1.23 1.79	2.26 3.06 3.86 5.46	0.08 0.10 0.11 0.15

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ANT150F6	C	From Leg	4.00 0.00 10.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 6.83 8.87 13.01	4.80 6.83 8.87 13.01	0.03 0.07 0.11 0.25
4'x2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.87 1.11 1.36 1.90	0.87 1.11 1.36 1.90	0.01 0.02 0.03 0.06
Support Arm SV197-48	C	From Leg	2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.68 0.95 1.23 1.79	2.26 3.06 3.86 5.46	0.08 0.10 0.11 0.15
Proposed Loading									
DS2C03F36D-D	A	From Leg	4.00 0.00 9.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.58 7.47 9.38 13.25	5.58 7.47 9.38 13.25	0.07 0.11 0.16 0.30
4'x3" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.11 1.36 1.62 2.16	1.11 1.36 1.62 2.16	0.03 0.04 0.05 0.09
Support Arm SV197-48	A	From Leg	2.00 0.00 0.00	0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.68 0.95 1.23 1.79	2.26 3.06 3.86 5.46	0.08 0.10 0.11 0.15
Ring Mount LWRM	C	None		0.0000	77.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.26 0.37 0.48 0.71

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 45 deg - No Ice
7	0.9 Dead+1.0 Wind 45 deg - No Ice
8	1.2 Dead+1.0 Wind 60 deg - No Ice
9	0.9 Dead+1.0 Wind 60 deg - No Ice
10	1.2 Dead+1.0 Wind 90 deg - No Ice
11	0.9 Dead+1.0 Wind 90 deg - No Ice
12	1.2 Dead+1.0 Wind 120 deg - No Ice
13	0.9 Dead+1.0 Wind 120 deg - No Ice
14	1.2 Dead+1.0 Wind 135 deg - No Ice
15	0.9 Dead+1.0 Wind 135 deg - No Ice
16	1.2 Dead+1.0 Wind 150 deg - No Ice
17	0.9 Dead+1.0 Wind 150 deg - No Ice
18	1.2 Dead+1.0 Wind 180 deg - No Ice

Comb. No.	Description
19	0.9 Dead+1.0 Wind 180 deg - No Ice
20	1.2 Dead+1.0 Wind 210 deg - No Ice
21	0.9 Dead+1.0 Wind 210 deg - No Ice
22	1.2 Dead+1.0 Wind 225 deg - No Ice
23	0.9 Dead+1.0 Wind 225 deg - No Ice
24	1.2 Dead+1.0 Wind 240 deg - No Ice
25	0.9 Dead+1.0 Wind 240 deg - No Ice
26	1.2 Dead+1.0 Wind 270 deg - No Ice
27	0.9 Dead+1.0 Wind 270 deg - No Ice
28	1.2 Dead+1.0 Wind 300 deg - No Ice
29	0.9 Dead+1.0 Wind 300 deg - No Ice
30	1.2 Dead+1.0 Wind 315 deg - No Ice
31	0.9 Dead+1.0 Wind 315 deg - No Ice
32	1.2 Dead+1.0 Wind 330 deg - No Ice
33	0.9 Dead+1.0 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	79.7917 - 59.7917	Pole	Max Tension	35	0.00	-0.00	-0.00
			Max. Compression	34	-4.71	0.45	0.62
			Max. Mx	26	-2.37	31.57	0.39
			Max. My	2	-2.37	0.10	31.87
			Max. Vy	26	-1.85	31.57	0.39
			Max. Vx	2	-1.85	0.10	31.87
			Max. Torque	22			-0.65
L2	59.7917 - 19.7917	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-9.85	0.46	0.48
			Max. Mx	26	-5.66	134.75	0.40
			Max. My	2	-5.66	0.10	135.05

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	26	-3.22	134.75	0.40
			Max. Vx	2	-3.22	0.10	135.05
			Max. Torque	22			-0.65

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	49	9.85	0.70	0.70
	Max. H_x	27	4.24	3.21	0.00
	Max. H_z	3	4.24	0.00	3.21
	Max. M_x	2	135.05	0.00	3.21
	Max. M_z	10	134.55	-3.21	0.00
	Max. Torsion	6	0.65	-2.27	2.27
	Min. Vert	15	4.24	-2.27	-2.27
	Min. H_x	11	4.24	-3.21	0.00
	Min. H_z	19	4.24	0.00	-3.21
	Min. M_x	18	-134.25	0.00	-3.21
	Min. M_z	26	-134.75	3.21	0.00
	Min. Torsion	22	-0.65	2.27	-2.27

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	4.71	0.00	0.00	-0.32	0.08	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	5.66	-0.00	-3.21	-135.05	0.10	-0.43
0.9 Dead+1.0 Wind 0 deg - No Ice	4.24	0.00	-3.21	-134.32	0.08	-0.43
1.2 Dead+1.0 Wind 30 deg - No Ice	5.66	1.61	-2.78	-117.01	-67.22	-0.61
0.9 Dead+1.0 Wind 30 deg - No Ice	4.24	1.61	-2.78	-116.36	-66.94	-0.61
1.2 Dead+1.0 Wind 45 deg - No Ice	5.66	2.27	-2.27	-95.61	-95.11	-0.65
0.9 Dead+1.0 Wind 45 deg - No Ice	4.24	2.27	-2.27	-95.07	-94.69	-0.65
1.2 Dead+1.0 Wind 60 deg - No Ice	5.66	2.78	-1.61	-67.72	-116.51	-0.63
0.9 Dead+1.0 Wind 60 deg - No Ice	4.24	2.78	-1.61	-67.31	-115.99	-0.63
1.2 Dead+1.0 Wind 90 deg - No Ice	5.66	3.21	-0.00	-0.40	-134.55	-0.48
0.9 Dead+1.0 Wind 90 deg - No Ice	4.24	3.21	0.00	-0.30	-133.95	-0.48
1.2 Dead+1.0 Wind 120 deg - No Ice	5.66	2.78	1.61	66.93	-116.51	-0.20
0.9 Dead+1.0 Wind 120 deg - No Ice	4.24	2.78	1.61	66.72	-115.99	-0.20
1.2 Dead+1.0 Wind 135 deg - No Ice	5.66	2.27	2.27	94.81	-95.11	-0.04
0.9 Dead+1.0 Wind 135 deg - No Ice	4.24	2.27	2.27	94.47	-94.69	-0.04
1.2 Dead+1.0 Wind 150 deg - No Ice	5.66	1.61	2.78	116.21	-67.22	0.13
0.9 Dead+1.0 Wind 150 deg - No Ice	4.24	1.61	2.78	115.77	-66.94	0.13
1.2 Dead+1.0 Wind 180 deg	5.66	-0.00	3.21	134.25	0.10	0.43

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 0.9 Dead+1.0 Wind 180 deg	4.24	0.00	3.21	133.73	0.08	0.43
- No Ice 1.2 Dead+1.0 Wind 210 deg	5.66	-1.61	2.78	116.21	67.43	0.61
- No Ice 0.9 Dead+1.0 Wind 210 deg	4.24	-1.61	2.78	115.77	67.09	0.61
- No Ice 1.2 Dead+1.0 Wind 225 deg	5.66	-2.27	2.27	94.81	95.31	0.65
- No Ice 0.9 Dead+1.0 Wind 225 deg	4.24	-2.27	2.27	94.47	94.84	0.65
- No Ice 1.2 Dead+1.0 Wind 240 deg	5.66	-2.78	1.61	66.93	116.71	0.63
- No Ice 0.9 Dead+1.0 Wind 240 deg	4.24	-2.78	1.61	66.72	116.14	0.63
- No Ice 1.2 Dead+1.0 Wind 270 deg	5.66	-3.21	-0.00	-0.40	134.75	0.48
- No Ice 0.9 Dead+1.0 Wind 270 deg	4.24	-3.21	0.00	-0.30	134.10	0.48
- No Ice 1.2 Dead+1.0 Wind 300 deg	5.66	-2.78	-1.61	-67.72	116.71	0.20
- No Ice 0.9 Dead+1.0 Wind 300 deg	4.24	-2.78	-1.61	-67.31	116.14	0.20
- No Ice 1.2 Dead+1.0 Wind 315 deg	5.66	-2.27	-2.27	-95.61	95.31	0.04
- No Ice 0.9 Dead+1.0 Wind 315 deg	4.24	-2.27	-2.27	-95.07	94.84	0.04
- No Ice 1.2 Dead+1.0 Wind 330 deg	5.66	-1.61	-2.78	-117.01	67.43	-0.13
- No Ice 0.9 Dead+1.0 Wind 330 deg	4.24	-1.61	-2.78	-116.36	67.09	-0.13
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	9.85	-0.00	-0.00	-0.48	0.46	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	9.85	-0.00	-0.99	-42.63	0.47	-0.14
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	9.85	0.49	-0.85	-36.99	-20.60	-0.17
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	9.85	0.70	-0.70	-30.29	-29.33	-0.17
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	9.85	0.85	-0.49	-21.56	-36.03	-0.15
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	9.85	0.99	-0.00	-0.49	-41.68	-0.09
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	9.85	0.85	0.49	20.58	-36.03	-0.01
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	9.85	0.70	0.70	29.31	-29.33	0.03
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	9.85	0.49	0.85	36.01	-20.60	0.07
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	9.85	-0.00	0.99	41.65	0.47	0.14
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	9.85	-0.49	0.85	36.01	21.54	0.17
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	9.85	-0.70	0.70	29.31	30.27	0.17
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	9.85	-0.85	0.49	20.58	36.97	0.15
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	9.85	-0.99	-0.00	-0.49	42.61	0.09
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	9.85	-0.85	-0.49	-21.56	36.97	0.01
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	9.85	-0.70	-0.70	-30.29	30.27	-0.03
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	9.85	-0.49	-0.85	-36.99	21.54	-0.07
Dead+Wind 0 deg - Service	4.71	0.00	-0.53	-22.39	0.08	-0.07
Dead+Wind 30 deg - Service	4.71	0.26	-0.46	-19.44	-10.95	-0.10
Dead+Wind 45 deg - Service	4.71	0.37	-0.37	-15.93	-15.52	-0.11
Dead+Wind 60 deg - Service	4.71	0.46	-0.26	-11.36	-19.02	-0.10
Dead+Wind 90 deg - Service	4.71	0.53	0.00	-0.33	-21.98	-0.08

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 120 deg - Service	4.71	0.46	0.26	10.70	-19.02	-0.03
Dead+Wind 135 deg - Service	4.71	0.37	0.37	15.27	-15.52	-0.01
Dead+Wind 150 deg - Service	4.71	0.26	0.46	18.78	-10.95	0.02
Dead+Wind 180 deg - Service	4.71	0.00	0.53	21.73	0.08	0.07
Dead+Wind 210 deg - Service	4.71	-0.26	0.46	18.78	11.12	0.10
Dead+Wind 225 deg - Service	4.71	-0.37	0.37	15.27	15.68	0.11
Dead+Wind 240 deg - Service	4.71	-0.46	0.26	10.70	19.19	0.10
Dead+Wind 270 deg - Service	4.71	-0.53	0.00	-0.33	22.15	0.08
Dead+Wind 300 deg - Service	4.71	-0.46	-0.26	-11.36	19.19	0.03
Dead+Wind 315 deg - Service	4.71	-0.37	-0.37	-15.93	15.68	0.01
Dead+Wind 330 deg - Service	4.71	-0.26	-0.46	-19.44	11.12	-0.02

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-4.71	0.00	0.00	4.71	0.00	0.000%
2	0.00	-5.66	-3.21	0.00	5.66	3.21	0.000%
3	0.00	-4.24	-3.21	0.00	4.24	3.21	0.000%
4	1.61	-5.66	-2.78	-1.61	5.66	2.78	0.000%
5	1.61	-4.24	-2.78	-1.61	4.24	2.78	0.000%
6	2.27	-5.66	-2.27	-2.27	5.66	2.27	0.000%
7	2.27	-4.24	-2.27	-2.27	4.24	2.27	0.000%
8	2.78	-5.66	-1.61	-2.78	5.66	1.61	0.000%
9	2.78	-4.24	-1.61	-2.78	4.24	1.61	0.000%
10	3.21	-5.66	0.00	-3.21	5.66	0.00	0.000%
11	3.21	-4.24	0.00	-3.21	4.24	0.00	0.000%
12	2.78	-5.66	1.61	-2.78	5.66	-1.61	0.000%
13	2.78	-4.24	1.61	-2.78	4.24	-1.61	0.000%
14	2.27	-5.66	2.27	-2.27	5.66	-2.27	0.000%
15	2.27	-4.24	2.27	-2.27	4.24	-2.27	0.000%
16	1.61	-5.66	2.78	-1.61	5.66	-2.78	0.000%
17	1.61	-4.24	2.78	-1.61	4.24	-2.78	0.000%
18	0.00	-5.66	3.21	0.00	5.66	-3.21	0.000%
19	0.00	-4.24	3.21	0.00	4.24	-3.21	0.000%
20	-1.61	-5.66	2.78	1.61	5.66	-2.78	0.000%
21	-1.61	-4.24	2.78	1.61	4.24	-2.78	0.000%
22	-2.27	-5.66	2.27	2.27	5.66	-2.27	0.000%
23	-2.27	-4.24	2.27	2.27	4.24	-2.27	0.000%
24	-2.78	-5.66	1.61	2.78	5.66	-1.61	0.000%
25	-2.78	-4.24	1.61	2.78	4.24	-1.61	0.000%
26	-3.21	-5.66	0.00	3.21	5.66	0.00	0.000%
27	-3.21	-4.24	0.00	3.21	4.24	0.00	0.000%
28	-2.78	-5.66	-1.61	2.78	5.66	1.61	0.000%
29	-2.78	-4.24	-1.61	2.78	4.24	1.61	0.000%
30	-2.27	-5.66	-2.27	2.27	5.66	2.27	0.000%
31	-2.27	-4.24	-2.27	2.27	4.24	2.27	0.000%
32	-1.61	-5.66	-2.78	1.61	5.66	2.78	0.000%
33	-1.61	-4.24	-2.78	1.61	4.24	2.78	0.000%
34	0.00	-9.85	0.00	0.00	9.85	0.00	0.000%
35	0.00	-9.85	-0.99	0.00	9.85	0.99	0.000%
36	0.49	-9.85	-0.85	-0.49	9.85	0.85	0.000%
37	0.70	-9.85	-0.70	-0.70	9.85	0.70	0.000%
38	0.85	-9.85	-0.49	-0.85	9.85	0.49	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
39	0.99	-9.85	0.00	-0.99	9.85	0.00	0.000%
40	0.85	-9.85	0.49	-0.85	9.85	-0.49	0.000%
41	0.70	-9.85	0.70	-0.70	9.85	-0.70	0.000%
42	0.49	-9.85	0.85	-0.49	9.85	-0.85	0.000%
43	0.00	-9.85	0.99	0.00	9.85	-0.99	0.000%
44	-0.49	-9.85	0.85	0.49	9.85	-0.85	0.000%
45	-0.70	-9.85	0.70	0.70	9.85	-0.70	0.000%
46	-0.85	-9.85	0.49	0.85	9.85	-0.49	0.000%
47	-0.99	-9.85	0.00	0.99	9.85	0.00	0.000%
48	-0.85	-9.85	-0.49	0.85	9.85	0.49	0.000%
49	-0.70	-9.85	-0.70	0.70	9.85	0.70	0.000%
50	-0.49	-9.85	-0.85	0.49	9.85	0.85	0.000%
51	0.00	-4.71	-0.53	0.00	4.71	0.53	0.000%
52	0.26	-4.71	-0.46	-0.26	4.71	0.46	0.000%
53	0.37	-4.71	-0.37	-0.37	4.71	0.37	0.000%
54	0.46	-4.71	-0.26	-0.46	4.71	0.26	0.000%
55	0.53	-4.71	0.00	-0.53	4.71	0.00	0.000%
56	0.46	-4.71	0.26	-0.46	4.71	-0.26	0.000%
57	0.37	-4.71	0.37	-0.37	4.71	-0.37	0.000%
58	0.26	-4.71	0.46	-0.26	4.71	-0.46	0.000%
59	0.00	-4.71	0.53	0.00	4.71	-0.53	0.000%
60	-0.26	-4.71	0.46	0.26	4.71	-0.46	0.000%
61	-0.37	-4.71	0.37	0.37	4.71	-0.37	0.000%
62	-0.46	-4.71	0.26	0.46	4.71	-0.26	0.000%
63	-0.53	-4.71	0.00	0.53	4.71	0.00	0.000%
64	-0.46	-4.71	-0.26	0.46	4.71	0.26	0.000%
65	-0.37	-4.71	-0.37	0.37	4.71	0.37	0.000%
66	-0.26	-4.71	-0.46	0.26	4.71	0.46	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00061110
3	Yes	4	0.00000001	0.00041184
4	Yes	4	0.00000001	0.00080392
5	Yes	4	0.00000001	0.00054252
6	Yes	5	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00082124
8	Yes	5	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00093080
10	Yes	4	0.00000001	0.00068457
11	Yes	4	0.00000001	0.00046121
12	Yes	4	0.00000001	0.00059088
13	Yes	4	0.00000001	0.00039431
14	Yes	4	0.00000001	0.00078473
15	Yes	4	0.00000001	0.00052292
16	Yes	4	0.00000001	0.00061073
17	Yes	4	0.00000001	0.00040672
18	Yes	4	0.00000001	0.00060559
19	Yes	4	0.00000001	0.00040911
20	Yes	5	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00090820
22	Yes	5	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00081511
24	Yes	4	0.00000001	0.00081301
25	Yes	4	0.00000001	0.00055056
26	Yes	4	0.00000001	0.00068616
27	Yes	4	0.00000001	0.00046200
28	Yes	4	0.00000001	0.00087897
29	Yes	4	0.00000001	0.00058553
30	Yes	4	0.00000001	0.00080754
31	Yes	4	0.00000001	0.00053419
32	Yes	4	0.00000001	0.00081199

33	Yes	4	0.00000001	0.00053951
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00083874
36	Yes	4	0.00000001	0.00087069
37	Yes	4	0.00000001	0.00088493
38	Yes	4	0.00000001	0.00086890
39	Yes	4	0.00000001	0.00079971
40	Yes	4	0.00000001	0.00082536
41	Yes	4	0.00000001	0.00083859
42	Yes	4	0.00000001	0.00082622
43	Yes	4	0.00000001	0.00080368
44	Yes	4	0.00000001	0.00086748
45	Yes	4	0.00000001	0.00087961
46	Yes	4	0.00000001	0.00086294
47	Yes	4	0.00000001	0.00082865
48	Yes	4	0.00000001	0.00087843
49	Yes	4	0.00000001	0.00089456
50	Yes	4	0.00000001	0.00088457
51	Yes	4	0.00000001	0.00000001
52	Yes	4	0.00000001	0.00000001
53	Yes	4	0.00000001	0.00000001
54	Yes	4	0.00000001	0.00000001
55	Yes	4	0.00000001	0.00000001
56	Yes	4	0.00000001	0.00000001
57	Yes	4	0.00000001	0.00000001
58	Yes	4	0.00000001	0.00000001
59	Yes	4	0.00000001	0.00000001
60	Yes	4	0.00000001	0.00000001
61	Yes	4	0.00000001	0.00000001
62	Yes	4	0.00000001	0.00000001
63	Yes	4	0.00000001	0.00000001
64	Yes	4	0.00000001	0.00000001
65	Yes	4	0.00000001	0.00000001
66	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	79.7917 - 59.7917	1.904	51	0.2200	0.0030
L2	59.7917 - 19.7917	1.012	51	0.1990	0.0021

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
77.00	CO-36A	51	1.771	0.2189	0.0028	49785

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	79.7917 - 59.7917	11.396	2	1.3082	0.0180
L2	59.7917 -	6.079	2	1.1908	0.0126

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
	19.7917				

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
77.00	CO-36A	2	10.602	1.3027	0.0173	8435

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	79.7917 - 59.7917 (1)	HSS18x0.375	20.00	0.00	0.0	19.3528	-2.37	609.61	0.004
L2	59.7917 - 19.7917 (2)	HSS18x0.375	40.00	0.00	0.0	19.3528	-5.66	609.61	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	79.7917 - 59.7917 (1)	HSS18x0.375	31.87	285.46	0.112	0.00	285.46	0.000
L2	59.7917 - 19.7917 (2)	HSS18x0.375	135.05	285.46	0.473	0.00	285.46	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	79.7917 - 59.7917 (1)	HSS18x0.375	1.85	182.88	0.010	0.43	283.81	0.002
L2	59.7917 - 19.7917 (2)	HSS18x0.375	3.22	182.88	0.018	0.43	283.81	0.002

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	79.7917 - 59.7917 (1)	0.004	0.112	0.000	0.010	0.002	0.116	1.050	4.8.2
L2	59.7917 - 19.7917 (2)	0.009	0.473	0.000	0.018	0.002	0.483	1.050	4.8.2

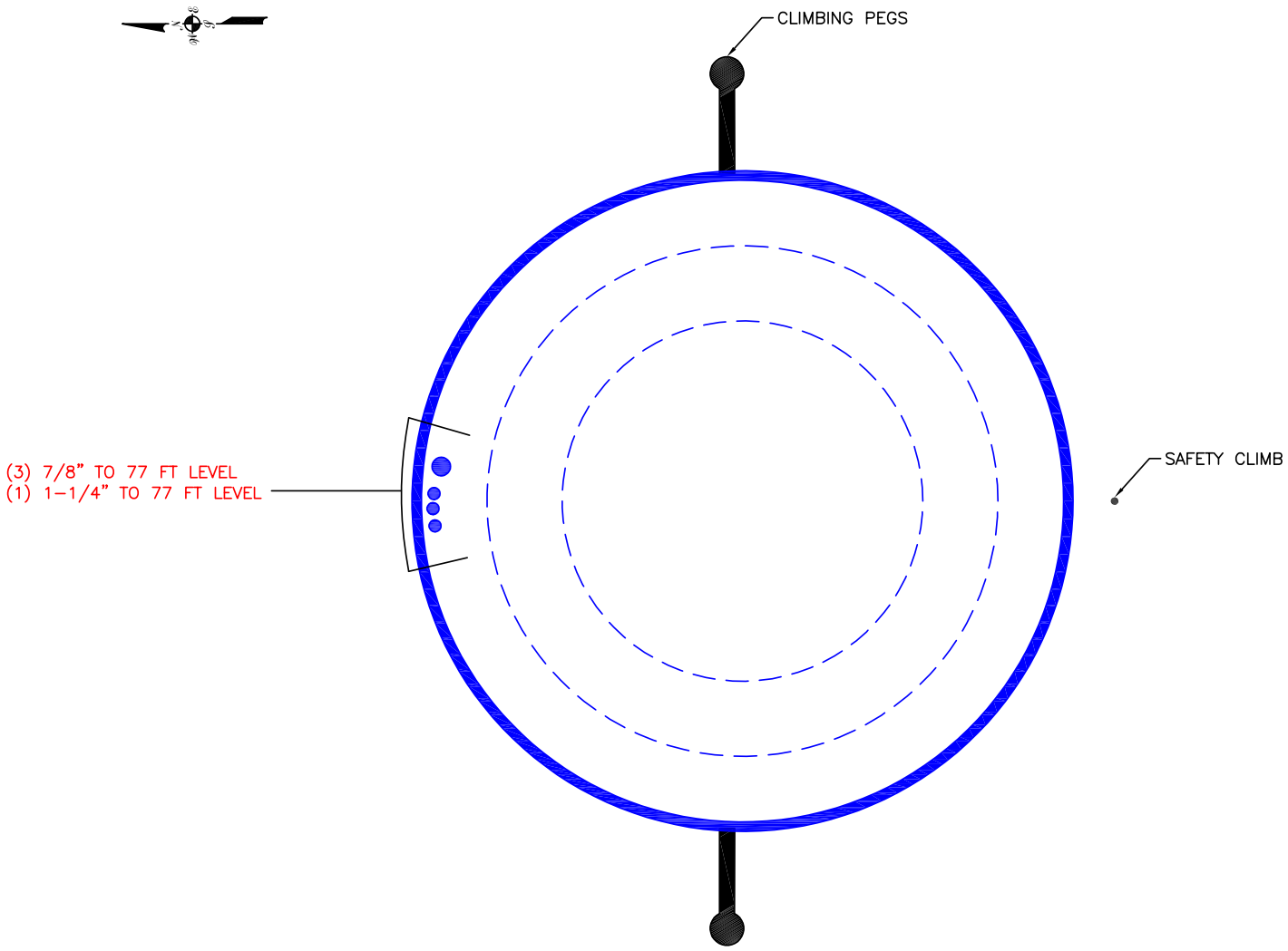
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	79.7917 - 59.7917	Pole	HSS18x0.375	1	-2.37	640.09	11.0	Pass
L2	59.7917 - 19.7917	Pole	HSS18x0.375	2	-5.66	640.09	46.0	Pass
							Summary	
						Pole (L2)	46.0	Pass
						RATING =	**46.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

Feed Line Plan



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Job:	***ES-153 Danielson Work Center***		
Project:	***405025***		
Client: Eversource	Drawn by: Cesar Garcia Godos		App'd:
Code: TIA-222-H	Date: 06/24/20		Scale: NTS
Path:			Dwg No. E-1

APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Flange Plate Connection

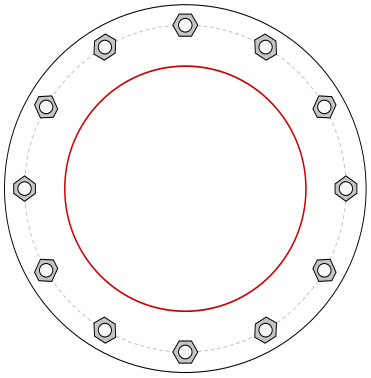
Elevation = 40 ft.

Site Number	ES-153
Site Name	Danielson Work Center
TIA-222 Revision	H

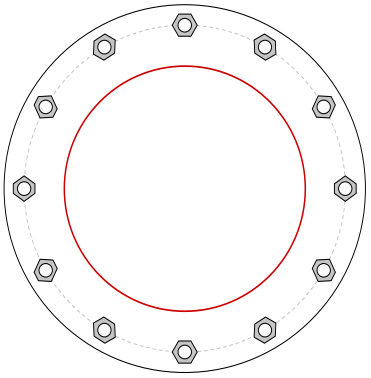
Applied Loads	
Moment (kip-ft)	31.87
Axial Force (kips)	2.37
Shear Force (kips)	1.85

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(12) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 24" BC

Top Plate Data

27" OD x 1" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

27" OD x 1" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

18" x 0.349" round pole (A53-B-35; Fy=35 ksi, Fu=60 ksi)

Bottom Pole Data

18" x 0.349" round pole (A53-B-35; Fy=35 ksi, Fu=60 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	5.11	
Allowable (kips)	54.54	
Stress Rating:	**8.9%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	7.53	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**22.1%**	**Pass**
Tension Side Stress Rating:	**11.1%**	**Pass**

Bottom Plate Capacity

Max Stress (ksi):	7.53	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**22.1%**	**Pass**
Tension Side Stress Rating:	**11.1%**	**Pass**

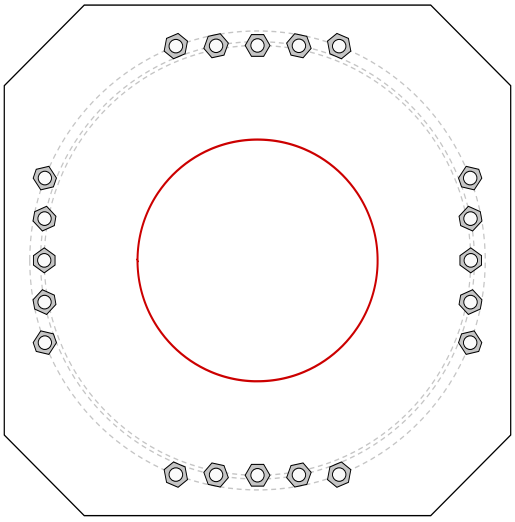
Monopole Base Plate Connection

Site Info	
Site Number	ES-153
Site Name	Danielson Work Center

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	135.05
Axial Force (kips)	5.66
Shear Force (kips)	3.22

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(20) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 34.18" BC

Base Plate Data

38" OD x 2" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

18" x 0.349" round pole (A53-B-35; Fy=35 ksi, Fu=60 ksi)

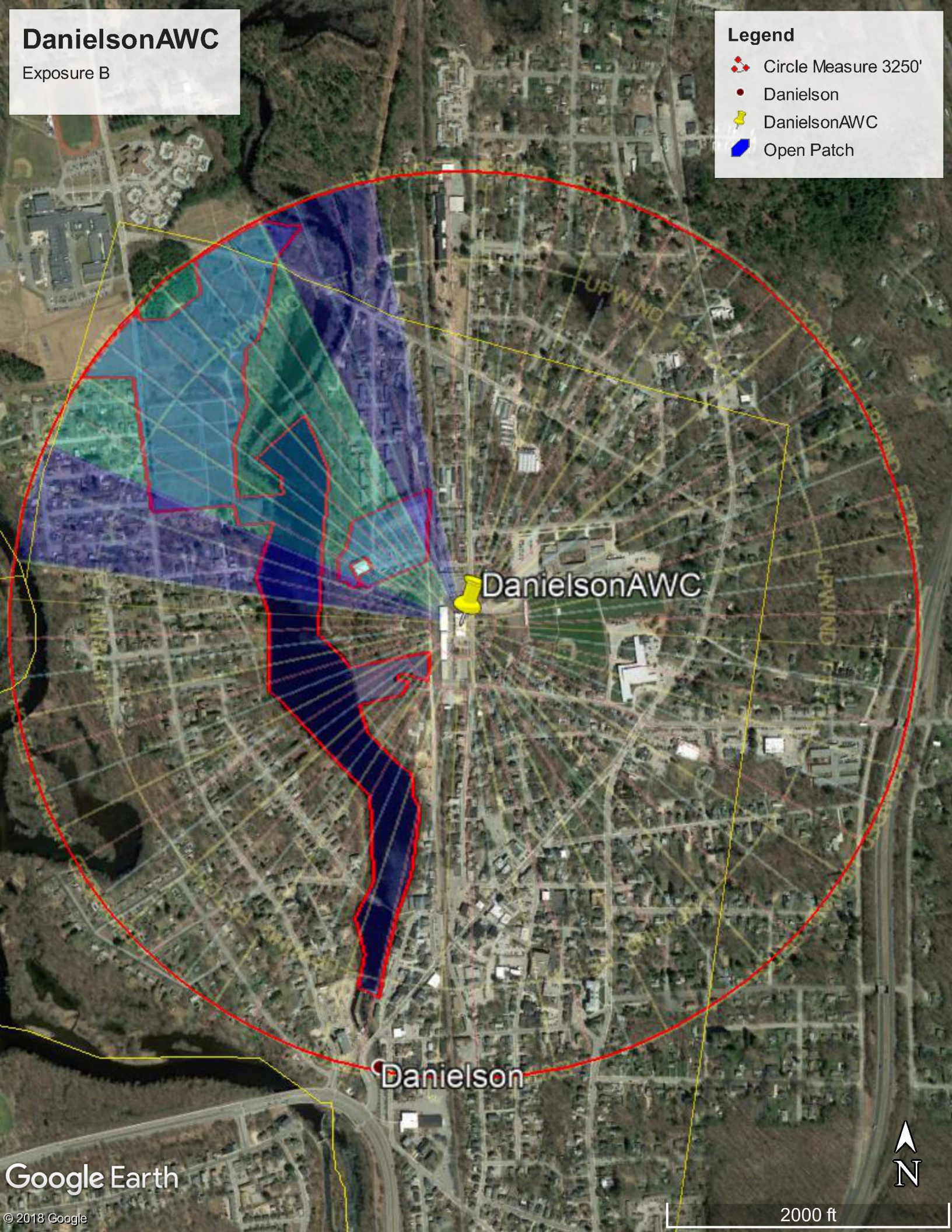
Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 10.38	ϕPn_c = 55.75	**Stress Rating**
Vu = 0.16	ϕVn = 16.73	**17.7%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	6.53	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**13.8%**	**Pass**


DanielsonAWC
Exposure B
Legend
Circle Measure 3250'
Danielson
DanielsonAWC
Open Patch
UPWIND
DanielsonAWC
Danielson
N
2000 ft
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