Clear Channel Outdoor

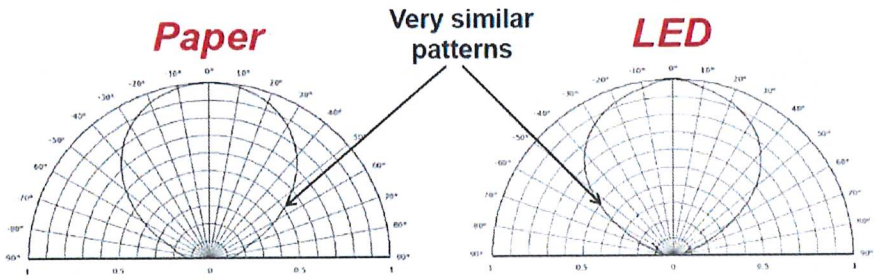
McHenry County Department of Planning & Development

RE: Digital Viewing Cone specifics- Vertical and Horizontal v6

The technological specifics of LED lighting are unique. Our signs will not contribute to the overall sky glow for three main reasons:

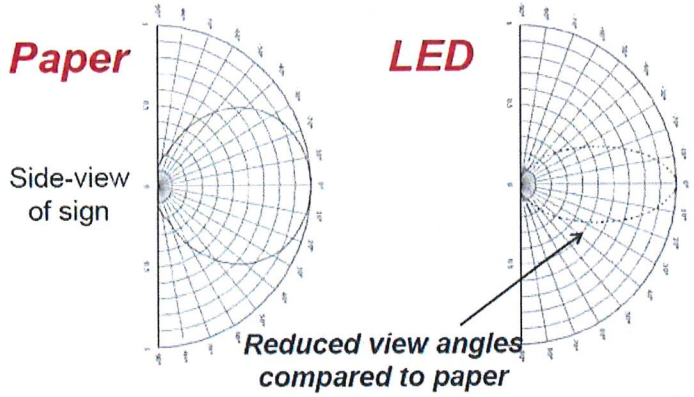
1 The LED's used in our signs have diodes focusing the emitted light into a directed beam.
2 The signs are aimed at the roadway so vehicular traffic can easily see the advertising message.
3 Horizontal Louvers manufactured as part of the sign face help to prevent upward illumination.
The first chart below is to be viewed as if the horizontal line at the bottom is the billboard face, viewed from overhead. This displays how the illuminance continues to reduce as you get more parallel to the sign face. Gradually reducing to nothing. If you stand right next to the sign, no light is visible. If you stand directly beneath the sign, no light is visible on the ground immediately around you.

Light from the LED sign face is spread horizontally and vertically.
Horizontally:



Top-view of sign

And Vertically:



-Source: Nichia Specifications for Blue LED http://www.nichia.com/specification/en/product/led/NSPB346KS-E.pdf

Clear Channel Outdoor
4000 South Morgan St Chicago, IL 60609-2581
Call 773.843.2020 / Visit ClearChannelOutdoor.com / Follow @CCOutdoor

Clear Channel Outdoor

Myth:

Digital billboards produce large amounts of sky glow.

The Facts:
Sky glow results from the use of lighting fixtures that emit light above a horizontal plane so that it enters the atmosphere directly. Digital billboards contain directional LEDs that prevent sky glow which may be produced by traditional billboards.

Fluorescent and standard 'bulb' shaped incandescent lamps emit light in all directions. This leads to a large portion of the light produced by the lamp escaping from the fixture in a direction that is not useful for the intended application, specifically above the sign. Digital billboards' directional LEDs, however, prevent excess light spillage in unintended locations. Additionally, louvers on these signs assist in controlling the light output by shielding any light directed upward.

DAKTRONICS
Daktronics specs a 70-degree vertical and a 140-degree horizontal viewing angle for their displays.

WATCHFIRE
Yesco specs a 70-degree vertical and a 140-degree horizontal viewing angle for their displays.

FORMETCO
Yesco specs a 60-degree vertical and a 140-degree horizontal viewing angle for their displays.

MEDIA RESOURCES
Yesco specs a 70-degree vertical and a 140-degree horizontal viewing angle for their displays
YESCO

Yesco specs a 49-degree vertical and a 120-degree horizontal viewing angle for their displays.

Light from the LED sign face is spread horizontally and vertically. This is also demonstrated by side view drawings showing how the louvers decrease sky glow.

Close up of LED module horizontal louvers:

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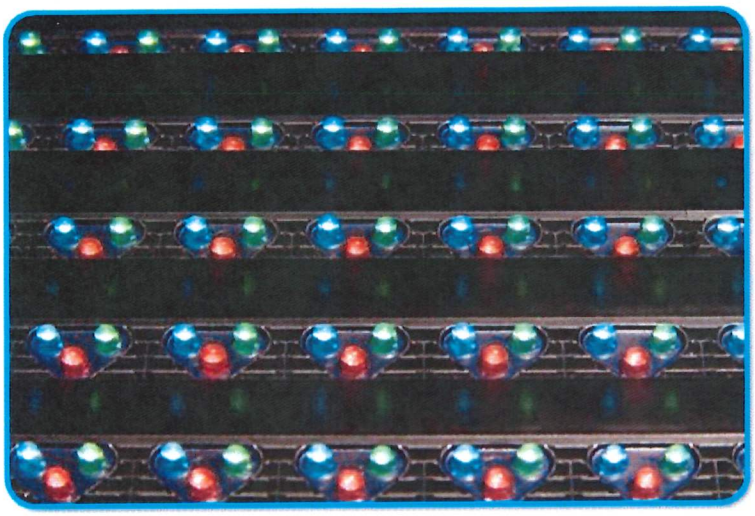
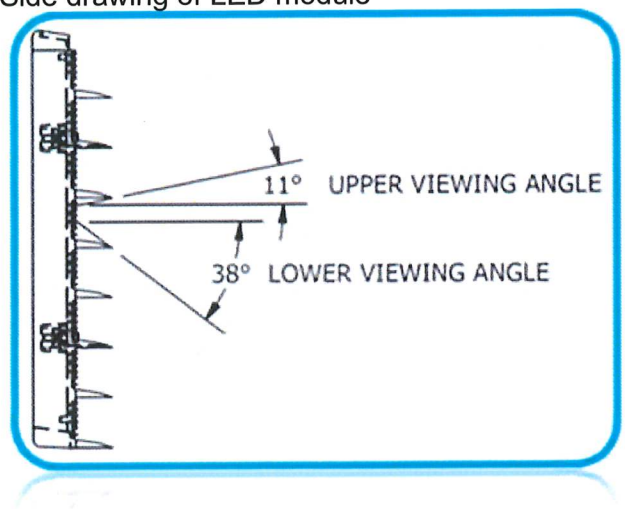


Side drawing of LED module



-Source Yesco

The illuminance of the area around the sign is not uniform. The illuminance is greatest in the area that is directly perpendicular to the sign, and gradually tapers off to nothing as you become more directly parallel to the sign. This result is because a LED sign is not a uniform light source, but rather it focuses the light in specific directions. For this reason, the brightest point is directly perpendicular to the sign, and gradually fades out as you move outside the viewing cone of the sign.

During daylight conditions, the illuminance area reaches as far as 250 feet from the sign at 0 degrees from center. During nighttime conditions, the illuminance area reaches a maximum of 100 feet from the sign at 0 degrees from center. This scenario contemplates signs at ground level. These distances will decrease further when you factor in that the bottom of the sign face is 33 feet in the air. Just as the horizontal viewing angle affects how much area the sign illuminates, the vertical height of the sign also affects how much area the sign illuminates.

Clear Channel Outdoor

McHenry County Department of Planning & Development

RE: Digital impact on Ambient Light

There are 3 necessary components to ensure a digital billboard will never be too bright for conditions.

1 An ambient light sensor installed on the sign structure.
2 Dimming software
3 Maximum brightness limits incorporating a footcandle standard.

The ambient light level of a CCO digital billboard will not vary significantly from that of a traditional billboard display. (In many cases it will be less.) We will set the light levels to be appropriate for the surroundings.

We utilize a photocell on all our digital billboards so that the display will easily be seen by motorists under changing light conditions. Sophisticated dimming software constantly changes the brightness of the display in response to changing ambient lighting conditions. This insures a CCO digital billboard will never be too bright for conditions.

The range of brightness varies greatly between daytime and nighttime conditions. In bright daylight, the unit must have higher intensity in order to be seen. During darkness conditions, the brightness can be set low and still be easily seen by motorists.

Lighting Standards – Measurements:

The industry recommended criteria follow the lighting standards established by the Illuminating Engineering Society of North America (IESNA). All OAAA member companies are already operating their digital signs according to these lighting criteria.

Recommended regulatory criteria:
Lighting levels will not increase by more than 0.3-foot candles (over ambient levels) as measured using a foot candle meter at a pre-set distance.

Each display must have a light sensing device that will adjust the brightness as ambient light conditions change.
Pre-set distances to measure the foot candles impact vary with the expected viewing distances of each size sign. Measurements should be taken as close to perpendicular to the face as practical.
Measurement distance criteria:

Nominal Face Size	Distance to measure from
12' x 24'	150'
10'6 x 36'	200'
14' x 48'	250'
20' x 60'	350'

Each display will have a light sensing device that will adjust the brightness as ambient light conditions change. We can set the photometrics from the manufacturer to consistently meet the above target day or night.

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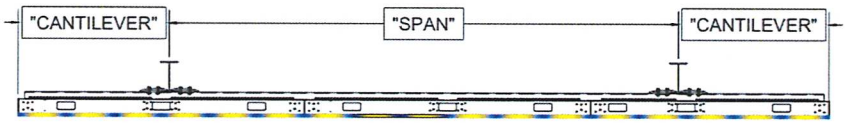
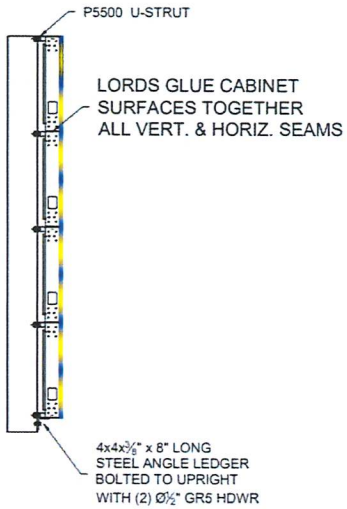
PRODUCT SPECS

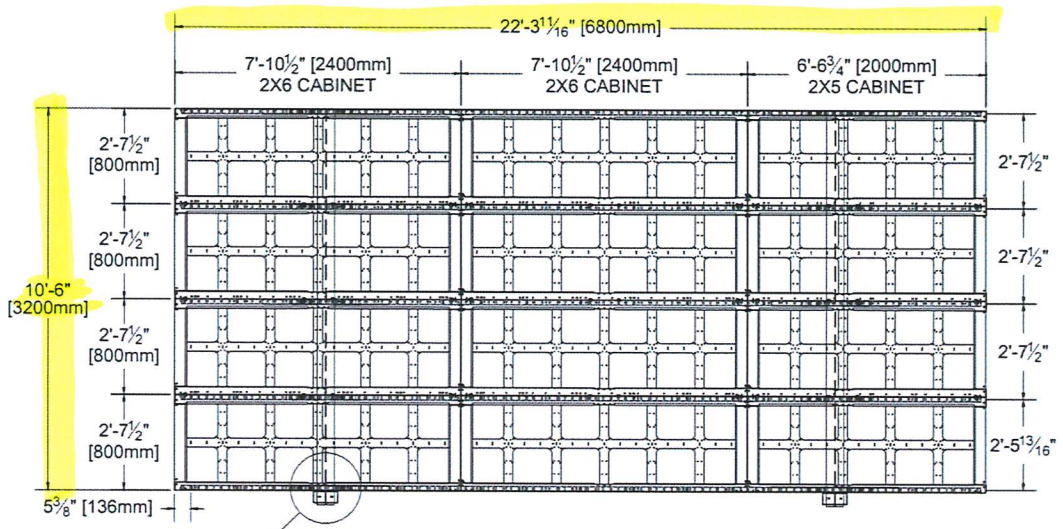
Specification	Formetco Standard Poster Unit	Formetco LCLW Poster Unit
Weight (Based on 12 X 24) Poster	3,000 LBS	1,400 LBS
Panel Size	10' 6" X 24' 1.75"	10' 6" X 22' 3"
Pixel Matrix	200 H x 460 W	*192 H x 408 W
Power Supply	5.19 AMPS	4.52 AMPS
Resolution	16MM	16.6MM
Module Count	230	136
Service	Rear/Front Service	Rear/Front Service
Brightness Guarantee	7500 NITS Shipped (Up to 10,000 NITS capable)	7500 NITS Shipped (Up to 10,000 NITS capable)
Web Camera	Included Mobotix M26	Included Mobotix M26
Warranty Coverage	10-Year all Components, 1-Year covered labor	10-Year components, *7-Year Modules, 1-Year covered labor

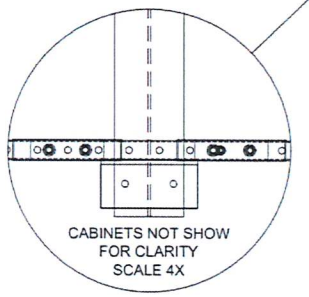
*Still meets aspect ratio

Maximum Pressure for Upright Spacing (est. by SolidWorks modeling-Case A)						
Upright Spacing		Cantilever Span		Max Pressure		
10.50	ft	5.90	ft	32	psf	
12.00	ft	5.15	ft	45	psf	
14.00	ft	4.15	ft	40	psf	
16.00	ft	3.15	ft	28	psf	









U-STRUT MOUNTING CONFIGURATION
(5) P5500 Unistrut (or equivalent)
@ top and bottom and each cabinet joint

ESTIMATED BASE ASSEMBLY WEIGHT
TWO UPRIGHTS @ VARIOUS CENTERS

HORIZONTAL FLT CABINETS.	1481.2#
MOUNTING U-STRUT/CLAMPS/HDWR.	317.2#
CONNECTORS AND LEDGERS	34.4#
SUPPLEMENTAL STEEL.	0.0#
TOTAL.	1833#

NOT FOR PERMIT

REV	DESCRIPTION	DATE	APPD
C	UPDATE MOUNTING AND WEIGHT (est. SOLIDWORKS)	9-9-22	RFW
B	UPDATE MOUNTING AND WEIGHT	8-31-22	RFW
A	UPDATE WEIGHT	8-29-22	RFW

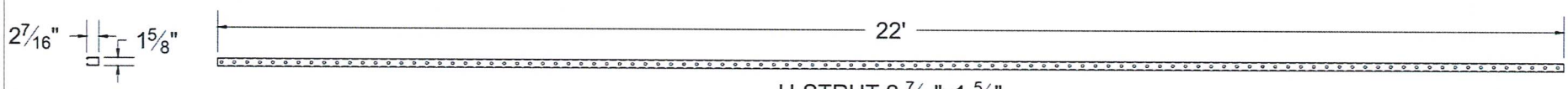
REVISIONS

PART NUMBER 8x17 LT WT POSTER
APPROVALS
DWN REW/JC 07-2022
ENGR UPDATED 11-11-22
CUSTOMER
DO NOT SCALE THIS DRAWING.

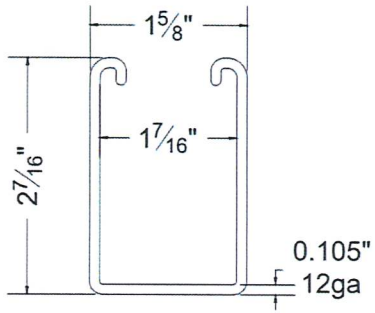
FORMETCO
2963 Pleasant Hill Rd. Duluth, GA 30096-3808

16.67mm FLT 192x408 LT WT POSTER
U-STRUT MOUNTING I-BEAM CLAMPS

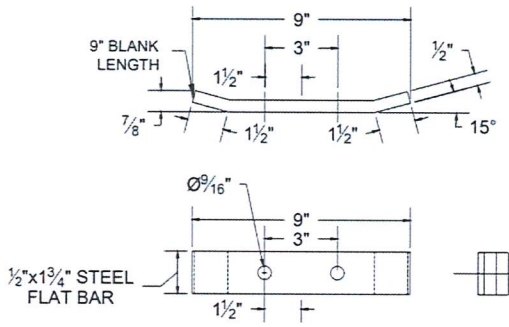
SIZE B SCALE 1:40 DWG NO. B-3540 SH 1 OF - REV. C



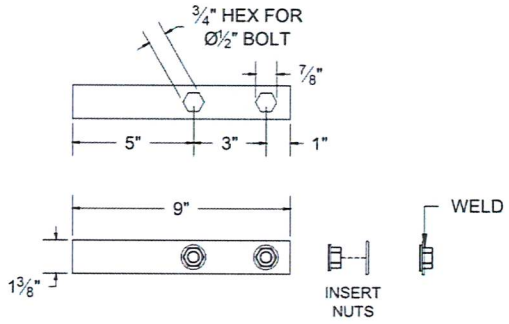
U-STRUT 2-7/16"x1-5/8"
MAKE 5



2 7/16"x1 5/8" U-STRUT
12ga GALVANIZED
UNISTRUT P-5500 OR EQUIV
NOT TO SCALE



FORMED I-BEAM CLAMP
SINGLE WIDTH
1¾"x½" FLAT BAR
PAINT GRAY
SCALE 4X
QTY = 20 REQ'D



U-STRUT CLAMP BOLT PLATE
1.375" x 9" FLAT
12ga GALVANNEAL
SCALE 4X
QTY = 20 REQ'D

NOTE: PAINT GRAY
UPRIGHT BEAM CLAMP - ½" THICK

REV	DESCRIPTION	DATE	APPD
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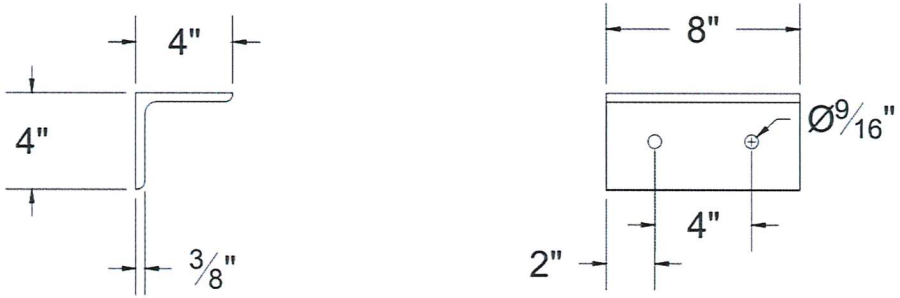
REVISIONS

PART NUMBER 8x17 LT WT POSTER
APPROVALS
DWN REW/JC 07-2022
ENGR UPDATED 11-11-22
CUSTOMER
DO NOT SCALE THIS DRAWING.

FORMETCO
2963 Pleasant Hill Rd. Duluth, GA 30096-3808

16.67mm FLT 192x408 LT WT POSTER
U-STRUT MOUNTING I-BEAM CLAMPS

SIZE B | SCALE 1:40 | DWG NO. B-3540 | SH 2 OF - | REV. -



4x4x3/8" x 8" LONG
STEEL ANGLE LEDGER
REQUIRES 2 PER DISPLAY
PAINT BLACK

P/N: xxxxxxxxxxxxxx
CUT 30 PIECES FROM
4x4x3/8" STEEL ANGLE
x 20' LONG STOCK
PAINT BLACK

REV	DESCRIPTION	DATE	APPD
-	----	----	--

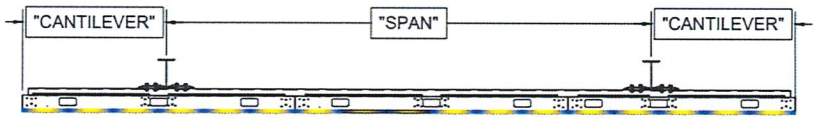
REVISIONS

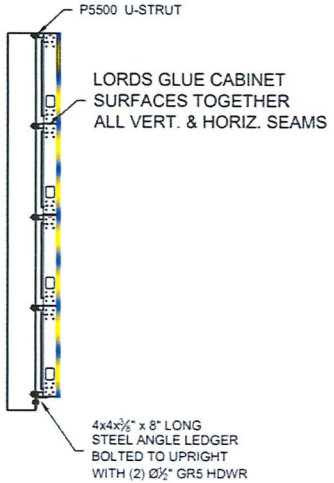
PART NUMBER 8x17 LT WT POSTER
APPROVALS
DWN REV/JC 07-2022
ENGRG UPDATED 11-14-22
CUSTOMER
DO NOT SCALE THIS DRAWING.

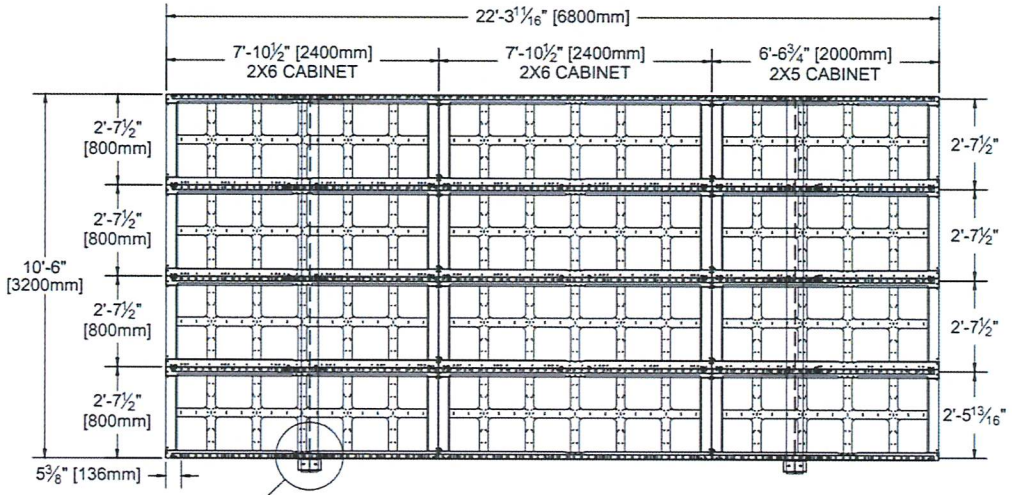
FORMETCO
2963 Pleasant Hill Rd. Duluth, GA 30096-3808
16.67mm FLT 192x408 LT WT POSTER LEDGER FABRICATION

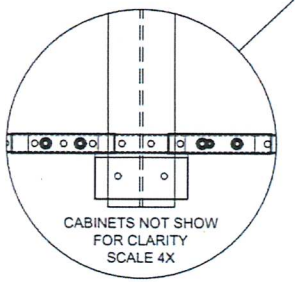
SIZE B | SCALE 1:40 | DWG NO. B-3540 | SH 3 OF - | REV -

Maximum Pressure for Upright Spacing (est. by SolidWorks modeling-Case A)						
Upright Spacing		Cantilever Span		Max Pressure		
10.50	ft	5.90	ft	32	psf	
12.00	ft	5.15	ft	45	psf	
14.00	ft	4.15	ft	40	psf	
16.00	ft	3.15	ft	28	psf	









MOUNTING CONFIGURATION
(5) P5500 Unistrut (or equivalent)
@ top and bottom & each cabinet joint

ESTIMATED BASE ASSEMBLY WEIGHT
TWO UPRIGHTS @ VARIOUS CENTERS

HORIZONTAL FLT CABINETS.	1481.2#
MOUNTING U-STRUT/CLAMPS/HDWR.	317.2#
CONNECTORS AND LEDGERS	34.4#
SUPPLEMENTAL STEEL.	0.0#
TOTAL.	1833#

NOT FOR PERMIT

REV	DESCRIPTION	DATE	APPD
C	UPDATE MOUNTING AND WEIGHT (est. SOLIDWORKS)	9-9-22	RFW
B	UPDATE MOUNTING AND WEIGHT	8-31-22	RFW
A	UPDATE WEIGHT	8-29-22	RFW

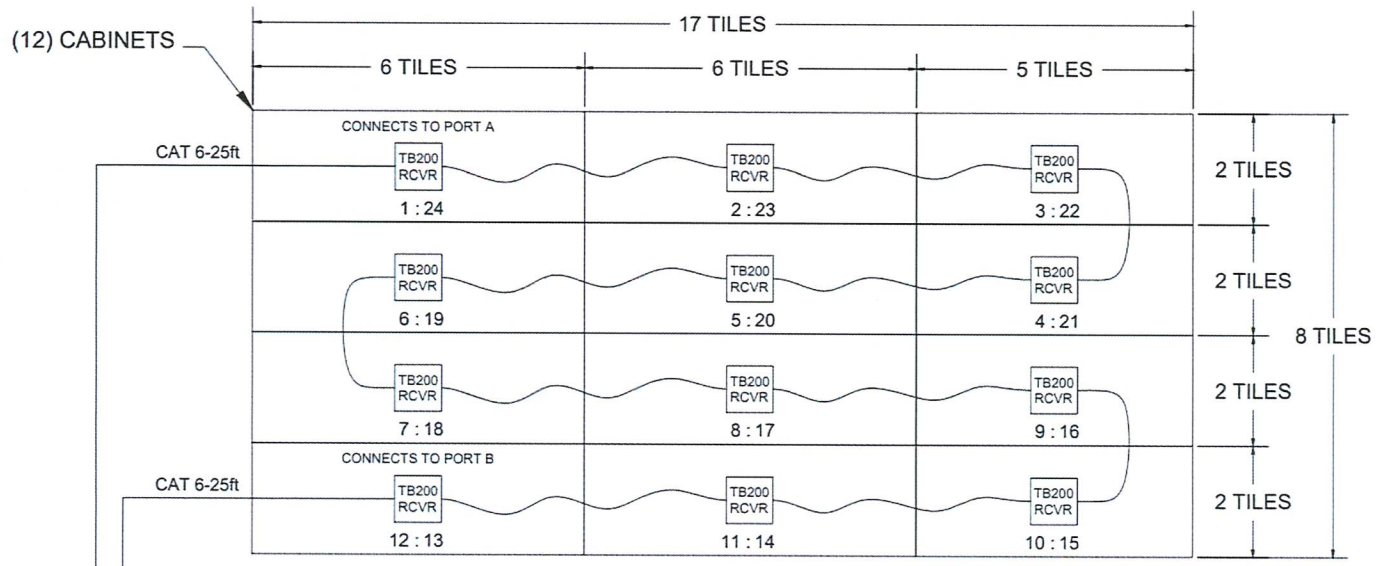
REVISIONS

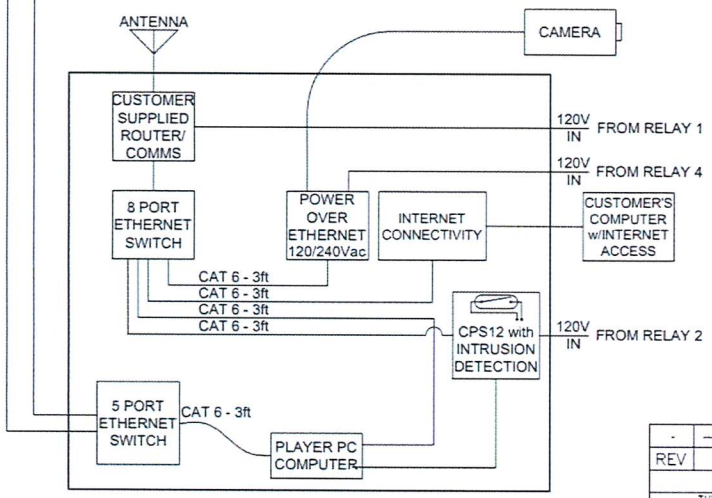
PART NUMBER 8x17 LT WT POSTER
APPROVALS
DWN RFW/JC 07-2022
ENGRG UPDATED 9-9-22
CUSTOMER
DO NOT SCALE THIS DRAWING

FORMETCO
2963 Pleasant Hill Rd. Duluth, GA 30096-3808

8x17 LIGHT WEIGHT LED POSTER MOUNTING CONCEPT I-BEAM CLAMPS

SIZE B | SCALE 1:40 | DWG NO. B-3484 | SH 1 OF - | REV. C





NOTE: CABINETS SHOWN AS VIEWED FROM THE REAR

CLEAR CHANNEL CUSTOM WIRING

REV	DESCRIPTION	DATE	APPD
	REVISIONS		

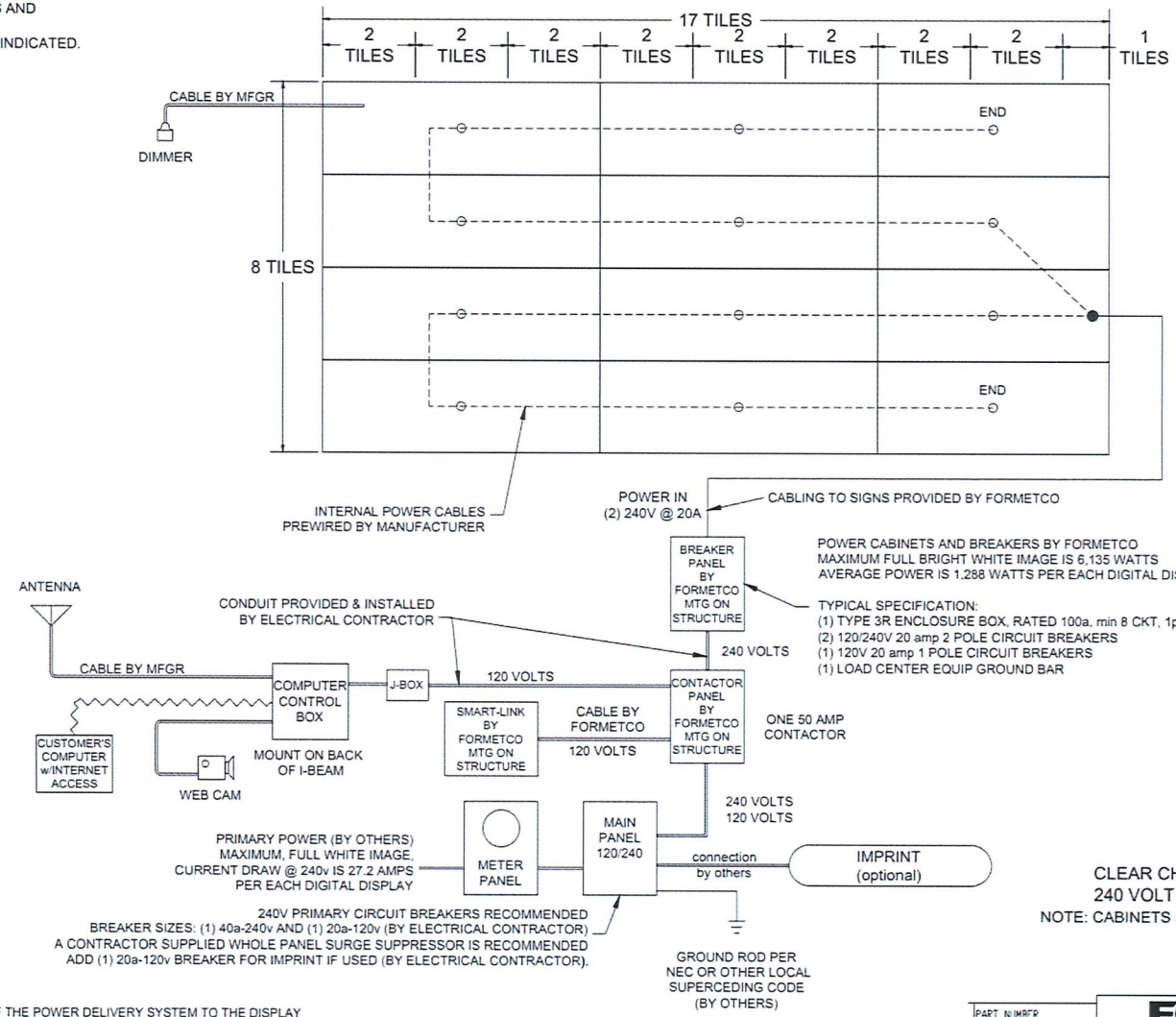
PART NUMBER 8x17 LT WT POSTER
APPROVALS
DWN RCW 11-2022
ENGRG UPDATED 11-11-22
CUSTOMER
DO NOT SCALE THIS DRAWING.

FORMETCO
2963 Pleasant Hill Rd. Duluth, GA 30096

FLT 192 x 408 - 16.67mm - D
LIGHT WEIGHT LED POST

SIZE B SCALE nts DWG NO. B-3498 SH 1 OF

POWER CABINET AND BREAKER REQUIREMENTS AND
AMPERAGE AND WATTAGE RATINGS SHOWN
ARE PER DIGITAL DISPLAY UNLESS OTHERWISE INDICATED.



CLEAR CHANNEL CUSTOM WIRING
240 VOLT SYSTEM SHOWN
NOTE: CABINETS SHOWN AS VIEWED FROM THE REAR

- FORMETCO IS NOT RESPONSIBLE FOR THE QUALITY OF THE POWER DELIVERY SYSTEM TO THE DISPLAY
- ALL DISPLAYS MUST BE GROUNDED PER ARTICLE 250 AND 600 OF THE NEC
- ALL ELECTRICAL WORK DONE MUST MEET OR EXCEED ANY LOCAL AND NATIONAL ELECTRICAL CODES
- THE OVER CURRENT PROTECTION DEVICE MUST BE MATCHED TO THE FAULT CURRENT THAT IS AVAILABLE IN THE POWER DELIVERY CIRCUIT.
- DUE TO THE INRUSH CURRENT CREATED BY THE DISPLAY ON STARTUP THE OVER CURRENT PROTECTION DEVICE(S) MAY HAVE TO BE OVERSIZED
- ALL PRIMARY FEEDER CIRCUITS TO THE DISPLAY MUST BE UL 489 LISTED
- ALL SPECIFICATIONS ARE SUBJECT TO CHANGE DUE TO FORMETCO'S CONTINUING PRODUCT IMPROVEMENT

REV	DESCRIPTION	DATE	APPD
-	------	-----	---

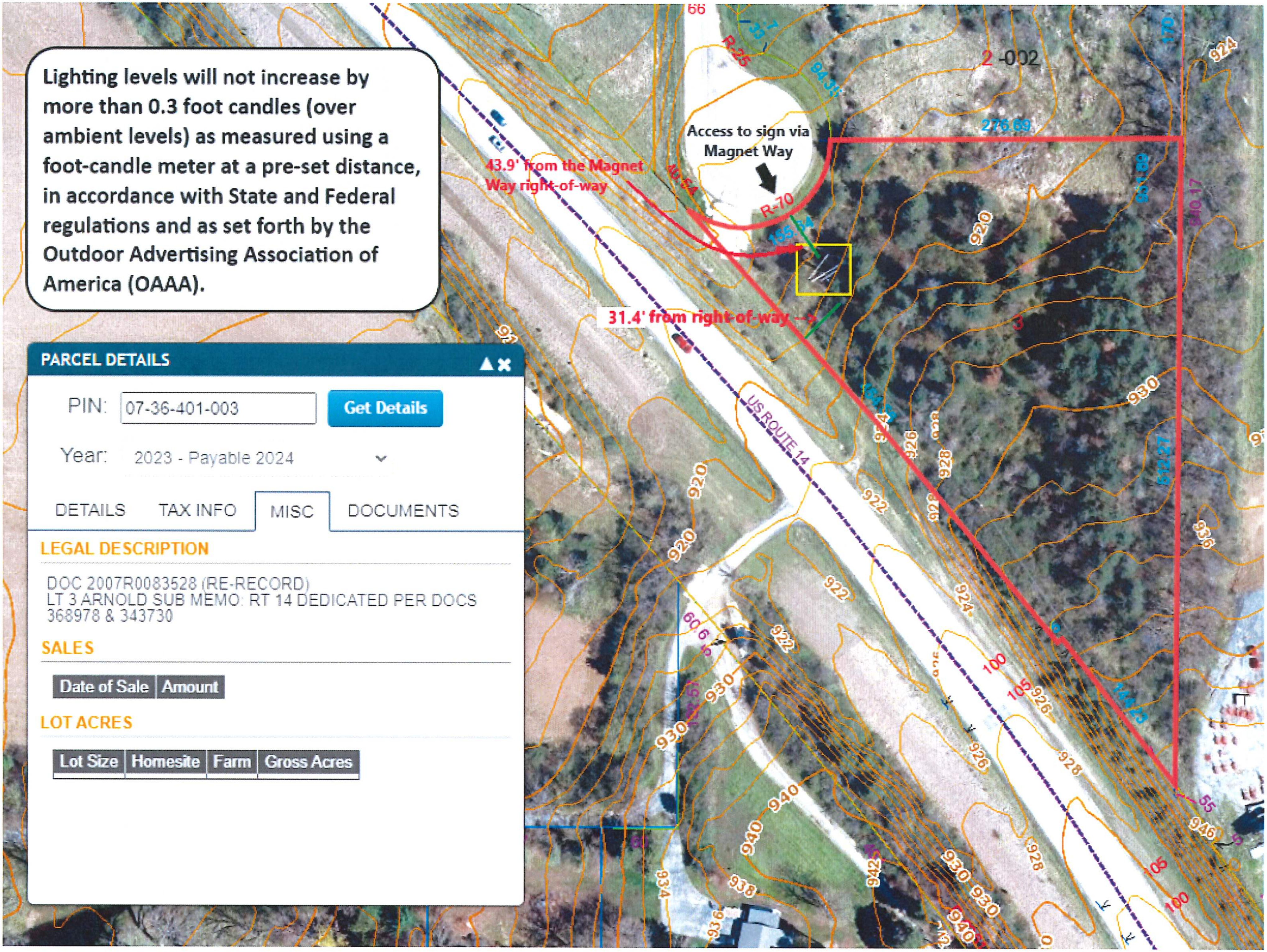
REVISIONS

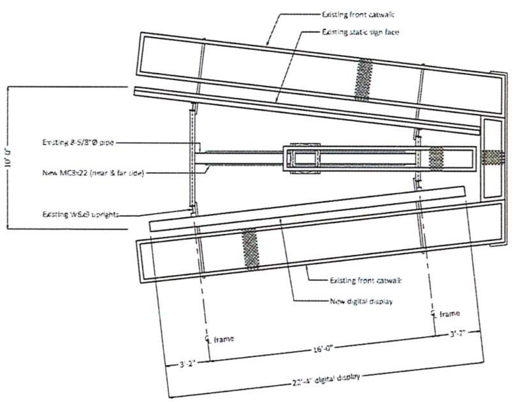
PART NUMBER 8X17 LT WT POSTER
APPROVALS
DWN REV 11-2022
ENGRG UPDATED 11-11-22
CUSTOMER
DO NOT SCALE THIS DRAWING.

FORMETCO
2963 Pleasant Hill Rd. Duluth, GA 30096-3808

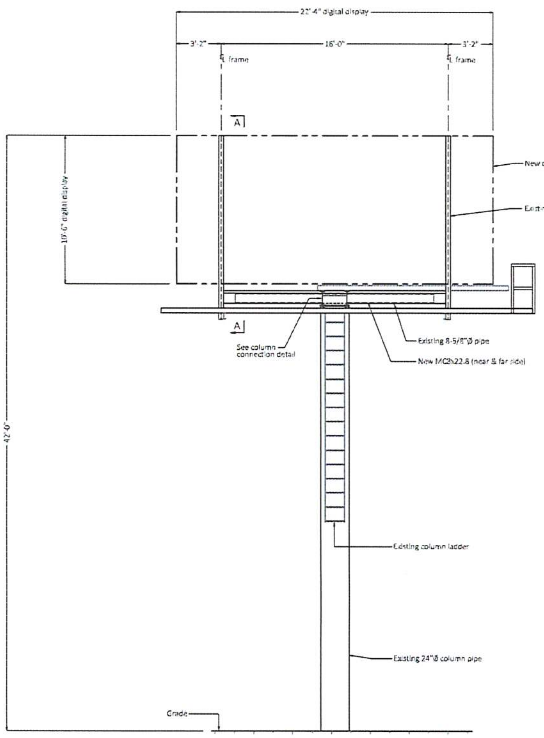
FLT 192 x 408 - 16.67mm - POWER
LIGHT WEIGHT LED POSTER

SIZE B | SCALE nts | DWG NO. B-3498 | SH 2 OF | REV -

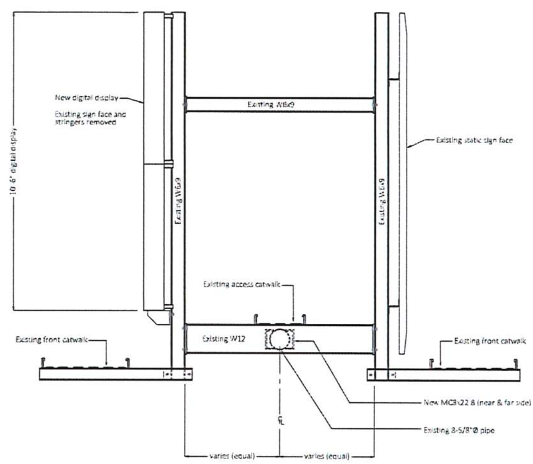

Lighting levels will not increase by more than 0.3 foot candles (over ambient levels) as measured using a foot-candle meter at a pre-set distance, in accordance with State and Federal regulations and as set forth by the Outdoor Advertising Association of America (OAAA).
Access to sign via Magnet Way
43.9' from the Magnet Way right-of-way
31.4' from right-of-way
US ROUTE 14
R-70
R-25
2 -002
3
276.69
155.34
PARCEL DETAILS
PIN: 07-36-401-003
Get Details
Year: 2023 - Payable 2024
DETAILS
TAX INFO
MISC
DOCUMENTS
LEGAL DESCRIPTION
DOC 2007R0083528 (RE-RECORD)
LT 3 ARNOLD SUB MEMO: RT 14 DEDICATED PER DOCS 368978 & 343730
SALES
Date of Sale
Amount
LOT ACRES
Lot Size
Homesite
Farm
Gross Acres



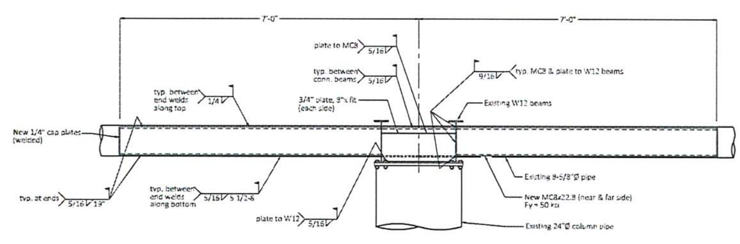
PLAN VIEW



SIGN FACE ELEVATION



SECTION A-A
FRAME DETAIL



COLUMN CONNECTION DETAIL

NOTES
- Structural design conforms to the 2018 International Building Code.
- Design standard is ASCE 7-16
- Scope of work is to replace existing sign faces with new stringerless digital displays weighing up to 1,880 lbs, each
- Existing sign faces and existing stringers are to be removed

WIND (For New Digital Display and its Installation)
- Design winds - 100 mph. (3 sec. gust) Exposure C
- Structure is classified risk category I.
- Wind importance factor - Iw = 1.0
- Design wind pressure is 20.8 p.s.f.

SEISMIC
- Seismic load importance factor: IE = 1.0
- Structure is classified occupancy category I.
- Mapped spectral response accelerations:
  - SS = 0.108 g
  - S1 = 0.056 g
- Site class : D
- Spectral response coefficients:
  - SDS = 0.116
  - SD1 = 0.093
- Seismic design category is B.
- Seismic basic force resisting system:
  - Non-buildings structure not similar to building - signs and billboards
- Design base shear : 0.50 kips
- Seismic response coefficient: Cs = 0.039
- Response modification factor : R = 3
- Analysis procedure used: Equivalent lateral force method

STEEL
- Structural steel channels shall conform to ASTM A992 or A572 grade 50
- Structural steel plate and angless shall conform to ASTM A36.
- Steel shall be primed and painted.
- Steel welding shall be in accordance with AWS standards.
- Steel members and elements of the structure shall be fabricated and erected according to the latest AISC specifications and standard practice.

GENERAL
- The contractor shall verify all dimensions and conditions in the field and notify the engineer of any discrepancies.
- Voss Structural Engineering, PLLC will not be supervising or monitoring the erection/installation of this structure

VOSS STRUCTURAL ENGINEERING, PLLC
7264 W Benton Dr, Frankfort, IL 60423
(815) 595-VOSS (8677)
IL FIRM NO 184-008800

LICENSED STRUCTURAL ENGINEER
FRANK T VOSS
081-006514
EXP 11/30/24
STATE OF ILLINOIS
5/22/24

DocuSigned by: Frank Voss 5/22/2024

This drawing has been digitally signed and sealed by Frank Voss on the date adjacent to the seal.
Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

ENGINEER		WY	CAD
ISSUE	DATE	REMARKS	
00	4-6-24	for approval	
01	4-11-24	revised	

CLEARCHANNEL OUTDOOR

DIGITAL DISPLAY FACE INSTALLATION
10'-6" x 22'-4"
MONOPOLE SIGN STRUCTURE
CENTER MOUNT 10'-V
42'-0" OVERALL HEIGHT
ROUTE 14 .6 MI. E/O ROUTE 320 NS
WOODSTOCK, ILLINOIS

VOSS NO. 23-017-574
DRAWING NO. 25-3786
SHEET S1 of S1

VOSS STRUCTURAL ENGINEERING, PLLC
7264 W Benton Dr, Frankfort, IL 60423
(815) 595-VOSS (8677)

CLIENT CLEAR CHANNEL
VOSS NO. 23-017-574
JOB 25-3786
DATE 3/28/2024 ENG. WY

IL FIRM NO 184-008800

LOCATION: RT 14, 0.6 MI E/O RT 320 NS
WOODSTOCK, IL

BUILDING CODE: 2018 INTERNATIONAL BUILDING CODE

WIND: 100 MPH, EXP "C," IW = 1
PER ASCE 7-16
RISK CATEGORY I PW = 20.8 PSF

SEISMIC: S_s = 0.108 g S_1 = 0.058 g
S_{DS} = 0.116 S_{D1} = 0.093
SC = D, SDC = B, CS = 0.039, V = CS*W = 0.50K

DESCRIPTION: ADD 2 DIGITAL FACES TO EXISTING BILLBOARD STRUCTURE

LICENSED STRUCTURAL ENGINEER
FRANK T. VOSS
081-006514
EXP 11/20/24
STATE OF ILLINOIS

5/22/24

DocuSigned by: Frank Voss
06A61EA841854CE...
5/22/2024

EX: 12X24.5, CM, 10' NOM V, 42' OAH
PROP: 10.5'X22.33', CM, 10' NOM V, 42'OAH

DESIGNED FOR INSTALLATION OF ONE OR TWO STRINGERLESS HEAVY FACES WEIGHING UP TO 1800# EACH

FRONT WALKS NOT TO BE REMOVED - NEEDED FOR ACCESS

NO REAR WALKS EXCEPT ACCESS WALK FROM COLUMN TO WALKAROUND

This drawing has been digitally signed and sealed by Frank Voss on the date adjacent to the seal.
Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

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DATE 3/28/2024 ENG. FV

Load Comparison of alterations to existing billboard structure

Building Code assumed at time of original construction: 2003 International Building Code
Current Building Code for new structures: 2018 International Building Code
Existing Building Code: 2018 Existing Building Code

Comparison using Code for New Structures as basis

	2018 IBC Loading						
	Existing	Proposed		Proposed			
		1 LED	% increase	2 LED	% increase		
Overall height	42	42		42			
Sign height (H)	12	12		12			
Sign width (W)	24.5	24.5		24.5			
Apron + extra	0.75	0.75		0.75			
Flag	0	0		0			
Offset (incl. face wt.)	0.2808196	0.55		0.27			
Head weight	7.16	8.63		9.29			
Natural frequency (f)	1.412	1.302		1.260			
Gust effect factor (G, Gf)	0.850	0.850		0.850			
Wind pressure (pw)	20.8	20.8		20.8			
Column 1 Fy	35	35		35			
Column 1 IC	0.959	0.974	1.62%	0.968	1.01%		
Torsion Fy	35	35		35			
Torsion IC	3.062	3.218	5.11%	3.193	4.30%		
Foundation Depth	15.0	15.0		15.0			
Foundation IC	1.008	1.018	1.02%	1.013	0.48%		

Loads on column and foundation are not increased more than 5% by this alteration, need not upgrade to meet new code for new structures.

Torsion pipe is significantly overstressed, provide reinforcement to torsion pipe to reduce stress due to proposed and future loads.

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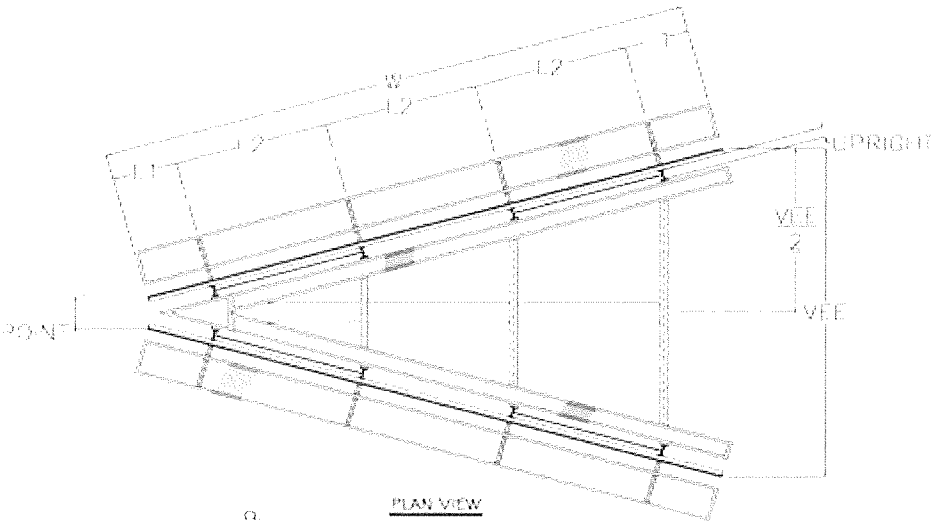
Overall Data Sheet

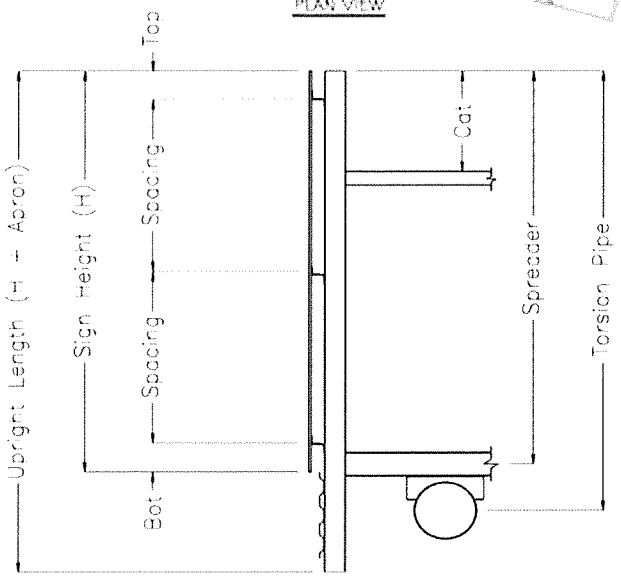
Location: Rt 14, 0.6 mi E/O Rt 320 NS, Woodstock, IL

Building Code:	2018 International Building Code		
Wind Code:	ASCE 7-16		
Wind Speed (V):	100 mph	3 Second Gust	ASIF = 1
Wind Exposure:	C		
Wind Importance (I_w):	1.00		
Max Overall Height:	42.0 ft		
Sign Height (H):	12.0 ft		
Sign Width (W):	24.5 ft		
Apron plus extra:	.75 ft		
Flag (CL face to CL column)	.0 ft		
Offset (CL torsion pipe to CL Column)	.0 ft		



Superstructure Layout

Cantilever (L1)	4.25 ft
Upright Spacing (L2)	16.0 ft
Point width (Point)	6.0 ft
Vee width (Vee)	11.0 ft
Upright (Upright)	30.0 in
Number of Uprights	2
Spreader	11.5 ft
Torsion Pipe	11.5 ft
Catwalk location (Cat)	3.75 ft
Top Stringer (Top)	.75 ft
Bot Stringer (Bot)	.25 ft
Number of stringers	3
Stringer Spacing (Spacing)	5.5 ft
Lat br spacing	11.0 ft



Various Other Data

Wall Thickness factor	0.93
Poff Multiplier	1
Xbracing locations	
Bay1	
X	

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Seismic Design Criteria

Building Code: 2018 International Building Code
Subsection: 1603.1.5 - Earthquake Design Data
ASCE Std: ASCE 7-16

1. Seismic importance Factor: I_E = **1.00**
   Risk Category (Table 1604.5): **I**

2. Mapped Spectral Response accelerations (From USGS Website):
   Lat: 42.3331 S_S **0.108 g**
   Long: -88.4782 S_1 **0.058 g**

3. Site Class: **D**

4. Spectral Response Coefficients:

S_{DS}	**0.116**	fv	**2.400**	2.4
S_{D1}	**0.093**	fa	**1.600**	1.6

5. Seismic Design Category: **B**
   S_{DS} S_{DC} A
   S_{D1} S_{DC} B

6. Basic Seismic Force Resisting System:
   Non-Building Structures Not Similar to Buildings - Signs and Billboards

7. Design Base Shear: $V = C_S * W$ = **0.50** kips **Wind Governs over Seismic**

8. Seismic Response Coefficient, C_S = **0.039**

9. Reponse Modification Factor (ASCE 7-16, Table 15.4-2)
   R = **3**

10. Analysis Procedure Used: **Equivalent Lateral Force Method**

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Seismic Design Calculations

Building Code: 2018 International Building Code
Subsection: 1603.1.5 - Earthquake Design Data

Site Coefficients, Fa, Fv

Site Coefficient, Fa	1.6 (interpolated from Table 11.4-1 in ASCE 7)	1.6
Site Coefficient, Fv	2.4 (interpolated from Table 11.4-2 in ASCE 7)	2.4

Natural Period of Structure

Ts	0.802 sec	T_L	12 sec	
Approximate Period, T_a	0.330 sec			
Upper Limit Coefficient, C_u	1.700 (interpolated from Table 12.8-1 in ASCE 7)			
Maximim period, T_{max}	0.561 sec			
T_{actual}	0.794 sec (from analysis, computer or by hand)		T=	0.794 sec
			T<=1.5 Ts	

Calculation of Seismic Response Coefficient

$C_s = S_{DS} / (R/I)$ =	0.0387	Equation 12.8-2
need not exceed $S_{DS} / (T (R/I))$=	0.0391	Equation 12.8-3
$C_{s\ min}$ =	0.03	Equation 15.4-1
If $S_1 \geq 0.6g$, $C_{s\ min} = 0.8\ S_1/(R/I)$ =	N/A	Equation 15.4-2

Governing C_s = 0.0387

Seismic W

Appx Head Weight =	10 kips
Appx Column Weight =	3 kips
W =	**13 kips**

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Wind Design Data

Building Code: 2018 International Building Code
Wind Code: ASCE 7-16
Wind Speed (V): 100 mph 3 Second Gust V_{ASD} 77 mph
Wind Exposure: C
Wind Importance (I_w): 1
Max Overall Height: 42.0 ft

Coefficients

Kz	1.054355	G	0.85
Kzt	1	Cf	1.780153
Kd	0.85	ω	1

LF 0.6

Load Cases to check
Load Case 1: Wind load applied at centroid of Sign area
Load Case 2: Wind load at 0.2*Sign Width from Centroid of Sign area
Figure 29.3-1, Footnote 3
Load Case 3: Case C Computed elsewhere

qs = 22.94 psf
pw = 20.83 psf
ω pw = 20.8 psf

Therefore, use 20.83 psf for design
with 1.00 ASIF (Allowable Stress Increase Factor)
(Ultimate pw = 34.7 psf)

Wind applied to computer model with torsion pipe along global X axis:

Wind Pressure perpendicular to sign Face

Sign face angle from Global X-Axis: 5.86 degrees
pz 20.7 psf
px 2.1 psf

Wind pressure, 60% perpendicular, 30% transverse (used sometimes to size crossbracing)
pz 13.1 psf
px 7.5 psf

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ASCE 7-05/ASCE 7-10/ASCE 7-16/ASCE 7-22 Wind Pressure Calculations

V, mph	100
OAH, ft	42
Exp	C
Kz	1.054355
Kzt	1
ortance Fa	1
	1.00
Kd	0.85
G	0.85
Cf	1.780153
ω	1
LF	0.6

q	22.94277
Design	20.82924
Pressure	20.82924

s/h	0.303571	0.303571	0.303571
B/s	1.921569	1.921569	1.921569
Cf	1.780153		
Cf(rounded to nearest	1		1.8

Supporting Tables and Calculations

Table 6-2 - Terrain Exposure Constants

Exposure	α	z_g (ft)	â	b hat	alpha bar	b bar	c	ℓ (ft)	eps bar	z min (ft)
B	7	1200	0.142857	0.84	0.25	0.45	0.3	320	0.333333	30
C	9.5	900	0.105263	1	0.153846	0.65	0.2	500	0.2	15
D	11.5	700	0.086957	1.07	0.111111	0.8	0.15	650	0.125	7

8.5

Cf, Case A and Case B

Clearance Ratio, s/h	Aspect Ratio, B/s											
	<0.05	0.1	0.2	0.5	1	2	4	5	10	20	30	>45
1	1.8	1.7	1.65	1.55	1.45	1.4	1.35	1.35	1.3	1.3	1.3	1.3
0.9	1.85	1.75	1.7	1.6	1.55	1.5	1.45	1.45	1.4	1.4	1.4	1.4
0.7	1.9	1.85	1.75	1.7	1.65	1.6	1.6	1.55	1.55	1.55	1.55	1.55
0.5	1.95	1.85	1.8	1.75	1.75	1.7	1.7	1.7	1.7	1.7	1.7	1.75
0.3	1.95	1.9	1.85	1.8	1.8	1.8	1.8	1.8	1.8	1.85	1.85	1.85
0.2	1.95	1.9	1.85	1.8	1.8	1.8	1.8	1.8	1.85	1.9	1.9	1.95
<.16	1.95	1.9	1.85	1.85	1.8	1.8	1.85	1.85	1.85	1.9	1.9	1.95

Cf, Case C

Region	Aspect Ratio, B/s									Region		
	2	3	4	5	6	7	8	9	10		13	>45
0 to s	2.25	2.6	2.9	3.1	3.3	3.4	3.55	3.65	3.75	0 to s	4	4.3
s to 2s	1.5	1.7	1.9	2	2.15	2.25	2.3	2.35	2.45	s to 2s	2.6	2.55
2s to 3s		1.15	1.3	1.45	1.55	1.65	1.7	1.7	1.85	2s to 3s	2	1.95
3s to 10s			1.1	1.05	1.05	1.05	1.05	1.05	0.95	3s to 4s	1.5	1.85
										4s to 5s	1.35	1.85
										5s to 10s	0.9	1.1
										>10s	0.55	0.55

Case C wind pressures

Region	Cf	pw
0 to s	0.000	0.00
s to 2s	0.000	0.00
2s to 3s	0.000	0.00
3s to 10s	0.000	0.00

Case B vs Case C

	p_{max}		P_{total}	Ecc Factor
B	34.78	psf	6.51 kips	0.2
C	0.00	psf	0.00 kips	#VALUE!
	Case B Governs		**Case B Governs**	**Design Ecc**
	#DIV/0!			0.2

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Detailed Deadload Takeoff

One Heavy Face

Side 1

	Number	Load	Area/Length	Total	Loc.	Mom.
Face	1	8	234.465	1876	4.25	8.0
Stringers	0	5.8	24.5	0	3.41	0.0
Clips	2	6.6	0.75	10	3.41	0.0
Uprights	2	9	12.75	230	3.00	0.7
Hangrail/lat brace	1	4.9	24.5	120	3.00	0.4
Front CW ledgers	2	6.7	5.70	76	6.09	0.5
Ledger Clips	4	4.9	0.42	8	3.00	0.0
Front CW stringers	2	5.8	34.17	396	6.09	2.4
Front CW grating	1	3	87.2	262	6.09	1.6
Apron	0	3	6.125	0	3.00	0.0
Rear CW stringers	2	5.8	27.9	324	0.00	0.0
Rear CW grating	1	3	51.9	156	0.00	0.0
Point Walkaround	0.5	130	1	65	5.00	0.3
Vee Walkaround	0	91	1	0	7.50	0.0
Handrails	1	8	16.5	132	0.00	0.0
Lights	0	50	1	0	9.09	0.0
				3654		13.9

Side 2

	Number	Load	Area/Length	Total	Loc.	Mom.
Face	1	3	294	882	4.25	3.7
Stringers	3	5.8	24.5	426	3.41	1.5
Clips	6	6.6	0.33	13	3.41	0.0
Uprights	2	9	12.75	230	3.00	0.7
Hangrail/lat brace	1	4.9	24.5	120	3.00	0.4
Front CW ledgers	2	6.7	5.70	76	6.09	0.5
Ledger Clips	4	4.9	0.42	8	3.00	0.0
Front CW stringers	2	5.8	34.17	396	6.09	2.4
Front CW grating	1	3	87.2	262	6.09	1.6
Apron	0	3	6.125	0	3.00	0.0
Rear CW stringers	0	5.8	27.9	0	1.75	0.0
Rear CW grating	0	3	51.9	0	1.75	0.0
Point Walkaround	0.5	130	1	65	5.00	0.3
Vee Walkaround	0	91	1	0	7.50	0.0
Handrails	1	8	16.5	132	1.75	0.2
Lights	1	50	1	50	9.09	0.5
				2661		11.8

Common

	Number	Load	Area/Length	Total	Loc.	Mom.
Upper Spreaders	2	9	5.51	99	0.00	0.0
End Plates	4	8	0.33	11	0.00	0.0
Lower Spreaders	2	16	5.51	176	0.00	0.0
End Plates	4	6.8	1.00	27	0.00	0.0
Moonbeams	0	16	0.00	0	0.00	0.0
Torsion Pipe	1	27.8	18	500	0.00	0.0
Ladders	1	8	12.75	102	0.00	0.0
X-bracing	4	1.5	18.78	113	0.00	0.0
Bolts	1	200	1	200	0.00	0.0
Safety system	3	50	1	150	0.00	0.0
Head Plate	0	61	4.34	0	0.00	0.0
Connection Beams	2	19.0	2.08	79	0.00	0.0
Box Plates	0	30.6	1.66	0	0.00	0.0
Gussets1	0	0.21	31.25	0	0.00	0.0
Gussets2	0	0.21	102.19	0	0.00	0.0
Misc	1	1000	1	1000	0.00	0.0
				2457		

Total Weight	8772	Net Moment (abs)	2.071492
Total Weight without faces	6014	Net Offset	0.236153

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Detailed Deadload Takeoff

Two Heavy Faces

Side 1

	Number	Load	Area/Length	Total	Loc.	Mom.
Face	1	8	234.465	1876	4.25	8.0
Stringers	0	5.8	24.5	0	3.41	0.0
Clips	2	6.6	0.75	10	3.41	0.0
Uprights	2	9	12.75	230	3.00	0.7
Hangrail/lat brace	1	4.9	24.5	120	3.00	0.4
Front CW ledgers	2	6.7	5.70	76	6.09	0.5
Ledger Clips	4	4.9	0.42	8	3.00	0.0
Front CW stringers	2	5.8	34.17	396	6.09	2.4
Front CW grating	1	3	87.2	262	6.09	1.6
Apron	0	3	6.125	0	3.00	0.0
Rear CW stringers	2	5.8	27.9	324	0.00	0.0
Rear CW grating	1	3	51.9	156	0.00	0.0
Point Walkaround	0.5	130	1	65	5.00	0.3
Vee Walkaround	0	91	1	0	7.50	0.0
Handrails	1	8	16.5	132	0.00	0.0
Lights	0	50	1	0	9.09	0.0
				3654		13.9

Side 2	Number	Load	Area/Length	Total	Loc.	Mom.
Face	1	8	234.465	1876	4.25	8.0
Stringers	0	5.8	24.5	0	3.41	0.0
Clips	2	6.6	0.75	10	3.41	0.0
Uprights	2	9	12.75	230	3.00	0.7
Hangrail/lat brace	1	4.9	24.5	120	3.00	0.4
Front CW ledgers	2	6.7	5.70	76	6.09	0.5
Ledger Clips	4	4.9	0.42	8	3.00	0.0
Front CW stringers	2	5.8	34.17	396	6.09	2.4
Front CW grating	1	3	87.2	262	6.09	1.6
Apron	0	3	6.125	0	3.00	0.0
Rear CW stringers	0	5.8	27.9	0	1.75	0.0
Rear CW grating	0	3	51.9	0	1.75	0.0
Point Walkaround	0.5	130	1	65	5.00	0.3
Vee Walkaround	0	91	1	0	7.50	0.0
Handrails	1	8	16.5	132	1.75	0.2
Lights	0	50	1	0	9.09	0.0
				3175		14.1

Common	Number	Load	Area/Length	Total	Loc.	Mom.
Upper Spreaders	2	9	5.51	99	0.00	0.0
End Plates	4	8	0.33	11	0.00	0.0
Lower Spreaders	2	16	5.51	176	0.00	0.0
End Plates	4	6.8	1.00	27	0.00	0.0
Moonbeams	0	16	0.00	0	0.00	0.0
Torsion Pipe	1	27.8	18	500	0.00	0.0
Ladders	1	8	12.75	102	0.00	0.0
X-bracing	4	1.5	18.78	113	0.00	0.0
Bolts	1	200	1	200	0.00	0.0
Safety system	3	50	1	150	0.00	0.0
Head Plate	0	61	4.33	0	0.00	0.0
Connection Beams	2	19.0	2.08	79	0.00	0.0
Box Plates	0	30.6	1.65	0	0.00	0.0
Gussets1	0	0.21	31.25	0	0.00	0.0
Gussets2	0	0.21	102.19	0	0.00	0.0
Misc	1	1000	1	1000	0.00	0.0
				2457		

Total Weight	9286	Net Moment (abs)	0.23155
Total Weight without faces	5535	Net Offset	0.024936

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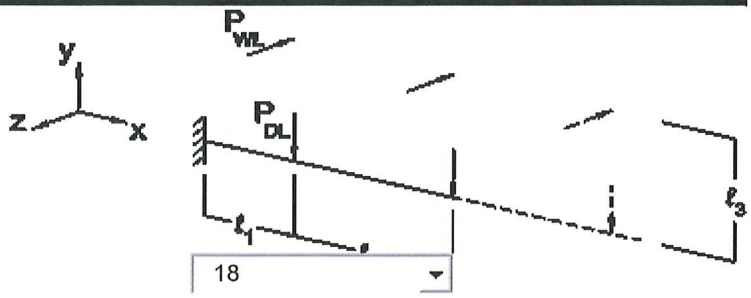
Torsion Pipe



Pr	-0.058	kips	(axial)
Mrx	33.593	ft-kips	(torsion)
Mry	41.399	ft-kips	(WL)
Mrz	45.669	ft-kips	(DL)
Mres	61.64037	ft-kips	
Vres	7.934681	kips	
IC Gov	3.213946		

LC 5
Member M42
Section 2

Pipe Properties

E (ksi)	Fy (ksi)	Diameter D (in)	Ins. Diam. D_1 (in)	Wall thickness t (in)	t_{eff} (in)	D/t	rad. of gyr. r (in)	Weight (lb/ft)
29000	35	8.625	8.04375	0.3125	0.290625	29.68	2.95	27.77

Area A (in^2)	I (ksi)	S (in^3)	Z (in^3)	J (in^4)	C (in^3)	Bending Compact?	Axial Compact?
7.61	66.2	15.3	20.2	132.3	30.7	Compact	Compact

λ_p bending 58.00 λ_r bending 256.86
λ_p axial - λ_r axial 91.14

Axial Checks

r_{eff} from above (in)	Length above (for r) (ft)	Length of this pipe (ft)	Total Length (ft)	r_{eff} (in)	K	Kl/r	Fe (ksi)
2.95	0	9	9	2.94842593	2.1	76.9224004	48.371782

Ω_c 1.67

Flexural buckling Limit State Q=1.0
Q=Qa ??

F_{cr} -35 ksi Ft -20.958084 ksi P_n/Ω_c = -159.4805 kips

Flexure

Ω_b 1.67 D/t max 372.857143

Applicable Limit States: Yielding,
Yielding "Fb" = 27.592814 ksi (= Fy/Ωb*Z/C) M_n/Ω_b = 35.271617 ft-kips
Local Buckling "Fb" =

Torsion and Shear

Shear yielding and shear buckling
Ω_v 1.67
F_{cr}/Ω_v = "Fv" = 12.5748503 $V_c = V_n/\Omega_v$ 47.84414 kips

Torsion
Ω_T 1.67
F_{cr}/Ω_T = "Fv_T" = 12.5748503 $T_c = T_n/\Omega_T$ 32.14836 ft-kips

Torsion pipe is overstressed without reinforcement. Provide reinforcement per following pages.

Identity Checks

H2
Pr/Pc 0.000364 Use H2-1 Axial Tension

H3:
Tr/Tc 1.04493674 Use checks Below
IC = 3.21394582

IC = 1.747955

DON'T USE 8.6" diam x 0.313" thick, Fy = 35 ksi

VOSS STRUCTURAL ENGINEERING, PLLC
7264 W Benton Dr, Frankfort, IL 60423
(815) 595-VOSS (8677)

CLIENT CLEAR CHANNEL
VOSS NO. 23-017-574
JOB 25-3786
DATE 28 MAR 2024 ENG. WV

11/16

TORSION PIPE REINFORCEMENT

Check channel reinforced torsion pipe with $F_y = 50$ ksi channels (T.P. $F_y = 35$ ksi)

Pipe alone: $\frac{M_n}{\Omega} = 35.27$ k-ft

Try MC8 × 22.8 channels → check for compactness:

$b = 8 - 2(0.525) = 6.95$ in. $\quad t = t_w = 0.427$ in. $\quad \} \; b/t = \frac{6.95}{0.427} = 16.28$

From table B4.1b in AISC 15, for flange cover plates: $\lambda_p = 1.12\sqrt{\frac{E}{F_y}}$

$\lambda_p = 1.12\sqrt{\frac{29000}{50}} = 26.97$

$26.97 > 16.28 \therefore$ MC8 × 22.8 is compact

FLEXURE

Channels alone:

$\frac{M_n}{\Omega} = \frac{F_y \cdot Z_{CH}}{\Omega}$ where $Z_{CH} = 2(6.7) \cdot 3.66\text{in} = 49.04\ \text{in}^3$

$Z_{eff} = 20.2 + 49.04 = 70\ \text{in}^3$

$= \frac{50 \cdot 49.04}{1.67} = 1468.38$ k-in OR 122.37 k-ft

Use pipe reqd strength for torsion & axial loads $\quad IC = \left(\frac{P_r}{P_c} + \frac{M_r}{M_c}\right) + \left(\frac{V_r}{V_c} + \frac{T_r}{T_c}\right)^2 \le 1.0$

$\therefore \; IC_{CHANNEL} = \frac{0.724}{325} + \frac{75.76}{(35.27 + 122.37)} + \left(\frac{6.79}{132} + \frac{28.09}{45}\right)^2$

$IC_{CHANNEL} = 0.939 \quad \therefore$ o.k.

For torsion pipe: $f_b = \frac{M \cdot c}{I_{YG}} = \frac{75.76\ \text{k-ft} \cdot 12\ \text{in/ft} \cdot 8.625\ \text{in}/2}{282\ \text{in}^4} = 13.90$ ksi

$F_b = 27.59$ ksi

$IC_{TP} = \frac{0.724}{325} + \frac{13.90}{27.59} + \left(\frac{6.79}{132} + \frac{28.09}{45}\right)^2 = 0.963 \quad \therefore$ o.k.

USE MC8 × 22.8 CHANNELS @ $F_y = 50$ ksi TO REINFORCE EXISTING 8" STD PIPE w/ reinforcement, pipe meets new code

CHECK w/ RISA ANALYSIS RESULTS

LC5, TOR2 (between conn. beams)

$Z = 2(6.7) \cdot 2.75 = 36.85\ \text{in}^3$

$\frac{M_n}{\Omega} = \frac{50\text{ksi} \cdot 36.85\text{in}^3}{1.67} = 1103.3$ k-in OR 91.94 k-ft

$IC_{CHANNEL} = \frac{0.058}{440} + \frac{61.64}{35.27 + 91.94} + \left(\frac{7.93}{132} + \frac{33.59}{45}\right)^2$

$IC_{CHANNEL} = 1.13$

IC_{pipe}: $f_b = \frac{61.64 \cdot 12 \cdot 4.3125}{299} = 13.07$ ksi

$IC_{pipe} = \frac{0.058}{440} + \frac{13.07}{27.59} + \left(\frac{7.93}{132} + \frac{33.59}{45}\right)^2 = 1.12$

significantly Reduced

USE MC8 × 22.8 CHANNELS @ $F_y = 50$ ksi AS REINFORCEMENT

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7264 W Benton Dr, Frankfort, IL 60423
(815) 595-VOSS (8677)

CLIENT CLEAR CHANNEL
VOSS NO. 23-017-574
JOB 25-3786
DATE 3/28/2024 ENG. WY

Steel Channel Reinforcement of Pipes

Pipe Properties

Diameter	8.625	in	A	7.61	in^2	J	132.3 in^4
tnom	0.3125	in	I	66.2	in^4	C	30.7 in^3
tdes	0.291	in	S	15.3	in^3	A_0	54.56 in^2
E	29000	ksi	Fy	42	ksi	D/t	27.6
λ_p bending	48.33	λ_r bending	214.05	λ_p axial	-	λ_r axial	75.95
Bending Compact?	Compact		Axial Compact?				

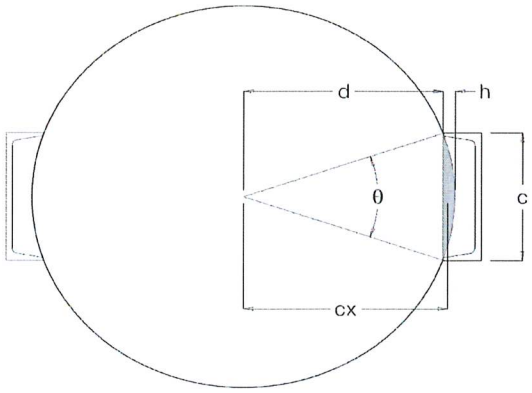
Channel Properties

MC8X22.8

A	6.7 in^2	d	8 in	tw	0.427 in
Ix	63.8 in^4	bf	3.5 in	tf	0.525 in
Iy	7.01 in^4	x	1.01 in		

Circular Segment properties at intersection of channel

c	8 in	$\theta_{channel}$	2.38 rad
d	1.61 in	h	2.70 in
cx	2.73 in	$A_{segment}$	13.45783 in^2



Properties of Channel with respect to pipe

$c_{channel-x}$ 4.10 in (max distance of CG)

Loads acting on Pipe

Pr	-0.058 kips	(axial)	
Mrx	33.593 ft-kips	(torsion)	
Mry	41.399 ft-kips		
Mrz	45.669 ft-kips		
Mres	61.64037 ft-kips	α_{loads}	0.834 rad (from y-axis)
Vres	7.934681 kips		47.81 degrees (from y-axis)

Full Composite Action

Pipe Allowables

Fa	-20.96 ksi	Fb	27.59 ksi	Fv	12.57 ksi
Pc	-440 kips	Vc	132 kips	Tc	45 ft-kips
Mc	88 ft-kips	T/Tc	0.751	IC	1.360
		$Ic_{no\ tors}$	0.706	IC_{tors}	1.360

See previous pages for code check with 50ksi channels for the 35ksi pipe

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CLIENT CLEAR CHANNEL
VOSS NO. 23-017-574
JOB 25-3786
DATE 3/28/2024 ENG. WY

13/16

Channel Location Worksheet

Symmetrical Channel Locations
Neutral axis is located at the center of the pipe
Number of channels 2

Description: 2 channels on z
r ≡ radius to centroid of channel
θ ≡ Angle from y-axis to centroid, rad

Locations of channels with respect to local pipe axes:

Channel	r	θ	$A_{channel}$	y	z	I_0y	I_0z	I_0yz
1	4.10	1.57	6.7	0.00	4.10	7.0	63.8	0.0
2	4.10	4.71	6.7	0.00	-4.10	7.0	63.8	0.0

Centroid of combined shape

y' 0.00 in
z' 0.00 in

Properties of combined shape with respect to local pipe axes and centroid of combined shape

A 21.01 in^2 Iz_{CG} 194 in^4 A_0 73.4 in^2
Izy_{CG} 0 in^4 Iy_{CG} 306 in^4

Locations of channels with respect to Mres:

Channel	r	θ	$A_{channel}$	y	z	I_0y	I_0z	I_0yz
1	4.10	2.41	6.7	-3.04	2.75	38.2	32.6	28.3
2	4.10	5.55	6.7	3.04	-2.75	38.2	32.6	28.3

Centroid of combined shape

y' 0.00 in
z' 0.00 in

Properties of combined shape with respect to local pipe axes and centroid of combined shape

A 21.01 in^2 Iz_{CG} 255 in^4 A_0 73.4 in^2
Izy_{CG} -56 in^4 Iy_{CG} 244 in^4 Iadd

Finding maximum distances from Mres axis Zeff

Channel	θtop	θbot	ytop	ztop	ybot	zbot	Jeff
1	3.59	1.217432	-6.47373	0.469567	-1.10076	6.396722	
2	6.73	4.359024	6.473734	-0.46957	1.100762	-6.39672	

Section Properties of Combined Shape

Sy 38.2 in^3 Sz 39.41406 in^3

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CLIENT CLEAR CHANNEL
VOSS NO. 23-017-574
JOB 25-3786
DATE 3/28/2024 ENG. WY

Channel Welding Worksheet

8.625" x 0.3125" with 2 - MC8X22.8 Channels

Loads due to bending

Q	20.4 in^3		I_{net}	244 in^4	
V_{res}	7.93 kips		q_b	0.66	k/in total
	each weld:		q_b	0.33	k/in each weld

Loads due to torsion

M_{tors}	33.59 ft-kips	q_t	2.75	k/in each weld
A_o	73.42 in^2			

Total loads on intermittant welds: q_{tot} 3.08 k/in total

Weld size	**0.31**	**in fillet**
Weld spacing	**8**	**in o.c.**
Length req'd	**5.304006**	**in long**

Use 0.3125" welds, 5.5" long, 8" o.c.

End Welds:

M_{tors}	62 ft-kips		
T Max	61.7 kips/channel	q_t	2.75 k/in each weld

Weld size	**0.31**	**in fillet**		
Weld Length	**19**	**in**		
Weld size req'd	**0.294218**	**in long**	0.94	Accept

Use 0.3125" Fillet welds, 19" long at each end

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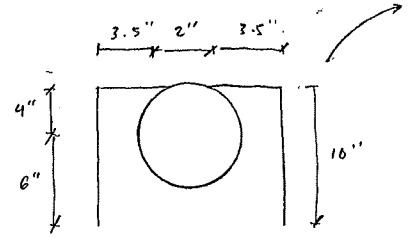
CLIENT CLEAR CHANNEL OUTDOOR
VOSS NO. 23-017-574
JOB 25-3786
DATE 28 MAR 2024 ENG. WY

15/16

WELD @ CONNECTION BEAMS

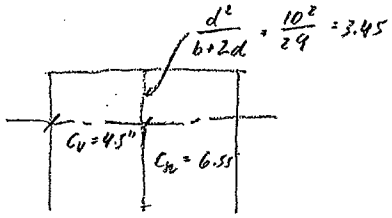


TWISTING → M_{TX} (torsion) = 33.59 ft-k

$$J_w = \frac{(b+2d)^3}{12} - \frac{d^2(b+d)^2}{b+2d}$$

$$J_w = \frac{(9+20)^3}{12} - \frac{10^2(9+10)^2}{29}$$

$$J_w = 787.59\ in^3$$



$$f_H = \frac{33.59\ ft\text{-}k \cdot 12 \cdot 6.55\ in}{787.59\ in^3} = 3.35\ k/in$$

$$f_V = \frac{33.59\ ft\text{-}k \cdot 12 \cdot 4.5\ in}{787.59\ in^3} = 2.303\ k/in$$

$$f_{SV} = \frac{V}{A} = \frac{7.93k}{9+2(10)\ in} = 0.273\ k/in$$

$$f_r = \sqrt{f_H^2 + (f_V + f_{SV})^2}$$

$$f_r = 4.23\ k/in$$

BENDING — from sheet

$f = \frac{M_z}{S_w}$ where $S_w = \frac{2bd+d^2}{3}$

$S_w = 93.33$

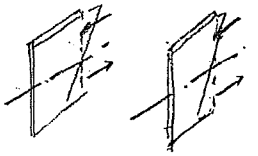
$$f = \frac{45.669\ ft\text{-}k \cdot 12\ in/ft}{93.33\ in^2}$$

$f = 5.87\ k/in$

$$w = \frac{4.23\ k/in}{11.2\ k/in} = 0.377 \rightarrow$$ USE 7/16" OR 1/2" FILLET ALL AROUND ~~X~~

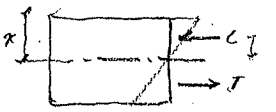
$$w = \frac{5.87}{11.2} = 0.524 \rightarrow$$ USE 9/16" FILLET WELD ALL AROUND ← governs

SIZING OF PLATE



$M_z = 45.669\ ft\text{-}k$

$F_y = 36\ ksi$



$$C = T = \frac{45.669\ ft\text{-}k \cdot 12\ in/ft}{2/3\ x} \div 2\ plates$$

if $F_y = 36\ ksi$ then

$$F_y = \frac{T}{A} = \frac{T}{t \cdot x} \quad \text{where } t = 0.75"$$

$$36\ ksi = \frac{45.669\ ft\text{-}k \cdot 12\ in/ft}{0.75x \cdot 2/3\ x \cdot 2}$$

$$x^2 = \frac{45.669 \cdot 12}{0.75 \cdot 2/3 \cdot 2 \cdot 36}$$

$x^2 = 15.223 \rightarrow x = 3.9\ in \sim 4\ in$

total lt of PL is $2x = 8"$

USE (2) 0.75" thick x 8" PL in between conn. beams for transfer of loads.

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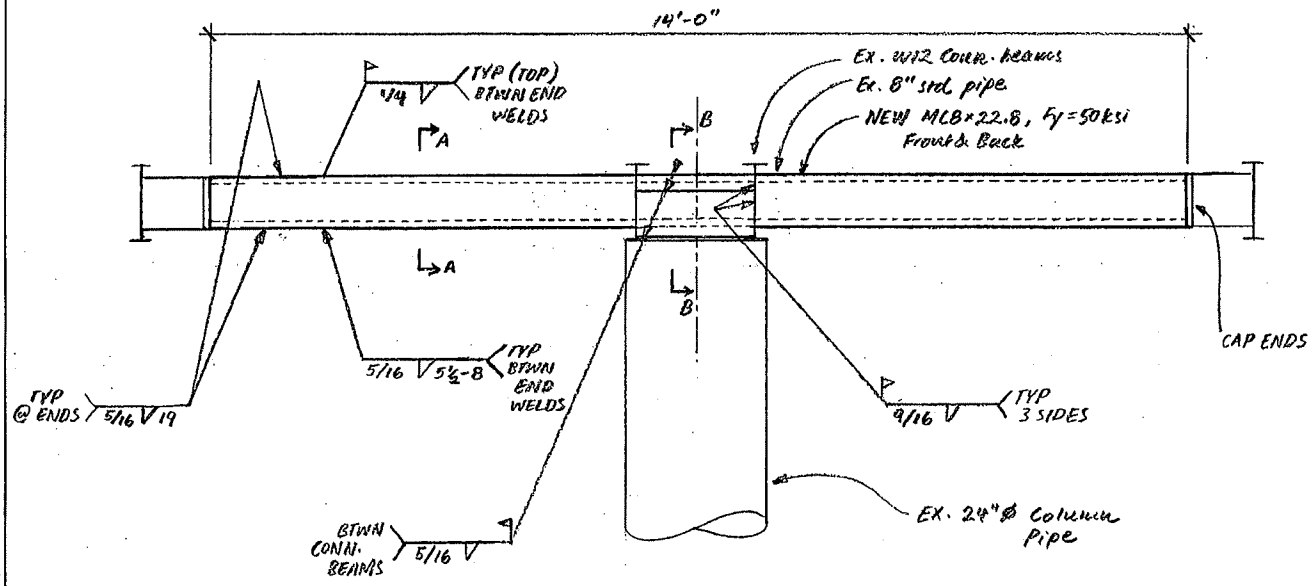
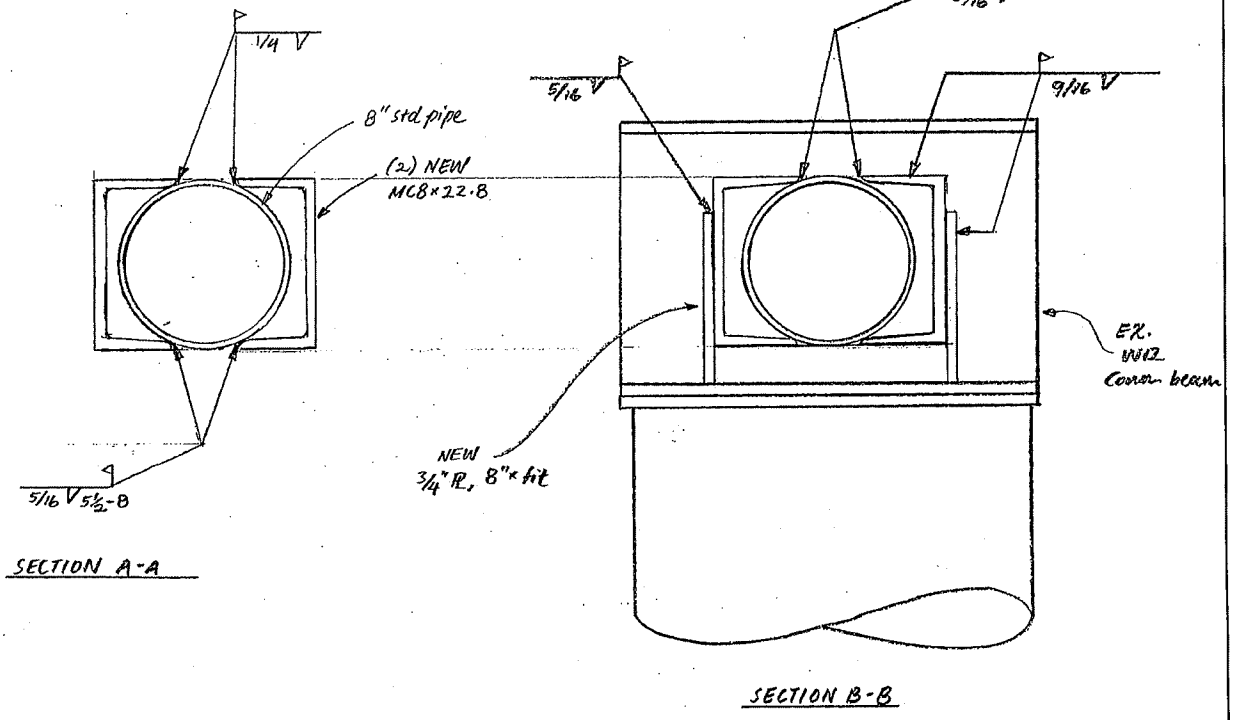
CLIENT CLEAR CHANNEL
VOSS NO. 23-017-574
JOB 25-3786
DATE 28 MAR 2024 ENG. WY 16/16
p. 3 of 3



ELEVATION : TORSION PIPE REINFORCEMENT



SECTION A-A

SECTION B-B

McHenry County
Department of Planning & Development
2200 North Seminary Ave.
Woodstock, IL 60098
plandev@mchenrycountyil.gov
815.334.4560

MCH
MCHENRY COUNTY · IL

Panel 5508

September 21, 2023

Nataliya Govdyak
Real Estate Representative
Clear Channel Outdoor
4000 South Morgan St
Chicago, IL 60609-2581

RE: P.I.N.# 07-36-401-003

Dear Ms. Govdyak,

In response to your inquiries:

1) That the above-described land parcel is currently located within the unincorporated limits of McHenry County.

Yes, the parcel identified above is within the unincorporated limits of McHenry County.

2) The current County zoning classification of the above-described land parcel.

The parcel identified above is currently zoned I-1, Light Industrial District.

Sincerely,

Anna Kurtzman

Anna B. Kurtzman, Senior Planner
Planning & Zoning Department
Office: 815-334-4560 | Direct: 815-334-4215 | ABKurtzman@mchenrycountyil.gov

McHENRY Co.
ILLINOIS

McHENRY COUNTY ILLINOIS

KEY INFO - Please Review

You can pay by electronic check, debit card, or credit card up until midnight on November 16, 2023. Cash or check payments can still be made in our office ***IN PERSON*** until 5pm November 17 at 2100 N. Seminary Avenue, Woodstock. Office hours are 7:30am to 5pm.

Property Information

arcel Number
07-36-401-003

ax Year
2022 (Payable 2023)

ale Status
None

Site Address
500 MAGNET WAY
WOODSTOCK, IL 60098

Owner Name & Address
JGA GLA LLC

operty Class
0080 - Industrial

Tax Code
07002 -

Tax Status
Taxable

et Taxable Value
43,216

Tax Rate
8.885091

Total Tax
$3,839.78

Tax Bill

ownship
HARTLAND TWP

Acres
0.0000

Mailing Address
ARNOLD, JEFFREY
P O BOX 1490
WOODSTOCK, IL, 60098-1490

egal Description
DOC 2007R0083528 (RE-RECORD) LT 3 ARNOLD SUB MEMO: RT 14 DEDICATED PER DOCS 368978 & 343730

Assessments

Level	Homesite	Dwelling	Farm Land	Farm Building	Mineral	Total
DOR Equalized	43,216	0	0	0	0	43,216
Department of Revenue	43,216	0	0	0	0	43,216
Board of Review Equalized	43,216	0	0	0	0	43,216
Board of Review	43,216	0	0	0	0	43,216
S/A Equalized	43,216	0	0	0	0	43,216
Supervisor of Assessments	38,769	0	0	0	0	38,769
Township Assessor	38,769	0	0	0	0	38,769
Prior Year Equalized	38,769	0	0	0	0	38,769

here are 8 levels of assessments in an assessment year. The assessed value is not final for the year until all levels of asessment are complete. The assessment ear is complete when the DOR Equalized line appears at the top of the list shown above.

Billing

Installment	Date Due	Tax Billed	Penalty Billed	Cost Billed	Drainage Billed	Total Billed	Amount Paid	Date Paid	Total Unpaid
1	06/12/2023	$1,919.89	$0.00	$0.00	$0.00	$1,919.89	$1,919.89	6/8/2023	**$0.00**
2	09/12/2023	$1,919.89	$0.00	$0.00	$0.00	$1,919.89	$1,919.89	9/6/2023	**$0.00**
Total		**$3,839.78**	**$0.00**	**$0.00**	**$0.00**	**$3,839.78**	**$3,839.78**		**$0.00**

No Drainage / Special District Information

No Farmland Information

No Forfeiture Information

Parcel Genealogy

Relationship	Parcel Number	Action	Year	Change Effective Year	Completed
Parent Parcel	0736400021	N		2005	Yes

Parcel Owner Information

Name	Tax Bill	Address
JGA GLA LLC	N	

No Redemptions

No Sales History Information

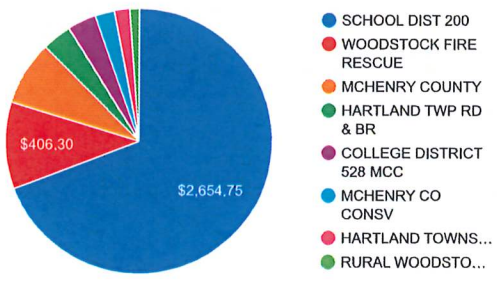
Payment History

Tax Year	Total Billed	Total Paid	Amount Unpaid
2022	$3,839.78	$3,839.78	$0.00
2021	$3,574.82	$3,574.82	$0.00
2020	$3,578.88	$3,578.88	$0.00

Show 15 More

Taxing Bodies

District	Tax Rate	Extension
SCHOOL DIST 200	6.142990	$2,654.75
WOODSTOCK FIRE RESCUE	0.940172	$406.30
MCHENRY COUNTY	0.698158	$301.73
HARTLAND TWP RD & BR	0.315449	$136.32
COLLEGE DISTRICT 528 MCC	0.306028	$132.25
MCHENRY CO CONSV	0.212478	$91.82
HARTLAND TOWNSHIP	0.164981	$71.30
RURAL WOODSTOCK LIBRARY	0.104835	$45.31
TOTAL	**8.885091**	**$3,839.78**



Make Check Payable to: *McHENRY COUNTY COLLECTOR*
Remit payment to: *P.O. Box 458, Crystal Lake, IL 60039-0458*
or pay on-line at: treasurer.mchenrycountyil.gov

Parcel Number / PIN: **07-36-401-003**

1st 2022

****DUPLICATE****

ARNOLD JEFFREY
P O BOX 1490
WOODSTOCK IL 60098-1490

1ST INSTALLMENT FOR 2022	$1,919.89
PENALTY	
INSTALLMENT AMOUNT PAID	$1,919.89
INSTALLMENT BALANCE DUE	$0.00
DUE BY 06/12/2023	

☐ CHECK HERE IF CHANGING ADDRESS ON THE BACK

INCLUDE THIS COUPON WITH YOUR PAYMENT

16962

07364010030000000000014

Donna Kurtz - McHenry County Treasurer
Make Check Payable to: *McHENRY COUNTY COLLECTOR*
Remit payment to: *P.O. Box 458, Crystal Lake, IL 60039-0458*
or pay on-line at: treasurer.mchenrycountyil.gov

Parcel Number / PIN: **07-36-401-003**

2nd 2022

****DUPLICATE****

ARNOLD JEFFREY
P O BOX 1490
WOODSTOCK IL 60098-1490

2ND INSTALLMENT FOR 2022	$1,919.89
PENALTY	
INSTALLMENT AMOUNT PAID	$1,919.89
INSTALLMENT BALANCE DUE	$0.00
DUE BY 09/12/2023	

☐ CHECK HERE IF CHANGING ADDRESS ON THE BACK

INCLUDE THIS COUPON WITH YOUR PAYMENT

07364010030000000000026

Taxing Body		Rate	Percent	Tax This Year	Tax Last Year
ENRY COUNTY		0.625255	7.04	$270.22	$255.03
ENRY COUNTY	PENSION	0.072903	0.82	$31.51	$30.48
ENRY CO CONSV		0.212478	2.39	$91.82	$86.05
EGE DISTRICT 528 MCC		0.305922	3.44	$132.20	$127.77
EGE DISTRICT 528 MCC	PENSION	0.000106	0.00	$0.05	$0.04
OL DIST 200		5.883196	66.21	$2,542.47	$2,352.71
OL DIST 200	PENSION	0.259794	2.92	$112.28	$109.46
DSTOCK FIRE RESCUE		0.778757	8.76	$336.54	$310.30
DSTOCK FIRE RESCUE	PENSION	0.161415	1.82	$69.76	$61.20
L WOODSTOCK LIBRARY		0.104835	1.18	$45.31	$41.79
LAND TOWNSHIP		0.164981	1.86	$71.30	$70.71
LAND TWP RD & BR		0.315449	3.55	$136.32	$129.28
Totals		**8.885091**		**$3,839.78**	**$3,574.82**

PARCEL NUMBER / PIN 16962

07-36-401-003

Late Payment Schedule

	1ST	2ND
06/13 - 07/12	1,948.69	
07/13 - 08/12	1,977.49	
08/13 - 09/12	2,006.29	
09/13 - 10/12	2,035.08	1,948.69
10/13 - 11/12	2,063.88	1,987.49
11/13 - 11/17	2,092.68	2,016.29

2022 Property Tax Bill

Assessed to:
JGA GLA LLC

Mail to:
ARNOLD JEFFREY
P O BOX 1490
WOODSTOCK IL 60098-1490

Property location:
500 MAGNET WAY
WOODSTOCK, IL 60098

Legal Description:
DOC 2007R0083528 (RE-RECORD)
LT 3
ARNOLD SUB

MEMO: RT 14 DEDICATED
PER DOCS 368978 & 343730

Township: HA	Tax Code: 07002	Property Class: 0080
Sub Lot:	Acres:	Back Taxes: NO

1st Installment	2nd Installment
$1,919.89	$1,919.89
Paid on 06/08/2023	Paid on 09/06/2023

Fair Cash Value	129,660
S/A Value	38,769
S/A Multiplier X	1.1147
S/A Equalized Value =	43,216
Brd. of Review Value	43,216
Brd. of Review Mulitplier X	1.0000
Brd. of Review EQ Value =	43,216
Home Improv./Vet Exemptions -	0
State Multiplier X	1.0000
State Equalized Value =	43,216
Farmland and Bldgs. Value +	0
Total Amt. Prior to Exemptions =	43,216
Annual Homestead Exemptions -	0
Sr. Freeze Abated Amount -	0
Senior Homestead Exemption -	0
Disabled Vet Homestead Ex -	0
Disabled Person Exemption -	0
Returning Veteran Exemption -	0
Net Taxable Amount =	43,216
Local Tax Rate X	8.885091
Total Current Year Tax Due =	**$3,839.78**

IRST PAYMENT RECEIVED

1

SECOND PAYMENT RECEIVED

2