

**COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION**

In the Matter of:

THE APPLICATION OF)
NEW CINGULAR WIRELESS PCS, LLC,)
A DELAWARE LIMITED LIABILITY COMPANY,)
D/B/A AT&T MOBILITY)
FOR ISSUANCE OF A CERTIFICATE OF PUBLIC) CASE NO.: 2021-00187
CONVENIENCE AND NECESSITY TO CONSTRUCT)
A WIRELESS COMMUNICATIONS FACILITY)
IN THE COMMONWEALTH OF KENTUCKY)
IN THE COUNTY OF HICKMAN)

SITE NAME: INGRAM BARGE

* * * * *

**NOTICE OF REDUCTION IN HEIGHT OF APPROVED WIRELESS
COMMUNICATIONS TOWER TO COMPLY WITH REGULATORY REQUIREMENTS**

On July 7, 2021, the Kentucky Public Service Commission ("PSC") issued a Certificate of Public Convenience and Necessity ("CPCN") to New Cingular Wireless PCS, LLC, a Delaware limited liability company, d/b/a AT&T Mobility ("Applicant") to construct a tower not to exceed 199' in height, with attached antennas at 112 Bottery Road, Columbus, Hickman County, Kentucky (North Latitude 36° 45' 35.679142" by West Longitude 89° 06' 36.912318"). After receiving approval of the CPCN and in order to receive applicable approvals from the State Historic Preservation Office the Applicant has revised the proposed tower design to reduce the overall tower height from 199' to 170' (a 165' tall tower with a 5' lightning arrestor). A revised version of the Site Development Plan filed as part of **Exhibit B** of the original application is attached as **Revised Exhibit B**. The Tower and Foundation Design filed as **Exhibit C** of the original

application has also been revised accordingly, and is attached as **Revised Exhibit C**.

Both revised Exhibits depict the revised, lower tower height and comply with the CPCN issued on July 7, 2021.

WHEREFORE, Applicant respectfully request that the PSC accept the foregoing filing and include it as part of the administrative record for this site.

Respectfully submitted,



David A. Pike
Pike Legal Group, PLLC
1578 Highway 44 East, Suite 6
P. O. Box 369
Shepherdsville, KY 40165-0369
Telephone: (502) 955-4400
Telefax: (502) 543-4410
Email: dpike@pikelegal.com
Attorney for New Cingular Wireless PCS, LLC
d/b/a AT&T Mobility

LIST OF EXHIBITS

- Revised B - Site Development Plan:
- 500' Vicinity Map
 - Legal Descriptions
 - Flood Plain Certification
 - Site Plan
 - Vertical Tower Profile
- Revised C - Tower and Foundation Design

REVISED EXHIBIT B

SITE DEVELOPMENT PLAN:

**500' VICINITY MAP
LEGAL DESCRIPTIONS
FLOOD PLAIN CERTIFICATION
SITE PLAN
VERTICAL TOWER PROFILE**



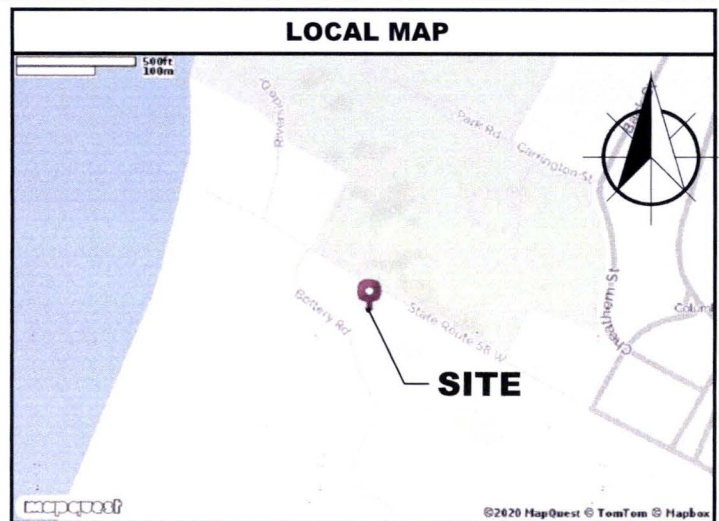
CONTRACTOR NOTES:
 IF INADVERTENT DISCOVERIES OF NATIVE AMERICAN CULTURAL MATERIALS OR HUMAN REMAINS ARE MADE DURING CONSTRUCTION, ALL WORK SHOULD CEASE AND POTENTIALLY AFFECTED TRIBES, AS WELL AS THE STATE HISTORIC PRESERVATION OFFICE SHOULD BE NOTIFIED IMMEDIATELY.

DIRECTIONS

FROM AT&T MTSO: 4510 OHARA DRIVE, EVANSVILLE, IN 47711
 TAKE N US-41 S TO PENNYRILE PKWY IN HENDERSON 15.1 MI, HEAD NORTHEAST ON OHARA DR TOWARD SPORTSPLEX BL 0.1 MI, TURN LEFT ONTO BERGDOLT RD 0.4 MI, TURN LEFT ONTO HITCH AND PETERS RD 0.5 MI, TURN RIGHT ONTO LYNCH RD 0.6 MI, USE ANY LANE TO TURN LEFT ONTO US-41 S 0.5 MI, TAKE THE EXIT TOWARD IN-66 W/DIAMOND AVE 0.2 MI, TURN LEFT ONTO N US-41 S, ENTERING KENTUCKY 10.4 MI, KEEP LEFT TO CONTINUE ON US-41 S 2.4 MI, DRIVE FROM I-69 TO MAYFIELD. TAKE EXIT 22 FROM I-69 128 MI, KEEP LEFT TO CONTINUE ON PENNYRILE PKWY, FOLLOW SIGNS FOR OWENSBORO 1.2 MI, CONTINUE ONTO I-69/PENNYRILE PKWY 42.6 MI, KEEP RIGHT AT THE FORK TO STAY ON I-69, FOLLOW SIGNS FOR PADUCAH 38.4 MI, TAKE EXIT 68 B TO MERGE ONTO I-24 W/I-69 S TOWARD PADUCAH 16.2 MI, USE THE LEFT LANE TO MERGE ONTO I-69 29.5 MI, TAKE EXIT 22 FOR KY-80 TOWARD MAYFIELD/FANCY FARM 0.2 MI, FOLLOW KY-80 W TO KY-58 W IN HICKMAN COUNTY 28.5 MI, TURN RIGHT ONTO KY-80 W/W BROADWAY/FANCY FARM RD CONTINUE TO FOLLOW KY-80 W 8.3 MI, TURN RIGHT ONTO KY-339 N/KY-80 W 249 FT, TURN LEFT ONTO KY-80 W 6.4 MI, TURN LEFT TO STAY ON KY-80 W 11.8 MI, TURN LEFT ONTO KY-123 S/KY-80 W 1.5 MI, TURN RIGHT ONTO E HOOVER PKWY 0.1 MI, SLIGHT LEFT TO STAY ON E HOOVER PKWY 203 FT, TURN RIGHT ONTO KY-123 N/KY-58 W 226 FT, CONTINUE STRAIGHT ONTO KY-58 W DESTINATION WILL BE ON THE LEFT.

FROM COUNTY SEAT: 110 E CLAY ST E, CLINTON, KY 42031
 HEAD WEST ON KY-58 W/W CLAY ST TOWARD N JEFFERSON ST CONTINUE TO FOLLOW KY-58 W 9.5 MI, CONTINUE STRAIGHT TO STAY ON KY-58 W DESTINATION WILL BE ON THE LEFT.

DRAFTER NAME: CONNOR SHEEHAN PHONE: (919) 674-5879



SCOPE OF WORK:

ZONING DRAWINGS FOR:
 CONSTRUCTION OF A NEW UNMANNED TELECOMMUNICATIONS FACILITY.

SITE WORK: NEW TOWER,
 UNMANNED WALK UP CABINET ON A 10'-0"X17'-0" PLATFORM,
 GENERATOR ON A 10'-0"X17'-0" PLATFORM, AND UTILITY INSTALLATIONS.

CONTACT INFORMATION

FIRE DEPARTMENT:	COLUMBUS VOLUNTEER FIRE DEPARTMENT PHONE: (270) 677-4034
POLICE DEPARTMENT:	CLINTON CITY POLICE DEPARTMENT PHONE: (270) 653-5871


SITE SUMMARY

SCOPE TYPE:	RAW-LAND
OCCUPANCY TYPE:	TELECOMMUNICATIONS
STRUCTURE HEIGHT:	165'
OVERALL HEIGHT:	170'
STRUCTURE TYPE:	MONOPOLE
LATITUDE:	36° 45' 35.679142" N (36.759911)
LONGITUDE:	-89° 06' 36.912318" W (-89.110253)
PROPOSED LEASE AREA:	4,200 SQFT
JURISDICTION:	HICKMAN COUNTY
COUNTY:	HICKMAN
POWER COMPANY:	KENTUCKY UTILITIES
TELCO COMPANY:	AT&T

PROJECT DIRECTORY

APPLICANT:	NEW CINGULAR WIRELESS PCS, LLC A DELAWARE LIMITED LIABILITY COMPANY, D/B/A AT&T MOBILITY 462 S. 4TH STREET, SUITE 2400 LOUISVILLE, KY 40202
PROJECT MANAGER:	MASTEC NETWORK SOLUTIONS 1975 JOE B JACKSON PARKWAY MURFREESBORO, TN 371127 MATT HILL PHONE: (615) 339-5218
SITE DESIGN:	MASTEC ENGINEERING, PLLC 507 AIRPORT BLVD, SUITE 111 MORRISVILLE, NC 27560 CONTACT: RAPHAEL MOHAMED PHONE: (919) 674-5895

NSB - RAWLAND ZONING DRAWINGS




FA #: **15246752** SITE ID: **INGRAM BARGE**

SITE NAME:
INGRAM BARGE

SITE ADDRESS:
**112 BOTTERY ROAD
 COLUMBUS, KY 42032
 (HICKMAN COUNTY)**

GENERAL NOTES

 **811 Know what's below. Call before you dig.**

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION, THEREFORE HANDICAP ACCESS IS NOT REQUIRED. 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. NO WORK SHALL COMMENCE WITHOUT THE APPROVED TOWER/ANTENNA MOUNT STRUCTURAL ANALYSIS REPORT SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER UNDER SEPARATE COVER.

CODE COMPLIANCE

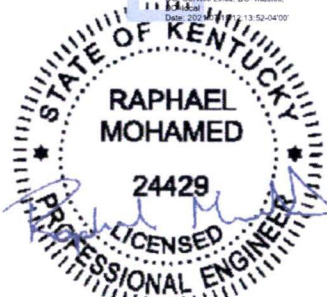
ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING:

- AMERICAN CONCRETE INSTITUTE 318
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL OF STEEL CONSTRUCTION
- TELECOMMUNICATIONS INDUSTRY ASSOCIATION TIA-222
- STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND SUPPORTING STRUCTURES TIA-601
- COMMERCIAL BUILDING GROUNDING AND BONDING
- REQUIREMENTS FOR TELECOMMUNICATIONS
- INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS IEEE-81, IEEE 1100, IEEE C62.41
- ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION
- 2018 KBC
- 2017 NEC

SHEET INDEX

SHEET	DESCRIPTION	REV.	REV. DATE
T-1	TITLE SHEET	2	07/15/2021
	SITE SURVEY		
M-1	500' RADIUS AND ABUTTERS MAP	2	07/15/2021
C-1	OVERALL SITE LAYOUT	2	07/15/2021
C-2	COMPOUND LAYOUT	2	07/15/2021
C-3	TOWER ELEVATION	2	07/15/2021

Digitally signed by Raphael Mohamed
 DN: cn=Raphael Mohamed, o=MasTec Network Solutions, ou=MasTec Network Solutions, email=Raphael.Mohamed@mas-tec.com, c=US



07/15/2021

RAPHAEL MOHAMED, P.E.
 KENTUCKY LIC. NO. 24429


SUBMITTALS

DATE	DESCRIPTION	REV.	ISSUED BY
12/10/2020	CONSTRUCTION	0	RM
03/23/2021	CONSTRUCTION	1	RM
07/15/2021	CONSTRUCTION	2	RM


DRAWN BY: CTS
 CHECKED BY: CZB
 APPVD BY: RM
 MNS PROJECT NO: 24225

THE INFORMATION CONTAINED IN THESE DOCUMENTS IS PROPRIETARY BY NATURE. REPRODUCTION OR CAUSING TO BE REPRODUCED THE WHOLE OR ANY PART OF THESE DRAWINGS WITHOUT THE PERMISSION OF MASTEC NETWORK SOLUTIONS IS PROHIBITED.

PREPARED FOR:



PREPARED BY:



507 AIRPORT BLVD, SUITE 111
 MORRISVILLE, NC 27560

SITE ID:
INGRAM BARGE

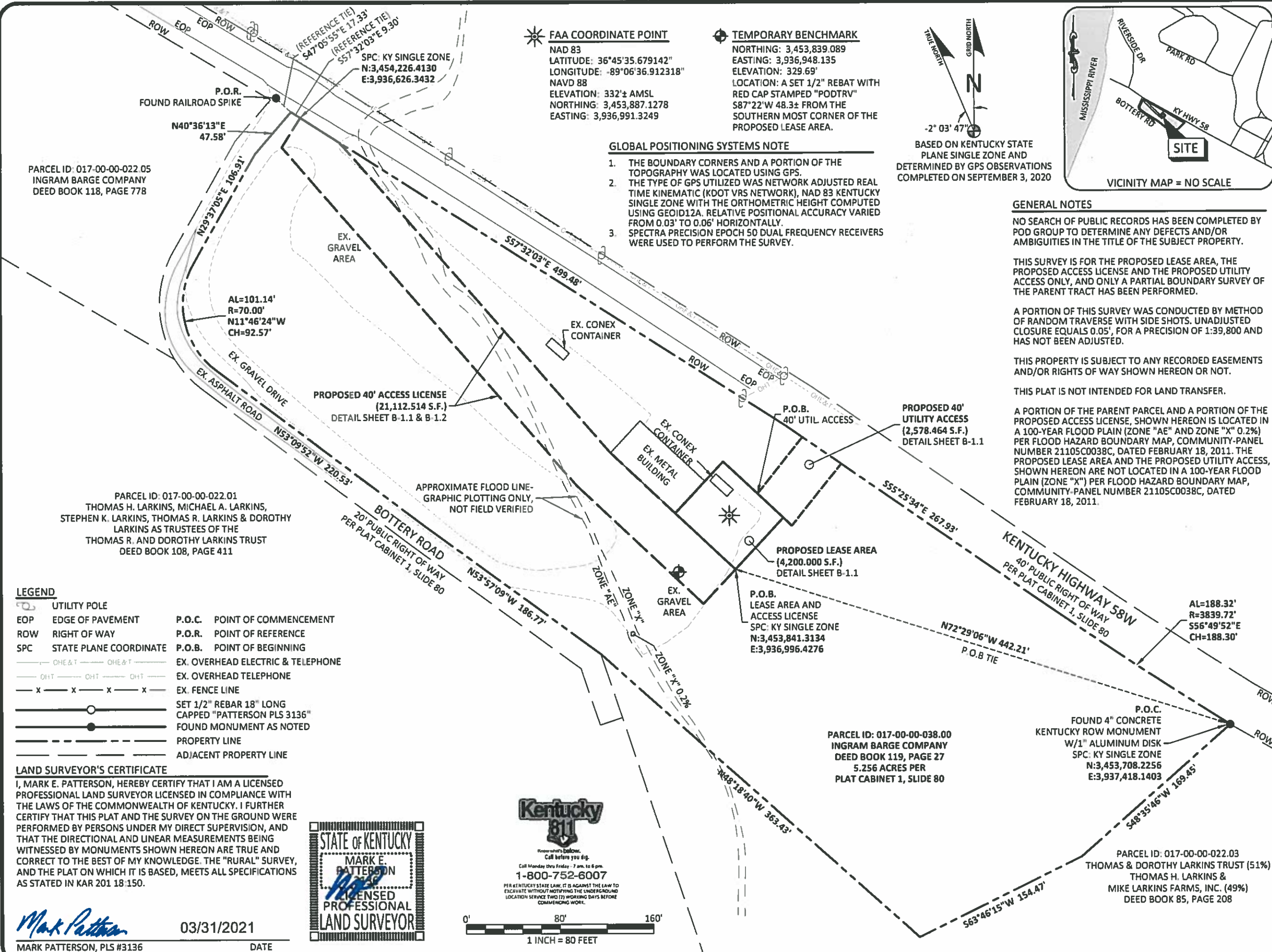
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INGRAM BARGE

SITE ADDRESS:
**112 BOTTERY ROAD
 COLUMBUS, KY 42032**

FA LOCATION:
15246752

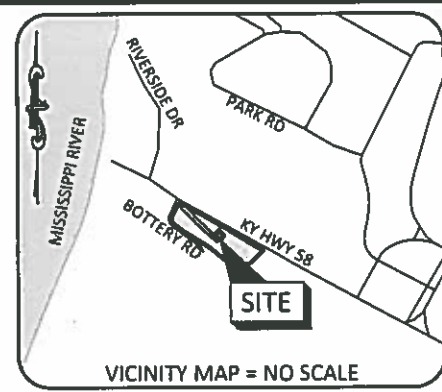
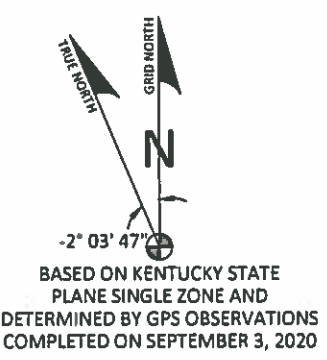
SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



FAA COORDINATE POINT
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 LONGITUDE: -89°06'36.912318"
 NAVD 88
 ELEVATION: 332± AMSL
 NORTHING: 3,453,887.1278
 EASTING: 3,936,991.3249

TEMPORARY BENCHMARK
 NORTHING: 3,453,839.089
 EASTING: 3,936,948.135
 ELEVATION: 329.69'
 LOCATION: A SET 1/2" REBAT WITH RED CAP STAMPED "PODTRV" S87°22'W 48.3± FROM THE SOUTHERN MOST CORNER OF THE PROPOSED LEASE AREA.



- GLOBAL POSITIONING SYSTEMS NOTE**
1. THE BOUNDARY CORNERS AND A PORTION OF THE TOPOGRAPHY WAS LOCATED USING GPS.
 2. THE TYPE OF GPS UTILIZED WAS NETWORK ADJUSTED REAL TIME KINEMATIC (KDOT VRS NETWORK), NAD 83 KENTUCKY SINGLE ZONE WITH THE ORTHOMETRIC HEIGHT COMPUTED USING GEOID12A. RELATIVE POSITIONAL ACCURACY VARIED FROM 0.03' TO 0.06' HORIZONTALLY.
 3. SPECTRA PRECISION EPOCH 50 DUAL FREQUENCY RECEIVERS WERE USED TO PERFORM THE SURVEY.

GENERAL NOTES

NO SEARCH OF PUBLIC RECORDS HAS BEEN COMPLETED BY POD GROUP TO DETERMINE ANY DEFECTS AND/OR AMBIGUITIES IN THE TITLE OF THE SUBJECT PROPERTY.

THIS SURVEY IS FOR THE PROPOSED LEASE AREA, THE PROPOSED ACCESS LICENSE AND THE PROPOSED UTILITY ACCESS ONLY, AND ONLY A PARTIAL BOUNDARY SURVEY OF THE PARENT TRACT HAS BEEN PERFORMED.

A PORTION OF THIS SURVEY WAS CONDUCTED BY METHOD OF RANDOM TRAVERSE WITH SIDE SHOTS. UNADJUSTED CLOSURE EQUALS 0.05', FOR A PRECISION OF 1:39,800 AND HAS NOT BEEN ADJUSTED.

THIS PROPERTY IS SUBJECT TO ANY RECORDED EASEMENTS AND/OR RIGHTS OF WAY SHOWN HEREON OR NOT.

THIS PLAT IS NOT INTENDED FOR LAND TRANSFER.

A PORTION OF THE PARENT PARCEL AND A PORTION OF THE PROPOSED ACCESS LICENSE, SHOWN HEREON IS LOCATED IN A 100-YEAR FLOOD PLAIN (ZONE "AE" AND ZONE "X" 0.2%) PER FLOOD HAZARD BOUNDARY MAP, COMMUNITY-PANEL NUMBER 21105C0038C, DATED FEBRUARY 18, 2011. THE PROPOSED LEASE AREA AND THE PROPOSED UTILITY ACCESS, SHOWN HEREON ARE NOT LOCATED IN A 100-YEAR FLOOD PLAIN (ZONE "X") PER FLOOD HAZARD BOUNDARY MAP, COMMUNITY-PANEL NUMBER 21105C0038C, DATED FEBRUARY 18, 2011.

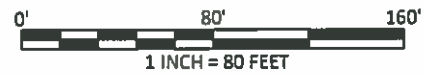
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 INGRAM BARGE COMPANY
 DEED BOOK 118, PAGE 778

PARCEL ID: 017-00-00-022.01
 THOMAS H. LARKINS, MICHAEL A. LARKINS,
 STEPHEN K. LARKINS, THOMAS R. LARKINS & DOROTHY
 LARKINS AS TRUSTEES OF THE
 THOMAS R. AND DOROTHY LARKINS TRUST
 DEED BOOK 108, PAGE 411

- LEGEND**
- UTILITY POLE
 - EOP EDGE OF PAVEMENT
 - ROW RIGHT OF WAY
 - SPC STATE PLANE COORDINATE
 - OHE&T OHE&T
 - OHT OHT
 - X X X X EX. FENCE LINE
 - SET 1/2" REBAR 18" LONG CAPPED "PATTERSON PLS 3136"
 - FOUND MONUMENT AS NOTED
 - PROPERTY LINE
 - ADJACENT PROPERTY LINE
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 - P.O.R. POINT OF REFERENCE
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LAND SURVEYOR'S CERTIFICATE

I, MARK E. PATTERSON, HEREBY CERTIFY THAT I AM A LICENSED PROFESSIONAL LAND SURVEYOR LICENSED IN COMPLIANCE WITH THE LAWS OF THE COMMONWEALTH OF KENTUCKY. I FURTHER CERTIFY THAT THIS PLAT AND THE SURVEY ON THE GROUND WERE PERFORMED BY PERSONS UNDER MY DIRECT SUPERVISION, AND THAT THE DIRECTIONAL AND LINEAR MEASUREMENTS BEING WITNESSED BY MONUMENTS SHOWN HEREON ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. THE "RURAL" SURVEY, AND THE PLAT ON WHICH IT IS BASED, MEETS ALL SPECIFICATIONS AS STATED IN KAR 201 18-150.



PREPARED BY:
POD
 POWER OF DESIGN
 11490 BLUEGRASS PARKWAY
 LOUISVILLE, KY 40299
 502-437-5252

PREPARED FOR:
MasTec

PREPARED FOR:

REVISIONS

REV	DATE	DESCRIPTION
A	9.10.20	PRELIMINARY ISSUE
B	10.13.20	40' UTILITY EASEMENT
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SITE INFORMATION:

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TAX PARCEL NUMBER:
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PROPERTY OWNER:
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 4400 HARDING ROAD
 NASHVILLE, TN 37205

SOURCE OF TITLE:
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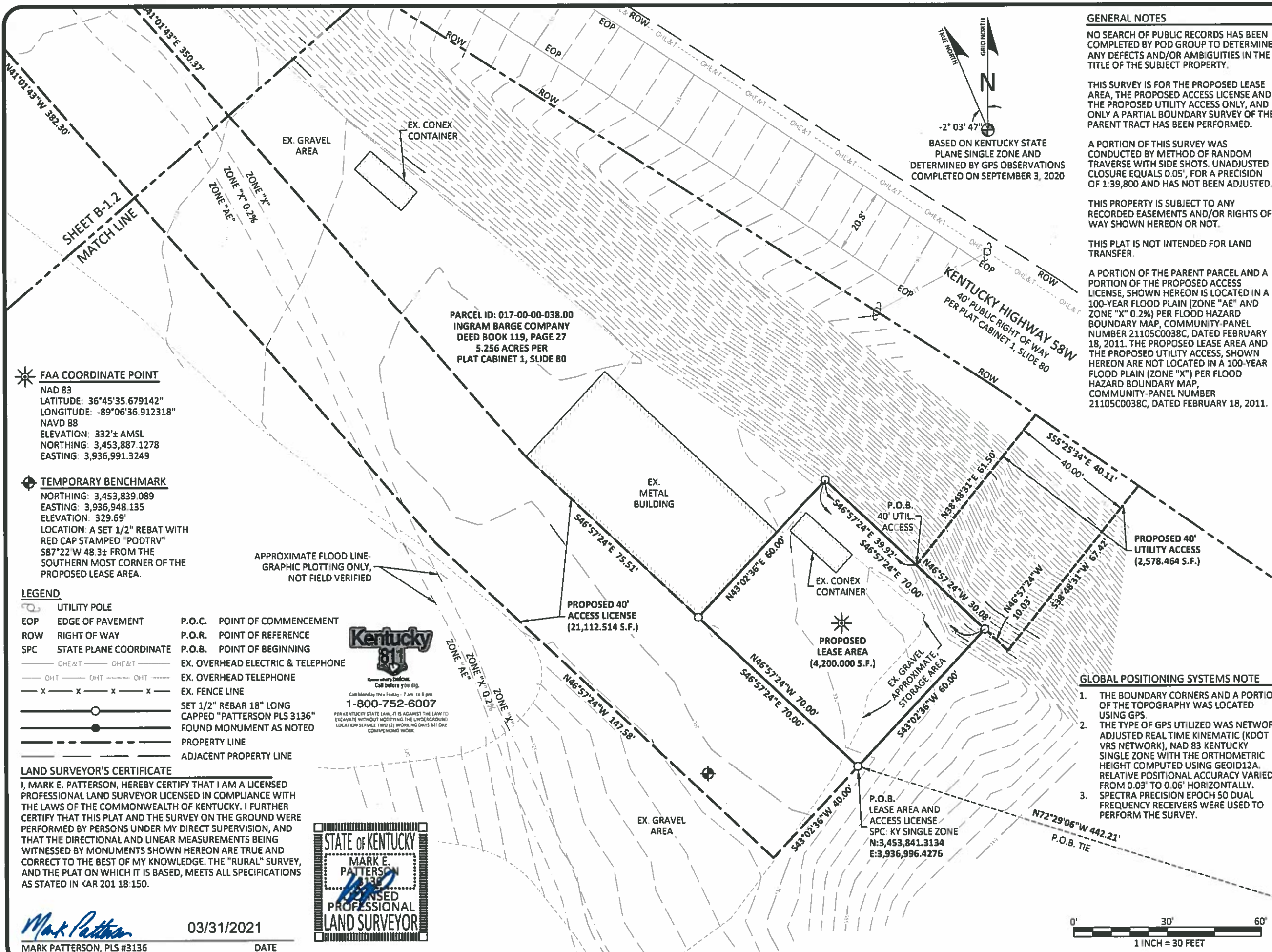
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DRAWN BY: DAP
 CHECKED BY: MEP
 SURVEY DATE: 9.3.20
 PLAT DATE: 9.10.20

SHEET TITLE:
SITE SURVEY
 THIS DOES NOT REPRESENT A
 BOUNDARY SURVEY OF THE
 PARENT PARCEL

SHEET NUMBER: (4 pages)
B-1

Mark Patterson
 MARK PATTERSON, PLS #3136
 DATE: 03/31/2021



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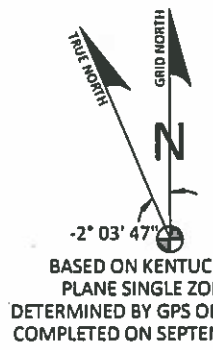
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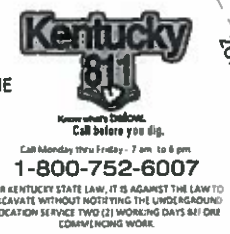
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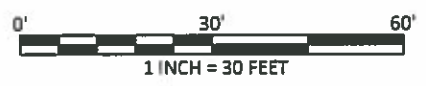


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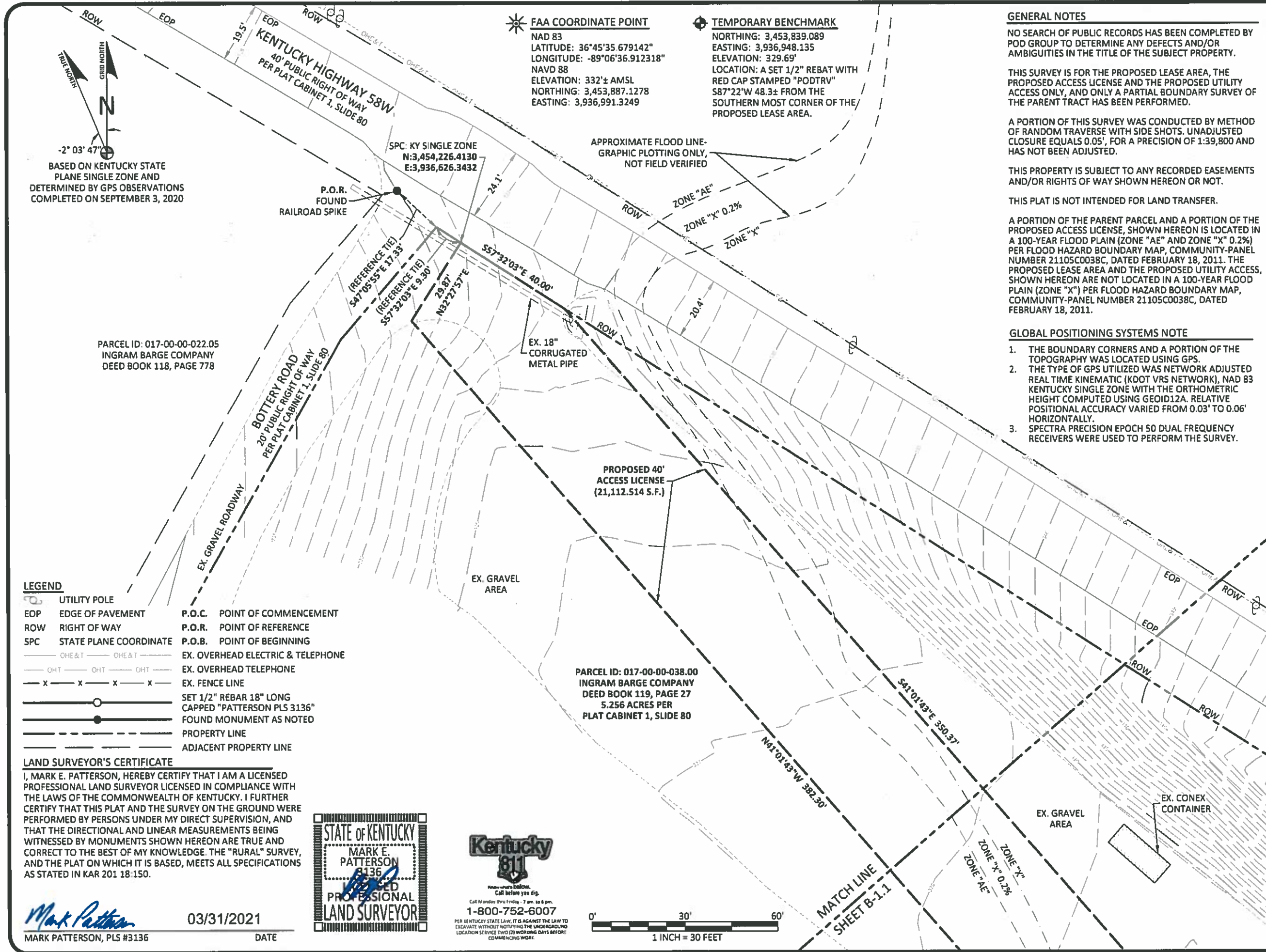
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THIS PROPERTY IS SUBJECT TO ANY RECORDED EASEMENTS AND/OR RIGHTS OF WAY SHOWN HEREON OR NOT.

THIS PLAT IS NOT INTENDED FOR LAND TRANSFER.

A PORTION OF THE PARENT PARCEL AND A PORTION OF THE PROPOSED ACCESS LICENSE, SHOWN HEREON IS LOCATED IN A 100-YEAR FLOOD PLAIN (ZONE "AE" AND ZONE "X" 0.2%) PER FLOOD HAZARD BOUNDARY MAP, COMMUNITY-PANEL NUMBER 21105C0038C, DATED FEBRUARY 18, 2011. THE PROPOSED LEASE AREA AND THE PROPOSED UTILITY ACCESS, SHOWN HEREON ARE NOT LOCATED IN A 100-YEAR FLOOD PLAIN (ZONE "X") PER FLOOD HAZARD BOUNDARY MAP, COMMUNITY-PANEL NUMBER 21105C0038C, DATED FEBRUARY 18, 2011.

GLOBAL POSITIONING SYSTEMS NOTE

1. THE BOUNDARY CORNERS AND A PORTION OF THE TOPOGRAPHY WAS LOCATED USING GPS.
2. THE TYPE OF GPS UTILIZED WAS NETWORK ADJUSTED REAL TIME KINEMATIC (KOOT VRS NETWORK), NAD 83 KENTUCKY SINGLE ZONE WITH THE ORTHOMETRIC HEIGHT COMPUTED USING GEOID12A. RELATIVE POSITIONAL ACCURACY VARIED FROM 0.03' TO 0.06' HORIZONTALLY.
3. SPECTRA PRECISION EPOCH 50 DUAL FREQUENCY RECEIVERS WERE USED TO PERFORM THE SURVEY.

-2° 03' 47"
 BASED ON KENTUCKY STATE PLANE SINGLE ZONE AND DETERMINED BY GPS OBSERVATIONS COMPLETED ON SEPTEMBER 3, 2020

PARCEL ID: 017-00-00-022.05
 INGRAM BARGE COMPANY
 DEED BOOK 118, PAGE 778

PROPOSED 40'
 ACCESS LICENSE
 (21,112.514 S.F.)

PARCEL ID: 017-00-00-038.00
 INGRAM BARGE COMPANY
 DEED BOOK 119, PAGE 27
 5.256 ACRES PER
 PLAT CABINET 1, SLIDE 80

- LEGEND**
- UTILITY POLE
 - EOP EDGE OF PAVEMENT
 - ROW RIGHT OF WAY
 - SPC STATE PLANE COORDINATE
 - OHE&T OHE&T
 - OHT OHT
 - X X X X EX. FENCE LINE
 - SET 1/2" REBAR 18" LONG CAPPED "PATTERSON PLS 3136"
 - FOUND MONUMENT AS NOTED
 - PROPERTY LINE
 - ADJACENT PROPERTY LINE
 - P.O.C. POINT OF COMMENCEMENT
 - P.O.R. POINT OF REFERENCE
 - P.O.B. POINT OF BEGINNING
 - EX. OVERHEAD ELECTRIC & TELEPHONE
 - EX. OVERHEAD TELEPHONE
 - EX. FENCE LINE
 - SET 1/2" REBAR 18" LONG CAPPED "PATTERSON PLS 3136"
 - FOUND MONUMENT AS NOTED
 - PROPERTY LINE
 - ADJACENT PROPERTY LINE

LAND SURVEYOR'S CERTIFICATE
 I, MARK E. PATTERSON, HEREBY CERTIFY THAT I AM A LICENSED PROFESSIONAL LAND SURVEYOR LICENSED IN COMPLIANCE WITH THE LAWS OF THE COMMONWEALTH OF KENTUCKY. I FURTHER CERTIFY THAT THIS PLAT AND THE SURVEY ON THE GROUND WERE PERFORMED BY PERSONS UNDER MY DIRECT SUPERVISION, AND THAT THE DIRECTIONAL AND LINEAR MEASUREMENTS BEING WITNESSED BY MONUMENTS SHOWN HEREON ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. THE "RURAL" SURVEY, AND THE PLAT ON WHICH IT IS BASED, MEETS ALL SPECIFICATIONS AS STATED IN KAR 201 18-150.



Mark Patterson
 MARK PATTERSON, PLS #3136
 03/31/2021
 DATE



REVISIONS

REV.	DATE	DESCRIPTION
A	9.10.20	PRELIMINARY ISSUE
B	10.13.20	40' UTILITY EASEMENT
0	10.23.20	ISSUED AS FINAL
1	2.10.21	REMOVED 15' UTILITY EASEMENT
2	2.19.21	SITE ADDRESS
3	3.22.21	CLIENT COMMENTS
4	3.31.21	SITE ADDRESS

SITE INFORMATION:
INGRAM BARGE
 112 BOTTERY ROAD
 COLUMBUS, KY 42032
 HICKMAN COUNTY

TAX PARCEL NUMBER:
 017-00-00-038.00

PROPERTY OWNER:
 INGRAM BARGE COMPANY
 4400 HARDING ROAD
 NASHVILLE, TN 37205

SOURCE OF TITLE:
 DEED BOOK 119, PAGE 27
 5.256 ACRES PER
 PLAT CABINET 1, SLIDE 80

FA NUMBER:
 15246752

POD NUMBER: 20-68187

DRAWN BY: DAP
 CHECKED BY: MEP
 SURVEY DATE: 9.3.20
 PLAT DATE: 9.10.20

SHEET TITLE:
SITE SURVEY
 THIS DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARENT PARCEL

SHEET NUMBER: (4 pages)
B-1.2

LEGAL DESCRIPTIONS

PROPOSED LEASE AREA

THE FOLLOWING IS A DESCRIPTION OF THE PROPOSED LEASE AREA TO BE LEASED FROM THE PROPERTY CONVEYED TO INGRAM BARGE COMPANY AS RECORDED IN THE OFFICE OF THE CLERK OF HICKMAN COUNTY, KENTUCKY AS DEED BOOK 119, PAGE 27 (5.256 ACRES PER PLAT CABINET 1, SLIDE 80), PARCEL ID: 017-00-00-038.00, WHICH IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEARING DATUM USED HEREIN IS BASED UPON KENTUCKY STATE PLANE COORDINATE SYSTEM, SINGLE ZONE, NAD 83, FROM A REAL TIME KINEMATIC GLOBAL POSITIONING SYSTEM OBSERVATION USING THE KENTUCKY TRANSPORTATION CABINET REAL TIME GPS NETWORK COMPLETED ON SEPTEMBER 3, 2020.

COMMENCING AT A FOUND 4" CONCRETE KENTUCKY RIGHT OF WAY MONUMENT WITH A 1" ALUMINUM DISK, HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N 3,453,708.2256, E 3,937,418.1403 AND AS SHOWN IN PLAT CABINET 1, SLIDE 80, BEING IN THE SOUTH LINE OF THE RIGHT OF WAY OF KENTUCKY HIGHWAY 58W AND BEING THE EASTERN MOST CORNER TO THE PROPERTY CONVEYED TO INGRAM BARGE COMPANY AS RECORDED IN DEED BOOK 119, PAGE 27 (5.256 ACRES PER PLAT CABINET 1, SLIDE 80), PARCEL ID: 017-00-00-038.00 ALSO CORNER TO THE PROPERTY CONVEYED TO THOMAS & DOROTHY LARKINS TRUST (51%) AND THOMAS H. LARKINS & MIKE LARKINS FARMS, INC. (49%) AS RECORDED IN DEED BOOK 85, PAGE 208, PARCEL ID: 017-00-00-022.03; THENCE LEAVING SAID MONUMENT AND TRAVERSING THE LAND OF SAID INGRAM BARGE, N72°29'06"W 442.21' TO A SET 1/2" REBAR, 18" LONG, CAPPED "PATTERSON PLS 3136", HEREAFTER REFERRED TO AS A "SET IPC", HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N:3,453,841.3134, E:3,936,996.4276 AT THE SOUTHERN MOST CORNER OF THE PROPOSED LEASE AREA AND BEING THE TRUE POINT OF BEGINNING; THENCE N46°57'24"W 70.00' TO A SET "IPC"; THENCE N43°02'36"E 60.00' TO A "SET IPC" HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N:3,453,932.9423, E:3,936,986.2221; THENCE S46°57'24"E 70.00'; THENCE S43°02'36"W 60.00' TO THE POINT OF BEGINNING CONTAINING 4,200.000 SQUARE FEET AS PER SURVEY BY MARK E. PATTERSON, PLS #3136 DATED SEPTEMBER 3, 2020.

PROPOSED 40' ACCESS LICENSE

THE FOLLOWING IS A DESCRIPTION OF THE PROPOSED 40' ACCESS LICENSE TO BE GRANTED FROM THE PROPERTY CONVEYED TO INGRAM BARGE COMPANY AS RECORDED IN THE OFFICE OF THE CLERK OF HICKMAN COUNTY, KENTUCKY AS DEED BOOK 119, PAGE 27 (5.256 ACRES PER PLAT CABINET 1, SLIDE 80), PARCEL ID: 017-00-00-038.00, WHICH IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

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COMMENCING AT A FOUND 4" CONCRETE KENTUCKY RIGHT OF WAY MONUMENT WITH A 1" ALUMINUM DISK, HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N 3,453,708.2256, E 3,937,418.1403 AND AS SHOWN IN PLAT CABINET 1, SLIDE 80, BEING IN THE SOUTH LINE OF THE RIGHT OF WAY OF KENTUCKY HIGHWAY 58W AND BEING THE EASTERN MOST CORNER TO THE PROPERTY CONVEYED TO INGRAM BARGE COMPANY AS RECORDED IN DEED BOOK 119, PAGE 27 (5.256 ACRES PER PLAT CABINET 1, SLIDE 80), PARCEL ID: 017-00-00-038.00 ALSO CORNER TO THE PROPERTY CONVEYED TO THOMAS & DOROTHY LARKINS TRUST (51%) AND THOMAS H. LARKINS & MIKE LARKINS FARMS, INC. (49%) AS RECORDED IN DEED BOOK 85, PAGE 208, PARCEL ID: 017-00-00-022.03; THENCE LEAVING SAID MONUMENT AND TRAVERSING THE LAND OF SAID INGRAM BARGE, N72°29'06"W 442.21' TO A SET 1/2" REBAR, 18" LONG, CAPPED "PATTERSON PLS 3136", HEREAFTER REFERRED TO AS A "SET IPC", HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N:3,453,841.3134, E:3,936,996.4276 AT THE SOUTHERN MOST CORNER OF THE PROPOSED LEASE AREA AND BEING THE TRUE POINT OF BEGINNING; THENCE LEAVING SAID LEASE AREA, S43°02'36"W 40.00'; THENCE N46°57'24"W 147.58'; THENCE N41°01'43"W 382.30'; THENCE N32°27'57"E 29.87' TO THE SOUTH LINE OF THE RIGHT OF WAY OF KENTUCKY HIGHWAY 58W AND THE NORTH LINE OF SAID INGRAM BARGE, HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N:3,454,226.4130, E:3,936,626.3432 FOR REFERENCE BEING S47°05'55"E 17.33 AND S57°32'03"E 9.30 FROM A FOUND RAILROAD SPIKE IN THE RIGHT OF WAY OF KENTUCKY HIGHWAY 58W AND AS SHOWN IN PLAT CABINET 1, SLIDE 80; THENCE WITH SAID COMMON LINE, S57°32'03"E 40.00'; THENCE LEAVING SAID COMMON LINE AND TRAVERSING THE LAND OF SAID INGRAM BARGE, S41°01'43"E 350.37'; THENCE S46°57'24"E 75.51' TO A SET "IPC" IN THE WESTERN MOST CORNER OF SAID LEASE AREA; THENCE WITH SAID LEASE AREA, S46°57'24"E 70.00' TO THE POINT OF BEGINNING CONTAINING 21,112.514 SQUARE FEET AS PER SURVEY BY MARK E. PATTERSON, PLS #3136 DATED SEPTEMBER 3, 2020.

PROPOSED 40' UTILITY ACCESS

THE FOLLOWING IS A DESCRIPTION OF THE PROPOSED 40' UTILITY ACCESS TO BE GRANTED FROM THE PROPERTY CONVEYED TO INGRAM BARGE COMPANY AS RECORDED IN THE OFFICE OF THE CLERK OF HICKMAN COUNTY, KENTUCKY AS DEED BOOK 119, PAGE 27 (5.256 ACRES PER PLAT CABINET 1, SLIDE 80), PARCEL ID: 017-00-00-038.00, WHICH IS MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEARING DATUM USED HEREIN IS BASED UPON KENTUCKY STATE PLANE COORDINATE SYSTEM, SINGLE ZONE, NAD 83, FROM A REAL TIME KINEMATIC GLOBAL POSITIONING SYSTEM OBSERVATION USING THE KENTUCKY TRANSPORTATION CABINET REAL TIME GPS NETWORK COMPLETED ON SEPTEMBER 3, 2020.

COMMENCING AT A FOUND 4" CONCRETE KENTUCKY RIGHT OF WAY MONUMENT WITH A 1" ALUMINUM DISK, HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N 3,453,708.2256, E 3,937,418.1403 AND AS SHOWN IN PLAT CABINET 1, SLIDE 80, BEING IN THE SOUTH LINE OF THE RIGHT OF WAY OF KENTUCKY HIGHWAY 58W AND BEING THE EASTERN MOST CORNER TO THE PROPERTY CONVEYED TO INGRAM BARGE COMPANY AS RECORDED IN DEED BOOK 119, PAGE 27 (5.256 ACRES PER PLAT CABINET 1, SLIDE 80), PARCEL ID: 017-00-00-038.00 ALSO CORNER TO THE PROPERTY CONVEYED TO THOMAS & DOROTHY LARKINS TRUST (51%) AND THOMAS H. LARKINS & MIKE LARKINS FARMS, INC. (49%) AS RECORDED IN DEED BOOK 85, PAGE 208, PARCEL ID: 017-00-00-022.03; THENCE LEAVING SAID MONUMENT AND TRAVERSING THE LAND OF SAID INGRAM BARGE, N72°29'06"W 442.21' TO A SET 1/2" REBAR, 18" LONG, CAPPED "PATTERSON PLS 3136", HEREAFTER REFERRED TO AS A "SET IPC", HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N:3,453,841.3134, E:3,936,996.4276 AT THE SOUTHERN MOST CORNER OF THE PROPOSED LEASE AREA; THENCE WITH SAID LEASE AREA FOR THE NEXT THREE CALLS, N46°57'24"W 70.00' TO A SET "IPC"; THENCE N43°02'36"E 60.00' TO A "SET IPC" HAVING A KENTUCKY STATE PLANE SINGLE ZONE COORDINATE OF N:3,453,932.9423, E:3,936,986.2221; THENCE S46°57'24"E 39.92' TO THE TRUE POINT OF BEGINNING; THENCE LEAVING SAID LEASE AREA, N38°48'31"E 61.50' TO THE SOUTH LINE OF THE RIGHT OF WAY OF KENTUCKY HIGHWAY 58W AND THE NORTH LINE OF SAID INGRAM BARGE; THENCE WITH SAID COMMON LINE, S55°25'34"E 40.11'; THENCE LEAVING SAID COMMON LINE AND TRAVERSING THE LAND OF SAID INGRAM BARGE, S38°48'31"W 67.42'; THENCE N46°57'24"W 10.03' TO A SET "IPC" AT THE EASTERN MOST CORNER OF SAID LEASE AREA; THENCE WITH SAID LEASE AREA, N46°57'24"W 30.08' TO THE POINT OF BEGINNING CONTAINING 2,578.464 SQUARE FEET AS PER SURVEY BY MARK E. PATTERSON, PLS #3136 DATED SEPTEMBER 3, 2020.

LAND SURVEYOR'S CERTIFICATE

I, MARK E. PATTERSON, HEREBY CERTIFY THAT I AM A LICENSED PROFESSIONAL LAND SURVEYOR LICENSED IN COMPLIANCE WITH THE LAWS OF THE COMMONWEALTH OF KENTUCKY. I FURTHER CERTIFY THAT THIS PLAT AND THE SURVEY ON THE GROUND WERE PERFORMED BY PERSONS UNDER MY DIRECT SUPERVISION, AND THAT THE DIRECTIONAL AND LINEAR MEASUREMENTS BEING WITNESSED BY MONUMENTS SHOWN HEREON ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. THE "RURAL" SURVEY, AND THE PLAT ON WHICH IT IS BASED, MEETS ALL SPECIFICATIONS AS STATED IN KAR 201 18:150.



Mark Patterson
MARK PATTERSON, PLS #3136

03/31/2021
DATE

PREPARED BY:
POD
POWER OF DESIGN
11490 BLUEGRASS PARKWAY
LOUISVILLE, KY 40298
502-437-5252

PREPARED FOR:
MasTec

PREPARED FOR:
 at&t

REVISIONS

REV	DATE	DESCRIPTION
A	9.10.20	PRELIMINARY ISSUE
B	10.13.20	40' UTILITY EASEMENT
0	10.23.20	ISSUED AS FINAL
1	2.10.21	REMOVED 15' UTILITY EASEMENT
2	2.19.21	SITE ADDRESS
3	3.22.21	CLIENT COMMENTS
4	3.31.21	SITE ADDRESS

SITE INFORMATION:

INGRAM BARGE
112 BOTTERY ROAD
COLUMBUS, KY 42032
HICKMAN COUNTY

TAX PARCEL NUMBER:
017-00-00-038.00

PROPERTY OWNER:
INGRAM BARGE COMPANY
4400 HARDING ROAD
NASHVILLE, TN 37205

SOURCE OF TITLE:
DEED BOOK 119, PAGE 27
5.256 ACRES PER
PLAT CABINET 1, SLIDE 80

FA NUMBER:
15246752

POD NUMBER: 20-68187

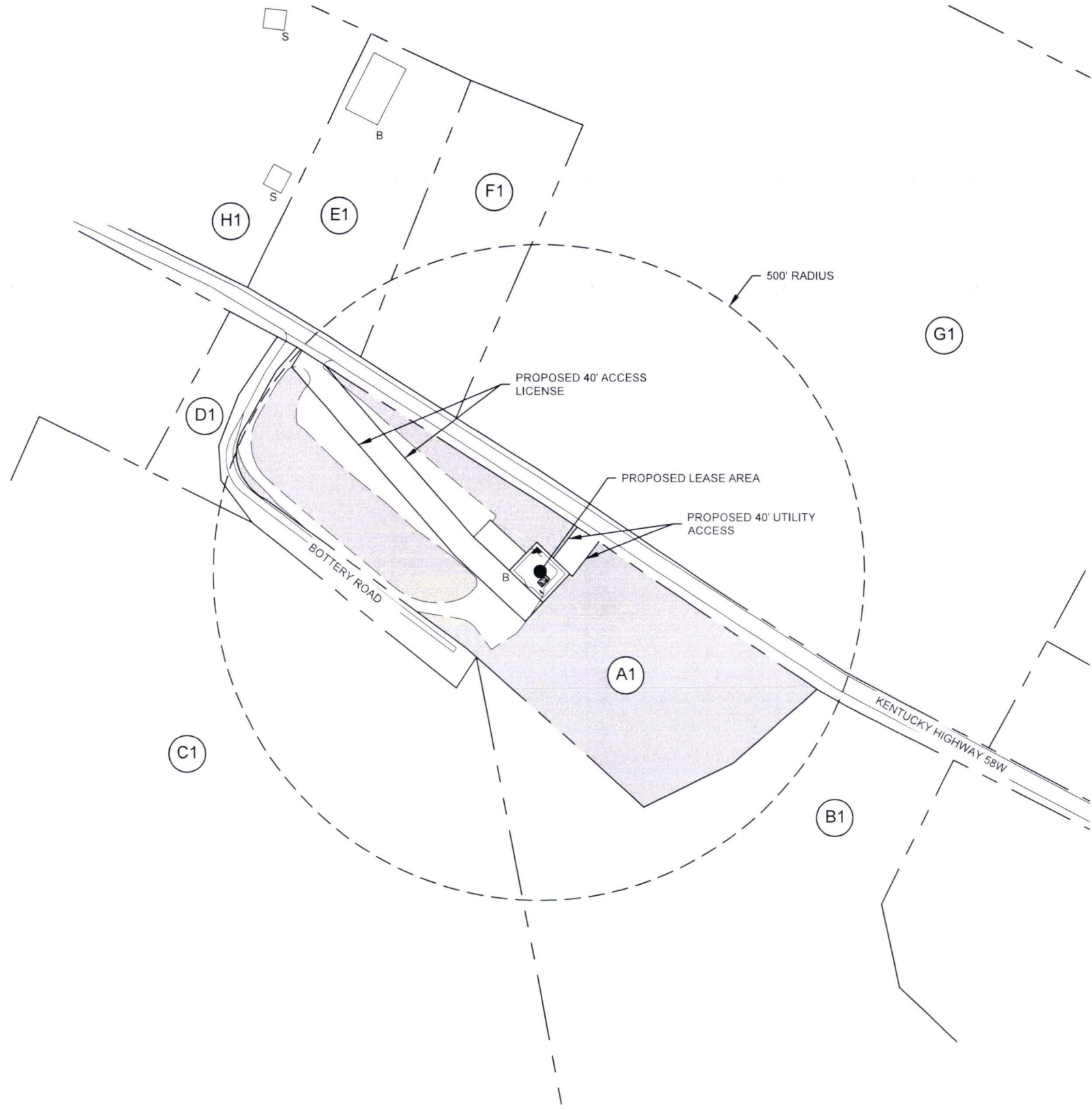
DRAWN BY: DAP
CHECKED BY: MEP
SURVEY DATE: 9.3.20
PLAT DATE: 9.10.20

SHEET TITLE:

SITE SURVEY
THIS DOES NOT REPRESENT A
BOUNDARY SURVEY OF THE
PARENT PARCEL

SHEET NUMBER: (4 pages)

B-1.3



500' RADIUS AND ABUTTERS MAP

11"x17" SCALE: 1"=200'-0"

GENERAL NOTES:

1. ALL INFORMATION SHOWN HERON WAS OBTAINED FROM THE INFORMATION DESCRIBED AND RECORDED FROM DEED BOOKS IN THE COUNTY CLERK'S OFFICE, ON 10/28/20 AND RE-VERIFIED ON 07/15/21. THE PROPERTY VALUATION ADMINISTRATION RECORDS MAY NOT REFLECT THE CURRENT OWNERS AND ADDRESSES DUE TO THE COUNTY PROPERLY VALUATION ADMINISTRATION EXPRESSLY DISCLAIMS ANY WARRANTY FOR THE CONTENT AND ANT ERRORS CONTAINED IN THEIR FILES.
2. THIS MAP IS FOR GENERAL INFORMATIONAL PURPOSES ONLY AND IS NOT A BOUNDARY SURVEY
3. NOT FOR RECORDING OR PROPERTY TRANSFER

(A1)	PARCEL ID: 017-00-00-038.00 INGRAM BARGE CO 4400 HARDING RD NASHVILLE, TN 37205
(B1)	PARCEL ID: 017-00-00-022.03 LARKINS THOMAS & DOROTHY TRUST THOMAS H & MIKE LARKINS FARMS 6614 ST RT 58 WEST CLINTON, KY 42031
(C1)	PARCEL ID: 017-00-00-022.01 LARKINS THOMAS & DOROTHY TRUST C/O TOM LARKINS 6614 ST RT 58 WEST CLINTON, KY 42031
(D1)	PARCEL ID: 017-00-00-022.05 INGRAM BARGE CO 4400 HARDING RD NASHVILLE, TN 37205
(E1)	PARCEL ID: 016-00-00-048.00 MCKINNEY LEE C/O PATRICIA MCKINNEY LEWIS 1802 LYDERHURST SAVOY, IL 68174
(F1)	PARCEL ID: 016-00-00-049.01 FERGUSON KAY & SHANE STEPHENS P O BOX 3 COLUMBUS, KY 42032
(G1)	PARCEL ID: 016-00-00-045.00 STATE OF KENTUCKY COLUMBUS BELMONT STATE PARK COLUMBUS KENTUCKY, 42032
(H1)	PARCEL ID: 016-00-00-053.00 FERGUSON KAY & SHANE STEPHENS P O BOX 3 COLUMBUS, KY 42032

EXISTING BUILDINGS
 B=BARN
 C=CHURCH
 G=GARAGE
 R=RESIDENCE
 S=SHED



RAPHAEL MOHAMED, P.E.
KENTUCKY LIC. NO. 24429

SUBMITTALS			
DATE	DESCRIPTION	REV	ISSUED BY
12/10/2020	CONSTRUCTION	0	RM
03/23/2021	CONSTRUCTION	1	RM
07/15/2021	CONSTRUCTION	2	RM

DRAWN BY: _____ CTS
 CHECKED BY: _____ CZB
 APPVD BY: _____ RM
 MNS PROJECT NO: _____ 24225

THE INFORMATION CONTAINED IN THESE DOCUMENTS IS PROPRIETARY BY NATURE. REPRODUCTION OR CAUSING TO BE REPRODUCED THE WHOLE OR ANY PART OF THESE DRAWINGS WITHOUT THE PERMISSION OF MASTEC NETWORK SOLUTIONS IS PROHIBITED.

PREPARED FOR:



PREPARED BY:



SITE ID:
INGRAM BARGE

SITE NAME:
INGRAM BARGE

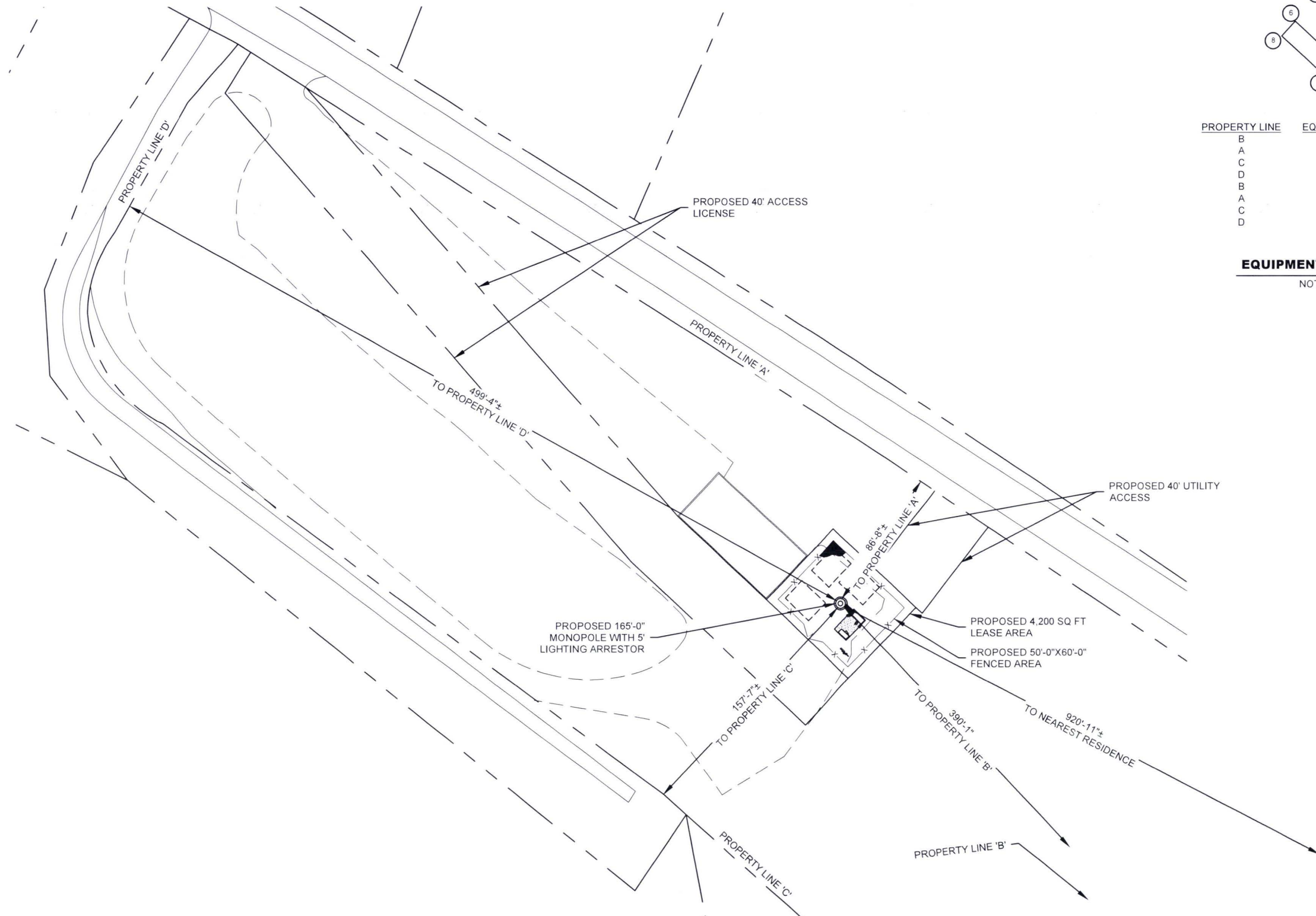
SITE ADDRESS:
**112 BOTTERY ROAD
COLUMBUS, KY 42032**

FA LOCATION:
15246752

SHEET TITLE
**500' RADIUS AND
ABUTTERS MAP**

SHEET NUMBER
M-1





PROPERTY LINE	EQUIPMENT	DISTANCE
B	1	375'±
A	2	86'±
C	3	159'±
D	4	513'±
B	5	372'±
A	6	98'±
C	7	150'±
D	8	511'±

EQUIPMENT ENLARGMENT
NOT TO SCALE



07/15/2021
RAPHAEL MOHAMED, P.E.
KENTUCKY LIC. NO. 24429

SUBMITTALS

DATE	DESCRIPTION	REV	ISSUED BY
12/10/2020	CONSTRUCTION	0	RM
03/23/2021	CONSTRUCTION	1	RM
07/15/2021	CONSTRUCTION	2	RM

DRAWN BY: CTS
CHECKED BY: CZB
APPV'D BY: RM
MNS PROJECT NO: 24225

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PREPARED FOR:



PREPARED BY:



SITE ID:
INGRAM BARGE

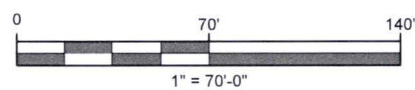
SITE NAME:
INGRAM BARGE

SITE ADDRESS:
**112 BOTTERY ROAD
COLUMBUS, KY 42032**

FA LOCATION:
15246752

SHEET TITLE
OVERALL SITE LAYOUT

SHEET NUMBER
C-1



OVERALL SITE LAYOUT
11"x17" SCALE: 1" = 70'-0"





07/15/2021

RAPHAEL MOHAMED, P.E.
KENTUCKY LIC. NO. 24429

SUBMITTALS

DATE	DESCRIPTION	REV	ISSUED BY
12/10/2020	CONSTRUCTION	0	RM
03/23/2021	CONSTRUCTION	1	RM
07/15/2021	CONSTRUCTION	2	RM

DRAWN BY: CTS
 CHECKED BY: CZB
 APPVD BY: RM
 MNS PROJECT NO: 24225

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PREPARED FOR:



PREPARED BY:



SITE ID:

INGRAM BARGE

SITE NAME:

INGRAM BARGE

SITE ADDRESS:

**112 BOTTERY ROAD
COLUMBUS, KY 42032**

FA LOCATION:

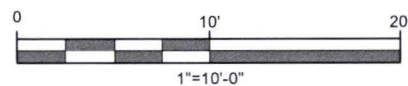
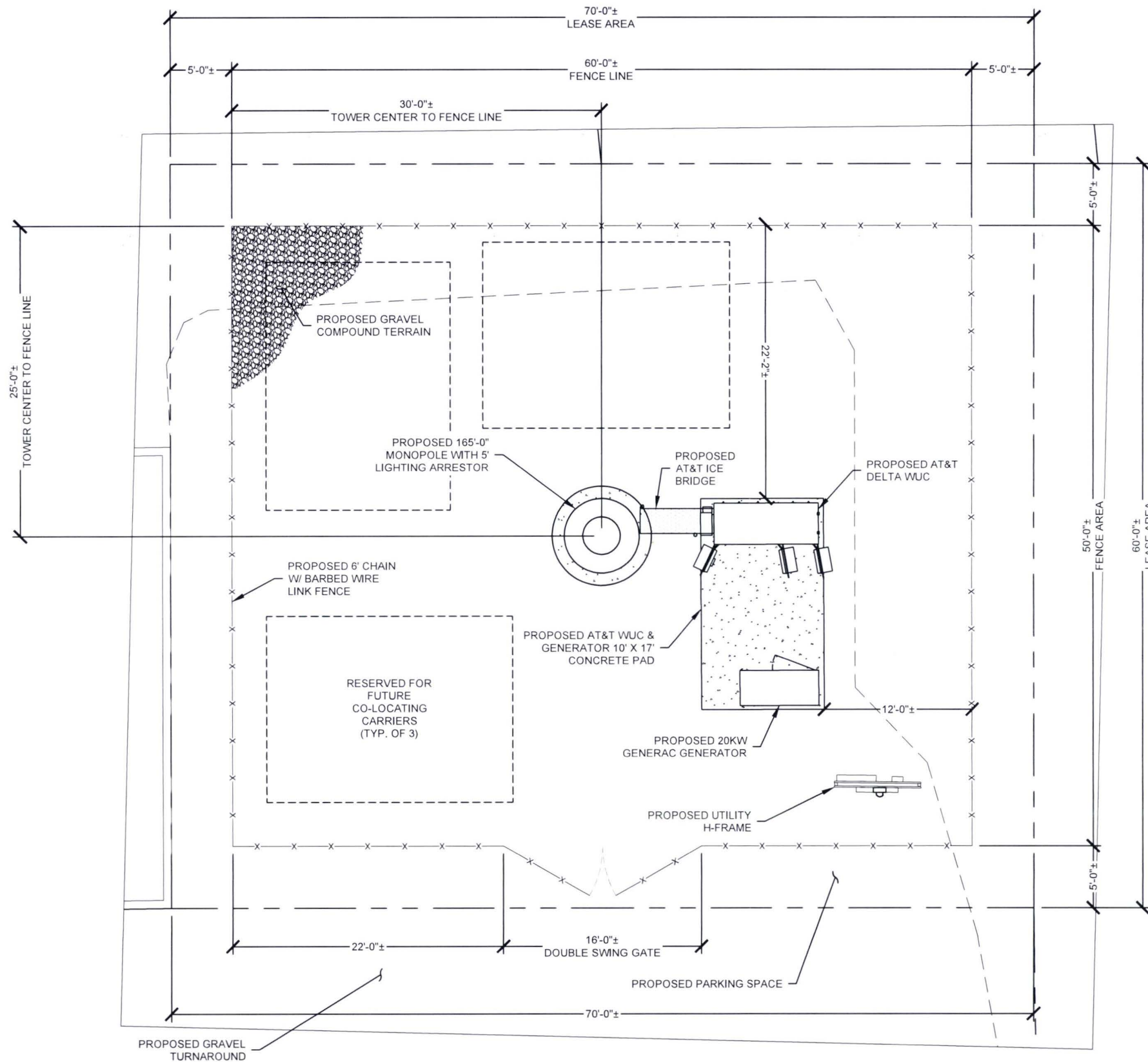
15246752

SHEET TITLE

COMPOUND LAYOUT

SHEET NUMBER

C-2



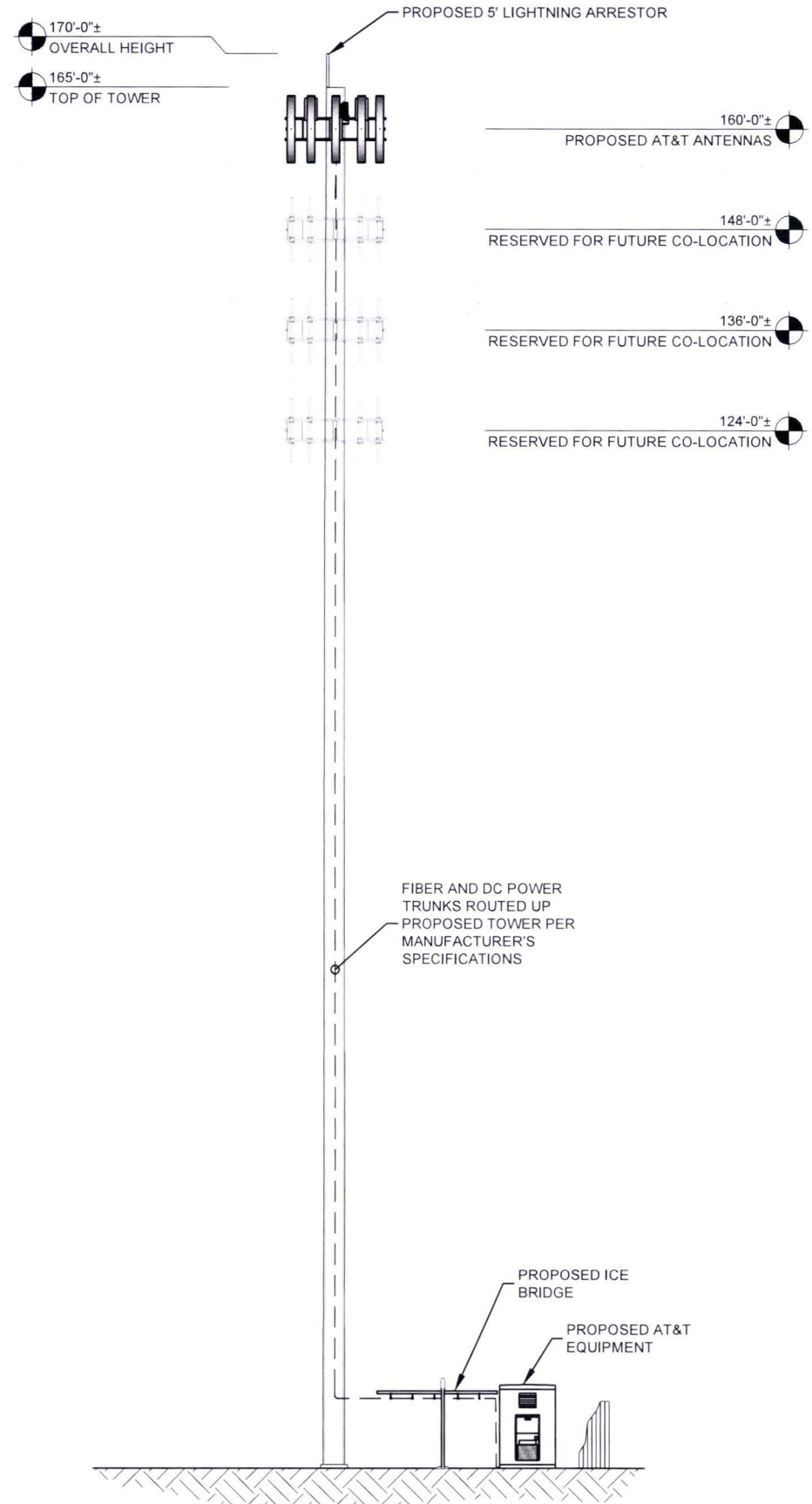
COMPOUND LAYOUT

11"x17" SCALE: 1"=10'-0"



TOWER NOTES:

1. THE PROPOSED TOWER, FOUNDATION, ANTENNA MOUNTS, AND ANTENNAS WERE/ARE DESIGNED BY OTHERS.
2. THE TOWER ELEVATION SHOWN IS FOR REFERENCE ONLY.
3. SEE TOWER MANUFACTURE'S DRAWINGS FOR TOWER AND FOUNDATION DETAILS & SPECIFICATIONS.
4. MANUFACTURE'S DRAWINGS SUPERCEDE A&E DRAWINGS



TOWER ELEVATION

11"x17" SCALE: 1" = 20'-0"



07/15/2021

RAPHAEL MOHAMED, P.E.
KENTUCKY LIC. NO. 24429

SUBMITTALS

DATE	DESCRIPTION	REV	ISSUED BY
12/10/2020	CONSTRUCTION	0	RM
03/23/2021	CONSTRUCTION	1	RM
07/15/2021	CONSTRUCTION	2	RM

DRAWN BY: CTS
 CHECKED BY: CZB
 APPVD BY: RM
 MNS PROJECT NO: 24225

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PREPARED FOR:



PREPARED BY:



SITE ID:

INGRAM BARGE

SITE NAME:

INGRAM BARGE

SITE ADDRESS:

**112 BOTTERY ROAD
COLUMBUS, KY 42032**

FA LOCATION:

15246752

SHEET TITLE

TOWER ELEVATION

SHEET NUMBER

C-3

REVISED EXHIBIT C
TOWER AND FOUNDATION DESIGN

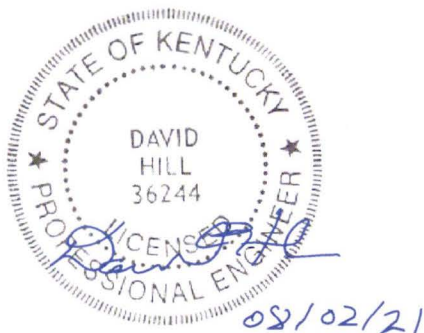


Structural Design Report
165' Monopole
Site: Ingram Barge, KY
Site Number: FA# 15246752

Prepared for: AT&T
by: Sabre Industries™

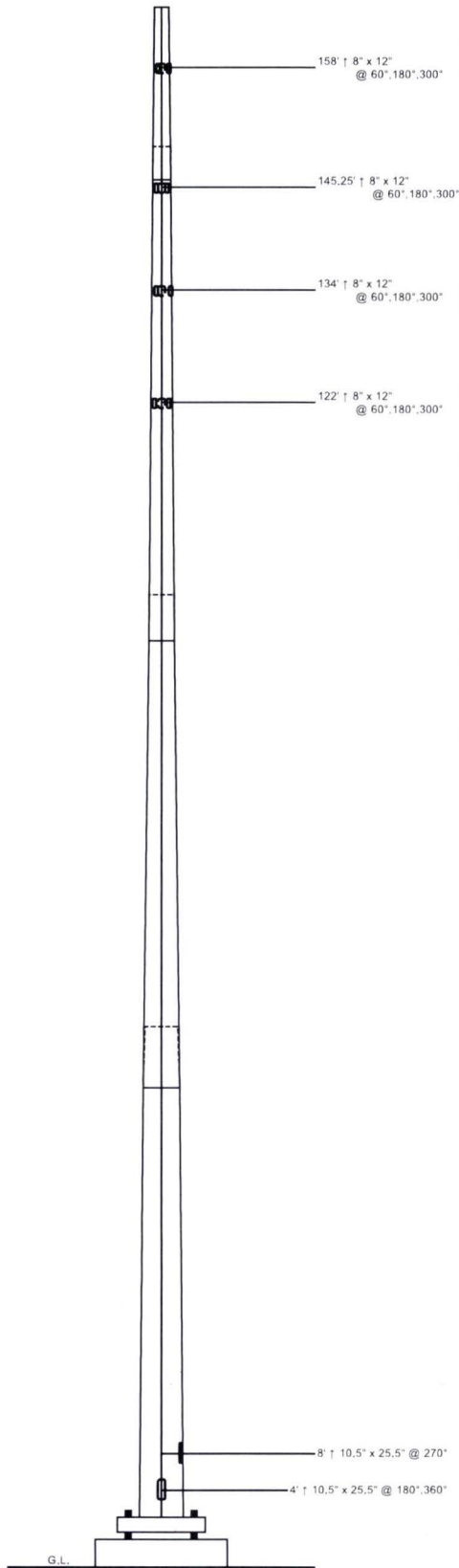
Job Number: 480163
Revision A
August 2, 2021

Monopole Profile.....	1
Foundation Design Summary (Option 1).....	2
Foundation Design Summary (Option 2).....	3
Pole Calculations.....	4-13
Foundation Calculations.....	14-21



Digitally Signed By David Hill
DN: c=US, st=Texas,
l=Alvarado, o=SABRE
INDUSTRIES, INC., cn=David
Hill,
email=dhill@sabreindustries.c
om Date: 2021.08.02 11:35:45

Length (ft)	53'-3"	53'-6"	18'-9"
Number Of Sides	18		
Thickness (in)	1/2"	3/8"	1/4"
Lap Splice (ft)	6'-6"	5'-0"	A
Top Diameter (in)	44.33"	33.75"	19.3"
Bottom Diameter (in)	57.44"	46.93"	23.92"
Taper (in/ft)	0.2463		
Grade	A572-65		
Weight (lbs)	17215	12197	6902
Overall Steel Height (ft)	164		



Designed Appurtenance Loading

Elev	Description	Tx-Line
160	(1) 278 sq. ft. EPA 6000# (no ice)	(18) 1 5/8"
148	(1) 208 sq. ft. EPA 4000# (no ice)	(18) 1 5/8"
136	(1) 208 sq. ft. EPA 4000# (no ice)	(18) 1 5/8"
124	(1) 208 sq. ft. EPA 4000# (no ice)	(18) 1 5/8"

Wind & Ice Design Criteria - ANSI/TIA-222-H

Wind Speed (No Ice)	106 mph
Wind Speed (Ice)	30 mph
Design Ice Thickness	1.50 in
Risk Category	II
Exposure Category	D
Topographic Factor Procedure	Method 1 (Simplified)
Topographic Category	1
Ground Elevation	331 ft

Limit State Load Combination Reactions

Load Combination	Axial (kips)	Shear (kips)	Moment (ft-k)	Deflection (ft)	Sway (deg)
1.2 D + 1.0 Wo	74.54	54.68	7371.31	16.06	10.73
0.9 D + 1.0 Wo	56.01	54.59	7210.17	15.62	10.41
1.2 D + 1.0 Di + 1.0 Wi	118.86	7.84	1135.73	2.62	1.74
1.0 D + 1.0 Wo (Service @ 60 mph)	62.2	15.67	2106.44	4.7	3.1

Base Plate Dimensions

Shape	Diameter	Thickness	Bolt Circle	Bolt Qty	Bolt Diameter
Round	70.25"	2.5"	64.5"	24	2.25"

Anchor Bolt Dimensions


Length	Diameter	Hole Diameter	Weight	Type	Finish
84"	2.25"	2.625"	2906.4	A615-75	Galv

Material List

Display	Value
A	3' - 6"

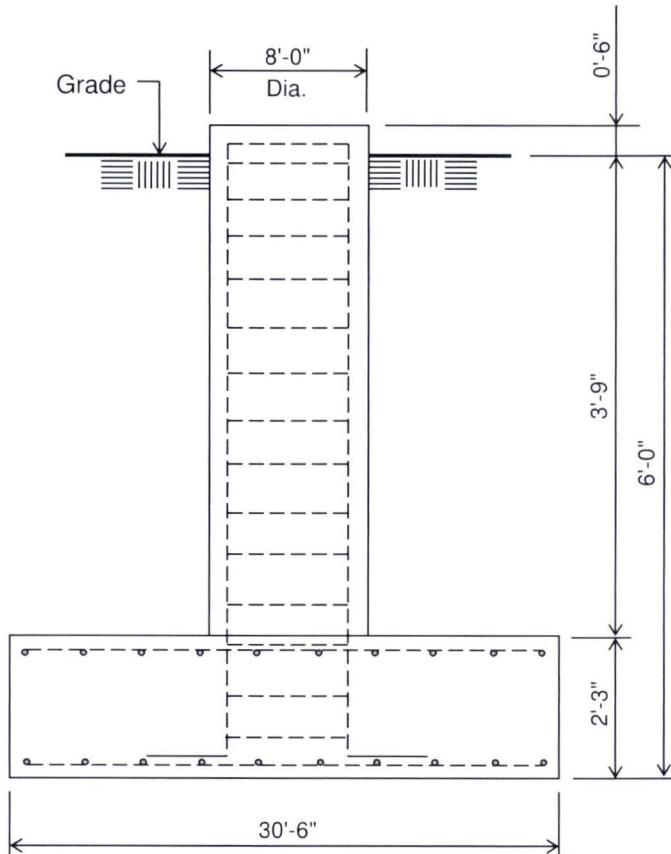
Notes

- 1) Antenna Feed Lines Run Inside Pole
- 2) All dimensions are above ground level, unless otherwise specified.
- 3) Weights shown are estimates. Final weights may vary.
- 4) Full Height Step Bolts
- 5) This tower design and, if applicable, the foundation design(s) shown on the following page(s) also meet or exceed the requirements of the 2015 International Building Code.
- 6) Tower Rating: 100%

 <p>Sabre Industries 7101 Southbridge Drive P.O. Box 658 Sioux City, IA 51102-0658 Phone: (712) 258-6690 Fax: (712) 279-0814</p>	<p>Job: 480163A</p> <p>Customer: AT&T</p> <p>Site Name: Ingram Barge, KY FA# 15246752</p> <p>Description: 165' Monopole</p> <p>Date: 2021.08.02</p>
	<p>By: DJH</p>

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Customer: AT&T
Site: Ingram Barge, KY FA# 15246752
165' Monopole



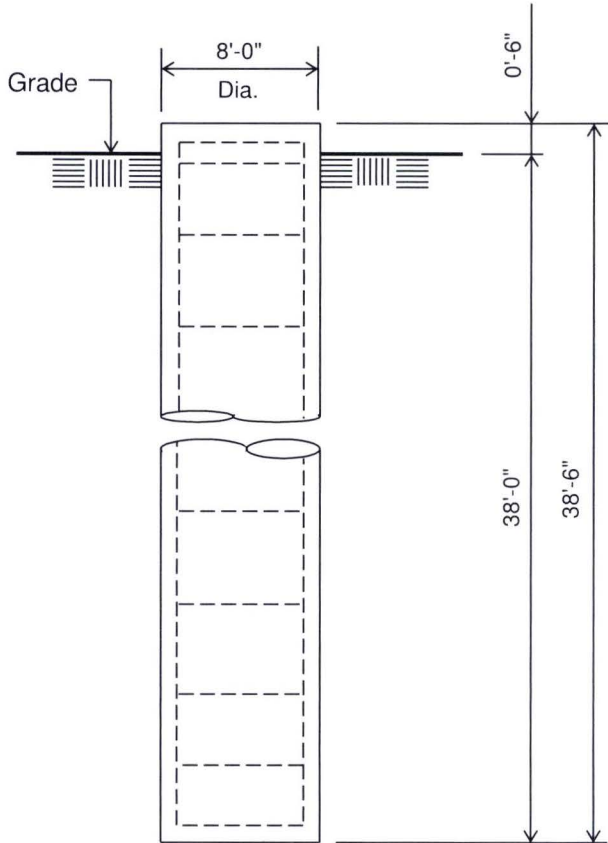
ELEVATION VIEW
(85.43 Cu. Yds.)
(1 REQUIRED; NOT TO SCALE)

Notes:

- 1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-14.
- 2) Rebar to conform to ASTM specification A615 Grade 60.
- 3) All rebar to have a minimum of 3" concrete cover.
- 4) All exposed concrete corners to be chamfered 3/4".
- 5) The foundation design is based on the geotechnical report by Power of Design Group, LLC; project# 20-68190; dated April 16, 2020.
- 6) See the geotechnical report for compaction requirements, if specified.
- 7) 3.75 ft of soil cover is required over the entire area of the foundation slab.
- 8) Tie overlaps shall be staggered with a nominal 180° separation.
- 9) The bottom anchor bolt template shall be positioned as closely as possible to the bottom of the anchor bolts.

Rebar Schedule for Pad and Pier	
Pier	(50) #11 vertical rebar w/ hooks at bottom w/ #5 ties, (2) within top 5" of pier, then 4" C/C
Pad	(39) #10 horizontal rebar evenly spaced each way top and bottom (156 total)

Customer: AT&T
Site: Ingram Barge, KY FA# 15246752
165' Monopole



ELEVATION VIEW

(71.67 Cu. Yds.)

(1 REQUIRED; NOT TO SCALE)

Notes:

- 1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-14.
- 2) Rebar to conform to ASTM specification A615 Grade 60.
- 3) All rebar to have a minimum of 3" concrete cover.
- 4) All exposed concrete corners to be chamfered 3/4".
- 5) The foundation design is based on the geotechnical report by Power of Design Group, LLC; project# 20-68190; dated April 16, 2020.
- 6) See the geotechnical report for drilled pier installation requirements, if specified.
- 7) Tie overlaps shall be staggered with a nominal 180° separation.
- 8) The bottom anchor bolt template shall be positioned as closely as possible to the bottom of the anchor bolts.

Rebar Schedule for Pier

Pier	(50) #11 vertical rebar w/ #5 ties, (2) within top 5" of pier, then 7" C/C
------	--

Processed under license at:

Sabre Towers and Poles on: 2 aug 2021 at: 11:10:21
 =====

165' Monopole / Ingram Barge, KY

* All pole diameters shown on the following pages are across corners.
 See profile drawing for widths across flats.

=====

ELEV	SECTION NAME	No. SIDE	OUTSIDE DIAM	THICK -NESS	RESISTANCES		SPLICE TYPE	...OVERLAP...		w/t
ft			in	in	♦*Pn kip	♦*Mn ft-kip		LENGTH ft	RATIO	
164.0	A	18	19.60	0.250	1123.1	437.8				12.4
148.7	A/B	18	23.40	0.250	1344.0	628.4	SLIP	3.50	1.79	
145.2	B	18	23.79	0.375	2038.3	958.6				10.1
100.2	B/C	18	35.02	0.375	3016.8	2110.5	SLIP	5.00	1.71	
95.2	C	18	35.53	0.500	4067.1	2867.2				11.5
53.2	C/D	18	46.01	0.500	5283.7	4854.7	SLIP	6.50	1.70	
46.7	D	18	46.65	0.500	5358.1	4993.2				15.4
0.0			58.33	0.500	6385.0	7471.8				

=====

SECTION NAME	BASE ELEV	BOLTS NUMBER	TYPE	AT BASE DIAM	OF SECTION STRENGTH	THREADS IN SHEAR PLANE	CALC BASE ELEV
	ft			in	ksi		ft
A	145.250	0	A325	0.00	92.0	0	145.250
B	95.250	0	A325	0.00	92.0	0	95.250
C	46.750	0	A325	0.00	92.0	0	46.750
D	0.000	0	A325	0.00	92.0	0	0.000

=====

SECTION NAME	No. of SIDES	LENGTH	OUTSIDE DIAMETER		BEND RAD	MAT-ERIAL ID	FLANGE ID		FLANGE WELD	
		ft	BOT	TOP	in	ID	BOT	TOP	BOT	TOP
			* in	* in					..GROUP-ID..	
A	18	18.75	24.29	19.60	0.625	1	0	0	0	0
B	18	53.50	36.28	22.90	0.625	2	0	0	0	0
C	18	53.50	47.65	34.27	0.625	3	0	0	0	0
D	18	53.25	58.33	45.01	0.625	4	0	0	0	0

* - Diameter of circumscribed circle

=====

TYPE OF SHAPE	TYPE NO	NO OF ELEM.	ORIENT	HEIGHT	WIDTH	.THICKNESS.		IRREGULARITY .PROJECTION.	
			& deg	in	in	WEB	FLANGE	% OF AREA	ORIENT deg
PL	1	1	0.0	24.29	0.25	0.250	0.250	0.00	0.0
PL	2	1	0.0	36.28	0.38	0.375	0.375	0.00	0.0

PL	3	1	0.0	47.65	0.50	0.500	0.500	0.00	0.0
PL	4	1	0.0	58.33	0.50	0.500	0.500	0.00	0.0

& - with respect to vertical

MATERIAL PROPERTIES

MATERIAL TYPE NO.	ELASTIC MODULUS ksi	UNIT WEIGHT pcf	.. STRENGTH .. Fu ksi Fy ksi		THERMAL COEFFICIENT /deg
1	29000.0	490.0	80.0	65.0	0.00001170
2	29000.0	490.0	80.0	65.0	0.00001170
3	29000.0	490.0	80.0	65.0	0.00001170
4	29000.0	490.0	80.0	65.0	0.00001170

* Only 3 condition(s) shown in full
 * Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A

106 mph wind with no ice. Wind Azimuth: 0° (1.2 D + 1.0 Wo)

LOADS ON POLE

LOAD TYPE	ELEV ft	APPLY. RADIUS ft	LOAD. AT AZI	LOAD AZI	.....FORCES.....		.....MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	162.500	0.00	0.0	0.0	0.0169	0.0084	0.0000	0.0000
C	159.000	0.00	0.0	0.0	0.0000	3.5718	0.0000	0.0000
C	159.000	0.00	0.0	0.0	12.8390	7.2000	0.0000	0.0000
C	155.000	0.00	0.0	0.0	0.0335	0.0168	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	3.3022	0.0000	0.0000
C	147.000	0.00	0.0	0.0	9.5309	4.8366	0.0000	0.0000
C	145.000	0.00	0.0	0.0	0.0331	0.0168	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0000	3.0326	0.0000	0.0000
C	135.000	0.00	0.0	0.0	9.3918	4.8366	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0327	0.0168	0.0000	0.0000
C	125.000	0.00	0.0	0.0	0.0323	0.0168	0.0000	0.0000
C	123.000	0.00	0.0	0.0	0.0000	2.7631	0.0000	0.0000
C	123.000	0.00	0.0	0.0	9.2421	4.8366	0.0000	0.0000
C	115.000	0.00	0.0	0.0	0.0318	0.0168	0.0000	0.0000
C	105.000	0.00	0.0	0.0	0.0313	0.0168	0.0000	0.0000
C	95.000	0.00	0.0	0.0	0.0308	0.0168	0.0000	0.0000
C	85.000	0.00	0.0	0.0	0.0302	0.0168	0.0000	0.0000
C	75.000	0.00	0.0	0.0	0.0296	0.0168	0.0000	0.0000
C	65.000	0.00	0.0	0.0	0.0288	0.0168	0.0000	0.0000
C	55.000	0.00	0.0	0.0	0.0280	0.0168	0.0000	0.0000
C	45.000	0.00	0.0	0.0	0.0270	0.0168	0.0000	0.0000
C	35.000	0.00	0.0	0.0	0.0259	0.0168	0.0000	0.0000
C	25.000	0.00	0.0	0.0	0.0244	0.0168	0.0000	0.0000
C	15.000	0.00	0.0	0.0	0.0223	0.0168	0.0000	0.0000
D	164.000	0.00	180.0	0.0	0.0492	0.0638	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0548	0.0718	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0570	0.1855	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0570	0.1855	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0607	0.1212	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0607	0.1212	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0682	0.1390	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0682	0.1390	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0752	0.1567	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0752	0.1567	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0795	0.3885	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0795	0.3885	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0817	0.2350	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0817	0.2350	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0867	0.2570	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0867	0.2570	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0908	0.2791	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0908	0.2791	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0931	0.5849	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0931	0.5849	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0924	0.3040	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0924	0.3040	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0926	0.3224	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0926	0.3224	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0899	0.3409	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.0899	0.3409	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.0913	0.3594	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0913	0.3594	0.0000	0.0000

LOADING CONDITION M

106 mph wind with no ice. wind Azimuth: 0 (0.9 D + 1.0 Wo)

LOADS ON POLE

=====

LOAD TYPE	ELEV ft	APPLY.. RADIUS ft	LOAD.. AT AZI	LOAD AZI	.....FORCES.....		.....MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	162.500	0.00	0.0	0.0	0.0169	0.0063	0.0000	0.0000
C	159.000	0.00	0.0	0.0	0.0000	2.6788	0.0000	0.0000
C	159.000	0.00	0.0	0.0	12.8390	5.4000	0.0000	0.0000
C	155.000	0.00	0.0	0.0	0.0335	0.0126	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	2.4767	0.0000	0.0000
C	147.000	0.00	0.0	0.0	9.5309	3.6274	0.0000	0.0000
C	145.000	0.00	0.0	0.0	0.0331	0.0126	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0000	2.2745	0.0000	0.0000
C	135.000	0.00	0.0	0.0	9.3918	3.6274	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0327	0.0126	0.0000	0.0000
C	125.000	0.00	0.0	0.0	0.0323	0.0126	0.0000	0.0000
C	123.000	0.00	0.0	0.0	0.0000	2.0723	0.0000	0.0000
C	123.000	0.00	0.0	0.0	9.2421	3.6274	0.0000	0.0000
C	115.000	0.00	0.0	0.0	0.0318	0.0126	0.0000	0.0000
C	105.000	0.00	0.0	0.0	0.0313	0.0126	0.0000	0.0000
C	95.000	0.00	0.0	0.0	0.0308	0.0126	0.0000	0.0000
C	85.000	0.00	0.0	0.0	0.0302	0.0126	0.0000	0.0000
C	75.000	0.00	0.0	0.0	0.0296	0.0126	0.0000	0.0000
C	65.000	0.00	0.0	0.0	0.0288	0.0126	0.0000	0.0000
C	55.000	0.00	0.0	0.0	0.0280	0.0126	0.0000	0.0000
C	45.000	0.00	0.0	0.0	0.0270	0.0126	0.0000	0.0000
C	35.000	0.00	0.0	0.0	0.0259	0.0126	0.0000	0.0000
C	25.000	0.00	0.0	0.0	0.0244	0.0126	0.0000	0.0000
C	15.000	0.00	0.0	0.0	0.0223	0.0126	0.0000	0.0000
D	164.000	0.00	180.0	0.0	0.0492	0.0479	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0548	0.0539	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0570	0.1392	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0570	0.1392	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0607	0.0909	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0607	0.0909	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0682	0.1042	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0682	0.1042	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0752	0.1175	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0752	0.1175	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0795	0.2914	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0795	0.2914	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0817	0.1762	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0817	0.1762	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0867	0.1928	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0867	0.1928	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0908	0.2093	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0908	0.2093	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0931	0.4386	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0931	0.4386	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0924	0.2280	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0924	0.2280	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0926	0.2418	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0926	0.2418	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0899	0.2557	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.0899	0.2557	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.0913	0.2695	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0913	0.2695	0.0000	0.0000

LOADING CONDITION Y

30 mph wind with 1.5 ice. wind Azimuth: 0 (1.2 D + 1.0 Di + 1.0 Wi)

LOADS ON POLE

=====

LOAD TYPE	ELEV ft	APPLY.. RADIUS ft	LOAD.. AT AZI	LOAD AZI	.....FORCES.....		.....MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	162.500	0.00	0.0	0.0	0.0108	0.0204	0.0000	0.0000
C	159.000	0.00	0.0	0.0	0.0000	3.5718	0.0000	0.0000
C	159.000	0.00	0.0	0.0	1.7510	17.7391	0.0000	0.0000
C	155.000	0.00	0.0	0.0	0.0212	0.0288	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	3.3022	0.0000	0.0000
C	147.000	0.00	0.0	0.0	1.2992	11.8081	0.0000	0.0000
C	145.000	0.00	0.0	0.0	0.0209	0.0288	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0000	3.0326	0.0000	0.0000
C	135.000	0.00	0.0	0.0	1.2758	11.7494	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0205	0.0288	0.0000	0.0000
C	125.000	0.00	0.0	0.0	0.0201	0.0288	0.0000	0.0000
C	123.000	0.00	0.0	0.0	0.0000	2.7631	0.0000	0.0000
C	123.000	0.00	0.0	0.0	1.2507	11.6858	0.0000	0.0000
C	115.000	0.00	0.0	0.0	0.0196	0.0288	0.0000	0.0000

C	105.000	0.00	0.0	0.0	0.0192	0.0288	0.0000	0.0000
C	95.000	0.00	0.0	0.0	0.0187	0.0288	0.0000	0.0000
C	85.000	0.00	0.0	0.0	0.0182	0.0288	0.0000	0.0000
C	75.000	0.00	0.0	0.0	0.0176	0.0288	0.0000	0.0000
C	65.000	0.00	0.0	0.0	0.0169	0.0288	0.0000	0.0000
C	55.000	0.00	0.0	0.0	0.0162	0.0288	0.0000	0.0000
C	45.000	0.00	0.0	0.0	0.0154	0.0288	0.0000	0.0000
C	35.000	0.00	0.0	0.0	0.0144	0.0288	0.0000	0.0000
C	25.000	0.00	0.0	0.0	0.0132	0.0288	0.0000	0.0000
C	15.000	0.00	0.0	0.0	0.0116	0.0288	0.0000	0.0000
D	164.000	0.00	180.0	0.0	0.0081	0.1111	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0088	0.1242	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0091	0.2400	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0091	0.2400	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0096	0.1792	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0096	0.1792	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0106	0.2040	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0106	0.2040	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0116	0.2286	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0116	0.2286	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0122	0.4648	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0122	0.4648	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0124	0.3138	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0124	0.3138	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0131	0.3414	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0131	0.3414	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0136	0.3685	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0136	0.3685	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0139	0.6775	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0139	0.6775	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0137	0.3971	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0137	0.3971	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0136	0.4186	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0133	0.4513	0.0000	0.0000

=====
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Sabre Towers and Poles on: 2 aug 2021 at: 11:10:21
 =====

165' Monopole / Ingram Barge, KY

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 MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)
 =====

MAST ELEV ft	DEFLECTIONS (ft)			ROTATIONS (deg)		
	HORIZONTAL ALONG	ACROSS	DOWN	TILT ALONG	ACROSS	TWIST
164.0	16.06E	0.060	2.17L	10.73E	0.040	0.01B
158.9	15.14E	0.050	2.00L	10.73E	0.040	0.01B
153.8	14.22E	0.050	1.83L	10.67E	0.040	0.01B
148.7	13.31E	0.050	1.66L	10.52E	0.040	0.01B
145.2	12.69E	0.040	1.55E	10.42E	0.040	0.01B
130.2	10.13E	0.040	1.10E	9.66E	0.030	0.01B
115.2	7.81E	0.030	0.73E	8.48E	0.030	0.01B
100.2	5.81E	0.020	0.46E	7.07E	0.020	0.00B
95.2	5.22E	0.020	0.39E	6.69E	0.020	0.00B
81.2	3.73E	0.010	0.24E	5.58E	0.020	0.00B
67.2	2.51E	0.010	0.13E	4.50E	0.020	0.00B
53.2	1.55E	0.010	0.06E	3.48E	0.010	0.00B
46.7	1.18E	0.000	0.04E	3.02E	0.010	0.00B
35.1	0.65E	0.000	0.02E	2.19E	0.010	0.00B
23.4	0.28E	0.000	0.00E	1.41E	0.010	0.00B
11.7	0.07E	0.000	0.00E	0.68E	0.000	0.00B
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t. ALONG kip	WIND.DIR ACROSS kip	MOMENT.w.r.t. ALONG ft-kip	WIND.DIR ACROSS ft-kip	TORSION ft-kip
164.0	-0.02 U	0.03 L	0.02 R	0.08 B	0.04 R	-0.01 R
158.9	21.91 AJ	13.14 L	0.02 R	-2.12 F	-0.04 R	0.01 R
	21.91 AD	13.19 B	-0.05 W	-2.06 C	0.05 L	-0.01 C
153.8	22.54 AD	13.48 B	-0.05 W	-77.74 B	0.24 W	0.08 L
	22.54 AD	13.53 M	-0.07 W	-77.85 B	0.24 W	0.06 N
148.7	23.16 AD	13.80 M	-0.07 W	-155.08 B	0.61 W	0.15 L
	23.16 AD	13.90 A	0.20 B	-155.23 B	0.77 W	0.13 K
145.2	39.11 AD	23.62 A	0.20 B	-228.17 B	-0.96 B	0.26 B
	39.11 AA	23.59 N	0.16 F	-228.05 B	-0.93 B	0.28 B
130.2	56.64 AA	33.95 N	0.16 F	-681.77 A	-3.31 O	0.62 B
	56.64 AA	33.95 B	0.14 B	-681.78 A	-3.30 O	0.61 B
115.2	74.17 AA	44.23 B	0.14 B	-1337.17 A	-5.37 O	1.10 B
	74.17 AA	44.28 E	0.13 B	-1337.19 A	-5.37 O	1.10 B
100.2	77.66 AA	45.46 E	0.13 B	-2079.76 E	-6.91 O	1.51 B
	77.66 AA	45.46 N	0.17 X	-2079.98 E	-7.08 O	1.52 B
95.2	79.98 AA	45.86 N	0.17 X	-2330.07 E	-7.32 O	1.63 B
	79.98 AA	45.92 E	0.17 O	-2330.16 E	-7.31 O	1.65 B
81.2	84.43 AA	47.12 E	0.17 O	-3042.00 E	-9.79 O	1.89 B
	84.43 AA	47.10 A	0.21 O	-3041.94 E	-9.80 O	1.89 B
67.2	89.24 AA	48.34 A	0.21 O	-3764.91 E	-12.83 O	2.13 B
	89.24 AA	48.35 A	0.21 O	-3764.85 E	-12.82 O	2.13 B
53.2	94.45 AA	49.67 A	0.21 O	-4498.70 E	-15.81 O	2.32 B
	94.45 AA	49.67 E	0.18 O	-4498.77 E	-15.80 O	2.32 B
46.7	98.86 AA	50.27 E	0.18 O	-4843.36 E	-17.04 O	2.40 B
	98.86 AA	50.31 E	0.19 O	-4843.38 E	-17.08 O	2.40 B
35.1	103.53 AA	51.42 E	0.19 O	-5468.77 E	-19.37 O	2.51 B
	103.56 AA	51.43 E	0.20 C	-5468.76 E	-19.38 O	2.51 B
23.4	108.54 AA	52.54 E	0.20 C	-6099.04 E	-21.76 O	2.59 B
	108.54 AA	52.54 E	0.19 O	-6099.04 E	-21.77 O	2.59 B
11.7	113.65 AA	53.61 E	0.19 O	-6733.60 E	-24.06 O	2.64 B
	113.65 AA	53.61 E	0.19 O	-6733.59 E	-24.06 O	2.64 B
	118.86 AA	54.68 E	0.19 O	-7371.31 E	-26.31 O	2.66 B
base reaction	118.86 AA	-54.68 E	-0.19 O	7371.31 E	26.31 O	-2.66 B

COMPLIANCE WITH 4.8.2 & 4.5.4

ELEV ft	AXIAL	BENDING	SHEAR + TORSIONAL	TOTAL	SATISFIED	D/t(w/t)	MAX ALLOWED
164.00	0.00U	0.00B	0.00L	0.00H	YES	12.38A	45.2
158.92	0.02AJ	0.00F	0.02L	0.02AD	YES	13.26A	45.2
	0.02AD	0.00C	0.02B	0.02AB	YES	13.26A	45.2
153.83	0.02AD	0.14B	0.02B	0.15B	YES	14.14A	45.2
	0.02AD	0.14B	0.02M	0.15B	YES	14.14A	45.2

148.75	0.02AD	0.25B	0.02M	0.26B	YES	15.03A	45.2
	0.01AD	0.17B	0.01A	0.17B	YES	9.90A	45.2
145.25	0.02AD	0.23B	0.02A	0.24B	YES	10.31A	45.2
	0.02AA	0.24B	0.02N	0.25B	YES	10.07A	45.2
130.25	0.02AA	0.53A	0.03N	0.54A	YES	11.81A	45.2
	0.02AA	0.53A	0.03B	0.54A	YES	11.81A	45.2
115.25	0.03AA	0.80A	0.03B	0.81A	YES	13.55A	45.2
	0.03AA	0.80A	0.03E	0.81A	YES	13.55A	45.2
100.25	0.03AA	0.98E	0.03E	1.00E	YES	15.28A	45.2
	0.02AA	0.75E	0.02N	0.76E	YES	11.37A	45.2
95.25	0.02AA	0.78E	0.02N	0.79E	YES	11.81A	45.2
	0.02AA	0.81E	0.02E	0.82E	YES	11.54A	45.2
81.25	0.02AA	0.88E	0.02E	0.89E	YES	12.76A	45.2
	0.02AA	0.88E	0.02E	0.89E	YES	12.76A	45.2
67.25	0.02AA	0.91E	0.02E	0.92E	YES	13.98A	45.2
	0.02AA	0.91E	0.02A	0.92E	YES	13.98A	45.2
53.25	0.02AA	0.93E	0.02E	0.94E	YES	15.19A	45.2
	0.02AA	0.93E	0.02E	0.94E	YES	15.19A	45.2
46.75	0.02AA	0.93E	0.02E	0.94E	YES	15.76A	45.2
	0.02AA	0.97E	0.02E	0.98E	YES	15.40A	45.2
35.06	0.02AA	0.97E	0.02E	0.99E	YES	16.42A	45.2
	0.02AA	0.97E	0.02E	0.99E	YES	16.42A	45.2
23.37	0.02AA	0.98E	0.02E	0.99E	YES	17.43A	45.2
	0.02AA	0.98E	0.02E	0.99E	YES	17.43A	45.2
11.69	0.02AA	0.99E	0.02W	1.00E	YES	18.45A	45.2
	0.02AA	0.99E	0.02W	1.00E	YES	18.45A	45.2
0.00	0.02AA	0.99E	0.02W	1.00E	YES	19.46A	45.2

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN	SHEAR.w.r.t.WIND.DIR	MOMENT.w.r.t.WIND.DIR	TORSION
kip	ALONG	ALONG	ft-kip
	ACROSS	ACROSS	
	kip	ft-kip	
118.86	54.68	-7371.31	2.66
AA	E	E	B
	O	O	

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Sabre Towers and Poles on: 2 aug 2021 at: 11:10:58

165' Monopole / Ingram Barge, KY

 ***** Service Load Condition *****

* Only 1 condition(s) shown in full
 * Some concentrated wind loads may have been derived from full-scale wind tunnel testing

LOADING CONDITION A =====

60 mph wind with no ice. wind Azimuth: 0° (1.0 D + 1.0 Wo)

LOADS ON POLE

=====

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES.....		.....MOMENTS.....	
					HORIZ kip	DOWN kip	VERTICAL ft-kip	TORSNAL ft-kip
C	162.500	0.00	0.0	0.0	0.0048	0.0070	0.0000	0.0000
C	159.000	0.00	0.0	0.0	0.0000	2.9765	0.0000	0.0000
C	159.000	0.00	0.0	0.0	3.6806	6.0000	0.0000	0.0000
C	155.000	0.00	0.0	0.0	0.0096	0.0140	0.0000	0.0000
C	147.000	0.00	0.0	0.0	0.0000	2.7518	0.0000	0.0000
C	147.000	0.00	0.0	0.0	2.7322	4.0305	0.0000	0.0000
C	145.000	0.00	0.0	0.0	0.0095	0.0140	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0000	2.5272	0.0000	0.0000
C	135.000	0.00	0.0	0.0	2.6924	4.0305	0.0000	0.0000
C	135.000	0.00	0.0	0.0	0.0094	0.0140	0.0000	0.0000
C	125.000	0.00	0.0	0.0	0.0093	0.0140	0.0000	0.0000
C	123.000	0.00	0.0	0.0	0.0000	2.3026	0.0000	0.0000
C	123.000	0.00	0.0	0.0	2.6495	4.0305	0.0000	0.0000
C	115.000	0.00	0.0	0.0	0.0091	0.0140	0.0000	0.0000
C	105.000	0.00	0.0	0.0	0.0090	0.0140	0.0000	0.0000
C	95.000	0.00	0.0	0.0	0.0088	0.0140	0.0000	0.0000
C	85.000	0.00	0.0	0.0	0.0087	0.0140	0.0000	0.0000
C	75.000	0.00	0.0	0.0	0.0085	0.0140	0.0000	0.0000
C	65.000	0.00	0.0	0.0	0.0083	0.0140	0.0000	0.0000
C	55.000	0.00	0.0	0.0	0.0080	0.0140	0.0000	0.0000
C	45.000	0.00	0.0	0.0	0.0078	0.0140	0.0000	0.0000
C	35.000	0.00	0.0	0.0	0.0074	0.0140	0.0000	0.0000
C	25.000	0.00	0.0	0.0	0.0070	0.0140	0.0000	0.0000
C	15.000	0.00	0.0	0.0	0.0064	0.0140	0.0000	0.0000
D	164.000	0.00	180.0	0.0	0.0141	0.0532	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0157	0.0599	0.0000	0.0000
D	148.750	0.00	180.0	0.0	0.0164	0.1546	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0164	0.1546	0.0000	0.0000
D	145.250	0.00	180.0	0.0	0.0174	0.1010	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0174	0.1010	0.0000	0.0000
D	130.250	0.00	180.0	0.0	0.0195	0.1158	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0195	0.1158	0.0000	0.0000
D	115.250	0.00	180.0	0.0	0.0216	0.1306	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0216	0.1306	0.0000	0.0000
D	100.250	0.00	180.0	0.0	0.0228	0.3237	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0228	0.3237	0.0000	0.0000
D	95.250	0.00	180.0	0.0	0.0234	0.1958	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0234	0.1958	0.0000	0.0000
D	81.250	0.00	180.0	0.0	0.0249	0.2142	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0249	0.2142	0.0000	0.0000
D	67.250	0.00	180.0	0.0	0.0260	0.2326	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0260	0.2326	0.0000	0.0000
D	53.250	0.00	180.0	0.0	0.0267	0.4874	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0267	0.4874	0.0000	0.0000
D	46.750	0.00	180.0	0.0	0.0265	0.2533	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0265	0.2533	0.0000	0.0000
D	35.062	0.00	180.0	0.0	0.0265	0.2687	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0265	0.2687	0.0000	0.0000
D	23.375	0.00	180.0	0.0	0.0258	0.2841	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.0258	0.2841	0.0000	0.0000
D	11.687	0.00	180.0	0.0	0.0262	0.2995	0.0000	0.0000
D	0.000	0.00	180.0	0.0	0.0262	0.2995	0.0000	0.0000

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MAXIMUM POLE DEFORMATIONS CALCULATED(w.r.t. wind direction)

=====

MAST ELEV ftDEFLECTIONS (ft).....		ROTATIONS (deg).....		
	..... HORIZONTAL ALONG	..... ACROSS	DOWN	..... TILT .....	..... ACROSS	TWIST
164.0	4.70K	-0.01B	0.19K	3.10K	-0.01B	0.00E
158.9	4.43K	-0.01B	0.17K	3.10K	-0.01B	0.00E
153.8	4.16K	-0.01B	0.16K	3.08K	-0.01B	0.00E
148.7	3.88K	-0.01B	0.14K	3.04K	-0.01B	0.00E
145.2	3.70K	-0.01B	0.13K	3.01K	-0.01B	0.00E
130.2	2.94K	0.01F	0.10K	2.78K	-0.01B	0.00E
115.2	2.26K	0.01F	0.06K	2.44K	-0.01B	0.00E
100.2	1.67K	0.01F	0.04K	2.03K	-0.01B	0.00E
95.2	1.50K	0.00F	0.03K	1.92K	0.01F	0.00E
81.2	1.07K	0.00F	0.02K	1.60K	0.00F	0.00E

67.2	0.72K	0.00F	0.01K	1.29K	0.00F	0.00E
53.2	0.44K	0.00F	0.01K	0.99K	0.00F	0.00E
46.7	0.34K	0.00F	0.00K	0.86K	0.00F	0.00E
35.1	0.19K	0.00F	0.00K	0.63K	0.00F	0.00E
23.4	0.08K	0.00F	0.00K	0.40K	0.00F	0.00E
11.7	0.02K	0.00F	0.00K	0.20K	0.00F	0.00E
0.0	0.00A	0.00A	0.00A	0.00A	0.00A	0.00A

MAXIMUM POLE FORCES CALCULATED(w.r.t. to wind direction)

MAST ELEV ft	TOTAL AXIAL kip	SHEAR.w.r.t. ALONG kip	WIND.DIR ACROSS kip	MOMENT.w.r.t. ALONG ft-kip	WIND.DIR ACROSS ft-kip	TORSION ft-kip
164.0	0.00 I	-0.01 K	0.00 F	-0.03 D	0.01 F	0.00 F
158.9	9.26 D	3.76 C	0.00 F	-0.59 C	-0.01 F	0.00 K
153.8	9.27 K	3.79 K	-0.01 B	-0.61 F	0.02 L	0.00 B
148.7	9.57 K	3.87 K	-0.01 B	-22.52 K	0.04 L	-0.01 E
145.2	9.57 K	3.88 K	-0.03 L	-22.51 C	-0.04 F	-0.01 E
130.2	9.87 K	3.96 K	-0.03 L	-45.03 K	0.21 L	-0.01 F
115.2	9.87 K	3.97 D	-0.04 L	-45.09 K	0.19 L	-0.01 E
100.2	17.19 K	6.76 D	-0.04 L	-66.08 K	0.34 L	-0.02 E
95.2	17.20 K	6.77 L	-0.04 B	-66.02 K	0.32 L	-0.02 E
81.2	25.30 K	9.74 L	-0.04 B	-197.21 L	0.77 B	-0.07 E
67.2	25.30 K	9.73 L	-0.05 B	-197.21 L	0.77 B	-0.07 E
53.2	33.38 K	12.68 L	-0.05 B	-385.55 L	1.49 B	-0.12 E
46.7	33.39 K	12.68 L	-0.05 B	-385.55 L	1.49 B	-0.12 E
35.1	35.37 K	13.02 L	-0.05 B	-597.96 L	2.21 B	-0.17 E
23.4	35.37 K	13.02 K	-0.04 B	-598.07 L	2.20 B	-0.17 E
11.7	36.99 K	13.13 K	-0.04 B	-669.32 L	2.40 B	-0.19 E
0.0	36.99 K	13.15 K	0.05 F	-669.39 L	2.47 B	-0.19 E
164.0	39.76 K	13.50 K	0.05 F	-872.07 K	2.72 B	-0.23 E
158.9	39.76 K	13.51 K	0.05 F	-872.06 K	2.73 B	-0.23 E
153.8	42.77 K	13.87 K	0.05 F	-1078.06 K	-3.36 F	-0.27 E
148.7	42.77 K	13.86 K	0.04 F	-1078.07 K	-3.36 F	-0.27 E
145.2	46.05 K	14.24 K	0.04 F	-1287.05 K	-4.04 F	-0.29 E
130.2	46.05 K	14.23 K	-0.04 E	-1287.10 K	-4.04 F	-0.29 E
115.2	49.22 K	14.40 K	-0.04 E	-1385.12 K	-4.32 F	-0.31 E
100.2	49.22 K	14.42 K	0.04 F	-1385.14 K	-4.32 F	-0.31 E
95.2	52.19 K	14.73 K	0.04 F	-1563.16 K	-4.85 F	-0.32 E
81.2	52.21 K	14.73 K	-0.04 E	-1563.17 K	-4.85 F	-0.32 E
67.2	55.36 K	15.05 K	-0.04 E	-1742.79 K	-5.38 F	-0.33 E
53.2	55.36 K	15.05 K	0.04 F	-1742.79 K	-5.37 F	-0.33 E
46.7	58.70 K	15.36 K	0.04 F	-1923.96 K	-5.91 F	-0.34 E
35.1	58.70 K	15.36 K	0.04 F	-1923.96 K	-5.91 F	-0.34 E
23.4	62.20 K	15.67 K	0.04 F	-2106.44 K	-6.44 F	-0.34 E
11.7	62.20 K	15.67 K	0.04 F	-2106.44 K	-6.44 F	-0.34 E
base reaction	62.20 K	-15.67 K	-0.04 F	2106.44 K	6.44 F	0.34 E

COMPLIANCE WITH 4.8.2 & 4.5.4

ELEV ft	AXIAL	BENDING	SHEAR + TORSIONAL	TOTAL	SATISFIED	D/t(w/t)	MAX ALLOWED
164.00	0.00I	0.00D	0.00K	0.00D	YES	12.38A	45.2
158.92	0.01D	0.00C	0.01C	0.01C	YES	13.26A	45.2
153.83	0.01K	0.04K	0.01K	0.05K	YES	14.14A	45.2
148.75	0.01K	0.07K	0.01K	0.08K	YES	15.03A	45.2
145.25	0.01K	0.07K	0.01D	0.07K	YES	10.31A	45.2
130.25	0.01K	0.15L	0.01L	0.16L	YES	11.81A	45.2
115.25	0.01K	0.23L	0.01L	0.24L	YES	13.55A	45.2
100.25	0.01K	0.28L	0.01L	0.29L	YES	15.28A	45.2
95.25	0.01K	0.22L	0.01K	0.23L	YES	11.81A	45.2
81.25	0.01K	0.25K	0.01K	0.26K	YES	12.76A	45.2
67.25	0.01K	0.26K	0.01K	0.27K	YES	13.98A	45.2
53.25	0.01K	0.26K	0.01K	0.27K	YES	15.19A	45.2
46.75	0.01K	0.27K	0.01K	0.27K	YES	15.76A	45.2
35.06	0.01K	0.28K	0.01K	0.29K	YES	16.42A	45.2
23.37	0.01K	0.28K	0.01K	0.29K	YES	17.43A	45.2
11.69	0.01K	0.28K	0.00K	0.29K	YES	18.45A	45.2
0.00	0.01K	0.28K	0.00K	0.29K	YES	19.46A	45.2

MAXIMUM LOADS ONTO FOUNDATION(w.r.t. wind direction)

DOWN kip	SHEAR.w.r.t.WIND.DIR ALONG kip	ACROSS WIND.DIR kip	MOMENT.w.r.t.WIND.DIR ALONG ft-kip	ACROSS WIND.DIR ft-kip	TORSION ft-kip
62.20 K	15.67 K	0.04 F	-2106.44 K	-6.44 F	-0.34 E

Round Base Plate and Anchor Rods, per ANSI/TIA 222-H

Pole Data

Diameter:	57.440	in (flat to flat)
Thickness:	0.5	in
Yield (Fy):	65	ksi
# of Sides:	18	"0" IF Round
Strength (Fu):	80	ksi

Reactions

Moment, Mu:	7371.31	ft-kips
Axial, Pu:	74.54	kips
Shear, Vu:	54.68	kips

Anchor Rod Data

Quantity:	24	
Diameter:	2.25	in
Rod Material:	A615	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
BC Diam. (in):	64.5	BC Override:

Plate Data

Diameter (in):	70.25	Dia. Override:
Thickness:	2.5	in
Yield (Fy):	50	ksi
Eff Width/Rod:	7.60	in
Drain Hole:	2.625	in. diameter
Drain Location:	26.5	in. center of pole to center of drain hole
Center Hole:	45	in. diameter

Anchor Rod Results

(per 4.9.9)

Maximum Put:	226.24 Kips
$\Phi_t \cdot R_{nt}$:	243.75 Kips
Vu:	2.28 Kips
$\Phi_v \cdot R_{nv}$:	149.10 Kips
Tension Interaction Ratio:	0.86
Maximum Puc:	231.67 Kips
$\Phi_c \cdot R_{nc}$:	268.39 Kips
Vu:	2.28 Kips
$\Phi_c \cdot R_{ncv}$:	120.77 Kips
Compression Interaction Ratio:	0.86
Maximum Interaction Ratio:	86.4% Pass

Base Plate Results

Base Plate (Mu/Z):	42.7 ksi
Allowable $\Phi \cdot F_y$:	45.0 ksi (per AISC)
Base Plate Interaction Ratio:	94.8% Pass

MAT FOUNDATION DESIGN BY SABRE INDUSTRIES

165' Monopole AT&T Ingram Barge, KY (480163) 08/02/21 DJH

Overall Loads:

Factored Moment (ft-kips)	7371.31
Factored Axial (kips)	74.54
Factored Shear (kips)	54.68
Bearing Design Strength (ksf)	3
Water Table Below Grade (ft)	999
Width of Mat (ft)	30.5
Thickness of Mat (ft)	2.25
Depth to Bottom of Slab (ft)	6
Quantity of Bolts in Bolt Circle	24
Bolt Circle Diameter (in)	64.5
Effective Anchor	
Bolt Embedment (in)	66.5
Diameter of Pier (ft)	8
Ht. of Pier Above Ground (ft)	0.5
Ht. of Pier Below Ground (ft)	3.75
Quantity of Bars in Mat	39
Bar Diameter in Mat (in)	1.27
Area of Bars in Mat (in ²)	49.40
Spacing of Bars in Mat (in)	9.44
Quantity of Bars Pier	50
Bar Diameter in Pier (in)	1.41
Tie Bar Diameter in Pier (in)	0.625
Spacing of Ties (in)	4
Area of Bars in Pier (in ²)	78.07
Spacing of Bars in Pier (in)	5.49
f'c (ksi)	4.5
fy (ksi)	60
Unit Wt. of Soil (kcf)	0.11
Unit Wt. of Concrete (kcf)	0.15

Max. Net Bearing Press. (ksf)	2.89
Allowable Bearing Pressure (ksf)	2.00
Safety Factor	2.00
Ultimate Bearing Pressure (ksf)	4.00
Bearing Φ s	0.75

Minimum Pier Diameter (ft)	8.00
Equivalent Square b (ft)	7.09
Square Pier? (Y/N)	N

Recommended Spacing (in)	5 to 12
--------------------------	---------

Minimum Pier A _s (in ²)	36.19
Recommended Spacing (in)	5 to 12

Volume of Concrete (yd³) 85.43

Two-Way Shear Action:

Average d (in)	22.73
ϕv_c (ksi)	0.201
$\phi v_c = \phi(2 + 4/\beta_c)f'_c$	0.302
$\phi v_c = \phi(\alpha_s d/b_o + 2)f'_c$	0.207
$\phi v_c = \phi 4f'_c$	0.201
Shear perimeter, b _o (in)	431.23
β_c	1

v _u (ksi)	0.110
----------------------	-------

J (in ³)	1.920E+07
c + d (in)	107.81
0.40M _{sc} (ft-kips)	3041.5

One-Way Shear:

ϕV_c (kips)	837.1
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V _u (kips)	442.7
-----------------------	-------

Stability:

Overturning Design Strength (ft-k)	10583.5
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Total Applied M (ft-k)	7726.7
------------------------	--------

Pier-Slab Transfer by Flexure:

b_{slab} (ft)	14.75		
ϕM_n (ft-kips)	<input type="text" value="4660.0"/>	$0.60M_{sc}$ (ft-kips)	<input type="text" value="4562.2"/>

Pier Design:

ϕV_n (kips)	<input type="text" value="1275.8"/>	V_u (kips)	<input type="text" value="54.7"/>
$\phi V_c = \phi 2(1 + N_u / (2000 A_g)) f'_c{}^{1/2} b_w d$	745.7		
V_s (kips)	<input type="text" value="706.9"/>	$*** V_s \max = 4 f'_c{}^{1/2} b_w d$ (kips)	<input type="text" value="1978.3"/>
Maximum Spacing (in)	7.62	(Only if Shear Ties are Required)	
Actual Hook Development (in)	21.46	Req'd Hook Development l_{dh} (in) - Tension	17.66
		Req'd Hook Development l_{dc} (in) - Compression	19.04

Flexure in Slab:

ϕM_n (ft-kips)	<input type="text" value="4817.9"/>	M_u (ft-kips)	<input type="text" value="3472.6"/>
a (in)	2.12		
Steel Ratio	0.00594		
β_1	0.825		
Maximum Steel Ratio (ρ_t)	0.0197		
Minimum Steel Ratio	0.0018		
Rebar Development in Pad (in)	<input type="text" value="132.00"/>	Required Development in Pad (in)	<input type="text" value="34.08"/>

Condition	1 is OK, 0 Fails
Maximum Soil Bearing Pressure	1
Pier Area of Steel	1
Pier Shear	1
Interaction Diagram	1
Two-Way Shear Action	1
One-Way Shear Action	1
Overtuning	1
Flexure	1
Steel Ratio	1
Length of Development in Pad	1
Hook Development	1
Anchor Bolt Pullout	1
Anchor Bolt Punching Shear	1

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Files Used for Analysis

Path to file locations:
\Program Files (x86)\Ensoft\Lpile2019\files\

Name of input data file:
480163A.lp11d

Name of output report file:
480163A.lp11o

Name of plot output file:
480163A.lp11p

Name of runtime message file:
480163A.lp11r

Date and Time of Analysis

Date: August 2, 2021

Time: 11:16:00

Problem Title

Site : Ingram Barge, KY

Tower : 165' Monopole

Prepared for : AT&T

Job Number : 480163 Revision A

Engineer : DJH

Program Options and Settings

Computational Options:
- Conventional Analysis
Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:
- Maximum number of iterations allowed = 999
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 100.0000 in
- Number of pile increments = 100

Loading Type and Number of Cycles of Loading:
- Static loading specified

- Use of p-y modification factors for p-y curves not selected

- Analysis uses layering correction (Method of Georgiadis)
- No distributed lateral loads are entered
- Loading by lateral soil movements acting on pile not selected
- Input of shear resistance at the pile tip not selected
- Input of moment resistance at the pile tip not selected
- Input of side resistance moment along pile not selected
- Computation of pile-head foundation stiffness matrix not selected
- Push-over analysis of pile not selected
- Buckling analysis of pile not selected

Output Options:

- Output files use decimal points to denote decimal symbols.
- Report only summary tables of pile-head deflection, maximum bending moment, and maximum shear force in output report file.
- No p-y curves to be computed and reported for user-specified depths
- Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 1
Total length of pile = 38.500 ft
Depth of ground surface below top of pile = 0.5000 ft

Pile diameters used for p-y curve computations are defined using 2 points.

p-y curves are computed using pile diameter values interpolated with depth over the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	96.0000
2	38.500	96.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile
Length of section = 38.500000 ft
Shaft Diameter = 96.000000 in
Shear capacity of section = 0.0000 lbs

Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
= 0.000 radians
Pile Batter Angle = 0.000 degrees
= 0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is stiff clay without free water

Distance from top of pile to top of layer = 0.500000 ft
Distance from top of pile to bottom of layer = 3.500000 ft
Effective unit weight at top of layer = 120.000000 pcf
Effective unit weight at bottom of layer = 120.000000 pcf
Undrained cohesion at top of layer = 500.000000 psf
Undrained cohesion at bottom of layer = 500.000000 psf
Epsilon-50 at top of layer = 0.020000
Epsilon-50 at bottom of layer = 0.020000

Layer 2 is stiff clay without free water

Distance from top of pile to top of layer = 3.500000 ft
Distance from top of pile to bottom of layer = 29.500000 ft
Effective unit weight at top of layer = 120.000000 pcf
Effective unit weight at bottom of layer = 120.000000 pcf
Undrained cohesion at top of layer = 1000.000000 psf
Undrained cohesion at bottom of layer = 1000.000000 psf
Epsilon-50 at top of layer = 0.010000
Epsilon-50 at bottom of layer = 0.010000

Layer 3 is stiff clay without free water

Distance from top of pile to top of layer = 29.500000 ft
 Distance from top of pile to bottom of layer = 40.500000 ft
 Effective unit weight at top of layer = 120.000000 pcf
 Effective unit weight at bottom of layer = 120.000000 pcf
 Undrained cohesion at top of layer = 2000. psf
 Undrained cohesion at bottom of layer = 2000. psf
 Epsilon-50 at top of layer = 0.007000
 Epsilon-50 at bottom of layer = 0.007000

(Depth of the lowest soil layer extends 2.000 ft below the pile tip)

 Summary of Input Soil Properties

Layer Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	E50 or krm
1	Stiff Clay	0.5000	120.0000	500.0000	0.02000
	w/o Free Water	3.5000	120.0000	500.0000	0.02000
2	Stiff Clay	3.5000	120.0000	1000.0000	0.01000
	w/o Free Water	29.5000	120.0000	1000.0000	0.01000
3	Stiff Clay	29.5000	120.0000	2000.	0.00700
	w/o Free Water	40.5000	120.0000	2000.	0.00700

 Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length	Run Analysis
1	1	V = 72907. lbs	M = 117940960. in-lbs	99387.	No	Yes
2	1	V = 15670. lbs	M = 25277280. in-lbs	62200.	No	Yes

V = shear force applied normal to pile axis
 M = bending moment applied to pile head
 y = lateral deflection normal to pile axis
 S = pile slope relative to original pile batter angle
 R = rotational stiffness applied to pile head
 Values of top y vs. pile lengths can be computed only for load types with
 specified shear loading (Load Types 1, 2, and 3).
 Thrust force is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

 Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section = 38.500000 ft
 Shaft Diameter = 96.000000 in
 Concrete Cover Thickness (to edge of long. rebar) = 3.625000 in
 Number of Reinforcing Bars = 50 bars
 Yield Stress of Reinforcing Bars = 60000. psi
 Modulus of Elasticity of Reinforcing Bars = 29000000. psi
 Gross Area of Shaft = 7238. sq. in.
 Total Area of Reinforcing Steel = 78.072504 sq. in.
 Area Ratio of Steel Reinforcement = 1.08 percent
 Edge-to-Edge Bar Spacing = 4.074124 in
 Maximum Concrete Aggregate Size = 0.750000 in
 Ratio of Bar Spacing to Aggregate Size = 5.43
 Offset of Center of Rebar Cage from Center of Pile = 0.0000 in

 Axial Structural Capacities:

Nom. Axial Structural Capacity = $0.85 F_c A_c + F_y A_s$ = 32071.951 kips

Tensile Load for Cracking of Concrete = -3413.486 kips
 Nominal Axial Tensile Capacity = -4684.350 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.410000	1.561450	43.670000	0.000000
2	1.410000	1.561450	43.325649	5.473302
3	1.410000	1.561450	42.298027	10.860287
4	1.410000	1.561450	40.603339	16.075999
5	1.410000	1.561450	38.268313	21.038183
6	1.410000	1.561450	35.329772	25.668582
7	1.410000	1.561450	31.834060	29.894172
8	1.410000	1.561450	27.836306	33.648313
9	1.410000	1.561450	23.399556	36.871801
10	1.410000	1.561450	18.593782	39.513797
11	1.410000	1.561450	13.494772	41.532638
12	1.410000	1.561450	8.182942	42.896484
13	1.410000	1.561450	2.742062	43.583827
14	1.410000	1.561450	-2.742062	43.583827
15	1.410000	1.561450	-8.182942	42.896484
16	1.410000	1.561450	-13.494772	41.532638
17	1.410000	1.561450	-18.593782	39.513797
18	1.410000	1.561450	-23.399556	36.871801
19	1.410000	1.561450	-27.836306	33.648313
20	1.410000	1.561450	-31.834060	29.894172
21	1.410000	1.561450	-35.329772	25.668582
22	1.410000	1.561450	-38.268313	21.038183
23	1.410000	1.561450	-40.603339	16.075999
24	1.410000	1.561450	-42.298027	10.860287
25	1.410000	1.561450	-43.325649	5.473302
26	1.410000	1.561450	-43.670000	0.000000
27	1.410000	1.561450	-43.325649	-5.473302
28	1.410000	1.561450	-42.298027	-10.860287
29	1.410000	1.561450	-40.603339	-16.075999
30	1.410000	1.561450	-38.268313	-21.038183
31	1.410000	1.561450	-35.329772	-25.668582
32	1.410000	1.561450	-31.834060	-29.894172
33	1.410000	1.561450	-27.836306	-33.648313
34	1.410000	1.561450	-23.399556	-36.871801
35	1.410000	1.561450	-18.593782	-39.513797
36	1.410000	1.561450	-13.494772	-41.532638
37	1.410000	1.561450	-8.182942	-42.896484
38	1.410000	1.561450	-2.742062	-43.583827
39	1.410000	1.561450	2.742062	-43.583827
40	1.410000	1.561450	8.182942	-42.896484
41	1.410000	1.561450	13.494772	-41.532638
42	1.410000	1.561450	18.593782	-39.513797
43	1.410000	1.561450	23.399556	-36.871801
44	1.410000	1.561450	27.836306	-33.648313
45	1.410000	1.561450	31.834060	-29.894172
46	1.410000	1.561450	35.329772	-25.668582
47	1.410000	1.561450	38.268313	-21.038183
48	1.410000	1.561450	40.603339	-16.075999
49	1.410000	1.561450	42.298027	-10.860287
50	1.410000	1.561450	43.325649	-5.473302

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.074 inches between bars 1 and 50.

Ratio of bar spacing to maximum aggregate size = 5.43

Concrete Properties:

Compressive Strength of Concrete = 4500. psi
 Modulus of Elasticity of Concrete = 3823676. psi
 Modulus of Rupture of Concrete = -503.115295 psi
 Compression Strain at Peak Stress = 0.002001
 Tensile Strain at Fracture of Concrete = -0.0001152
 Maximum Coarse Aggregate Size = 0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	62.200
2	99.387

Summary of Results for Nominal Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	62.200	186588.604	0.00300000
2	99.387	187806.175	0.00300000

Note that the values of moment capacity in the table above are not factored by a strength reduction factor (ϕ -factor).

In ACI 318, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318, Section 9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in ²
1	0.65	186589.	40.430000	121283.	4.2660E+09
2	0.65	187806.	64.601333	122074.	4.2966E+09
1	0.75	186589.	43.540000	139941.	4.1199E+09
2	0.75	187806.	69.570667	140855.	4.1511E+09
1	0.90	186589.	46.650000	167930.	2.7632E+09
2	0.90	187806.	74.540000	169026.	2.7882E+09

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	0.5000	0.00	N.A.	No	0.00	41509.
2	3.5000	1.6470	Yes	No	41509.	1181102.
3	29.5000	18.4906	Yes	No	1222611.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals for Layer n. Layering correction equivalent depths are computed only for soil types with both shallow-depth and deep-depth expressions for peak lateral load transfer. These soil types are soft and stiff clays, non-liquefied sands, and cemented c-phi soil.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
 Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
 Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
 Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
 Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	72907.	M, in-lb	1.18E+08	99387.	19.2471	-0.06346	-585955.	1.22E+08
2	V, lb	15670.	M, in-lb	2.53E+07	62200.	0.07111	-4.13E-04	-115928.	2.59E+07

Maximum pile-head deflection = 19.2471492479 inches
 Maximum pile-head rotation = -0.0634573235 radians = -3.635837 deg.

The analysis ended normally.

IBC 1807.3.2.1

Moment (ft-k)	7,371.31	
Shear (k)	54.68	
Caisson diameter (ft)	8	
Caisson height above ground (ft)	0.5	
Caisson height below ground (ft)	31	
Lateral soil pressure (lb/ft ²)	300.00	
Ground to application of force, h (ft)	135.31	
Applied lateral force, P (lb)	54,680	
Lateral soil bearing pressure, S ₁ (lb/ft)	3,100.00	
Diameter, b (ft)	8	
A	5.16	$= (2.34P)/(S_1 b)$
Minimum depth of embedment, d (ft)	30.28	$= 0.5A[1 + (1 + (4.36h / A))^{1/2}]$