
BOIS BLANC TOWNSHIP

rev 4/2009

Application for: (check any that apply)

<input type="checkbox"/> Rezoning	<input type="checkbox"/> Home Occupation
<input type="checkbox"/> Variance (Board of Appeals)	<input type="checkbox"/> Cottage Industry
<input checked="" type="checkbox"/> Site Plan Review	<input type="checkbox"/> Other (please specify) _____
<input checked="" type="checkbox"/> Special Land Use	

Applicant Information

Name: Enbridge Energy, Limited Partnership _____
Phone: 1 (218) 522-4705 _____ Fax: _____ E-Mail Jason.Risdall@enbridge.com _____
Address: 11 E. Superior Street, Suite 125 Duluth, MN 55802 _____

Owner Information (if different from applicant)

Name: William & Diane Akright _____
Phone: 231-634-7070 _____
Address: 3154 N. Lime Kiln Drive, Bois Blanc Island, MI 49775 (HC1 – Box 906) _____

Property Information

Address/Location: 3154 N. Lime Kiln Drive _____
Parcel #: 001-014-003-00 _____
Zoning (current): Mixed Commercial District _____ Property Size: 10.5 Acres _____

Description of Proposed Use/Request (use other side or attach pages as needed)

Enbridge Energy, Limited Partnership (Enbridge) plans to own and install a temporary, approximate 130-foot, tower to mount a high-resolution Aptomar Camera on Parcel No. 001-014-003-00. The 130-foot height of the tower includes the base as well as the camera height. Installation will include an electrical cabinet, a back-up generator with a propane fuel system, and microwave radio for communication.

This high-resolution camera at the Straits will monitor ship traffic 24/7 and will act as an early warning and notification system. The system will have a 24/7/365 marine control center in the Straits that will initiate appropriate counter measures, document the monitoring process, and validate safe passage of vessels through the Straits. This safety measure will further reduce the risk of an anchor strike and will be in place while the Line 5 tunnel project moves forward.

Enbridge will decommission and remove the tower and camera when the tunnel is placed into service, which is estimated to occur in 2024. This in-service date is dependent on obtaining all necessary federal, state and local permits required for the project to commence.

I hereby attest that the information on this application form is, to the best of my knowledge, true and accurate.

Jason Risdall

1-20-2021

Signature of applicant

Date

Optional: I hereby grant permission for members of the Bois Blanc Township (Planning Commission) (Zoning Board of Appeals) (Township Board) (or Zoning Administrator) to enter the above described property for the purposes of gathering information related to this application. *Note to applicant: This permission is optional and failure to grant permission will not affect any decision on your application.*

Signature of applicant

Date

Office Use Only

Date Received: _____

Fee Paid: _____

Materials Received: _____ Site Plans _____ Legal Description _____

Application accepted by: _____



Jason Risdall
Manager Regulatory Affairs

tel (218) 348-5991
Jason.Risdall@enbridge.com

Enbridge Energy, Limited
Partnership
11 E Superior Street
Suite #125
Duluth, MN 55802

January 20, 2021

Brent Sharpe
Bois Blanc Township Supervisor
Bois Blanc Township Planning Commission
P.O. Box 898
Pointe Aux Pins, MI 49775

Re: Bois Blanc Special Use Permit Application
Enbridge Line 5 Mackinac Straits Camera Installation Project

Dear Mr. Sharpe:

Enbridge Energy, Limited Partnership (“Enbridge”) submits the Bois Blanc Township Special Use Permit Application for the Enbridge Line 5 Mackinac Straits Camera Installation Project (“Project”). The Project plans for Enbridge to own and install a temporary, approximate 130-foot, tower to mount a high-resolution Aptomar camera on Parcel No. 001-014-003-00. The 130-foot height of the tower includes the base as well as the camera height. Installation will include an electrical cabinet, a back-up generator with a propane fuel system, and microwave radio for communication.

This high-resolution camera is part of a six-camera early warning and notification system designed to monitor shipping vessels moving through the Straits of Mackinac (“Straits”), as described in the Camera Installation Overview Memo enclosed. It is being installed as a safety measure for the Line 5 pipeline, to reduce the risk of an anchor strike to the pipeline.

Enbridge will decommission and remove the camera and tower when the Line 5 tunnel is in service, which is estimated to occur in 2024. This in-service date is dependent on obtaining all necessary federal, state and local permits required for the project to commence.

Also enclosed, in support of the Application, are the site plans for this Project, the technical specification of the Aptomar camera, a Project Description, Alternative Location Review Memo, and Operation of Camera Searchlight Memo.

Enbridge will also be submitting appropriate applications to the Federal Communications Commission (“FCC”) and Federal Aviation Administration (“FAA”) for permits to operate the system. Once the FCC and FAA permits are obtained, a copy of the permits will be submitted to the Township.

Please do not hesitate to contact me at (218) 348-5991 if you have any questions related to this application.

Sincerely,

A handwritten signature in cursive script that reads "Jason Risdall".

Jason Risdall
Manager Regulatory Affairs
Enbridge Energy, Limited Partnership

Enclosures

Project Description

Enbridge Energy, Limited Partnership (“Enbridge”) will install a temporary tower complete with an Aptomar Camera (technical description of the Aptomar Camera included within the application) on Parcel Number 001-014-003-00 at 3154 N. Lime Kiln Drive, Bois Blanc Island, Michigan. Installation will include an electrical cabinet, a back-up generator with a propane fuel system, and microwave radio for communication. The Fiber connection will be installed to the camera for network communication. Power for the system will be provided by a local utility provider, Presque Isle Electric.

The overall camera installation height is 130-feet which includes the base and the camera height. The height of the tower will need to be 130-feet to provide line of sight to the Straits of Mackinac (“Straits”). This camera will provide a view to the dense vessel traffic area along the Round Island Passage and South Channel which is further described in the Camera Installation Overview Memo.

This high-resolution camera at the Straits will monitor ship traffic 24/7/365 and will act as an early warning and notification system. Enbridge will be able to shut-down the pipeline as a precaution, if necessary. This enhanced safety measure will further reduce the risk of an anchor strike and will be in place as the Line 5 tunnel project moves forward.

The tower and camera will be a temporary installation and will be removed after the Line 5 tunnel project is complete and in operation. Enbridge will decommission and remove the camera and tower when the Line 5 pipeline and tunnel is placed into service, which is estimated to occur in 2024. This in-service date is dependent on obtaining all necessary federal, state and local permits required for the project to commence.

The image below provides an example of what the tower will look like once installed. The temporary tower and camera will be installed on private property on Bois Blanc Island and will have natural concealment from the vantage point of N. Lime Kiln Point Drive with the abundance of trees in the surrounding area.

Photo 1



This image is an example of what the temporary tower will look like once installed.



memo

Date: January 20, 2021

To: Bois Blanc Township

From: Enbridge Energy, Limited Partnership ("Enbridge")

Re: **Enbridge Line 5 Mackinac Straits Camera Installation Project - Alternative Location Review on Bois Blanc Island**

Introduction

Enbridge Energy, Limited Partnership ("Enbridge") proposes to install six high-resolution Aptomar cameras along the Straits of Mackinac ("Straits").

For the Aptomar camera installation on Bois Blanc Island, Enbridge reviewed the potential locations through a Line of Sight ("LOS") survey. The LOS was used to determine the most feasible locations for the camera installation by evaluating a total field view of the Straits. After the survey was conducted, two locations from the LOS survey obtained a positive result on obtaining a view of the Straits (Figure A indicates the two locations that were reviewed):

- 1) Site 1 - TDS Tower, Island Co. Telephone Co. (Parcel No. 001-030-011-10)
- 2) Site 2 - 3154 N. Lime Kiln Drive (Parcel No. 001-014-003-00)

memo

Figure A



Site Location Objectives

The objectives outlined below were evaluated to determine the feasibility for installing the Aptomar Camera at the two identified locations:

- 1) The Aptomar camera would need to have total field view of the Straits and specifically the Round Island Channel and the South Channel.
- 2) The camera is designed to have optimal viewing range, in clear visibility conditions, at approximately 23,293 feet at a 260-degree radius (approximal 7,100 meters) and the location would need to meet that objective.

Alternative Location Review

After the LOS identified two positive locations, each location was further evaluated with the site location objectives above to determine the feasibility of installing the Aptomar camera. Site 1 was evaluated and it was determined that this site was not feasible for the following reasons:

- 1) Not an ideal location to serve the project needs as it only provides view of the South Channel and not the Round Island Passage.
- 2) The high-resolution camera recognition range at Site 1 is limited at providing vessel anchor monitoring. The high-resolution camera range is approximately 23,293 feet at a 260-degree radius (approximately 7,100 meters) in clear visibility conditions and this location goes beyond that range.

memo

- 3) Geographically the center of Bois Blanc Island is higher than the TDS tower. Therefore, in order to get the proper clearance and view of the Straits, the tower would need to be at least 160 feet. The existing TDS tower is approximately 120 feet and would need to be extended. Modifying a third-party tower to hold an approximate 400-pound camera and extending the existing tower for LOS would not be advantageous.

For the reasons listed above, the only feasible location on Bois Blanc Island was Site 2.

Site 2 Review

The camera placement at Site 2 was evaluated and was determined to be the optimal location on the island for the following reasons:

- 1) Site 2 provided total field view of the Straits and specifically the Round Island Channel and the South Channel.
- 2) Site 2 was at an ideal distance to have optimal viewing for the high-resolution camera.

Appendix A shows photos from Enbridge's on-site review and LOS survey for Site 2 (Photos 1-8). In addition, Photos 9-13 provides a 3D graphic depiction of the anticipated visual appearance of the tower from important vantage points on the property. The tower itself will be on private property and will have natural concealment from the vantage point of N. Lime Kiln Point Drive with the abundance of trees in the surrounding area.

memo

Appendix A Photographs

The following photos are from Enbridge's on-site review and LOS for Site 2.

Photo 1



Facing north towards the Round Island Passage.

memo

Photo 2

DJI_0042.JPG
2020:09:29 23:59:26
N45 48 45.645199 (45.812679) W84 34 41.318001 (84.578144) 180.38 m



Facing northeast towards the Round Island Passage.

memo

Photo 3

DJI_0047.JPG
2020:09:30 00:00:09
N45 48 45.6376 (45.812677) W84 34 41.342499 (84.578151) 180.31 m



Facing west towards the Mackinaw Bridge and the southern part of the Round Island Passage.

memo

Photo 4



Facing northwest towards the Round Island Passage.

memo

Photo 5



Facing north towards the northeast end of Mackinac Island and the Round Island Passage.

memo

Photo 6

DJI_0053.JPG
2020:09:30 00:03:03
N45 48 45.6423 (45.812678) W84 34 41.327599 (84.578147) 183.54 m



Facing northeast towards Lake Huron.

memo

Photo 7

DJI_0057.JPG
2020:09:30 00:03:40
N45 48 45.634998 (45.812676) W84 34 41.330399 (84.578147) 183.51 m



Facing southwest towards the South Channel.

memo

Photo 8



Facing northwest towards Round Island, Mackinac Island and the Round Island Passage.

memo

Photo 9



3D image of Site 2 with the proposed tower looking north-northeast.

memo

Photo 10



3D image of Site 2 with the proposed tower looking south-southwest.

memo

Photo 11



3D image of Site 2 with the proposed tower looking west.

memo

Photo 12



Top view No. 1 of the 3D image of Site 2 with the proposed tower.

memo

Photo 13



Top view No. 2 of the 3D image of Site 2 with the proposed tower.



memo

Date: January 20, 2021

To: Bois Blanc Township

From: Enbridge Energy, Limited Partnership ("Enbridge")

Re: **Enbridge Line 5 Mackinac Straits Camera Installation Project - Camera Installation Overview**

Introduction

Enbridge Energy, Limited Partnership ("Enbridge") plans to install six high-resolution cameras along the Straits of Mackinac ("Straits") to monitor and document shipping vessels as they move through the Straits. The cameras will be operated 24/7/365 from a marine control center in the Straits, from which anchor positions of the vessels can be observed. If in any case the anchor position or other activity of a vessel presents a safety issue for the Line 5 dual pipelines in the Straits, that information can be communicated to the vessel so appropriate counter measures can be taken. As a precautionary measure, Enbridge will be able to temporarily shut down the dual pipelines, when appropriate. The system will be operational in all weather, light and temperature conditions. The six currently planned locations are described below and the locations are shown in Figure A.

Site Locations

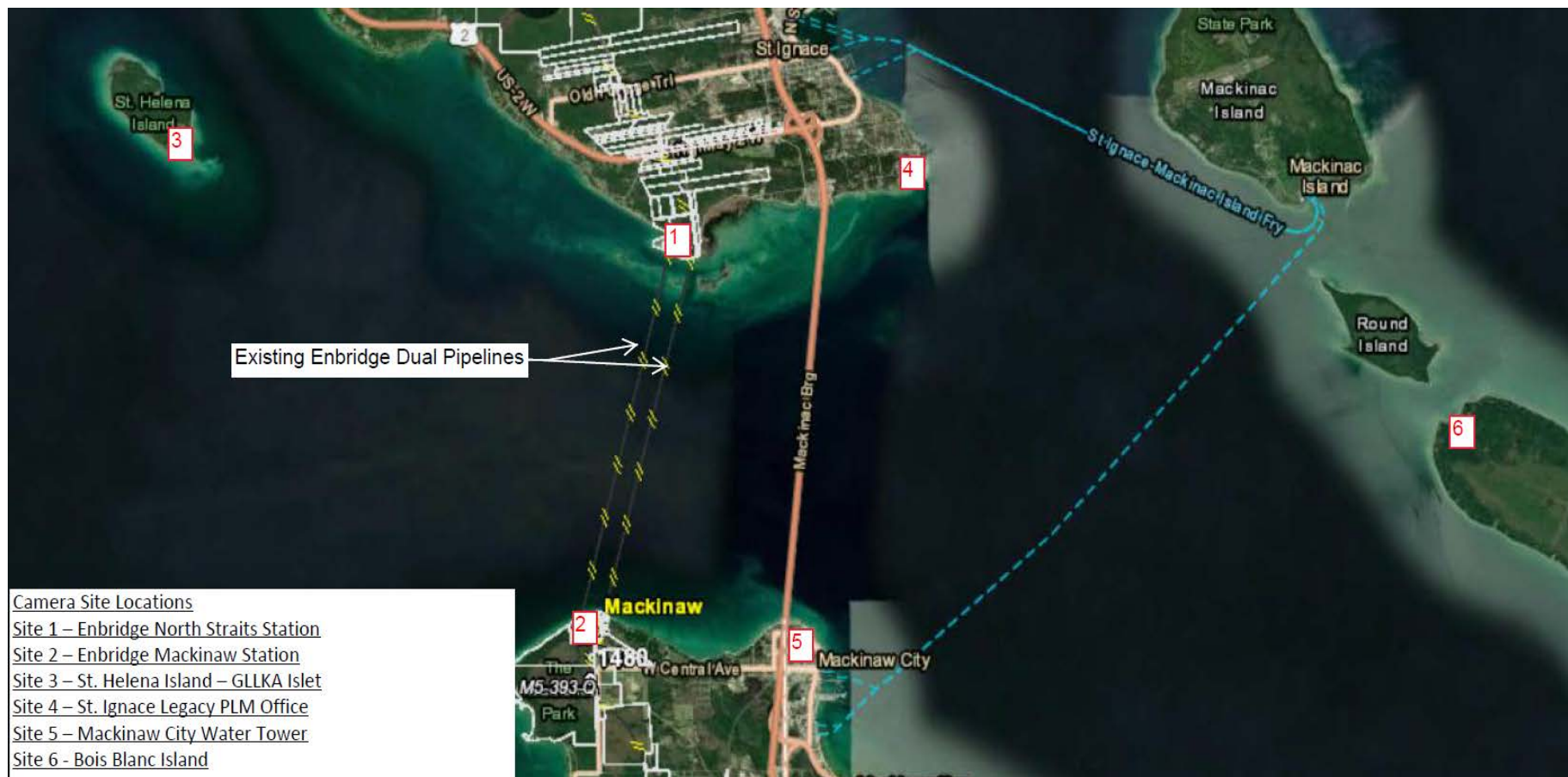
Site 1 – Enbridge North Straits Station
Site 2 – Enbridge Mackinaw Station
Site 3 - St. Helena Island – GLLKA Islet
Site 4 – St. Ignace Legacy PLM Office
Site 5 – Mackinaw City Water Tower
Site 6 – Bois Blanc Island

Field of Vision

The high-resolution camera recognition range is approximately 23,293 feet at a 260-degree radius (approximately 7,100 meters) in clear visibility conditions. Figure B shows the recognition range for each camera location. Figure C overlays the traffic density with the recognition range for each camera location.

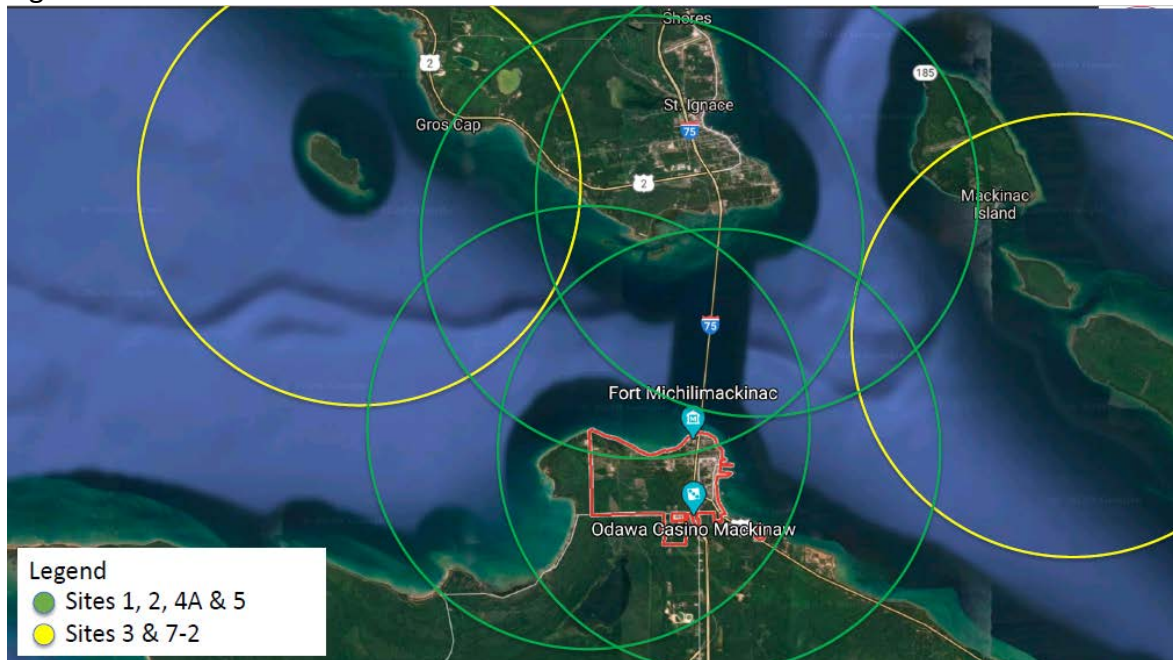
memo

Figure A



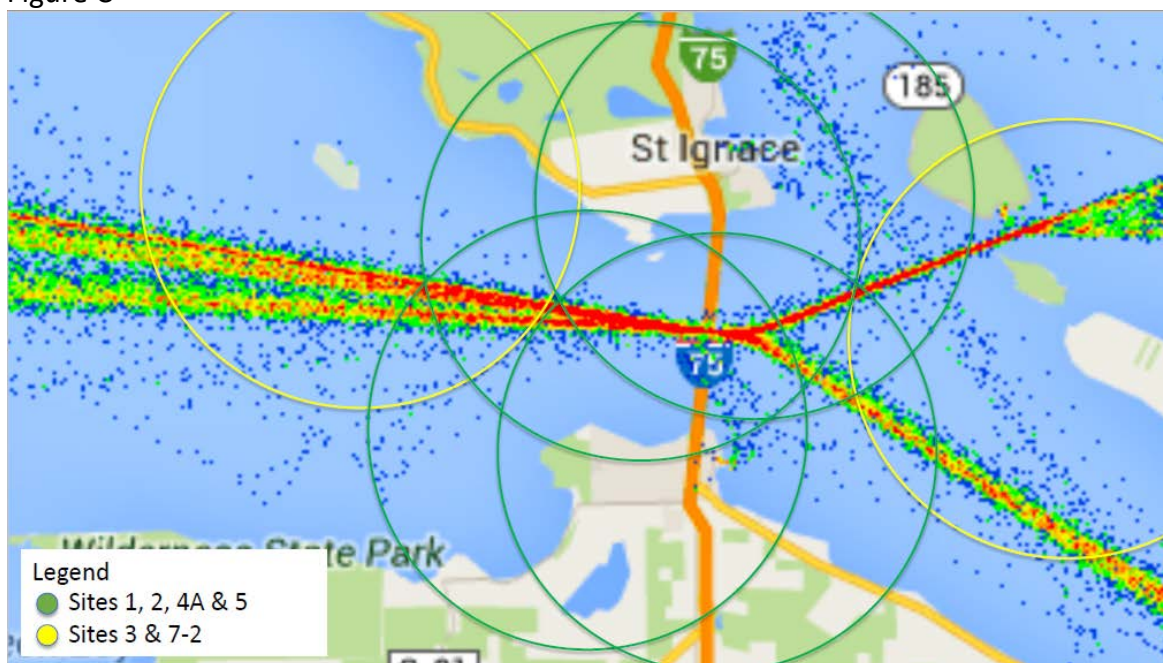
memo

Figure B



Each ring represents an approximate 7.1-kilometer radius of the camera (~23,293 feet).

Figure C



Each ring represents an approximate 7.1-kilometer radius of the camera (~23,293 feet).

memo

The red line shown on the Traffic Density Mapping in Figure C (shiptraffic.net), indicates the highest density of vessel traffic. The Round Island Channel and the South Channel are the critical areas of interest for the Bois Blanc Island camera location.

Bois Blanc Island Camera Overview

As shown in Figure C, the Bois Blanc Island Camera provides coverage over the critical areas of interest for marine traffic as depicted by the red line. This critical area of interest cannot be covered by the five other cameras located along the Straits. The Bois Blanc Island camera is the optimal location on the island to provide the most critical view to the Round Island Passage and South Channel.



memo

Date: January 20, 2021

To: Bois Blanc Township

From: Enbridge Energy Limited Partnership ("Enbridge")

Re: **Enbridge Line 5 Mackinac Straits Camera Installation Project – Operation of Camera Searchlight**

Introduction

Enbridge Energy, Limited Partnership ("Enbridge") proposes to install one high-resolution Aptomar camera located on Parcel Number 001-014-003-00 at 3154 N. Lime Kiln Drive, Bois Blanc Island, Michigan. This memo provides additional information on the camera searchlight to address any concerns on the light being seen by the public.

Operation of Xenon Searchlight

The Xenon searchlight is an integral part of the camera and is controlled by the operator. The searchlight will be turned off during normal operations. However, the searchlight operation is to be used when deemed necessary during emergency situations on the Straits of Mackinac.

Further, the Aptomar camera contains two cameras, the Infrared Camera and the HD Day/Low Light Camera. During normal monitoring operation, the night vision Infrared Camera and the HD Day/Low Light Camera can be used without the searchlight being turned on.

Figure A shows the Aptomar camera and indicates the location of the Xenon Searchlight.

memo

Figure A





aptomar

Technical Description; SECurus and radar antenna

Enbridge - Traffic vessel monitoring and early warning
system

10 November 2019

Content

1 TECHNICAL SPECIFICATIONS 3

1.1 SECURUS CAMERA SYSTEM TECHNICAL DATA..... 3

1.2 RADAR ANTENNA TECHNICAL DATA 5

1 Technical Specifications

This document contains technical information on the SECurus and Radar antenna for the Enbridge vessel monitoring and early warning project.

1.1 SECURUS CAMERA SYSTEM TECHNICAL DATA



The SECurus camera contains an infrared camera for 24 hour vision, an HD day/low light camera, a long range xenon searchlight and the necessary electronics and computer power to control the movement of the platform. Compensate the ship's movements. Powerful electrical motors control the unit to point in any direction given by the operator and provide a steady picture.

Mechanical Construction

The pointing unit is built to enable three axes of rotation which gives six degrees of freedom. Each of these three rotation axes is driven by an extremely accurate control loop, which makes the pointing unit able to position itself in given angles with very high accuracy.

Environmental

The pointing unit is designed to operate in rough environments from the arctic sea to the tropics. Internal temperature monitoring and control ensures stable operating conditions for internal components at external temperatures from -40°C to +50°C. The enclosure is sealed to IP 56.

The sensitive electronics and optics in the cameras are additionally protected by gas-proof casings filled with over-pressured nitrogen with IP rating IP68.

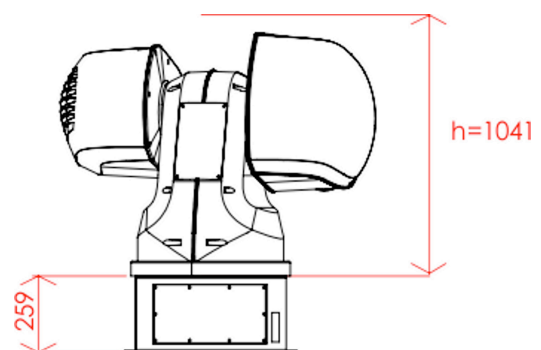
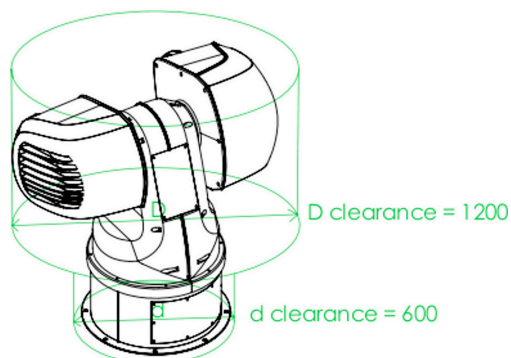
Material

The enclosure is made from cast aluminum, achromatized and coated with highly durable paint. Internal components are made from stainless steel, aluminum and plastic.

Dimensions	
Size [w x h x d]	1052 x 1070 x 686 [mm]
Weight	175 [kg]
Required free space (from centre)	R600 [mm]
Mounting	8 x M12
Power	
Power source	110-230 VAC, 50-60Hz
Power consumption	Max 2.0 kW
Environment	
Enclosure Rating	IP56
Operating temperature	-40°C to 50°C. Temperature preservation controlled
Enclosure material	Coated Cromatized Aluminium
Standards	IEC-60945
Interfaces	
Control	TCP/IP - 100 Mbps
Video	Dual TCP/IP - 1000 Mbps
System performance	
System type	3-axis stabilization of 6 DOF (roll, pitch, yaw, surge, sway and heave)
Azimuth coverage	$\pm 200^\circ$
Elevation coverage	-90° to $+80^\circ$
Roll coverage	-30° to $+30^\circ$
Azimuth slew rate	$> 90^\circ/\text{s}$
Elevation slew rate	$> 70^\circ/\text{s}$
Roll slew rate	$> 90^\circ/\text{s}$
Azimuth accuracy	$< 0.009^\circ$
Elevation accuracy	$< 0.004^\circ$
Roll accuracy	$< 0.004^\circ$
Stability	$< 3.5\mu$

The pointing unit has approximately 400° coverage in azimuth, meaning it has an overlap zone for a smoother operation. Dead zones are thus exclusively a result of placement at the point of installation. For best performance, the placement should be strived for to be as high as possible. The pointing unit is mounted to the bracket welded to a rigid body mounting point, through eight M12x60 stainless steel bolts.

See illustrations below for space requirements.



1.2 RADAR ANTENNA TECHNICAL DATA

The following is the technical data for the complete radar antenna, consisting of a turning unit and a transceiver. Size (width) of the Transceiver is 8ft and total weight of the antenna and turning unit is maximum 46 kg.

Turning Unit w/upmast Transceiver

Model: 65925TAR



Hardware technical specifications

Transmitter Characteristics

Magnetron Nominal Peak Power 25kW
Magnetron Frequency 9410MHz

Pulse Length/PRF

0.05µs/3000Hz Nominal
0.25µs/1760Hz Nominal
0.75µs/785Hz Nominal

Pulse Generator

Solid State with pulse forming network driving a magnetron

Transceiver Power Supplies

Nominal Input
AC 92V to 276V RMS at 47-64Hz

Power Consumption

Standard Speed 250W
High Speed 370W

Note: All power consumption figures assume maximum antenna size in 100 knot wind.

Receiver Characteristics

Logarithmic
Low noise front end
Automatic or manual Tuning
IF centred at 60MHz
IF bandwidth 20MHz (Short pulse) nom
IF bandwidth 20MHz (Medium pulse) nom
IF bandwidth 3MHz (Long pulse) nom
Noise factor 5dB nominal

General

Internally fitted Performance Monitor
Masthead mounted Transceiver

Additional Facilities

Biased limiter
External trigger input
Radar silence input
Pre-trigger output
Isolated ship's heading marker output
Buffered azimuth output
Remote two speed selection
3kHz short pulse (PRF)

Environmental Specifications

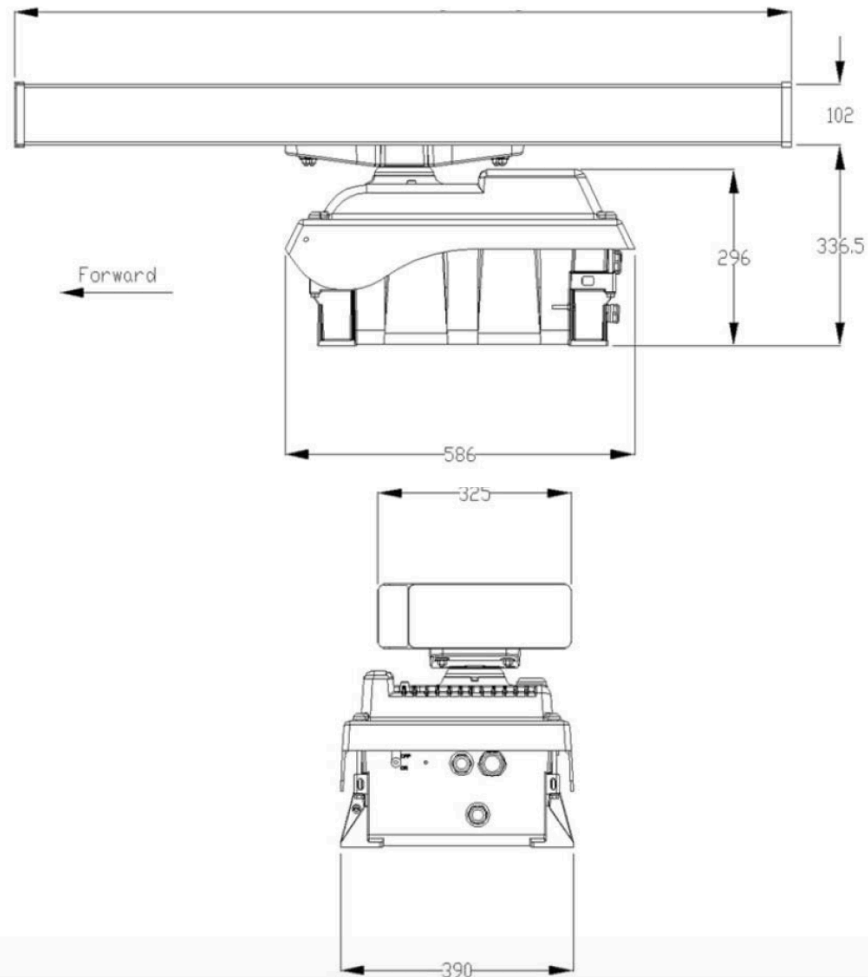
The unit meets in full or exceeds the requirements of IEC60945.
Russian Register of Shipping Requirements
Minimum Operating temperature -40 Deg.C.

Weights and Dimensions with Antenna (mm)

2535mm (8ft) Antenna Weight 46kg max.m/h

1920mm (6ft) Antenna Weight 44kg max.m/h

1310mm (4ft) Antenna Weight 42kg max.m/h



ENBRIDGE PIPELINES INC.
1409 HAMMOND AVENUE
SUPERIOR, WI 54880
USA



LINE 5 STRAITS ANCHOR MONITORING
AKRIGHT (MI) SITE
AFE 20018380
CIVIL/ELECTRICAL
ISSUED FOR 50% REVIEW
ENBRIDGE PROJECT MANAGER: EB SOWA
LHB PROJECT MANAGER: BRIAN SANTORI
CWP NUMBER
LHB PROJECT NUMBER 200433

AFE: 20018380
CWP NUMBER

LINE 5 STRAITS ANCHOR MONITORING
AKRIGHT (MI) SITE

ISSUED FOR 50% REVIEW
CIVIL/ELECTRICAL

SHT	DRAWING NUMBER	REV	DESCRIPTION	ISSUED FOR	ISSUED DATE	*
	GENERAL					
1	COVER SHEET	0.A	COVER SHEET	50% REVIEW	2021/01/18	*
2	INDEX SHEET1	0.A	INDEX SHEET 1	50% REVIEW	2021/01/18	*
3	TRACKING SHEET	0.A	TRACKING SHEET	50% REVIEW	2021/01/18	*
	CIVIL					
4	D-5-1.21-SKC01-0	0.A	AKRIGHT (MI) SITE NOTES & LEGEND	50% REVIEW	2021/01/18	*
5	D-5-1.21-SKC11-0	0.A	AKRIGHT (MI) SITE EROSION CONTROL PLAN	50% REVIEW	2021/01/18	*
6	D-5-1.21-SKC21-0	0.A	AKRIGHT (MI) SITE SITE PLAN	50% REVIEW	2021/01/18	*
7	D-5-1.21-SKC41-0	0.A	AKRIGHT (MI) SITE CIVIL DETAILS	50% REVIEW	2021/01/18	*
	ELECTRICAL					
8	D-5-4.0-SKE01-0	0.A	AKRIGHT (MI) SITE ELECTRICAL SCOPE OF WORK	50% REVIEW	2021/01/18	*

NOTE:
1. ASTERISK (*) COLUMN DENOTES DRAWING HAS BEEN REVISED WITH THIS RELEASE.

50% REVIEW ISSUE

REV: 0.A	PROJECT TITLE: LINE 5 STRAITS ANCHOR MONITORING	SEQ #:	
AFE: 20018380		PROJ NO: -	
WP NO: -			
REV	REVISION DESCRIPTION	DATE BY	CHK APPR
0.A	ISSUED FOR 50% REVIEW	2021-01-18 JAT	NJ TOD

AFE: 20018380
CWP NUMBER

LINE 5 STRAITS ANCHOR MONITORING
AKRIGHT (MI) SITE

ISSUED FOR 50% REVIEW
CIVIL/ELECTRICAL

DRAWING SET ISSUE RECORD					
AFE NUMBER(S): AFE# 20018380 PROJECT: LINE 5 STRAITS ANCHOR MONITORING					
ISSUE	DATE OF MAILING				CONSULTANT'S DRAWING COORDINATOR
	CIVIL / STRUCTURAL	MECHANICAL	ELECTRICAL/ INSTRUMENTATION	MANUFACTURE'S DRAWINGS	
30% REVIEW	-	-	-	-	-
RE-ISSUED FOR 30% REVIEW	-	-	-	-	-
50% REVIEW	2021-01-18	-	2021-01-18	-	-
90% REVIEW	-	-	-	-	-
ISSUED FOR BID	-	-	-	-	-
RE-ISSUED FOR BID	-	-	-	-	-
ISSUED FOR CONSTRUCTION	-	-	-	-	-
RE-ISSUED FOR CONSTRUCTION	-	-	-	-	-
ISSUED FOR COMMISSIONING	-	-	-	-	-
AS-BUILT	-	-	-	-	-
PREPARED BY: LHB					

ALL DRAWINGS IN THIS ISSUE HAVE BEEN REVIEWED BY THE FOLLOWING:

ENBRIDGE PROJECT MANAGER: EB SOWA

SIGNATURE: _____

ENGINEERING SERVICE PROVIDER PROJECT MANAGER: BRIAN SANTORI

SIGNATURE: _____

50% REVIEW ISSUE

REV: 0.A	PROJECT TITLE: LINE 5 STRAITS ANCHOR MONITORING	SEQ #:	
AFE: 20018380	PROJ NO: -		
WP NO: -			
REV	REVISION DESCRIPTION	DATE BY	CHK APPR
0.A	ISSUED FOR 50% REVIEW	2021-01-18 JAT	NJ TOD

DRAWING SET ISSUE RECORD

REDLINE MARKUP CHECKLIST



AFE No.	20018380	Province/State	MICHIGAN
Project Name	L5 STRAITS ANCHOR MONITORING	Station Name	
Contractor/Vendor		Location	
Contract Ref. No.: e.g. (WO, PO, CWP)		Date: mm/dd/yyyy	

VERIFICATION CHECKLIST

Verify the following items and indicate acceptance (A) or not applicable (NA). Use the comment section to provide reasoning indicating not applicable.

No.	REQUIREMENTS	CONTRACTOR REP. A or NA	ENBRIDGE SITE REP. A or NA	ENBRIDGE QA REP. A or NA
1.	Verify that the redline drawing package includes the Facility/Mainline Drawing List, that specifies the Issued for Construction (IFC), drawings per EWP/CWP (Engineering Work Package/Construction Work Package)			
2.	Confirm all drawings identified in the Facility/Mainline drawing list are included in the redline mark-up final turnover.			
3.	Verify all drawings identified in the Facility/Mainline drawing list are stamped as per ENB-CFCS-PROC-004 Redline Markup Procedure.			
4.	Confirm all changes/additions on redline mark-ups are marked in red, deletions are marked (hatched or crossed) in green, and comments are marked in blue.			
5.	Verify all redline changes to drawings have a reference to a management of change document such as an RFI (Request for Information), DCN (Design Change Notice), CO (change order), or FCN (Field Change Notice, etc.).			
6.	All equipment functional tagging must be verified and marked up on drawings.			
7.	Dimensions/coordinates and elevations for all work are checked and referenced back to existing building, control monument and/or any equipment located with respect to an entire site.			
8.	Tie-in elevations and coordinates for new facilities to the existing control monuments are shown on the Control Survey plan.			
9.	Isometric drawings are marked up legibly with the correct information regarding heat numbers, weld map information, hydrotest details, etc.			
10.	All piping changes, including dimensions, in all directions are shown.			
11.	For congested drawings (i.e. P&IDs, isometrics), an attached redline drawing is acceptable, however, the attachment must possess a title block which references the original drawing.			
12.	Discrepancies and errors in the drawings, including ones that are not related to the scope of work, are marked up and identified with an MOC document.			
13.	When referencing a Vendor drawing on a construction drawing, verify the vendor drawing is attached.			

Comments:

REPRESENTATIVES INFORMATION AND SIGNATURE INDICATING VERIFICATION COMPLETE

Contractor Rep:	Print	Sign	
Title:		Date yyyy/mm/dd:	
Enbridge Site Rep:	Print	Sign	
Title:		Date yyyy/mm/dd:	
Enbridge QA Rep:	Print	Sign	
Title:		Date yyyy/mm/dd:	

REDLINE MARKUP CHECKLIST

PAGE 1 OF 1

EXISTING LEGEND

	EXIST. PROPERTY LINE
	EXIST. R.O.W.
	EXIST. FENCE
	EXIST. GRAVEL SURFACE
	EXIST. WETLAND BOUNDARY
	EXIST. WETLANDS
	EXIST. RIP RAP
	EXIST. PIPELINE
	EXIST. CONTOUR (5' INTERVAL)
	EXIST. CONTOUR (1' INTERVAL)
	EXIST. CULVERT
	EXIST. PERFORATED PIPE
	EXIST. APRON
	EXIST. SANITARY SEWER
	EXIST. OVERHEAD ELECTRIC
	EXIST. UNDERGROUND ELECTRIC
	EXIST. LIGHT POLE
	EXIST. POWER POLE
	EXIST. ANCHOR
	EXIST. ELECTRIC HAND HOLE
	EXIST. TREE LINE
	EXIST. BOLLARD
	EXIST. CONTROL POINT

GENERAL CONSTRUCTION NOTES

- CONTRACTOR SHALL PROTECT FROM DAMAGE ALL EXISTING PAVEMENTS DESIGNATED TO REMAIN, INCLUDING IN THE PUBLIC R.O.W. ANY PAVEMENTS DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE OWNER.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES IN ACCORDANCE WITH THE ENBRIDGE GROUND DISTURBANCE POLICY PRIOR TO COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL UNDERGROUND UTILITIES. UTILIZE THE ONE CALL EXCAVATION NOTICE SYSTEM OF "MICHIGAN ONE-CALL" CALL 1-800-482-7171 AND PRIVATE UTILITIES ON PRIVATE PROPERTY.
- GRADES SHOWN ARE FINISH SURFACE ELEVATIONS. THE CONTRACTOR SHALL MAKE APPROPRIATE DEDUCTIONS FOR VARYING SURFACES TO DETERMINE SUBGRADE ELEVATIONS.
- ALL EXISTING AND PROPOSED STRUCTURE ACCESS COVERS SHALL BE ADJUSTED TO FINISHED GRADE BY THE CONTRACTOR.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION STAKING. THE ENGINEER WILL PROVIDE CONTROL POINTS, BENCHMARKS AND ELECTRONIC FILES.
- THE CONTRACTOR SHALL MAINTAIN THE EXISTING ACCESSWAY DURING CONSTRUCTION. COORDINATE ALL SHORT-TERM OUTAGES WITH ENBRIDGE OPERATIONS.
- ALL WORK SHALL BE CONTAINED WITHIN DESIGNATED CONSTRUCTION LIMITS. NO DISTURBANCE SHALL BE PERMITTED OUTSIDE THE DESIGNATED LIMITS.
- PREVENT ALL TRACKING INTO PUBLIC RIGHT OF WAYS AND PROVIDE SWEEPING AND CLEANING AS NECESSARY.
- GOVERNING SPECIFICATIONS: ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE DRAWING.
 - ENBRIDGE STANDARD SPECIFICATIONS FOR CONSTRUCTION
 - MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION 2012 EDITION

PROPOSED LEGEND

	CONSTRUCTION LIMITS
	PROP. ROCK BAGS SEE SHEET SKC41
	PROP. CONTOUR (5' INTERVAL)
	PROP. CONTOUR (1' INTERVAL)

ABBREVIATIONS

A.I.P.	ABANDON IN PLACE	PVC	POLYVINYL CHLORIDE
A.G.	ABOVE GROUND	PROP.	PROPOSED
B.G.	BELOW GROUND	RCP	REINFORCED CONCRETE PIPE
DIP	DUCTILE IRON PIPE	R.O.W.	RIGHT OF WAY
EXIST.	EXISTING	SCH.	SCHEDULE
ELEV.	ELEVATION	S.O.G.	SLAB ON GRADE
E.W.	EACH WAY	SS	STAINLESS STEEL
FM	FORCE MAIN	STD.	STANDARD
HDPE	HIGH DENSITY POLYETHYLENE	TEMP.	TEMPORARY
HMA	HOT MIX ASPHALT	(TYP.)	TYPICAL
IE	INVERT ELEVATION	V.I.F.	VERIFY IN FIELD
MAX.	MAXIMUM	MDOT	MICHIGAN DEPARTMENT OF
MIN.	MINIMUM		TRANSPORTATION
MOD.	MODIFIED	WMM	WELDED WIRE MESH
O.C.	ON CENTER		

EARTH WORK NOTES

- ALL AREAS DISTURBED DUE TO CONSTRUCTION SHALL BE RESTORED TO PRECONSTRUCTION CONDITION UNLESS OTHERWISE NOTED ON THE DRAWINGS.
- SUBGRADE PREPARATION
 - THE CONTRACTOR SHALL REMOVE THE TOP 2" OF EXISTING SOIL AND ALL ORGANICS, TOPSOIL, ROOTS, VEGETATION, AND DEBRIS PRIOR TO GRADING AND COMPACTING SUBGRADES. REFER TO GEOTECHNICAL INVESTIGATION REPORT FOR TOPSOIL THICKNESS. THE CONTRACTOR SHALL SEGREGATE MATERIALS FOR REUSE TO THE MAXIMUM EXTENT PRACTICABLE.
 - SUBGRADE SOILS SHALL BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE AFTER THE OVERLYING SOILS HAVE BEEN REMOVED AND PRIOR TO MOISTURE CONDITIONING AND RECOMPACTION.
 - COMPACT ENTIRE EXCAVATION'S SUBGRADE SOILS WITH VIBRATORY SMOOTH DRUM ROLLER TO A MINIMUM 95 PERCENT OF MAXIMUM PROCTOR DRY DENSITY.
 - PROOF ROLL ALL PREPARED SUBGRADE SOILS PRIOR TO THE PLACEMENT OF FILL MATERIALS. PROOF ROLLING SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 8.2.2 OF FCS001, AND IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE.
- FILLING
 - FILL TO CONTOURS AND ELEVATIONS INDICATED USING UNFROZEN MATERIAL.
 - EMPLOY PLACEMENT METHOD THAT DOES NOT DISTURB OR DAMAGE OTHER WORK.
 - BENCH FILL INTO NATIVE SOILS ON ALL SLOPED SURFACES 5:1 OR STEEPER. PLACE FILLS IN UNIFORM THICKNESS HORIZONTAL LIFTS, NOT EXCEEDING 8 INCHES UNCOMPACTED THICKNESS.
 - SLOPE GRADE AWAY FROM BUILDING A MINIMUM OF 2% FOR 10 FEET UNLESS OTHERWISE NOTED.
- REFER TO FCS-001 FOR FILL MATERIAL SPECIFICATIONS
- BASE COURSE: NON-ORGANIC CRUSHED ROCK FREE FROM DEBRIS OR RECYCLED MATERIAL AND CONFORMING TO THE FOLLOWING GRADATION REQUIREMENTS.

MATERIAL	GRADATION REQUIREMENTS	
	SIEVE SIZE	% PASSING
BASE COURSE	2"	100
	1-1/2"	95-100
	3/4"	70-92
	3/8"	50-70
	#4	35-55
	#30	12-25
	#200	0-8

- FIELD QUALITY CONTROL
 - COMPACTION REQUIREMENTS SHALL CONFORM TO THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT UNLESS OTHERWISE NOTED IN THE DRAWINGS.
 - MAXIMUM DENSITY SHALL BE DETERMINED IN ACCORDANCE WITH ASTM D698 "STANDARD TEST METHODS FOR LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING STANDARD EFFORT".
 - MINIMUM COMPACTION IN ALL AREAS SHALL BE 95% OF MAXIMUM DENSITY.
 - TEST FREQUENCY IN UTILITY TRENCHES SHALL BE ONE TEST PER 100 LF PER LIFT, AND IN ALL OTHER AREAS SHALL BE ONE TEST PER 2,400 SQ. YD. PER LIFT.

WARNING

LOCATION OF UNDERGROUND UTILITIES TO BE VERIFIED BY CONTRACTOR. CALL 3 DAYS BEFORE DIGGING.

MISS DIG
MICHIGAN'S ONE-CALL SYSTEM
1-800-482-7171
REQUIRED BY LAW

50% REVIEW ISSUE

REV: 0.A	PROJECT TITLE: L5 STRAITS ANCHOR MONITORING	SEQ #:	
AFE: 20018380		PROJ NO: 2000158	
WP NO: -			
REV	REVISION DESCRIPTION	DATE BY	CHK APPR
0.A	ISSUED FOR 50% REVIEW	2021-01-18 JPH	AFB DGS

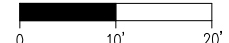
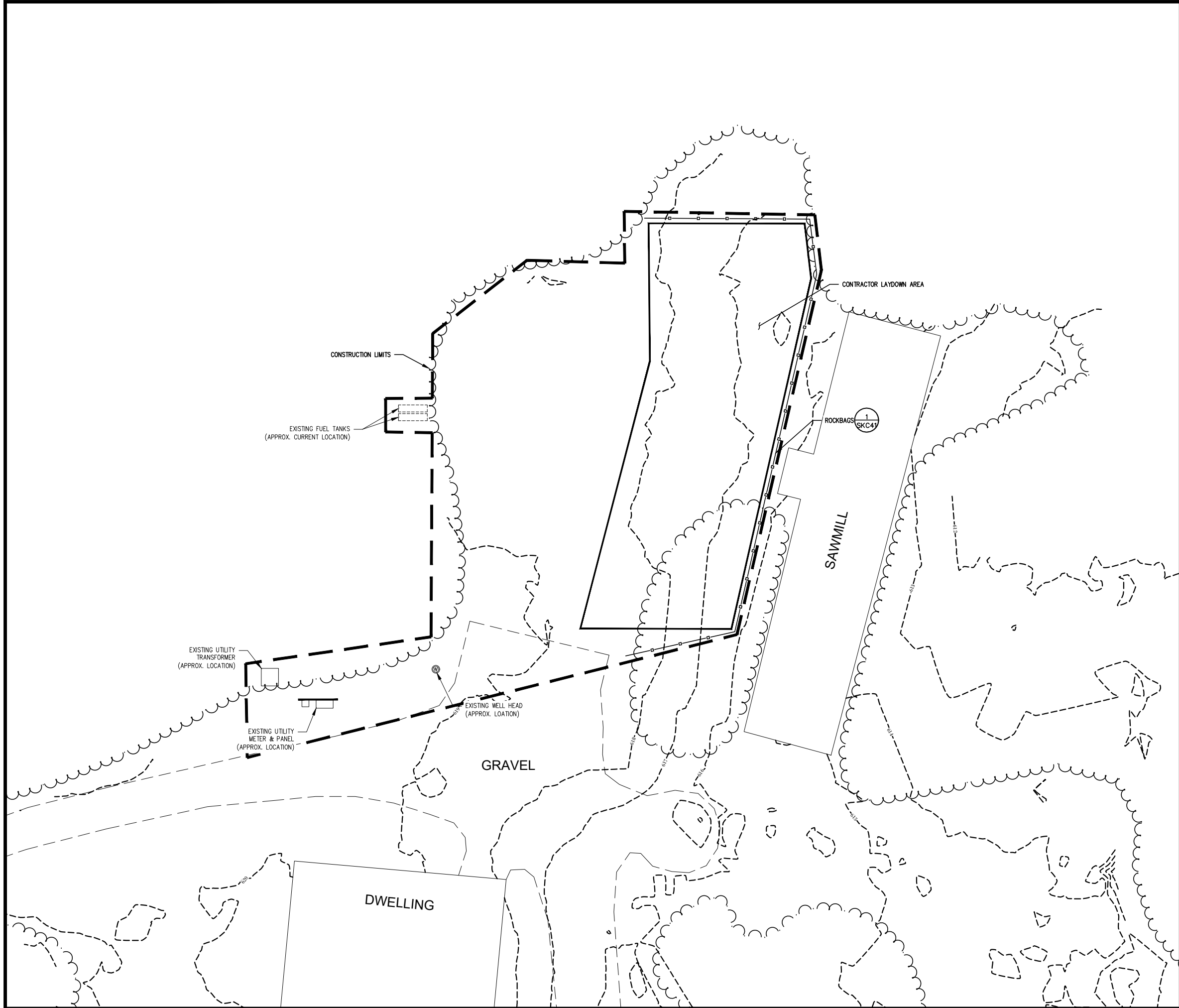
REFERENCE DRAWINGS

REV NO	REVISION DESCRIPTION	DATE BY	CHK	APPR
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AKRIGHT (MI) SITE
NOTES & LEGEND

BY: JPH	CHK: AFB	ENG.: D. SHAW	ENB APPR: E. SOWA
DATE: 2021-01-18	SCALE: AS SHOWN	STATUS: CONSTRUCTION	
DWG NO.:	D-5-1.21-SKC01-0		
		REV NO:	0.A



WARNING
LOCATION OF UNDERGROUND UTILITIES TO BE VERIFIED BY CONTRACTOR. CALL 3 DAYS BEFORE DIGGING.
MISS DIG
MICHIGAN'S ONE-CALL SYSTEM
1-800-482-7171
REQUIRED BY LAW

50% REVIEW ISSUE

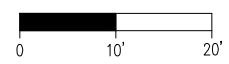
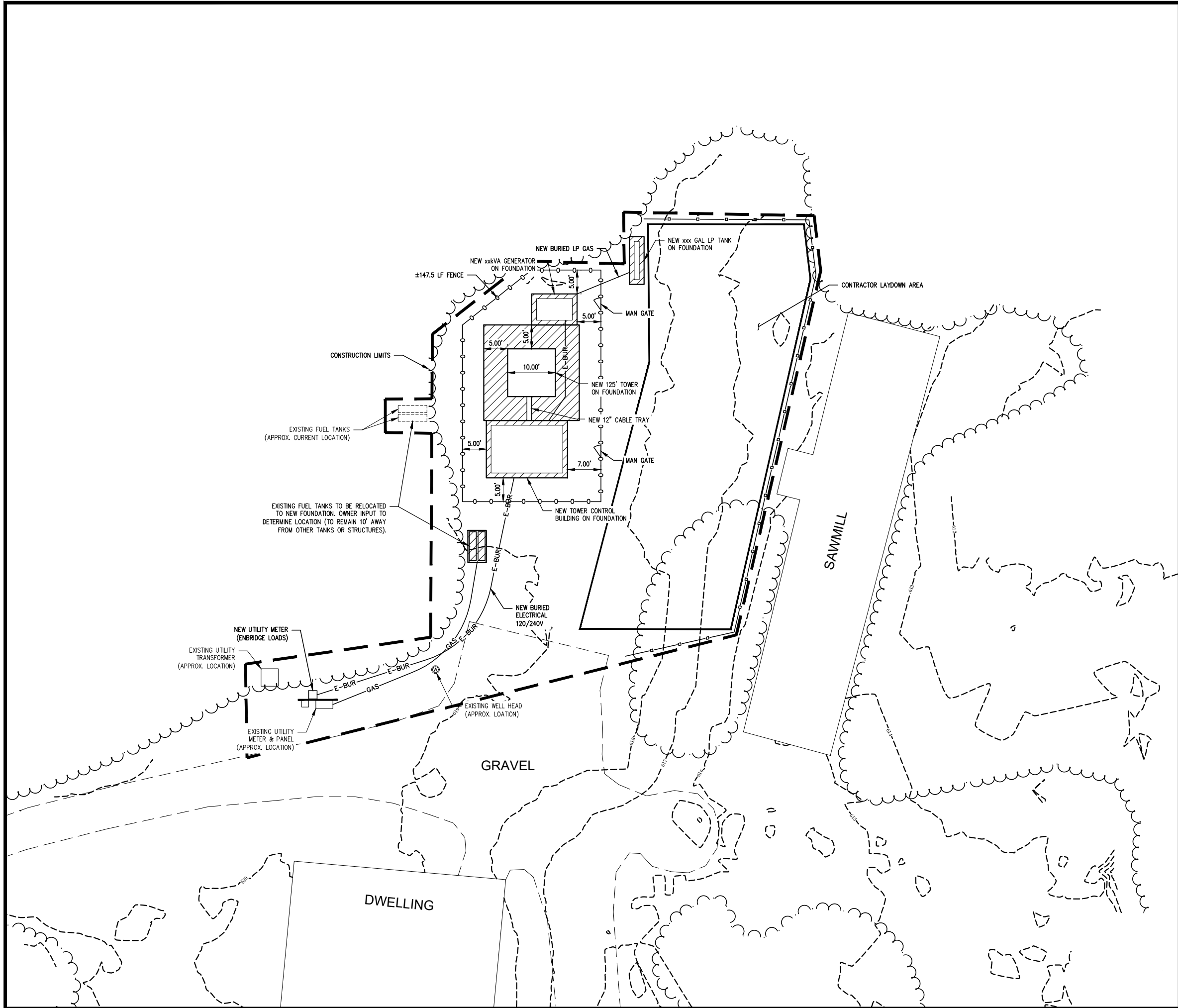
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AFE: 20018380		PROJ NO: 2000158	
WP NO: -			
REV	REVISION DESCRIPTION	DATE BY	CHK APPR
0.A	ISSUED FOR 50% REVIEW	2021-01-18 JPH	AFB DGS

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AKRIGHT (MI) SITE
EROSION CONTROL PLAN

BY: JPH	CHK: AFB	ENG.: D. SHAW	ENB APPR: E. SOWA
DATE: 2021-01-18	SCALE: AS SHOWN	STATUS: REVIEW	
DWG NO:	D-5-1.21-SKC11-0		REV NO: 0.A



WARNING
LOCATION OF UNDERGROUND
UTILITIES TO BE VERIFIED BY
CONTRACTOR. CALL 3 DAYS
BEFORE DIGGING.

MISS DIG
MICHIGAN'S ONE-CALL SYSTEM
1-800-482-7171
REQUIRED BY LAW

50% REVIEW ISSUE

REV: 0.A	PROJECT TITLE: L5 STRAITS ANCHOR MONITORING	SEQ #:	
AFE: 20018380		PROJ NO: 2000158	
WP NO: -			
REV	REVISION DESCRIPTION	DATE BY	CHK APPR
0.A	ISSUED FOR 50% REVIEW	2021-01-18 JPH	AFB DGS

REFERENCE DRAWINGS				
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AKRIGHT (MI) SITE
SITE PLAN

BY: JPH	CHK: AFB	ENG.: D. SHAW	ENB APPR: E. SOWA
DATE: 2021-01-18	SCALE: AS SHOWN	STATUS: REVIEW	REV NO:
DWG NO:	D-5-1.21-SKC21-0		0.A

WARNING

LOCATION OF UNDERGROUND
UTILITIES TO BE VERIFIED BY
CONTRACTOR. CALL 3 DAYS
BEFORE DIGGING.

MISS DIG
MICHIGAN'S ONE-CALL SYSTEM
1-800-482-7171
REQUIRED BY LAW

50% REVIEW ISSUE

REV: 0.A	PROJECT TITLE: L5 STRAITS ANCHOR MONITORING	SEQ #:	
AFE: 20018380		PROJ NO: 2000158	
WP NO: -			
REV	REVISION DESCRIPTION	DATE BY	CHK APPR
0.A	ISSUED FOR 50% REVIEW	2021-01-18 JPH	AFB DCS

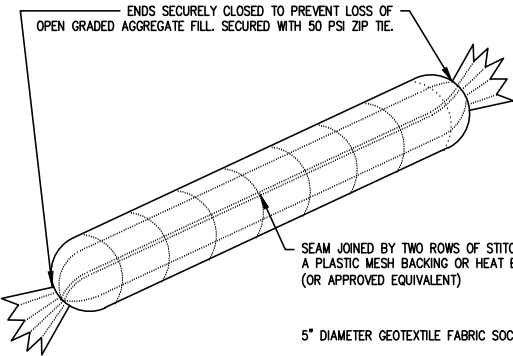
REFERENCE DRAWINGS

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AKRIGHT (MI) SITE
CIVIL DETAILS

BY: JPH	CHK: AFB	ENG.: D. SHAW	ENB APPR: E. SOWA
DATE: 2021-01-18	SCALE: AS SHOWN	STATUS: CONSTRUCTION	
DWG NO:	D-5-1.21-SKC41-0		REV NO: 0.A



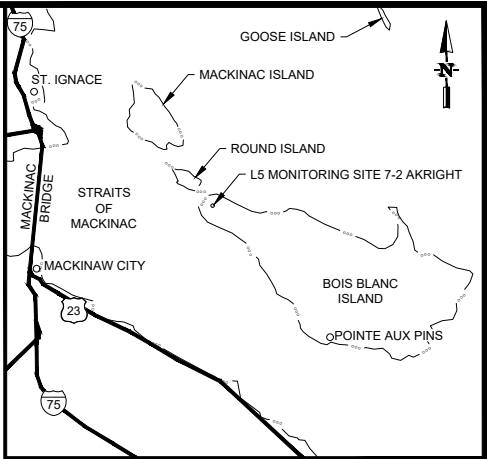
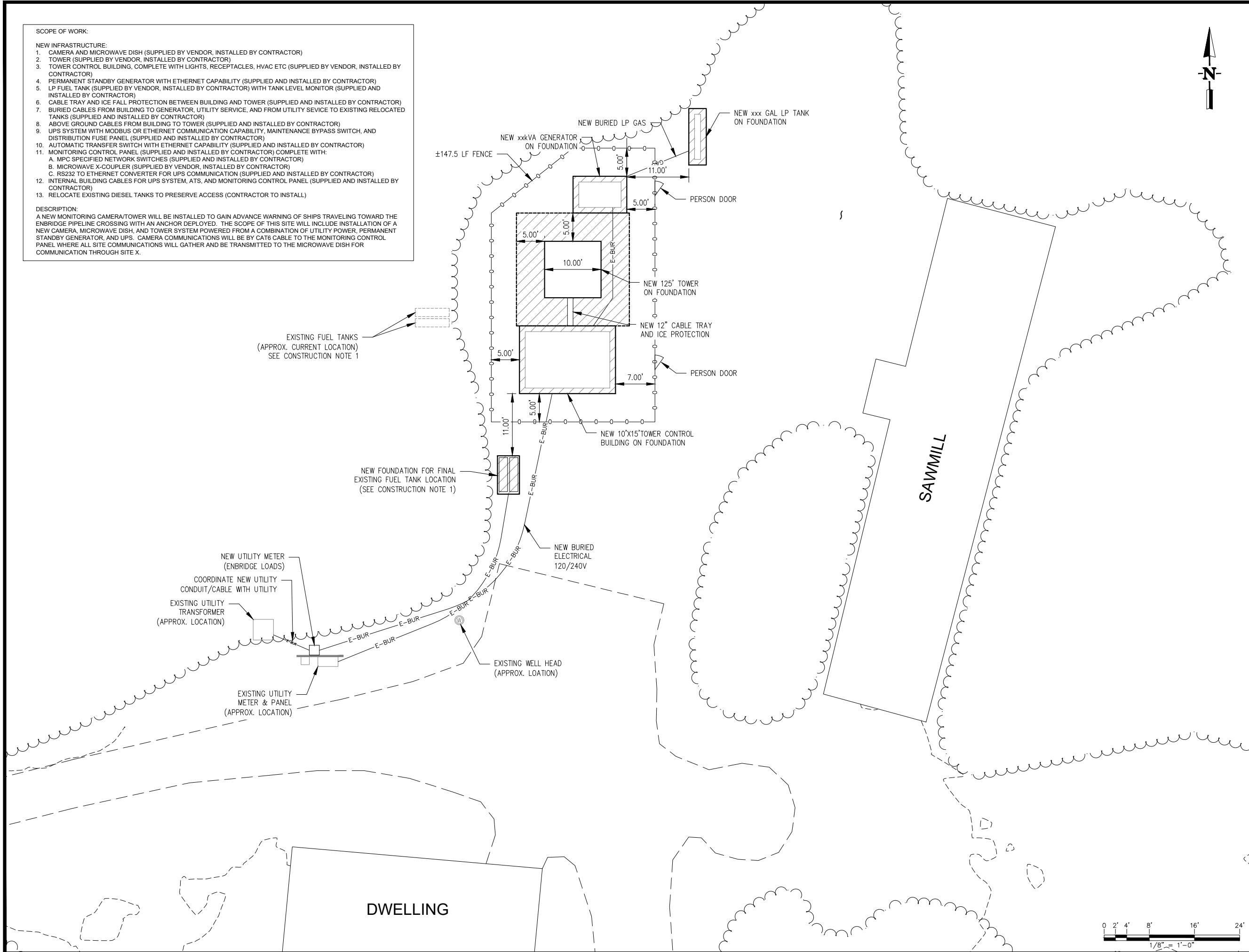
FILL ROCK BAG WITH 45 LBS. OF OPEN GRADED
AGGREGATE CONSISTING OF SOUND, DURABLE
PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL
CONFORMING TO THE FOLLOWING GRADATION.

GRADATION	
SIEVE SIZE	PERCENT PASSING
1-1/2 INCH	100
1 INCH	95-100
3/4 INCH	65-95
3/8 INCH	30-65
NO. 4	10-35
NO.10	3-20
NO. 40	0-8
NO. 200	0-3

NOTE: CRUSHED CONCRETE OR
BITUMINOUS SHALL NOT BE USED FOR
OPEN GRADED AGGREGATE.

1 ROCK BAGS
NOT TO SCALE

- SCOPE OF WORK:
- NEW INFRASTRUCTURE:
1. CAMERA AND MICROWAVE DISH (SUPPLIED BY VENDOR, INSTALLED BY CONTRACTOR)
 2. TOWER (SUPPLIED BY VENDOR, INSTALLED BY CONTRACTOR)
 3. TOWER CONTROL BUILDING, COMPLETE WITH LIGHTS, RECEPTACLES, HVAC ETC (SUPPLIED BY VENDOR, INSTALLED BY CONTRACTOR)
 4. PERMANENT STANDBY GENERATOR WITH ETHERNET CAPABILITY (SUPPLIED AND INSTALLED BY CONTRACTOR)
 5. LP FUEL TANK (SUPPLIED BY VENDOR, INSTALLED BY CONTRACTOR) WITH TANK LEVEL MONITOR (SUPPLIED AND INSTALLED BY CONTRACTOR)
 6. CABLE TRAY AND ICE FALL PROTECTION BETWEEN BUILDING AND TOWER (SUPPLIED AND INSTALLED BY CONTRACTOR)
 7. BURIED CABLES FROM BUILDING TO GENERATOR, UTILITY SERVICE, AND FROM UTILITY SERVICE TO EXISTING RELOCATED TANKS (SUPPLIED AND INSTALLED BY CONTRACTOR)
 8. ABOVE GROUND CABLES FROM BUILDING TO TOWER (SUPPLIED AND INSTALLED BY CONTRACTOR)
 9. UPS SYSTEM WITH MODBUS OR ETHERNET COMMUNICATION CAPABILITY, MAINTENANCE BYPASS SWITCH, AND DISTRIBUTION FUSE PANEL (SUPPLIED AND INSTALLED BY CONTRACTOR)
 10. AUTOMATIC TRANSFER SWITCH WITH ETHERNET CAPABILITY (SUPPLIED AND INSTALLED BY CONTRACTOR)
 11. MONITORING CONTROL PANEL (SUPPLIED AND INSTALLED BY CONTRACTOR) COMPLETE WITH:
 - A. MPC SPECIFIED NETWORK SWITCHES (SUPPLIED AND INSTALLED BY CONTRACTOR)
 - B. MICROWAVE X-COUPLER (SUPPLIED BY VENDOR, INSTALLED BY CONTRACTOR)
 - C. RS232 TO ETHERNET CONVERTER FOR UPS COMMUNICATION (SUPPLIED AND INSTALLED BY CONTRACTOR)
 12. INTERNAL BUILDING CABLES FOR UPS SYSTEM, ATS, AND MONITORING CONTROL PANEL (SUPPLIED AND INSTALLED BY CONTRACTOR)
 13. RELOCATE EXISTING DIESEL TANKS TO PRESERVE ACCESS (CONTRACTOR TO INSTALL)
- DESCRIPTION:
A NEW MONITORING CAMERA/TOWER WILL BE INSTALLED TO GAIN ADVANCE WARNING OF SHIPS TRAVELING TOWARD THE ENBRIDGE PIPELINE CROSSING WITH AN ANCHOR DEPLOYED. THE SCOPE OF THIS SITE WILL INCLUDE INSTALLATION OF A NEW CAMERA, MICROWAVE DISH, AND TOWER SYSTEM POWERED FROM A COMBINATION OF UTILITY POWER, PERMANENT STANDBY GENERATOR, AND UPS. CAMERA COMMUNICATIONS WILL BE BY CAT6 CABLE TO THE MONITORING CONTROL PANEL WHERE ALL SITE COMMUNICATIONS WILL GATHER AND BE TRANSMITTED TO THE MICROWAVE DISH FOR COMMUNICATION THROUGH SITE X.



LOCATION PLAN

SECTION X, T-XXN, R-XXW, XXXX TWP.
XX COUNTY, MICHIGAN

CONSTRUCTION NOTES:

1. CONTRACTOR TO RELOCATE EXISTING FUEL TANKS TO NEW FOUNDATION TO PRESERVE ACCESS. PROJECT TO GAIN OWNER INPUT TO DETERMINE DESIRED FINAL LOCATION. ENSURE TANKS REMAIN 10' AWAY FROM OTHER TANKS OR STRUCTURES.

50% REVIEW ISSUE

REV: 0.A	PROJECT TITLE: LINE 5 STRAITS ANCHOR MONITORING	SEQ #:	
AFE: 20018380		PROJ NO: -	
WP NO: -			
REV	REVISION DESCRIPTION	DATE BY	CHK APPR
0.A	ISSUED FOR 50% REVIEW	2021-01-18 JAT	NJ TOD

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REV NO	REVISION DESCRIPTION	DATE BY	CHK	APPR

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AKRIGHT (MI) SITE
ELECTRICAL SCOPE OF WORK

BY: JAT	CHK: NJ	ENG: T. DUPRAS	ENB APPR: E. SOWA
DATE: 2021-01-18	SCALE: 1/8" = 1'-0"	STATUS: DESIGN	
DWG NO:	REV NO:		

D-5-4.0-SKE01-0

0.A

