Wood Buffalo Environmental Association

Ambient Air Monitoring Station Site Documentation

Sawbones Bay

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WBEA Monitoring Network

Vision

People are empowered to make informed decisions to ensure a safe and healthy environment.

Mission

The Wood Buffalo Environmental Association is a multi-stakeholder, consensus-based organization that leads in state of the art environmental monitoring to enable informed decision-making.

Continuous ambient air quality and meteorological data are collected under the Ambient Air Monitoring (AAM) group in WBEA. The WBEA currently operates 29 permanent continuous monitoring stations, each measuring various air quality parameters. The continuously measured air quality parameters include Sulphur Dioxide (SO_2), Hydrogen Sulfide (H_2S), Total Reduced Sulphur (TRS), Ozone (O_3), Total Oxides of Nitrogen (NO_X), Nitric Oxide (NO), Nitrogen Dioxide (NO_2), Ammonia (NH_3), Carbon Monoxide (CO), Carbon Dioxide (CO_2,) Particulate Matter less than 2.5µm ($PM_{2.5}$), Total Suspended Particulates (TSP), Total Hydrocarbon (THC), Total and Non-Methane Hydrocarbon (NMHC). All sites also measure ambient air temperature (AT), wind speed (WS), wind direction (WD), and relative humidity (RH). Selected sites measure barometric pressure (BP), global radiation (GR), precipitation (PC), leaf wetness (LW), vertical wind speed (VWS), vertical temperature gradient VTG) and Present Weather Detector (PWD). The ambient air monitoring parameters for each station are summarized in Table 1.0 and 1.1.

The WBEA also maintains and operates five portable monitoring stations. The configuration of these stations differs depending on their task. Three are configured for compliance monitoring and are equipped to measure SO_2, H_2S, NO_X, NO, NO_2, THC, WS, WD, AT, RH. One portable is equipped to monitor all these compliance parameters as well as $PM_{2.5}$. The last portable is set up to operate gas chromatography systems and currently has a Sulphur and VOC GC installed to collect speciated data for the Odour Monitoring Program within WBEA.

Since 1998 WBEA has maintained time-integrated sampling for $PM_{2.5}$, PM_{10}, VOC and PAH. The sampling for time-integrated monitoring has evolved with a better understanding of technology, analytical laboratory methods and sample deployment and collection methods.

In 2015, the WBEA moved to duplicate sampling for the PM_{10} and $PM_{2.5}$ time integrated parameters for 2 reasons; (1) to have duplicate mass measurements for QA purposes, (2) to have separate filters for subsequent metals and ion analysis. Elemental and Organic Carbon (ECOC) sampling began on August 7, 2012 at the Bertha Ganter site. ECOC was added and the Wapasu and Stony Mountain sites on May 1, 2018. All time-integrated samples in the WBEA ambient air monitoring network are collected on the National Air Pollution Surveillance (NAPS) schedule every 6 days for a 24-hour period.

The WBEA also collects precipitation samples for chemistry analysis through the National Atmospheric Deposition Program (NADP) at here site. These samples are collected every Tuesday at 12:00

The time-integrated parameters for each station are summarized in Table 1.2.

Table 1.0 provides a listing of stations with their names and corresponding WBEA identification number and the air quality parameters measured by continuous methods at each site. Parameters measured include hydrogen sulphide (H_2S), total reduced sulphur (TRS), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), total hydrocarbons (THC), methane (CH_4), non-methane hydrocarbons (NMHC), ammonia (NH_3), carbon monoxide (CO), and carbon dioxide (CO_2). Sites are categorized as industrial or community, based on the setting in which they are located.

WBEA ID	TYPE	STATION NAME	SO_2	NO_2	O_3	$PM_{2.5}$	TRS	H_2S	THC	NMHC	CO	CO_2	NH_3
1	COMMUNITY	BERTHA GANTER-FORT MCKAY	X	X	X	X	X	X	X	X	X	X	X
2	COMPLIANCE	MILDRED LAKE	X					X	X	X			
3	METEOROLOGICAL	LOWER CAMP MET TOWER											
4	COMPLIANCE	BUFFALO VIEWPOINT	X	X	X	X		X	X	X			
5	COMPLIANCE/ METEORLOGICAL	MANNIX	X					X	X	X			
6	COMMUNITY	PATRICIA MCINNES	X	X	X	X	X		X	X			X
7	COMMUNITY	ATHABASCA VALLEY	X	X	X	X	X		X	X	X		
8	COMMUNITY/ COMPLIANCE	FORT CHIPEWYAN	X	X	X	X					X	X	
9	ATTRIBUTION	BARGE LANDING	X	X		X	X		X	X			
11	COMPLIANCE	LOWER CAMP	X					X	X	X			
13	COMPLIANCE/ ATTRIBUTION	FORT MCKAY SOUTH	X	X	X	X	X		X	X			
14	COMPLIANCE/ COMMUNITY	ANZAC	X	X	X	X	X		X	X			
17	COMPLIANCE	WAPASU	X	X	X	X		X	X				
18	BACKGROUND	STONY MOUNTAIN	X	X	X	X	X		X	X	X	X	
19	COMPLIANCE	FIREBAG	X	X				X	X				
20	COMPLIANCE	MACKAY RIVER	X	X				X	X				
21	COMMUNITY	CONKLIN	X	X	X	X	X		X	X			
22	COMMUNITY	JANVIER	X	X	X	X	X		X	X			
23	COMPLIANCE	FORT HILLS	X	X		X	X		X	X			
25	EMERGENCY RESPONSE	WASKOW OHCI PIMATISIWIN	X					X					
26	COMPLIANCE	CHRISTINA LAKE	X	X				X					
27	COMPLIANCE	JACKFISH 2/3	X	X				X					
29	COMPLIANCE	SURMONT 2	X	X		X		X	X				
30	COMPLIANCE	ELLS RIVER	X	X		X	X		X	X			
501	COMPLIANCE	LEISMER	X	X				X					
505	COMPLIANCE	SAWBONES BAY	X	X				X					
506	COMPLIANCE	JACKFISH 1	X	X				X					
507	COMPLIANCE	KIRBY SOUTH	X	X				X	X				
508	COMPLIANCE	KIRBY NORTH	X	X				X	X				

Table 1.0 - Pollutant Parameters monitored in the WBEA network

Table 1.1 provides a listing of stations and meteorological parameters measured by continuous methods. Parameters measured include ambient temperature, relative humidity, wind speed, wind direction, vertical wind speed, solar radiation, precipitation, and leaf wetness

WBEA ID	TYPE	STATION NAME	Temperature	RH	BP	WS	WD	VWS	GR	PC	LW
1	COMMUNITY	BERTHA GANTER-FORT MCKAY	X	X		X	X		X	X	X
2	COMPLIANCE	MILDRED LAKE	X	X		X	X				
3	METEOROLOGICAL	LOWER CAMP MET TOWER	X	X		X	X	X			
4	COMPLIANCE	BUFFALO VIEWPOINT	X	X		X	X				
5	COMPLIANCE/ METEORLOGICAL	MANNIX	X	X		X	X	X			
6	COMMUNITY	PATRICIA MCINNES	X	X		X	X				
7	COMMUNITY	ATHABASCA VALLEY	X	X	X	X	X				
8	COMMUNITY/ COMPLIANCE	FORT CHIPEWYAN	X	X		X	X		X		X
9	ATTRIBUTION	BARGE LANDING	X	X	X	X	X				
11	COMPLIANCE	LOWER CAMP	X	X		X	X				
13	COMPLIANCE/ ATTRIBUTION	FORT MCKAY SOUTH	X	X		X	X				
14	COMPLIANCE/ COMMUNITY	ANZAC	X	X		X	X				X
17	COMPLIANCE	WAPASU	X	X		X	X			X	
18	BACKGROUND	STONY MOUNTAIN	X	X		X	X		X	X	X
19	COMPLIANCE	FIREBAG	X	X		X	X				
20	COMPLIANCE	MACKAY RIVER	X	X		X	X			X	
21	COMMUNITY	CONKLIN	X	X		X	X				
22	COMMUNITY	JANVIER	X	X		X	X				
23	COMPLIANCE	FORT HILLS	X	X		X	X				
25	EMERGENCY RESPONSE	WASKOW OHCI PIMATISIWIN	X	X		X	X				
26	COMPLIANCE	CHRISTINA LAKE	X	X		X	X				
27	COMPLIANCE	JACKFISH 2/3	X	X		X	X				
29	COMPLIANCE	SURMONT 2	X	X		X	X				
30	COMPLIANCE	ELLS RIVER	X	X		X	X		X		
501	COMPLIANCE	LEISMER	X	X		X	X				
505	COMPLIANCE	SAWBONES BAY	X	X		X	X				
506	COMPLIANCE	JACKFISH 1	X	X		X	X				
507	COMPLIANCE	KIRBY SOUTH	X	X		X	X				
508	COMPLIANCE	KIRBY NORTH	X	X		X	X				

Table 1.1 – Meteorological Parameters monitored in the WBEA network

Table 1.2 provides a listing of stations and air quality parameters measured by time integrated methods. Parameters measured include volatile organic compounds (VOC), particulate matter less than 2.5 µm aerodynamic diameter ($PM_{2.5}$) and associated metals and ions, particulate matter less than 10 µm aerodynamic diameter (PM_{10}) and associated metals and ions, polycyclic aromatic hydrocarbons (PAH), and precipitation samples.

WBEA ID	TYPE	STATION NAME	VOC	$PM_{2.5}$	$PM_{2.5}$ ECOC	PM_{10}	PAH	PRECIP
1	COMMUNITY	BERTHA GANTER-FORT MCKAY	X	X	X	X	X	X
6	COMMUNITY	PATRICIA MCINNES	X	X		X	X	
7	COMMUNITY	ATHABASCA VALLEY	X	X		X	X	
8	COMPLIANCE/COMMUNITY	FORT CHIPEWYAN	X	X		X	X	
9	ATTRIBUTION	BARGE LANDING	X					
13	COMPLIANCE/ ATTRIBUTION	FORT MCKAY SOUTH	X			X		
14	COMPLIANCE/COMMUNITY	ANZAC	X	X		X	X	
17	COMPLIANCE	WAPASU			X			X
18	ENHANCED DEPOSITION/ BACKGROUND	STONY MOUNTAIN			X			X
21	COMMUNITY	CONKLIN	X	X		X	X	
22	COMMUNITY	JANVIER	X	X		X	X	
23	COMPLIANCE	FORT HILLS	X			X		
30	COMPLIANCE	ELLS RIVER	X			X		

Table 1.2 – Time-Integrated Parameters monitored in the WBEA network

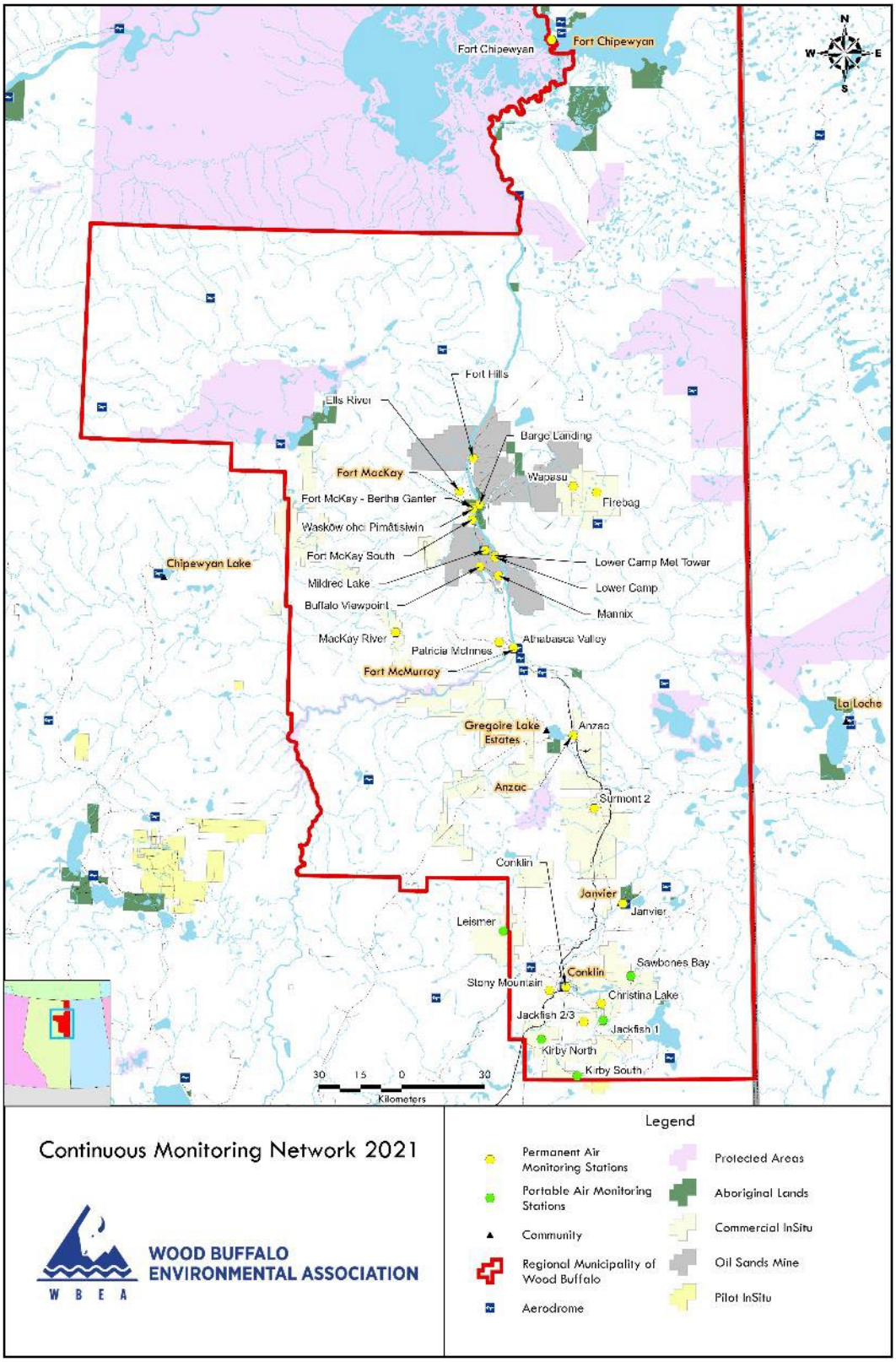


Figure 1.0 – WBEA Network Monitoring Sites

General Site Information

Station

Station ID	AMS 505
Station name	Sawbones Bay
Date station established	June 23, 2021

Location

Station street address	Station located in laydown yard at Christina Lake facility
Legal land description	1-16-77-5 W4
Airshed Zone	Wood Buffalo Environmental Association
Latitude	55.667847
Longitude	-110.705711
UTM East	518511
UTM North	6169152
Nearest community	Conklin
Community population	229
Census Year	2018

Owner/Operator/Approval Holder

Operating Agency	Wood Buffalo Environmental Association
Address of Operating Agency	Unit 3, 805 Memorial Drive, Fort McMurray, Alberta T9K 0K4
Name of Approval Holder	MEG Energy Corp.
Approval number	00216466-01-00
Contact Name	Bryan Wilson
Address	NA
Phone number	403-629-0853
Email address	Bryan.wilson@megenergy.com

Site Description

Land use by sector	0 – 90 degrees	Forest
	91 – 180 degrees	Forest
	181 – 270 degrees	SAGD operations
	271 – 360 degrees	Forest
Site elevation (m) (above sea level)	471 m	
Angle of elevation to nearby buildings	Greatest angle	0
	Building direction	None
Airflow restrictions	North	None
	East	None
	South	None

	West	None
Distance to nearest trees (m)	North	190
	East	75
	West	NA
	South	15
Sample manifold	Type	All glass
	Inlet height above roof	1 metre
Meteorological Sensors	Type	Cup and vane
	Height above ground (m)	10 m
	Distance from station (m)	0 m

Site Influences

Localized Sources (within 20 metres of station)

Type	Distance (m)	Description
SAGD Operations	500m W	MEG Energy operations
Laydown yard	100m S	Heavy equipment

Roadway Influences

Type	Traffic Volume	Distance (m)	Description
Roadway	Low	100	Gravel access road
Roadway	Low	500	Gravel access road

Major Point Sources

Facility Name	Source Type	Production Capacity	Distance from site (km)	Compass direction from site
MEG Christina Lake	SAGD operations	100,000 barrels per day	500m	West

Station Equipment

Equipment Owner: MEG Energy

Analytical Equipment

Parameter	Make	Model	Serial Number	Date Installed
SO2	Thermo Scientific	43i	710321323	2021
H2S	Thermo Scientific	450i	0922436966	2021
NO2	Teledyne/API	T200	4260	2021

Meteorological Equipment

Parameter	Make	Model	Serial Number	WMO Site Class	Date Installed
AT/RH	Vaisala	HMP155	N2910504	Class 3	2021
WS	Met One	010C-1	R14655	Class 4	2021
WD	Met One	020C-1	P10040	Class 4	2021

Support Equipment

Name	Description	Make	Model	Serial Number
Datalogger	Datalogger	Campbell Scientific	CR3000	6894
Gas Dilution Calibrator	Dynamic dilution calibrator	Teledyne/API	T700	5112
Zero air generator	Zero Air Generator	Teledyne/API	701	5611
Shelter / Building	Air monitoring portable	ITB	8 x 16 trailer	ITB1315940
HVAC	Heating and air conditioning system. Wall mount unit	BARD	1 ton	NA

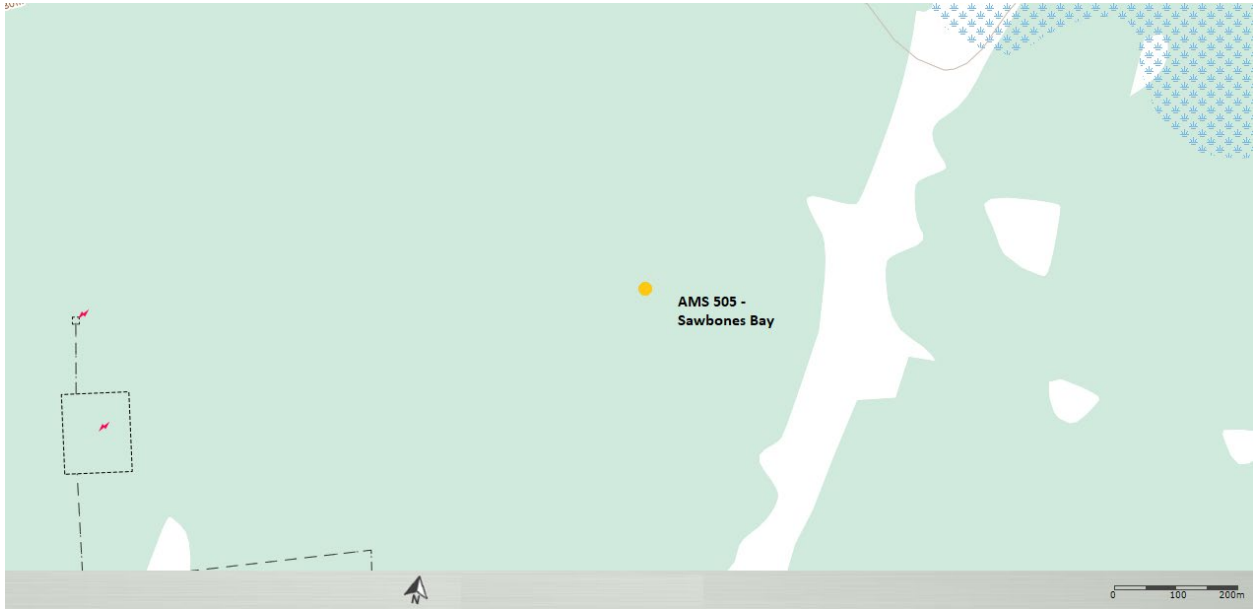
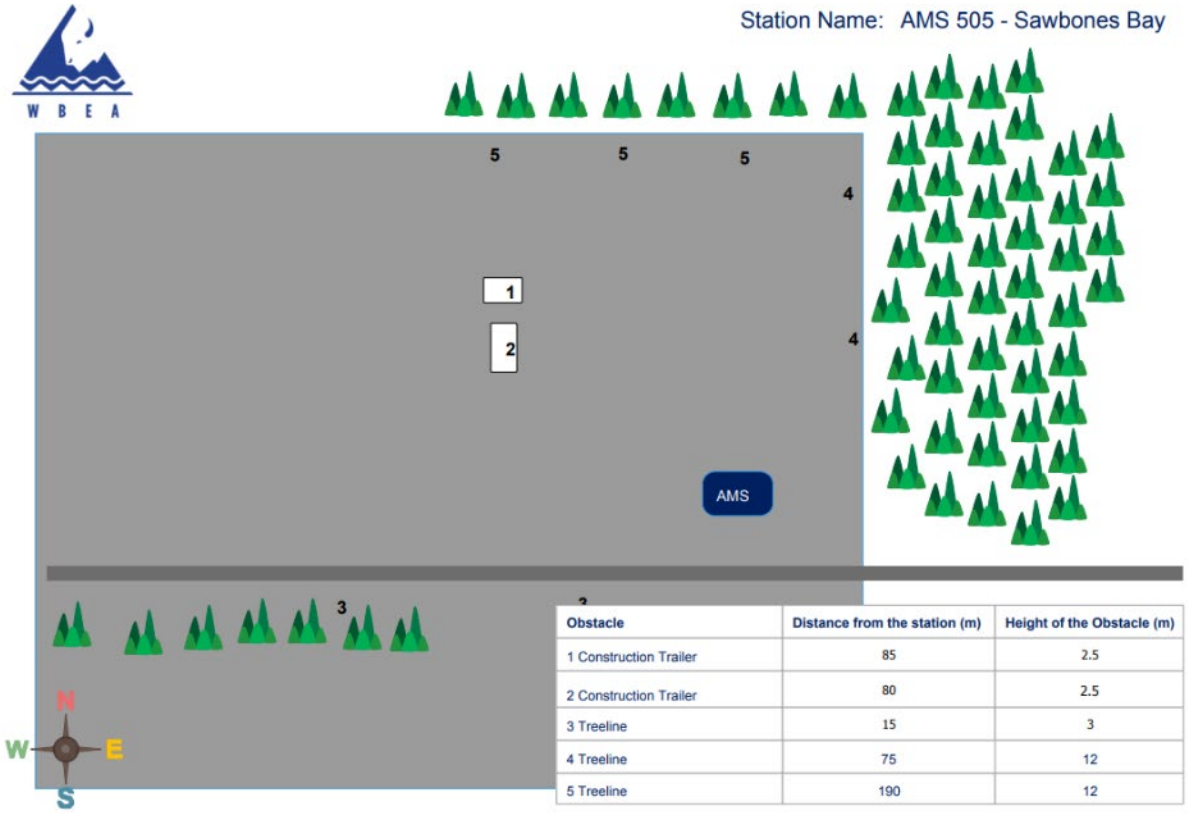


Figure 2.0 – Area Topographic map showing AMS 505

Figure 3.0 – Aerial image showing AMS 505



Obstacle	Distance from the station (m)	Height of the Obstacle (m)
1 Construction Trailer	85	2.5
2 Construction Trailer	80	2.5
3 Treeline	15	3
4 Treeline	75	12
5 Treeline	190	12

Figure 4.0 – Plan view sketch for AMS 505 – Sawbones Bay

Site photos

The following photos show the environment surrounding the monitoring station.

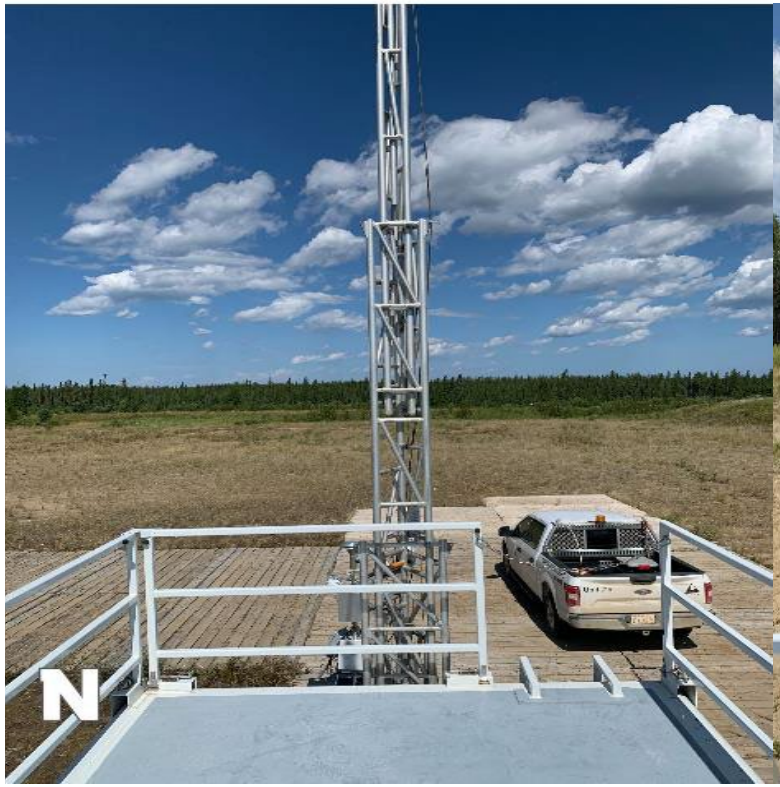


Figure 5.0 – Environment looking North

Figure 5.1 – Environment looking East

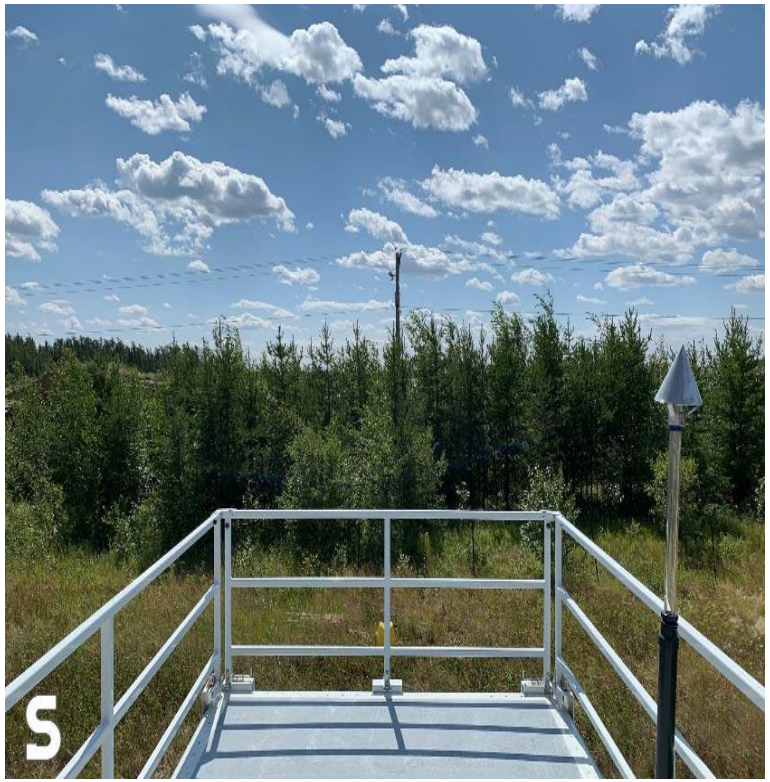


Figure 5.2 – Environment looking South

Figure 5.3 – Environment looking West

Figure 5.4 – Meteorological Tower

Station Photos

The following photos show the monitoring station and instrumentation.

Figure 6.0 – Photo showing the inlet and sample manifold

Figure 6.1 – Curb shot of the monitoring station

Figure 6.2 –Photo of the front and the back of instrument rack

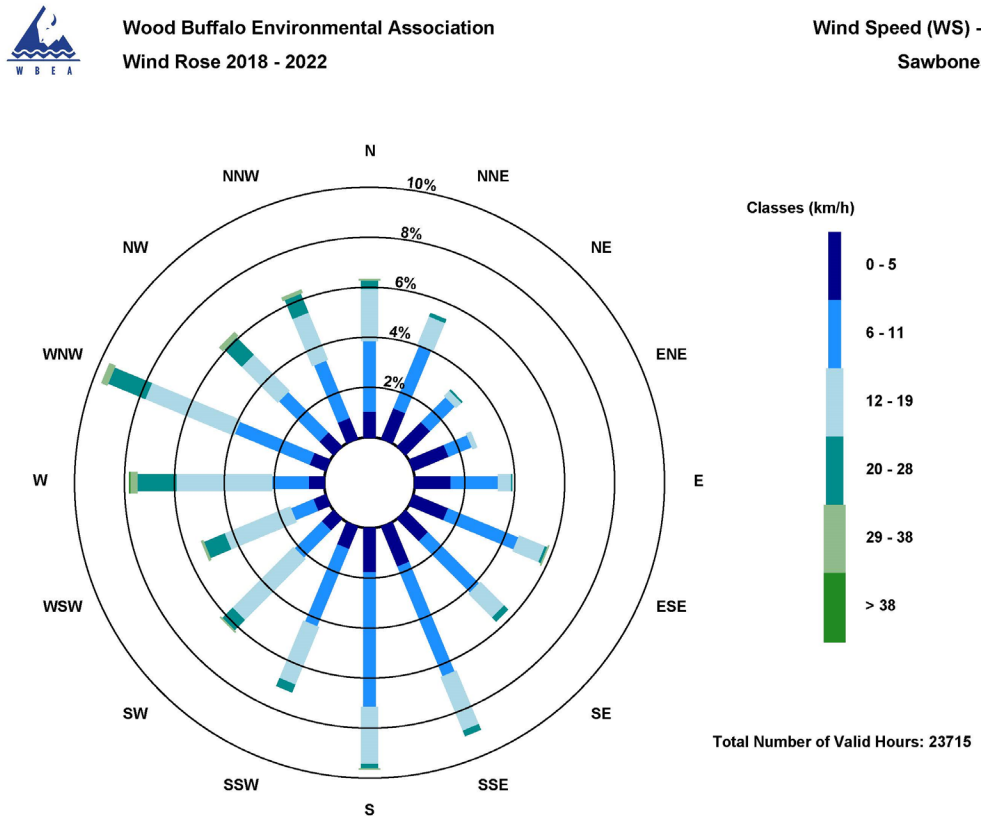


Figure 7.0 – Windrose (2018-2022)