PSC ANALYTICAL SERVICES

Prepared For:
Dave Butt

Date Generated
30-Jul-2004
Spreadsheet File Name
0413119,300H.XLS

Client ID:				L087	L088	L090	L091
Project ID:				3583	3583	3583	3583
PSC Analytical ID:				04-H049199	04-H049200	04-H049201	04-H049202
Matrix:				Filter	Filter	Filter	Filter
Duplicate of:							
Date Sampled:							
Client Description:							
Parameters	Method	EQL	Units				
C+H-:0 Lead	ICP-OES	5	ug				340
C+H-:0 Filter/Swab Digest	HNO3/HCl	-					Completed

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.

PSC ANALY SERVIC

Date Generated: 30-Jul-2004 Spreadsheet File Name: 0413119,300H.XLS	L093 3583 04-H049203 Filter	Swab #1 3583 04-H049204 Swab	Swab #2 3583 04-H049205 Swab	L094 3583 04-H049242 Filter
Parameters				
C-H-:0 Lead	120 Completed	< 5 Completed	< 5 Completed	< 5 Completed
C-H-:0 Filter/Swab Digest				

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.

Public Works and Government Services Canada
P.O. Box 4600
The John Cabot Bldg.
10 Barter's Hill
St. John's, NF
A1C 5T2

Travaux publics et Services gouvernementaux Canada
C.P. 4600
L'immeuble John Cabot
10 Barter's Hill
St. John's (T.-N.)
A1C 5T2

RECEIVED
TRANSPORT CANADA
APR 0 6 2005
HARBOURS & PORTS
DIRECTORATE
ATLANTIC REGION (NL)

File copy original sent Nov. 3/04

November 8, 2004

Transport Canada
8th Floor, John Cabot Building,
10 Barters Hill,
St. John's, NL

A1C 6H8

Attention: Mr. Kevin Edwards

RE: Lead and Asbestos Abatement Program at the Former Transmitter and Receiver Sites in Stephenville, NL

Dear Mr. Edwards:

Public Works and Government Services Canada – Environment Services (PWGSC) on behalf of the Transport Canada (TC) commissioned MGI Limited (MGI) to remove lead based paint and asbestos containing materials (ACM) from the Former Transmitter and Receiver sites located in Stephenville, NL. This program was based on information gathered by MGI during Phase I and II Environmental Site Assessments (ESA) previously conducted onsite.

The following is a summary of the work completed.

Summary

The Phase I and II ESAs conducted by MGI Limited revealed that lead based paint and ACM were present throughout the Former Transmitter and Receiver buildings. As a result, MGI Limited returned to the site in January 2004 to complete an abatement program.

Approximately 0.36m^3 of ACM was removed from the ductwork of the furnace room in the Transmitter building and approximately 0.16m^3 of ACM was removed from the floor of the furnace room in the Receiver building. 10.5m^2 of lead based paint was removed from the interior walls of the Receiver building at that time.

Following the completion of the lead and asbestos abatement program, additional painted surfaces were identified throughout the Transmitter and Receiver buildings that had not been identified during the previous assessments conducted by MGI personnel.

Canada

Ten (10) paint chip samples from these newly identified surfaces were collected and submitted for lead concentration analysis; six (6) of these samples underwent lead leachate analysis. Based on the results of the analysis, additional surfaces with lead based paint were identified at the Transmitter and Receiver Sites, totaling approximately 75 m^2.

MGI Limited returned to the site in May 2004 to complete the removal of the lead based paint. Approximately 30 m^2 of paint was removed from the interior walls of the Transmitter building and approximately 45 m^2 from the interior walls of the Receiver building.

Based on the above-noted work, there are no further concerns at the Transmitter and Receiver Sites. No further actions are recommended for the subject property at this time.

This letter is intended as a brief summary of the work completed at the Former Transmitter and Receiver Sites in Stephenville. Please refer to the attached reports for more detailed information.

Sincerely,

Heather Robbins
Environmental Services
PWGSC

Attachments: "Lead Abatement and Asbestos Abatement, Former Transmitter & Receiver Sites, Stephenville, NL, MGI Limited, May 2004."

"Lead Abatement, Former Transmitter & Receiver Sites, Stephenville, NL, MGI Limited, October 2004."

Privilege and Confidentiality Notice: The information in this letter is intended for the named recipients on the original letter at the time it was prepared. It may contain privileged and confidential information. Any use of this information by third parties requires the written consent of PWGSC. All findings and conclusions stated in this letter are based on facts and circumstances, as they existed at the time this letter was prepared. This report is not intended to be exhaustive in scope and any change in fact or circumstance upon which this report is based may affect the expressed findings and conclusion.

COPY

CLOSE OUT REPORT

DEMOLITION OF EPU/TRANSMITTER/RECEIVER AND CLEAN-UP AT STEPHENVILLE, NL

Prepared for:

Transport Canada
Heritage Court
95 Foundry St. PO Box 42
Moncton, NB E1C 8K6

Prepared by:

Whalen Enterprises Limited
Stephenville, NL

August 2007

TABLE OF CONTENTS

INTRODUCTION

Whalen Enterprises Limited of Stephenville was awarded the tender for the demolition of the Emergency Power Unit site, the Receiver site and the Transmitter site located on land adjacent to the Stephenville Airport in Stephenville. The land is currently owned by Transport Canada. A contract was signed between Whalen Enterprises Limited of Stephenville and Transport Canada of Moncton, New Brunswick to complete work as per Transport Canada's description of work and instructions.

SITE INFORMATION AND BACKGROUND

The site of the demolition project is located within the boundaries of the Town of Stephenville in Newfoundland. The buildings and concrete structures are currently the property of Transport Canada. The structures are located near the Stephenville Airport in the province of Newfoundland. There are currently no access roads to site as an existing quarry has made the original site access road impassable. Access to the site would have to be gained by installing a new temporary roadway.

WORK PLAN AND DESCRIPTION

A detailed site specific safety plan was the first order of business for the demolition contract. Whalen Enterprises Limited submitted a site specific safety plan to Transport Canada for approval before any work was to commence. Whalen Enterprises Limited planned to build a new access road to access site. Once the access road was build, Whalen Enterprises Limited would use road to bring in equipment and material to demolish structures identified.

MOBILIZATION AND SITE PREPARATION PLUS EXECUTION OF WORK

Equipment was moved to the site on July 7/07. The utilities were notified of possible site excavations and gave appropriate site clearances as outlined in the Aliant Location Certificate (Appendix A). The Town of Stephenville gave verbal approval for excavation work as their existing water and sewer lines were not on properties. The equipment mobilized included the following:

- 1 Cat 320 Excavator
    - 1 Cat 315 Excavator
    - 1 Cat 420 Backhoe complete with hydraulic buster
    - 1 Cat 928 Loader
    - 1 4x4 Pickup

A buffer zone was cleared around each site with the use of chainsaws. Also, a site access road was built in order for equipment to start work. The first building to be demolished was the Transmitter site. The building was knocked down using an excavator and then broken into small pieces using a hydraulic buster. Metals were separated and sent to the recycling yard. Concrete with any remnants of re-bar was trucked to local landfill (see attached dump slips Appendix B). Concrete that was clean was buried on site. Creosoted poles were also trucked to local landfill. Site was backfilled and leveled.

The next building to be demolished was the Receiver site. Access to site was gained by use of old gravel road. Building was demolished using excavator then broken into small pieces using a hydraulic buster. Metals were separated and sent to the recycling yard. Concrete with any remnants of re-bar was trucked to local landfill (see attached dump slips Appendix B). Concrete that was clean was buried on site. Site was backfilled and leveled.

The last site was the EPU site. Concrete in this site was extremely hard. Hydraulic buster was used to break concrete into small pieces. Because of the close proximity to the existing quarry fare, all concrete from EPU site was moved into existing pit and later trucked to local landfill (see attached dump slips Appendix B). There is no concrete buried at this site. The two piles of grubbed materials were removed and all metals, asphalt and debris were removed. Site was backfilled and leveled.

The last task to complete project was to install sign and barricades. The sign was obtained form the Stephenville Airport Corporation and installed. A galvanized guard rail was installed near the sign. Also, an armour stone barricade was installed on the temporary access road to prevent any vehicles from crossing Transport Canada's site.

Appendix "A"

Aliant

RECORD OF LOCATING TELEPHONE PLANT
DOSSIER DE LOCALISATION DES RÉSEAUX TÉLÉPHONIQUES

SWITCHING CENTRE / CENTRE DE COMMUTATION: STVC

SERIAL NUMBER / NUMÉRO DE SÉRIE:

APPOINTMENT DATE / DATE DU RENDEZ-VOUS: 07 M. 07 D. 12

PLACE / LIEU: 11

TIME / HEURE: 3 pm

REQUESTED BY / DEMANDÉ PAR: Wireless ENT

TELEPHONE NUMBER / NUMÉRO DE TÉLÉPHONE:

COMPANY NAME AND ADDRESS / NOM ET ADRESSE DE L'ENTREPRISE: same

CONTACT PERSON / PERSONNE-RESSOURCE: Mike Mahler

NATURE AND LOCATION OF WORK (SHOW WORK LIMITS) / NATURE ET EMPLACEMENT DU TRAVAIL (INDIQUER LES LIMITES DE TRAVAIL): old Control Structure to be removed

LIMITS OF THIS LOCATE / LIMITES DE CET EMPLACEMENT:

TYPE OF PLANT / TYPE D'INSTALLATION: Buried

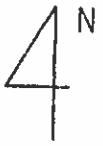
METHOD OF MARKING: / MÉTHODE DE MARQUAGE: STAKES / PIQUETS ☐ PAINT / PEINTURE ☐ OTHER (SPECIFY) / AUTRE (PRÉCISER): NO Cable

REMARKS / ADDITIONAL INSTRUCTIONS / REMARQUES OU INSTRUCTIONS SUPPLÉMENTAIRES

"CAUTION" "ATTENTION" HAND DIG WITHIN 3 FEET OF MARKINGS / CREUSER À LA MAIN DANS UN RAYON DE 3 PIEDS DES MARQUES

SKETCH OF PROPOSED EXCAVATION AND PLANT LOCATION (NOT TO SCALE)
CROQUIS DE L'EXCAVATION PROPOSÉE ET EMPLACEMENT DE L'INSTALLATION (CE CROQUIS N'EST PAS À L'ÉCHELLE)

STRUCTURE



old abitibi Road

Cable

PHONE / TÉLÉPHONE | EXT. / POSTE

ACCEPTED BY / ACCEPTÉ PAR: M Wirk — TITLE / TITRE — COMPANY / ENTREPRISE

LOCATOR'S SIGNATURE / SIGNATURE DU LOCALISATEUR: D. Reimer — DATE: July 12/07 — TIME / HEURE

ID / CODE DU COMPTE: ZR — HOURS / HEURES: 1 hr — FOLLOW-UP / SUIVI

CONTRACTED WORK / L'ENTREPRENEUR A COMMENCÉ LE TRAVAIL: YES / OUI ☑ NO / NON ☐

AD 12141 Sort Code 105964

Appendix "B "

TOWN OF STEPHENVILLE
LANDFILL LOAD BILLING

DATE: July 18th 2007

COMPANY: WHALEN

GOVT. _____

NINE

DEPT. _____

9 LOAD

PICK-UP _____ SINGLE AXLE _____ TANDEM ✓ TRAILER _____

PLATE NO CMP-497

DRIVER [illegible]

SIGNATURE [illegible]

Quality Printers (308011)

TOWN OF STEPHENVILLE
LANDFILL LOAD BILLING

DATE: July 21 2007

COMPANY: WHALEN

GOVT. ______

DEPT. ______

FIFTEEN (15) LOAD

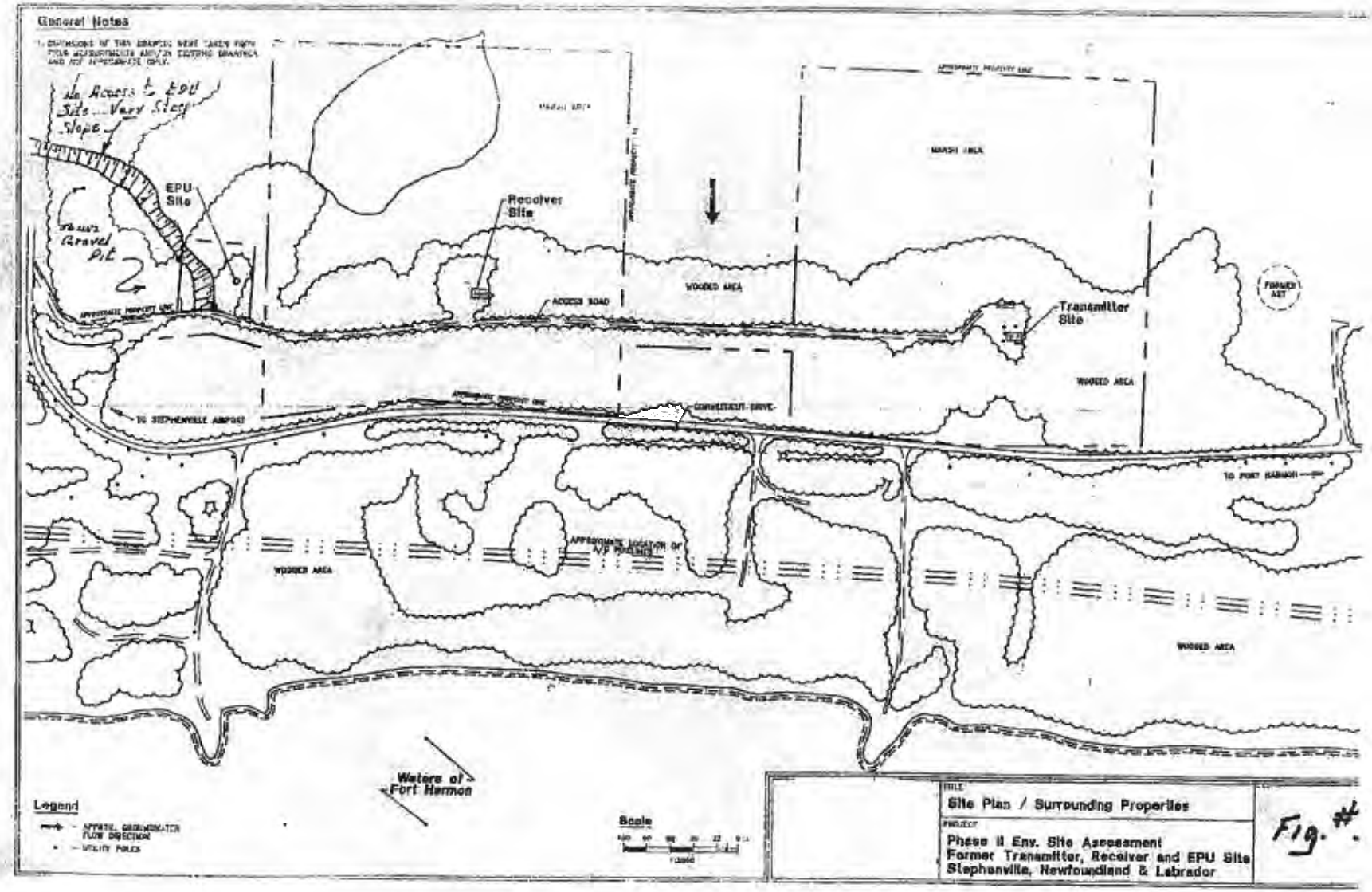
PICK-UP ______ SINGLE AXLE ______ TANDEM ✓ TRAILER ______

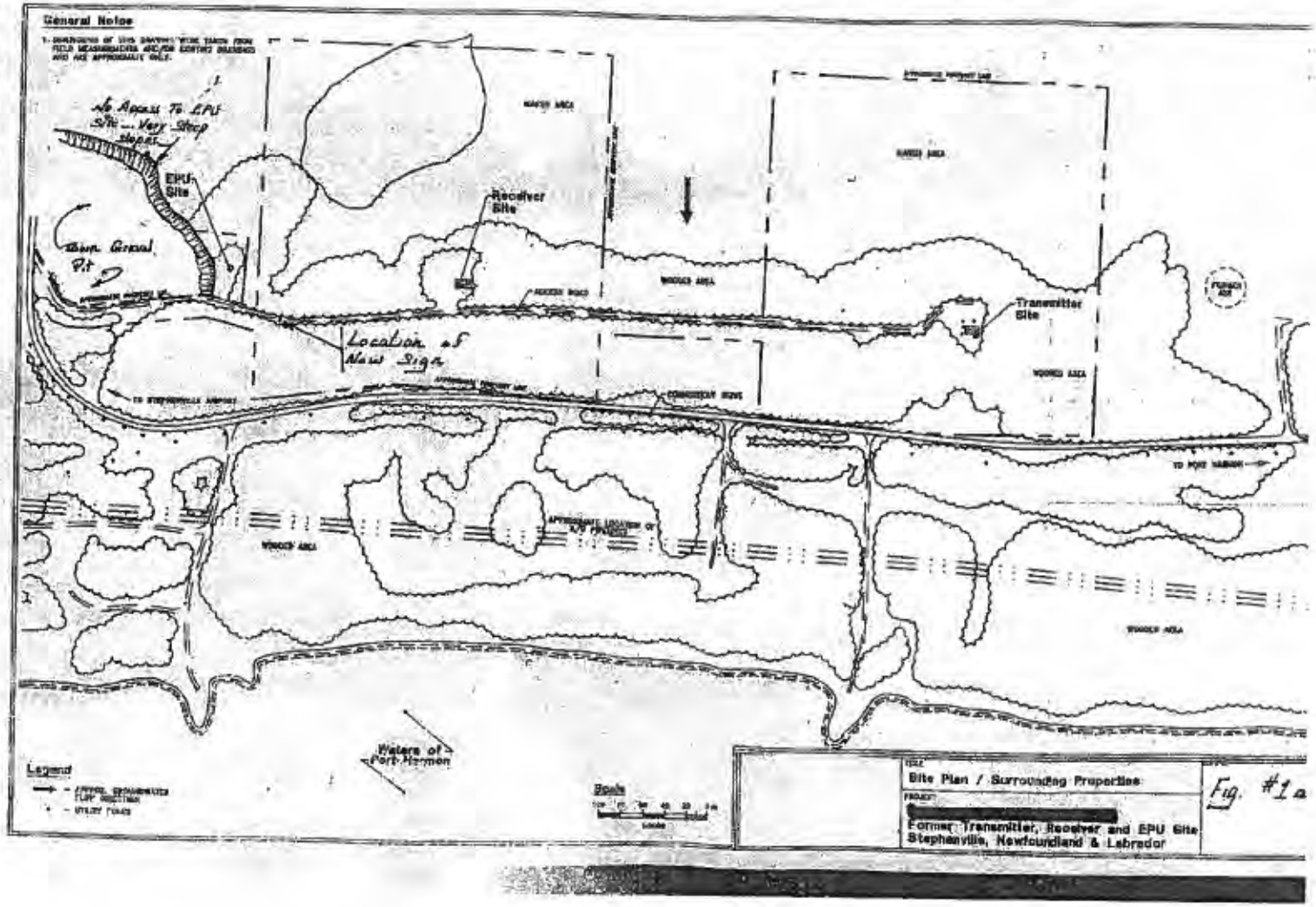
PLATE NO. CMP 500

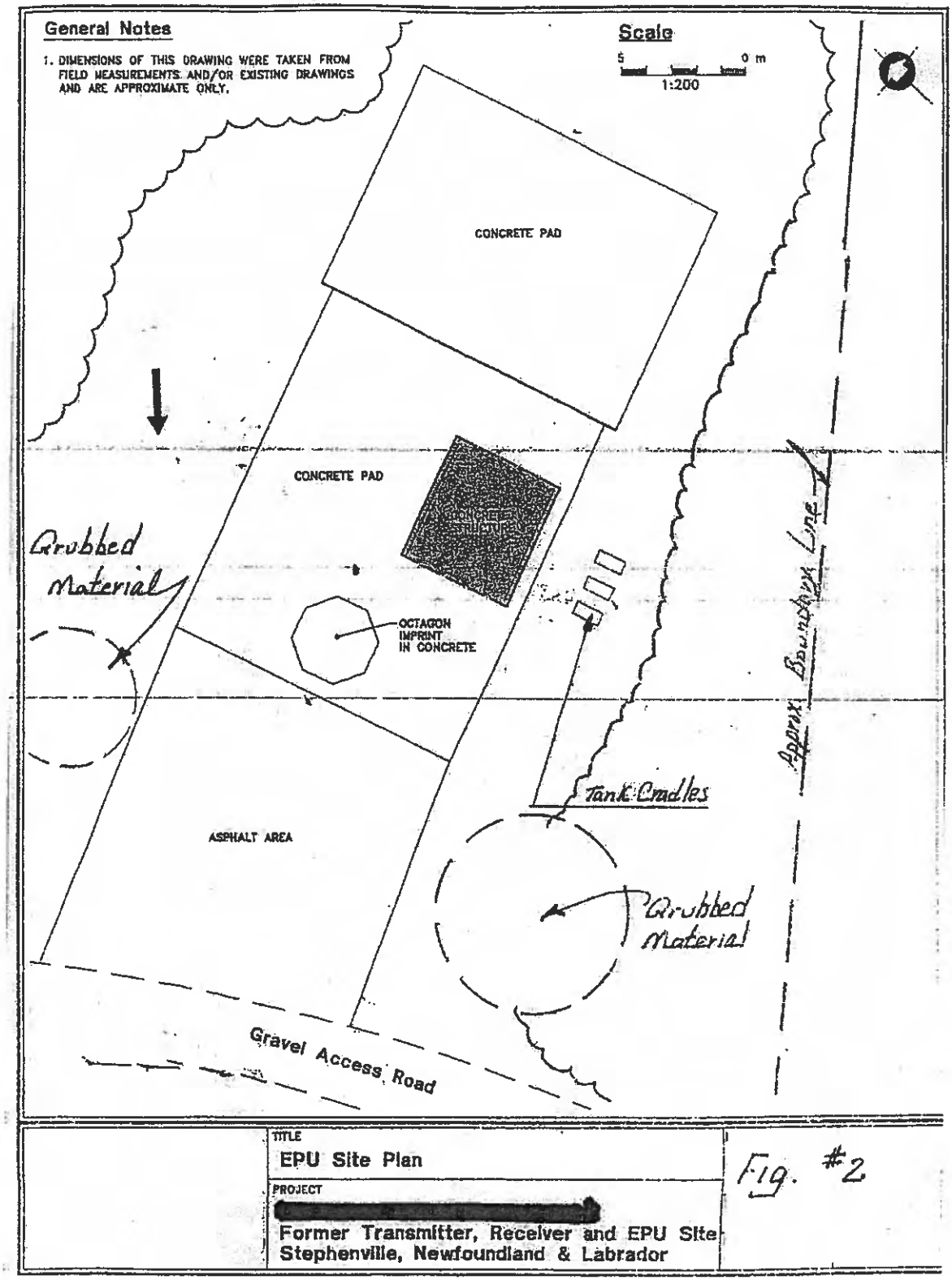
DRIVER X [signature]

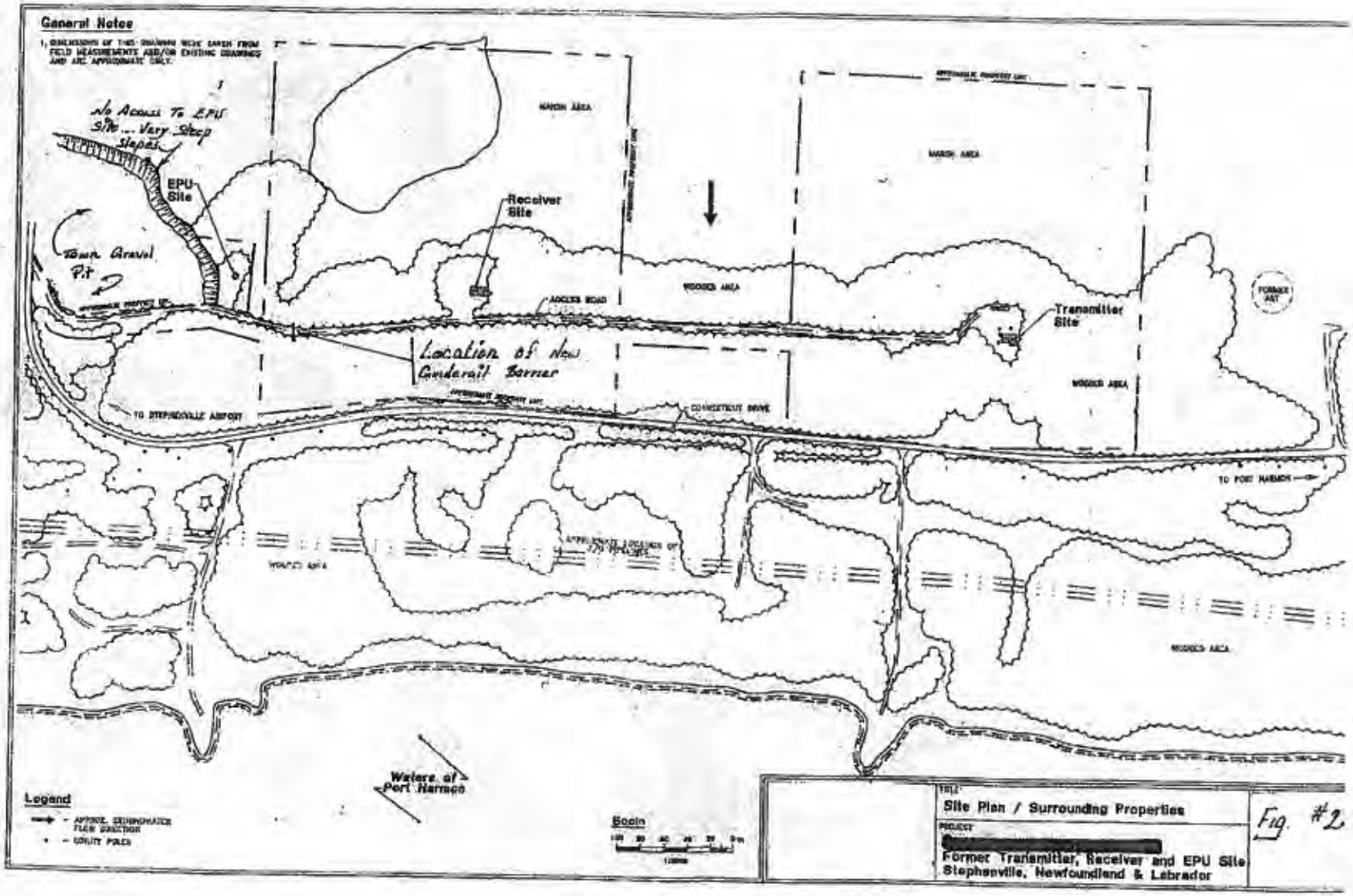
SIGNATURE [signature]

Appendix "C "


General Notes
No Access to EPU Site... Very Steep Slope
EPU Site
Receiver Site
Gravel Pit
ACCESS ROAD
WOODED AREA
MARSH AREA
Transmitter Site
TO STEPHENVILLE AIRPORT
CONNECTICUT DRIVE
TO PORT AUBAIN
Waters of Fort Harmon
Legend
Scale
Site Plan / Surrounding Properties
Phase II Env. Site Assessment
Former Transmitter, Receiver and EPU Site
Stephenville, Newfoundland & Labrador
Fig. #

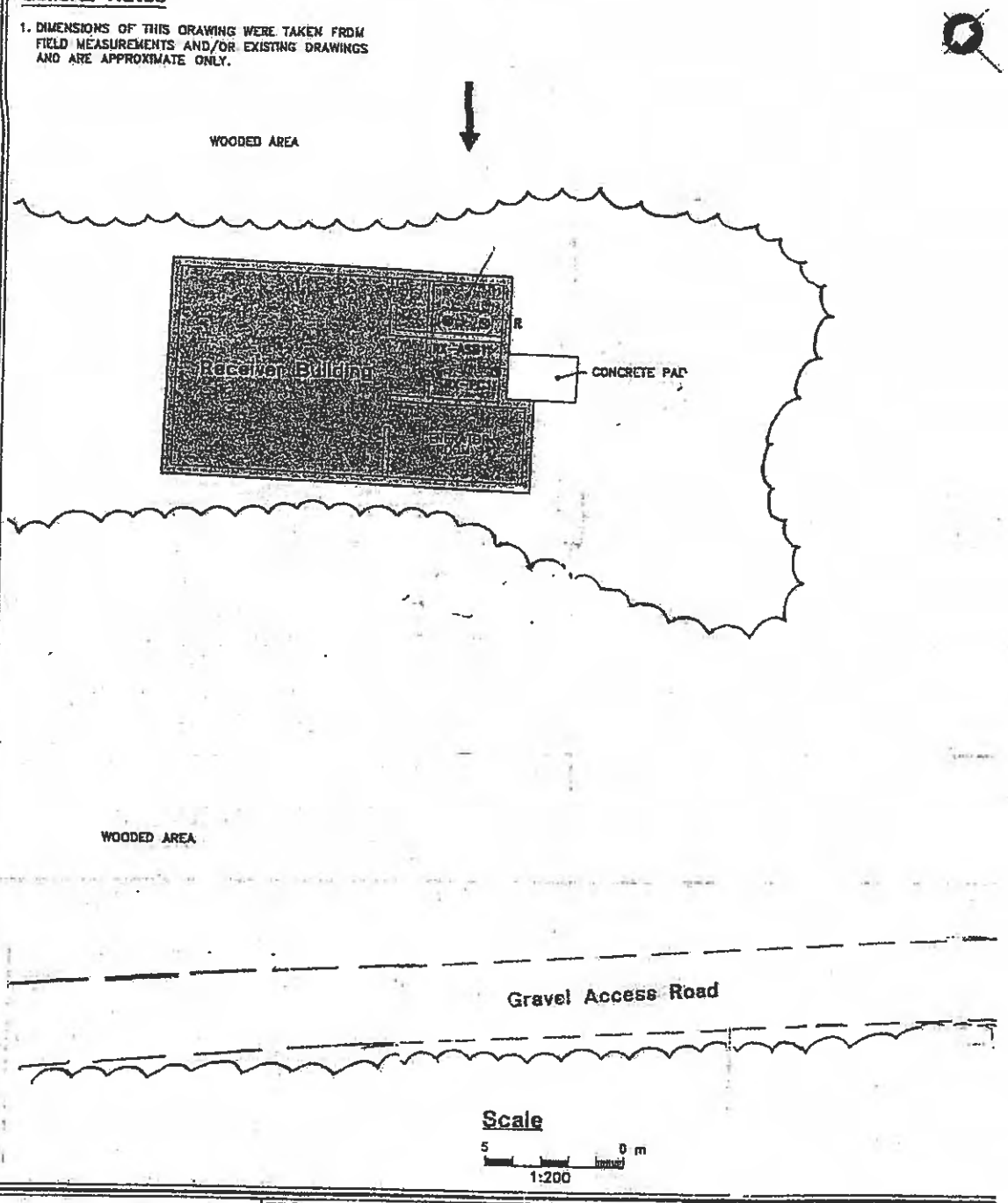

General Notes
No Access To EPU Site — Very Steep Slopes
EPU Site
Receiver Site
Gravel Pit
Location of New Sign
Transmitter Site
Waters of Port Hannon
Legend
Scale
Site Plan / Surrounding Properties
Former Transmitter, Receiver and EPU Site
Stephenville, Newfoundland & Labrador
Fig. #1a


General Notes
1. DIMENSIONS OF THIS DRAWING WERE TAKEN FROM FIELD MEASUREMENTS AND/OR EXISTING DRAWINGS AND ARE APPROXIMATE ONLY.
Scale
5 0 m
1:200
CONCRETE PAD
CONCRETE PAD
Grubbed Material
OCTAGON IMPRINT IN CONCRETE
Approx. Boundary Line
Tank Cradles
ASPHALT AREA
Grubbed Material
Gravel Access Road
TITLE
EPU Site Plan
PROJECT
Former Transmitter, Receiver and EPU Site
Stephenville, Newfoundland & Labrador
Fig. #2


General Notes
No Access To EPU Site ... Very Steep Slopes
EPU Site
Receiver Site
Town Gravel Pit
Location of New Guiderail Barrier
Transmitter Site
TO STEPHENVILLE AIRPORT
CONNECTICUT DRIVE
TO PORT HARMON
Waters of Port Harmon
Legend
Scale
Site Plan / Surrounding Properties
Former Transmitter, Receiver and EPU Site
Stephenville, Newfoundland & Labrador
Fig. #2

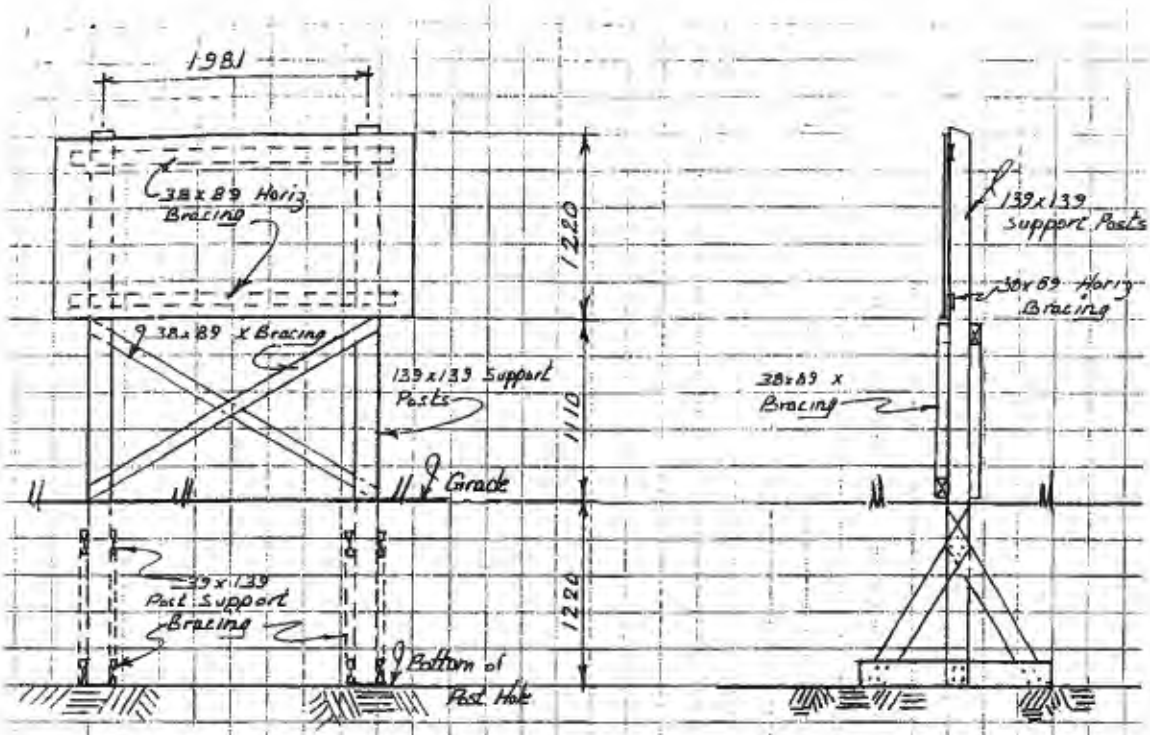
General Notes

1. DIMENSIONS OF THIS DRAWING WERE TAKEN FROM FIELD MEASUREMENTS AND/OR EXISTING DRAWINGS AND ARE APPROXIMATE ONLY.



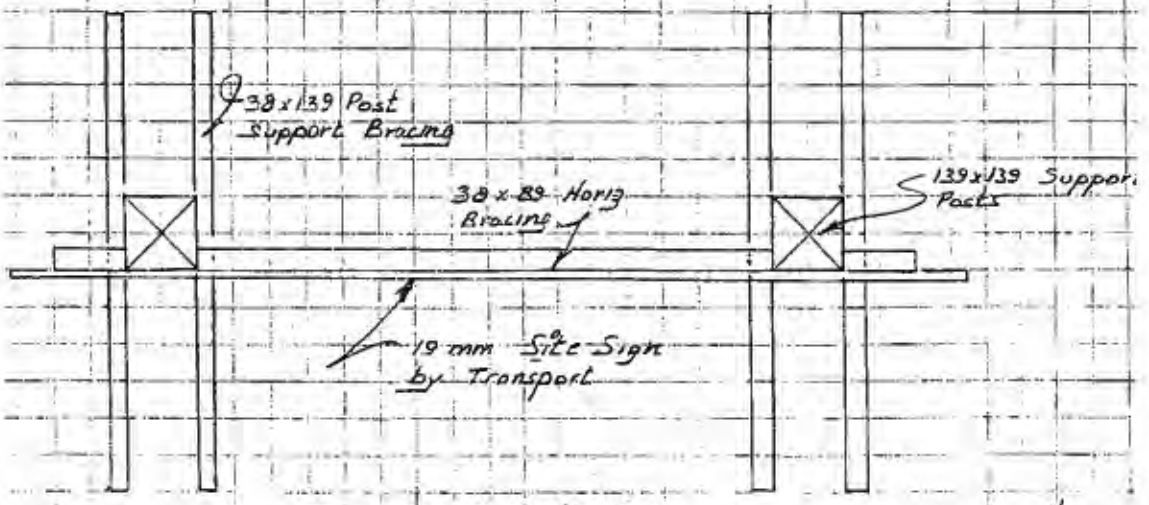
TITLE	Receiver Site Plan
PROJECT	[redacted] Former Transmitter, Receiver and EPU Site Stephenville, Newfoundland & Labrador

Fig. #3



Elevation of Sign

Section Thru Sign Support

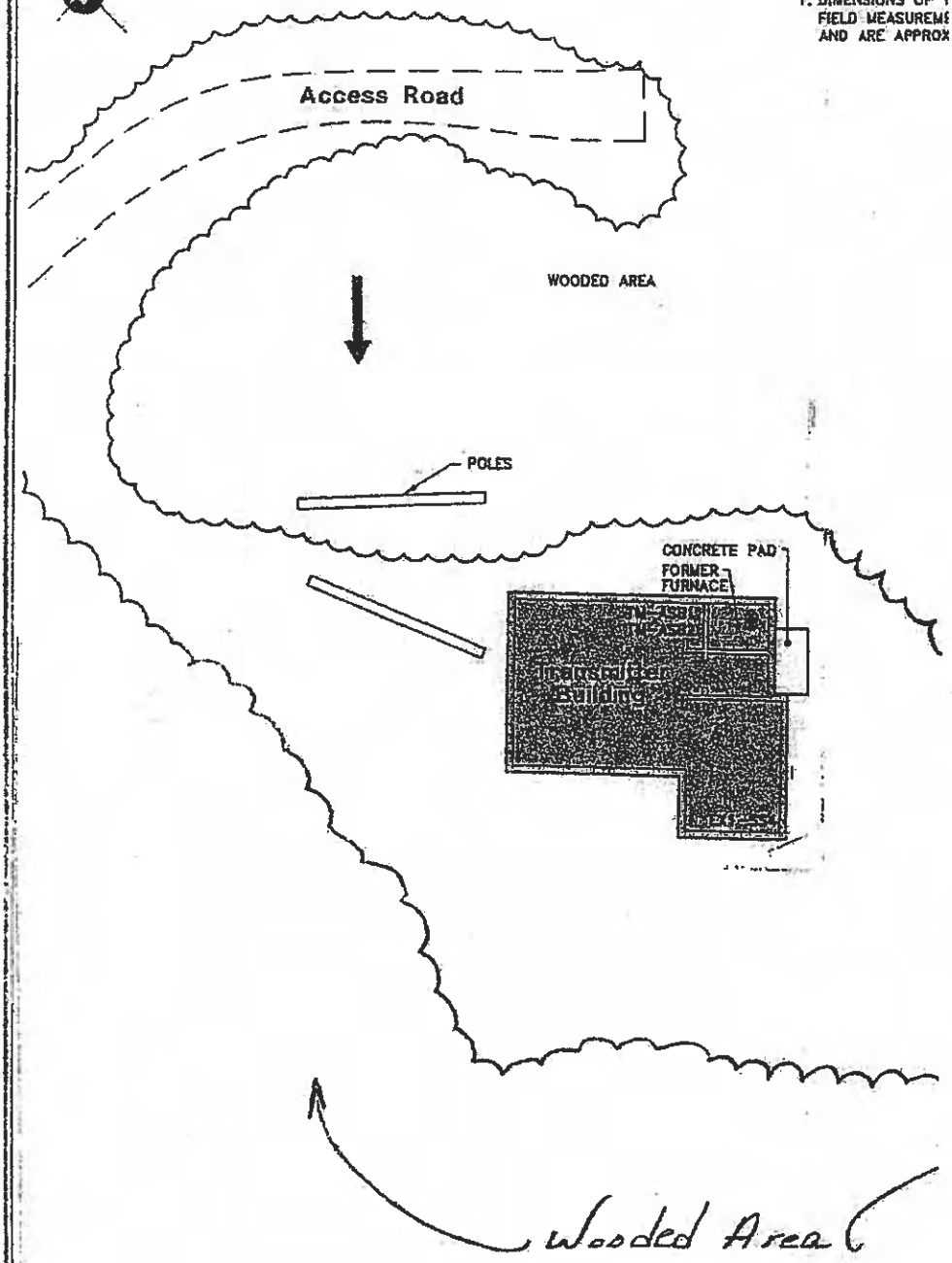


Plan of Site Sign

Fig. # 3a

General Note

1. DIMENSIONS OF T
FIELD MEASUREME
AND ARE APPROX



TITLE

Transmitter Site Plan

PROJECT

[redacted]

Former Transmitter, Receiver and EPU Site
Stephenville, Newfoundland & Labrador

Appendix "D "

Whyte, Margie

From: mwhalen@nfld.net
Sent: August 3, 2007 2:33 PM
To: Whyte, Margie
Subject: Pictures for you

Pictures of Demolition project. Stephenville, Newfoundland

Get Kodak prints of this picture, and all your other favorites, at www.kodakgallery.com!


07/16/2007


07/16/2007


07/17/2007


07/17/2007


07/17/2007


07/17/2007


07/17/2007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07/27/2007


07/27/2007


07/31/2007


07/31/2007


07/31/2007


07/31/2007


Canada
07/31/2007

How to save a picture
Simply right-click on it, then "Save Image As...". (Mac users: drag the picture to your desktop.)

Free Software!

Organize, print, and share your digital photos using FREE Kodak EasyShare software. Download the software

Kodak EasyShare Software

Get 20 Free Prints

Get started for free at kodakgallery.com and we'll give you 20 free prints (new members only). Plus, create photo mugs, books, cards, and more!

APPENDIX E

Aerial Photographs

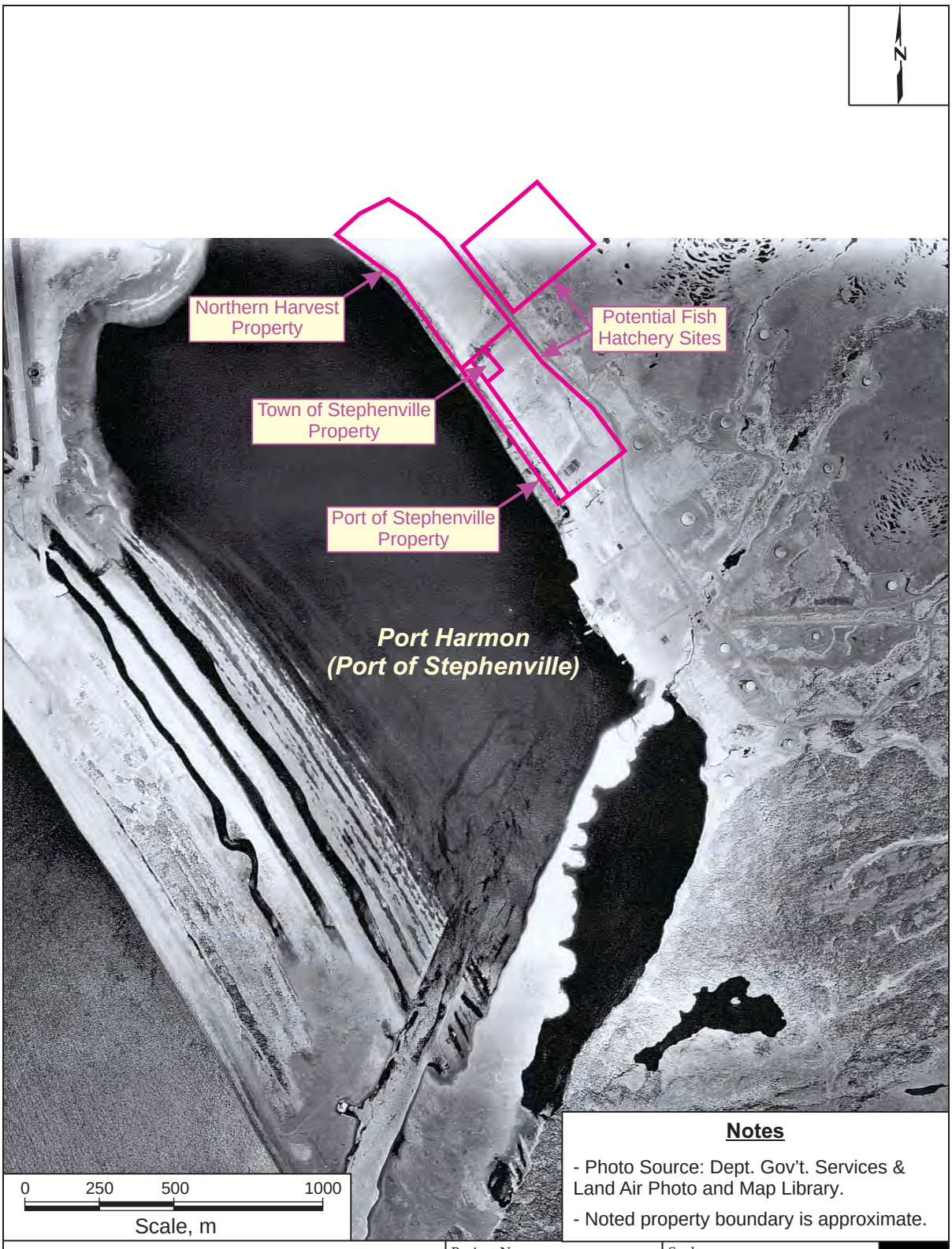
Notes

- Photo Source: Dept. Gov't. Services & Land Air Photo and Map Library.
- Noted property boundary is approximate.

Figure E1 Aerial photograph (1949) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC



Notes

- Photo Source: Dept. Gov't. Services & Land Air Photo and Map Library.
- Noted property boundary is approximate.

Figure E2 Aerial photograph (1966) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

Figure E3 Aerial photograph (1973) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

Figure E4 Aerial photograph (1974) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

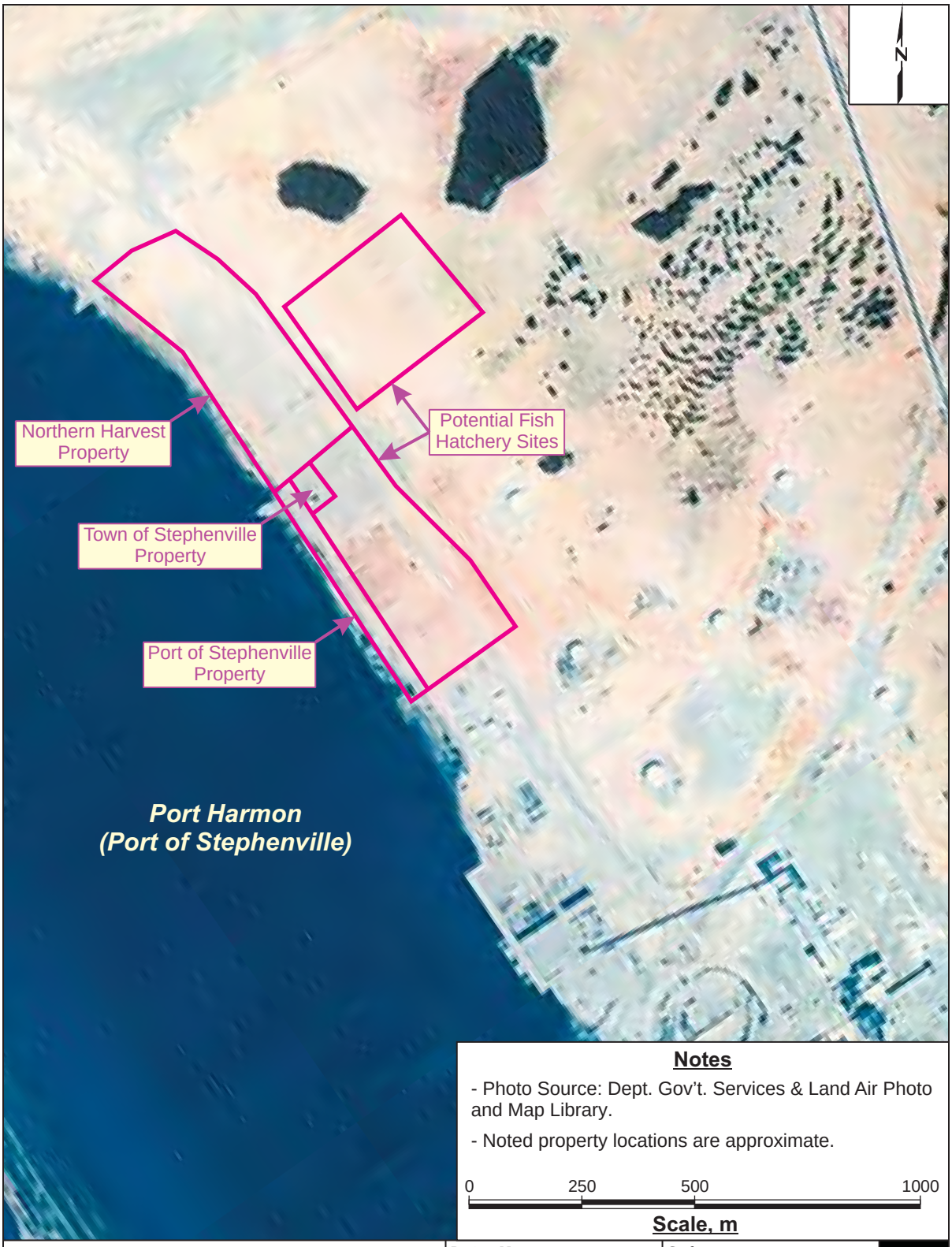


Figure E5 Aerial infrared photograph (1982) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

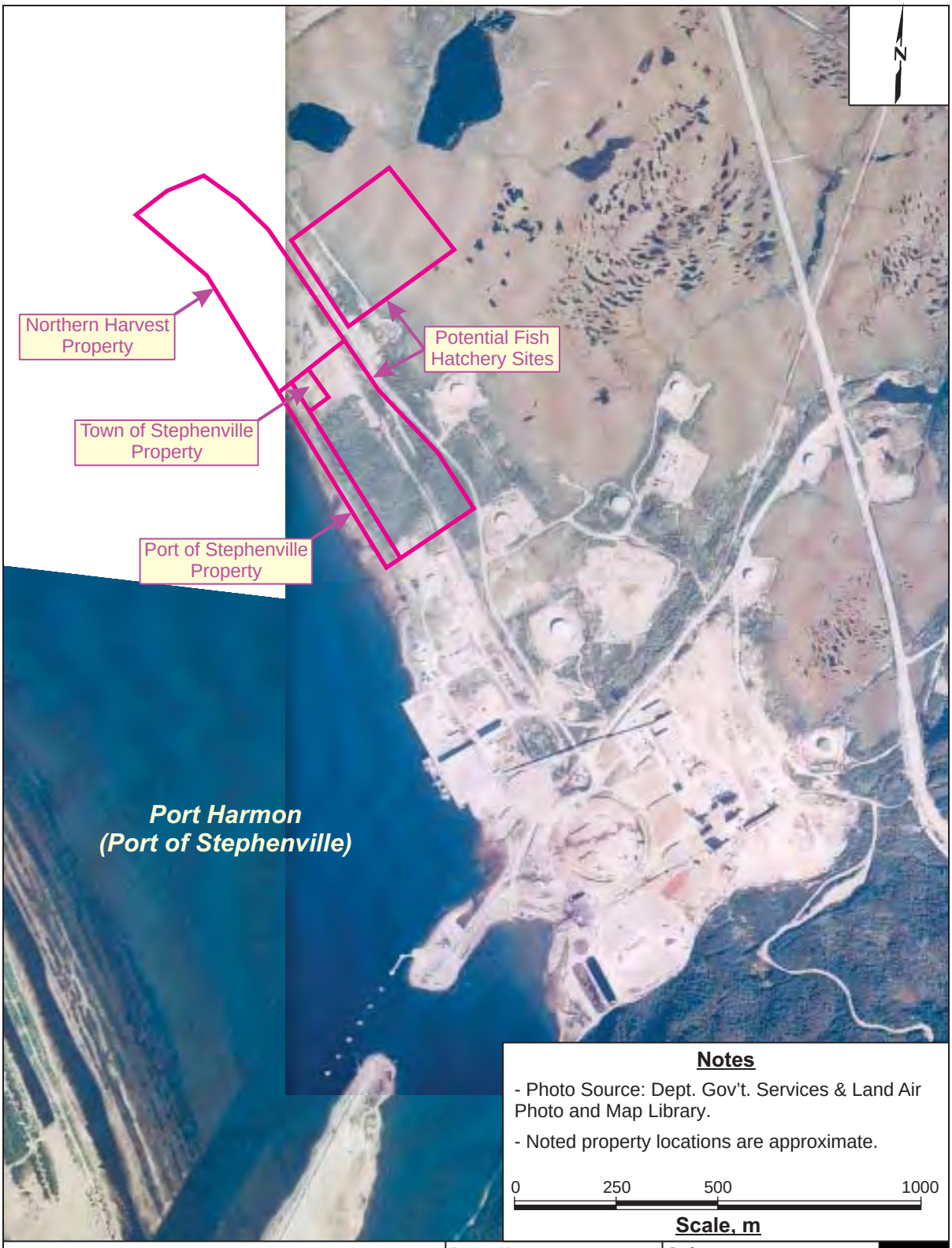


Figure E6 Aerial photograph (1984) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

Figure E7 Aerial photograph (1995) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

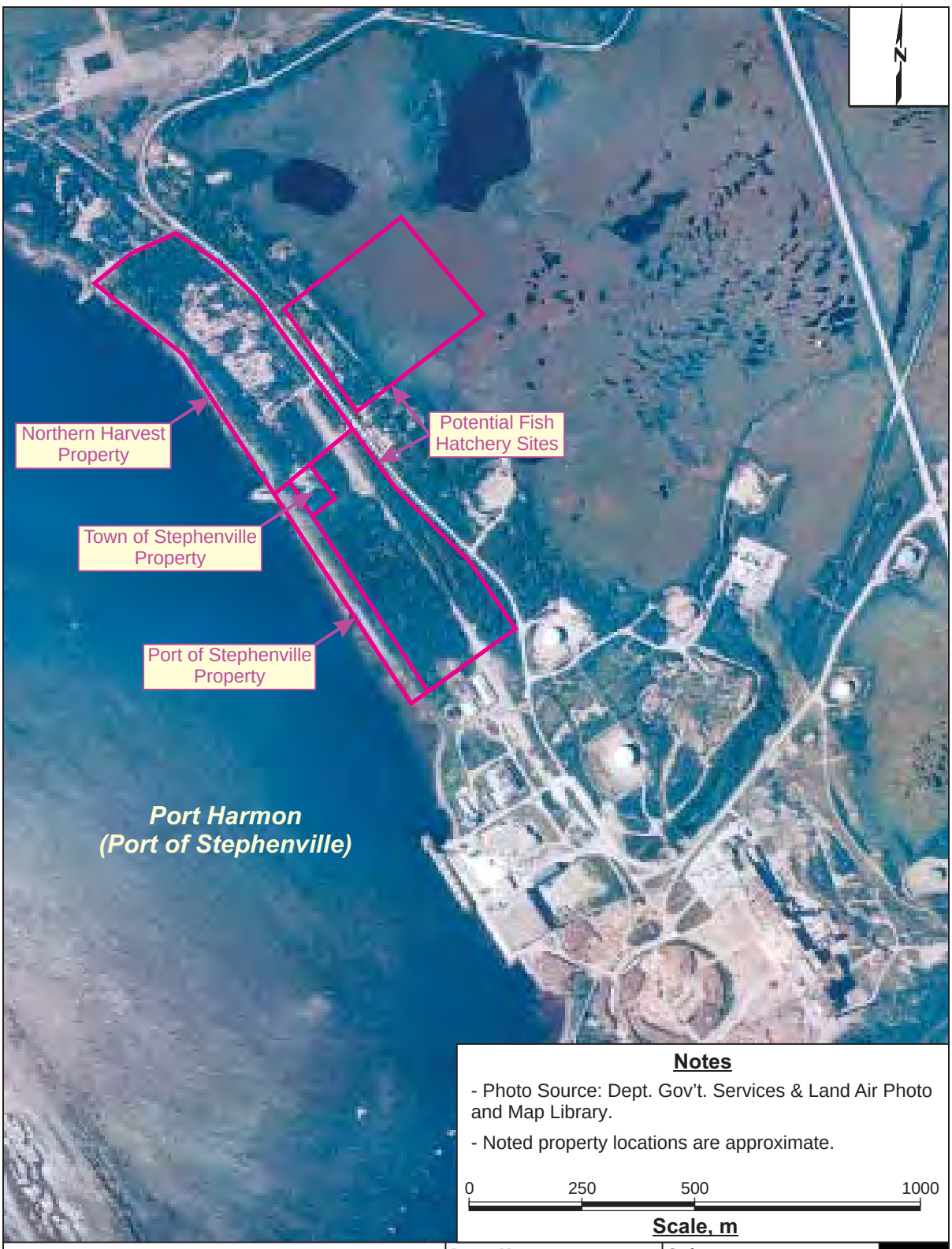


Figure E8 Aerial photograph (1997) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

Notes

- Photo Source: Google Earth Pro
- Noted property locations are approximate.

Figure E9 Aerial photograph (2016) showing the approximate location of the subject site and its surrounding area.

Project No.	Scale
3113	As Shown
Location	**Date**
Stephenville, NL	July 2018

FFC

APPENDIX F

Records of Communication, 2009

Record of Communication

Subject: History of property for potential Northern Sea Farms site.

Recorded by:	Sean MacDonnell	Routing:	Action:	_____
Date:	June 8, 2009			_____
Related to: Client	Northern Sea Farms			_____
Project No.	520		Info:	_____
Individuals:	Brian Kinsmen			_____
Company/Agency:	Tax Collector	Address:	125 Carolina Avenue	
	Town of Stephenville		P.O. Box 420	
Telephone:	Office: 709-643-8368		Stephenville, NL	
			A2N 2Z5	
		Email:	_____	

Pertinent Information Obtained:

Mr. Kinsmen was contacted via phone and relayed the following information:

- The land was transferred from the Newfoundland Government to the United States for a Military Base.
- The land was then transferred back to the Federal Government;
- The land was then transferred to the Newfoundland Government;
- The Newfoundland Government created the Harmon Corporation to manage the assets;
- The Harmon Corporation transferred the assets to the Newfoundland Housing Corporation; and
- The assets were then transferred to the Town of Stephenville.

Mr. Kinsmen also mentioned that the two building that were present on the PWGSC properties were removed prior to 1993.

Comments, Actions or Follow-Up:

For additional information, Mr. Coates recommended contacting the following persons:

- Barry Coates - Town Manager, Town of Stephenville

Record of Communication

Subject: History of property for potential Northern Sea Farms site.

Recorded by:	Sean MacDonnell	Routing:	Action:	_____
Date:	June 8, 2009			_____
Related to: Client	Northern Sea Farms			_____
Project No.	520		Info:	_____
Individuals:	Alan Reid			_____
Company/Agency:	NL Housing Corporation	Address:	58 Oregon Drive	
Telephone:	Office: 709-643-6828		Stephenville, NL	
			A2N 2Y1	
		Email:	_____	
			_____	

Pertinent Information Obtained:

Mr. Reid did not have much to offer with regards to personal information and was not able to provide any documented information as it was transferred over to the Town of Stephenville in 2000. Mr. Reid was able to locate several maps that were stored in the office and allowed one to go out on loan and several to have sections photocopied.

The maps included:

- Town of Stephenville, Stephenville East, Port Harmon Industrial Development Land Transfers, January 1994, Revised March 1994; , John G. Williams Associates Ltd., telephone: 416-391-3050, fax: 416-391-3051 (photocopied sections);
- Properties Acquired from Harmon Corporation on October 31, 1987 (photocopied sections); and
- Un-named map (Figure 1) showing land ownership (on loan).

Comments, Actions or Follow-Up:

For additional information, Mr. Coates recommended contacting the following persons:

- Barry Coates - Town Manager, Town of Stephenville
- Colleen O'Keefe - 709-724-3166 - NL Housing Engineering Department

Record of Communication

Subject: History of property for potential Northern Sea Farms site.

Recorded by:	Sean MacDonnell	Routing:	Action:	_____
Date:	June 11, 2009			_____
Related to: Client	Northern Sea Farms			_____
Project No.	520		Info:	_____
Individuals:	Barry Coates			_____
Company/Agency:	Town Manager	Address:	125 Carolina Avenue	
	Town of Stephenville		P.O. Box 420	
Telephone:	Office: 709-643-8366		Stephenville, NL	
	Cell: 709-649-7023		A2N 2Z5	
		Email:	manager@town.stephenville.nf.ca	

Pertinent Information Obtained:

Mr. Coates moved to the Stephenville area in 1970 and is the Town Manager at the Town of Stephenville, NL. I met with Mr. Coates at his office.

Mr. Coates has a black and white photo on his office wall that contains a photo of the US Army Corp of Engineers (Sub Port Harmon, 373rd T.M.P, Camp Morris - US Army) base that was taken in 1952. This photo shows the "Tent City" in the background on a piece of land that is adjacent to the proposed building site. The photo shows a very busy site that contains latrines, motor vehicles, 45 gal drums at each tent, tanker trucks, power poles (along road side and the shore side), and some buildings. Within the area specific to our site, it appears that numerous motor vehicles are parked there. Across the road, it appears that potato fields are present.

Regarding the site in particular, Mr. Coates gave me the following time line:

- **Prior to 1940-1941** - land was owned by the Government of Newfoundland and Labrador. The land was used as farmland;
- **1940-1941** - the United States (US) expropriated the land from the Government of Newfoundland and Labrador;
- **1941-1966** - land is used by the US for a military installation. The US Corp of Engineers set up Camp Morris (as described above);
- **December 31, 1966** - US closes military base, land transferred to the Government of Canada where the following occurs:
    - Government of Canada takes what it needs from the land transfer for use of an airport and sea port;
    - Government of Canada transfers what is left to Newfoundland;

    - Newfoundland creates the Harmon Corporation (provincial crown corporation) which is set up to manage the assets left from the US Military;
- **1969-1972** - the land at the site was used as a laydown yard for the Newfoundland Liner Board Company. The yard was used to store all of the steel construction for the plant. Mr. Coates believes that a rail line was used between this property and the building site;
- **1969-1977** - Rail tracks may have been present on the site between this period;
- **1972** - the housing stock is transferred from the Harmon Corporation to the Newfoundland Housing Corporation;
- **Mid 1970's** - Mr. Coates recalled that there were two locations of a local Yacht Club;
- **1977** - Newfoundland Liner Board Company shuts down. Land was used for storing pulp wood as stacks and stacks of it were present on the land;
- **1977-1979** - land was vacant;
- **1979** - Abitibi takes over Newfoundland Liner Board property. No known activity at the site;
- **1987** - the Harmon Corporation is phased out and all assets (except utilities) are transferred to the Town of Stephenville;
- **2000** - rest of the lands are diverted to the Town of Stephenville from the Newfoundland Housing Corporation. The Newfoundland Housing Corporation still holds a mortgage on land that gets transferred from the Town of Stephenville.

In addition, Mr. Coates indicated the following notes:

- that Tanks 6 and 10 (on Irving land) have been removed, however, he does not believe the land has been cleaned up environmentally;
- no idea what the concrete cribs were for. They may have been used as tank storage or they were used for the pulp debarking drums that were once onsite; and
- there is a lot of illegal dumping at the sites. The drum that had the stiff yellow/orange foam in it may have been for foam insulation (urea formaldehyde) as there was a facility in the Stephenville area.

Comments, Actions or Follow-Up:

For additional information, Mr. Coates recommended contacting the following persons:

- James Cochrane - 709-643-9500 - Chairman of Harmon Corporation and Port;
- Verne Chaffy - had a boat at the local Yacht Club

Photo 1.1 From Barry Coates interview. Photo (1952) on his office wall showing Camp Morris, Sub Port - Harmon 373rd T.M.P., US Army (1 of 6).

Photo 1.2 From Barry Coates interview. Photo (1952) on his office wall showing Camp Morris, Sub Port - Harmon 373rd T.M.P., US Army (2 of 6).

Photo 1.3 From Barry Coates interview. Photo (1952) on his office wall showing Camp Morris, Sub Port - Harmon 373rd T.M.P., US Army (3 of 6).

Photo 1.4 From Barry Coates interview. Photo (1952) on his office wall showing Camp Morris, Sub Port - Harmon 373rd T.M.P., US Army (4 of 6).

Photo 1.5 From Barry Coates interview. Photo (1952) on his office wall showing Camp Morris, Sub Port - Harmon 373rd T.M.P., US Army (5 of 6).

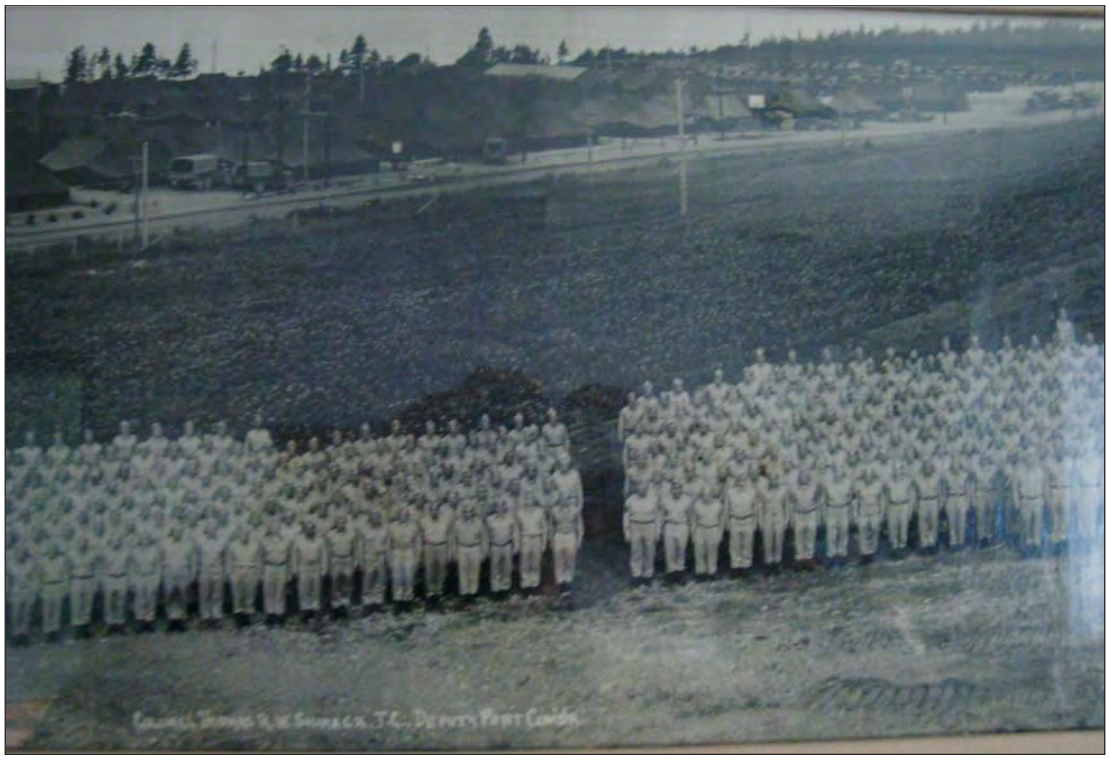


Photo 1.6 From Barry Coates interview. Photo (1952) on his office wall showing Camp Morris, Sub Port - Harmon 373rd T.M.P., US Army (6 of 6).

Record of Communication

Subject: History of property for potential Northern Sea Farms site.

Recorded by:	Sean MacDonnell	Routing:	Action:	_____
Date:	June 12, 2009			_____
Related to: Client	Northern Sea Farms			_____
Project No.	520		Info:	_____
Individuals:	Joe White			_____
Company/Agency:	Public Works	Address:	125 Carolina Avenue	
	Town of Stephenville		P.O. Box 420	
Telephone:	Office: 709-643-8375		Stephenville, NL	
	Cell: 709-649-1485		A2N 2Z5	
		Email:	_____	

Pertinent Information Obtained:

Mr. White has lived in the Stephenville area for 60 years and is one of the Water Supply Technicians for the Department of Public Works at the Town of Stephenville, NL. I met with Mr. White to discuss the site.

During the time of the US Military Base, a "tent city" was present that housed the Americans. At a later point, rows and rows of 45 gallon drums were stored here by the US and there may have been some bulk fuel storage where the current concrete tank cribs are now. Mr. White thought that fuel spills and releases were very common during the time of the Americans. There were some communication towers up on the hill with associated buildings. Mr. White thought that these sites were passed on to CN Telegraph and/or Transport Canada. He thought that some contamination may be present on these properties that would relate to electrical transformers (PCBs and Asbestos).

When NL Liner Board Company was running, they used the site as a laydown area for pulp storage and they may have had some debarking drums at the site. A rail way line was also present during this time and was either run by NL Liner Board or CN.

Comments, Actions or Follow-Up:

Record of Communication

Subject: History of property for potential Northern Sea Farms site.

Recorded by:	Sean MacDonnell	Routing:	Action:	_____
Date:	June 23, 2009			_____
Related to: Client	Northern Sea Farms			_____
Project No.	520		Info:	_____
Individuals:	James (Jim) Cochrane			_____
Company/Agency:	Port Authority	Address:	P.O. Box 190	
	Port Harmon		Port Aux Port, NL	
Telephone:	Office: 709-643-9500		A0N 1T0	
	Home: 709-648-2809			
		Email:	jimcochrane@nf.aibn.com	

Pertinent Information Obtained:

Mr. Cochrane was contacted by phone to discuss the historic usage of the site in question.

Mr. Cochrane is originally from Port-Aux-Port and worked for over 30 years with some relation to the US military base, he was the last Chairman of the Harmon Corporation (1976-87) and is currently one of the two Port Authorities for the Port Harmon. The following is a record of the conversation.

Initially, the site was used as farmland where potatoes, cherries and peaches were harvested and then, Mr. Cochrane said that the US Military initially came to Stephenville in 1938. The military installation was primarily a US air force refueling facility (pre-jet age) for American services along with other bases in NL such as Goose-Bay and Argentia. Newfoundland was viewed as the North East Air Command under the direction of a 3-Star General. At this time, Newfoundland was independent of Canada and it was said that the Germans were eyeing Newfoundland as a invasion target to use as a pre-invasion avenue to North America.

Regarding the site in question, the Americans had a tent site set up for the soldiers to reside at while permanent structures were being constructed. The tent site housed military personnel, corps of engineers and civilian contractors. Each tent had a 45 gallon drum for means of heating and several “honey” trucks were present to clean up the empty drums and dispose of the remaining fuel. The Americans did not have any vehicle maintenance sheds at this site at the time of the tent site. The Americans did have some bulk 5000 gallon tanks at the site, and there were located on the concrete tank cribs that are still present at the site today.

After the tent site was removed, the Americans used the site as a laydown area for POL storage. POL stands for Petroleum/Oil/Lube and these were stored in 45 gallon drums. Mr. Cochrane stated that the area between

the seaport to the airport was used for this storage. The area where the current fire training area is next to the airstrip was used for the bulk fueling station where fuel was stored in 45 gallon drums as well.

Regarding the fuel storage, Mr. Cochrane stated that the Americans were not out spilling fuel over the site and was generally treated in a manor as we treat fuel spills today. He said that accidental spills did happen from time to time as one might happen today. Nothing was ever buried at the site as the Americans had a base dump up in the vicinity of the now Heavy Equipment Training Area (Igloo Road) up near the new Hospital. The ultimate base disposal area is located at sea between Port-Aux-Basques and Argentia.

The Americans did have communication towers up on the hill that flank our potable well site but the towers were removed with the Americans. What was left behind was the building shells and some antennas on the buildings. These two properties were transferred to the Newfoundland Government and sold to Transport Canada for $1.00. Mr. Cochrane does not have any information on these two sites from PWGSC. He did confirm that there were communication cables all over the place and is likely what was encountered when road clearing and ditching was going on there in late May 2009.

The road that is present between the airstrip and the sea port was always there.

When NL Liner Board was active, they stored pulp wood at the site along with some construction materials and equipment. In the late 60s to early 70s, rail tracks were installed to the site from the main NL Liner Board property to move the pulp wood. The railway tracks were active for about 3 years and were eventually removed by the NL government after NL Liner Board closed.

The two small points that are present were described by Mr. Cochrane. He said the one on our site that is closest to the seaport was used originally by NL Liner Board Company as a tie up for its small work boats that moved pulp around the Port. He said some refueling was performed there. That wharf was constructed of cribbing and rocks. In the late 1970s that point was used as a Yacht Club that berthed 3 to 4 long liner class boats and a few bay liners. No buildings were ever present and the Yacht Club did not last due to lack of boats and interest. The second point, which is located near the fire training area, was used as a ramp area and some Search and Rescue Training.

Comments, Actions or Follow-Up:

For additional information, Mr. Coates recommended contacting the following persons:

1. Alfred Sharp - Supervisor to Operate Fuel Trucks at the US Military Base;
2. ?? Sharp - Air Radio or Marine Radio operator;
3. Brian Mosher - formerly of PWGSC in Halifax;
4. Don MacMillian - PWGSC.

Record of Communication

Subject: History of property for potential Northern Sea Farms site.

Recorded by:	Sean MacDonnell	Routing:	Action: _____
Date:	June 26, 2009		_____
Related to: Client	Northern Sea Farms		_____
Project No.	520		Info: _____
Individuals:	Margie Whyte		_____
Company/Agency:	Regional Manager Environmental Affairs Transport Canada Environmental Services	Address:	95 Foundry Street Moncton, NB
		Email:	margie.whyte@tc.gc.ca
Telephone:	Office: 506-851-7319		

Pertinent Information Obtained:

Mrs. Whyte is the Regional Manager for Environmental Affairs within Transport Canada and she is located in their Moncton, NB office. She was contacted by phone.

She was familiar with the two PWGSC sites and was aware of the two buildings. She did not believe that there was much for contaminated soil, but did say that there were some tanks present. She said that a decommissioning/environmental report was prepared, however she was not sure of its location at the present time. She is away next week, however she said she would have Lynn Power or Stephen Corbett contact me next week regarding the report.

Comments, Actions or Follow-Up:

Mrs. Whyte requested that I email her so she could have my email and contact information.

Appendices

Fracflow Consultants Inc.

Environmental, Hydrogeological and
Geotechnical Engineering Consultants

TECHNICAL MEMORANDUM

TO: Dean Guest, Marine Harvest Atlantic Canada FFC-NL-3113-005A

FROM: Fracflow Consultants Inc.

DATE: June 26, 2018

SUBJECT: **Soil Analysis and Classification Update for Fish Hatchery Construction Site Boreholes/Monitoring Wells.**

1. Background

Figure 1, in Appendix A, shows the locations of eight (8) monitoring wells that were completed in January of 2018 as outlined in Technical Memorandum FFC-NL-3113-005 issued on February 26, 2018. Each of these wells was completed using hollow-stem augers with near continuous split spoon sampling and accompanying Dynamic Cone Penetration Tests (DCPTs) out through the bottom of the augers in four of the well locations. A revised log of each monitoring well, including the grain size analysis data long with the original well construction, elevations, sample points, screen levels and DCPT data can be found in Appendix B.

2. Scope of Additional Soil Analysis

Eighty-three (83) split spoons were driven and soil samples collected from the eight boreholes during the original geotechnical investigation. Twenty six (26) soil samples were selected from the upper sections of the eight boreholes and water content and grain size distributions were determined.

3. Geotechnical Properties – Soil Classification

After completion of sieve analysis the results were interpreted using semi log graphs and the methods established by both the Canadian Foundation Engineering Manual (CFEM) and the Unified Soil Classification System (USCS) standards (CGS, 1992). The CFEM classifications are provided in each well log and both the USCS and CFEM classifications are provided in the grain size data sheets for each sample.

The grain size distribution curves showed that the area is underlain primarily by sandy overburden that ranges for well graded to poorly graded sand with minor percentages of silt – mostly less than 10%. Most of the samples also contain gravel that ranges from a trace to 50%.

The moisture contents for these 26 overburden samples ranged from 3% to 30% with most of the samples having moisture contents less than 12%.

The overall sandy nature of the overburden is typical of the material that was encountered in the geotechnical boreholes across the site. However, the upper 50 to 60 cm of the soil column appears to be fill that consists primarily of coarse gravel with minor amounts of cobbles. Boulders were encountered in most of the boreholes and a buried object was encountered in Borehole FHM8. Ground Penetrating Radar (GPR) was used to image this area and is presented under separate cover.

The soil samples from the bog area (between boreholes FHM8 and FHM9) and the GPR data also show that the bog is underlain by a silt-clay layer that is up to two metres thick.

4. References

CGS, 1992. Canadian Foundation Engineering Manual, 3rd Edition, Published by the Canadian Geotechnical Society, B-Tech Publishers, Ltd, Richmond, BC.

APPENDIX A

Location Map

Figure 1 Location map of monitoring wells, Stephenville, NL.

Project No.	Document Reference
3113	FFC-NL-3113-005A
Location	**Date**
Stephenville, NL	June 2018

FFC

APPENDIX B

Borehole Logs

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM1

Project No: 3113

Date: January 17, 2018

SUBSURFACE PROFILE				SAMPLE								
Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data - Shallow	Well Data - Deep	Well Description
0 / 0		Ground Surface (GS)	7.92									
1		Augering	7.13									Native sand packing from 0 m to 1.37 m
2 / 1		SPT: 12 / 22 / 33 / 47 / 24 CFEM: Sand, some Gravel, trace Silt/Clay	6.37	SS	1	55	45					0.025 m dia. riser from 0 m to 2.79 m
3		SPT: 8 / 34 / 57 CFEM: Gravelly Sand, trace Silt/Clay	5.91	SS	2	91	25					Bentonite packing from 1.37 m to 2.13 m
4 / 2		Augering	5.64									0.031 m dia. riser from 0 m to 8.36 m
5		SPT: 11 / 54 / 38 / 18 / 28 CFEM: Gravelly Sand, some Silt/Clay	4.88	SS	3	92	32					0.025 m dia. screen from 2.79 m to 5.84 m
6 / 3		SPT: 13 / 26 / 39 / 28 / 22 CFEM: Sand and Gravel, trace Silt/Clay	4.12	SS	4	65	33					Native sand packing from 2.13 m to 5.84 m
7		Augering										
8 / 4		SPT: 12 / 40 / 34 / 25 / 22 Gravelly sand	3.35	SS	5	74	22					(Shallow Well) 4.78 m BGS
9		SPT: 8 / 18 / 18 / 14 / 8 Gravelly sand	2.59	SS	6	36	17					4.86 m BGS (Deep Well) on Feb. 4, 2018
10 / 5		Augering										
11		SPT: 7 / 12 / 18 / 23 / 16 Sand, some gravel, trace silt/clay	1.68	SS	7	30	33					Screw-on cap
12		SPT: 11 / 11 / 12 / 12 Sand, some rock fragments *Up-coning sand	1.07	SS	8	23	38					Bentonite packing from 5.84 m to 6.40 m
13 / 6		Augering										Native sand packing from 6.40 m to 12.31 m
14		SPT: 10 / 12 / 12 / 14 / 22 Sand, trace silt/clay, some rock fragments	0.147	SS	9	24	20					
15 / 7							29					0.031 m dia. riser from 0 m to 8.36 m
16												
17												
18 / 8												
19												
20 / 9												
21												
22 / 10												
23												
24 / 11												
25												
26 / 12												

Fracflow Consultants Inc.
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Fax: (709) 753-5101

Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM1

Project No: 3113

Date: January 17, 2018

SUBSURFACE PROFILE				SAMPLE								
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data - Shallow	Well Data - Deep	Well Description
27		SPT: 18 / 30 / 52 / 18 Sand with gravel	-0.475	SS	10	82	29					
28		SPT: 12 / 46 / 24 / 63 / 25 Sand, some gravel, trace silt/clay, some rock fragments	-1.22	SS	11	70	20					0.031m dia. screen from 8.36 m to 11.41 m
29	9											
30												
31		SPT: 25 / 26 / 24 / 25 / 17 Sand, trace silt/slay, some rock fragments	-1.95	SS	12	50	23					
32												Native sand packing from 6.40 m to 12.31 m
33	10											
34		SPT: 15 / 24 / 25 / 15 / 16 Sand, some silt/clay, some gravel	-2.71	SS	13	49	27					
35												
36	11	SPT: 18 / 24 / 24 / 23 / 20 Sand, some silt/clay * Up-coning sand	-3.47	SS	14	48	47					
37												Screw-on cap
38		Augering										
39	12	SPT: 1 / 3 / 5 / 10 / 21 Sand, some silt/clay * Up-coning sand	-4.38	SS	15	8	5					
40												
41		End of Borehole										
42												
43	13											
44												
45												
46	14											
47												
48												
49	15											
50												
51												
52												

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Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM2

Project No: 3113

Date: January 19, 2018

Depth (ft / m)	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines
0 / 0	Ground Surface (GS)	5.73					
0–3 / 0–1	Augering	4.88					
3–5 / 1–1.5	SPT: 12 / 19 / 15 / 12 / 10 CFEM: Sand, some Gravel, trace Silt/Clay	4.11	SS	1	34	28	
5–7 / 1.5–2	SPT: 13 / 12 / 15 / 12 Sand, some gravel, some rock fragments	3.5	SS	2	27	48	
7–9 / 2–2.5	SPT: 13 / 27 / 28 / 21 / 15 Sand, some gravel, trace silt/clay	2.74	SS	3	55	17	
9–11 / 2.5–3.5	SPT: 9 / 13 / 8 / 14 / 14 CFEM: Gravel and Sand, trace Silt/Clay	1.98	SS	4	21	18	
11–13 / 3.5–4	Augering						
13–15 / 4–4.5	SPT: 7 / 13 / 16 / 17 / 19 CFEM: Sand, trace Silt/Clay Hydrocarbon odour, visible sheen	1.1	SS	5	29	58	
15–17 / 4.5–5	Augering						
17–18 / 5–5.5	SPT: 4 / 7 / 11 / 15 / 17 Silty/clayey sand Hydrocarbon odour	0.26	SS	6	18	27	
18–19 / 5.5–6	Augering SPT: 1 for 0.52 m / 2 for 0.09 m Sand	-0.363	SS	7	1	2	
19–21 / 6–6.5	SPT: 4 / 7 / 8 / 10 Sand, trace gravel, trace silt/clay Faint hydrocarbon odour	-0.972	SS	8	15	38	
21–22 / 6.5–7	* Up-coning sand	-1.17					
22–23 / 7–7	Augering						
23–24 / 7–7.5	Augering * Up-coning sand	-1.78					
24–26 / 7.5–8	End of Borehole						

Standard Penetration Test "N" Value per 300 mm: 20 60

Well Data

Well Description:

- Native sand packing from 0 m to 1.05 m
- Bentonite packing from 1.05 m to 1.51 m
- 0.05 m dia. riser from 0 m to 2.62 m
- 3.18 m BGS on Feb. 5, 2018
- 0.05 m dia. screen from 2.62 m to 5.67 m
- Native sand packing from 1.51 m to 7.51 m
- Screw-on cap

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Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Sheet: 1 of 1

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

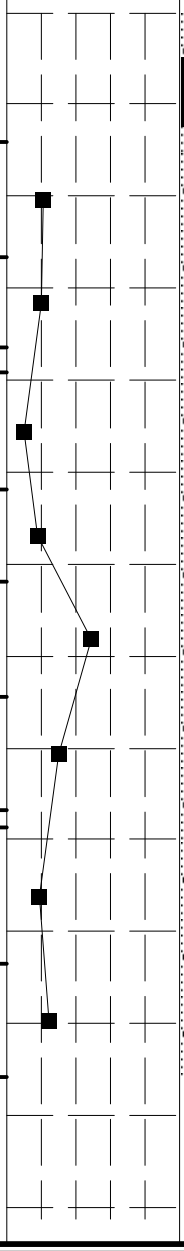
Location: Stephenville, NL

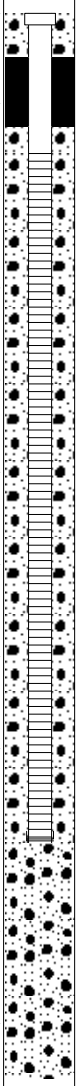
Log of Monitoring Well: FHM3

Project No: 3113

Date: January 19, 2018

Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Well Description
0 / 0		Ground Surface (GS)	4.25						
		Augering	3.38						Native sand packing from 0 m to 0.31 m Bentonite packing from 0.31 m to 0.76 m
3 / 1		SPT: 8 / 11 / 11 / 9 / 6 CFEM: Sand, some Gravel, trace Silt/Clay	2.62	SS	1	22	42		0.05 m dia. riser from 0 m to 0.93 m
6 / 2		SPT: 5 / 10 / 11 / 10 Sand, some gravel, some rock fragments	2.01	SS	2	21	25		
8		Augering							2.34 m BGS on Feb. 5, 2018
9 / 3		SPT: 4 / 6 / 5 / 3 / 8 Sand, some gravel, trace silt/clay some rock fragments Strong hydrocarbon odour, visible sheen	1.08	SS	3	11	20		
11 / 4		SPT: 8 / 6 / 12 / 12 CFEM: Sand, some Gravel, trace Silt/Clay	0.47	SS	4	18	19		0.05 m dia. screen from 0.93 m to 5.51 m
13 / 4		SPT: 19 / 25 / 25 / 23 / 19 CFEM: Sand, trace Silt/Clay, trace Gravel Hydrocarbon odour, visible sheen * Up-coning sand	-0.292	SS	5	50	28		Native sand packing from 0.76 m to 7.08 m
16 / 5		SPT: 5 / 11 / 20 / 17 / 16 Sand, some silt/clay, trace gravel * Up-coning sand	-1.05	SS	6	31	68		
18		Augering							Screw-on cap
19 / 6		SPT: 5 / 8 / 12 / 20 / 19 / 15 Sand, some silt/clay, trace gravel * Up-coning sand	-2.07	SS	7	20	68		
22 / 7		SPT: 8 / 11 / 14 / 19 / 20 Silty/clayey sand	-2.83	SS	8	25	2		
23		End of Borehole							





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Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Sheet: 1 of 1

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM4

Project No: 3113

Date: January 23, 2018

SUBSURFACE PROFILE				SAMPLE								
Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data - Shallow	Well Data - Deep	Well Description
0 / 0		Ground Surface (GS)	9.59									
0 – 3 / 0 – 1		Augering	8.76									Native sand packing from 0 m to 0.76 m
3 – 5 / 1 – 2		SPT: 12 / 16 / 11 / 10 / 10 CFEM: Sand, trace Silt/Clay, trace Gravel	7.99	SS	1	27	45					Bentonite packing from 0.76 m to 1.22 m
6 – 7 / 2		SPT: 10 / 9 / 11 / 10 CFEM: Sand, trace Silt/Clay, trace Gravel	7.38	SS	2	20	69					0.025 m dia. riser from 0 m to 2.60 m
8		Augering										
9 / 3		SPT: 7 / 9 / 8 / 8 / 9 CFEM: Sand, trace Silt/Clay	6.49	SS	3	17	55					0.031m dia. riser from 0 m to 8.70 m
10 – 12		SPT: 7 / 6 / 8 / 7 / 9 CFEM: Sand, trace Silt/Clay, trace Gravel	5.73	SS	4	14	55					0.025 m dia. screen from 2.60 m to 5.65 m
13 / 4 – 14		SPT: 5 / 8 / 7 / 7 / 8 Sand, some silt/clay	4.97	SS	5	15	62					Native sand packing from 1.22 m to 7.62 m
15 – 16 / 5		SPT: 6 / 7 / 7 / 9 / 10 Sand, some silt/clay	4.21	SS	6	14	57					Screw-on cap (Shallow Well) 5.99 m BGS on Feb 3, 2018
17 – 19 / 6		SPT: 6 / 12 / 19 / 23 / 22 Sand, some gravel, some silt/clay, some rock fragments	3.45	SS	7	31	57					6.02 m BGS on Feb. 4, 2018 (Deep Well)
20 – 22		SPT: 11 / 12 / 10 / 11 / 11 Sand, some silt/clay, some gravel, some rock fragments	2.68	SS	8	22	40					
23 / 7 – 24		SPT: 5 / 6 / 11 / 15 / 17 Sand, some silt/clay, some gravel * Up-coning sand	1.92	SS	9	17	43					0.031m dia. riser from 0 m to 8.70 m
25 – 26							44					

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Fax: (709) 753-5101

Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM4

Project No: 3113

Date: January 23, 2018

SUBSURFACE PROFILE				SAMPLE								
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data - Shallow	Well Data - Deep	Well Description
27		SPT: 9 / 15 / 20 / 27 Sand with gravel * Up-coning sand	1.31	SS	10	35	44					Bentonite packing from 7.62 m to 8.38 m
28		Augering	1.05									
29		SPT: 24 / 24 / 16 / 10 / 10 Sand, some silt/clay, some gravel		SS	11	40	8					
9 30			0.291									0.031 m dia. screen from 8.70 m to 11.75 m
31		SPT: 7 / 9 / 12 / 14 Sand, some gravel,some silt/clay, some rock fragments * Up-coning sand		SS	12	21	40					
32			-0.318									
10 33		SPT: 8 / 14 / 13 / 12 / 11 Siltly/clayey sand, some gravel		SS	13	27	33					Native sand packing from 8.38 m to 12.96 m
34			-1.08									
35		SPT: 6 / 8 / 9 / 12 / 10 Silty/clayey sand * Up-coning sand		SS	14	17	5					
11 36			-1.84									
37		SPT: 7 / 7 / 11 / 22 / 22 Sand, some gravel, trace silt/clay, some rock fragments * Up-coning sand		SS	15	18	30					Screw-on cap
12 38			-2.6									
39		SPT: 4 / 8 / 11 / 16 / 24 Silty/clayey Sand * Up-coning sand		SS	16	19	47					
40			-3.37									
13 41		End of Borehole										
42												
43												
44												
45												
14 46												
47												
48												
15 49												
50												
51												
52												

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Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

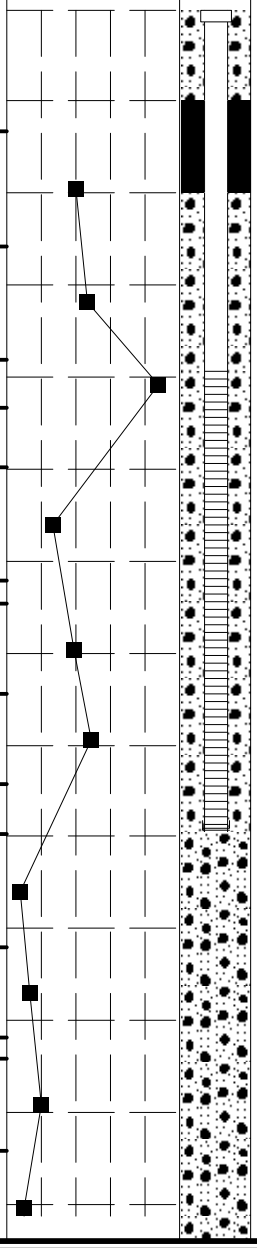
Location: Stephenville, NL

Log of Monitoring Well: FHM5

Project No: 3113

Date: January 25, 2018

Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines
0 / 0		Ground Surface (GS)	6.07					
1 / 2		Augering	5.27					
3 / 1		SPT: 7 / 26 / 15 / 23 / 23 CFEM: Gravelly Sand, trace Silt/Clay	4.51	SS	1	41	34	
6 / 2		SPT: 9 / 17 / 30 / 41 / 20 Sand, some gravel, somesSilt/clay	3.74	SS	2	47	23	
8		SPT: 8 / 36 / 52 for 0.03 m (Refusal) Sand, some gravel, trace silt/clay, some rock fragments	3.41	SS	3	88	38	
9 / 3		Augering	3.03					
10		SPT: 10 / 13 / 14 / 14 / 16 CFEM: Sand, trace Gravel, trace Silt/Clay	2.27	SS	4	27	60	
12 / 4		Augering						
13		SPT: 3 / 9 / 30 / 38 Sand, some gravel, trace silt/clay, some rock fragments	1.53	SS	5	39	75	
15		SPT: 40 / 30 / 19 / 11 Silty/clayey sand, some gravel * Up-coning sand	0.918	SS	6	49	42	
16 / 5		Augering	0.607					
17		SPT: 3 / 4 / 4 / 5 / 6 Sand, trace gravel	-0.155	SS	7	8	2	
19 / 6		SPT: 3 / 5 / 9 / 9 Sand, some silt/clay, trace gravel * Up-coning sand	-0.765	SS	8	14	2	
22		Augering						
23 / 7		SPT: 4 / 9 / 12 / 11 Silty/clayey sand * Up-coning sand	-1.49	SS	9	21	50	
25		SPT: 1 / 6 / 5 / 7 / 8 Silty/clayey sand					2	
26								



Well Description

- Native sand packing from 0 m to 0.61 m
- Bentonite packing from 0.61 m to 1.22 m
- 0.05 m dia. riser from 0 m to 2.41 m
- 2.85 m BGS on Feb. 5, 2018
- 0.05 m dia. screen from 2.41 m to 5.46 m
- Screw-on cap
- Native sand packing from 1.22 m to 15.11 m

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Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM5

Project No: 3113

Date: January 25, 2018

SUBSURFACE PROFILE				SAMPLE							
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 60)	Well Data	Well Description
27			-2.26	SS	10	11	2				
28				PC	--	4					
29				PC	--	5					
9				PC	--	5					
30				PC	--	7					
				PC	--	8					
31				PC	--	11					
				PC	--	10					
32				PC	--	12					
				PC	--	13					
10				PC	--	14					
33				PC	--	17					
				PC	--	18					
34				PC	--	20					
				PC	--	14					
35				PC	--	18					
				PC	--	28					
36		DCPT: (Blow counts per 150 mm) 4 / 5 / 5 / 7 / 8 / 11 / 10 / 12 / 13 / 14 / 17 / 18 / 20 / 14 / 18 / 28 / 30 / 29 / 31 / 27 / 21 / 23 / 22 / 23 / 22 / 22 / 25 / 26 / 22 / 24 / 22 / 23 / 25 / 28 / 23 / 28 / 30 / 29 / 30 / 30 / 24 / 25 / 22 / 23 / 25		PC	--	30					Native sand packing from 1.22 m to 15.11 m
11				PC	--	29					
				PC	--	31					
37				PC	--	27					
				PC	--	21					
38				PC	--	23					
				PC	--	22					
39				PC	--	23					
12				PC	--	22					
40				PC	--	22					
				PC	--	25					
41				PC	--	26					
				PC	--	22					
42				PC	--	24					
				PC	--	22					
13				PC	--	23					
43				PC	--	25					
				PC	--	28					
44				PC	--	23					
				PC	--	28					
45				PC	--	30					
				PC	--	29					
46				PC	--	30					
14				PC	--	30					
47				PC	--	24					
				PC	--	25					
48				PC	--	22					
				PC	--	23					
49			-9.03	PC	--	25					
15		End of Borehole									
50											
51											
52											

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Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM7-2

Project No: 3113

Date: January 29, 2018

Depth (ft)	Depth (m)	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Well Description
0	0	Ground Surface (GS)	5.51						
1–2		Augering	4.62						Native sand packing from 0 m to 0.61 m
3	1	SPT: 2 / 7 / 9 / 9 CFEM: Sand, some Gravel, some Silt/Clay	4.01	SS	1	16	33		Bentonite packing from 0.61 m to 1.22 m
5–6		SPT: 10 / 9 / 6 / 7 CFEM: Sand, some Gravel, trace Silt/Clay	3.4	SS	2	15	36		0.05 m dia. riser from 0 m to 1.85 m
7	2	Augering							
8–9		SPT: 6 / 9 / 10 / 9 / 10 Sand, some gravel, some silt/clay, some rock fragments	2.49	SS	3	19	32		2.87 m BGS on Feb. 6, 2018
10	3	SPT: 11 / 7 / 5 / 7 Sand, some gravel, trace silt/clay, some rock fragments	1.88	SS	4	12	31		0.05 m dia. screen from 1.85 m to 4.89 m
12		Augering							
13–14	4	SPT: 7 / 17 / 14 / 10 / 11 CFEM: Gravel and Sand, trace Silt/Clay	0.956	SS	5	31	42		
15–16		SPT: 4 / 8 / 14 / 13 Sand, some gravel, some silt/clay, some rock fragments * Up-coning sand	0.347	SS	6	22	67		Screw-on cap
17	5	Augering	0.115						
18–19		SPT: 7 / 15 / 21 / 26 / 26 Sand, some gravel, some silt/clay	-0.647	SS	7	36	50		
20	6	SPT: 13 / 17 / 18 / 19 Silty/clayey sand, some gravel, some rock fragments * Up-coning sand	-1.26	SS	8	35	52		Native sand packing from 1.22 m to 15.06 m
22				PC	--	11			
23	7	DCPT (Blow counts per 150 mm)		PC	--	13			
24				PC	--	22			
				PC	--	23			
25				PC	--	36			
				PC	--	30			
				PC	--	18			
26				PC	--	23			
				PC	--	11			

Standard Penetration Test "N" Value per 300 mm: 20 60

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Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM7-2

Project No: 3113

Date: January 29, 2018

SUBSURFACE PROFILE				SAMPLE							
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 60)	Well Data	Well Description
27		DCPT: (Blow counts per 150 mm) 11 / 13 / 22 / 23 / 36 / 30 / 18 / 23 / 11 / 6 / 8 / 7 / 4 / 6 / 7 / 10 / 5 / 7 / 8 / 7 / 8 / 9 / 8 / 8 / 8 / 9 / 10 / 15 / 10 / 9 / 12 / 10 / 9 / 11 / 13 / 15 / 15 / 13 / 13 / 13 / 14 / 14 / 12 / 14 / 19 / 13 / 16 / 15 / 17 / 16 / 19 / 20 / 22 / 20 / 22		PC	--	6					Native sand packing from 1.22 m to 15.06 m
28				PC	--	8					
29				PC	--	7					
9 30				PC	--	4					
31				PC	--	6					
32				PC	--	7					
10 33				PC	--	10					
34				PC	--	5					
35				PC	--	7					
11 36				PC	--	8					
37				PC	--	7					
38				PC	--	8					
12 39				PC	--	9					
40				PC	--	8					
41				PC	--	8					
42				PC	--	8					
13 43				PC	--	9					
44				PC	--	10					
45				PC	--	15					
14 46				PC	--	10					
47				PC	--	9					
48				PC	--	12					
15 49				PC	--	10					
50		End of Borehole	-9.56	PC	--	9					
51				PC	--	11					
52				PC	--	13					
				PC	--	15					
				PC	--	15					
				PC	--	13					
				PC	--	13					
				PC	--	13					
				PC	--	14					
				PC	--	14					
				PC	--	12					
				PC	--	14					
				PC	--	19					
				PC	--	13					
				PC	--	16					
				PC	--	15					
				PC	--	17					
				PC	--	16					
				PC	--	19					
				PC	--	20					
				PC	--	22					
				PC	--	20					
				PC	--	22					

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Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM8-2

Project No: 3113

Date: January 27, 2018

SUBSURFACE PROFILE				SAMPLE								
Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data - Shallow	Well Data - Deep	Well Description
0 / 0		Ground Surface (GS)	9.06									
		Augering	8.17									Native sand packing from 0 m to 0.91 m
3 / 1		SPT: 5 / 26 / 51 / 49 / 32 CFEM: Sand, trace Gravel, trace Silt/Clay	7.41	SS	1	77	60					Bentonite packing from 0.91 m to 1.52 m
		Augering										
6 / 2		SPT: 19 / 16 / 17 / 18 CFEM: Sand, some Silt/Clay, trace Gravel	6.71	SS	2	33	67					0.025 m dia. riser from 0 m to 3.39 m
		SPT: 6 / 8 / 8 / 7 / 10 CFEM: Sand, some Silt/Clay, trace Gravel	5.95	SS	3	16	50					0.031 m dia. riser from 0 m to 9.06 m
10 / 3		Augering										
		SPT: 10 / 10 / 12 / 10 Silty/clayey sand, some gravel	5.25	SS	4	22	50					Native sand packing from 1.52 m to 7.62 m
13 / 4		SPT: 5 / 11 / 13 / 16 / 18 CFEM: Sand, trace Silt/Clay	4.49	SS	5	24	53					0.025 m dia. screen from 3.39 m to 6.43 m
16 / 5		SPT: 10 / 13 / 19 / 21 / 20 Silty/clayey sand	3.73	SS	6	32	53					(Shallow Well) 5.24 m BGS on Feb. 3, 2018
18		Augering										
19 / 6		SPT: 6 / 10 / 14 / 10 / 13 Sand, some gravel, some silt/clay	2.84	SS	7	24	53					5.27 m BGS on Feb 2, 2018 (Deep Well)
21		SPT: 9 / 14 / 14 / 17 Sand, some gravel, some silt/clay * Up-coning sand	2.23	SS	8	28	52					Screw-on cap
23 / 7		Augering										
24		SPT: 8 / 16 / 13 / 14 / 18 Sand, some gravel, some silt/clay	1.31	SS	9	29	38					0.031 m dia. riser from 0 m to 9.06 m
26							33					Bentonite packing from 7.62 m to 8.23 m

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Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM8-2

Project No: 3113

Date: January 27, 2018

SUBSURFACE PROFILE				SAMPLE								
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data - Shallow	Well Data - Deep	Well Description
27		SPT: 10 / 12 / 15 / 14 Sand with gravel and rock fragments	0.704	SS	10	27	33					
28		Augering										
29		SPT: 8 / 20 / 19 / 16 / 15 Silty/clayey sand, some gravel, some rock fragments	-0.137	SS	11	39	22					
30	9											
31		SPT: 11 / 11 / 11 / 12 Wet, multi-coloured rock fragments	-0.746	SS	12	22	3					0.031 m dia. screen from 9.06 m to 10.58 m
32		Augering										
33	10											
34		SPT: 8 / 16 / 12 / 10 / 12 Sand, some gravel, some silt/glay, some rock fragments	-1.68	SS	13	28	13					Screw-on cap
35												
36	11	SPT: 5 / 6 / 9 / 12 Silty/clayey sand, some gravel, some rock fragments	-2.29	SS	14	15	21					
37				PC	--	2						
38		DCPT: (Blow counts per 150 mm) 2 / 8 / 11 / 10 / 12 / 11 / 17 / 19 / 14 / 17 / 17 / 17 / 17 / 18 / 19 / 21 / 27 / 24 / 26 / 28 / 28 / 29 / 30 / 30 / 29 / 31 / 20 / 17 / 15 / 16 / 18 / 17 / 17 / 18 / 16 / 18 / 31 / 29 / 34 / 32 / 31 / 33 / 27 / 23 / 26		PC	--	8						
39				PC	--	11						
40	12			PC	--	10						
41				PC	--	12						
42				PC	--	11						
43	13			PC	--	17						Native sand packing from 8.23 m to 18.07 m
44				PC	--	19						
45				PC	--	14						
46	14			PC	--	17						
47				PC	--	17						
48				PC	--	17						
49	15			PC	--	17						
50				PC	--	18						
51				PC	--	19						
52				PC	--	21						
				PC	--	27						
				PC	--	24						
				PC	--	26						
				PC	--	28						
				PC	--	28						
				PC	--	29						
				PC	--	30						
				PC	--	30						
				PC	--	29						
				PC	--	31						
				PC	--	20						
				PC	--	17						
				PC	--	15						
				PC	--	16						
				PC	--	18						
				PC	--	17						

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Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM8-2

Project No: 3113

Date: January 27, 2018

SUBSURFACE PROFILE				SAMPLE								
Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data - Shallow	Well Data - Deep	Well Description
53				PC	--	17						
54				PC	--	18						
55				PC	--	16						
56	17	DCPT (Blow counts per 150 mm)		PC	--	18						
57				PC	--	31						
58				PC	--	29						
59	18		-9.02	PC	--	34						
60		End of Borehole		PC	--	32						
61				PC	--	31						
62	19			PC	--	33						
63				PC	--	27						
64				PC	--	23						
65				PC	--	26						
66	20											Native sand packing from 8.23 m to 18.07 m
67												
68												
69	21											
70												
71												
72	22											
73												
74												
75	23											
76												
77												
78												

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Drilling Method: Hollow Stem Augering

Driller: Formation Drilling Ltd.

Datum: Geodetic

Project: Geotechnical/Environmental Assessment

Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM9

Project No: 3113

Date: January 26, 2018

Depth (ft / m)	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data	Well Description
0 / 0		Ground Surface (GS)	6.47								
1 – 2		Augering	5.66								Native sand packing from 0 m to 0.61 m
3 – 4 / 1		SPT: 7 / 16 / 22 / 16 / 15 CFEM: Gravelly Sand, trace Silt/Clay	4.9	SS	1	38	40				Bentonite packing from 0.61 m to 1.22 m
5 – 6 / 2		SPT: 5 / 12 / 16 / 15 / 19 CFEM: Sand and Gravel, trace Silt/Clay	4.14	SS	2	28	28				0.05 m dia. riser from 0 m to 2.38 m
8		Augering									
9 – 10 / 3		SPT: 28 / 62 / 65 / 35 / 28 Sand, some silt/clay, some rock fragments	3.28	SS	3	127	37				2.897 m BGS on Feb. 5, 2018
11 – 12		SPT: 18 / 17 / 13 / 12 Silty/clayey sand, some gravel, some rock fragments	2.67	SS	4	30	50				
13 / 4		Augering									
14 – 15		SPT: 6 / 14 / 18 / 18 / 21 CFEM: Sand, some Gravel, trace Silt/Clay	1.81	SS	5	32	63				0.05 m dia. screen from 2.38 m to 5.43 m
16 – 17 / 5		SPT: 6 / 6 / 10 / 15 Sand, some gravel, some silt/clay * Up-coning sand	1.2	SS	6	16	98				
18		Augering									Screw-on cap
19 – 20 / 6		SPT: 6 / 12 / 15 / 19 / 15 Sand, some gravel, some silt/clay * Up-coning sand	0.381	SS	7	27	40				
21 – 22		SPT: 6 / 7 / 13 / 16 / 13 Sand, some gravel, some silt/clay	-0.381	SS	8	20	22				
23 / 7 – 26		DCPT (Blow counts per 150 mm)		PC	--	6					Native sand packing from 1.22 m to 15.18 m
				PC	--	7					
				PC	--	10					
				PC	--	13					
				PC	--	14					
				PC	--	14					
				PC	--	18					
				PC	--	14					

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Client: Marine Harvest Atlantic Canada

Location: Stephenville, NL

Log of Monitoring Well: FHM9

Project No: 3113

Date: January 26, 2018

Depth	Symbol	Geologic Description	Elevation (m)	Sample Type	Sample Sequence	"N" Value	Recovery (%)	% Fines	Standard Penetration Test "N" Value per 300 mm (20 – 60)	Well Data	Well Description
27		DCPT: (Blow counts per 150 mm) 6 / 7 / 10 / 13 / 14 / 14 / 18 / 14 / 12 / 11 / 13 / 14 / 14 / 12 / 12 / 11 / 12 / 15 / 17 / 14 / 21 / 16 / 16 / 16 / 20 / 17 / 14 / 15 / 15 / 15 / 16 / 18 / 21 / 16 / 18 / 19 / 20 / 20 / 19 / 23 / 20 / 23 / 24 / 28 / 31 / 26 / 32 / 34 / 38 / 33 / 30 / 29 / 31 / 32 / 32		PC	--	12					
28				PC	--	11					
29				PC	--	13					
9				PC	--	14					
30				PC	--	14					
31				PC	--	12					
32				PC	--	12					
10				PC	--	11					
33				PC	--	12					
34				PC	--	15					
35				PC	--	17					
36				PC	--	14					
11				PC	--	21					
37				PC	--	16					
38				PC	--	16					
39				PC	--	16					
12				PC	--	20					
40				PC	--	17					
41				PC	--	14					
42				PC	--	15					
13				PC	--	15					
43				PC	--	15					
44				PC	--	16					
45				PC	--	18					
14				PC	--	21					
46				PC	--	16					
47				PC	--	18					
48				PC	--	19					
49				PC	--	20					
15				PC	--	20					
50			-8.71	PC	--	19					
51		End of Borehole		PC	--	23					
52				PC	--	20					
				PC	--	23					
				PC	--	24					
				PC	--	28					
				PC	--	31					
				PC	--	26					
				PC	--	32					
				PC	--	34					
				PC	--	38					
				PC	--	33					
				PC	--	30					
				PC	--	29					
				PC	--	31					
				PC	--	32					
				PC	--	32					

Native sand packing from 1.22 m to 15.18 m

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APPENDIX C

Grain Size Analysis

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

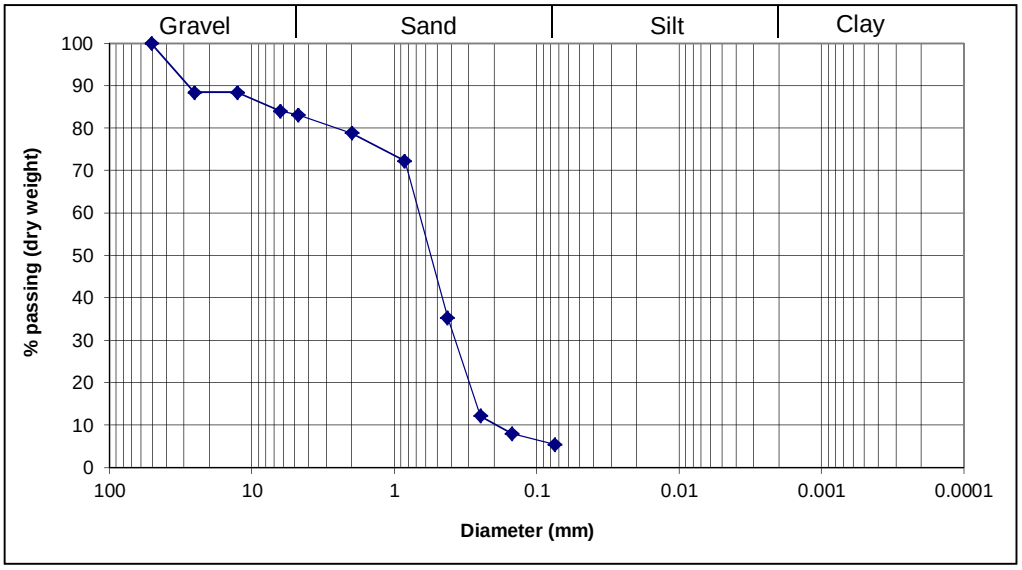
Sample No. : FHM1-SS1

Depth below GS : 0.79 - 1.55 m
(2.58 - 5.08 ft)

Sieve Analysis

Dry weight of sample (g) = 342.71

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	0.00	0.00	0.00	100.00
1	25.4	39.44	11.51	11.51	88.49
1/2"	12.7	0.00	0.00	11.51	88.49
1/4"	6.35	15.14	4.42	15.93	84.07
4	4.76	3.22	0.94	16.87	83.13
10	2.00	14.55	4.25	21.11	78.89
20	0.85	22.50	6.57	27.68	72.32
40	0.425	126.72	36.98	64.65	35.35
60	0.25	79.25	23.12	87.78	12.22
100	0.15	14.42	4.21	91.98	8.02
200	0.075	8.59	2.51	94.49	5.51
pan	---	18.88	5.51	100.00	---
		342.71			



D_{10} = 0.19

D_{30} = 0.38

D_{60} = 0.68

Cu = 3.58

Cc = 1.12

USCS: SP-SM (Poorly graded sand with silt and gravel) or SP-SC (Poorly graded sand with clay and gravel)

R_{200} = 94.49

R_4 = 16.87

R_4/R_{200} = 0.18

SF = 77.63

GF = 16.87

% Gravel = 16.87

% Sand = 77.63

% Silt & Clay = 5.51

% Clay = NA

CFEM: Sand, some Gravel, trace Silt/Clay

Moisture Content (%): 8.70

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

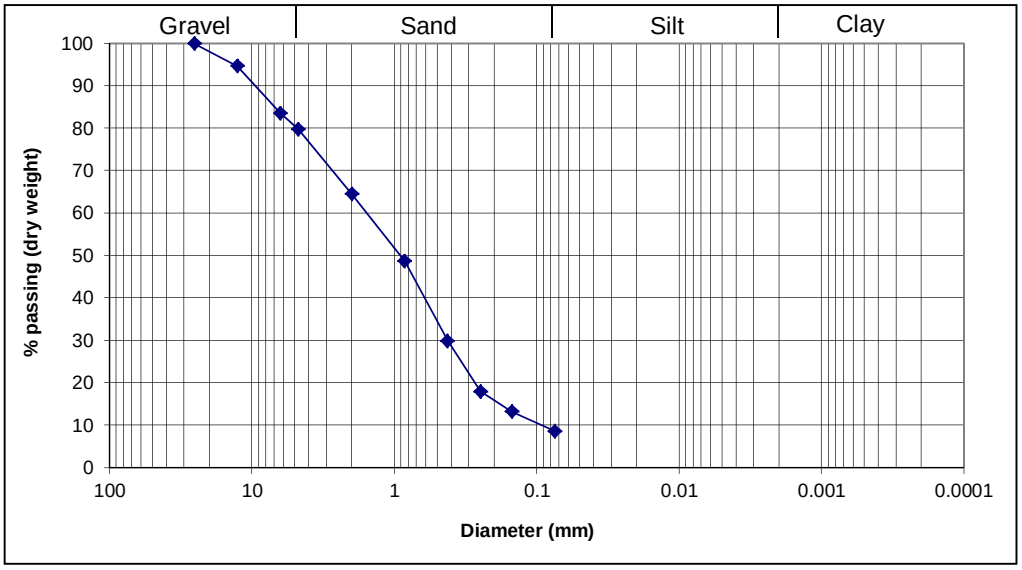
Sample No. : FHM1-SS2

Depth below GS : 1.53 - 1.99 m
(5.02 - 6.52 ft)

Sieve Analysis

Dry weight of sample (g) = 211.24

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	11.16	5.28	5.28	94.72
1/4"	6.35	23.38	11.07	16.35	83.65
4	4.76	7.93	3.75	20.11	79.89
10	2.00	32.38	15.33	35.43	64.57
20	0.85	33.49	15.85	51.29	48.71
40	0.425	39.77	18.83	70.11	29.89
60	0.25	24.96	11.82	81.93	18.07
100	0.15	10.12	4.79	86.72	13.28
200	0.075	9.81	4.64	91.37	8.63
pan	---	18.24	8.63	100.00	---
		211.24			



D_{10} = 0.093

D_{30} = 0.425 Cu = 16.67

D_{60} = 1.55 Cc = 1.25

USCS: SW-SM (Well-graded sand with silt and gravel) or SW-SC (Well-graded sand with clay and gravel)

R_{200} = 91.37 % Gravel = 20.11

R_4 = 20.11 % Sand = 71.26

R_4/R_{200} = 0.22 % Silt & Clay = 8.63

SF = 71.26 % Clay = NA

GF = 20.11 **CFEM:** Gravelly Sand, trace Silt/Clay

Moisture Content (%): 7.31

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

Sample No. : FHM1-SS3

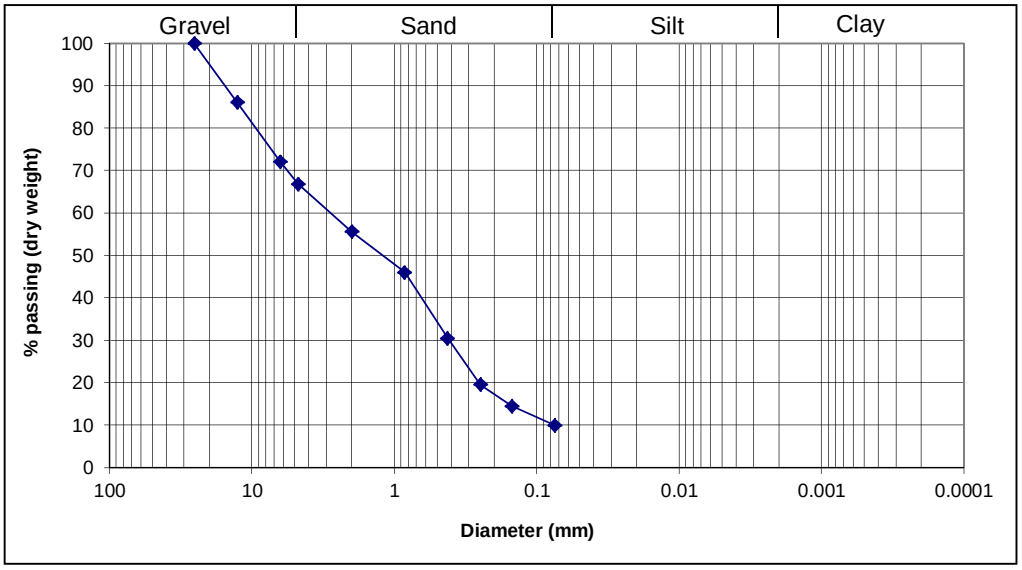
Depth below GS : 2.29 - 3.04 m

(7.48 - 9.98 ft)

Sieve Analysis

Dry weight of sample (g) = 240.61

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	33.44	13.90	13.90	86.10
1/4"	6.35	33.51	13.93	27.83	72.17
4	4.76	12.60	5.24	33.06	66.94
10	2.00	27.13	11.28	44.34	55.66
20	0.85	23.14	9.62	53.95	46.05
40	0.425	37.35	15.52	69.48	30.52
60	0.25	26.28	10.92	80.40	19.60
100	0.15	12.20	5.07	85.47	14.53
200	0.075	10.72	4.46	89.93	10.07
pan	---	24.24	10.07	100.00	---
		240.61			



D_{10} = 0.07

D_{30} = 0.42

D_{60} = 2.8

Cu = 40.00

Cc = 0.90

USCS: SP-SM (Poorly graded sand with silt and gravel) or SP-SC (Poorly graded sand with clay and gravel)

R_{200} = 89.93

R_4 = 33.06

R_4/R_{200} = 0.37

SF = 56.86

GF = 33.06

% Gravel = 33.06

% Sand = 56.86

% Silt & Clay = 10.07

% Clay = NA

CFEM: Gravelly Sand, some Silt/Clay

Moisture Content (%): 6.10

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

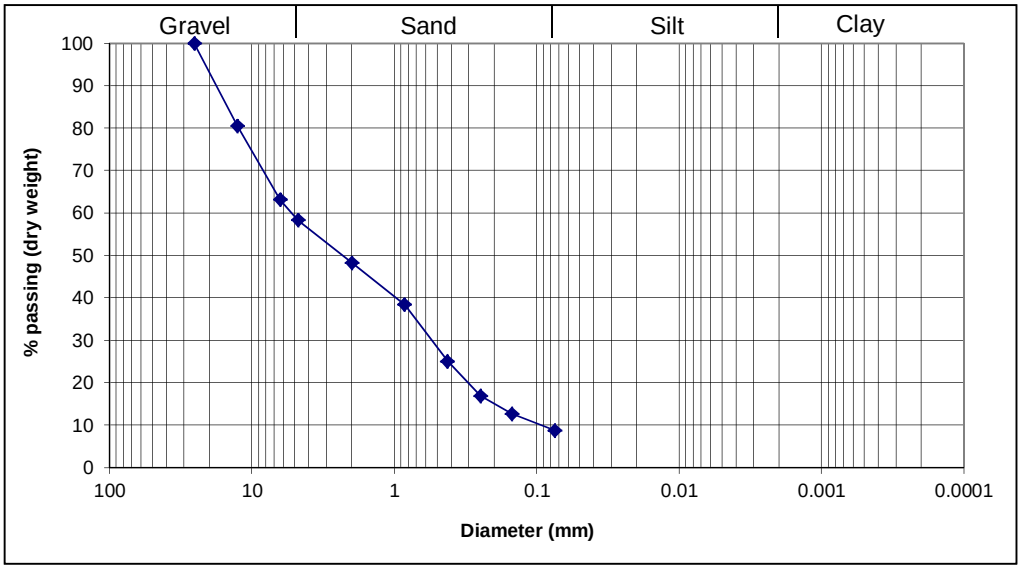
Sample No. : FHM1-SS4

Depth below GS : 3.05 - 3.81 m
(10.02 - 12.52 ft)

Sieve Analysis

Dry weight of sample (g) = 244.46

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	47.36	19.37	19.37	80.63
1/4"	6.35	42.66	17.45	36.82	63.18
4	4.76	11.73	4.80	41.62	58.38
10	2.00	24.59	10.06	51.68	48.32
20	0.85	24.13	9.87	61.55	38.45
40	0.425	32.50	13.29	74.85	25.15
60	0.25	20.11	8.23	83.07	16.93
100	0.15	10.18	4.16	87.24	12.76
200	0.075	9.55	3.91	91.14	8.86
pan	---	21.65	8.86	100.00	---
		244.46			



D_{10} = 0.093

D_{30} = 0.55

D_{60} = 5.3

Cu = 56.99

Cc = 0.61

USCS: SP-SM (Poorly graded sand with silt and gravel) or SP-SC (Poorly graded sand with clay and gravel)

R_{200} = 91.14

R_4 = 41.62

R_4/R_{200} = 0.46

SF = 49.52

GF = 41.62

% Gravel = 41.62

% Sand = 49.52

% Silt & Clay = 8.86

% Clay = NA

CFEM: Sand and Gravel, trace Silt/Clay

Moisture Content (%): 9.38

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

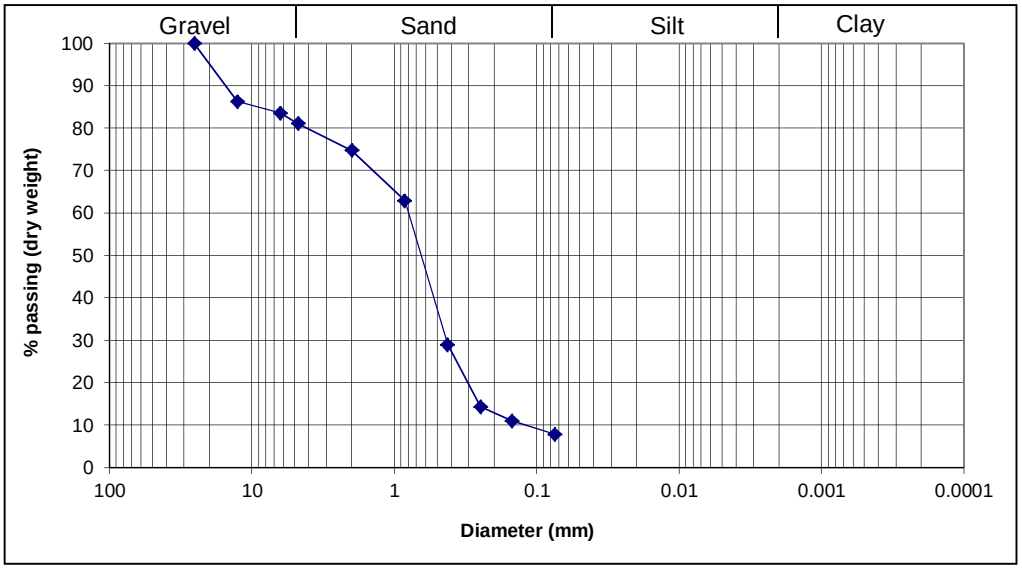
Sample No. : FHM2-SS1

Depth below GS : 0.84 - 1.60 m
(2.75 - 5.25 ft)

Sieve Analysis

Dry weight of sample (g) = 233.19

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	31.76	13.62	13.62	86.38
1/4"	6.35	6.32	2.71	16.33	83.67
4	4.76	5.93	2.54	18.87	81.13
10	2.00	14.71	6.31	25.18	74.82
20	0.85	27.67	11.87	37.05	62.95
40	0.425	78.98	33.87	70.92	29.08
60	0.25	34.18	14.66	85.57	14.43
100	0.15	7.89	3.38	88.96	11.04
200	0.075	7.39	3.17	92.13	7.87
pan	---	18.36	7.87	100.00	---
		233.19			



D_{10} = 0.12

D_{30} = 0.44

D_{60} = 0.8

Cu = 6.67

Cc = 2.02

USCS: SW-SM (Well-graded sand with silt and gravel) or SW-SC (Well-graded sand with clay and gravel)

R_{200} = 92.13

R_4 = 18.87

R_4/R_{200} = 0.20

SF = 73.25

GF = 18.87

% Gravel = 18.87

% Sand = 73.25

% Silt & Clay = 7.87

% Clay = NA

CFEM: Sand, some Gravel, trace Silt/Clay

Moisture Content (%): 12.45

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

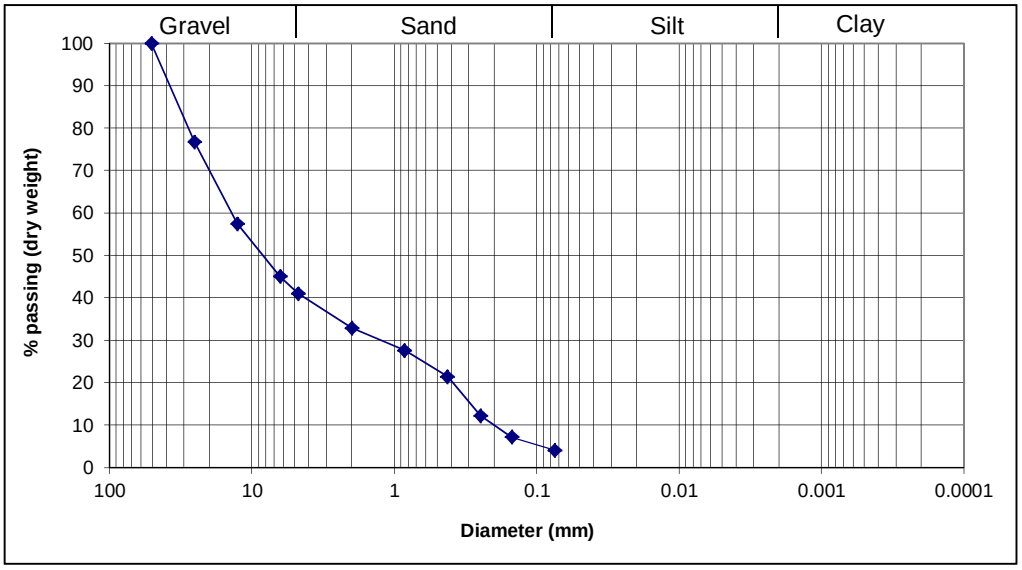
Sample No. : FHM2-SS4

Depth below GS : 2.99 - 3.75 m
(9.79 - 12.29 ft)

Sieve Analysis

Dry weight of sample (g) = 273.71

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	0.00	0.00	0.00	100.00
1	25.4	63.30	23.13	23.13	76.87
1/2"	12.7	53.04	19.38	42.50	57.50
1/4"	6.35	33.96	12.41	54.91	45.09
4	4.76	11.07	4.04	58.96	41.04
10	2.00	22.22	8.12	67.07	32.93
20	0.85	14.47	5.29	72.36	27.64
40	0.425	16.81	6.14	78.50	21.50
60	0.25	25.23	9.22	87.72	12.28
100	0.15	13.77	5.03	92.75	7.25
200	0.075	8.30	3.03	95.78	4.22
pan	---	11.54	4.22	100.00	---
		273.71			



D_{10} = 0.2

D_{30} = 1.25

D_{60} = 14

Cu = 70.00

Cc = 0.56

USCS: GP (Poorly graded gravel with sand)

R_{200} = 95.78

R_4 = 58.96

R_4/R_{200} = 0.62

SF = 36.83

GF = 58.96

% Gravel = 58.96

% Sand = 36.83

% Silt & Clay = 4.22

% Clay = NA

CFEM: Gravel and Sand, trace Silt/Clay

Moisture Content (%): 8.78

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

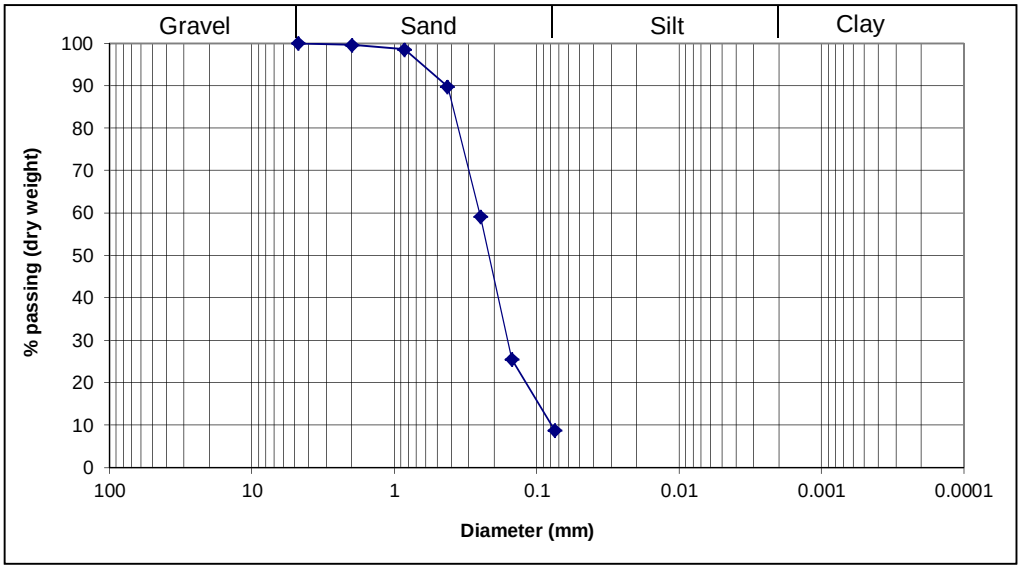
Sample No. : FHM2-SS5

Depth below GS : 3.86 - 4.62 m
(12.67 - 15.17 ft)

Sieve Analysis

Dry weight of sample (g) = 219.16

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	-	-		
1/2"	12.7	-	-		
1/4"	6.35	-	-		
4	4.76	0.00	0.00	0.00	100.00
10	2.00	0.96	0.44	0.44	99.56
20	0.85	2.27	1.04	1.47	98.53
40	0.425	19.18	8.75	10.23	89.77
60	0.25	67.13	30.63	40.86	59.14
100	0.15	73.46	33.52	74.37	25.63
200	0.075	36.92	16.85	91.22	8.78
pan	---	19.24	8.78	100.00	---
		219.16			



D_{10} = 0.079

D_{30} = 0.16

D_{60} = 0.255

Cu = 3.23

Cc = 1.27

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 91.22

R_4 = 0.00

R_4/R_{200} = 0.00

SF = 91.22

GF = 0.00

% Gravel = 0.00

% Sand = 91.22

% Silt & Clay = 8.78

% Clay = NA

CFEM: Sand, trace Silt/Clay

Moisture Content (%): 3.12

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

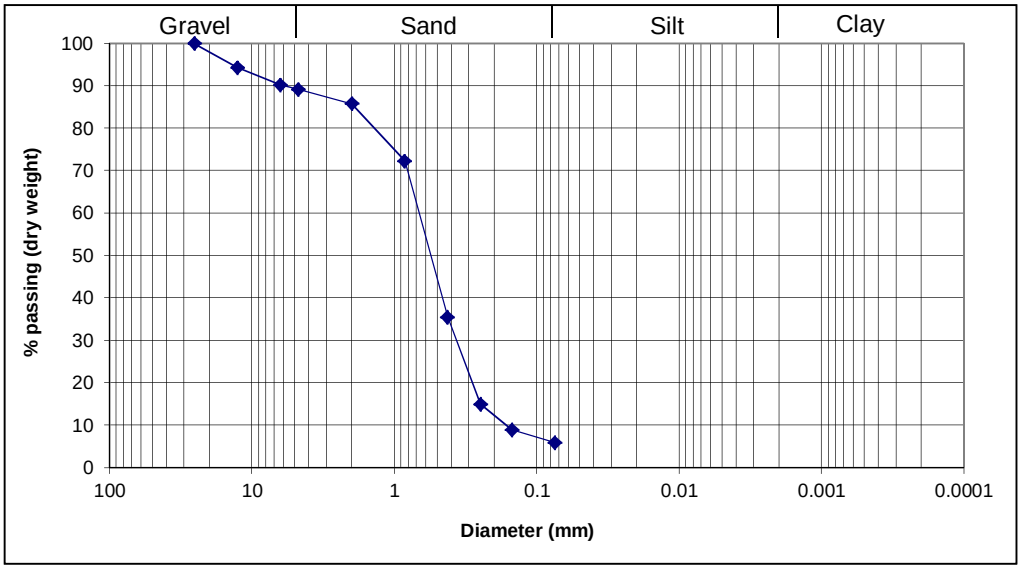
Sample No. : FHM3-SS1

Depth below GS : 0.86 - 1.63 m
(2.83 - 5.33 ft)

Sieve Analysis

Dry weight of sample (g) = 268.14

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	15.16	5.65	5.65	94.35
1/4"	6.35	10.89	4.06	9.72	90.28
4	4.76	2.78	1.04	10.75	89.25
10	2.00	9.20	3.43	14.18	85.82
20	0.85	36.16	13.49	27.67	72.33
40	0.425	98.74	36.82	64.49	35.51
60	0.25	54.98	20.50	85.00	15.00
100	0.15	16.30	6.08	91.08	8.92
200	0.075	8.04	3.00	94.07	5.93
pan	---	15.89	5.93	100.00	---
		268.14			



D_{10} = 0.16

D_{30} = 0.37

D_{60} = 0.68

Cu = 4.25

Cc = 1.26

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 94.07

R_4 = 10.75

R_4/R_{200} = 0.11

SF = 83.32

GF = 10.75

% Gravel = 10.75

% Sand = 83.32

% Silt & Clay = 5.93

% Clay = NA

CFEM: Sand, some Gravel, trace Silt/Clay

Moisture Content (%): 12.66

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

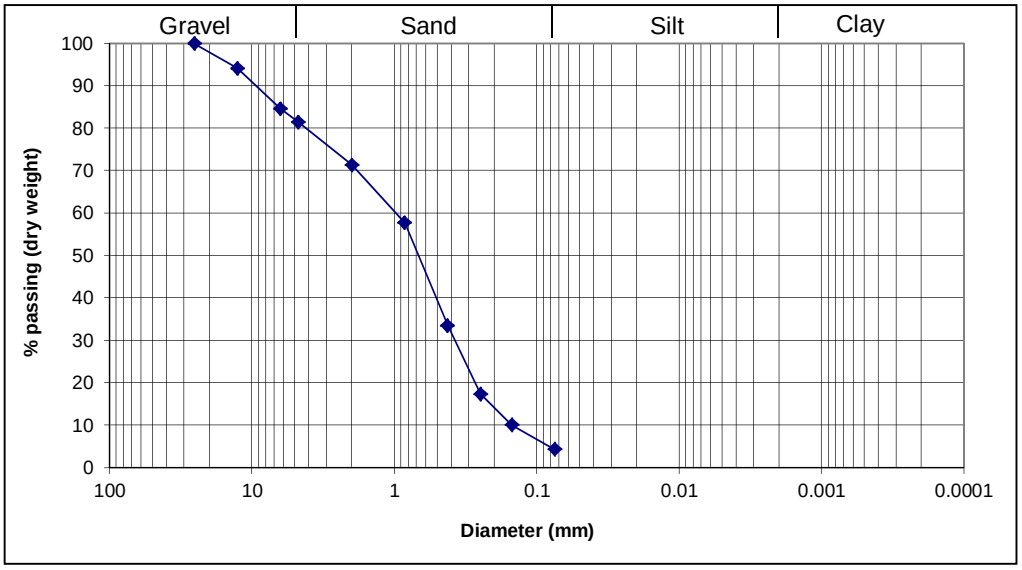
Sample No. : FHM3-SS4

Depth below GS : 3.17 - 3.78 m
(10.40 - 12.40 ft)

Sieve Analysis

Dry weight of sample (g) = 161.18

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	9.33	5.79	5.79	94.21
1/4"	6.35	15.40	9.55	15.34	84.66
4	4.76	5.02	3.11	18.46	81.54
10	2.00	16.31	10.12	28.58	71.42
20	0.85	22.01	13.66	42.23	57.77
40	0.425	39.00	24.20	66.43	33.57
60	0.25	25.95	16.10	82.53	17.47
100	0.15	11.88	7.37	89.90	10.10
200	0.075	9.23	5.73	95.63	4.37
pan	---	7.05	4.37	100.00	---
		161.18			



D_{10} = 0.15

D_{30} = 0.38

D_{60} = 0.98

Cu = 6.53

Cc = 0.98

USCS: SP (Poorly graded sand with gravel)

R_{200} = 95.63

R_4 = 18.46

R_4/R_{200} = 0.19

SF = 77.17

GF = 18.46

% Gravel = 18.46

% Sand = 77.17

% Silt & Clay = 4.37

% Clay = NA

CFEM: Sand, some Gravel, trace Silt/Clay

Moisture Content (%): 19.21

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

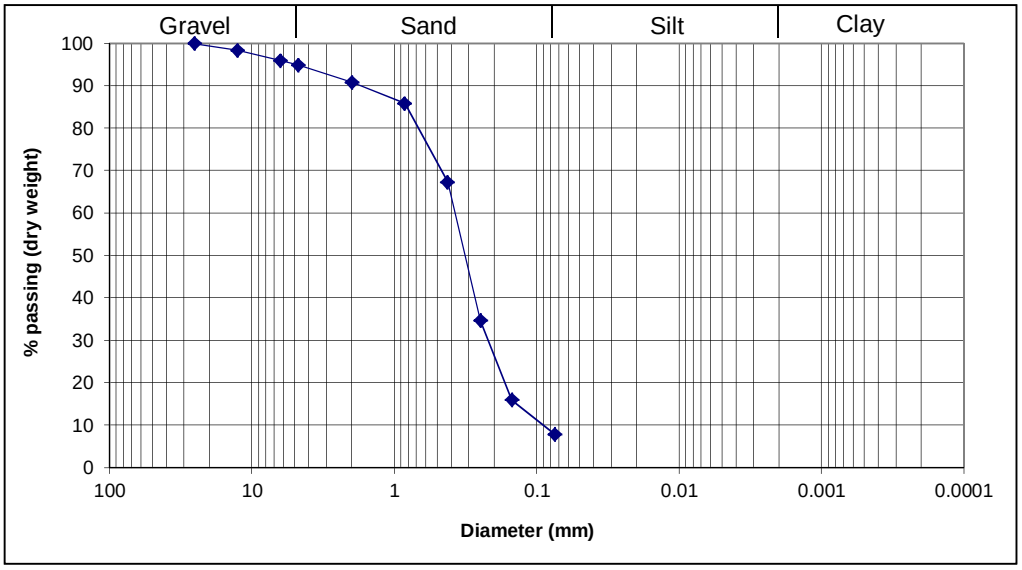
Sample No. : FHM3-SS5

Depth below GS : 3.81 - 4.57 m
(12.50 - 15.00 ft)

Sieve Analysis

Dry weight of sample (g) = 236.22

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	3.72	1.57	1.57	98.43
1/4"	6.35	5.67	2.40	3.98	96.02
4	4.76	2.45	1.04	5.01	94.99
10	2.00	9.81	4.15	9.17	90.83
20	0.85	11.64	4.93	14.09	85.91
40	0.425	43.82	18.55	32.64	67.36
60	0.25	77.15	32.66	65.30	34.70
100	0.15	44.17	18.70	84.00	16.00
200	0.075	18.97	8.03	92.03	7.97
pan	---	18.82	7.97	100.00	---
		236.22			



D_{10} = 0.09

D_{30} = 0.22

D_{60} = 0.38

Cu = 4.22

Cc = 1.42

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 92.03

R_4 = 5.01

R_4/R_{200} = 0.05

SF = 87.02

GF = 5.01

% Gravel = 5.01

% Sand = 87.02

% Silt & Clay = 7.97

% Clay = NA

CFEM: Sand, trace Silt/Clay, trace Gravel

Moisture Content (%): 18.08

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

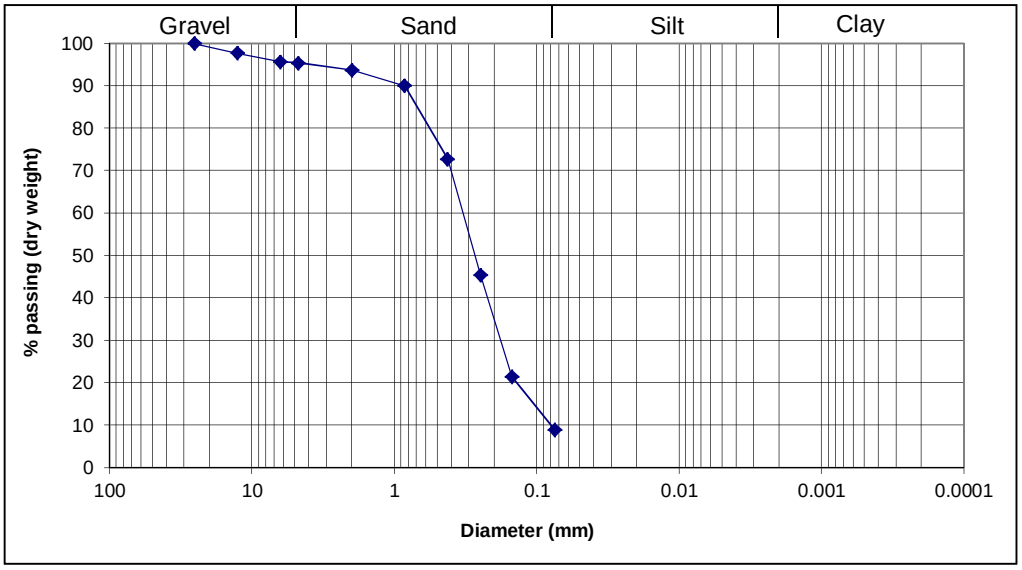
Sample No. : FHM4-SS1

Depth below GS : 0.84 - 1.60 m
(2.75 - 5.25 ft)

Sieve Analysis

Dry weight of sample (g) = 259.45

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	5.89	2.27	2.27	97.73
1/4"	6.35	5.35	2.06	4.33	95.67
4	4.76	0.70	0.27	4.60	95.40
10	2.00	4.23	1.63	6.23	93.77
20	0.85	9.67	3.73	9.96	90.04
40	0.425	44.91	17.31	27.27	72.73
60	0.25	70.78	27.28	54.55	45.45
100	0.15	62.24	23.99	78.54	21.46
200	0.075	32.39	12.48	91.02	8.98
pan	---	23.29	8.98	100.00	---
		259.45			



D_{10} = 0.08

D_{30} = 0.18

D_{60} = 0.33

Cu = 4.13

Cc = 1.23

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 91.02

R_4 = 4.60

R_4/R_{200} = 0.05

SF = 86.42

GF = 4.60

% Gravel = 4.60

% Sand = 86.42

% Silt & Clay = 8.98

% Clay = NA

CFEM: Sand, trace Silt/Clay, trace Gravel

Moisture Content (%): 14.48

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

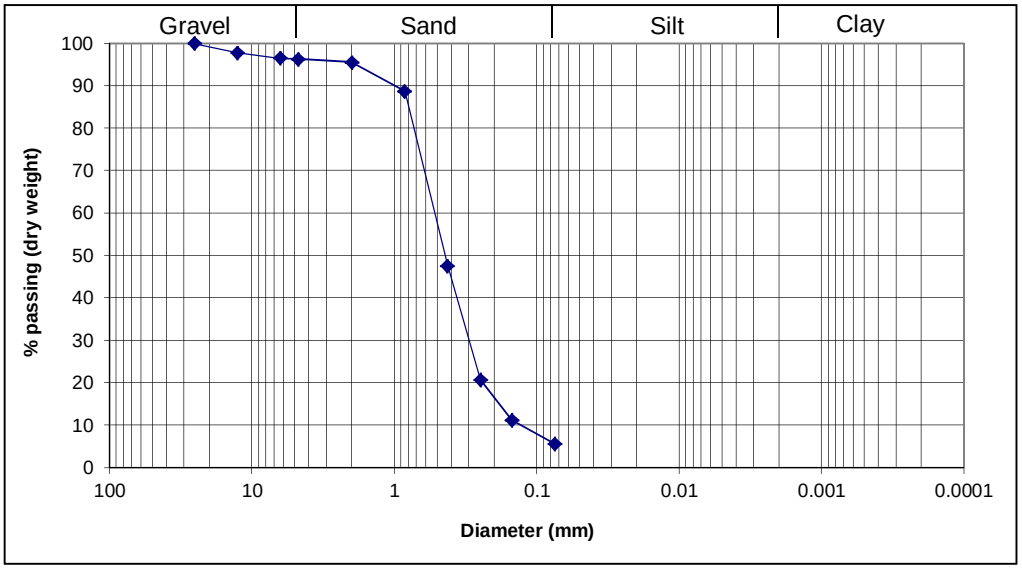
Sample No. : FHM4-SS2

Depth below GS : 1.64 - 2.25 m
(5.38 - 7.38 ft)

Sieve Analysis

Dry weight of sample (g) = 297.33

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	6.44	2.17	2.17	97.83
1/4"	6.35	3.89	1.31	3.47	96.53
4	4.76	0.55	0.18	3.66	96.34
10	2.00	2.31	0.78	4.44	95.56
20	0.85	20.25	6.81	11.25	88.75
40	0.425	122.28	41.13	52.37	47.63
60	0.25	79.85	26.86	79.23	20.77
100	0.15	28.27	9.51	88.74	11.26
200	0.075	16.71	5.62	94.36	5.64
pan	---	16.78	5.64	100.00	---
		297.33			



D_{10} = 0.13

D_{30} = 0.3

D_{60} = 0.53

Cu = 4.08

Cc = 1.31

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 94.36

R_4 = 3.66

R_4/R_{200} = 0.04

SF = 90.70

GF = 3.66

% Gravel = 3.66

% Sand = 90.70

% Silt & Clay = 5.64

% Clay = NA

CFEM: Sand, trace Silt/Clay, trace Gravel

Moisture Content (%): 9.46

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

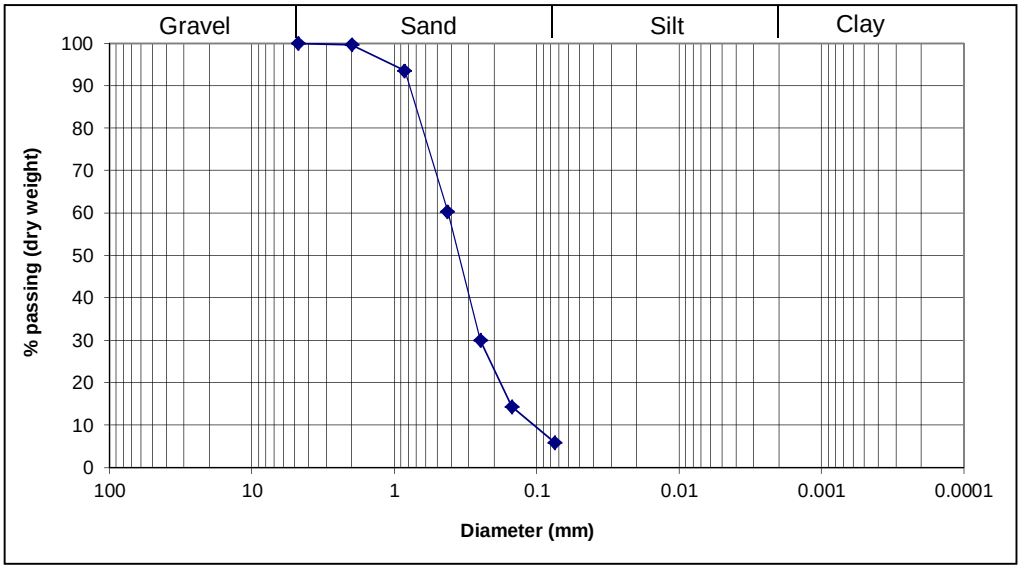
Sample No. : FHM4-SS3

Depth below GS : 2.34 - 3.10 m
(7.67 - 10.17 ft)

Sieve Analysis

Dry weight of sample (g) = 259.28

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	-	-		
1/2"	12.7	-	-		
1/4"	6.35	-	-		
4	4.76	0.00	0.00	0.00	100.00
10	2.00	0.76	0.29	0.29	99.71
20	0.85	16.00	6.17	6.46	93.54
40	0.425	85.84	33.11	39.57	60.43
60	0.25	78.89	30.43	70.00	30.00
100	0.15	40.36	15.57	85.56	14.44
200	0.075	22.06	8.51	94.07	5.93
pan	---	15.37	5.93	100.00	---
		259.28			



D_{10} = 0.103

D_{30} = 0.25

D_{60} = 0.42

Cu = 4.08

Cc = 1.44

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 94.07

R_4 = 0.00

R_4/R_{200} = 0.00

SF = 94.07

GF = 0.00

% Gravel = 0.00

% Sand = 94.07

% Silt & Clay = 5.93

% Clay = NA

CFEM: Sand, trace Silt/Clay

Moisture Content (%): 5.87

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

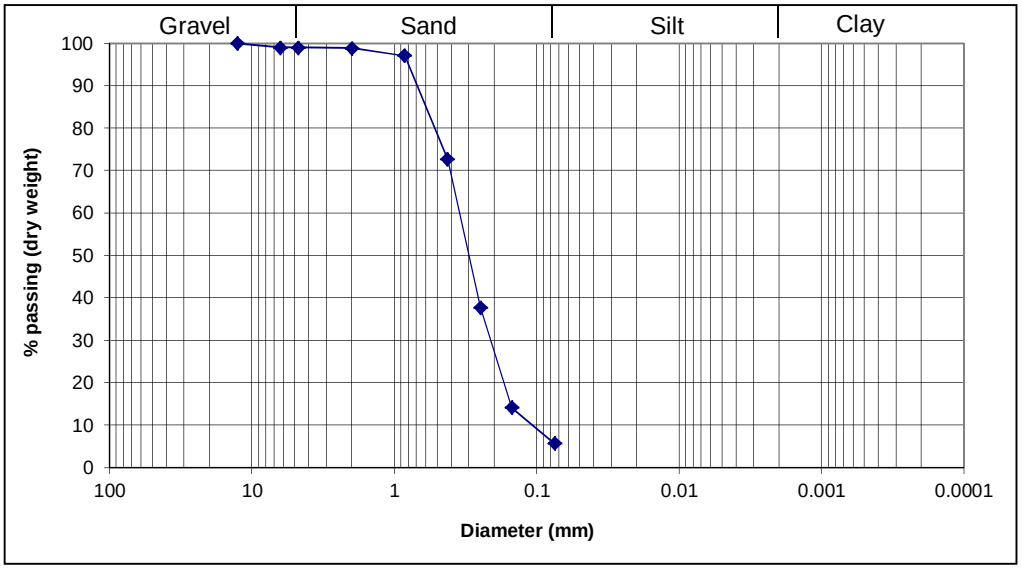
Sample No. : FHM4-SS4

Depth below GS : 3.05 - 3.81 m
(10.00 - 12.50 ft)

Sieve Analysis

Dry weight of sample (g) = 230.95

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	-	-		
1/2"	12.7	0.00	0.00	0.00	100.00
1/4"	6.35	2.37	1.03	1.03	98.97
4	4.76	0.00	0.00	1.03	98.97
10	2.00	0.36	0.16	1.18	98.82
20	0.85	3.91	1.69	2.88	97.12
40	0.425	56.46	24.45	27.32	72.68
60	0.25	80.46	34.84	62.16	37.84
100	0.15	54.63	23.65	85.82	14.18
200	0.075	19.53	8.46	94.27	5.73
pan	---	13.23	5.73	100.00	---
		230.95			



D_{10} = 0.105

D_{30} = 0.21

D_{60} = 0.35

Cu = 3.33

Cc = 1.20

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 94.27

R_4 = 1.03

R_4/R_{200} = 0.01

SF = 93.25

GF = 1.03

% Gravel = 1.03

% Sand = 93.25

% Silt & Clay = 5.73

% Clay = NA

CFEM: Sand, trace Silt/Clay, trace Gravel

Moisture Content (%): 6.41

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

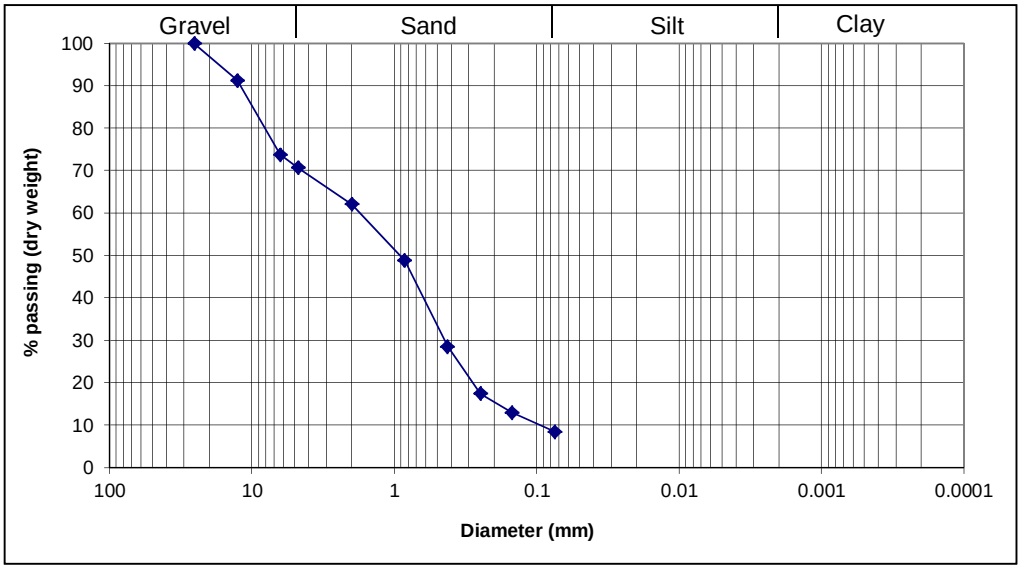
Sample No. : FHM5-SS1

Depth below GS : 0.81 - 1.57 m
(2.65 - 5.15 ft)

Sieve Analysis

Dry weight of sample (g) = 276.52

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	24.11	8.72	8.72	91.28
1/4"	6.35	48.25	17.45	26.17	73.83
4	4.76	8.56	3.10	29.26	70.74
10	2.00	23.73	8.58	37.85	62.15
20	0.85	36.72	13.28	51.12	48.88
40	0.425	55.97	20.24	71.37	28.63
60	0.25	30.82	11.15	82.51	17.49
100	0.15	12.22	4.42	86.93	13.07
200	0.075	12.57	4.55	91.48	8.52
pan	---	23.57	8.52	100.00	---
		276.52			



D_{10} = 0.094

D_{30} = 0.45

D_{60} = 1.75

Cu = 18.62

Cc = 1.23

USCS: SW-SM (Well-graded sand with silt and gravel) or SW-SC (Well-graded sand with clay and gravel)

R_{200} = 91.48

R_4 = 29.26

R_4/R_{200} = 0.32

SF = 62.21

GF = 29.26

% Gravel = 29.26

% Sand = 62.21

% Silt & Clay = 8.52

% Clay = NA

CFEM: Gravelly Sand, trace Silt/Clay

Moisture Content (%): 11.71

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

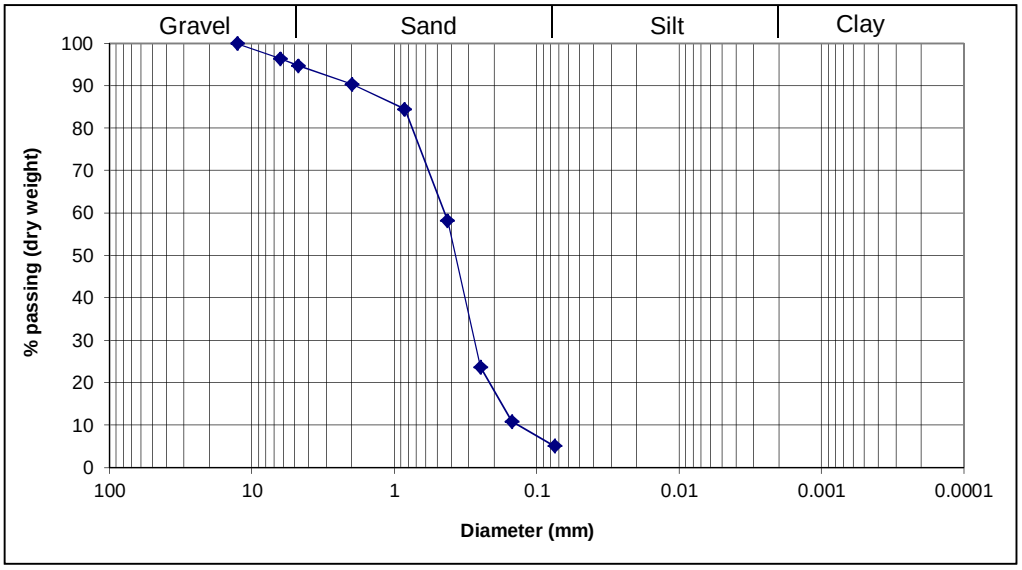
Sample No. : FHM5-SS4

Depth below GS : 3.04 - 3.80 m
(9.98 - 12.48 ft)

Sieve Analysis

Dry weight of sample (g) = 285.63

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	-	-		
1/2"	12.7	0.00	0.00	0.00	100.00
1/4"	6.35	10.06	3.52	3.52	96.48
4	4.76	4.80	1.68	5.20	94.80
10	2.00	12.50	4.38	9.58	90.42
20	0.85	16.91	5.92	15.50	84.50
40	0.425	75.10	26.29	41.79	58.21
60	0.25	98.28	34.41	76.20	23.80
100	0.15	36.72	12.86	89.06	10.94
200	0.075	16.59	5.81	94.86	5.14
pan	---	14.67	5.14	100.00	---
		285.63			



D_{10} = 0.135

D_{30} = 0.275

D_{60} = 0.45

Cu = 3.33

Cc = 1.24

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 94.86

R_4 = 5.20

R_4/R_{200} = 0.05

SF = 89.66

GF = 5.20

% Gravel = 5.20

% Sand = 89.66

% Silt & Clay = 5.14

% Clay = NA

CFEM: Sand, trace Gravel, trace Silt/Clay

Moisture Content (%): 16.14

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

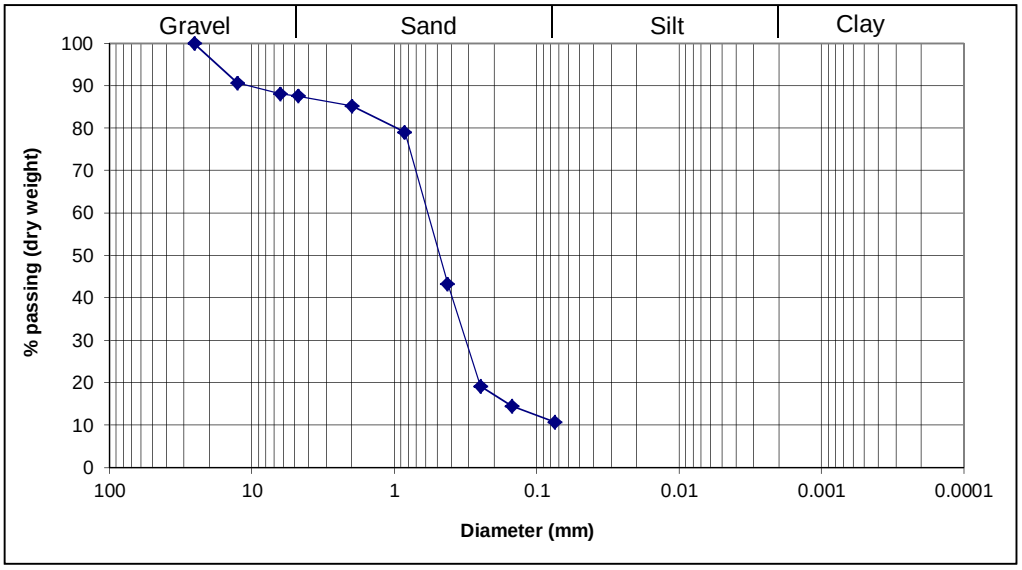
Sample No. : FHM7-2-SS1

Depth below GS : 0.86 - 1.48 m
(2.83 - 4.83 ft)

Sieve Analysis

Dry weight of sample (g) = 187.66

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	17.50	9.33	9.33	90.67
1/4"	6.35	4.64	2.47	11.80	88.20
4	4.76	1.07	0.57	12.37	87.63
10	2.00	4.39	2.34	14.71	85.29
20	0.85	11.71	6.24	20.95	79.05
40	0.425	67.02	35.71	56.66	43.34
60	0.25	45.13	24.05	80.71	19.29
100	0.15	8.94	4.76	85.47	14.53
200	0.075	7.08	3.77	89.25	10.75
pan	---	20.18	10.75	100.00	---
		187.66			



D_{10} = 0.067

D_{30} = 0.32

D_{60} = 0.59

Cu = 8.81

Cc = 2.59

USCS: SW-SM (Well-graded sand with silt) or SW-SC (Well-graded sand with clay)

R_{200} = 89.25

R_4 = 12.37

R_4/R_{200} = 0.14

SF = 76.88

GF = 12.37

% Gravel = 12.37

% Sand = 76.88

% Silt & Clay = 10.75

% Clay = NA

CFEM: Sand, some Gravel, some Silt/Clay

Moisture Content (%): 29.57

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

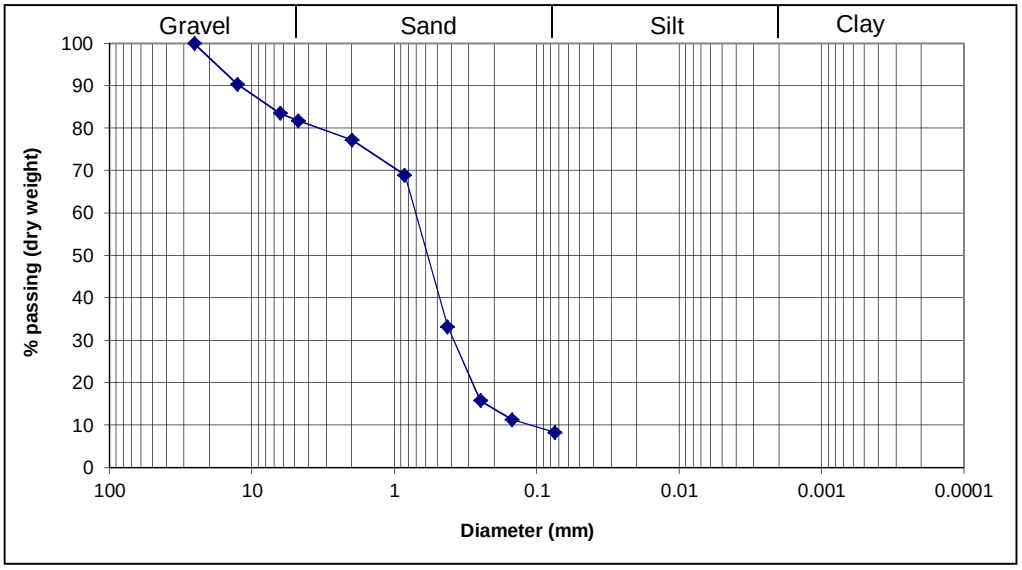
Sample No. : FHM7-2-SS2

Depth below GS : 1.52 - 2.13 m
(4.98 - 6.98 ft)

Sieve Analysis

Dry weight of sample (g) = 224.53

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	21.44	9.55	9.55	90.45
1/4"	6.35	15.47	6.89	16.44	83.56
4	4.76	3.81	1.70	18.14	81.86
10	2.00	10.20	4.54	22.68	77.32
20	0.85	18.74	8.35	31.02	68.98
40	0.425	80.11	35.68	66.70	33.30
60	0.25	39.17	17.45	84.15	15.85
100	0.15	9.92	4.42	88.57	11.43
200	0.075	6.91	3.08	91.64	8.36
pan	---	18.76	8.36	100.00	---
		224.53			



D_{10} = 0.11

D_{30} = 0.39

D_{60} = 0.71

Cu = 6.45

Cc = 1.95

USCS: SW-SM (Well-graded sand with silt and gravel) or SW-SC (Well-graded sand with clay and gravel)

R_{200} = 91.64

R_4 = 18.14

R_4/R_{200} = 0.20

SF = 73.51

GF = 18.14

% Gravel = 18.14

% Sand = 73.51

% Silt & Clay = 8.36

% Clay = NA

CFEM: Sand, some Gravel, trace Silt/Clay

Moisture Content (%): 21.44

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

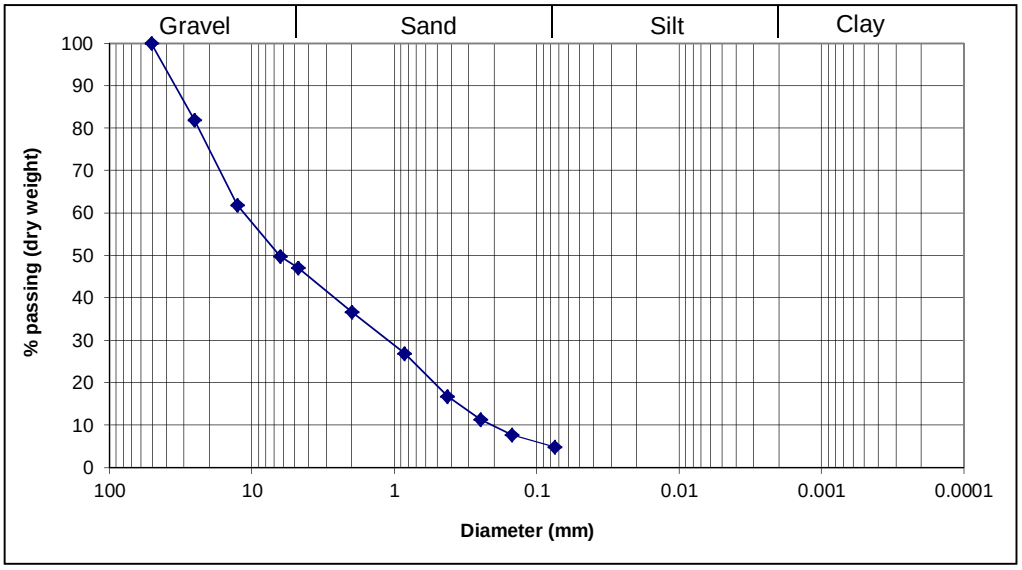
Sample No. : FHM7-2-SS5

Depth below GS : 3.76 - 4.52 m
(12.33 - 14.83 ft)

Sieve Analysis

Dry weight of sample (g) = 308.23

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	0.00	0.00	0.00	100.00
1	25.4	55.53	18.02	18.02	81.98
1/2"	12.7	61.85	20.07	38.08	61.92
1/4"	6.35	37.19	12.07	50.15	49.85
4	4.76	8.46	2.74	52.89	47.11
10	2.00	31.83	10.33	63.22	36.78
20	0.85	30.27	9.82	73.04	26.96
40	0.425	31.13	10.10	83.14	16.86
60	0.25	16.82	5.46	88.60	11.40
100	0.15	11.15	3.62	92.21	7.79
200	0.075	9.06	2.94	95.15	4.85
pan	---	14.94	4.85	100.00	---
		308.23			



D_{10} = 0.2

D_{30} = 1.1

D_{60} = 11.5

Cu = 57.50

Cc = 0.53

USCS: GP (Poorly graded gravel with sand)

R_{200} = 95.15

R_4 = 52.89

R_4/R_{200} = 0.56

SF = 42.26

GF = 52.89

% Gravel = 52.89

% Sand = 42.26

% Silt & Clay = 4.85

% Clay = NA

CFEM: Gravel and Sand, trace Silt/Clay

Moisture Content (%): 9.61

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

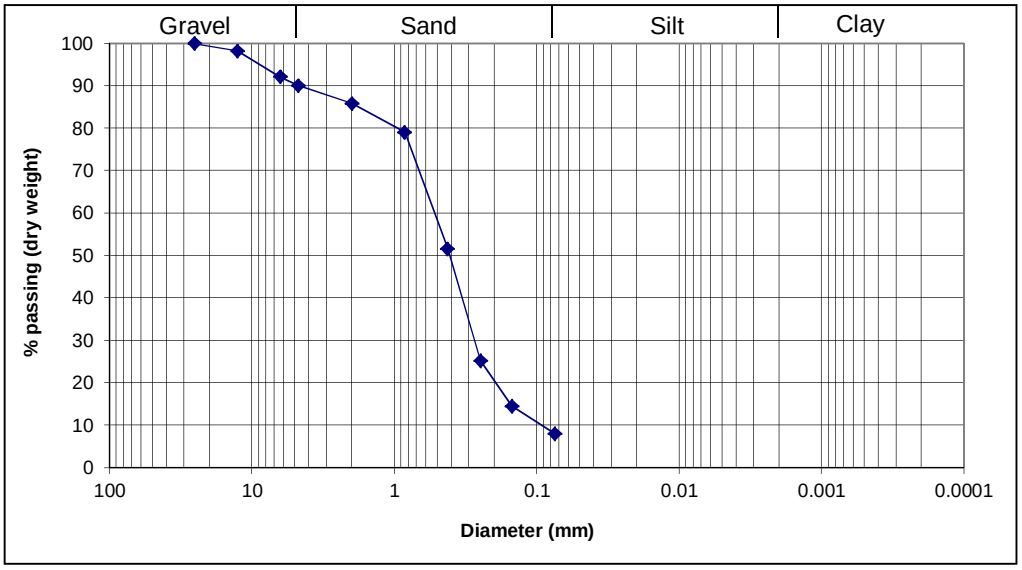
Sample No. : FHM8-2-SS1

Depth below GS : 0.88 - 1.65 m
(2.90 - 5.40 ft)

Sieve Analysis

Dry weight of sample (g) = 284.31

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	4.94	1.74	1.74	98.26
1/4"	6.35	17.43	6.13	7.87	92.13
4	4.76	5.77	2.03	9.90	90.10
10	2.00	11.93	4.20	14.09	85.91
20	0.85	19.27	6.78	20.87	79.13
40	0.425	78.22	27.51	48.38	51.62
60	0.25	74.93	26.36	74.74	25.26
100	0.15	30.28	10.65	85.39	14.61
200	0.075	18.71	6.58	91.97	8.03
pan	---	22.83	8.03	100.00	---
		284.31			



D_{10} = 0.093

D_{30} = 0.275

D_{60} = 0.53

Cu = 5.70

Cc = 1.53

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 91.97

R_4 = 9.90

R_4/R_{200} = 0.11

SF = 82.07

GF = 9.90

% Gravel = 9.90

% Sand = 82.07

% Silt & Clay = 8.03

% Clay = NA

CFEM: Sand, trace Gravel, trace Silt/Clay

Moisture Content (%): 20.91

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

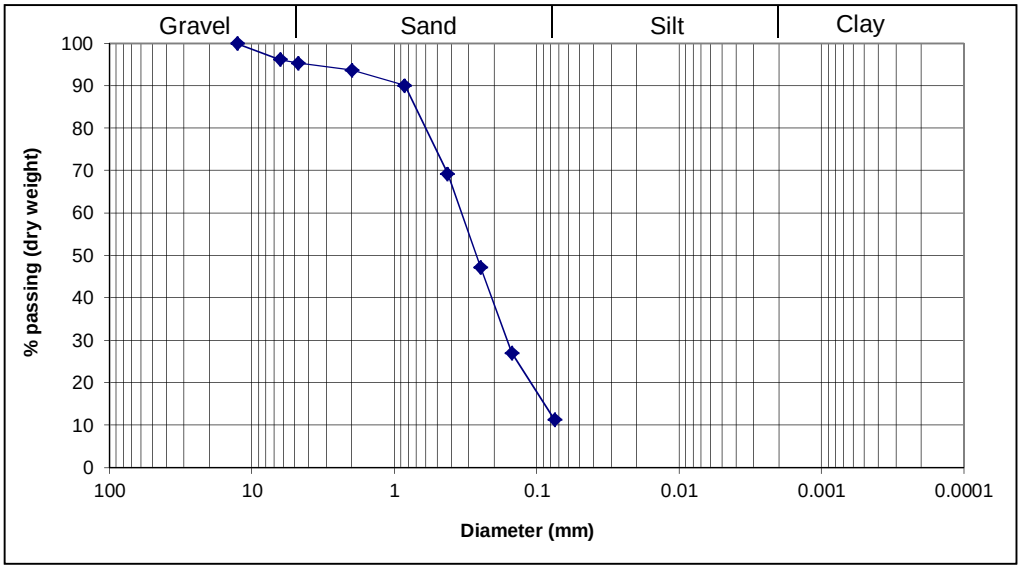
Sample No. : FHM8-2-SS2

Depth below GS : 1.68 - 2.29 m
(5.52 - 7.52 ft)

Sieve Analysis

Dry weight of sample (g) = 249.34

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	-	-		
1/2"	12.7	0.00	0.00	0.00	100.00
1/4"	6.35	9.45	3.79	3.79	96.21
4	4.76	2.05	0.82	4.61	95.39
10	2.00	4.25	1.70	6.32	93.68
20	0.85	8.78	3.52	9.84	90.16
40	0.425	52.11	20.90	30.74	69.26
60	0.25	54.67	21.93	52.66	47.34
100	0.15	50.64	20.31	72.97	27.03
200	0.075	39.20	15.72	88.69	11.31
pan	---	28.19	11.31	100.00	---
		249.34			



D_{10} = 0.07

D_{30} = 0.16

D_{60} = 0.34

Cu = 4.86

Cc = 1.08

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 88.69

R_4 = 4.61

R_4/R_{200} = 0.05

SF = 84.08

GF = 4.61

% Gravel = 4.61

% Sand = 84.08

% Silt & Clay = 11.31

% Clay = NA

CFEM: Sand, some Silt/Clay, trace Gravel

Moisture Content (%): 16.51

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

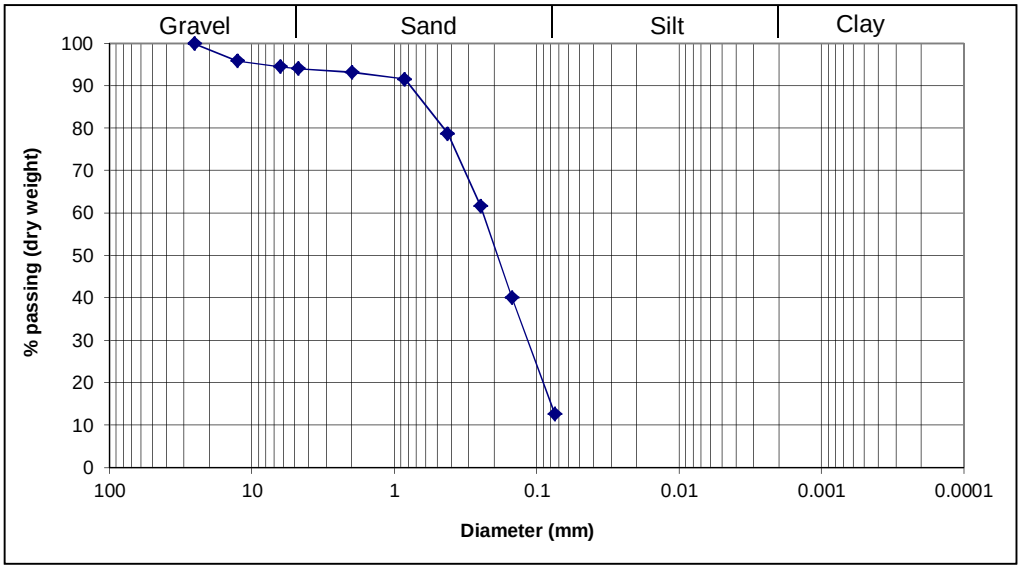
Sample No. : FHM8-2-SS3

Depth below GS : 2.38 - 3.14 m
(7.81 - 10.31 ft)

Sieve Analysis

Dry weight of sample (g) = 252.80

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	10.35	4.09	4.09	95.91
1/4"	6.35	3.36	1.33	5.42	94.58
4	4.76	1.19	0.47	5.89	94.11
10	2.00	2.27	0.90	6.79	93.21
20	0.85	4.00	1.58	8.37	91.63
40	0.425	32.55	12.88	21.25	78.75
60	0.25	43.08	17.04	38.29	61.71
100	0.15	54.34	21.50	59.79	40.21
200	0.075	69.31	27.42	87.20	12.80
pan	---	32.35	12.80	100.00	---
		252.80			



D_{10} = 0.068

D_{30} = 0.115

D_{60} = 0.24

Cu = 3.53

Cc = 0.81

USCS: SM (Silty sand) or SP (Clayey sand)

R_{200} = 87.20

R_4 = 5.89

R_4/R_{200} = 0.07

SF = 81.31

GF = 5.89

% Gravel = 5.89

% Sand = 81.31

% Silt & Clay = 12.80

% Clay = NA

CFEM: Sand, some Silt/Clay, trace Gravel

Moisture Content (%): 19.13

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

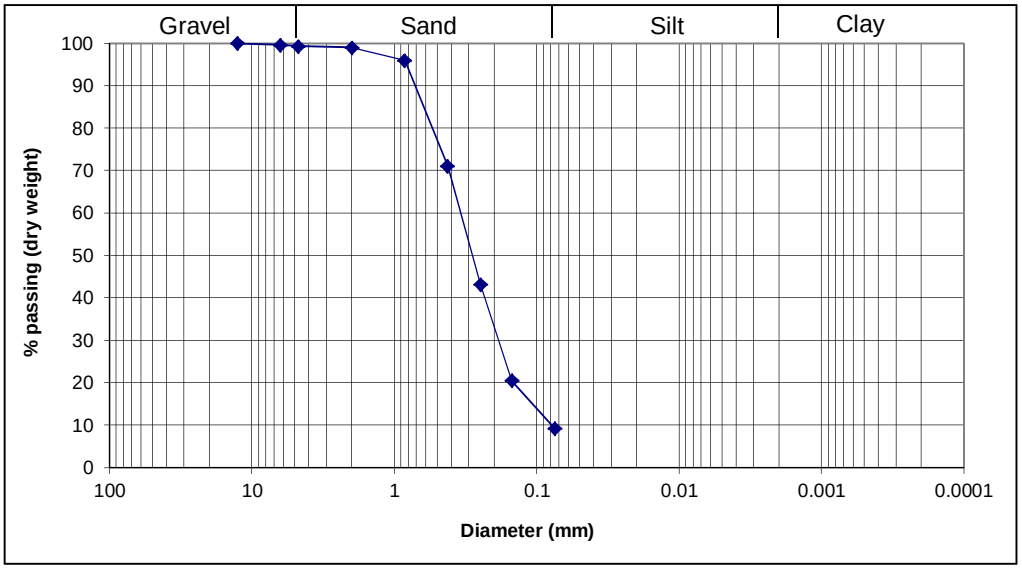
Sample No. : FHM8-2-SS5

Depth below GS : 3.86 - 4.62 m
(12.67 - 15.17 ft)

Sieve Analysis

Dry weight of sample (g) = 276.09

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	-	-		
1/2"	12.7	0.00	0.00	0.00	100.00
1/4"	6.35	1.08	0.39	0.39	99.61
4	4.76	0.93	0.34	0.73	99.27
10	2.00	0.75	0.27	1.00	99.00
20	0.85	8.38	3.04	4.03	95.97
40	0.425	68.66	24.87	28.90	71.10
60	0.25	76.91	27.86	56.76	43.24
100	0.15	62.76	22.73	79.49	20.51
200	0.075	30.97	11.22	90.71	9.29
pan	---	25.65	9.29	100.00	---
		276.09			



D_{10} = 0.077

D_{30} = 0.185 Cu = 4.42

D_{60} = 0.34 Cc = 1.31

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 90.71 % Gravel = 0.73

R_4 = 0.73 % Sand = 89.98

R_4/R_{200} = 0.01 % Silt & Clay = 9.29

SF = 89.98 % Clay = NA

GF = 0.73 **CFEM:** Sand, trace Silt/Clay

Moisture Content (%): 10.46

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

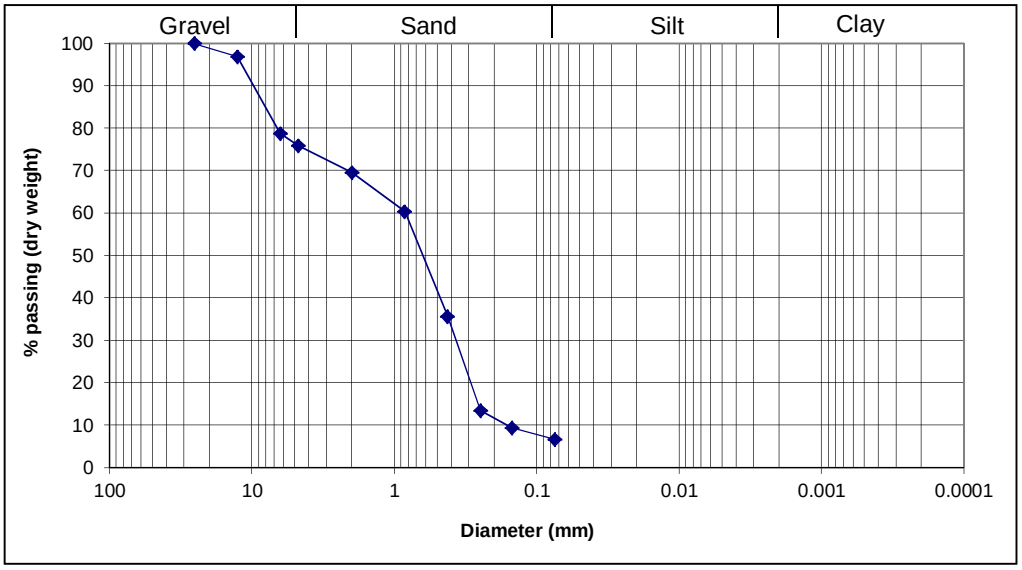
Sample No. : FHM9-SS1

Depth below GS : 0.83 - 1.59 m
(2.73 - 5.23 ft)

Sieve Analysis

Dry weight of sample (g) = 251.15

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	7.74	3.08	3.08	96.92
1/4"	6.35	45.44	18.09	21.17	78.83
4	4.76	7.19	2.86	24.04	75.96
10	2.00	16.09	6.41	30.44	69.56
20	0.85	22.99	9.15	39.60	60.40
40	0.425	61.97	24.67	64.27	35.73
60	0.25	55.69	22.17	86.45	13.55
100	0.15	10.42	4.15	90.60	9.40
200	0.075	6.87	2.74	93.33	6.67
pan	---	16.75	6.67	100.00	---
		251.15			



D_{10} = 0.16

D_{30} = 0.37

D_{60} = 0.85

Cu = 5.31

Cc = 1.01

USCS: SP-SM (Poorly graded sand with silt and gravel) or SP-SC (Poorly graded sand with clay and gravel)

R_{200} = 93.33

R_4 = 24.04

R_4/R_{200} = 0.26

SF = 69.29

GF = 24.04

% Gravel = 24.04

% Sand = 69.29

% Silt & Clay = 6.67

% Clay = NA

CFEM: Gravelly Sand, trace Silt/Clay

Moisture Content (%): 13.01

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

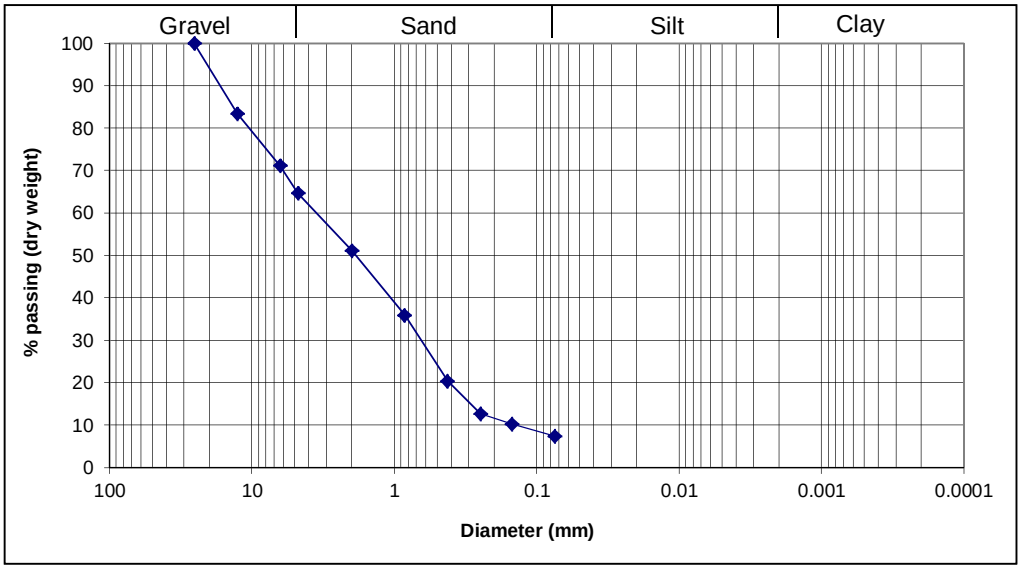
Sample No. : FHM9-SS2

Depth below GS : 1.55 - 2.31 m
(5.08 - 7.58 ft)

Sieve Analysis

Dry weight of sample (g) = 262.91

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	43.48	16.54	16.54	83.46
1/4"	6.35	32.27	12.27	28.81	71.19
4	4.76	17.10	6.50	35.32	64.68
10	2.00	35.57	13.53	48.85	51.15
20	0.85	39.78	15.13	63.98	36.02
40	0.425	41.01	15.60	79.57	20.43
60	0.25	20.20	7.68	87.26	12.74
100	0.15	6.41	2.44	89.70	10.30
200	0.075	7.55	2.87	92.57	7.43
pan	---	19.54	7.43	100.00	---
		262.91			



D_{10} = 0.15

D_{30} = 0.64

D_{60} = 3.5

Cu = 23.33

Cc = 0.78

USCS: SP-SM (Poorly graded sand with silt and gravel) or SP-SC (Poorly graded sand with clay and gravel)

R_{200} = 92.57

R_4 = 35.32

R_4/R_{200} = 0.38

SF = 57.25

GF = 35.32

% Gravel = 35.32

% Sand = 57.25

% Silt & Clay = 7.43

% Clay = NA

CFEM: Sand and Gravel, trace Silt/Clay

Moisture Content (%): 9.07

GRAIN SIZE ANALYSIS

Project : 3113 - Stephenville, NL

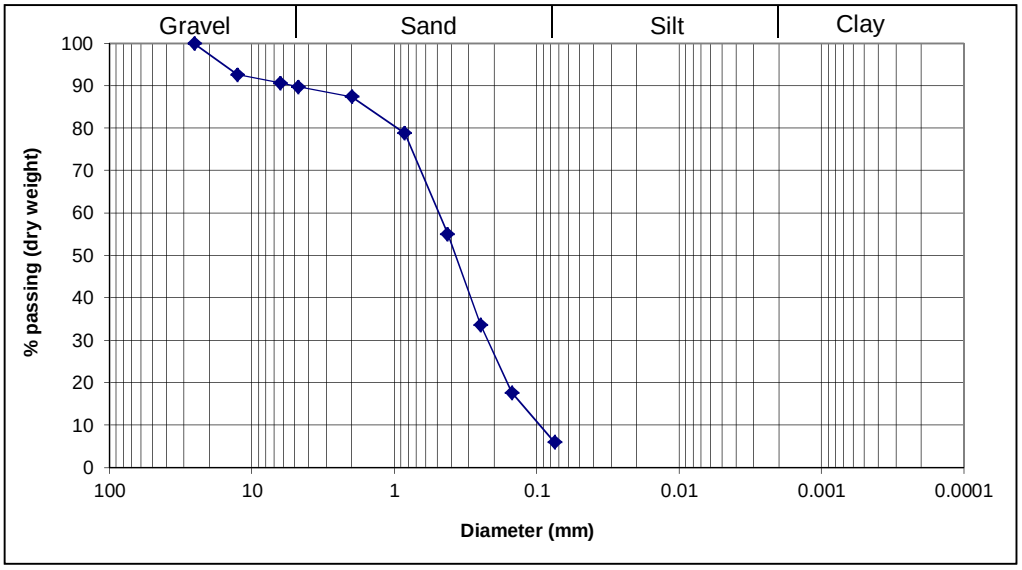
Sample No. : FHM9-SS5

Depth below GS : 3.90 - 4.66 m
(12.79 - 15.29 ft)

Sieve Analysis

Dry weight of sample (g) = 222.29

Sieve	Opening (mm)	Retained (g)	% Retained	Cumulative % Ret	% Passing
2	50.8	-	-		
1	25.4	0.00	0.00	0.00	100.00
1/2"	12.7	16.35	7.36	7.36	92.64
1/4"	6.35	4.31	1.94	9.29	90.71
4	4.76	1.93	0.87	10.16	89.84
10	2.00	5.24	2.36	12.52	87.48
20	0.85	19.10	8.59	21.11	78.89
40	0.425	52.94	23.82	44.93	55.07
60	0.25	47.42	21.33	66.26	33.74
100	0.15	35.68	16.05	82.31	17.69
200	0.075	25.89	11.65	93.96	6.04
pan	---	13.43	6.04	100.00	---
		222.29			



D_{10} = 0.093

D_{30} = 0.22

D_{60} = 0.49

Cu = 5.27

Cc = 1.06

USCS: SP-SM (Poorly graded sand with silt) or SP-SC (Poorly graded sand with clay)

R_{200} = 93.96

R_4 = 10.16

R_4/R_{200} = 0.11

SF = 83.80

GF = 10.16

% Gravel = 10.16

% Sand = 83.80

% Silt & Clay = 6.04

% Clay = NA

CFEM: Sand, some Gravel, trace Silt/Clay

Moisture Content (%): 17.25