

## Land Surveys Session



Photo Courtesy of Tulloch Engineering



## August 28 – morning Agenda:

- 1) Part A – Survey Plan Elements
- 2) Part B – Survey Report Elements
- 3) Using a Plan Scale Introduction & Exercises
- 4) Part C – Plan Review Exercises



# Review of Survey Plan Elements:

## PART A:

What are the to 2 basic parts/components  
*(not the types)* of ANY survey plan?

1. Title Block
2. Diagram



# 1. Title Block

- National Standards for the Surveys of Canada Lands  
*(effective January 19, 2015)*
- General Instructions for Surveys of Canada Lands,  
e-Edition *(effective 2004 to 2015)*



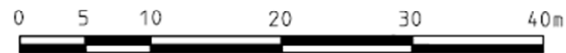
# National Standards Chapter 2: Survey Plans (Section 2.2.3)

- Title of the Plan
- Purpose
- Location  
Name of Reserve  
Province

PLAN OF SURVEY OF LOTS 366 TO 372 AND 373 (ROAD)  
TZEACHTEN INDIAN RESERVE NO. 13  
NEW WESTMINSTER DISTRICT  
BRITISH COLUMBIA  
B. C. G. S. 92H. 011

- Scale Bar

SCALE: 1: 500 (METRIC)



ALL DISTANCES ARE IN METRES  
AND ARE HORIZONTAL GROUND

- Scale statement

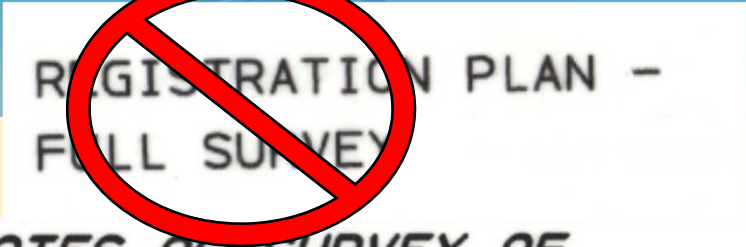
THE INTENDED PLOT SIZE OF THIS PLAN IS 864 mm  
IN WIDTH BY 560mm IN HEIGHT (D SIZE) WHEN  
PLOTTED AT A SCALE OF 1: 500.

THIS SURVEY WAS EXECUTED FROM APRIL 17, 2018  
TO MAY 7, 2018 BY K. M. POWER B. C. L. S. , C. L. S.

- Date(s) of field survey
- Name of Surveyor



# Title Block (continued):



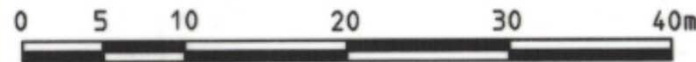
- Title of the Plan
- Purpose
- Location:  
Name of Reserve  
Province

PLAN AND FIELD NOTES OF SURVEY OF  
LOTS 259-27 TO 259-59 AND 259-60 (ROAD)  
TZEACHTEN INDIAN RESERVE NUMBER 13  
NEW WESTMINSTER DISTRICT  
BRITISH COLUMBIA

B. C. G. S. 92H. 011

- Scale Bar

SCALE: 1: 500 (METRIC)



ALL DISTANCES ARE IN METRES  
GROUND LEVEL AND EXPRESSED IN METRES

*No scale statement  
(plotting scale) required by  
the General Instructions  
(e-Edition)*

THIS SURVEY WAS EXECUTED FROM MARCH 25, 2013  
TO MAY 1, 2013 BY K. M. POWER B. C. L. S., C. L. S.

- Date(s) of field survey
- Name of Surveyor

*Example for Plan prepared under the  
General Instructions (e-Edition)*



# Title Block (continued): Legend



## LEGEND:

- Bearing Statement

BEARINGS ARE NAD83 (CSRS) UTM GRID DERIVED FROM DIFFERENTIAL CARRIER PHASE GNSS OBSERVATIONS AT GCP1 AND GCP2 AND ARE REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 10 (123°).

- Unit of measurement

THIS PLAN SHOWS THE HORIZONTAL GROUND LEVEL DISTANCES IN METRES. TO COMPUTE GRID DISTANCES MULTIPLY GROUND LEVEL DISTANCES BY THE AVERAGE COMBINED SCALE FACTOR OF 0.99967375.

- Explanation of symbols used

- STANDARD B. C. L. S. IRON POST FOUND
- STANDARD B. C. L. S. IRON POST PLACED
- △ HUB PLACED
- OLD PATTERN DOMINION IRON POST FOUND

B. C. G. S. DENOTES BRITISH COLUMBIA GEOGRAPHIC SYSTEM

— LANDS DEALT WITH BY THIS PLAN BOUNDED THUS

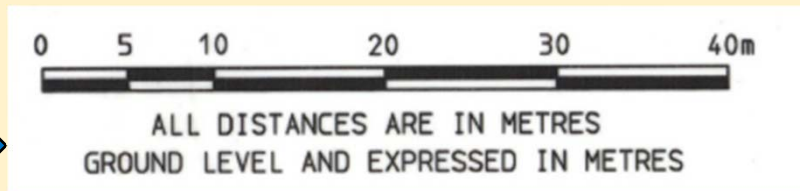
Explanation of abbreviations



# Title Block (continued): Legend



Unit of measurement




Bearing Statement

**LEGEND:**

BEARINGS ARE NAD83 (CSRS) UTM GRID DERIVED FROM THE BEARING 88°23'06" BETWEEN STANDARD IRON POSTS ALONG THE NORTHERLY BOUNDARY OF LOT 259-25 (ROAD) PLAN 100567 C. L. S. R. AND ACCORDING TO THAT PLAN THE BEARINGS WERE DERIVED FROM DIFFERENTIAL CARRIER PHASE GPS OBSERVATIONS REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 10 (123°). TO COMPUTE GRID DISTANCES MULTIPLY GROUND-LEVEL DISTANCES BY THE MEAN COMBINED SCALE FACTOR OF 0.99967126.

Explanation of symbols used

- STANDARD B. C. L. S. IRON POST FOUND
- STANDARD B. C. L. S. IRON POST PLACED
- B. C. G. S. DENOTES BRITISH COLUMBIA GEOGRAPHIC SYSTEM
- (c) CALCULATED
- REM. DENOTES REMAINDER
- NF DENOTES NO EVIDENCE FOUND
-  LANDS DEALT WITH BY THIS PLAN BOUNDED THUS

Explanation of abbreviations





# Title Block(continued): Statements



RE: SECTION 38, CANADA LANDS SURVEYORS REGULATIONS  
CERTIFIED CORRECT

Digitally signed by Power,  
Mitchell  
DN: c=CA, o=GC, ou=NRCAN-  
RNCAN, cn=Power, Mitchell  
Date: 2018.05.17 20:39:15  
'-07'00



Statement of  
Responsibility

Digitally signed by  
Brebner, Andrew  
Date: 2018.06.08  
'11:38:28 -06'00

Department of Natural Resources  
Surveyor General Branch  
Section 31, Canada Lands Surveys Act

APPROVED

Manager, Cadastral Services  
West & North

Approval of Surveyor  
General Branch

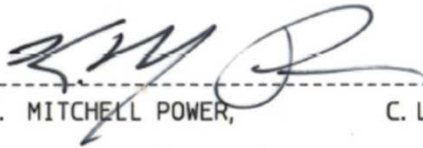
FILE No. SM8210-08058  
PROJECT No. 2018-10-017  
CHECKLIST NUMBER: 5658


Example for Plan prepared under the  
National Standards



# Title Block (continued): Statements

RE: SECTION 38, CANADA LANDS SURVEYORS REGULATIONS  
CERTIFIED CORRECT  
ON THE 21st DAY OF AUGUST, 2013.


  
K. MITCHELL POWER, C. L. S., B. C. L. S.



Statement of  
Responsibility

DEPARTMENT OF NATURAL RESOURCES, CANADA  
RE: SECTION 31, CANADA LANDS SURVEYS ACT  
AND FRAMEWORK ACCORD (FEBRUARY 2007)

APPROVED

  
ANDREW BREINER, C.L.S. DATE  
Sep 5, 2013

HEAD, CADASTRAL SERVICES,  
WESTERN REGION,  
SURVEYOR GENERAL BRANCH

FILE No. SM8210-08058  
PROJECT No. 2014-10-242  
2

Approval of Surveyor  
General Branch

Example for Plan prepared under the  
General Instructions (e-Edition)



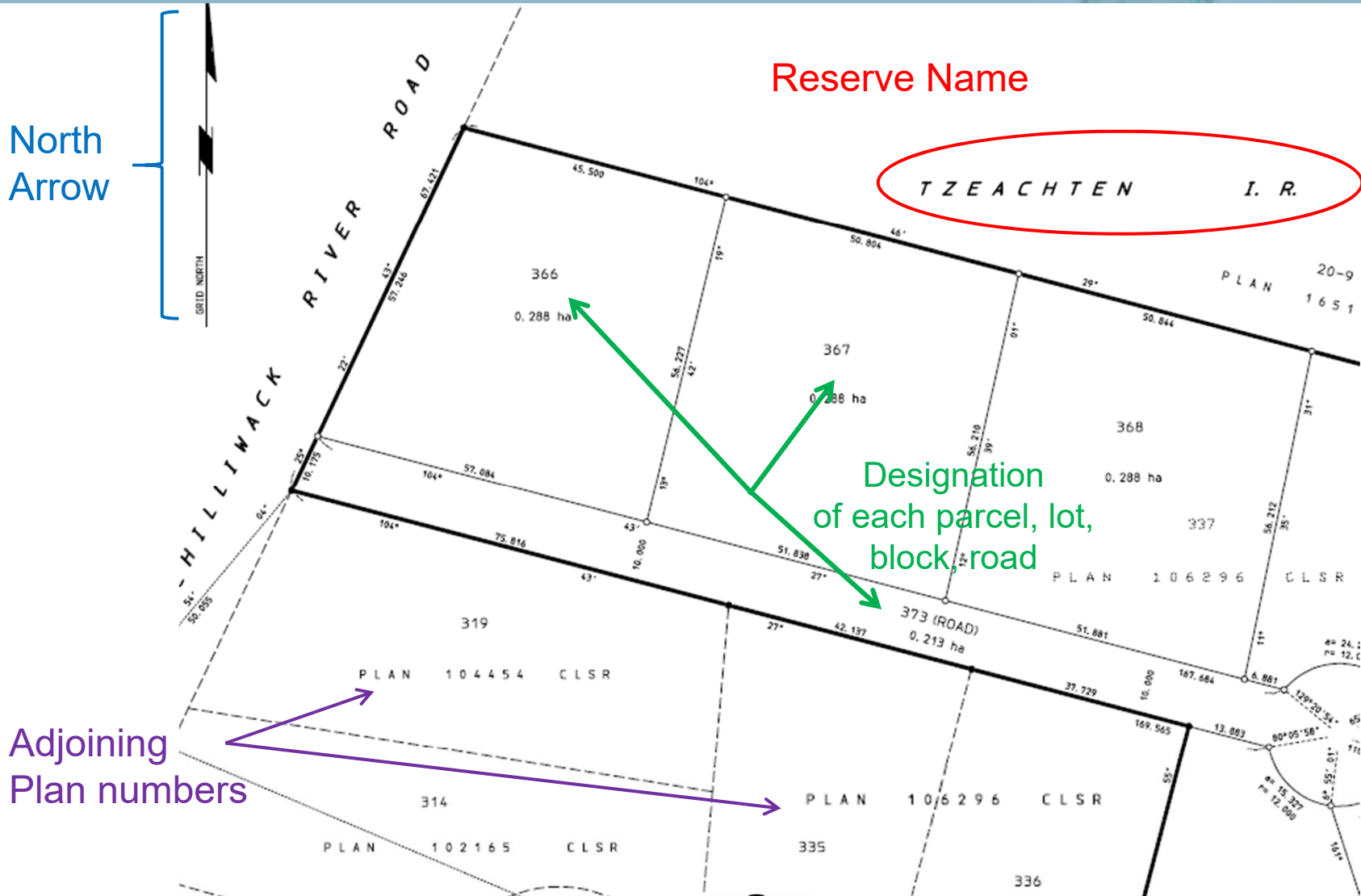


## 2. Diagram

- National Standards for the Surveys of Canada  
Lands



# National Standards Chapter 2: Survey Plans (Section 2.2.4)



Example for Plan prepared under the National Standards



# National Standards Chapter 2: Survey Plans (Section 2.2.4)

## Evidence:

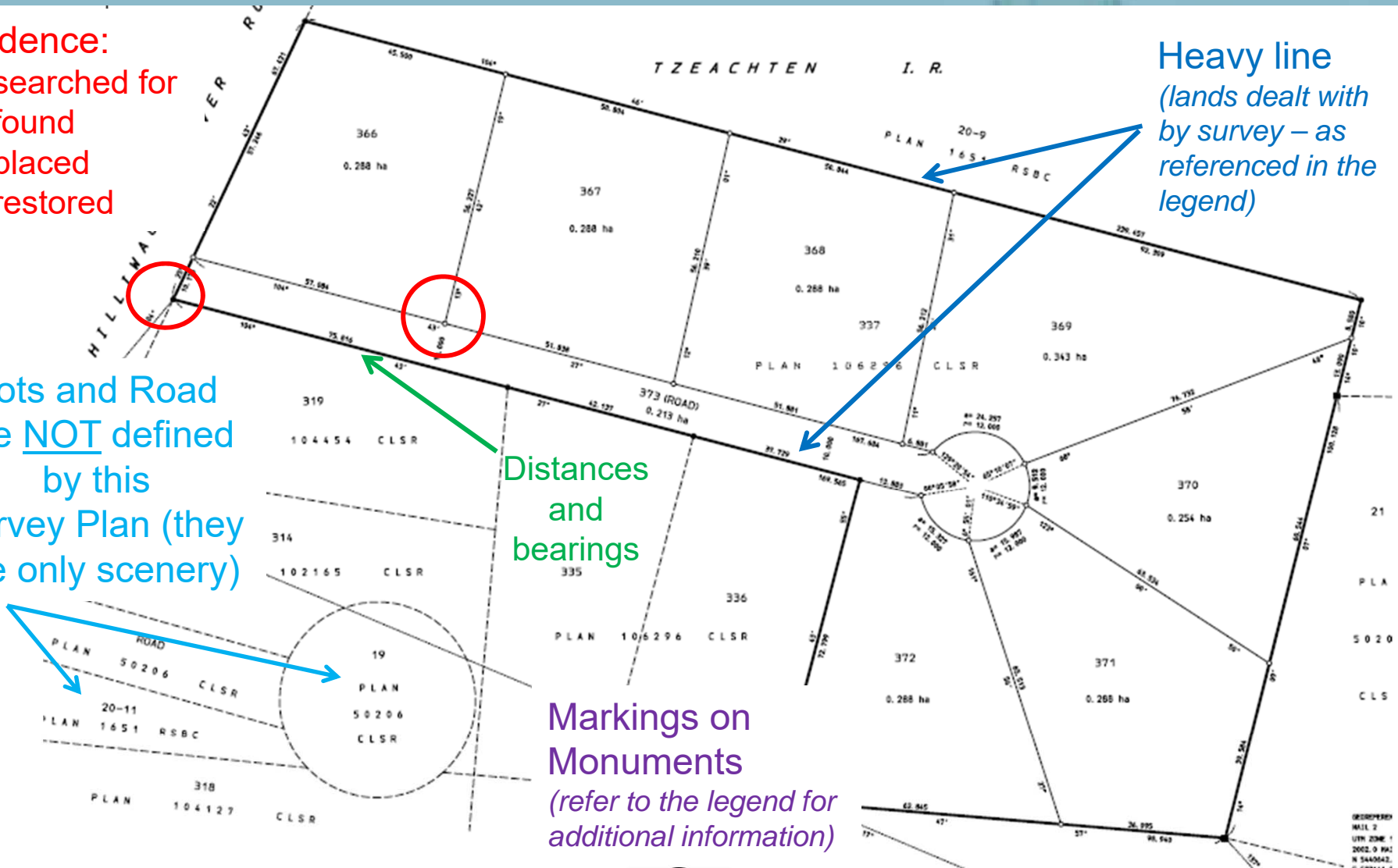
- searched for
- found
- placed
- restored

Heavy line  
(lands dealt with  
by survey – as  
referenced in the  
legend)

Lots and Road  
are NOT defined  
by this  
Survey Plan (they  
are only scenery)

Distances  
and  
bearings

Markings on  
Monuments  
(refer to the legend for  
additional information)



Example for Plan prepared under the  
National Standards



## National Standards Chapter 2: Survey Plans (Section 2.2.4)

A galvanized square iron bar that:

- is no less than 1.2 cm across any face
- at least 75 cm long



Photo courtesy of: BC Surveyor General Branch Office



## National Standards Chapter 2: Survey Plans (Section 2.2.4)



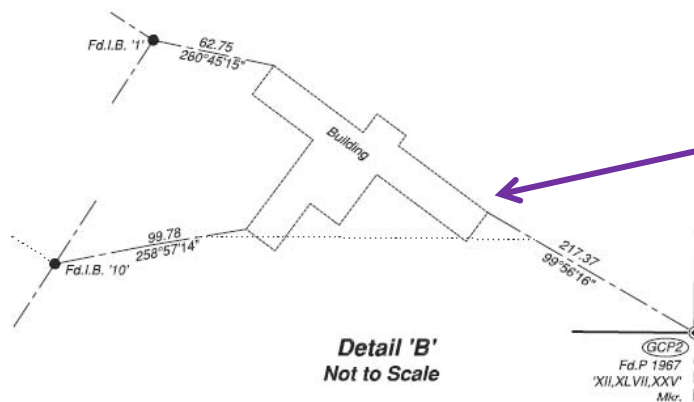
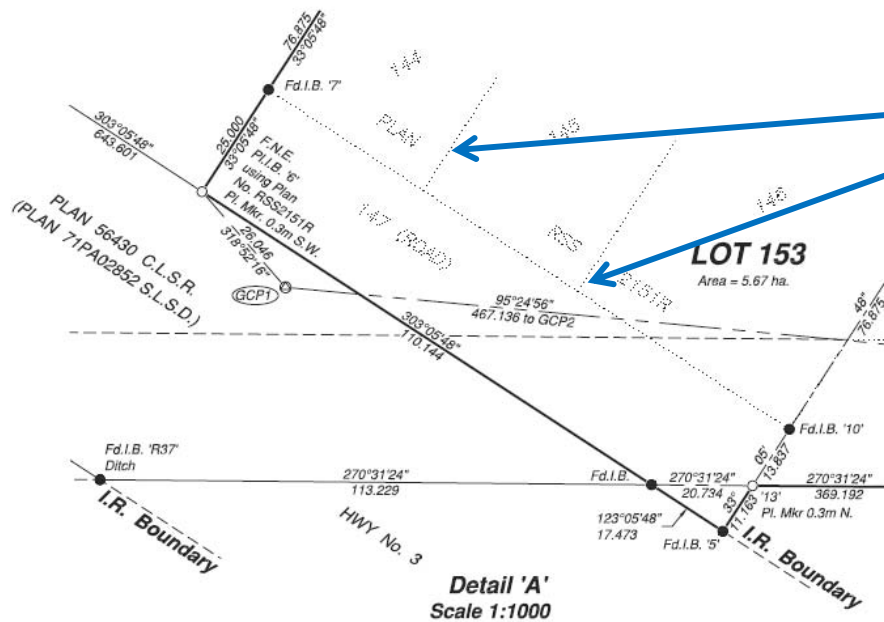
*Example for Plan prepared under the*  
**National Standards**



Photo courtesy of: BC Surveyor  
General Branch Office

# National Standards Chapter 2: Survey Plans (Section 2.2.4)

Phantom boundaries of parcels being subdivided or consolidated



Features (natural or man-made)

Example for Plan prepared under the National Standards





# Review of Survey Report Elements:

## PART B:

What information does a  
Survey Report contain?  
Is it important?



# National Standards Chapter 4: Survey Reports

- Circumstances and actions taken if the surveyor was unable to comply with the National Standards, Survey Instructions or other requirements of the survey
- Information that is not evident on the plan:
  - How monuments were restored or re-established
  - Access to the parcels
  - Discrepancies with previous surveys and how they were addressed
  - Any survey problems encountered and how they were dealt with
- Copies of plans or documents that are not of public record
- Imagery/photographs of water boundaries

A Survey Report is not required if there is nothing more to report (*than what is currently shown on the plan*), unless the Survey Instructions specifically require one or the survey includes a natural boundary.

- The Survey Report is certified and recorded in the CLSR as a field book.



## Survey Reports *(prior to the National Standards)*:

- Similar requirements to the current National Standards, but also included:
  - Contacts with local officials and the reasons for the contacts
  - Name of the person requesting the survey, reason for the survey and the type of transaction
  - The type of terrain, access to the site, or weather conditions which affected the execution of the survey.
- The General Instructions (preceding the General Instructions e-Edition), did not require the survey report to be recorded in the CLSR.
  - As of 2008 – The survey report is to be signed and dated.
    - If they were intended to be recorded in the CLSR, they had to be certified and sealed.
- Required a survey report to be prepared, even if there was nothing to report on.

“If a surveyor believes there is nothing to report, then a report stating this should be submitted by the surveyor.”



# National Standards Chapter 4: Survey Reports

TO COMPLETE THE COORDINATES, DISTANCES SHOULD BE REDUCED TO SEA LEVEL AND THE PROJECTION PLANE BY MULTIPLYING A COMBINED SCALE FACTOR OF 0.99958991.

ALL MONUMENTS PLANTED DURING THE COURSE OF THIS SURVEY ARE MARKED WITH 1604. THEY ARE ALSO MARKED WITH UNIQUE POINT NUMBERS AS SHOWN ON THE PLAN.

ALL SET AND FOUND MONUMENTS ARE ACCOMPANIED BY A METAL POST OR WOOD MARKER SET NOT MORE THAN 0.3m AWAY UNLESS NOTED OTHERWISE.

AREAS ARE IN HECTARES, AND CAN BE CONVERTED TO ACRES BY MULTIPLYING BY 2.4711.

SUPPORT INFORMATION FOR THIS SURVEY IS CONTAINED IN A SURVEY REPORT RECORDED UNDER FIELD BOOK NUMBER FB 41791 (C.L.S.R.)

SURVEY MONUMENT FOUND	■
SURVEY MONUMENT PLANTED	□
SHORT STANDARD IRON BAR (2.5cm x 2.5cm x 60cm long)	SSIB
STANDARD IRON BAR (2.5cm x 2.5cm x 120cm long)	SIB
IRON BAR (1.5cm x 1.5cm x 60cm long)	IB
IRON BAR (2.5cm x 2.5cm x 15cm long)	RB
CLS STANDARD POST IN CONCRETE MONUMENT (SHORT)	P.CM
HORIZONTAL CONTROL MONUMENT	HCM
NO VISIBLE MARKINGS	NVM
NO MONUMENT MARKER SET	NM
FOUND NO EVIDENCE	FNE
LANDS DEALT WITH BY THIS PLAN BOUNDED THUS	—————
RIGHTS-OF-WAY (UTILITY) DEALT WITH BY THIS PLAN BOUNDED THUS	——— ——— ———
PLANTED MONUMENT UNIQUE STAMPED NUMBER	①
SURVEY TIES SHOWN THUS	-----


Field book number  
Assigned to the  
Survey Report

*Example for Survey Report prepared under the  
National Standards*



# National Standards Chapter 4: Survey Reports


CANADA LANDS SURVEYS RECORDS ARCHIVES D'ARPENTAGE DES TERRES DU CANADA	
<b>FB 41791</b>	
DATE: 2017-12-11	

## SURVEY REPORT

**Description:** Lot 30 (Utility Access Road), Lot 31 (Utility Access Road), Lot 32 (Utility Access Road) and Right of Way (Utility) over Part of Lot 30, Part of Lot 32, Part of 20.117m Wide Road as Shown on Plan RD4410 (C.L.S.R.) and Part of the Unsurveyed Portion of The Henvey Inlet Indian Reserve No. 2

SGB Project Number: 201714165  
SM Number: SM8206-06170  
Region of Survey: Ontario  
Location of Survey: (06170) Henvey Inlet Indian Reserve No. 2  
Type of Survey: Parcel Survey

Digitally signed by Truchon, Melissa Date: 2017.12.12 10:04:47 -05'00	Certified Correct 
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December 2017  
TULLOCH Project #: 17-3542-39

*Example for Survey Report prepared under the National Standards*



# National Standards Chapter 4: Survey Reports



**TULLOCH**

Pattern Energy  
Transmission Line and Access Road  
Survey Report

**TRANSMISSION LINE AND ACCESS ROAD SURVEY REPORT AND  
SUPPLEMENTARY FIELD NOTES**

*SGB Project Number: 201714165  
SM Number: SMS206-06170  
Description: Transmission Line and Access Road  
Region of Survey: Ontario  
Location of Survey: (06170) Henvey Inlet Indian Reserve No. 2  
Type of Survey: Parcel Survey  
Instructions Issued to: Mel Truchon OLS, CLS, Tulloch Geomatics Inc.*

This plan was prepared to allow for the lease of lands by Henvey Inlet Wind LP within the Henvey Inlet Indian Reserve No. 2 for the purposes of a transmission line and access road.

Additional field notes of the survey have been prepared separately from the plan and are appended to this report in Appendix A. Included in the field notes is one page containing calculations pertaining to the re-establishment of 4 monuments from Plan 98696. There were some discrepancies with the underlying plans and the calculation sheets address the methods of re-establishment for these monuments.

Monuments S8 and S5 from Plan 98696 CLSR were found in good condition and measurements between them were found to agree very well with the underlying plan. Monument S7 was found bent and subsequently removed and re-established. Monument S6 was found leaning south east and was re-established as part of the survey. The five monuments that were found in the area for the access road (RD4410) appear to be located easterly of where the measurements on Plan 98696 CLSR indicate. These monuments are fairly consistent with one another in terms of their east-west location. There are discrepancies with the plan in this area; however, the overall distance between R11 and R15 (bent and restored) is consistent with the plan and R13 does in fact fall on the line between S8 and the re-established location of S6. Monuments R11, R13, R12, R15 and R10 were deemed to be in their original location and accepted. Being as the dimensions on the plan between S8 and R13 and between R12 and S6 appear to be incorrect, monument S7 was re-established by setting the distance from S8 and S6 was re-established by setting the bearing from S5 to intersect the re-established bearing from the south.

In re-tracing the boundaries of Access Road shown on Plan RD4410, many monuments were missing between monument R12 (RD4410) and R15 (98696 CLSR). The measurements shown on Plan 98696 CLSR were compiled from Plan R.S.O. 6664R. Plan R.S.O. 6664R did not find any evidence associated with the access road shown on RD4410. In calculating between the original monument R12 (RD4410) and monument R15 (98696 CLSR) a large discrepancy was found with a misclosure of 5.475 at 24°04'27". The bearings and distances throughout this area

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Project # 17-3542-39  
December 2017

Page 1



The reason of the survey

Where additional field notes can be found

*Example for Survey Report prepared under the  
**National Standards***

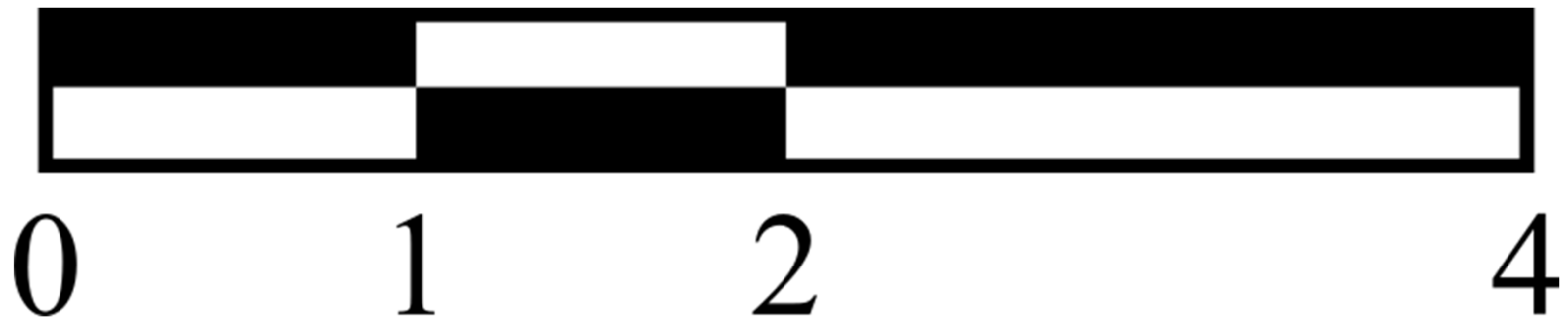


# Plan Measurements and Scales:



## Using a Plan Scale:

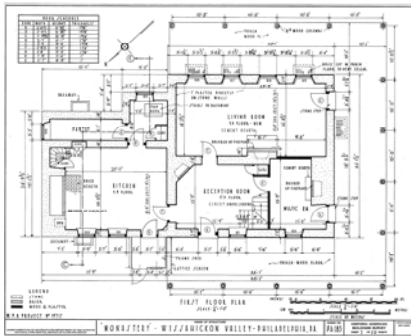
- Introduction
- Exercises



# Plan Measurements and Scales:

## Plan Scale:

### Drawing Measurements



Compared to

### Real World Measurements



**1** drawing unit =  
**X** real world units

**1** : **X**

1 metre = 1 metre





## Plan Measurements and Scales

A drawing scale of **1 : 100** means

**1** equals **100**  
**drawing unit** **real world units**

For survey plans, it can be units of metres

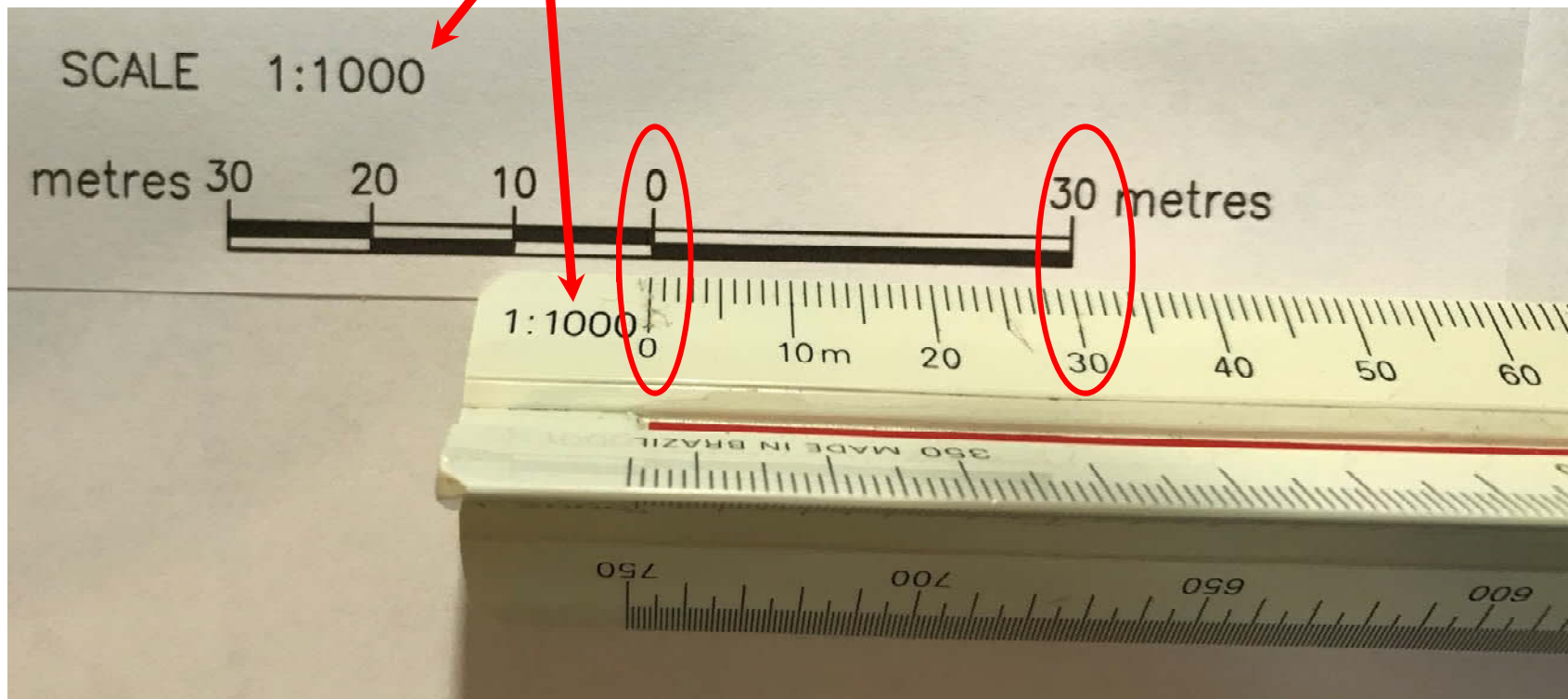
Whereby:

**1 drawing unit** equals **100 metres** on the  
ground



# Plan Measurements and Scales:

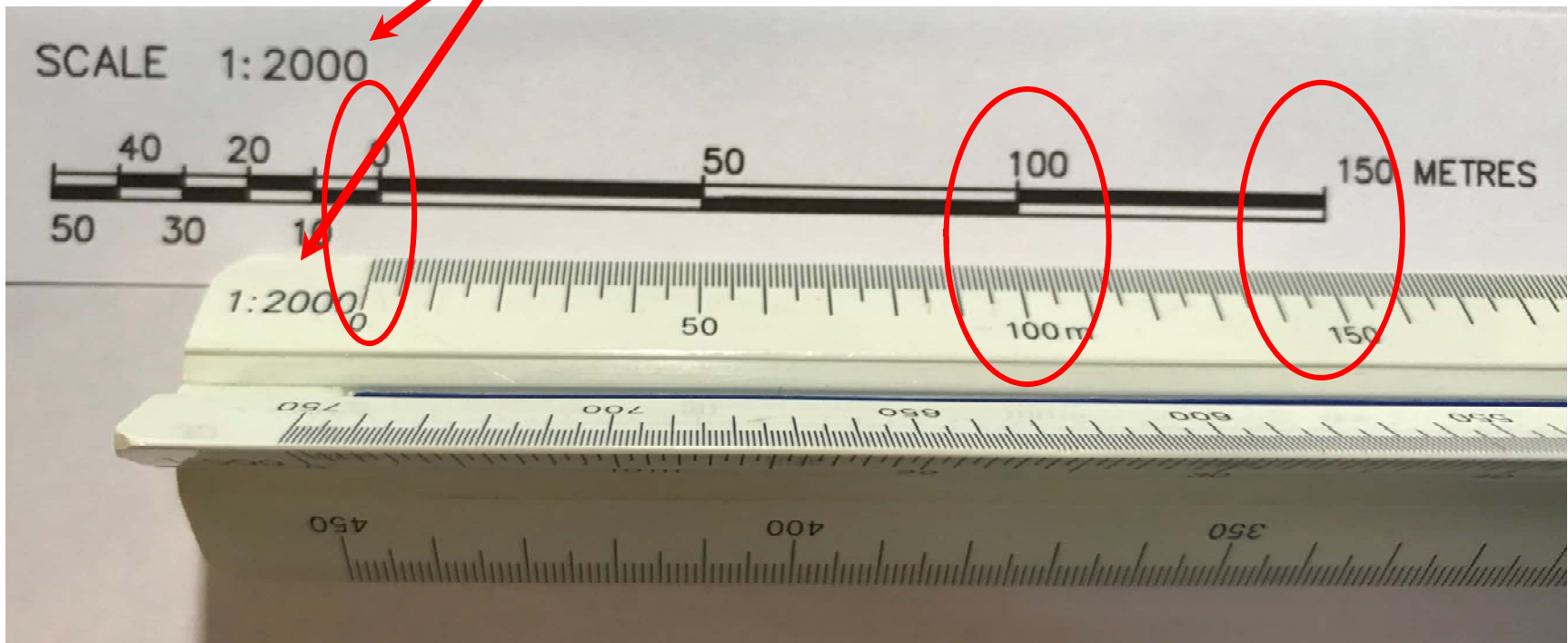
Examples: 1:1000



# Plan Measurements and Scales:

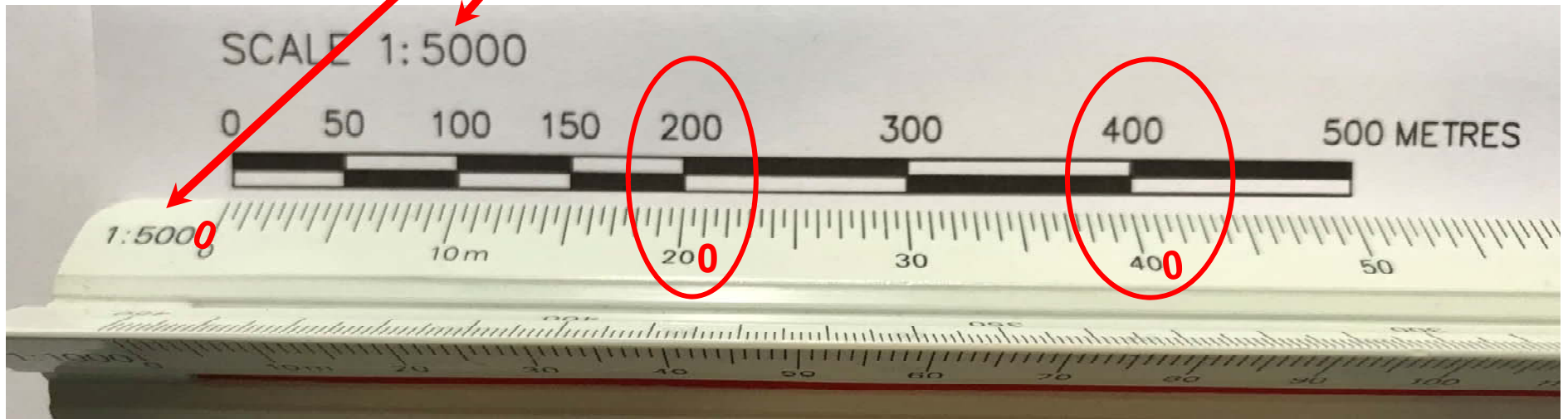
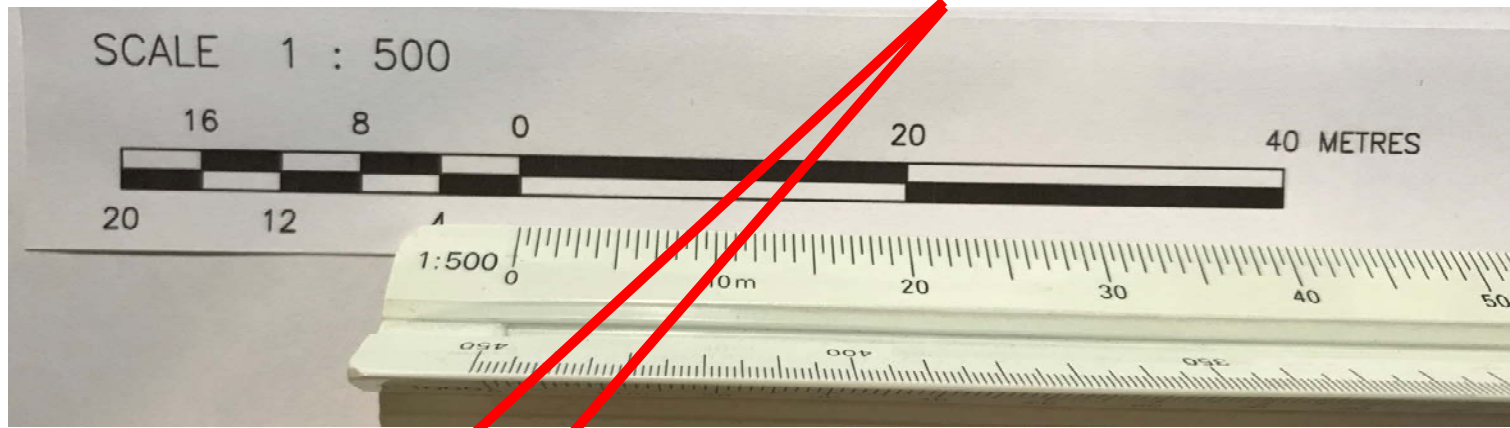


Examples: 1:2000

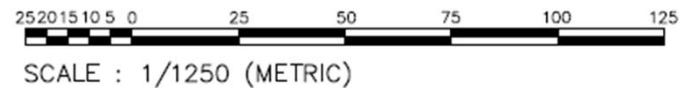
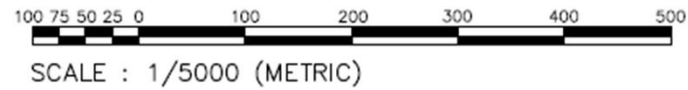
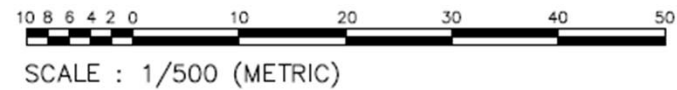
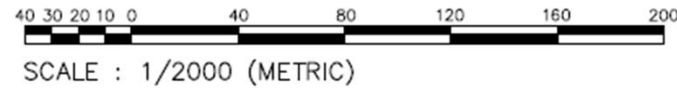
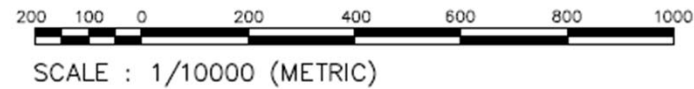
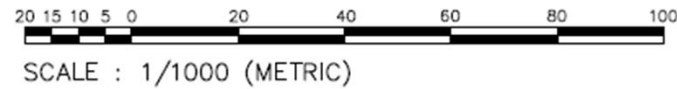


# Plan Measurements and Scales:

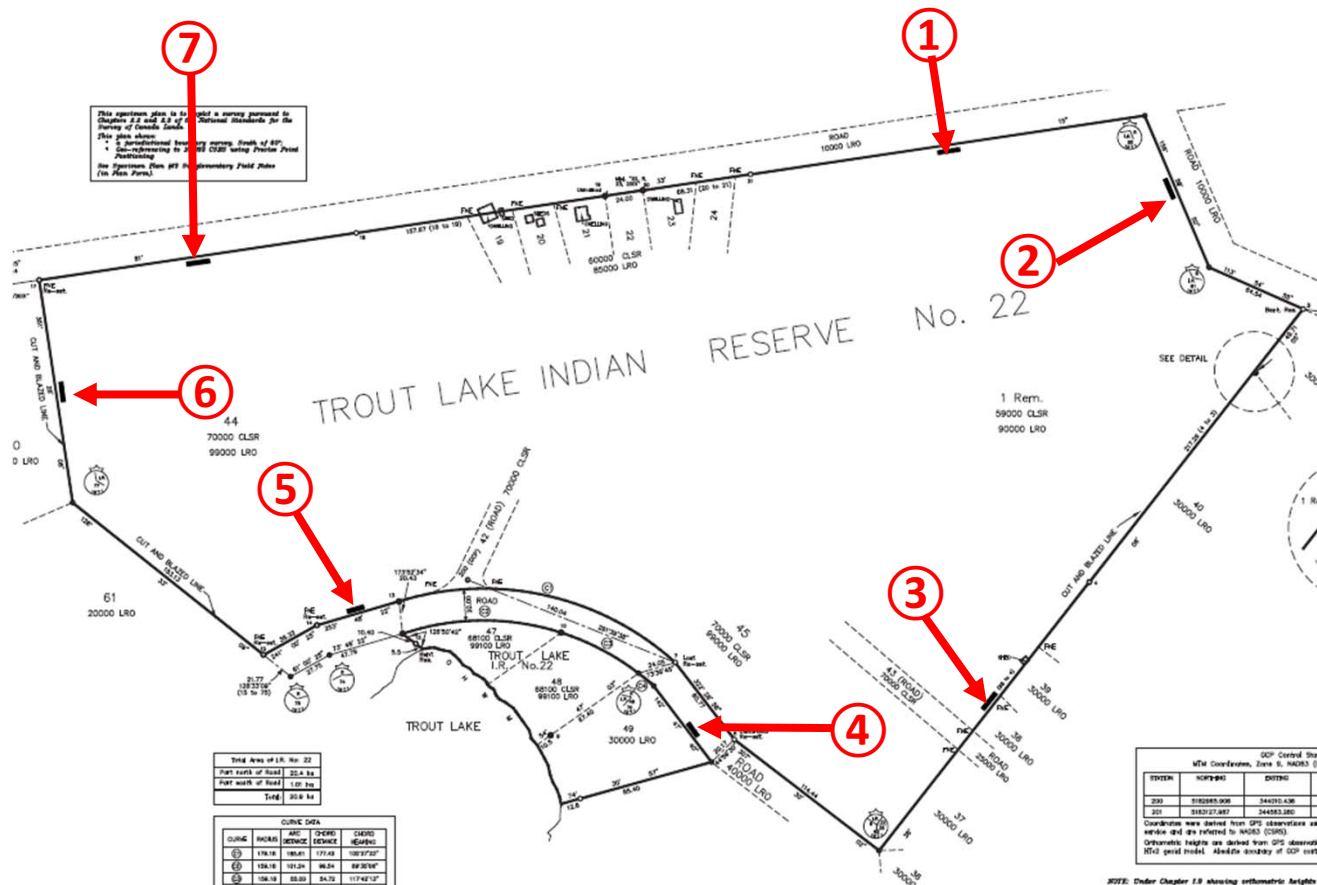
Examples: 1:500 & 1:5000



# Plan Measurements and Scales:



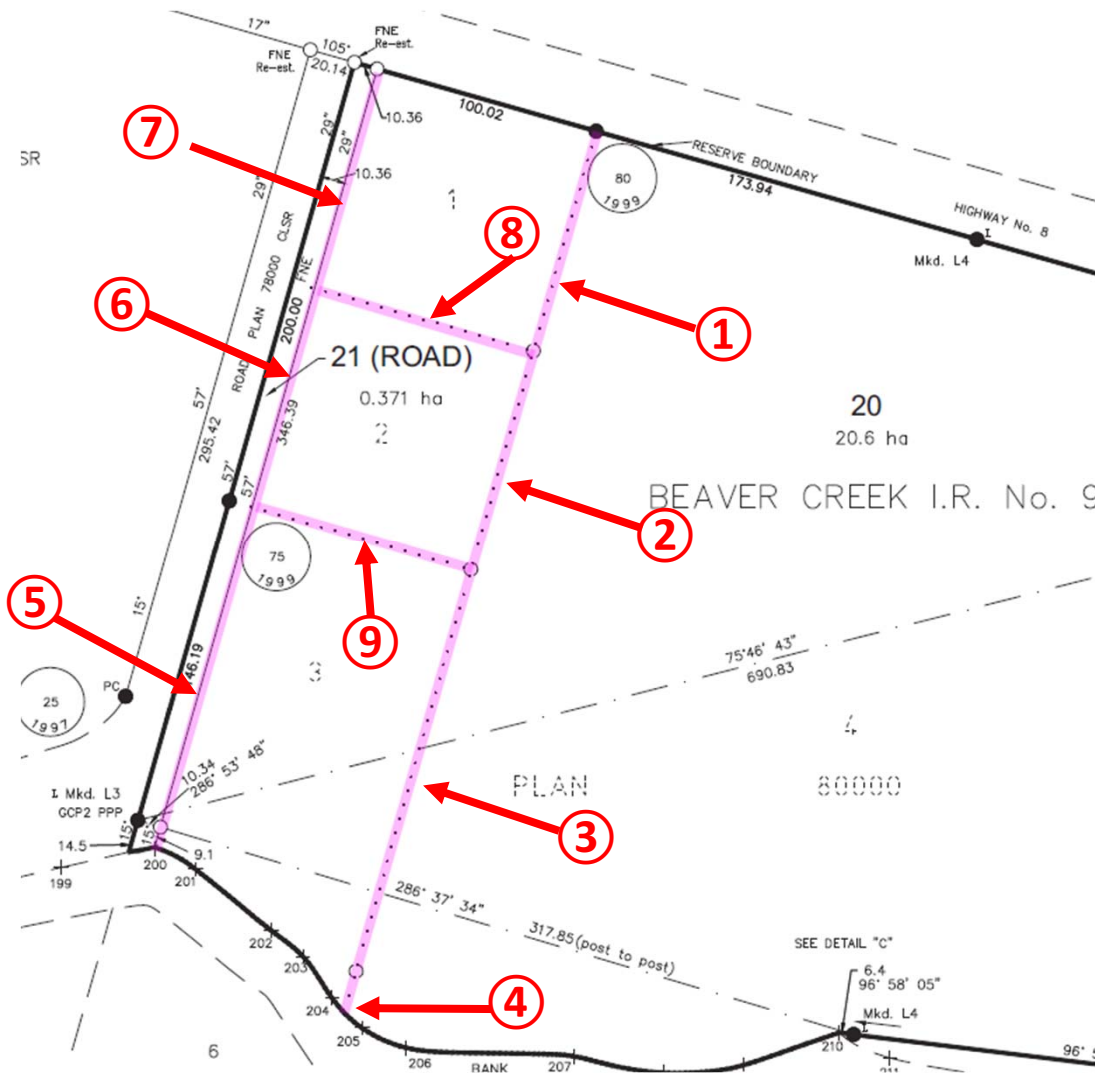
# Scale Exercise 1:



- Using Plan 1:
- Provide missing dimensions (*to the nearest metre*) for the boundaries of the plan
  - Check the plotting of the plan:
    - Scale bar
    - Measurement on the plan



# Scale Exercise 2(a):

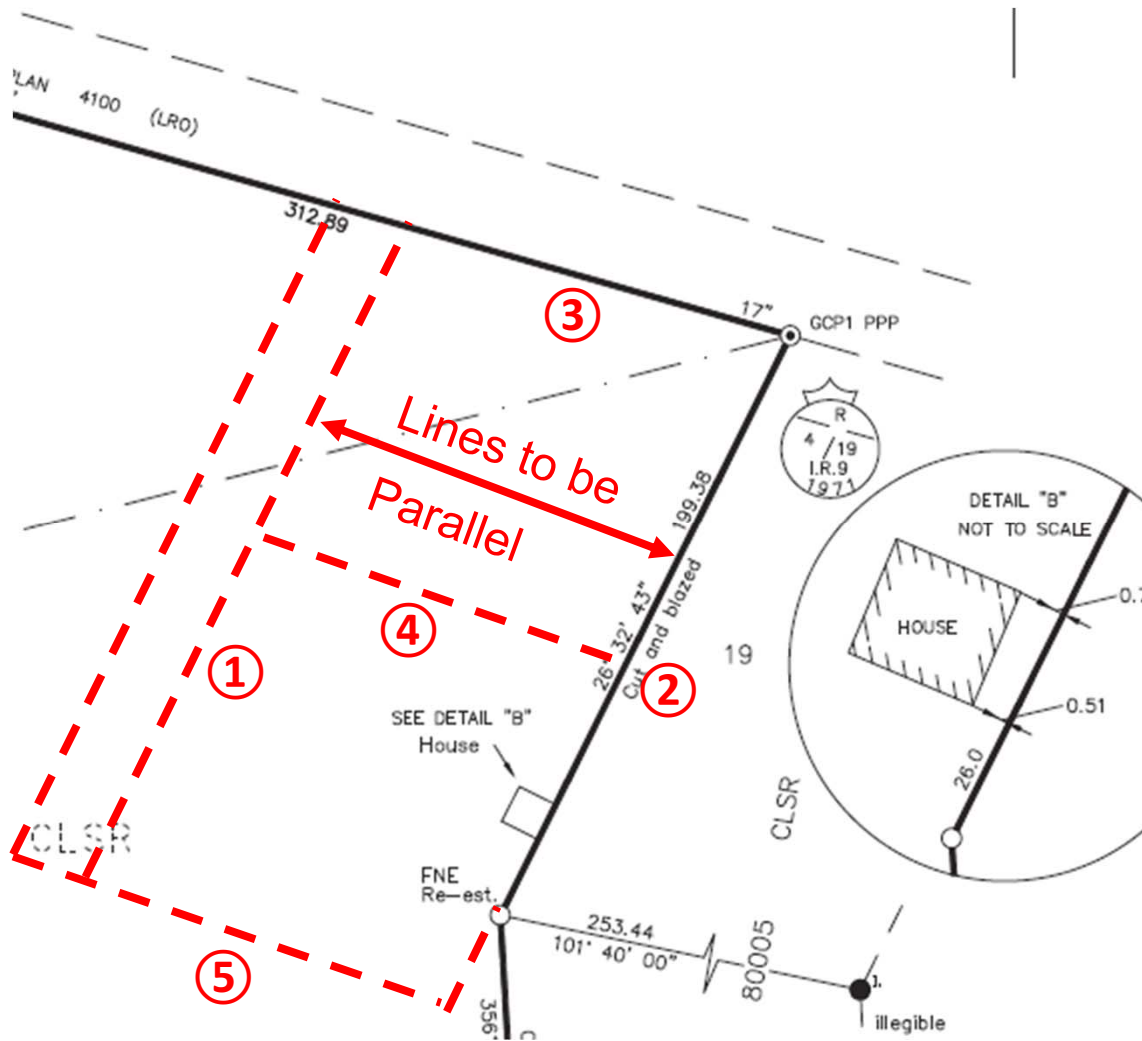


## Using Plan 2:

- Provide dimensions *(to the nearest metre)* for the boundaries of Lots 1, 2 and 3 *(measurements are from/to the centre of each monument/line)*
- Don't forget to check the plotting of the plan first – is it to scale?



# Scale Exercise 2(b):



## Using Plan 2:

(a) Draw 2 100m x 100m Lots:

- where the east & west (②, ①) boundaries of the Lots are parallel with each other

- where the north & south (③, ④, ⑤) boundaries of the lots are parallel with each other

(b) Draw a 20m wide access Road for the 2 Lots.





Review of Survey Plan Types:

**PART C:**

# Survey Plan Review Exercises

