

Land Surveys Session



Photo Courtesy of Tulloch Engineering



August 21 – 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)

A COPY OF THIS PLAN HAS BEEN FILED
IN THE SASKATCHEWAN LAND SURVEYS
DIRECTORY AS:
NUMBER 102275377

CANADA LANDS SURVEYS RECORDS
ARCHIVES D'ARPENTAGE DES TERRES DU CANADA
107052
DATE: 2018-03-29

**PLAN OF SURVEY OF
LOT 153
SUPERSEDING LOTS 144 TO 147 (INCLUSIVE)
PLAN RSS 2151R
IN
N.E. 1/4 SEC. 12 & S.E. 1/4 SEC. 13
Tp. 47 - R. 25 - W2M.,
AND A PORTION OF A
ROAD ALLOWANCE
WITHIN
MUSKODAY FIRST NATION INDIAN RESERVE 99
FIRST NATION LAND MANAGEMENT AREA
PROVINCE OF SASKATCHEWAN**

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

- Scale Bar
- Scale statement

Scale 1: 5000



(The plot size that will provide true scale and optimum readability for this plan is 508.0 by 584.2 mm.)

THIS SURVEY WAS EXECUTED BETWEEN THE DATES OF NOVEMBER 23rd
AND 28th, 2017

BY: DARREN P. PATKAU, C.L.S., S.L.S.

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

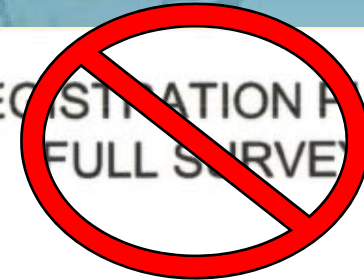
Example for Plan prepared under the
National Standards



Title Block (continued):

CANADA LANDS SURVEYS RECORDS
102138
August 20, 2013

REGISTRATION PLAN -
FULL SURVEY



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

Plan and Field Notes of Survey of
Lots 264, 265, 266, 267 (Access Road), 268 and 269
Within Whitecap Indian Reserve No. 94
In N.W. 1/4 Sec. 30, Tp. 33, R. 5, W3M.
First Nations Land Management Area
Province of Saskatchewan

Scale: 1:1000

- Scale Bar



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

This survey was executed during the period August 31st, 2012 to
February 23rd, 2013 by Calvin W.A. Bourassa, 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

- Explanation of symbols used

- GPS Control Monuments (0.015m x 0.457m iron bar) established are shown thus 
- Found Provincial Pattern standard iron bars are shown thus 
- Found CLS standard post 
- Placed Provincial Pattern standard iron bars are stamped with company identifier "S002" and are shown thus 
- Traverse lines are shown thus 
- Lands dealt with by this survey are bounded thus 
- Buildings are shown bounded thus 
- Planted Iron Bars are stamped with a unique number as indicated on the plan diagram.

- Unit of measurement

- Distances shown are horizontal at general ground level and are expressed in metres and decimals thereof.
- Combined scale factor to reduce ground level distances to UTM grid distances is 0.9995500.

- Bearing Statement

- Bearings are UTM grid, derived from the calculated bearing $95^{\circ} 24' 56''$ between GPS stations GCP1 and GCP2, and are referenced to the central meridian 105° west longitude, UTM Zone 13.
- Real-Time Kinematic GPS observations were used to determine all measurements of this survey.

- Explanation of abbreviations

- Geo-referenced coordinates shown in "TABLE 1 - CONTROL MONUMENTS" have been derived by utilization of the Canadian Spatial Reference System (CSRS) Precise Point Positioning (PPP) service of Natural Resources Canada. Static carrier phase GPS observations at control station GCP1 have been post-processed through the PPP service to determine an estimated absolute position for GCP1 & GCP2 at better than 0.10m with respect to CSRS.
- Key Plan obtained from National Topographic System (NTS) map sheets (073H04).
- RSS stands for Regional Survey Standard.
- S.L.S.D. stands for Saskatchewan Land Surveys Directory.

Example for Plan prepared under the National Standards



Title Block (continued): Legend



Bearing Statement [Green text, bracketed to the first line of the legend]

Unit of measurement [Blue text, arrow pointing to the second line of the legend]

Explanation of abbreviations [Purple text, arrow pointing to the third line of the legend]

Explanation of symbols used [Red text, bracketed to the last two lines of the legend]

LEGEND


- : Bearings are UTM grid derived from the calculated bearing 172°15'44" between Fd.I.B. 424 and Fd.I.B. 420 and are referred to the central meridian of UTM zone 13 (105°) NAD 83 (CSRS) datum.
- : Distances shown are horizontal at general ground level and are in metres and decimals thereof.
- : GPS observations were used to derive part of this survey.
- : To compute UTM coordinates, distances must be reduced to the projection plane by multiplying by the combined scale factor 0.999698.
- : The Unique Identifier of S064 has been stamped on all established standard iron posts.
- : GPS Tie Lines are shown thus — — — — —
- : Lands dealt with by this plan are outlined with a bold line, shown thus —————
- : Fence is shown thus —x—x—x—

Placed Found

Provincial Iron Post - Ø 0.020 x 0.760, with square top ○ ← ● ←



Title Block(continued): Statements

Digitally signed by Patkau, Darren Date: 2018.03.26 '09:28:43 -06'00				RE: Section 38, Canada Lands Surveyors Regulations CERTIFIED CORRECT		Statement of Responsibility
Digitally signed by Brebner, Andrew Date: 2018.03.27 '13:50:29 -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	
Meridian Surveys Ltd.	A-S17299-CLS.dwg kb/dpp	Project No: 201712131 File No: S17299	A.C.L.S. Checklist # 5523A			

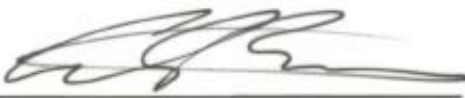
Example for Plan prepared under the
National Standards




Title Block (continued): Statements

RE: Section 38, Canada Lands Surveyors Regulations
CERTIFIED CORRECT


On the 25th day of July, 2013


Calvin W.A. Bourassa, C.L.S., S.L.S., P.Surv.


ASSOCIATION OF CANADA LANDS SURVEYORS
ASSOCIATION DES ARPENTEURS DES TERRES DU CANADA
Calvin W.A. Bourassa
Comm. No. 1798

Department of Natural Resources
RE: Section 31, Canada Lands Surveys Act
and Framework Accord (February 2009)

APPROVED


ANDREW BLESNER, CLS
Surveyor General or designate
MANAGER, CADASTRAL SERVICES
Surveyor General Branch

Aug 19, 2013
Date

Project : 201212122
File : SM8208 - 06556
Checklist : 1610A

Statement of
Responsibility

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

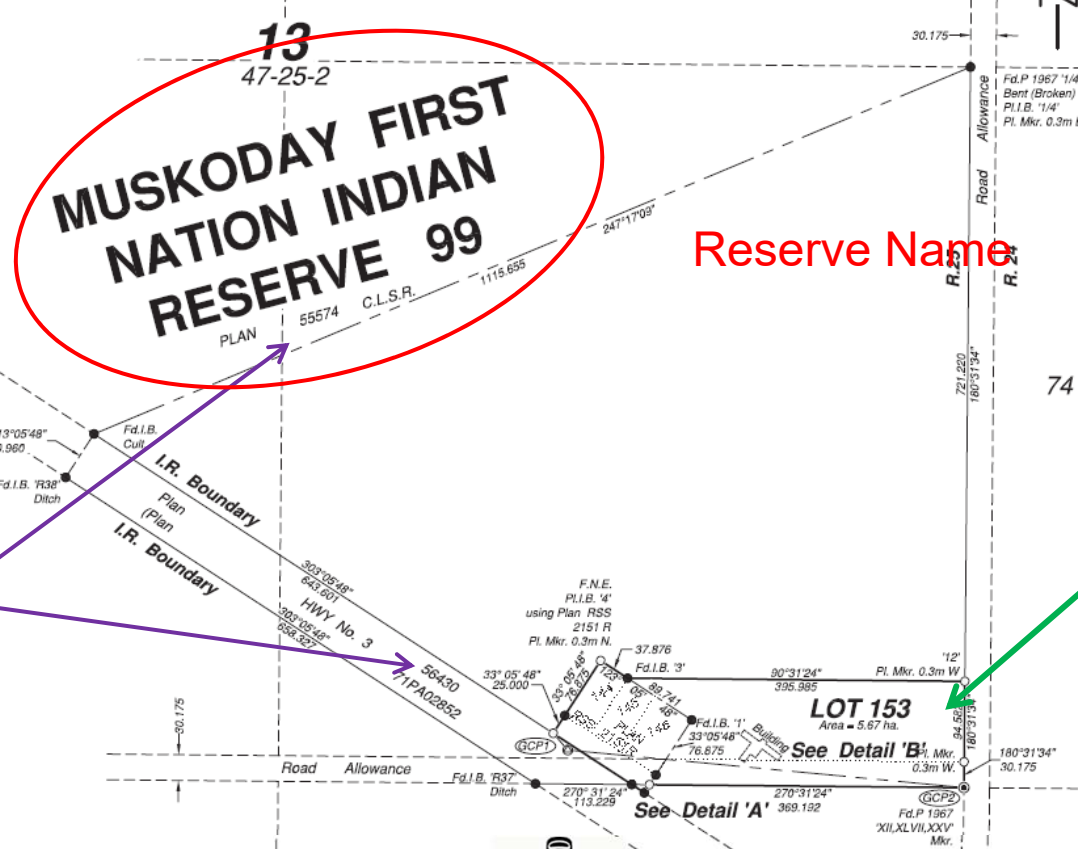
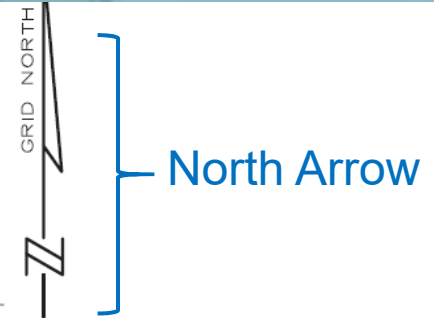


National Standards Chapter 2: Survey Plans (Section 2.2.4)

TABLE 1 - CONTROL MONUMENTS

NAD83 (CSRS)(1997.0) UTM Zone 13 - C.M. = 105°

PT. NUMBER	NORTHING (m)	EASTING (m)	LATITUDE	LONGITUDE	ORTHOMETRIC ELEVATION (m) (CGVD28 HTv2.0)	COMBINED SCALE FACTOR
GCP1	5,883,063.650	463,280.046	53°05'44.7428"	105°32'54.1467"	449.256	0.9995498
GCP2	5,883,019.782	463,744.888	53°05'43.4311"	105°32'29.1390"	444.073	0.9995502



Reserve Name

Adjoining Plan numbers

Designation of each parcel, lot, block, road

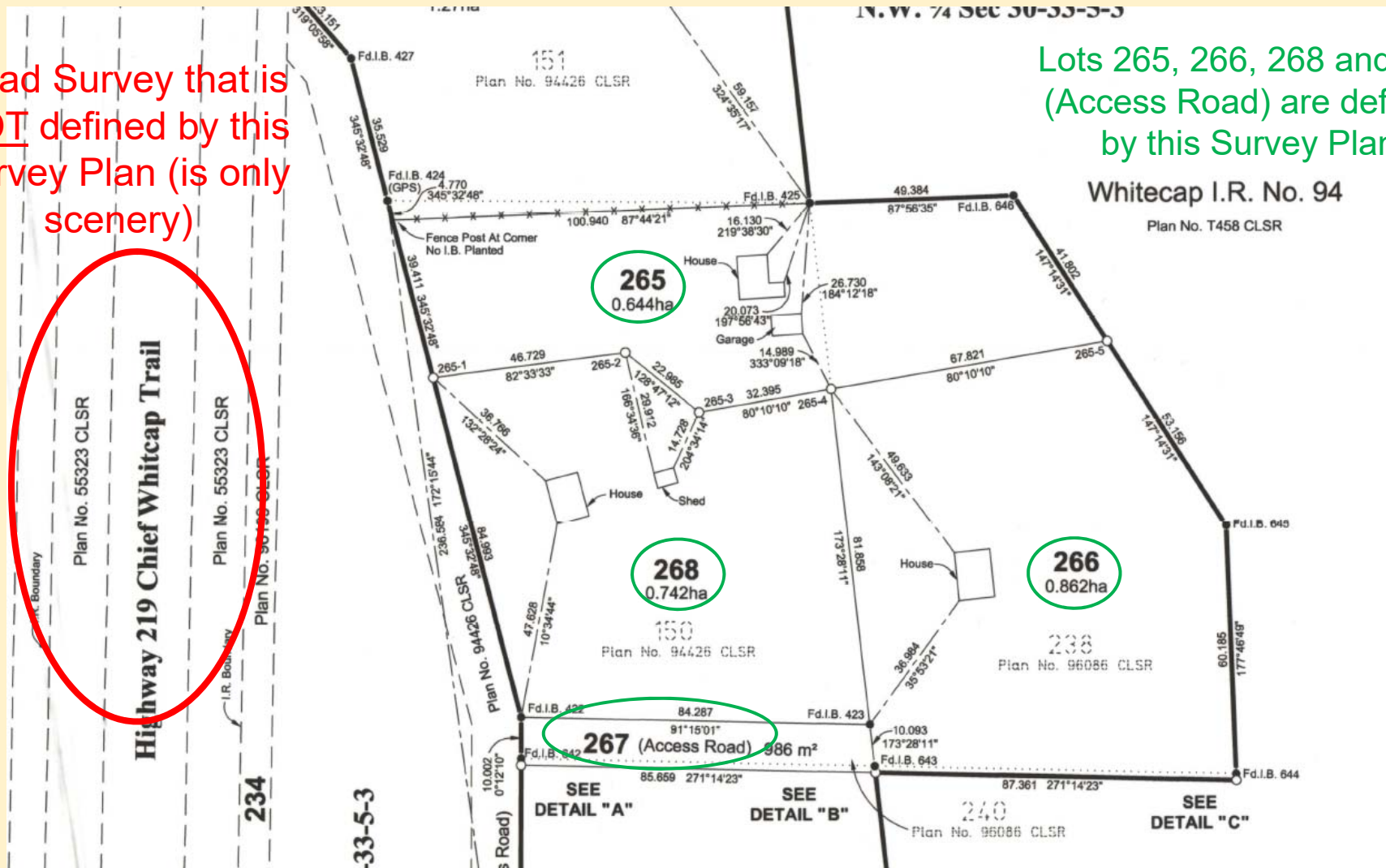
Example for Plan prepared under the National Standards



General Instructions and National Standards Requirements:

Road Survey that is NOT defined by this Survey Plan (is only scenery)

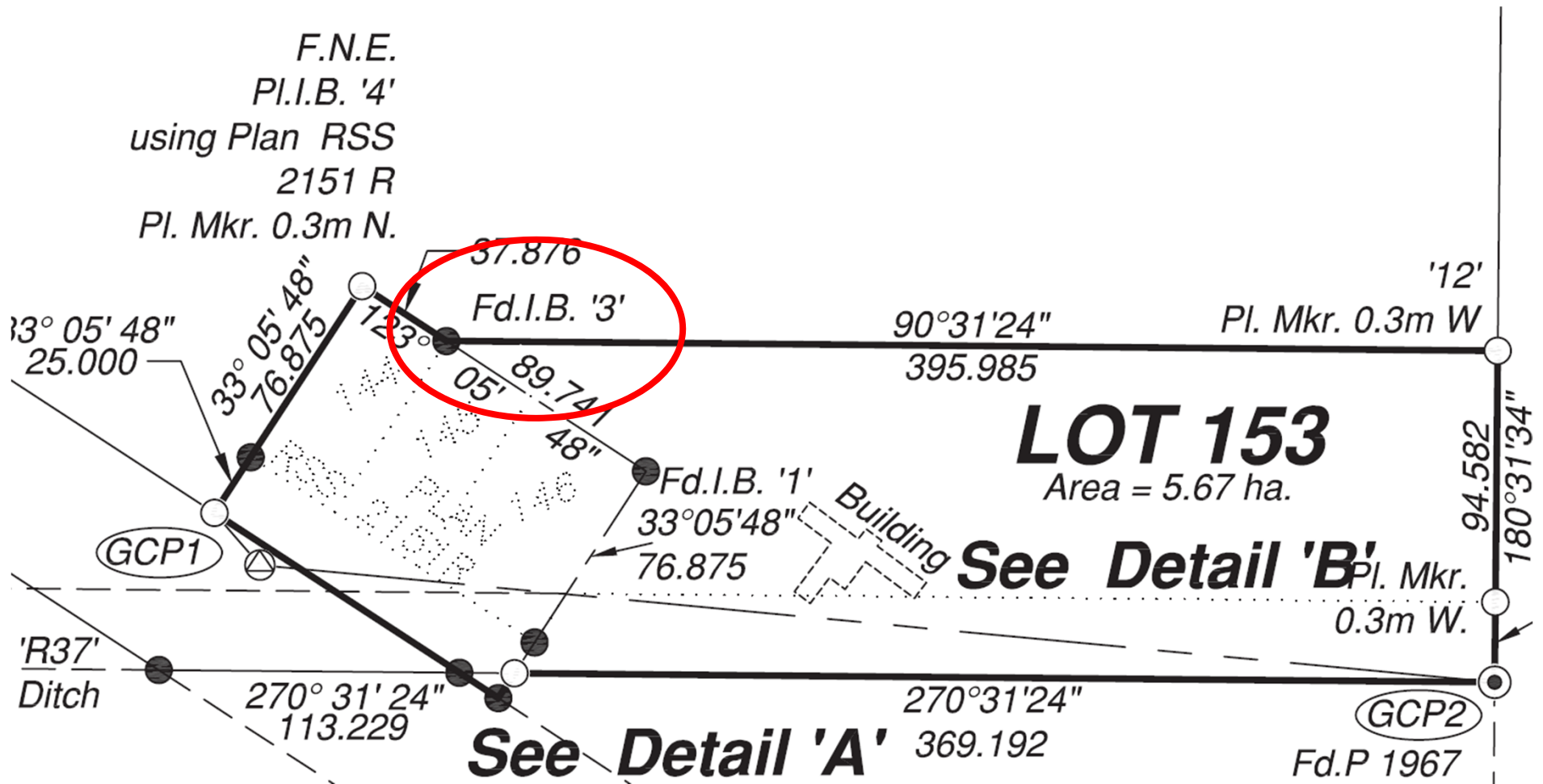
Lots 265, 266, 268 and 267 (Access Road) are defined by this Survey Plan



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



National Standards Chapter 2: Survey Plans (Section 2.2.4)



Example for Plan prepared under the
National Standards



Saskatchewan Standard Iron Bar:

A round post of solid iron that:

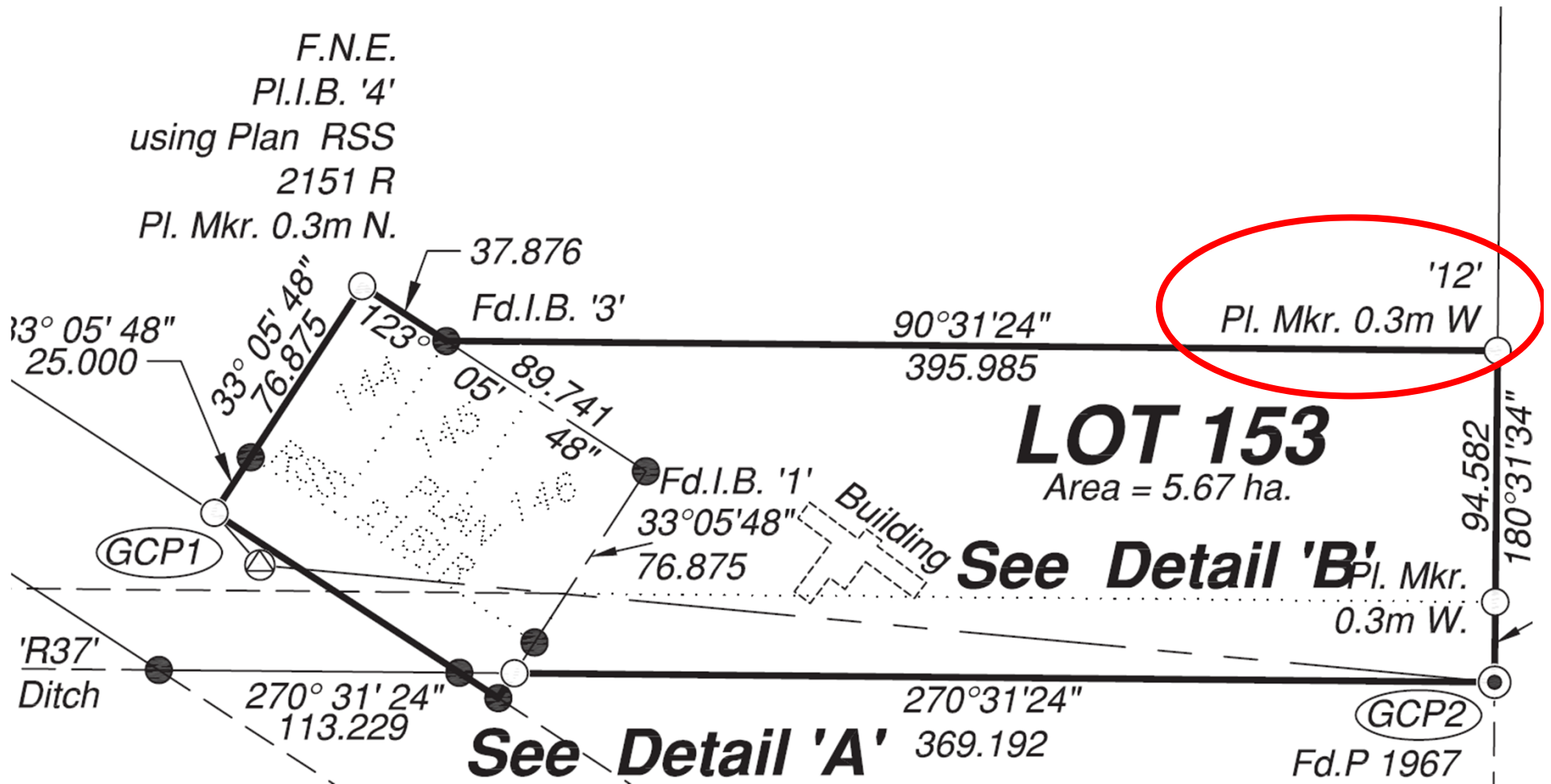
- is 2 cm nominal diameter
- at least 76 cm long
- Has a point at 1 end
- Has a top at least 15cm long and 2 cm nominal square



Photo curtesy of: Calvin Bourassa - Altus Group



National Standards Chapter 2: Survey Plans (Section 2.2.4)



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



Marker Post:



Photo courtesy of: Calvin Bourassa - Altus Group



Marker Post:

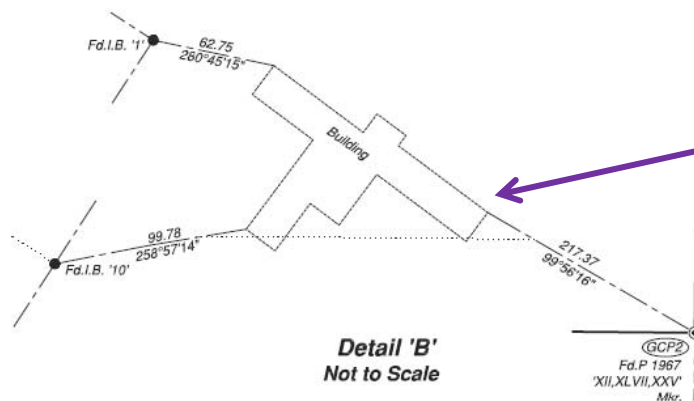
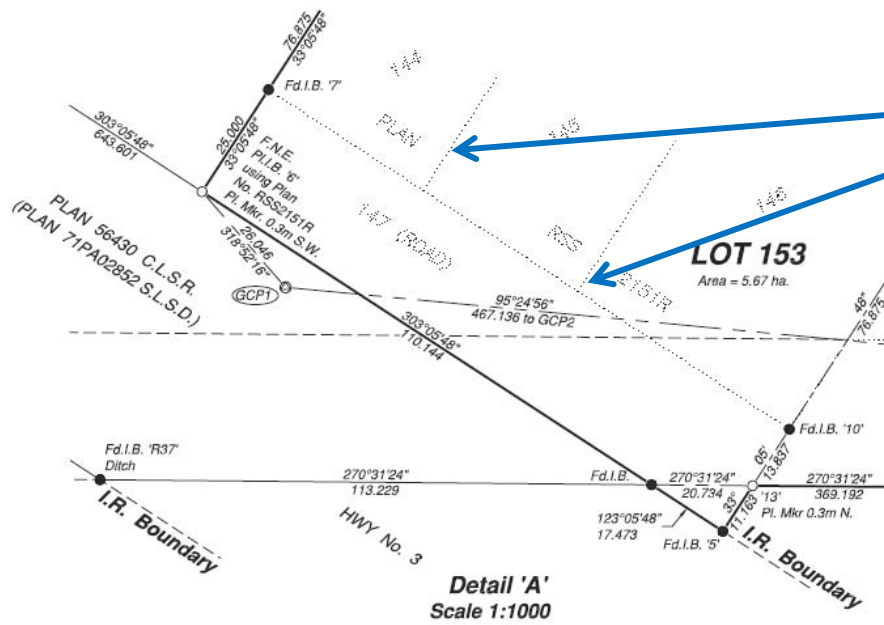


Photo courtesy of: Calvin Bourassa - Altus Group



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	
FB 41791	
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

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

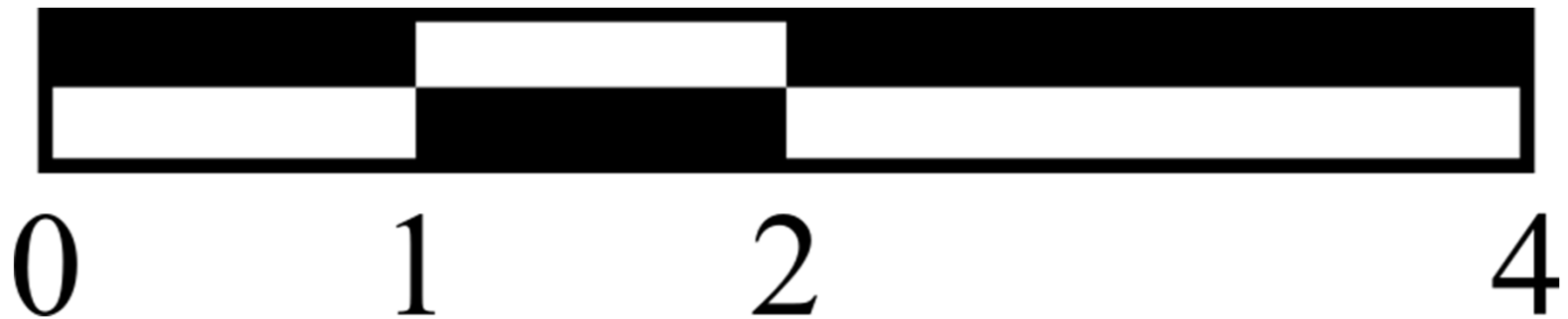


Plan Measurements and Scales:



Using a Plan Scale:

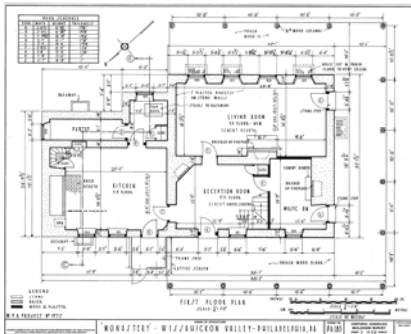
- Introduction
- Exercises



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

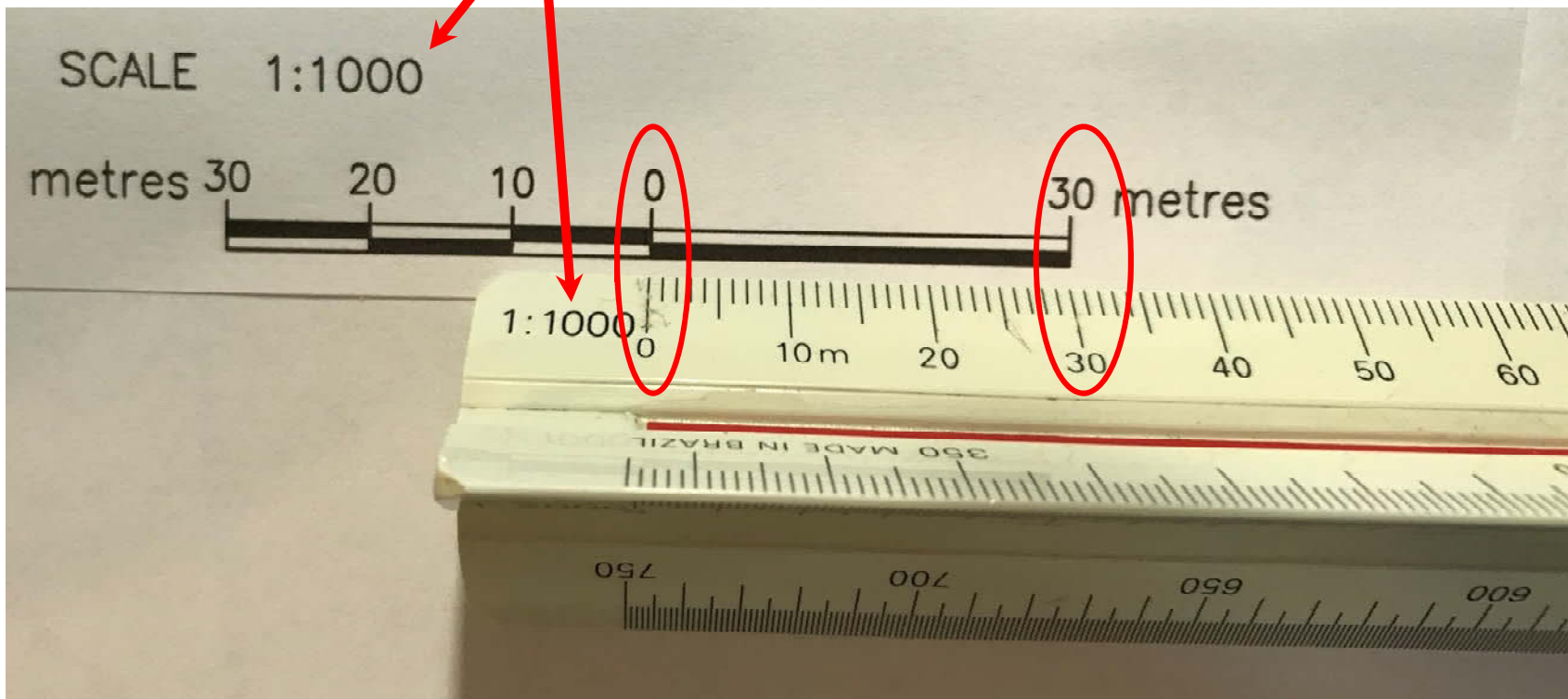
Whereby:

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



Plan Measurements and Scales:

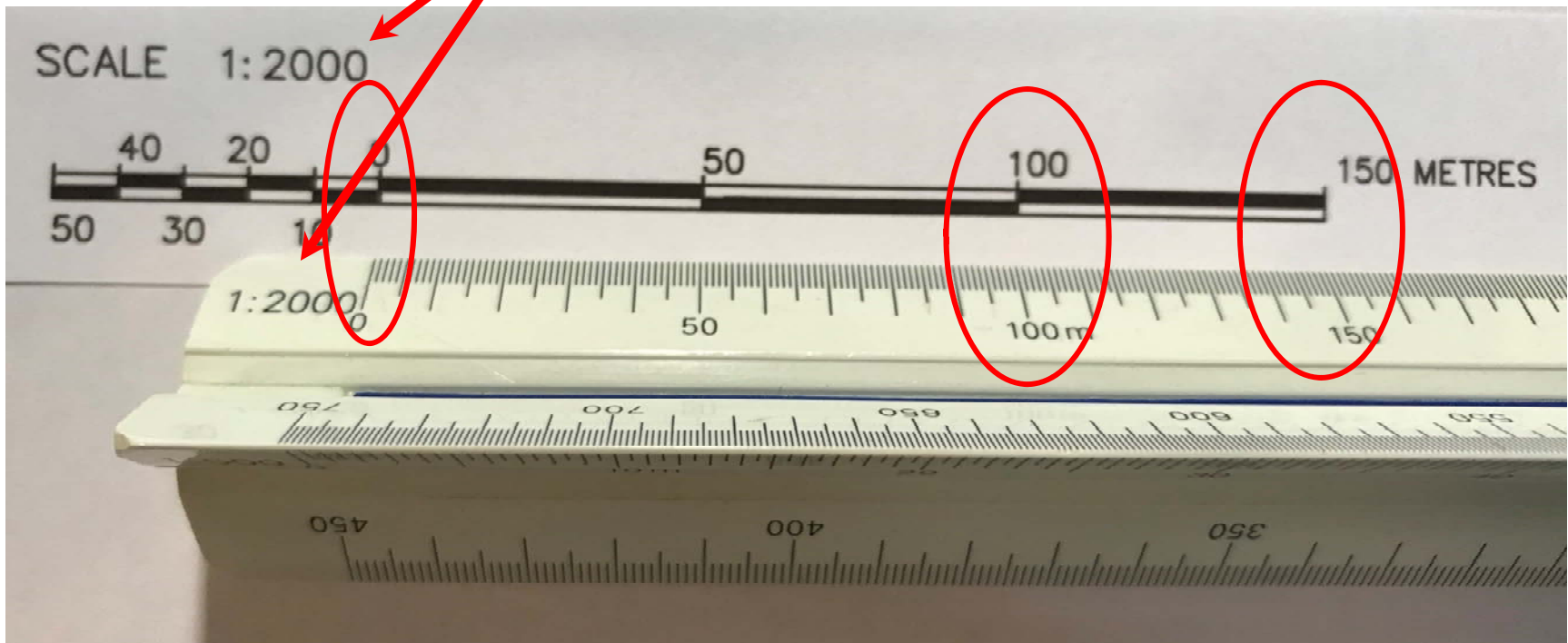
Examples: 1:1000



Plan Measurements and Scales:

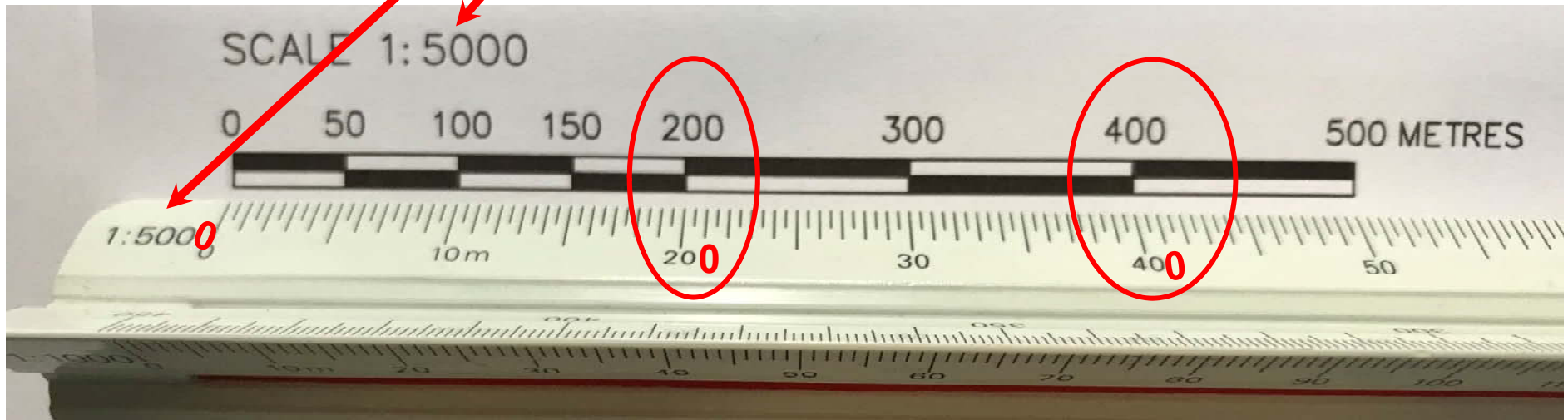
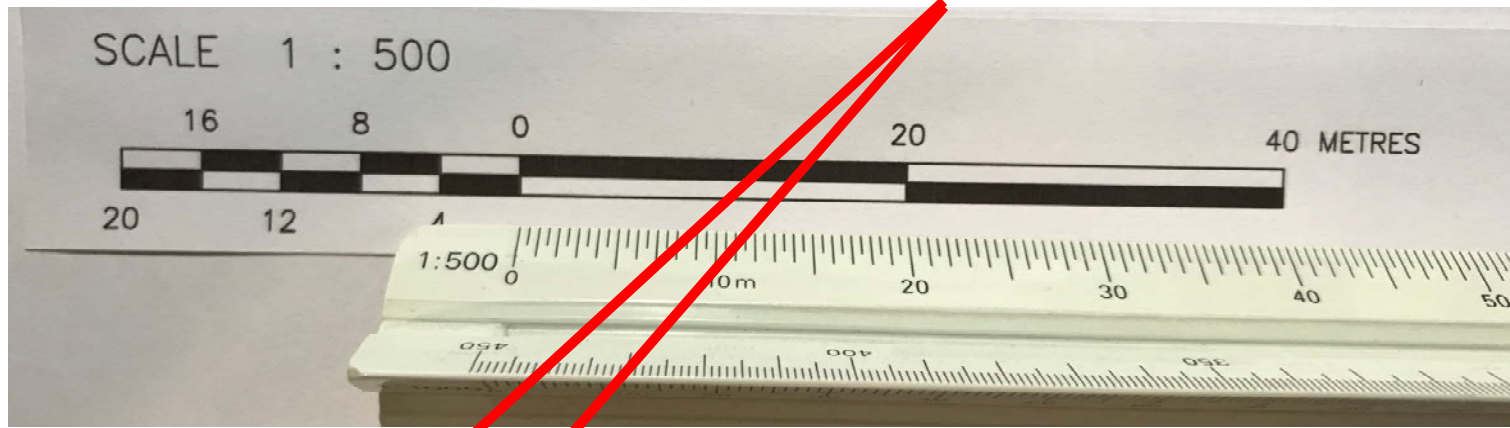


Examples: 1:2000

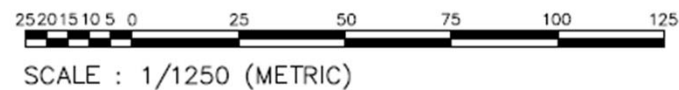
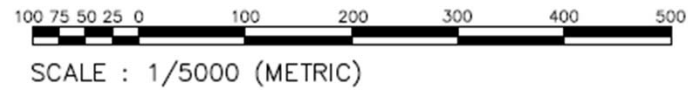
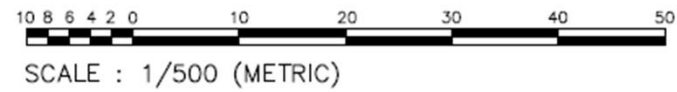
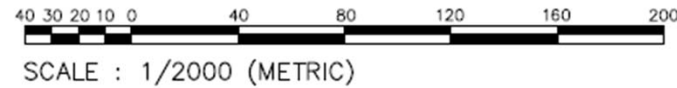
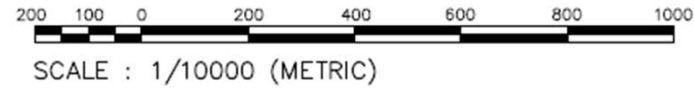
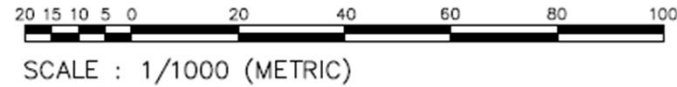


Plan Measurements and Scales:

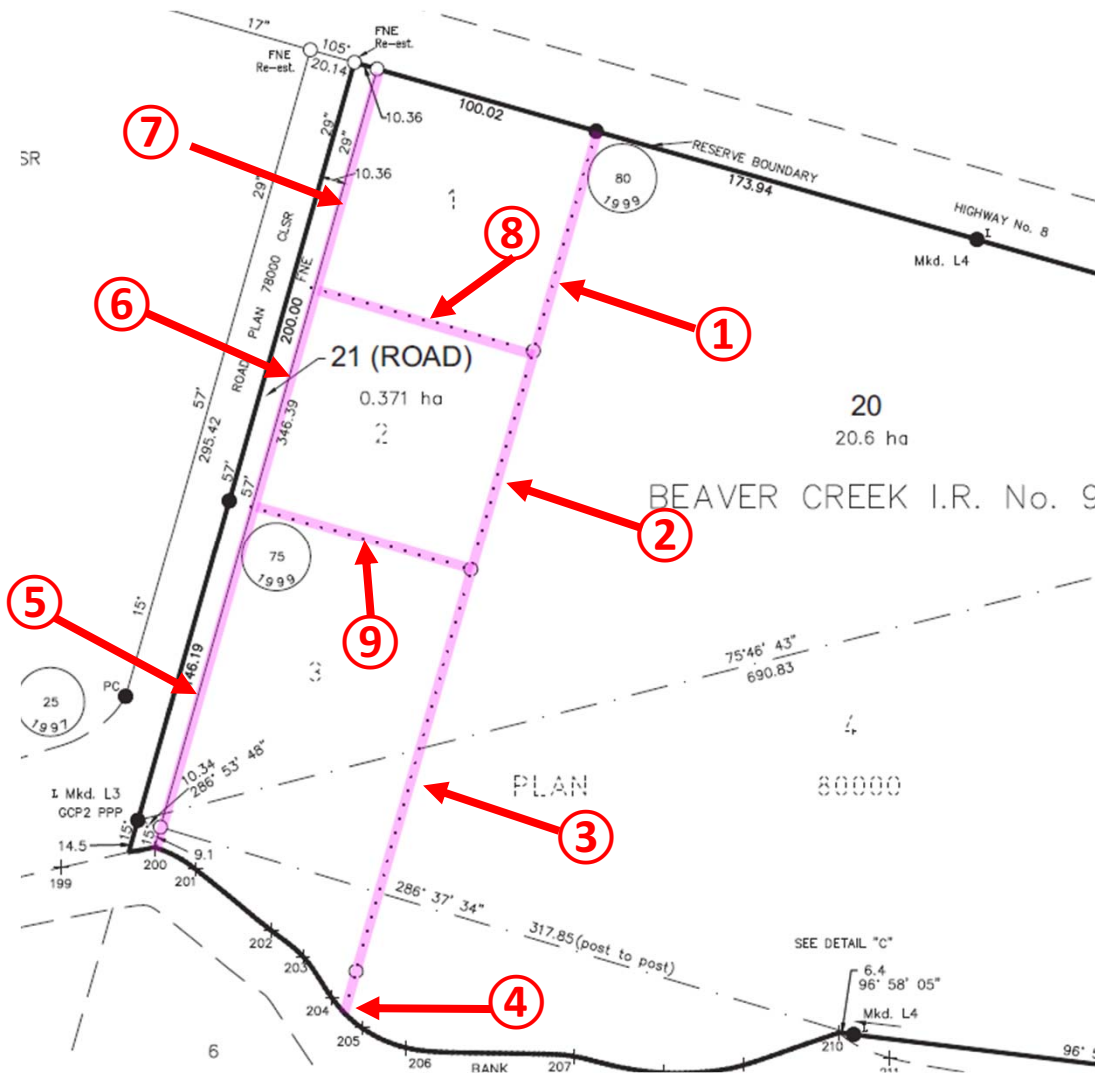
Examples: 1:500 & 1:5000



Plan Measurements and Scales:



Scale Exercise 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) Starting at ① Draw a 100m x 100m Lot:
- where ② is the east boundary of the Lot and the west boundary of the Lot is parallel with ② (*east boundary*)
- (b) Draw a 20m wide Road to the new Lot to ③ (Highway 8), where ② is the east boundary of the Road

