Deploying ESRI Apps in a Forestry Context

INTERPINE

Bringing innovation to the forest industry

Forest Inventory
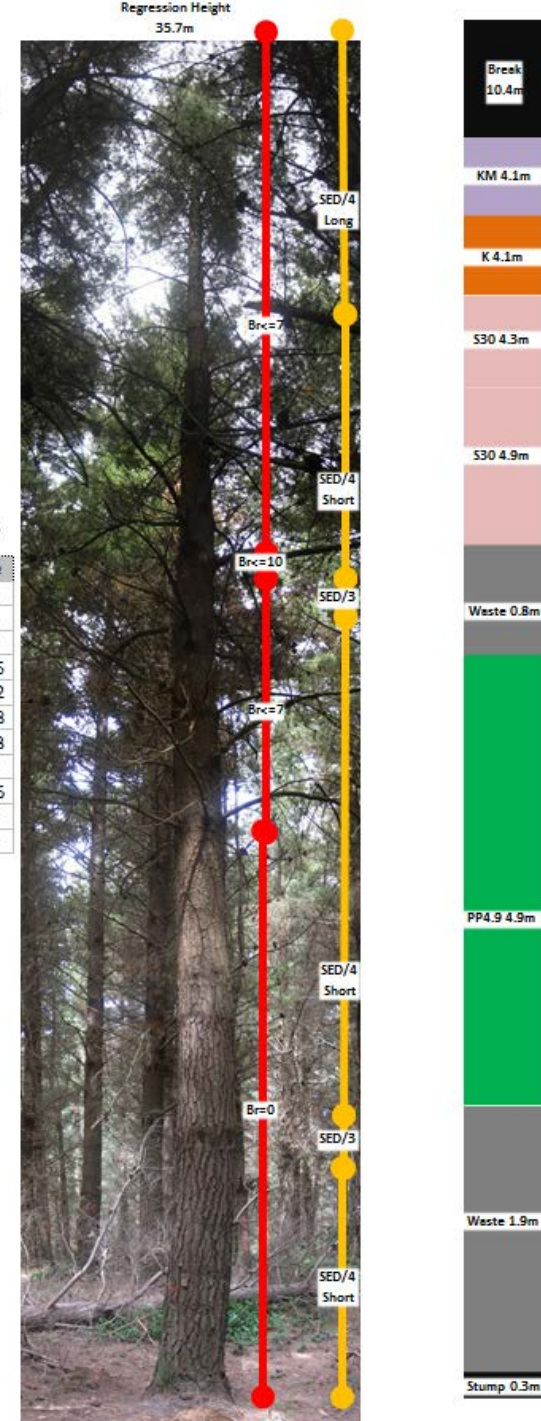

STEM 0

D	H	BrB	Sw	F
⚓	35.7	7	L	
	10.7		S	
	7.9	10		
	7.8	7		
	7.6		3	
	7.4		S	
	4.8	0		
	2.2		3	
	2		S	
⊢ 543	1.4			
⌴	0			

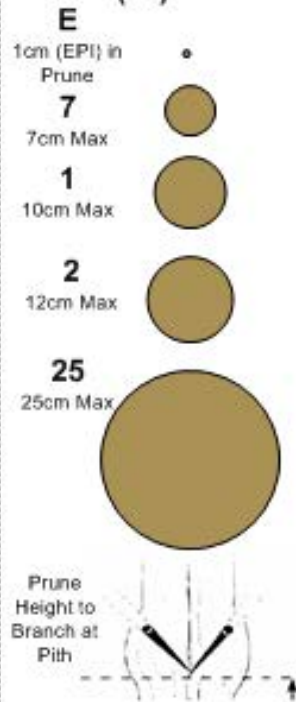| Grade	Base	Lth	SED	LED	Vol	Value
top	30.8	4.9	0	10	0.02	$ -
break	25.4	5.4	10	18	0.09	$ -
waste	25.3	0.1	18	18	0.00	$ -
KM	21.2	4.1	18	25	0.15	$ 5
K	17.1	4.1	25	31	0.25	$ 12
S30	12.8	4.3	31	36	0.38	$ 28
S30	7.9	4.9	36	41	0.57	$ 43
waste	7.1	0.8	41	41	0.11	$ -
PP4.9	2.2	4.9	41	47	0.74	$ 66
waste	0.3	1.9	47	54	0.37	$ -
stump	0	0.3	54	56	0.07	$ -

Cruising Comments:

The cruiser has used the SED/3 sweep code to describe movements which are acceptable in a short (3.1-4m export pulp type log grade), but not extreme enough for pulp. This allows the optimiser to maximise value and in this case inserts waste at these sections, which is an important reason for minimising the length of SED/3 codes, brings the better sweep codes as far into these cut-zones as possible.
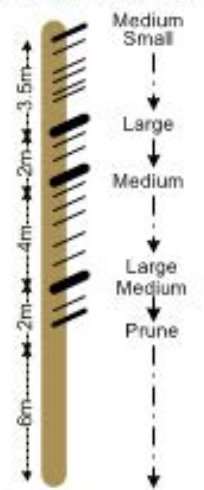
However if the quality before and/or after the SED/3 is poor it is likely the optimiser will place a 3.1-4m export pulp type log or pulp/biowood over this section instead of waste.
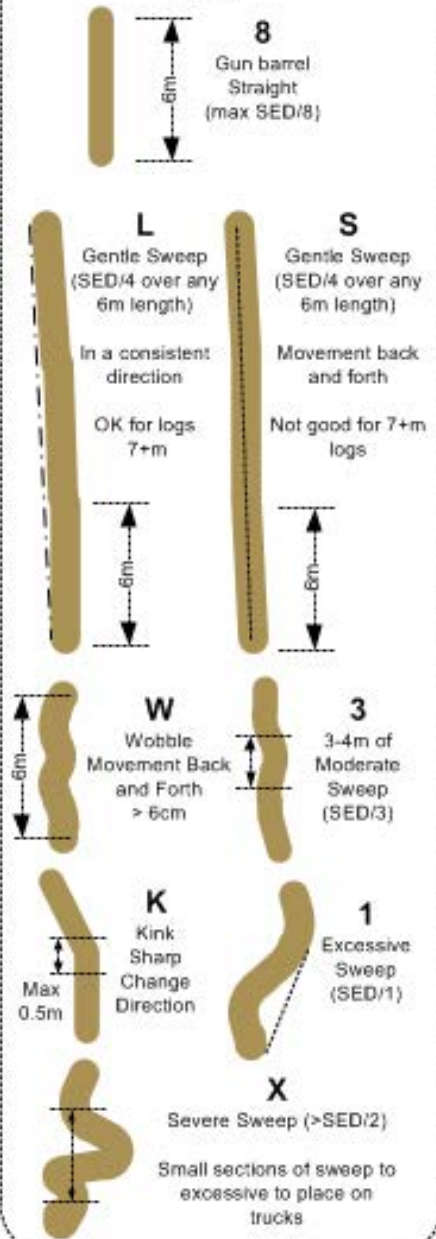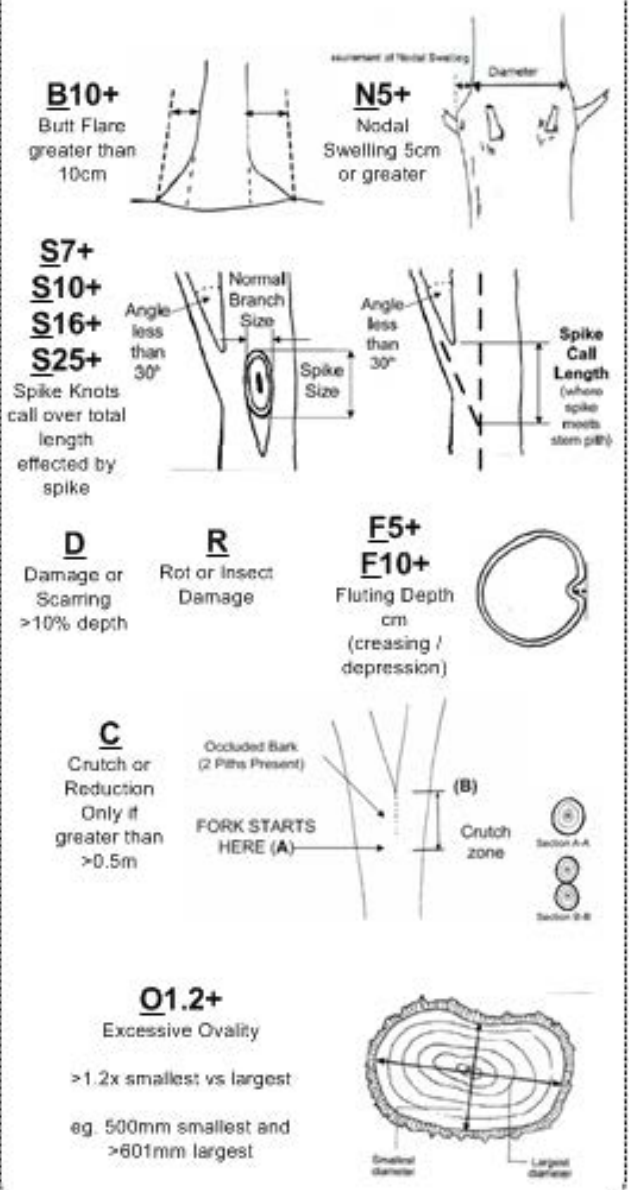
Regression Height 35.7m

Break 10.4m
KM 4.1m
K 4.1m
S30 4.3m
S30 4.9m
Waste 0.8m
PP4.9 4.9m
Waste 1.9m
Stump 0.3m

SED/4 Long
Br<=7
SED/4 Short
Br<=10
SED/3
Br<=7
SED/4 Short
Br=0
SED/3
SED/4 Short

BRANCHES (Br)

E
1cm (EPI) in Prune

7
7cm Max

1
10cm Max

2
12cm Max

25
25cm Max

Prune Height to Branch at Pith

Only Upgrade Class (to Smaller Branch Class) if >3m Section

Medium Small
↓
Large
↓
Medium
↓
Large Medium
↓
Prune

3.5m — 2m — 4m — 2m — 6m

SWEEP (Sw)

8
Gun barrel Straight (max SED/8)

6m

L
Gentle Sweep (SED/4 over any 6m length)

In a consistent direction

OK for logs 7+m

6m

S
Gentle Sweep (SED/4 over any 6m length)

Movement back and forth

Not good for 7+m logs

6m

W
Wobble Movement Back and Forth > 6cm

6m

3
3-4m of Moderate Sweep (SED/3)

K
Kink Sharp Change Direction

Max 0.5m

1
Excessive Sweep (SED/1)

X
Severe Sweep (>SED/2)

Small sections of sweep to excessive to place on trucks

FEATURES (F)

B10+
Butt Flare greater than 10cm

N5+
Nodal Swelling 5cm or greater

Movement of Nodal Swelling

Diameter

S7+
S10+
S16+
S25+
Spike Knots call over total length effected by spike

Normal Branch Size

Angle less than 30°

Spike Size

Angle less than 30°

Spike Call Length (where spike meets stem pith)

D
Damage or Scarring >10% depth

R
Rot or Insect Damage

F5+
F10+
Fluting Depth cm (creasing / depression)

C
Crutch or Reduction Only if greater than >0.5m

Occluded Bark (2 Piths Present)

FORK STARTS HERE (A)

(B)

Crutch zone

Section A-A

Section B-B

O1.2+
Excessive Ovality

>1.2x smallest vs largest

eg. 500mm smallest and >601mm largest

Smallest diameter

Largest diameter

FOREST INVENTORY- IT'S A HARD JOB

1.4m

Stratum panel
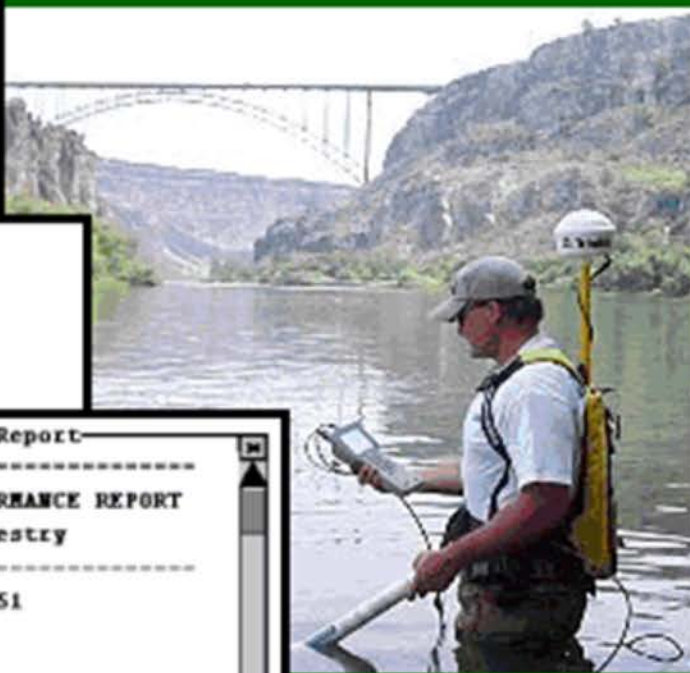
Field	Value
Stratum	1
Description	cpt 532_533
Area	149.5
Ht. trees	27
Cruiser1	JEFF_HAPETA
Cruiser2	jh
YearEst	1999
Species	P.RAD

Plots <Click for New>

11	26 Live, P 0.05Ha Circular
12	20 Live, P 0.05Ha Circular
17	26 Live, P 0.05Ha Circular
18	19 Live, P 0.05Ha Circular
23	14 Live, P 0.05Ha Circular
29	13 Live, P 0.05Ha Circular
31	17 Live, P 0.05Ha Circular
32	21 Live, P 0.05Ha Circular

PlotSafe - SMOPH-RAD99-EBBB-18-1-JH

File Edit View Tools Help

Field	Value
Plot	11
Type	P 0.05Ha Circular
Measured	10/08/2018
Slope	4
Radius (m)	12.63
Edge plot	Not Edge Plot
Status	Finished
Cruiser1	JEFF_HAPETA
Cruiser2	jh
YearEst	1999
PlotComments	1 regent
PlotHazard	
AuditPlot	
Auditor	
AuditComments	
Species	P.RAD

Trees <Click for New>

1	D265 ABC < H22.9
2	D266 ABC <
3	D186 ABC <
4	D268 ABC <
5	D226 ABC
6	D214 ABC <
7	D318 ABC <
8	D188 ABC
9	D130 ABC
10	D229 ABC
11	D344 ABC H23.3
12	D248 ABC
13	D337 ABC <
14	D363 ABC
15	D266 ABC <
16	D273
17	D183 ABC H 9.5*
18	D269 ABC
19	D250 ABC H22.0
20	D328 ABC
21	D300 ABC
22	D184 ABC
23	D260 ABC
24	D278 ABC
25	D313 ABC <
26	D224 ABC
27	D160 ABC H15.0*

PlotSafe - SMOPH-RAD99-EBBB-18-1-JH

File Edit View Tools Help

	D	H	Br	Sw	F
⚓		22.9	6	S	
		6		2	
⊔	200	5.5			
➤		4.2		S	
		1.6		2	S6+
		1.5			NONE
⊔	265	1.3			
�		0			
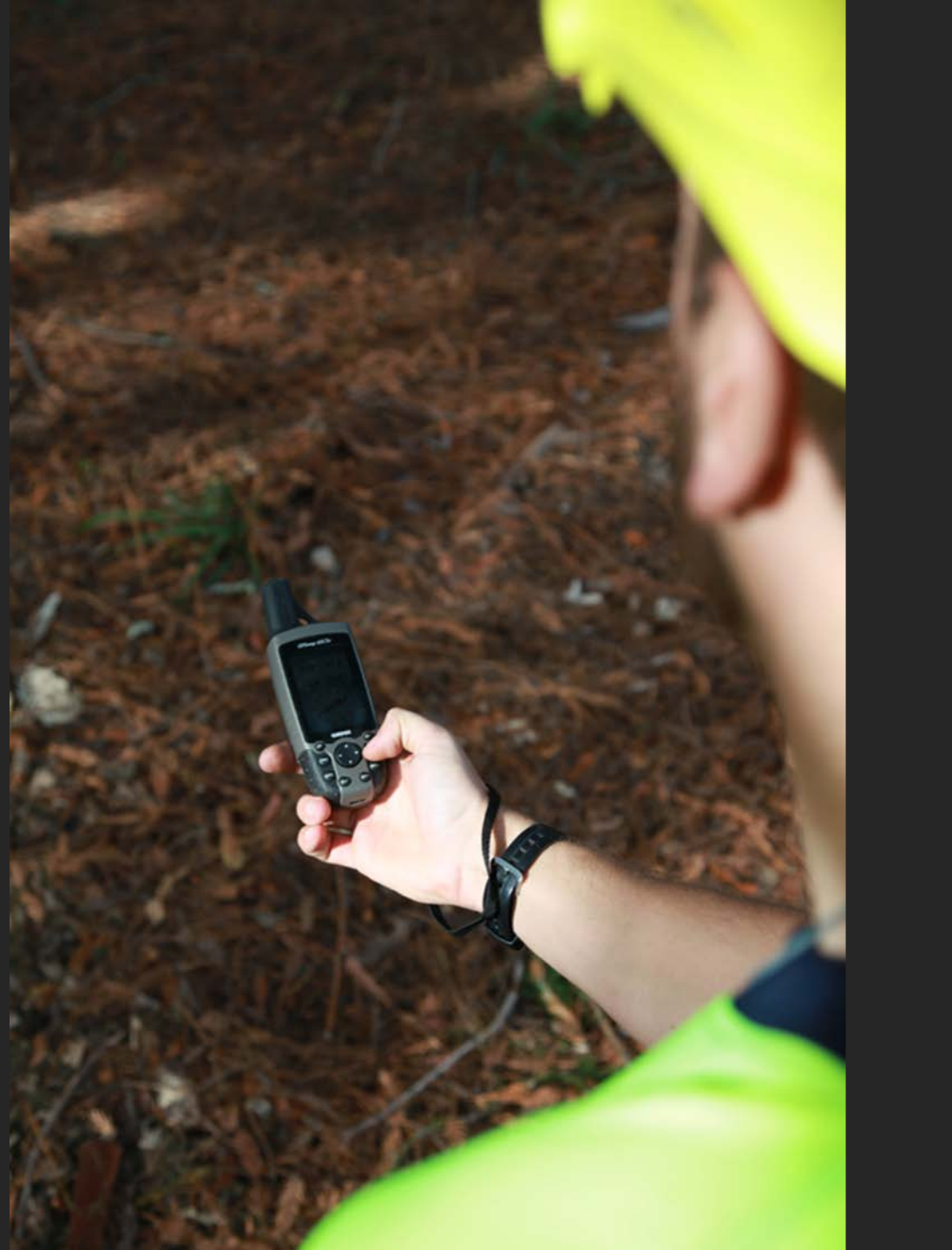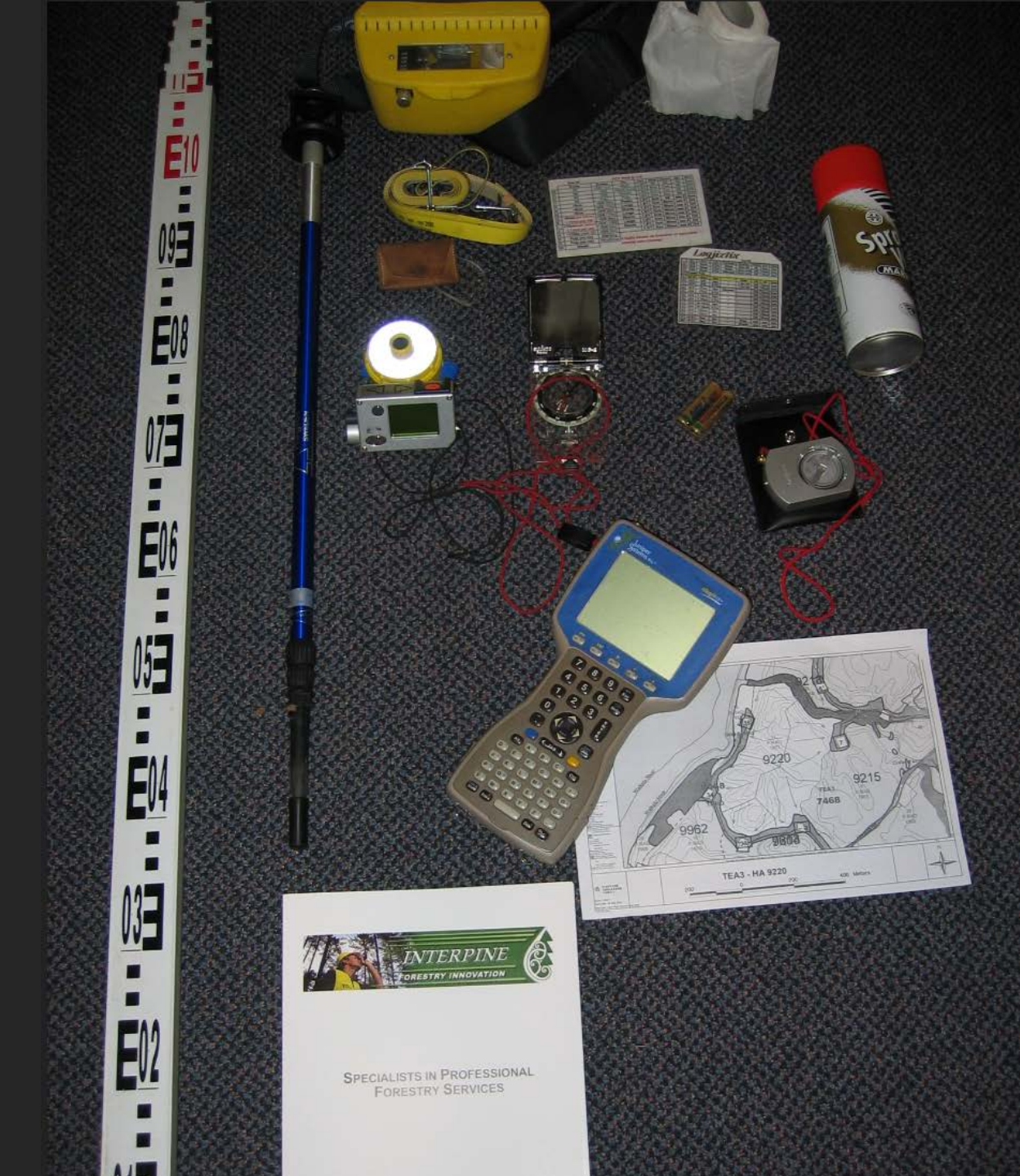
WPHR0701

Haparangi A4 Trust
Stand 7.1
PHA plot map

NT - DG.

(CORES DONE NT-DG)

2790000 2790500 2791000 2791500

6324000

N

W — E

S

6323500

6323000

90
93
91
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112
113
114

2790000 2790500 2791000 2791500

Stand	YOE	Area (ha)	SPH	PH (m)	Plot size (ha)	Grid (m)	Orientation (deg)
7.1	1983	36.0	242	5.9	0.06 0.07	120.1	122.3(T) 101.9(M)
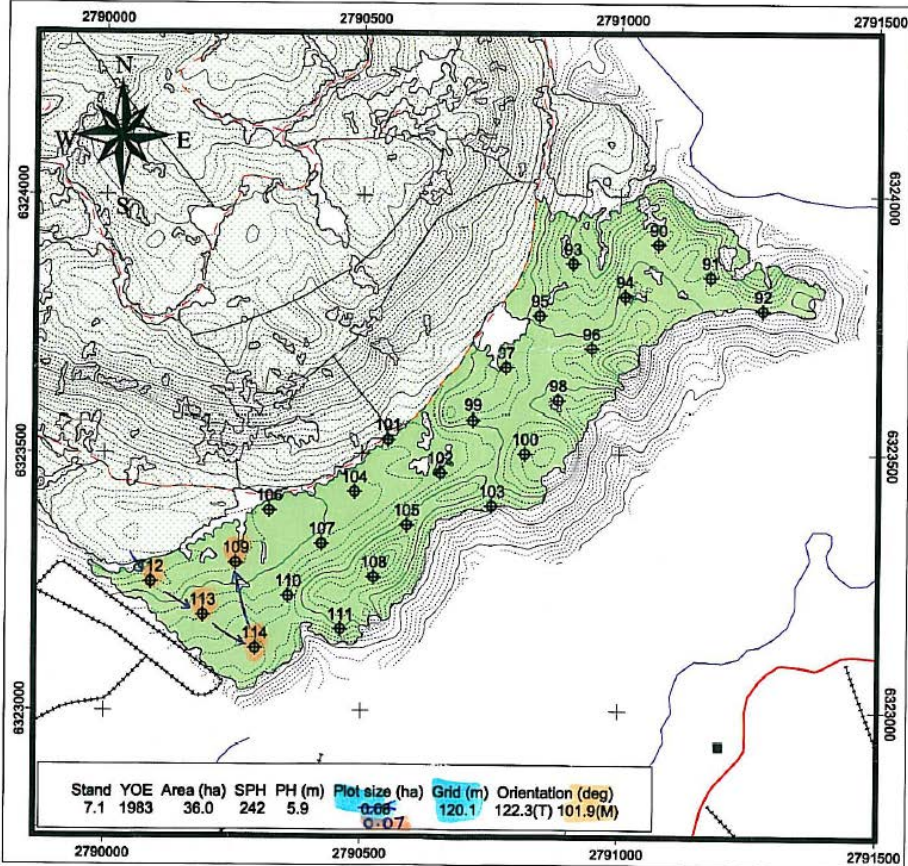
Plot centre
Building
Track
Road
Fence
River
Contour
25m CI
5m CI
Stand
Forest

0 100 200 300 400 500 Meters

Scale 1:10,000

282'   12'

192'   102'

Finished block.
LT- 09/07/2015
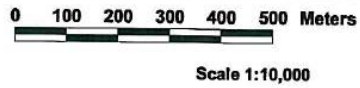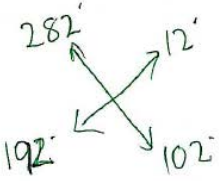
Hokonui
Stratum 708:9961
Job No. 298594
Type   MRI

65.0 ha
Total Area

1261000   1262000   1263000

Emergency Coordinate (Map Centre) =   46°14.81' (Lat),   36.41' (Long)

4871000
4870000
4869000
4868000
4867000

10   12   11   14   15

Birch Rd
Waimack Rd
No Name Rd
Southdown Road
Bluegum Road
West Road
Centre Road
College Stream Road
Short Peak
Short Road
Flax Road
Menzies Road
Titipua Road
Dacre Road
Kamahi Road
Shunt Road
Centre Road
Swamp Road
West Road West Road Centre Road
College Stream Road
Forest

21   19   18

FORESTRY ROAD
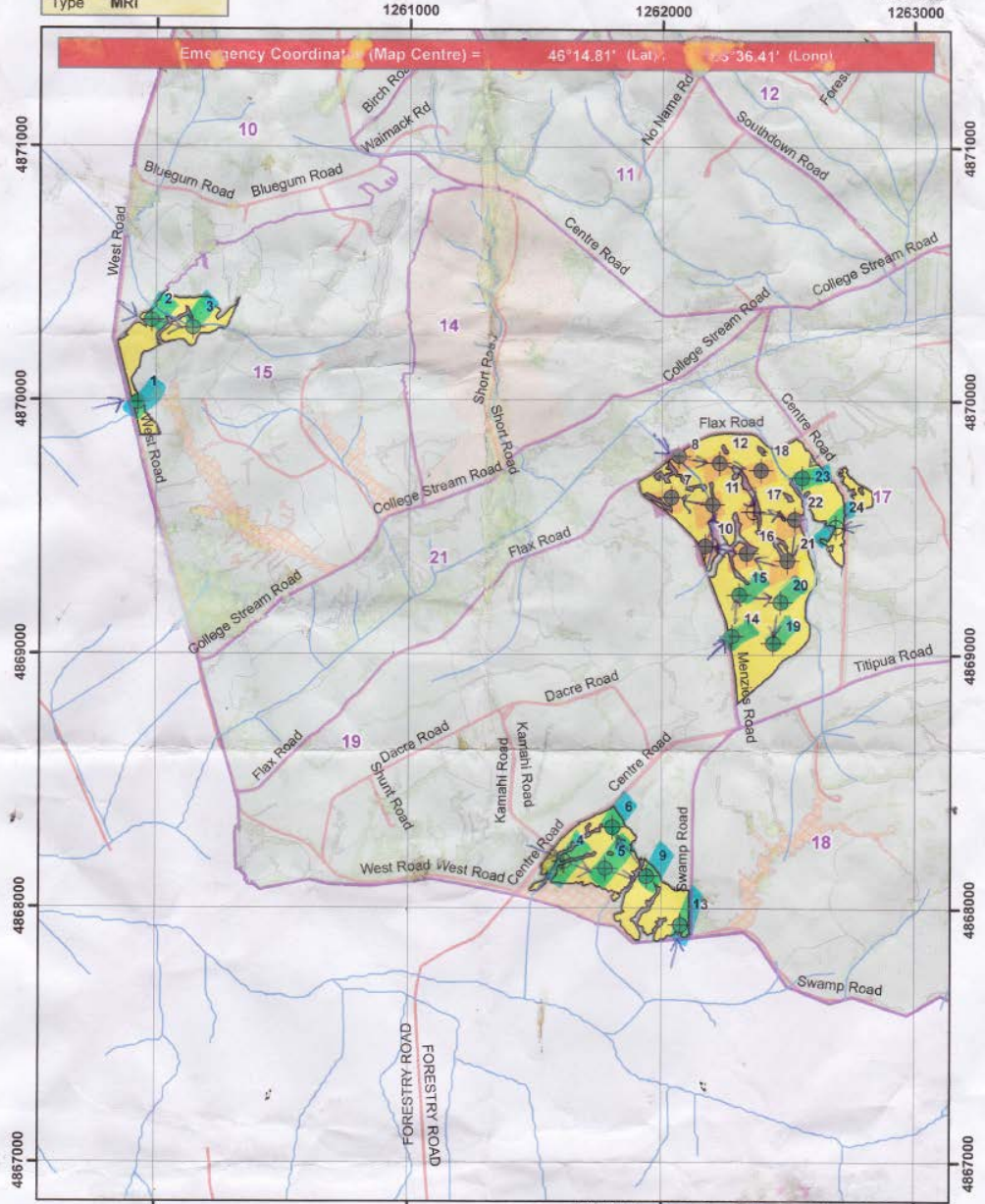
Total Plots	24	Plot Size
Primary plots		0.04
Edge plots		0.04

Transect bearing   10°
Transect spacing 165m
Plot spacing   165m
(Bearings relative to Grid North)
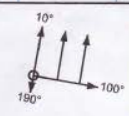
Reference Location Markers
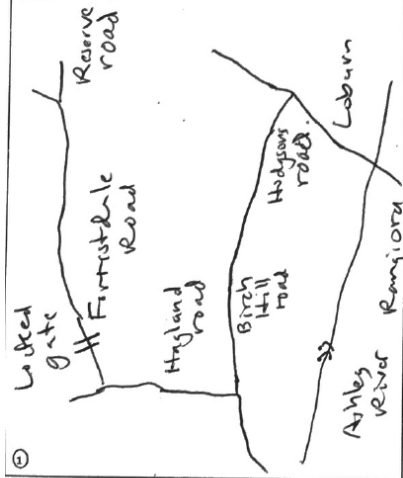No. Easting Northing Plot Bearing Distance

N

1:20,000

Left Form

CMS SITE IDENTIFIER: BI27E1

SURVEY DATE: 18 / 7 /20 17

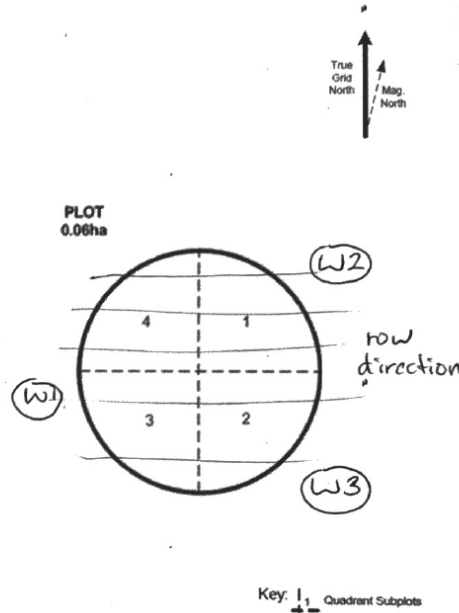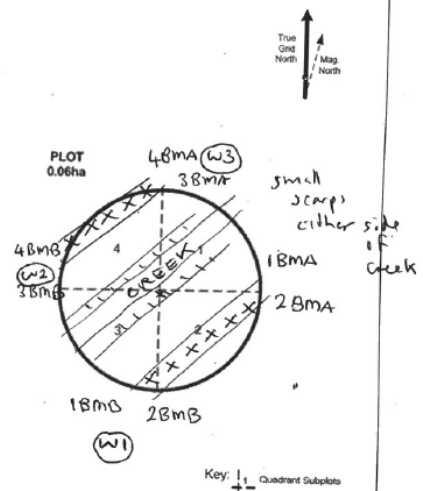**TEAM LEADER:** W. Baxter

DRAWINGS BY: W. Baxter

SITE LOCATION DIAGRAM
Please record on this diagram landmarks, hazards, navigational aids (eg. slips, cliffs, fences, gates, streams, large rocks etc), site plot orientation (North arrow), track marks, waypoint points, photo points, witness trees locations, i.e. relevant info for relocation of site.


SITE LAYOUT DIAGRAM
Please record landmarks, hazards, navigations aids (eg. slips, cliffs, streams, large rocks), boundaries of afforested area (LCDB2 changes) where it eclipses any plot perimeter, rough location of witness trees

PLOT 0.06ha

Key: Quadrant Subplots

Location and Layout Comments (please min. comments if using data capture software. Each level of data entry has room for comments to be added)
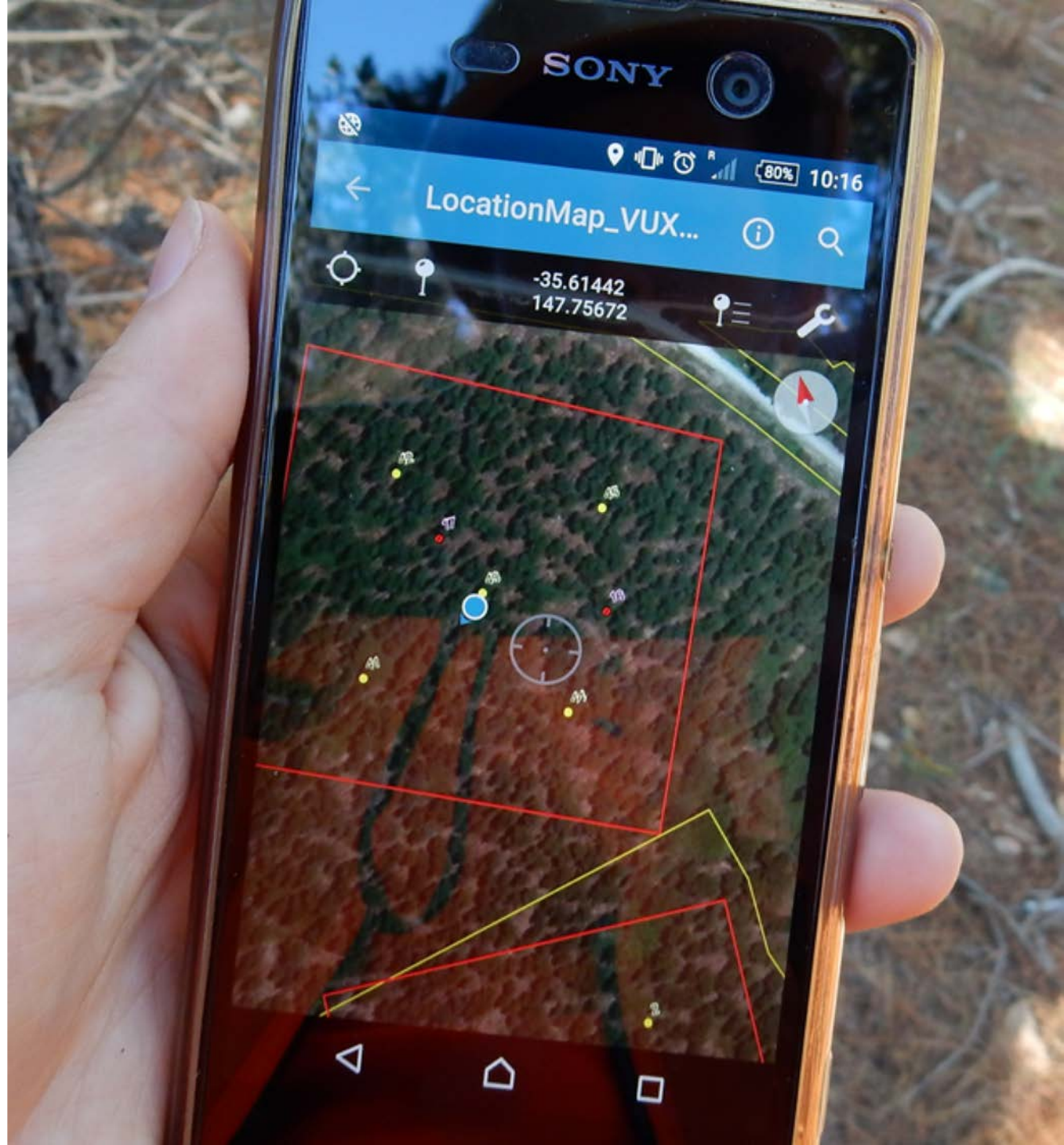
From Rangiora travel North toward Loburn.
turn left onto Hodgsons Road @ Loburn
Follow onto Fishers road, then onto
Birch Hill Road, then right onto
Hagland Road, pass houses — and entry
to park area, then right onto Forrestdale
road — then locked gate, follow to a right
onto Reserve road.

Sorry — cannot access data plus to put in wpts

Right Form

CMS SITE IDENTIFIER: AU144E5

SURVEY DATE: 1 / 8 /20 17

TEAM LEADER: W. Baxter

DRAWINGS BY: W. Baxter

SITE LOCATION DIAGRAM
Please record on this diagram landmarks, hazards, navigational aids (eg. slips, cliffs, fences, gates, streams, large rocks etc), site plot orientation (North arrow), track marks, waypoint points, photo points, witness trees locations, i.e. relevant info for relocation of site.

SITE LAYOUT DIAGRAM
Please record landmarks, hazards, navigations aids (eg. slips, cliffs, streams, large rocks), boundaries of afforested area (LCDB2 changes) where it eclipses any plot perimeter, rough location of witness trees

PLOT 0.06ha

Key: Quadrant Subplots

Location and Layout Comments (please min. comments if using data capture software. Each level of data entry has room for comments to be added)

Travel south from Timaru, cross Pareora River then
turn right onto Pareora River Road soon after—
— follow this road onto Pareora Gorge Road — then
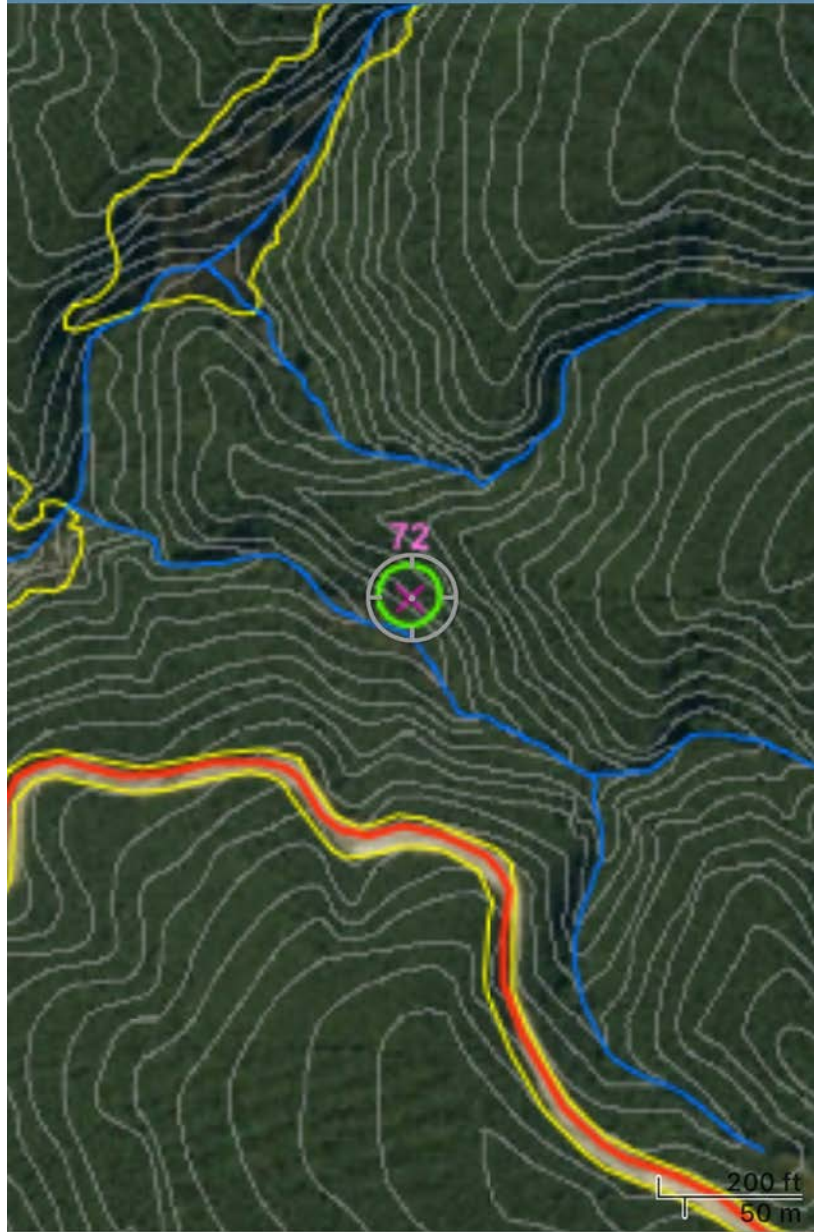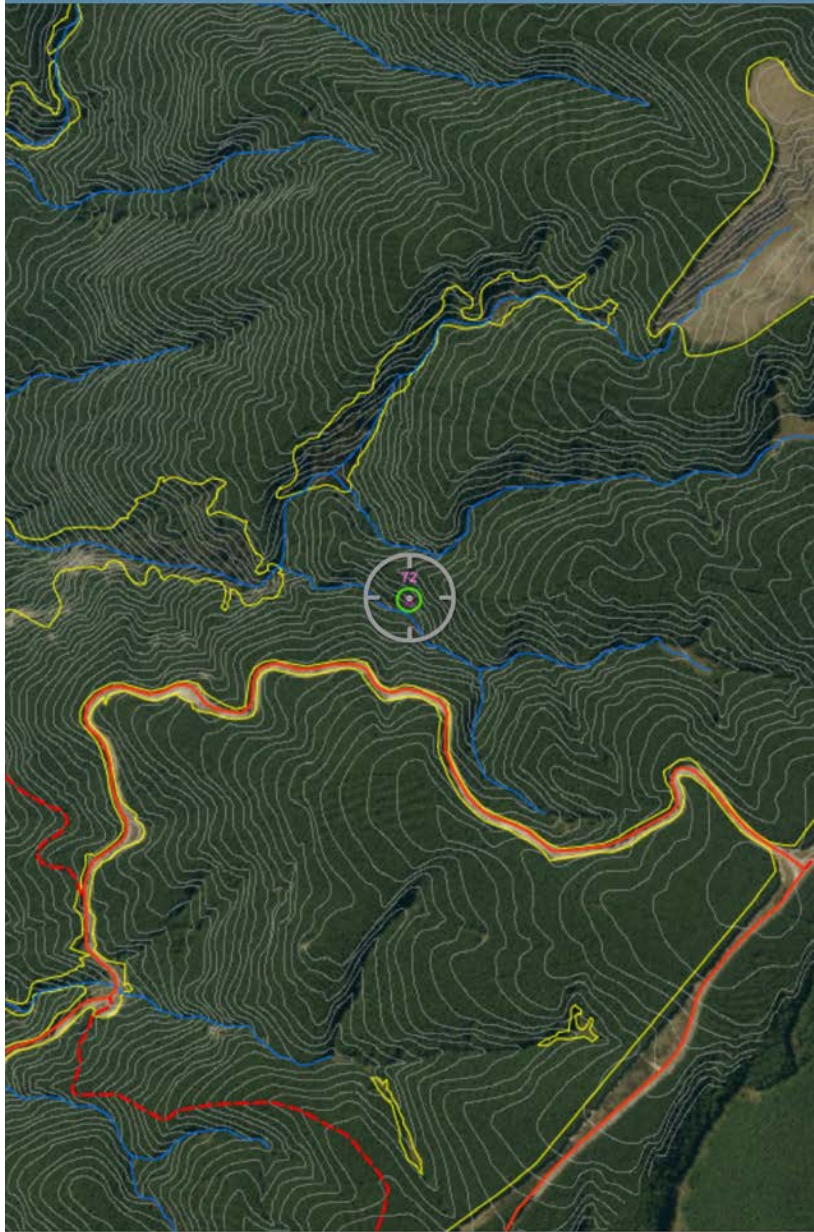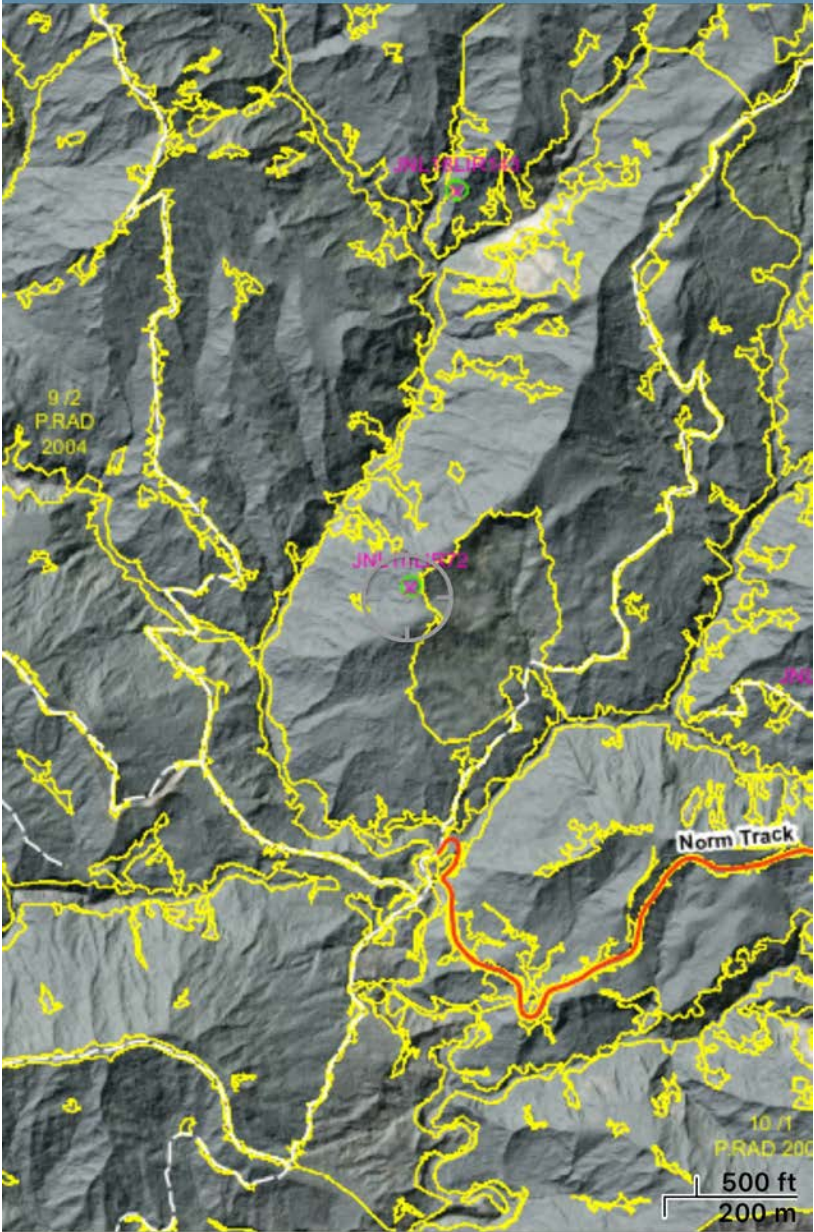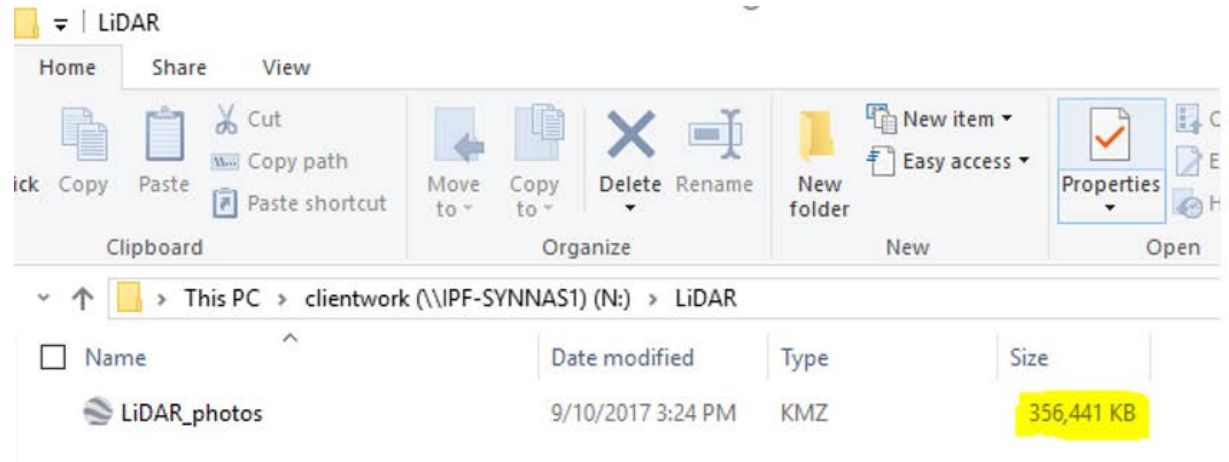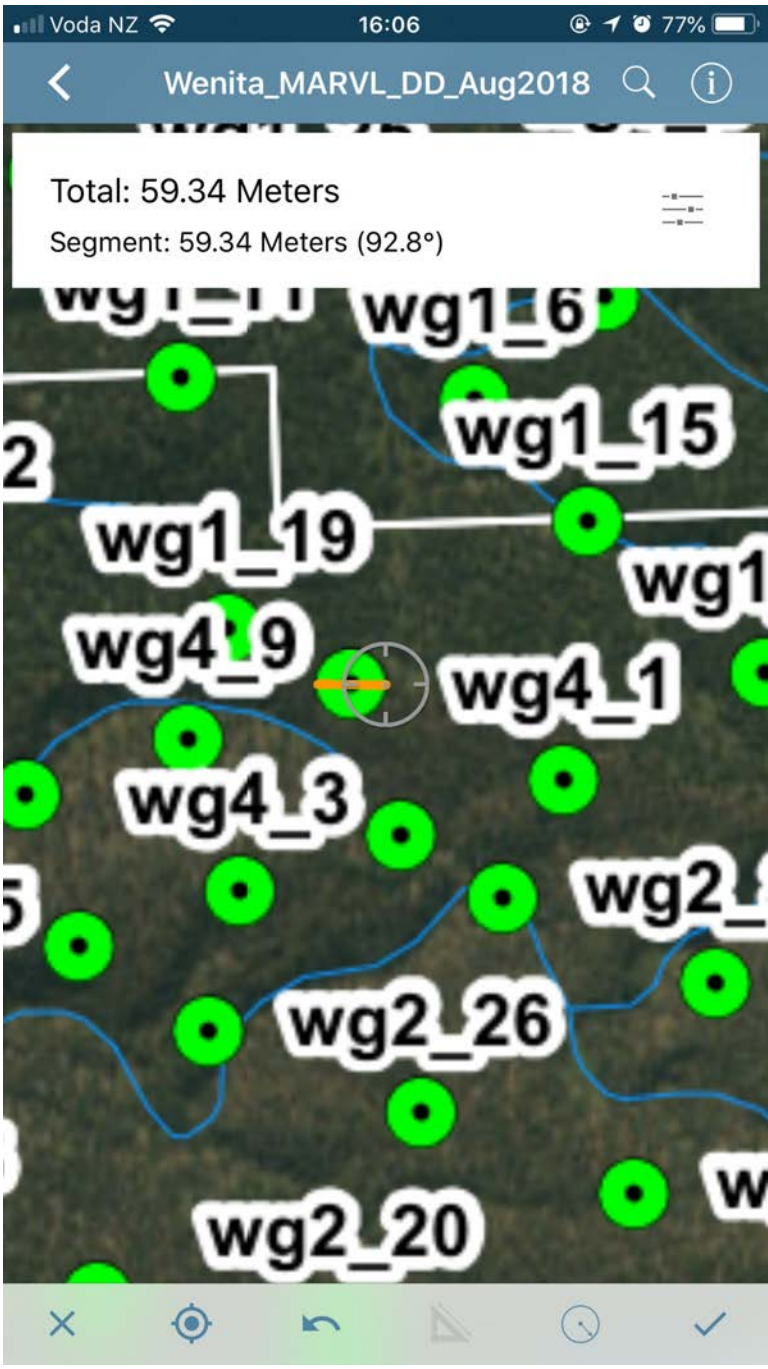turn left onto Limestone road and follow
to the plot
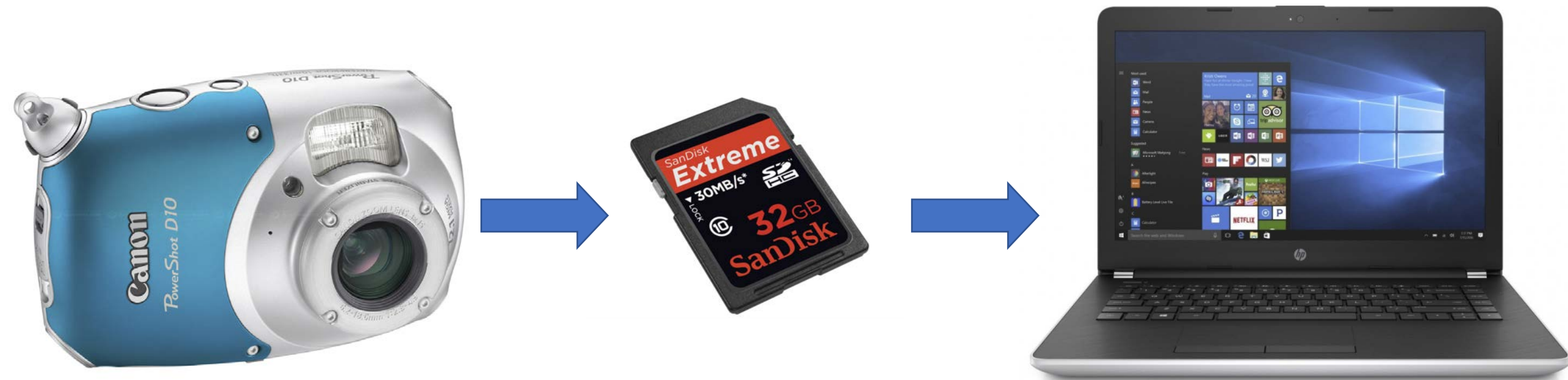
Issues:
- 10,000 plots, average of 3 photos per plot = over 30,000 photos per year
- Manual download
- Working remotely – Crews manually uploading photos to SharePoint then manual download at head office
- Allocating photos to the correct plot

type	name	label	hint	constraint	constraint_message	required	required_mess	appearance	default	readonly
datetime	PlotDateTime	Date & Time Measured				yes			now()	yes
integer	PlotNumber	Plot Number				yes		minimal		
select_one yes_no	Health_and_Safety1	Daily Safety Meeting	Has a Daily Safety Meeting Taken Place			yes				
select_one yes_no	Health_and_Safety2	Risks / Hazards	Have all risks and hazards been identified and recorded in plot			yes				
select_one crewleader1	CrewLeader	Crew Leader				yes		spinner		
image	NorthPicture	North Plot Picture	Make sure you are standing atleast 4meters back from center peg			yes				
image	EastPicture	East Plot Picture	Make sure you are standing atleast 4meters back from center peg			yes				
image	SouthPicture	South Plot Picture	Make sure you are standing atleast 4meters back from center peg			yes				
image	WestPicture	West Plot Picture	Make sure you are standing atleast 4meters back from center peg			yes				
image	CanopyPicture	Canopy Picture				yes				
image	BoundaryPictures1	Boundary Pictures								
image	BoundaryPictures2	Boundary Pictures								
image	PlotLayout	Plot Layout						draw	PlotLayout.PNG	
select_one yes_no	trimble	Trimble Points Collected				yes		multiline		
text	PlotNotes	Plot Notes						multiline		

LiDAR Template

Date & Time Measured *

| Friday, 17 August 2018 ⌄ | 5:25 PM ⌄ |

Plot Number *

[   ]

Daily Safety Meeting *
Has a Daily Safety Meeting Taken Place
○ Yes
○ No

Risks / Hazards *
Have all risks and hazards been identified and recorded in plot
○ Yes
○ No

Crew Leader *
○ AJ   ○ Toby   ○ Josh   ○ Naani   ○ Epi   ○ Nigel   ○ Bruce   ○ Vili   ○ Albert   ○ Jeff

North Plot Picture *
Make sure you are standing atleast 4meters back from center peg

📷 📁

East Plot Picture *
Make sure you are standing atleast 4meters back from center peg

📷 📁

South Plot Picture *
Make sure you are standing atleast 4meters back from center peg

📷 📁

West Plot Picture *
Make sure you are standing atleast 4meters back from center peg

📷 📁

Canopy Picture *

JNL Gisborne LiDAR

Overview   Design   Collaborate   (Analyze)   Data   Settings   ◁
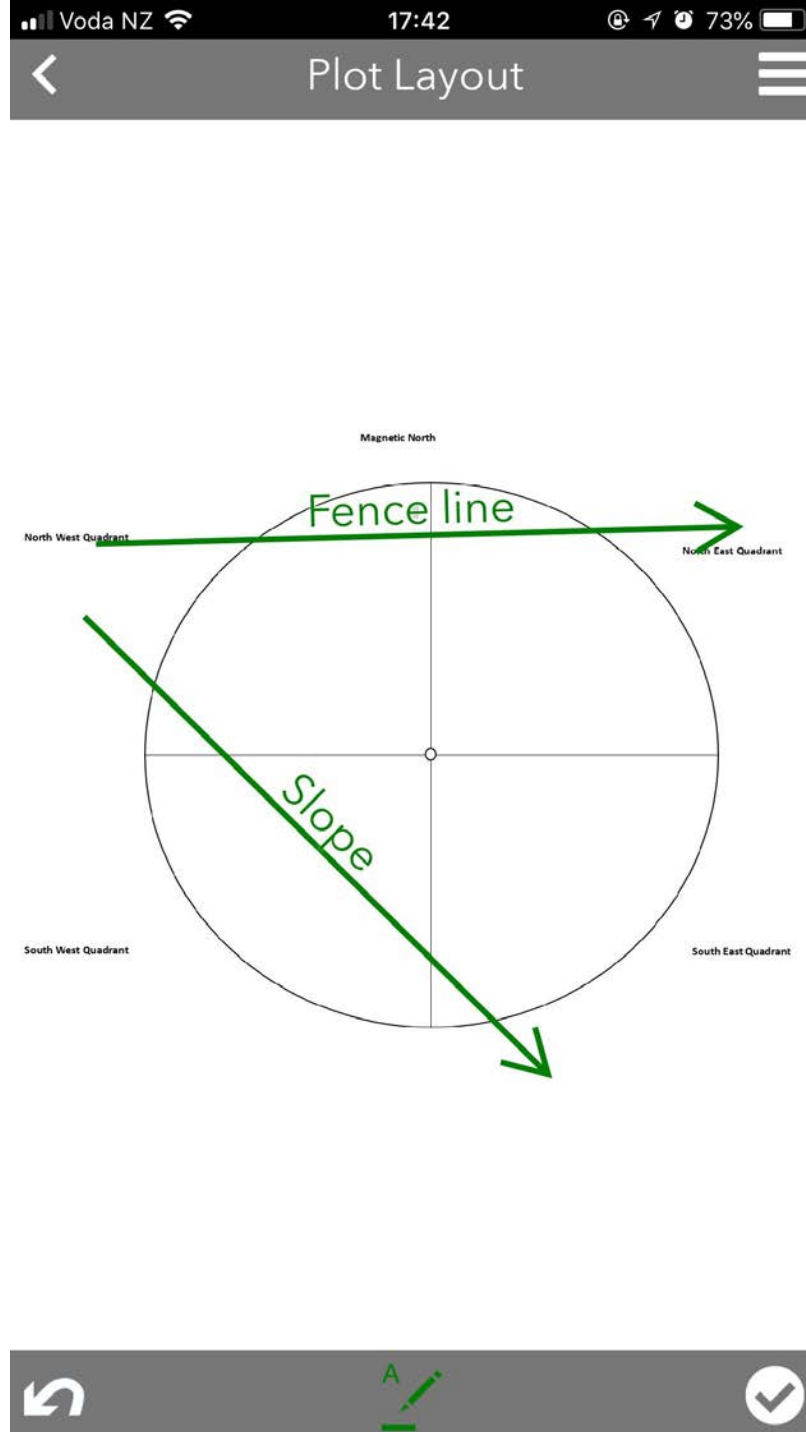
Filtered Count: 292 (Total: 292)   📅 4/6/18 - 8/17/18

View Settings

👁	Set Visibility
🖨	Print Current View

Date & Time Measured ⋆   Histogram

Tip: drag on the chart to zoom in the data.   Reset
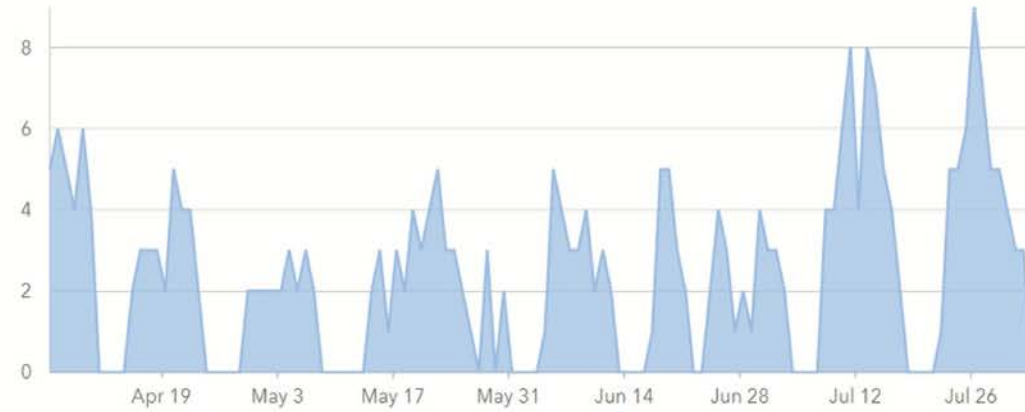
Hide Table

Date	Count
Apr 5, 2018 - Apr 6, 2018	5
Apr 6, 2018 - Apr 7, 2018	6
Apr 7, 2018 - Apr 8, 2018	5
Apr 8, 2018 - Apr 9, 2018	4
Apr 9, 2018 - Apr 10, 2018	6
Apr 10, 2018 - Apr 11, 2018	4
Apr 15, 2018 - Apr 16, 2018	2
Apr 16, 2018 - Apr 17, 2018	3
Apr 17, 2018 - Apr 18, 2018	3

Under Development

PPE Audit V1

Record(s): 0

Monthly Vehicle Audit 2018

Record(s): 8

General Hazard Identification Form

Record(s): 0

UAV Pre and Post Flight

Record(s): 14

Incident Reporting V1

Record(s): 0

Driving- Safe Behavioural Observatio...

Record(s): 0

MONTHLY VEHICLE SAFETY AUDIT

Please complete this form on the 1st of every month during crew safety meeting / or for a new vehicle.   Return to office

CREW / DRIVER DETAILS

CREW ID NUMBER:	C5	DRIVER:	B S GILL
PERSON DOING AUDIT:	B S GILL	AFTER HOURS ADDRESS FOR VEHICLE:	
DATE COMPLETED:	14/10/16	1 A WEST END AVENUE, WHANGAREI	

GENERAL VEHICLE DETAILS

Vehicle Ownership: INTERPINE / RENTA	INTERPINE	Tyre Condition:	Good
Make (circle) : VW / FORD / TOYOTA / 2WD /	2WD	Road User License Disk Current :	YES
Number Plate (Rego):	EFM 561	Panel Exterior Damage (Note Below):	YES
Current Milage Reading:	274954	Vehicle is Clean (Inside and Out):	YES
Servicing Current:	YES	Is this a New Vehicle Pre-Check?	YES

General Vehicle Issues / Servicing / Damage Comments:

AC is not working.

(Write on another piece of paper with diagrams if needed)

GENERAL VEHICLE EQUIPMENT

IPF Health and Safety Manual and Forms	YES	Jack / Wheel Brace / Spare-W Removal Tool	YES
OSH Safety in Forest Operations Handbook	YES	Spare Wheel	YES
First Aid Kit Complete	YES	Emergency Triangle	YES
Fuel Cards (Caltex / BP / Mobil)	YES	Spare Drinking Water (Replaced Regularly)	YES
Radio Telephone (R.T.) Fitted and Working	No	Tow Rope	YES
RT Channel Quick Reference Card Fitted	NA	Rotating Orange Flashing Light	YES
RT Aerial in Good Condition	NA	Traction (Snow) Chains NO	Asset #

GENERAL EQUIPMENT COMMENTS:

VEHICLE FIRE EQUIPMENT   (Note number of)

FIRE EXTINGUISHER (Charge Green!):	YES	COMMENTS:	
SHOVELS (at least 1 per vehicle):	YES		

OCCUPANT AWARENESS AND MONITORING   Comments:

Occupants are aware of emergency equipment locations?	Y / N	Y
Have you been the driver of this vehicle all of the last month?	Y / N	Y
All drivers have current NZ full drivers license?	Y / N	Y

COMPANY SPECIFIC INFORMATION *(Circle ones you have - add others as applicable)*

TLL Emergency Procedures Sticker	NA	HANCOCKS Emergency Procedures Sticker	NA
TLL Road Safety Manual	NA	HANCOCKS Health and Safety Rules	NA
TLL Emergency Plan	NA	OTHER:	
TLL RT Network Info and Call Signs	NA		

HAZARD

GENERAL HAZARD IDENTIFICATION FORM
FOR INTERPINE GROUP LTD

Each non-inventory crew (inventory crew use INVENTORY HAZARD ID FORM) must complete this form a minimum of the 1st of these each month

Please return with Timesheets to Interpine office

Operation Type: (circle)	SCALING LOG QC	LOG MAKER AUDITS	ADMIN	TECHNICAL	OTHER _____

Reason: (circle)	1st of the Month Crew Safety Meeting	New Working Site	New Equipment / Machinery (new vehicles use vehicle form)	New Procedure / System	OTHER _____

Crew Details

Crew Number : 5	Crew Members : N.Tioke
Report Period: Month of May or / /20	Date Completed : 1.5.18

HAZARD ASSESSMENT *(over and above current hazard register)*

Hazard Locality and Date	Hazard Description	Action Taken to Eliminate (E), Isolate (I), Minimise (M)
E.g. 0.5m of Mud in KPP yard 25/05/15	E.g. Slipping or Getting stuck in Mud – not being able to move away fast if needed	E.g. (E) – get loaders to lay loads out only sealed area – have contacted and left message with Steve G to enforce this.
rds	Slippery and maybe icey going into winter	(M) drive to the conditions

NEW SAFETY ISSUES to be discussed at next Safety Meeting (continue on a separate page if necessary)

Near Miss Reported in this month?	YES / NO

Please sign below to acknowledge that all information is an accurate record.
Signed Team Leader/s_N.Tioke   Assistants/s
Date_3.4.17

Hazard Register Updated YES / NO by _office_ Date / / 20	Discussed at Meeting Yes / No / Not Req.

Incident Reporting

INCIDENT REPORT FOR INTERPINE GROUP LTD

Use this form for Lost Time Injuries (LTI) Medical Treatment Injuries (MTI), Minor Injuries, Property Damage, Near Hit Events and Critical Rule Breaches.

Incident Type: (circle)	Lost Time Injury	Medical Treatment Injury	Minor Injury	Property Damage (no injury)	Near Hit / Observation (no injury)	Critical Rule Breach

Is it a Sentinel Incident (An incident which could have resulted in a fatality of serious disablement): Yes / No
If Yes, describe why:

Crew Name / Crew Leader / Person Involved:	IPG crew number:	Vehicle Registration / Asset Number Involved:
Kawerau-Scaling, Caleb	IPF 19	CSQ574.

Date of Incident	Time of Incident	Client / Company	Location of Incident (Forest/Cmpt/Road/Yard etc.)
JULY 18			KAWERAU MILL.

Experience in industry (yrs & mths)	Experience in task where incident occurred (yrs & mths)	Staff member qualified for the task?	Weather (circle)			Gradient (circle)	
2	2	Yes / No / NA Under Training	Rain Calm	Dry Windy	Frost	Flat Rolling Steep (30° or more) N/A	

The following section (two lines) should only be completed for Sentinel Incidents:

Travel time to and from workplace (hrs)	Hours worked on present shift:	Work Start Time	Hours of sleep prior to work:

Total hours worked over 7 days:	Hours worked since last day off:	Rest breaks taken (total time/hrs):

LOG MANUFACTURING			FORESTRY
Type of operation: (circle)		**Task: (circle)**	**Part of operation: (circle)**
Clearfell – Mechanical – stems/logs		Felling / Mechanical Harvesting	Plotting / Data Collection / Travel
Clearfell – Motor manual – stems/logs		Trimming/Limbing / Log Processing/Skidwork	UAV / RPAS Flight Operations
Roadline – stems/logs		Breaking out / Extraction (machine)	Land preparation (machine) Planting
Hauler – stems/logs		Log Loading / Fleeting/Sorting/Stacking	Release - Spot Spray or Aerial Application
Mill Logyard	Sort-yard	Maintenance / Moving Plant	Prune (ground) Prune (ladder)
Transport	Roading	Travel / Quality Control / Scaling	Prune (chainsaw) Thin to waste
Other		Logmaker Audits / Visitor	Nursery Fire fighting
		Other	Other ....

Describe what happened. Include details of event, equipment or machines, personal protective equipment used etc, and what the causes of the accident were. (Continue on a separate page if necessary and draw a picture of damage to property (i.e. vehicle) if applicable)

HITMAN   NOT WORKING PROPERLY, — CHHWD unit.

SHOWS "HIT" But will show RE-TRY (NO HITMAN READING)

NOT ABLE TO TAKE HITMAN READINGS

#67 = CHHWOOD PRODUCTS HITMAN TOOL

Include notes on objects/agents involved with the injury (e.g. spar, chainsaw, chemical, vehicle) and mechanism of injury (e.g. slip, struck by)

Type of Injury: (circle)		Mark body part injured on chart:	
Cut/laceration	Bruise	Name body part injured:	
Strain/sprain	Dislocation		
Fracture	Crush		
Puncture	Foreign Body		
Sting/bite	Infection		
Internal Injury	Burn	**Treatment: (circle)**	
		None	

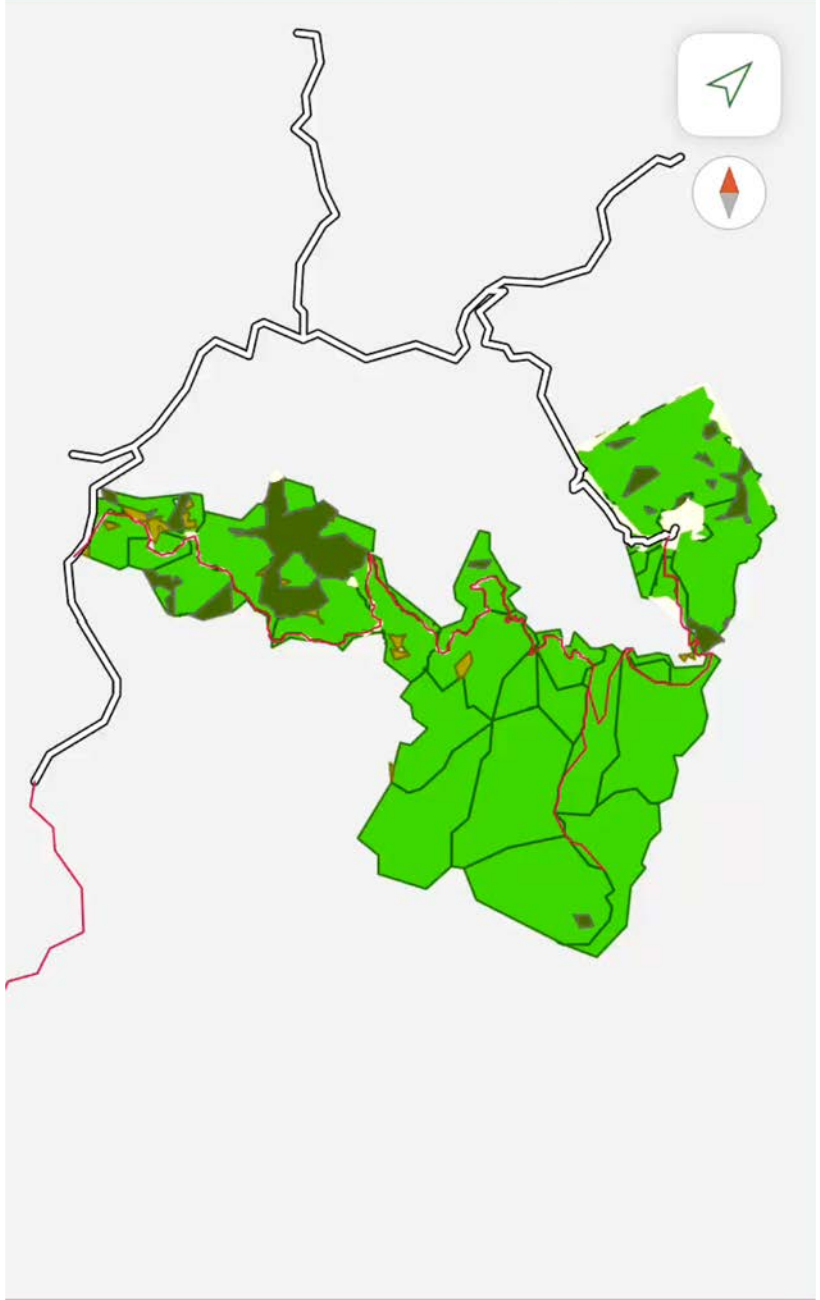# Explorer for ArcGIS

Replace Avenza

Annotate map

Link to Survey123

Good for where plot location is not as important

Collector for ArcGIS

Waiting, waiting, waiting ☺

Labelling

Supports High-Grade GPS

Good for fixed plot location

Should be the solution

Issues/Problems

Offline use – useless without it

Tiling scheme for publishing vector tile packages in NZTM in order to use it as basemap

Survey123 - haven't yet tried GeoPoint – for us must be offline and vector based tile package using NZTM.

Geolocation under canopy – relying on phone GPS and geolocating the first photo

Getting data from clients to create maps – sharing or create our own

Bringing in LiDAR data?? Canopy height model and DTM

Deploying ESRI Apps in a Forestry Context

INTERPINE

Bringing innovation to the forest industry