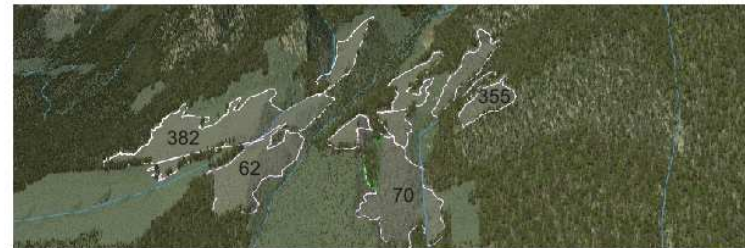


Photography by Bernice Patterson



New Site Viewpoint Looking North to Blocks 355, 382, 62, 70

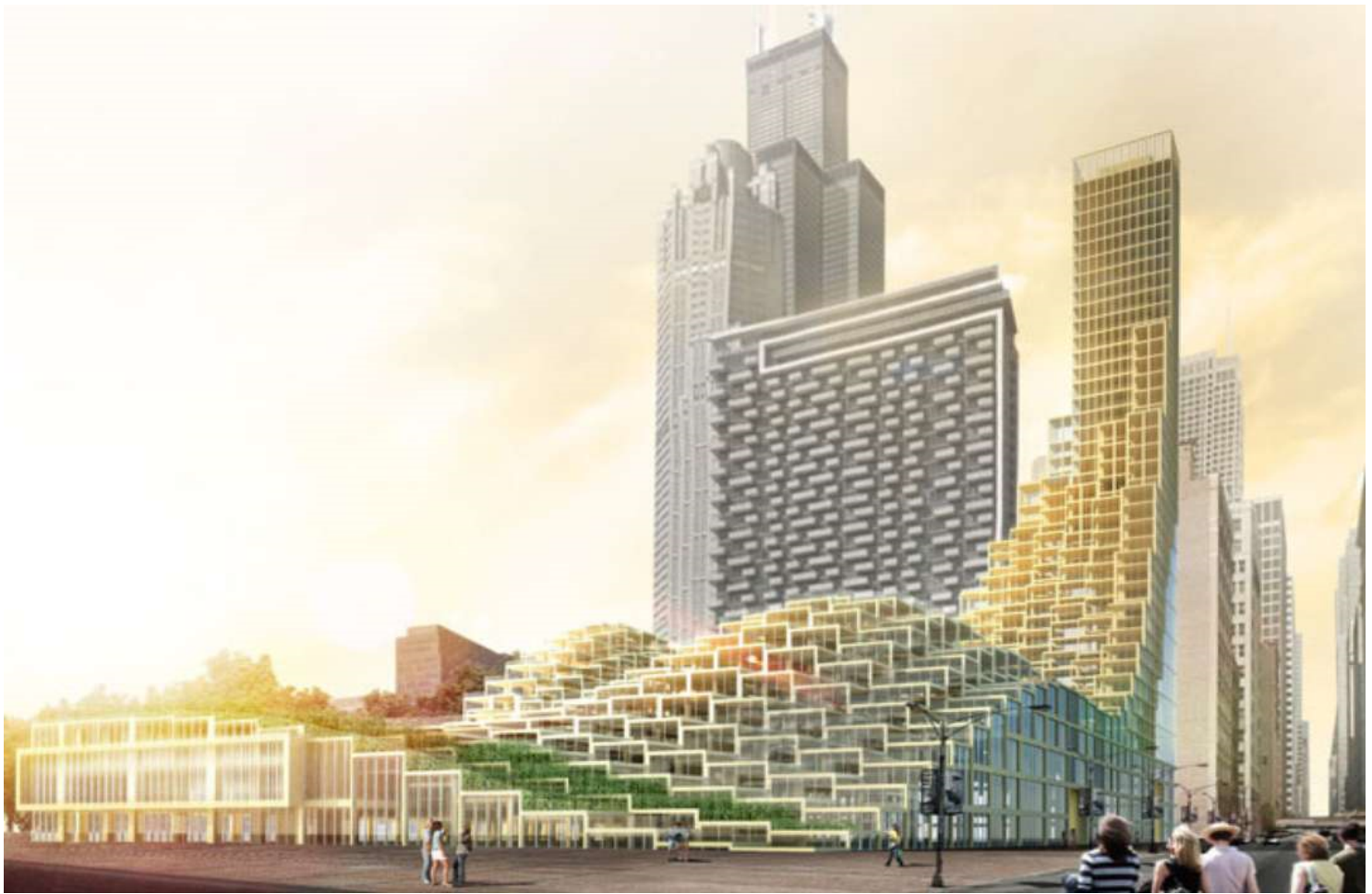
Creekside Resources Inc. / Mount Currie Band
 F.L. A71487
 New Site Area Blocks 355, 382, 62, 70, Visual Impact Assessment
 September 15, 2005

Prepared for B&B Forestry
 by:
RDI Resource Design Inc.
 Resource Planning and Visualization

EXAMPLE OF A VISUAL IMPACT ASSESSEMENT SHEET PRODUCED BY RDI FOR MOUNT CURRIE BAND 2005

VISUAL LANDSCAPE DESIGN APPROACHES

Ken Fairhurst, PhD, RPF
March 21, 2017



Wood is Good



A Selection of Visual Impact Assessments and Integrated Visual Design Plans produced for BCTS by Ken Fairhurst, RDI Resource Design Inc – 2015-2017

Ken Fairhurst's Background

- ✦ *BSF – UBC – Forest Management*
- ✦ *MSc Forestry - Parks and Recreation Resources UBC 1980*
- ✦ *PhD - Forest Management UBC 2010 –Dissertation on “GEOptics” Landscape Apparency for multi-functional Landscape Planning*
- ✦ *Adjunct Professor, UBC FRM (current);*
- ✦ *Co-taught FRST 491 – Landscape Planning and Visualization*
- ✦ *15 years Ministry of Forests – Regional Landscape Specialist*
- ✦ *21 years Head of RDI Resource Design Inc*
- ✦ *5 years Annual Contracts as VRM Specialist for the Kamloops Business Area*
- ✦ www.rdi3d.com – ken.fairhurst@rdi3d.com

<http://rdi3d.com/BCTS/Albreda2015-151119-4.pdf> 75mb

<http://rdi3d.com/BCTS/BM160107RDI.pdf> 19mb Berry Messiter

<http://rdi3d.com/BCTS/Dora151202RDI.pdf> 39mb Received FLNRO accolades

<http://rdi3d.com/BCTS/English Lake A93332 Visual Assessment RDI 2017.pdf> 6mb

<http://rdi3d.com/BCTS/FO7F7-2016.pdf> 6mb Foghorn

<http://rdi3d.com/BCTS/Foghorn-160318.pdf> 90mb

http://rdi3d.com/BCTS/Gotchen_Go15_2016.pdf 13mb

<http://rdi3d.com/BCTS/Harbour-160322-Final.pdf> 21mb

<http://rdi3d.com/BCTS/Little Hells Gate VIA RDI 160914.pdf> 5mb

<http://rdi3d.com/BCTS/Mahood-RDI-VIA-2017.pdf> 25mb Main Demonstration Project for Kamloops Session

<http://rdi3d.com/BCTS/Peddie Visuals 2017 RDI.pdf> 10mb

<http://rdi3d.com/BCTS/RDIFoghorn151107SH.pdf> 81mb

<http://rdi3d.com/BCTS/Stratton-160320.pdf> 32mb

<http://rdi3d.com/BCTS/Tracy2017-RDI.pdf> 11mb

<http://rdi3d.com/BCTS/Yellowhead VIA 2016 RDI.pdf> 14mb

<http://rdi3d.com/BCTS/RDI Tshinakin IVD-8.pdf> 126mb Integrated Visual Design with VQO relaxation

Helpful References

Forest and Range Practices Act Legislation; Compliance and Enforcement

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_02069_01

Government Action Regulation (GAR)

<http://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/policy-legislation/legislation-regulation/forest-range-practices-act/government-actions-regulation>

Visual Landscape Inventory Guide

http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/visual-resource-mgmt/vli_procedures_standards_manual97.pdf

VLI Training Manual

http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/visual-resource-mgmt/training-VRM/vrm_visual_landscape_inventory_course_manual.pdf

Visual Impact Assessment Guidebook

<https://www.for.gov.bc.ca/TASB/LEGSREGS/FPC/FPCGUIDE/visual/VIA-01.pdf>

<https://www.for.gov.bc.ca/rsi/Stewardship/Landscape/Visual%20Resource%20Management.pdf>

FREP Visual Quality Protocol

http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/visual-resource-mgmt/monitoring-VRM/vrm_protocol_for_visual_quality_effectiveness.pdf

Visual Quality Research Publications

<http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/visual-resource-management/visual-resource-research-publications>

Managing Change Brochure

http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/visual-resource-mgmt/vrm_managing_change.pdf

VQO Guide Poster

http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/visual-resource-mgmt/vrm_a_guide_to_visual_quality_objectives.pdf

Forest Practices Board Audit – Headwaters FD

<http://rdi3d.com/BCTS/FPB-Audit-Headwaters-FD.pdf>

Forest Appeals Commission 2015-FRP-002(a) Interfor Stuart Island see p.37-Due Diligence; P. 40 additional experts

<http://www.fac.gov.bc.ca/forestAndRange/2015frp002a.pdf>

Visual Landscape Design Training Manual

<https://www.for.gov.bc.ca/hfd/pubs/docs/mr/Rec023.htm>

Effect of VRM on Timber Supply Availability

http://www.siferp.org/sites/default/files/publications/jem_archive/ISS14/vol1_no2_art1.pdf

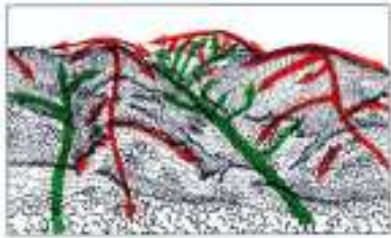
https://www.researchgate.net/publication/242256437_Beyond_Visual_Resource_Management_Emerging_Theories_of_an_Ecological_Aesthetic_and_Visible_Stewardship Sheppard

Outline

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1. Forestry Commission, UK

- **Small forest landbase**
- **Separate plan for each landform**
- **Originated with need to overcome hard lines and patterns of afforestation**
- **Landscape architects do the design**
- **Golden mean, not VQOs**



Lines of Force



Total Plan

Each landscape unit is fully planned using lines of force as a guide.

See: Lucas, Oliver. 1990. *The Design of Forest Landscapes.*



Afforestation in Scotland (photos by K. Fairhurst, 2003)

Design treats ridges (convexities) and hollows (concavities) as separate elements of the landscape. Afforestation patterns flow down over ridges and up hollows.



Afforestation in Scotland (photos by K. Fairhurst, 2003)

**Use of different tree species in different places (colours, textures).
Each unit a future coupe (harvest unit).**

2. BCMOF VRM Process

- **Origins of VRM program – USFS Visual Landscape Management System**
- **Design approaches adapted from Forestry Commission (UK) e.g. visual force analysis**
- **Distinction amongst other two processes is: use of quantified VQOs**
- **Conducted by operational foresters and engineers, VRM consultants**

There are five steps to the BCMOF process:

1. Visual Landscape Inventory

2. Analysis and Establishment of Visual Quality Objectives

3. Planning and Visual Design (our focus today)

4. Implementation of Forest Practices

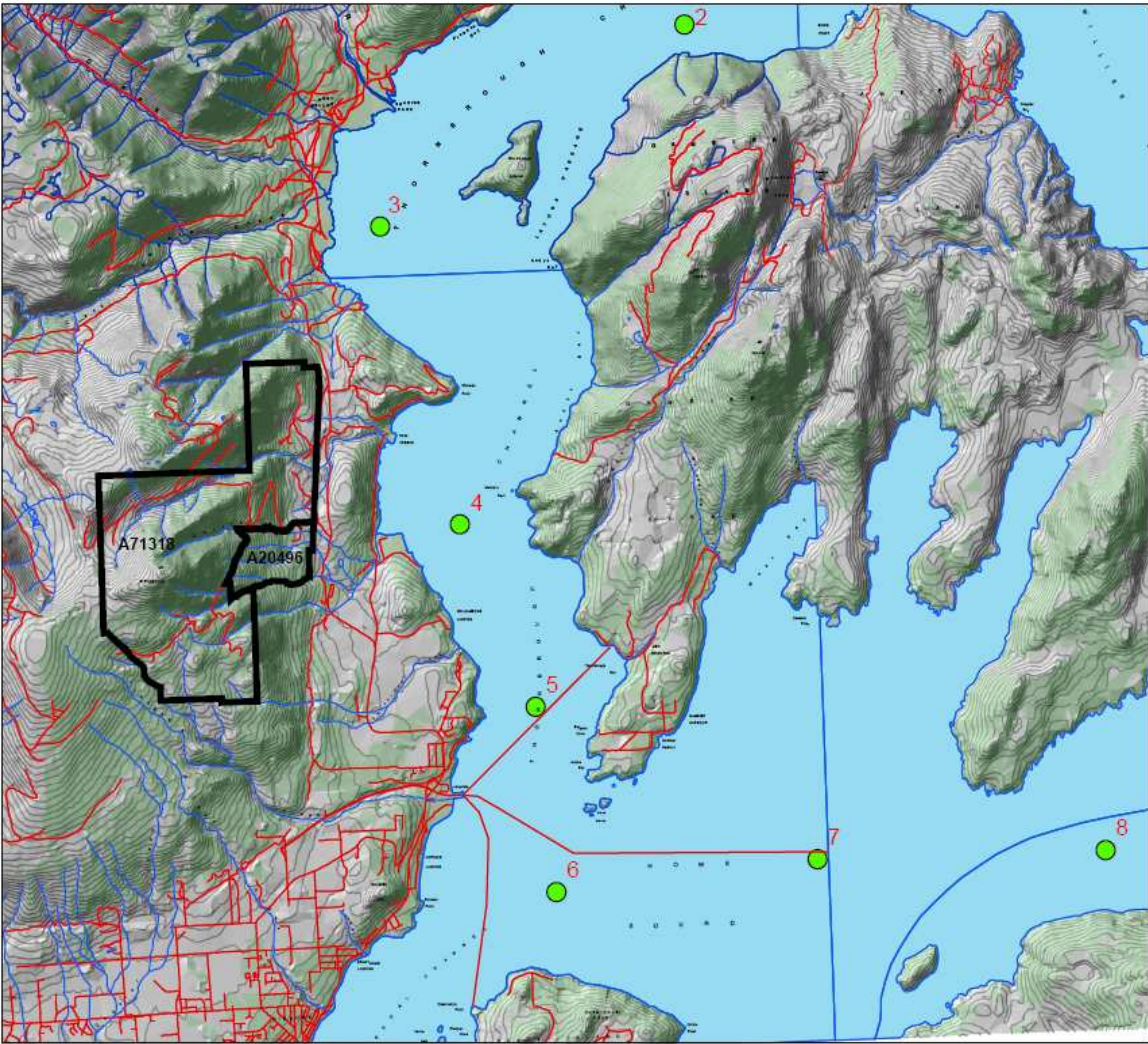
5. Monitoring

3. Planning and Visual Design

On-the-ground forest practices are designed that are capable of meeting the established visual quality objectives (VQOs) or recommended Visual Quality Classes.

A preliminary analysis might be undertaken with GIS to define the cumulative visibility.

Port Mellon Woodlot Visibility Analysis



Produced by KB Fairhurst, RDI Resource Design Inc. for Ministry of Forests, Sunshine Coast Forest District, 2005

Visual impact assessments (VIAs) are an integral part of step 3 (Planning and Visual Design) of the visual resource management process.



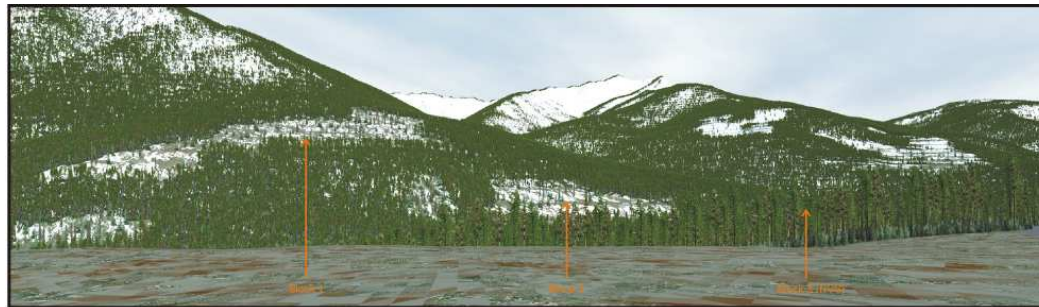
They are used to estimate the potential visual impact of proposed operations on scenic resources and to assess whether the VQOs would be achieved and carried out to achieve stated visual objectives.



Eakin Creek Project Produced by RDI for E.P. Runtz, 2006

VRM Key Steps - 4. Implementation of Forest Practices

On-the-ground forest practices are carried out to achieve stated visual objectives with greater assurance following design and testing in step 3.



Visualization Produced with Visual Nature Studio

Upper Parking Lot Viewpoint



Photo by Greg Dubois

Intrawest Panorama
Visual Simulation from Upper Parking Lot - Panorama, B.C.
March 10, 2006
Produced by RDI for Intrawest 2006

Prepared for Summit Valley Contracting Ltd.
by:
RDI Resource Design Inc.
Resource Planning and Visualization

VRM Key Steps – 5. Monitoring

When harvesting or road construction/modification operations are completed, monitoring is conducted to determine whether these operations achieved the visual objective.



RDI Photo – Interfor Operations – Cordero Channel 2006 – What is the VQO?

VQO Definitions VIA Table 1 (Pre-FRPA)

VQO definitions are used as one measure of the ability of proposed operations, in combination with non-visually effective green-up (nonVEG) alterations, to achieve the basic VQO. Visually effective green-up (VEG) is achieved when a new forest can be seen and when bare ground and stumps are covered over.

Table 1 Visual quality objectives: five levels of landscape alteration

Preservation	(P)	No visible activities
Retention	(R)	Activities are not visually evident
Partial Retention	(PR)	Activities are visible, but remain subordinate
Modification	(M)	Activities are visually dominant, but have characteristics that appear natural
Maximum Modification	(MM)	Activities are dominant and out of scale, but appear natural in the background

<u>VISUAL QUALITY CLASS</u>	<u>SYMBOL</u>	Basic Definitions - FRPA - FPPR An alteration of a forest landscape resulting from the presence of cutblocks or roads, such that when assessed from a viewpoint that is representative of significant public viewing opportunities, the alteration is:
Preservation	P	(a) very small in scale, and (b) designed to be indistinguishable from the pre-harvest landscape.
Retention	R	(a) is difficult to see, (b) is small in scale, and (c) has a design that mimics natural occurrences.
Partial Retention	PR	(a) is easy to see, (b) is small to moderate in scale, and (c) has a design that appears natural and is not angular or geometric.
Modification	M	very easy to see and is either (a) large in scale with a design that is natural in its appearance, or (b) small to moderate in scale but with a design that has some angular characteristics;
Maximum Modification	MM	extremely easy to see and one or both of the following apply: (a) the alteration is very large in scale; (b) the alteration is angular and geometric.

Retention VQO/VQC

- VIA: APPENDIX 9, MODERATE DESIGN, 0.3% ALTERATION

FOR MORE EXAMPLES, SEE VIA: 59



FOLLOW LINK: <http://www.for.gov.bc.ca/TASB/LEGSREGS/FPC/FPCGUIDE/visual/via10020.htm>

Partial Retention VQO/VQC

- VIA: APPENDIX 9, MODERATE DESIGN, 5.3% ALTERATION

FOR MORE EXAMPLES, SEE VIA: 60-61

FOLLOW LINK: <http://www.for.gov.bc.ca/TASB/LEGSREGS/FPC/FPCGUIDE/visual/via10021.htm#E65E3>



Modification VQO/VQC

- VIA: APPENDIX 9, POOR DESIGN, 5.9% ALTERATION

FOR MORE EXAMPLES, SEE VIA: 62-63 Follow link: <http://www.for.gov.bc.ca/TASB/LEGSREGS/FPC/FPCGUIDE/visual/via10023.htm#E65E5>



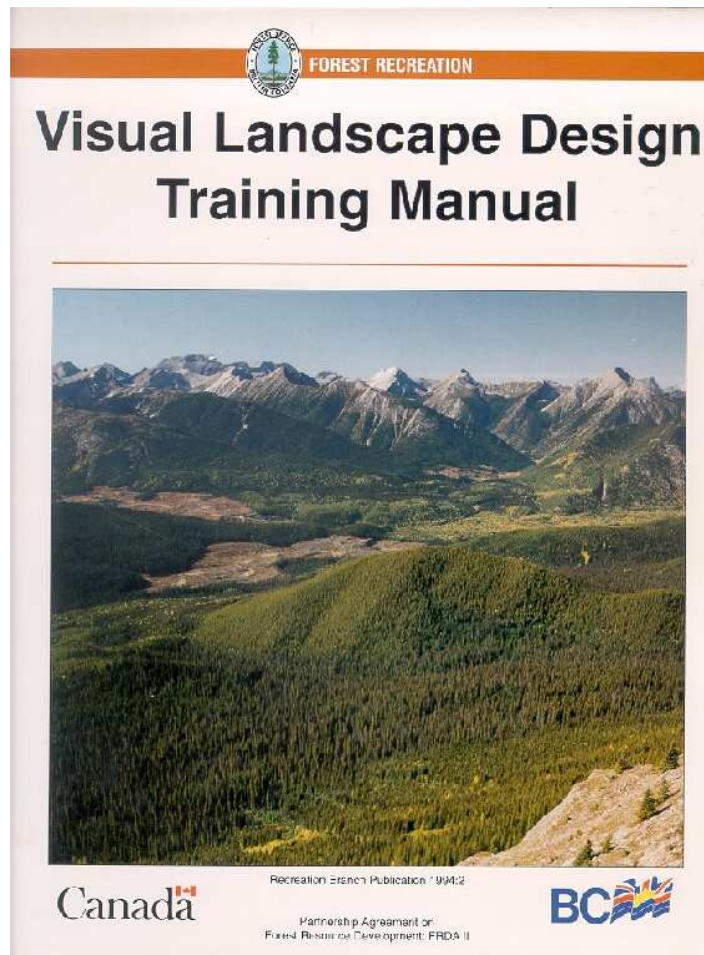
Maximum Modification VQO/VQC

- VIA: APPENDIX 9, POOR DESIGN, 21% ALTERATION

FOR MORE EXAMPLES SEE VIA: 64 Follow link: <http://www.for.gov.bc.ca/TASB/LEGSREGS/FPC/FPCGUIDE/visual/via10025.htm#E65E7>



Visual Landscape Design Training Manual (VLD: 6)



Visual Landscape Design
Concepts and Principles

Landscape Character Analysis

Design Applications

Design Techniques

Integrated Visual Design Process

Total Resource Design

OH D2: Design Elements (VLD: 10-48)

Some important Elements:

Shape – Line – Pattern – Texture – Scale – Colour – Unity – Diversity



Source: VIA Guidebook, Appendix 9. Ref.: VLD: 11-48.

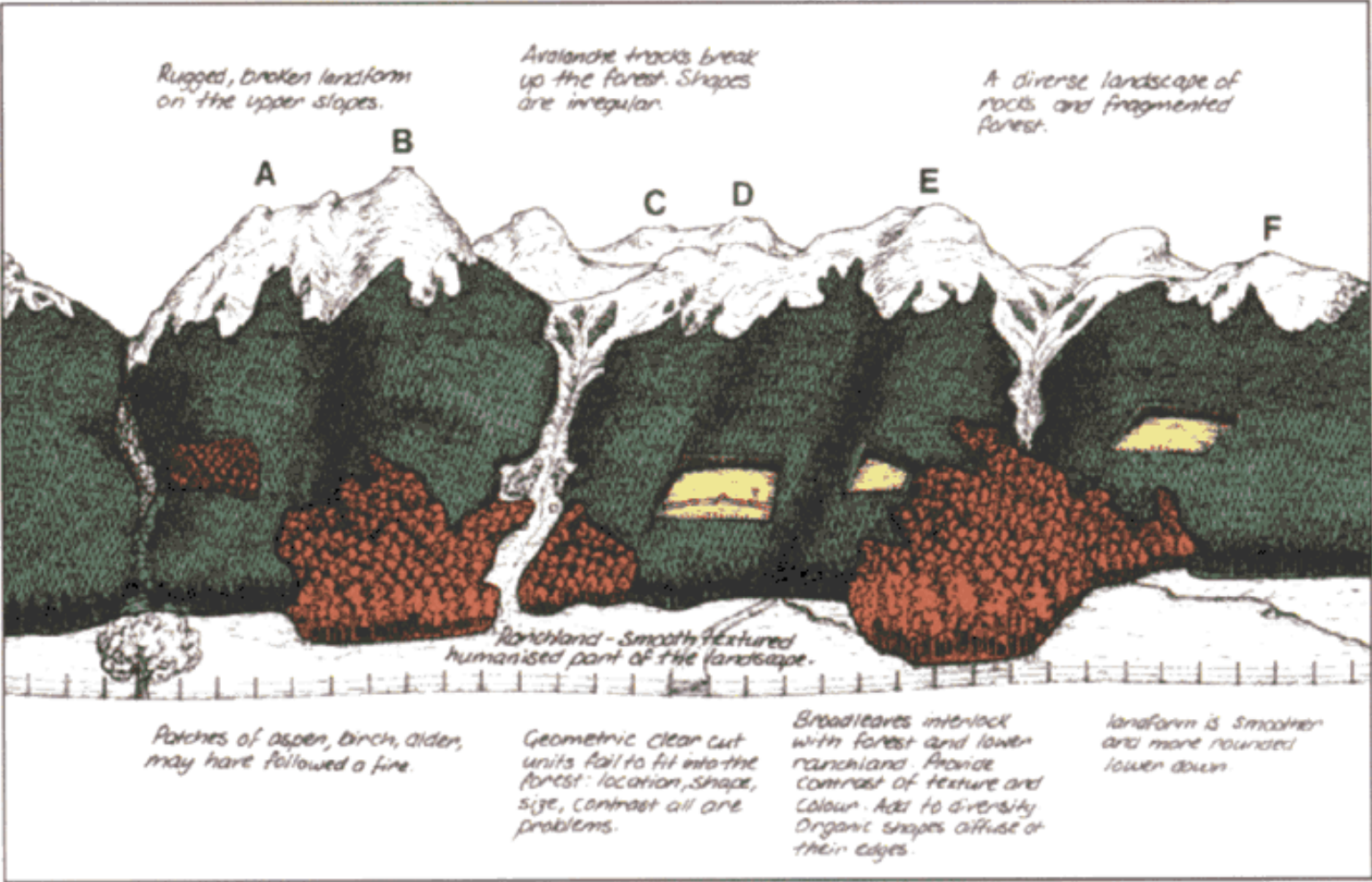
Landscape Character Analysis

Landscape Character Analysis has 2 components

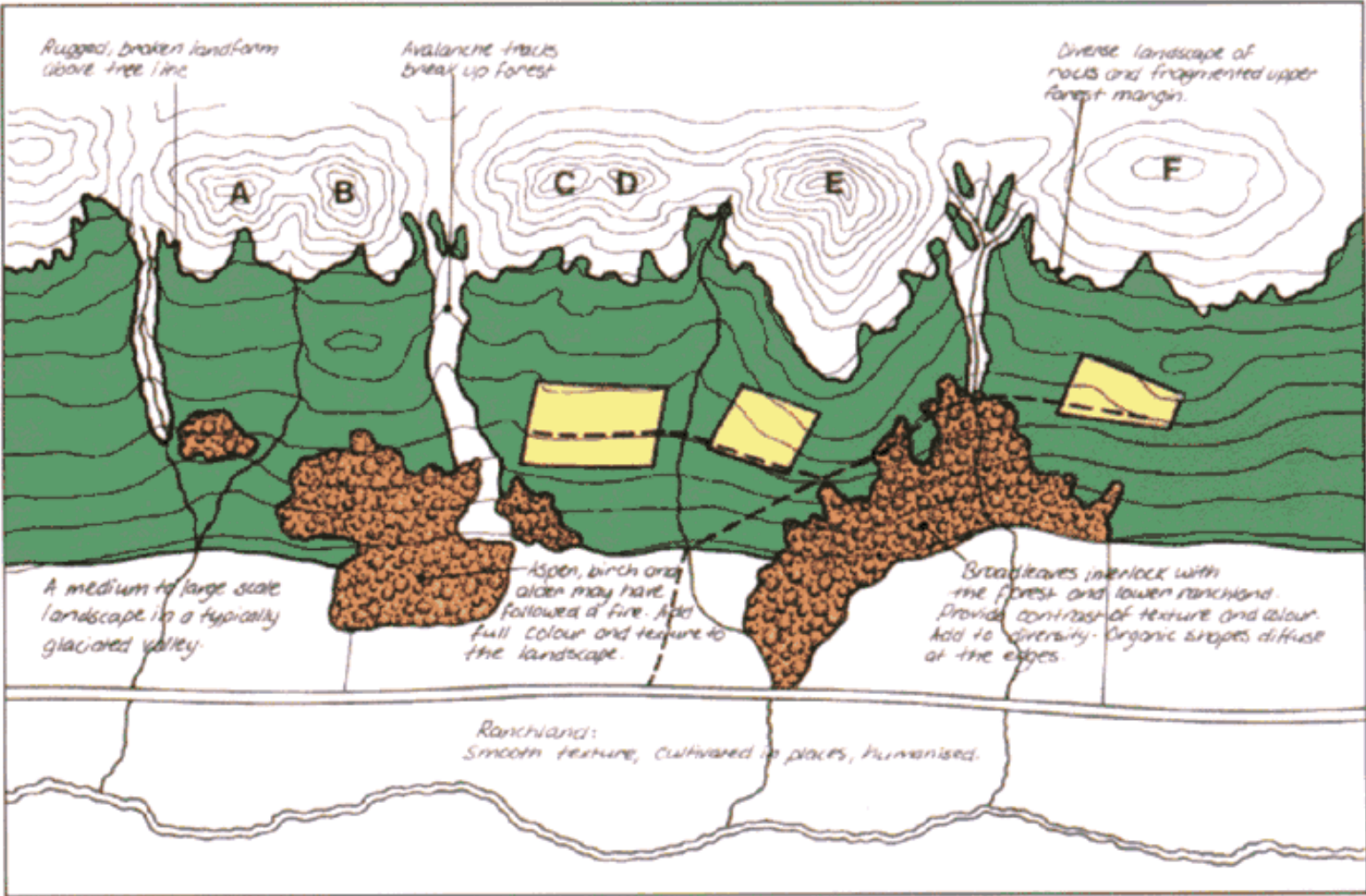
- Land Feature Analysis and Visual Force analysis (VLD: 46)**

Land feature analysis builds on the visual landscape inventory and identifies all the various features in the landscape that make up its character and diversity, its visual absorption capability (VAC), and its existing visual condition (EVC).

Land Feature Analysis in Perspective View (VLD:48)



Land Feature Analysis in Plan View (VLD: 48)





*Photos by Bernice Patterson, B&B Forestry, Panorama produced with Autostitch
(www.cs.ubc.ca/~mbrown/autostitch/autostitch.html)*

Exercise 1: Land Feature Analysis

Identify all the various features in the landscape that make up its character and diversity, its visual absorption capability (VAC), and its existing visual condition (EVC).

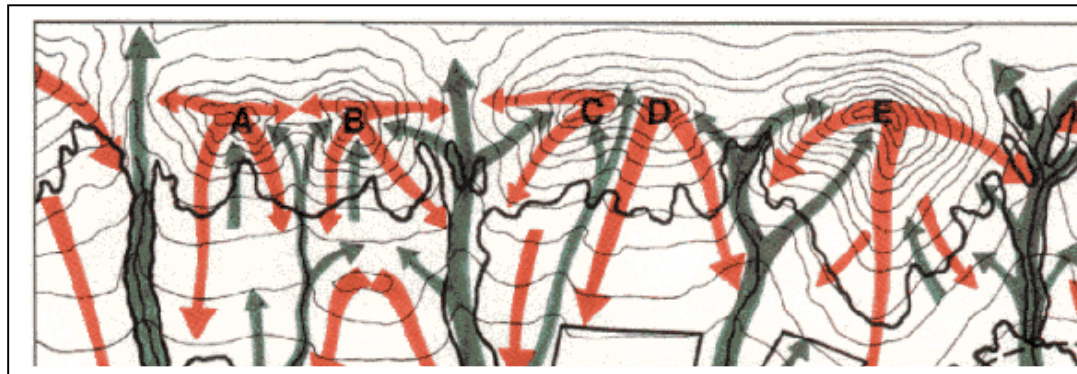
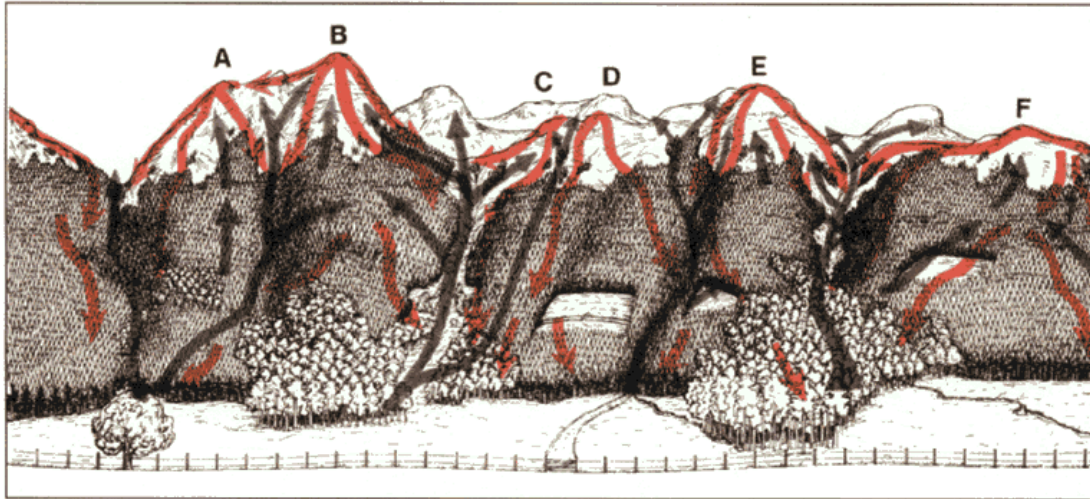
2. Visual Force Analysis (VLD: 44)

The visual force concept is based on the premise that, as we observe the landscape, our eyes are drawn up hollows and down ridge lines.

Perhaps more validly, visual forces are the structure of the landform – its ridges and hollows.

Learning how to map this concept is critical to developing cutblock designs that better fit the natural landscape.

Lines of force are mapped in plan and perspective view using different colours and weights of arrows: red arrows are drawn down ridges and green arrows up hollows.



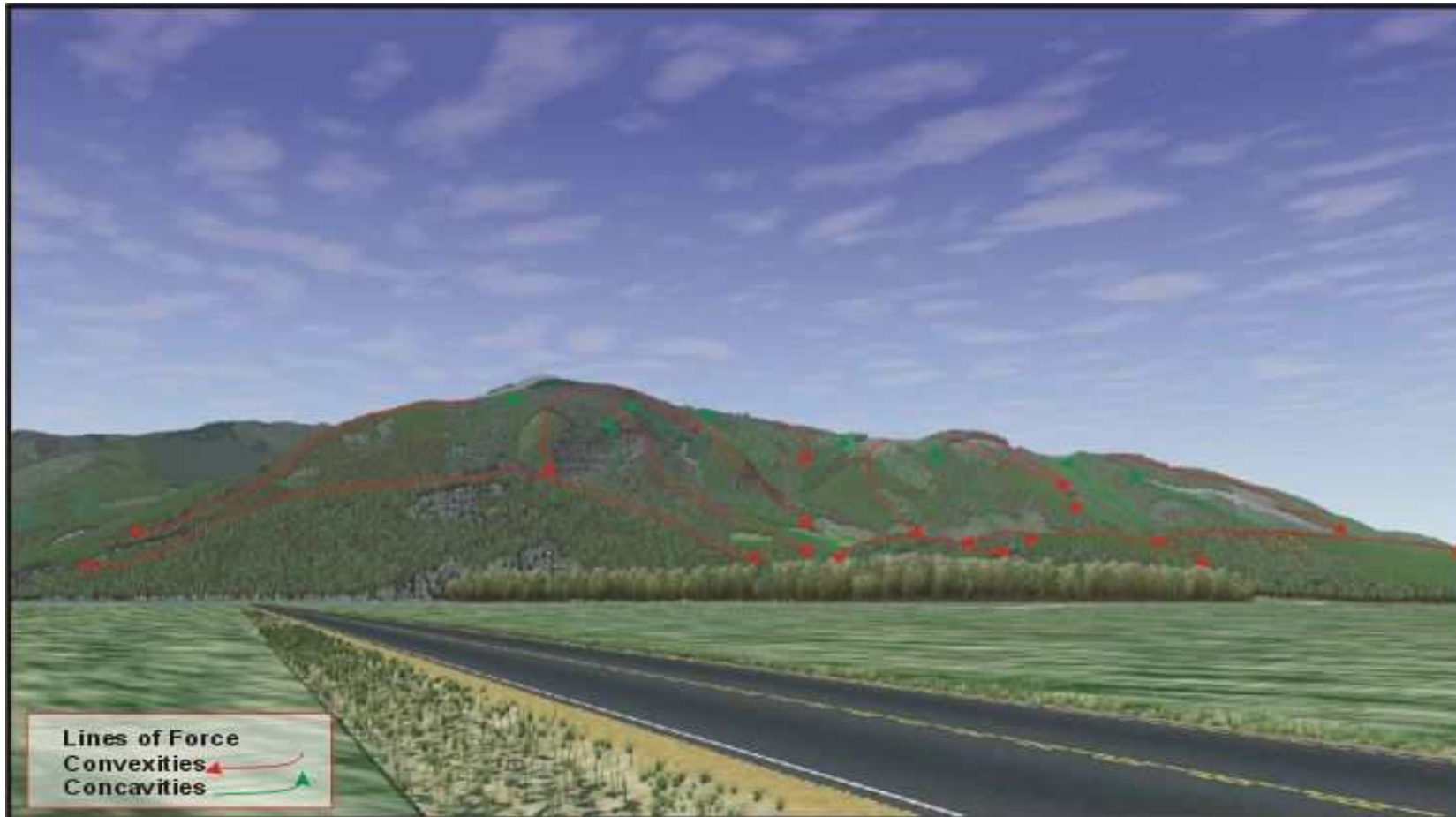
Visual Force in Perspective and Plan View (VLD: 45)

Using Visual Force Analysis (VLD: 46)

After mapping the landscape character and visual force lines in perspective and plan view, they are used to guide cutblock design.

When cutblocks are being designed, they should respond to visual force analysis mapping in plan view, by pushing up in gullies (green arrows) and dropping down on ridge lines (red arrows).

The weight of the arrow will dictate the amount of response. The thicker the arrow, the stronger the response; the thinner the arrow, the weaker the response.

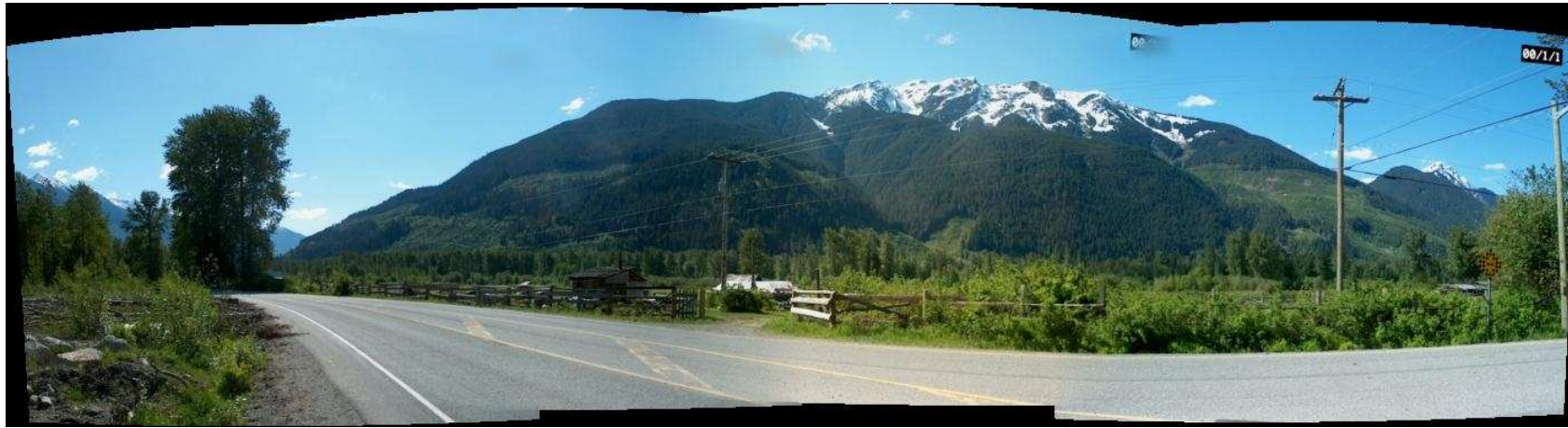


Viewpoint 1 Location:
 Highway 7 near Bateson Slough
 Lat: 49.279166
 Lon: 121.92839
 Elv: 19.7 m
 FOV: 60 degrees

Canadian Forest Products Ltd.
Coastal Operation - Harrison
F.L. A19208 Pretty Creek Visual Assessment Package
Blocks: 1497, 1498A, 1498B, 1499, 1451, 1495
 Revised with Block 1495, October 4, 2001

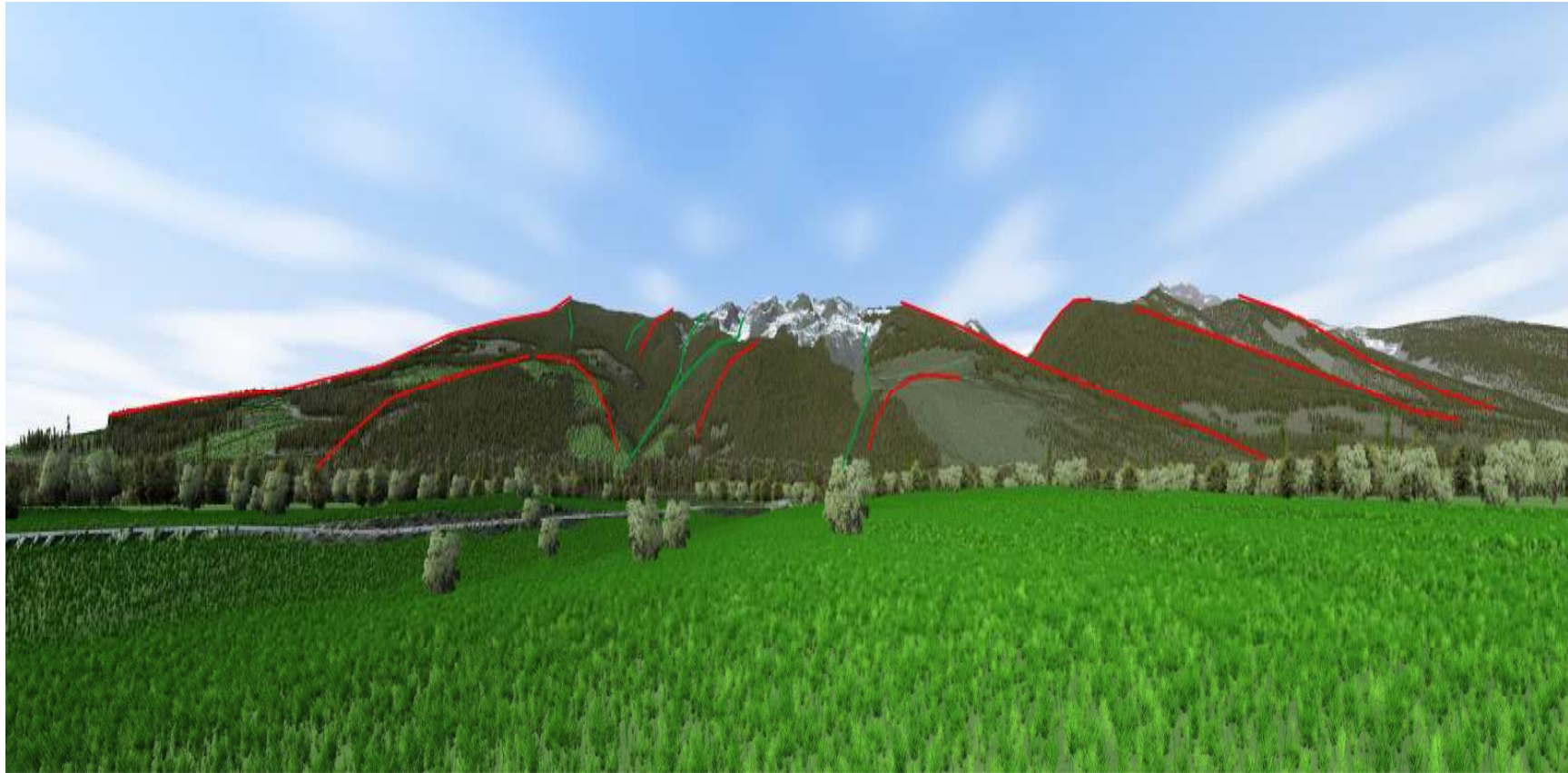

Resource Design Inc
 Forestand Land Planning Services
 4 of 9

Visual Force Example



Exercise 2: Visual Force Analysis (Landform Analysis)
Locate convexities (red down arrow) and concavities (green up arrow)

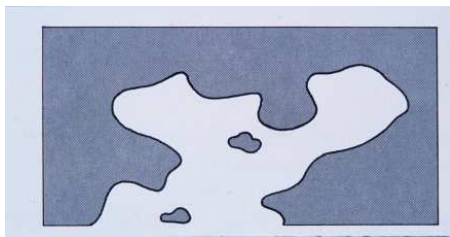
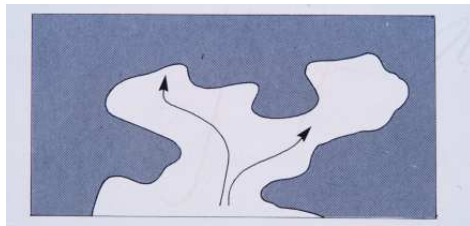
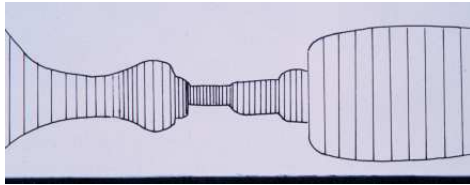
See answer sheet next page:



Exercise 2: Visual Force Analysis (Landform Analysis)
Convexities (red down arrow) and concavities (green up arrow)

:

3. Design of Harvesting Units (VLD: 71)



- Organic, interlocking shapes reduce apparent scale, increase screening.
- Retained groups and individual leave-trees break up visual prominence.
- Partial-cutting with 30-70% of stems remaining can avoid contribution to percent alteration and visible change. (see VIA:25-27)
- Forest Openings should consider the following design options:
 - Undulating forest edge
 - Feathering edges
 - Leaving tree patches
 - Using variable retention
 - Integrating block boundaries with forest type lines
 - Integrating block boundaries with old fire boundaries
 - Work with Visual Absorption Capability (VAC) – pattern, scale texture, color

Design of Harvesting Units (VLD: 71)



Integration with valley bottom reduces effect of line and shape. Leave-trees within block reduce bare ground effect. Shape blends with forest types. Terry Turner Photo - Alberta

Design Complete Pattern of Shapes (VLD: 77-79)



1. Untouched landscape photo



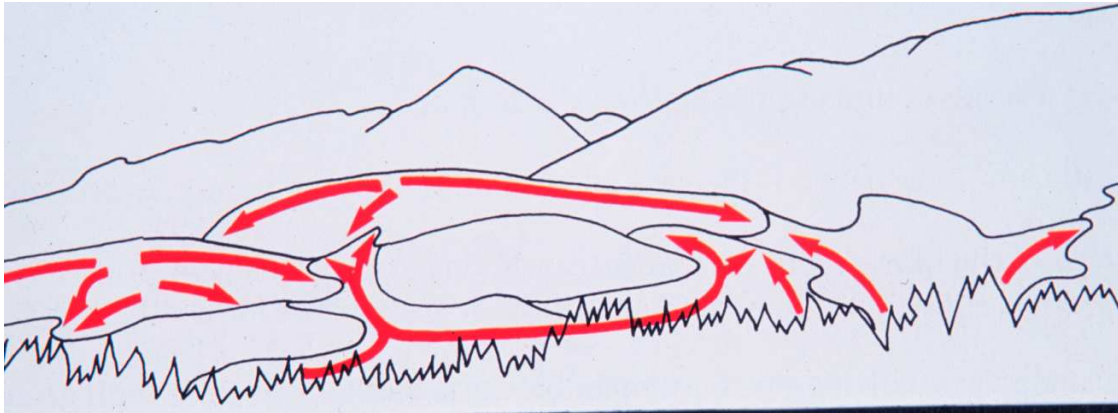
2. Sketch from on top of photo

**Force Line analysis
(Landform analysis)**

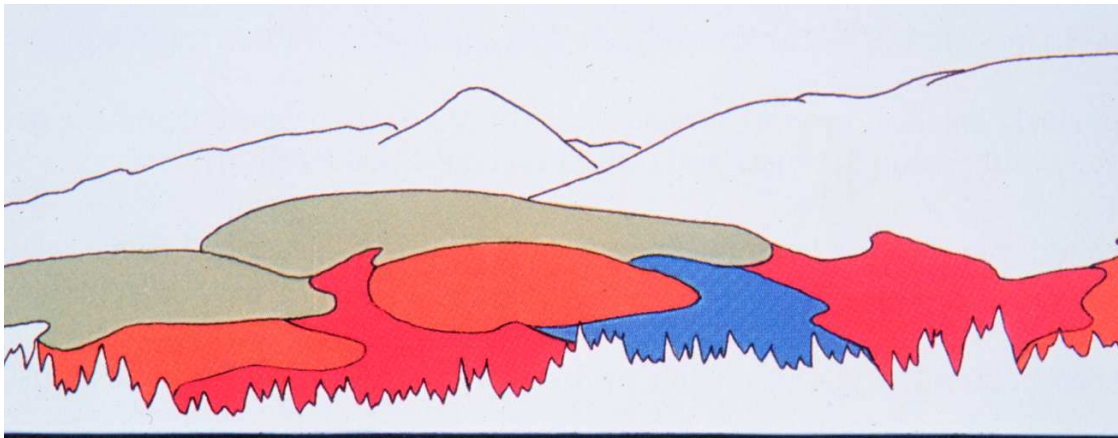
**Red lines – down
convexities (ridges)**

**Green Lines – up
concavities (draws)**

Design Complete Pattern of Shapes (VLD: 77-79)



3. Basic pattern of shapes based on landform structure. No Decisions as to what should take place. Convexities and concavities are separate units.



4. Assign a schedule. Spread for spatial separation and visual balance. Choose silvicultural and harvest systems.

Design Complete Pattern of Shapes (VLD: 77-79)



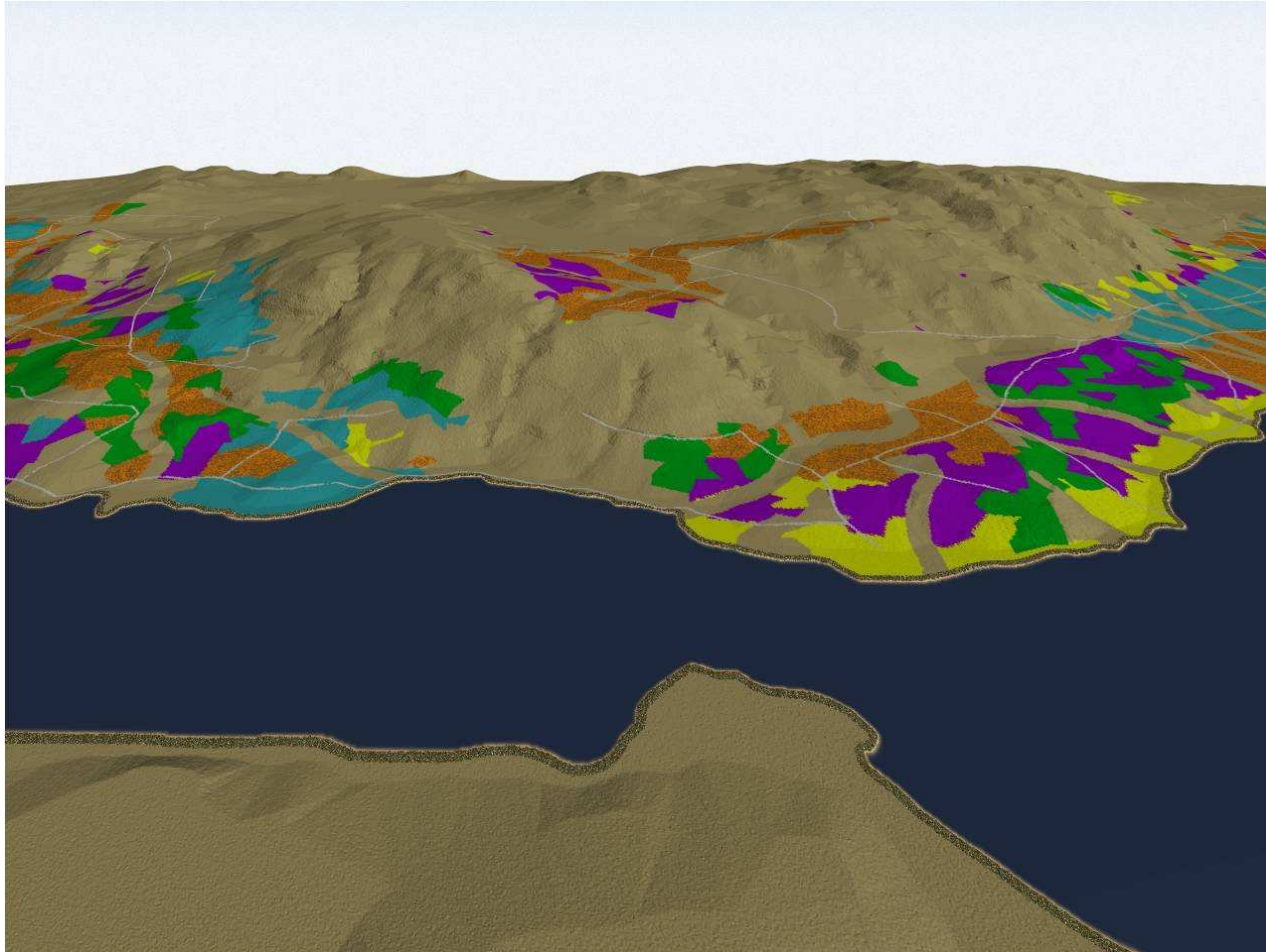
5. Phase 1. Two units in hollows are cleared, linking with valley bottom. Skylines are maintained. Residual trees left in clearing.

6. Phase 2. First units reforested and now have reached VEG (20 years approx.). Next 2 units harvested. VEG delay may have been avoided if new blocks were to be partial-cuts (no additional visual alteration).

7. Phase 3. New clearcut and partial-cut blocks harvested. Earliest clearcuts now 30-40 years. One unit remains as protected riparian zone.

Design Complete Pattern of Shapes (VLD: 77-79)

Houston Forest Products – Nadina Lake Integrated Visual Design RDI 2006





Design Applications: Roads



Roads have an enduring impact
Interfor TFL45 South Frederick Arm

Roads and other Linear Alteration

- **Avoid strong line effect across mid slope of landform**
- **Locate along forest edge**
- **Locate low on the landform**
- **Avoid skyline notching**
- **Dog leg off main road to limit sight line**
- **Minimize road right-of-way clearing**
- **Minimize cuts and fills**
- **Locate along forest edge**

Existing Visual Condition

Existing Visual Condition (EVC) is a measure of the present level of landscape alteration caused by human activities. EVC establishes the baseline from which additional landscape alterations, if made, would be measured. EVC is expressed as a Visual Quality Class as follows:

Preserved	P	No visible human-caused alterations
Retained	R	Human-caused alterations are visible but not evident
Partially Retained	PR	Human-caused alterations are evident but subordinate and therefore not dominant
Modified	M	Human-caused alterations are dominant but have natural appearing characteristics
Maximally Modified	MM	Human-caused alterations are dominant and out of scale
Excessively Modified	EM	Human-caused alterations are excessive and greatly out of scale

Note: Assess current conditions and update EVC if necessary

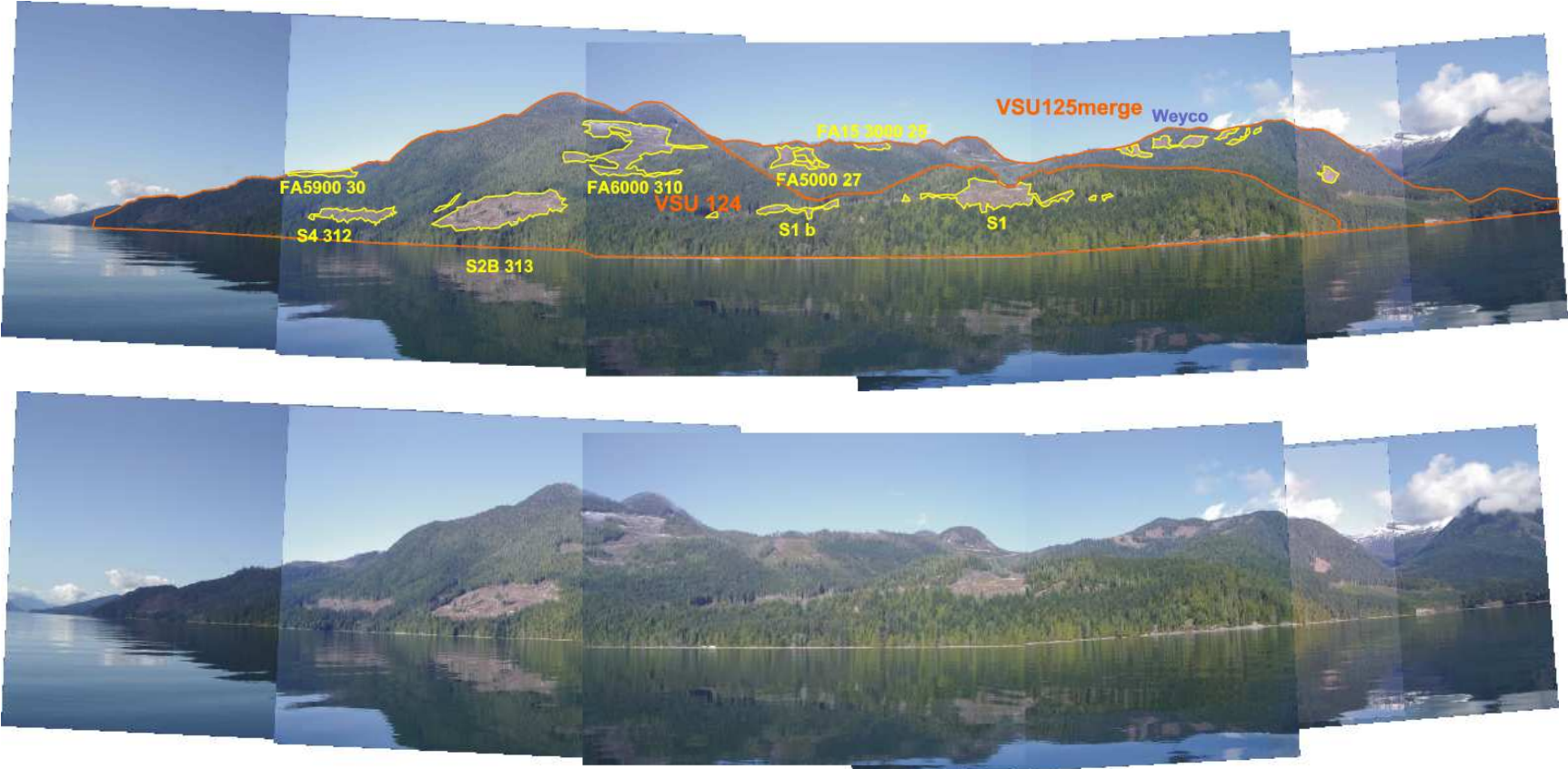
Note 2: New EVC-VQO definitions under FRPA eliminate percent alteration numbers:

R - "difficult to see, small in scale, natural in appearance"

PR - "easy to see, natural appearing, not rectangular"

M - "very easy to see, large in scale, natural appearing, or small to medium in scale but with some angular characteristics"

Percent Alteration – by VSU and Scene



Photos – K Fairhurst – Interfor Visual Resource Management Strategy, 2005 Frederick-Phillips-Cordero

RDI VP F4			
	VSU 124	FR	11.86%
	VSU 125 merge	FR	5.73
	Scene		11.34

9. Design Assessment Criteria

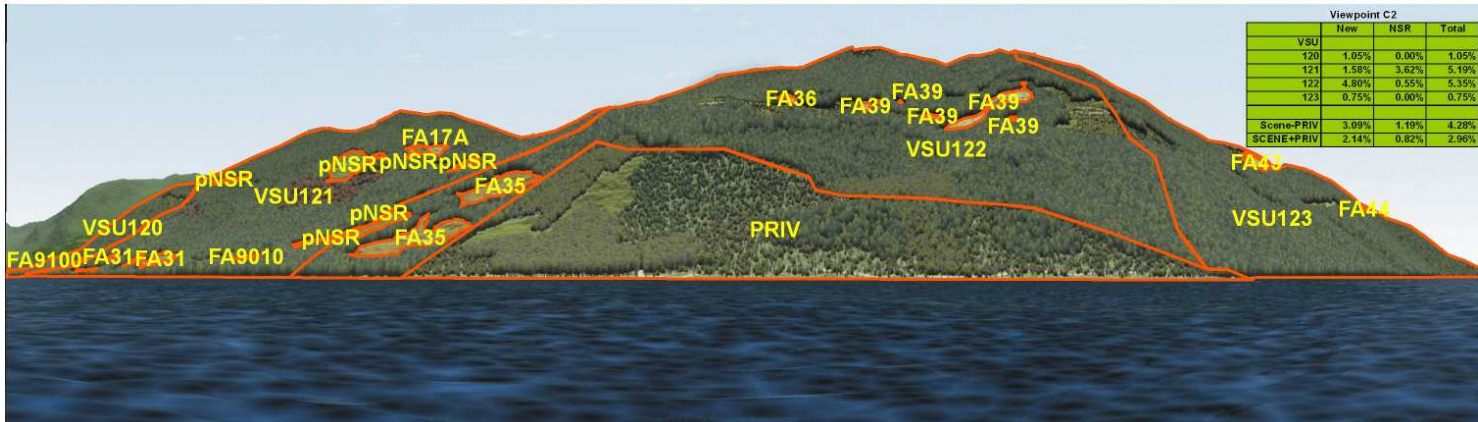
PROPOSAL MUST MEET THE 3 CRITERIA:

- 1. VERBAL DEFINITIONS WITH VQO/VQC TERMS**
- 2. VISUAL DESIGN**
- 3. NUMERICAL ASSESSMENT**

NOTE: EXISTING AND PROPOSED OPERATIONS MUST MEET THE BASIC VQO/VQC DEFINITION AND EXHIBIT APPROPRIATE DESIGN ELEMENTS.

IMPORTANT:

USE THE NUMERICAL ASSESSMENT ONLY AS ONE INDICATOR OF THE VQO/VQC CLASS THAT WILL BE ACHIEVED, BUT NOT AS THE LEADING OR SINGLE DETERMINING FACTOR.



**RDI PLANNING AND SIMULATION - INTERFOR'S CORDERO CHANNEL – FREDERICK ARM – PHILLIPS ARM 2008
VNS SIMULATION**



Exercise 5: Evaluate Block Design

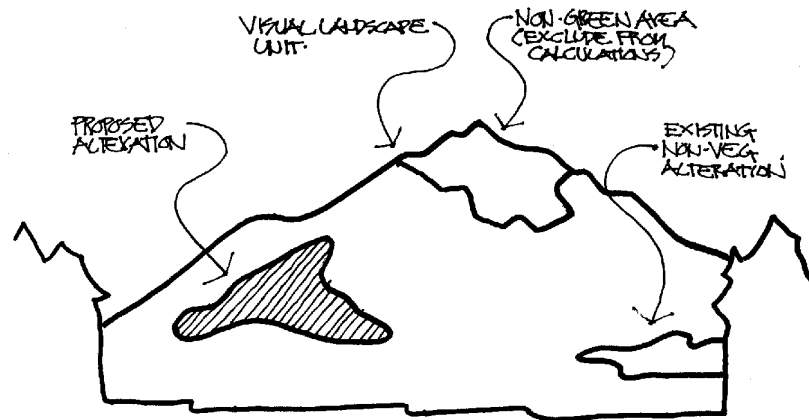
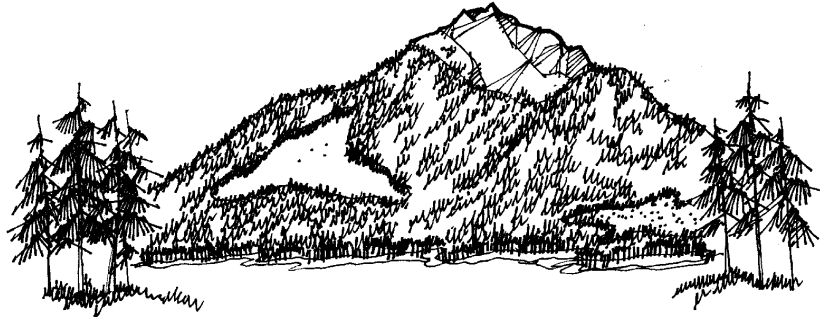
OH E9D: Assessment Criterion 3 - Numerical Assessment (VIA: 24-27) (Clear-Cut)

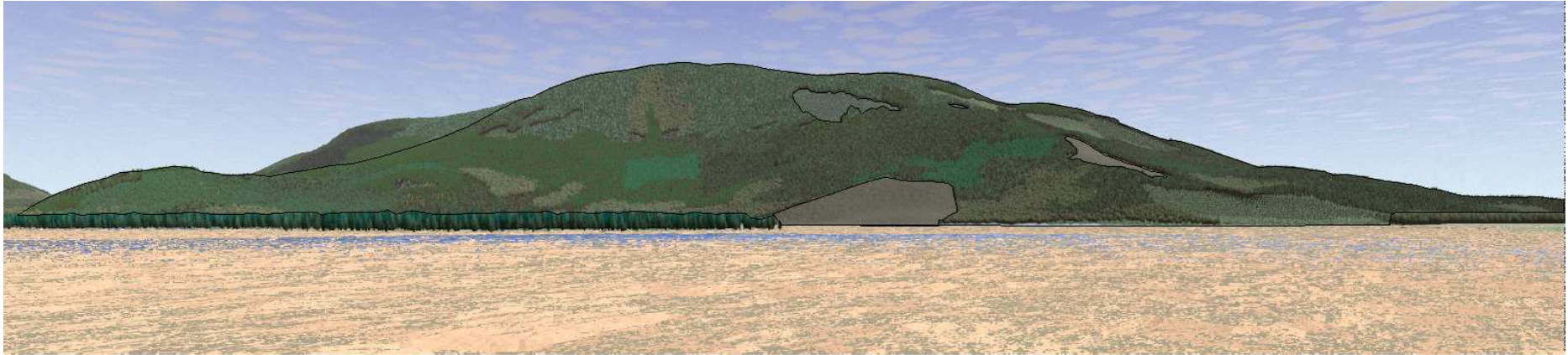
Visual quality objective (VQO)	Percent alteration per VQO	Percent of visual landscape or landform permitted to be in non-vegetated state	
		0-----10-----20 -----30	
Preservation	0		
Retention	0–1.5		
Partial Retention	1.6–7.0		
Modification	7.1–18.0		
Maximum Modification	18.1–30.0		

*Note 2: New EVC-VQO definitions under FRPA eliminate percent alteration numbers:
 R - "difficult to see, small in scale, natural in appearance"
 PR - "easy to see, natural appearing, not rectangular"
 M - "very easy to see, large in scale, natural appearing, or small to medium in scale but with some angular characteristics"*

Calculating percent alteration (VIA: 56-57)

Measure VSU, existing nonVEG, newly proposed, calculate percent in perspective view, by landform





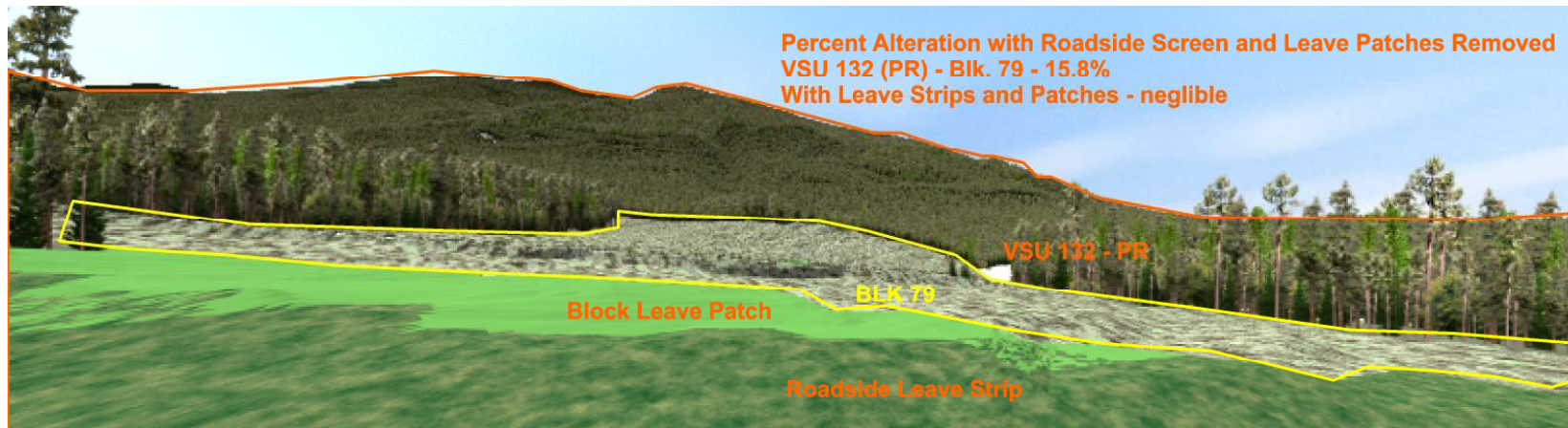
Percent Alteration in Perspective View

Define VSU – may be different from Landscape Inventory

Influenced by the angle of view where it hits the land-plane (Angle of Incidence)

The Angle of Incidence strongly influences Plan to Perspective ratios.

- discuss the relationship on timber supply planning and operational planning



Roadside Treatment Visual Analysis
CRB Logging Joffre Creek VIA 2005 – VNS Simulations



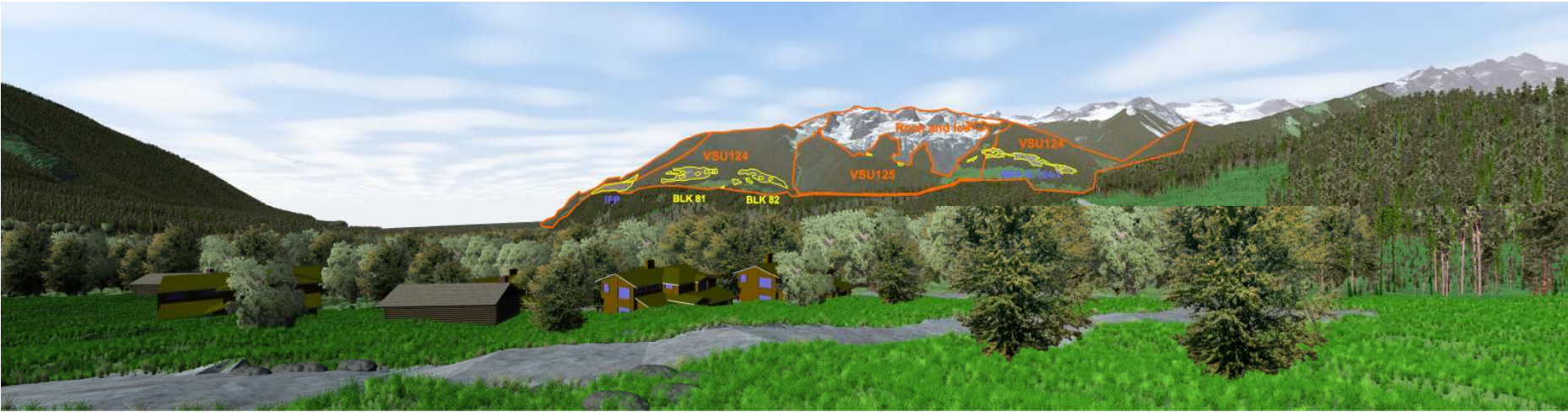
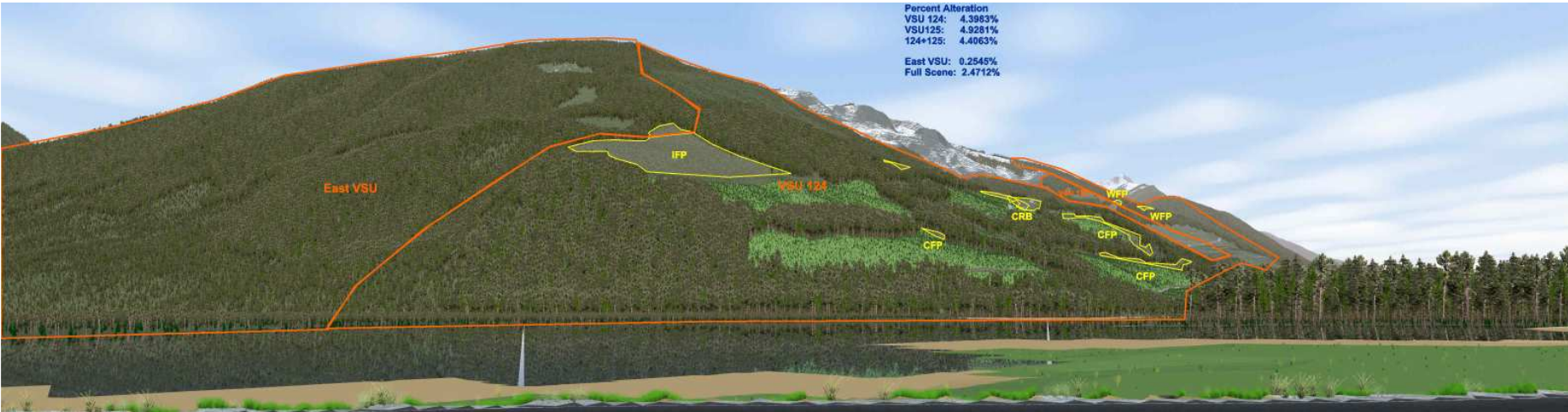
Bare Land portrayal shows full extent of proposed alteration, and is useful for Visual Force Analysis

10. Visually Effective Green-up



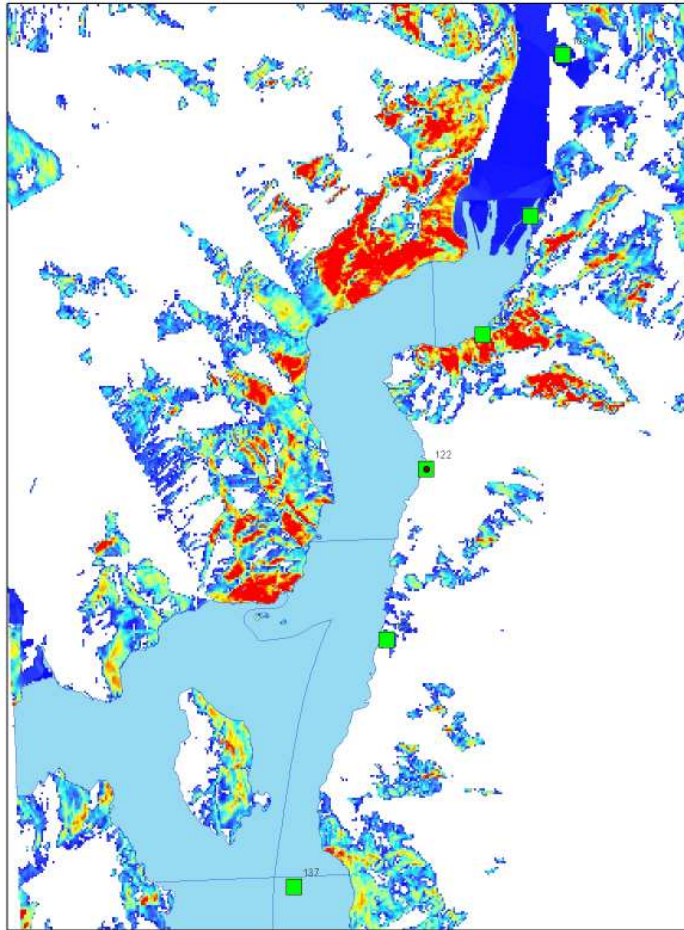
Visually Effective Green-up (VEG) KF Photo – Phillips Arm 2005

11. Angle of Incidence – P2P



Simulations by K.Fairhurst using Visual Nature Studio 3

12. GEOptics (Fairhurst Dissertation)



A process to provide advance indication of overall (cumulative) visual apperancy
– angle of visual incidence

13. Silvae – Forestry = Art



K. Fairhurst Simulation Alex Fraser Research Forest
Laurie McGugan Design with engineering consideration by Ken Day



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A Visual Aesthetic Assessment based on the VLS was completed for the Jack Pine Mine by the same people:
http://www.jackpinemine.com/code/products/oilsands/growth/mrm_v4_s7_5_visual.pdf

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Contacts

Ken B. Fairhurst
RDI Resource Design Inc
116 - 845 Denman Street
Vancouver BC Canada
V6G 2L7
604-689-3195
604-677-5924 (fax)
www.rdi3d.com
ken.fairhurst@rdi3d.com

Adjunct Professor
Forest Resources Management
Faculty of Forestry
FSC 2644, Forest Sciences Centre
University of British Columbia
604-689-3195
[Collaborative for Advanced Landscape Planning](http://www.calp.forestry.ubc.ca)
www.calp.forestry.ubc.ca