

Landform 1 with RDI shift suggestion

Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015

Contents

1	Cover Map
2	Contents
3	RDI Report 1
4	RDI Report 2
5	Interfor Report
6	Original Plan
7	RDI iMap VSUs
8	Viewpoint 1 Simulation and Analysis
9	Viewpoint 1 Original
10	Viewpoint 1 Photo
11	Viewpoint 1 Photo and Landform 1
12	Viewpoint 1 Visual Force Analysis
13	Viewpoint 1 Cutblocks in Photo
14	Viewpoint 1 Photo
15	Viewpoint 2 Simulation and Analysis
16	Viewpoint 2 Photo and Landforms
17	Viewpoint 2 Photo
18	Viewpoint 3 Simulation and Analysis
19	Viewpoint 3 Photo and Landforms

Analysis of FL 19232 Visual Quality

Dr. Ken Fairhurst, RPF, RDI Resource Design Inc, was asked by Interfor Corporation to review the Visual Plan prepared for the proposed FL A19232 cutblocks 129 and 227. RDI has 20 years of progressive experience in all aspects of Visual Resource Management and Planning in all regions of British Columbia, and is highly-regarded as an independent advocate for excellence in the professional discipline of VRM.

The operations are to be located on Vancouver Island on the south shore of Race Passage, part of the Alaskan cruise ship route along Johnstone Strait near Helmken Island and 8 km east of Sayward. The cutblocks are to be located near the shore at the foot of Hkusam Mountain – a very scenic, rugged and complex geological feature which reaches a maximum elevation of 1560m. It is amongst the most dominant features around the Sayward section of Johnstone Strait. The slopes become simpler and more uniform at lower elevations, cut by numerous deeply incised creeks. The terrain is also more gentle further west towards Sayward.

The information provided by Interfor consisted of a key map indicating viewpoints, The Visual Landscape Inventory (VLI) Visual Sensitivity Units (VSUs) with Visual Quality Objectives (VQOs), the cutblocks being advanced in the plan, photography, and a Visual Impact Assessment report prepared and signed by Kai Sonnenberg, RPF on December 10, 2015. The information was accompanied by a series of visual simulations dated between December 2, 2015 and December 16, 2015. These depicted the view from each of 3 viewpoints using Visual Nature Studio software (VNS) for 3D visualization.

Cutblocks were cut into the forested surface of the simulation model to provide visual estimates of the shape and scale of openings, accounting for topography, forest stand heights, and intervening tree-screening. Renderings and photographs were overlain with line estimates of the locations of the (VSUs) that were indicated on the key map. Interfor also delineated what they considered to be the relevant landform(s). One hybrid simulation was prepared by Interfor from Viewpoint 1 on December 18 which superimposed cutblock forms on the photo. A visual force analysis was also prepared which correlated the planimetric interpretation with perspective interpretation from Viewpoint 1.

The cutblocks are to be located within VSU 1604, a low-lying concave unit traversing an east-west oriented creek behind a low frontal shoreline landform (VSU 138). VSU 138 obscures some of the viewing opportunity towards the cutblocks approaching from the northwest along Race Passage. The VSU extends uphill north-east as high as the 300m elevation to meet the low height of land of VSU 138 along the shore, and up the foot of the steep main Hkusam Mountain landform reaching as high as 320m, meeting the base of 4 other VSUs over its 4300m length: VSUs 146, 1616, 1610, and 1606 (from east to west). The 4 mountain VSUs plus VSU 1604 at their base comprise much of the structure of the mountain's terrain. Unlike VSU 1604 which crosses the visual force lines, the mountain VSU boundaries above VSU 1604 follow visual force line convexities (ridgelines). All VSUs have the same VQO of Partial Retention (PR). There is no clear demarcation on the lower slope or evident purpose for VSU 1404 to climb above the creek onto the foot of Hkusam Mountain and so appears to be either misplaced or just arbitrary. This background will become useful later when examining the landforms identified by Interfor, and when discussing and further determining logical landform design units (Section 2).

The Interfor plan was provided to RDI as having incorporated their best operational practices to achieve the VQOs in design, conformity with visual forces, pattern and scale. The Interfor assessment found that PR would be achieved within their defined landforms from all 3 viewpoints, as discussed separately. Percent Alteration ranges from 2.2% (VP 3) to 6.5% (VP2). Viewpoint 1 achieved 5.4% alteration. The Forest and Range Practices Act (FRPA) Definition of PR is provided below.

A site visit was provided for RDI by Interfor with Bruce Gullickson on June 25, 2015. Inclement weather prevented good photography of the mountain tops, though the visit presented a good opportunity to experience, discuss and record the magnitude and proximity of the landforms and locations of the cutblocks. This report has examined the plan from each of the viewpoints and has made comments and recommendations.

1. Selection and Cutblock Coverage of Viewpoints

Three (3) viewpoints were selected by Interfor as the landscape would be experienced while boating from west to east along Race Passage (see key map). Alaska cruise ships on return travel pass along a route similar distance from the shore as indicated by the selected viewpoints. Viewpoint 1 is the most direct view while Viewpoints 2 and 3 increasingly diminish the extent of visibility of the cutblocks due to the intervening topographic screen of the frontal landform (VSU 138). Potential views of the area from further west than Viewpoint 1 towards Sayward are increasingly oblique to the landform and therefore incur greater landform and vegetative screening compared to Viewpoint 1.

2. Visual Sensitivity Unit / Landform Approach

Interfor's assessment approach adopted the most recent understanding of landform management espoused by FRPA Forest and Range Evaluation Program through the Protocol for Visual Quality Effectiveness Evaluation Procedures and Standards (FRPA FREP VQEE). In doing so, the visible portion of VSU 1604 which contains the proposed cutblocks was integrated with the VSUs reaching to the height of land (Hkusam Mountain) to make a single design landform. The approach is discussed individually, by viewpoint.

Viewpoint 1

Viewpoint 1 was “determined to be the most significant public viewpoint as it is a more direct and closer scale view of the cutblocks compared to the other viewpoints”. Consistent with the FREP VQEE, Interfor delineated a single landform (Landform 1) containing the cutblocks in VSU 1604 as seen from Viewpoint 1. The VSUs are outlined in red in the key map, Viewpoint 1 simulation, and visual force page. The landform shown was defined as a pink line in Viewpoint 1 simulation; a red line in photos), appears to extend from the dividing ridgeline between VSUs 1603 and 1606 as its western extremity eastward to include the west ridge of VSU 1616 (the actual east boundary of the Interfor's Landform 1 was somewhat unclear to RDI as there was no corresponding indication of the landform on the key map).

A distinct gully flows down the centre of the landform. It provides a strong visual force line to guide design and layout (numbered G2b by RDI on Interfor's visual force analysis page). The visual force analysis page (lines of force or LOF) for Viewpoint 1 indicated Interfor's understanding and good use of force lines - red arrows down convexities (ridges); green arrows up concavities (draws and gullies).

Cutblocks and the very substantial leave areas between the openings were designed to respond to them (see Cutblock Design Section of this report). RDI assigned numbers to the LOFs to assist interpretation between the perspective and planimetric views of the force lines. By so doing, the boundaries of Landform 1 became more obvious. RDI concluded that Landform 1 (the design landform for the cutblocks) properly incorporates the visible portion of VSU 1604 at the base of the main slope plus the 2 VSUs of Hkusam Mountain directly above the cutblocks – VSUs 1606 and 1610.

While RDI concurs with the Landform 1 assembly, it would prefer to see it utilize the immediately adjacent gullies (G1 and the LOF added by RDI: G7) rather than the vertical ridges as defining the east boundary (G1 LOF) and west boundary (just beyond the VSU 1610 edge – G7). The reason is that landforms complete themselves by rounding into the concavities rather than stopping at ridges. The dashed-line suggestions made by RDI in purple on the key map and in solid yellow on the iMAP BC map of complete VSUs shows the suggested adjustment. For clarity of understanding and verification, Interfor's cover map should reveal the VSUs and landforms to the height of land as shown in RDI's iMap.

Viewpoint 2

Interfor has defined 2 landforms seen from Viewpoint 2. Whereas all cutblocks fitted within the single landform from Viewpoint 1, a division was made in that landform down the ridgeline boundary between VSUs 1610 and 1606, placing the small westerly blocks into Landform 2. Landform 1 extends east to the west ridgeline of VSU1610 as in the Viewpoint 1 landform. The west extent of Landform 2 was not outlined on the simulation, though RDI inferred that it extends fully across VSU 1603 rather than to the break between VSU 1603 and 1606 as in Landform 1. RDI would prefer to leave VSU 1603 out of the design landform. It leads northwesterly towards Sayward as a distinctly lower topographic unit having a much simpler character than the main Hkusam landform.

Again, RDI prefers landform divisions down concavities (green LOFs) and would encourage the west boundary to be shifted to LOF G1 as numbered on the LOF page. The purpose of the split into two landforms from Viewpoint 2 was not addressed by Interfor in their report. The larger single design landform as indicated in Viewpoint 1, together with RDI's suggestion to utilize the gullies (G1 and G7) immediately adjacent to the current ridges defining the landform should be considered for the Viewpoint 2 simulation. The RDI suggestion would easily accommodate the proposed alteration within PR limits while respecting the concept of landform definition. The coalesced, highly complex Hkusam landform provides greater opportunity to work with the strong vertical LOFs within the landform, which include the Viewpoint 1 LOFs. No LOF analysis was prepared by Interfor from Viewpoint 2. Placement of landform boundaries on the key map by Interfor and LOF determination would assist that understanding.

Viewpoint 3

The Landform 1 identified in the Viewpoint 3 simulation is similar to the Landform 1 indicated in the Viewpoint 2 simulation, except that it includes all of the visible development of cutblock 129. Block 227 is not visible from this viewpoint, as it will be screened from view by the VSU 138 landform. RDI suggests that this version of Landform 1 be expanded to between LOF G1 and LOF G7 for consistency with the other viewpoint versions. Placement of landform boundaries on the key map and LOF on the viewpoint image by Interfor would assist that understanding.

3. Cutblock Design

Interfor's Visual Assessment report indicated that the cutblocks were placed low on the landscape, used organic shapes, had a strong response to visual lines, and were small to medium in scale. The Visual Absorption Capacity of the landscape was identified as moderate to high given a "multi-textured patchwork" of earlier harvesting and original forest allowing the cutblocks to blend well. RDI agrees, in general, and considers the plan to be a serious effort and an indication of responsible visual resource management within this important Scenic Corridor.

While the development is fairly accomplished in design, RDI would encourage a further look at the largest opening of cutblock 129 as seen from Viewpoint 1. The opening would climb from near the shore at about 20m elevation to nearly the 160m elevation over about a 400m run (verification requested). This creates a somewhat stark, open appearance and is centrally located in the view of the landform. It has neither the oblique view angle benefitting the much larger Block 227, nor the screening of the much smaller openings of Block 129. The opening exhibits only subtle responses to the LOFs (pushing up hollows; down convexities).

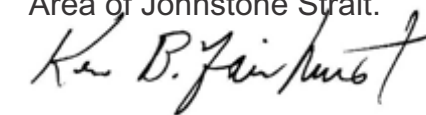
RDI's recommendation is to bring the upper southwest corner somewhat downhill as suggested by the orange line in the Viewpoint 1 simulation. Without the benefit of having the use of the 3D model for exact location, RDI remains unsure of the planimetric location of the suggested adjustment. By interactively tracing in perspective view with VNS to see the corresponding location in planimetric view, Interfor can produce a quick and simple approximation of line can be determined in VNS, which can then be exported to bring into ArcMap to refine the shape of the opening.

4. Summary and Conclusions

The proposed development for FL A19232 is situated at the bottom of the Hkusam Mountain. The proposed development will be easy to see as evidenced in the simulations prepared by Interfor dated from December 2, 2015 to December 16, 2015, and the related, undated development map with viewpoints, creeks and topographic lines (elevations were incorrectly numbered on the map). The single landform approach used by Interfor is supported for design and assessment purposes following FREP guidance. The design landform requires some refinement as suggested in this report to produce a single landform covered by all 3 viewpoints, and one that is shown clearly on the key map.

The visual force analysis in planimetric and perspective views prepared by Interfor for Viewpoint 1 proved to be highly useful for interpretation and for guiding the design of cutblocks. Similar analysis should be completed for the other two viewpoints, applying the numbering system initiated by RDI to assist tracking.

Overall, the layout of the entire plan appears to be a well-considered, fairly natural-appearing array of several small to moderately sized openings capable of largely meeting the intent of the PR VQO assigned to the VSUs and the design landform (when adjusted per RDI's suggestions). The largest opening of Block 129 requires some adjustment to make it more natural appearing and less starkly open to view. RDI asks that a design change for the cutblock be tested in VNS to bring it into fullest conformity with the VQO in this highly sensitive Scenic Area of Johnstone Strait.



Ken B. Fairhurst, PhD, RPF
RDI Resource Design Inc
December 21, 2015

Coastal Woodlands

Visual Impact Assessment
Bear Lake – FL A19232

Blocks – BLK-129, BLK227

This Visual Impact Assessment (VIA) is for blocks BLK-129, BLK227. These blocks are planned for conventional harvesting – clearcut with reserves. These blocks are within a designated Scenic Area and are covered by Visual Landscape Inventory Polygon 1604 with a recommended Visual Quality Condition 'rVQC' of 'Partial Retention'.

The *Partial Retention* category of visually altered forest landscapes is described as consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint is easy to see, small to medium in scale and natural and not rectilinear or geometric in shape.

This Visual Impact Assessment is consistent with the requirements of the Campbell River Mainland, Forest Stewardship Plan 2006 which was approved on February 23, 2007 and extended on February 20, 2012.

The viewpoints shown on the VQO overview map were picked to show the best possible views of blocks BLK-129, BLK227. Viewpoint 1 was determined to be the most significant public viewpoint as it is a more direct and closer scale view compared to the other viewpoints.

Individual landforms were identified from the viewpoints during the field assessment and photographs were taken to confirm detail. A digital terrain model was then developed based on the information collected in the field.

The assessment includes a Digital Terrain Model (DTM) taken from each viewpoint and a Visual Alteration Percentage Breakdown Table for the viewpoints. The table below was calculated to show the percent alterations for each of the viewpoints within the viewscape to be used as a numerical assessment tool in determining whether or not the visual management strategy has been achieved (see summary of calculations below).

Percent Alteration Summary Table 1

View-point	Block(s)	L.U. Class	Percent Alteration %	Landscape Inventory Polygon	Achieved / Not Achieved
1	BLK-129, BLK227	PR	5.4	1604	Achieved
2	BLK-129, BLK227	PR	6.5	1604	Achieved
3	BLK-129, BLK227	PR	2.2	1604	Achieved

Cublocks BLK-129 and BLK227 were engineered with visual quality objectives in mind, and care was taken to ensure they conformed to the VQO of Partial Retention by placing them in a low position on the landscape, using organic block shapes (i.e. avoiding rectilinear and geometric shapes), using block shapes with a strong response to visual lines of force and by creating 3 separate openings that are small to medium in scale. Furthermore, the current landscape consists of a multi-textured patchwork of old, mature, mid-seral and young forests resulting in a viewscape with a moderate to high visual absorption capacity. Cutblocks BLK-129, BLK227 blend well into the existing textures of the viewscape.

To solidify the achievement of the visual quality objectives, the percent alterations of the landform in perspective view, were below or within the range for the Visual Landscape Inventory Polygon.

In summary, development of cutblocks BLK-129, BLK227 is consistent with the visual quality objectives for Visual Landscape Inventory Polygon 1604.

Attached to this assessment are the following:

1. Visual Overview Map – Bear Lake
2. Digital Terrain Models by Viewpoint
3. Lines of Force Analysis for Viewpoint 1
4. Visual Impact Assessment Summary Forms for Each Viewpoint

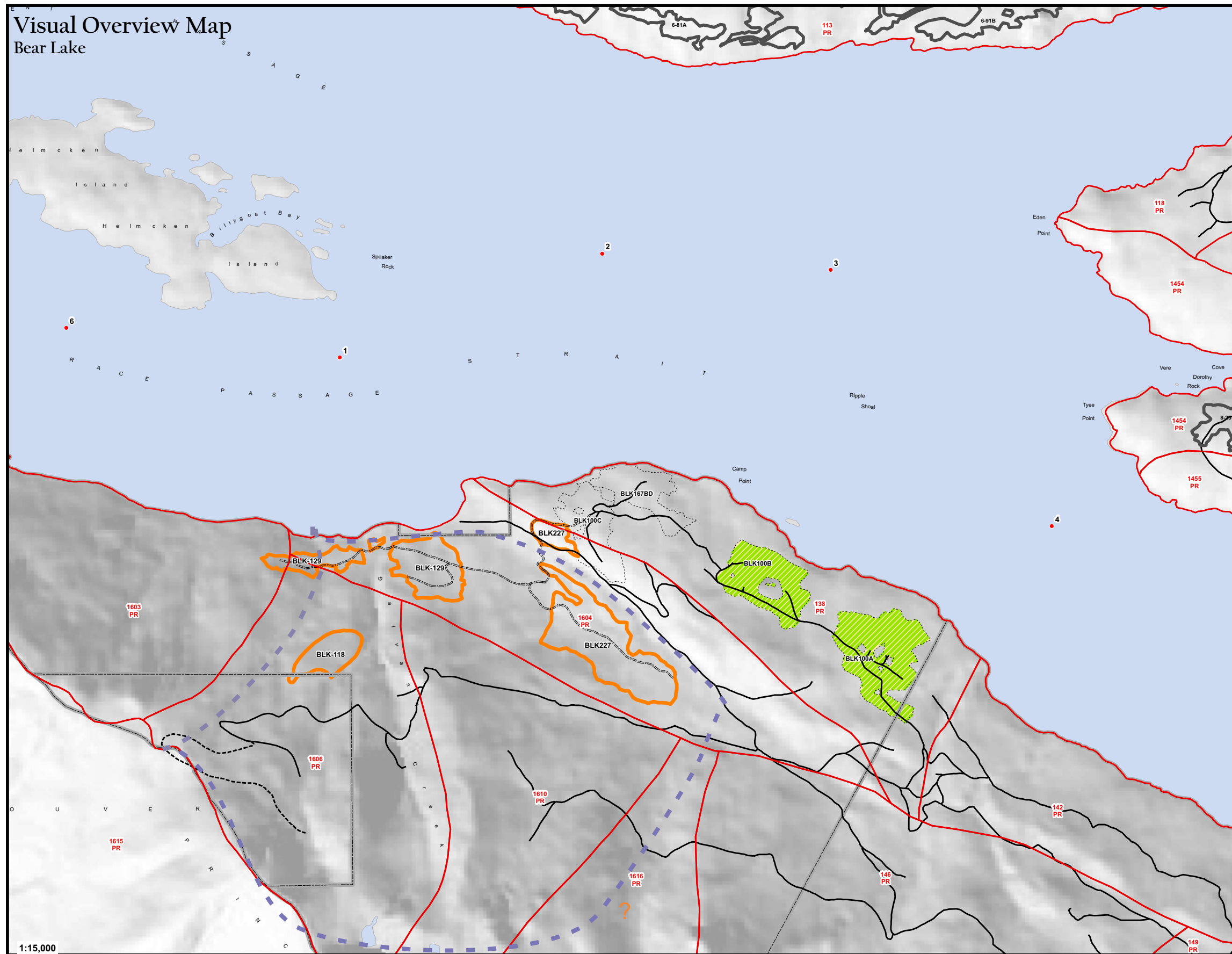


Kai Sonnenburg, RPF
Area Forester

12/10/2015

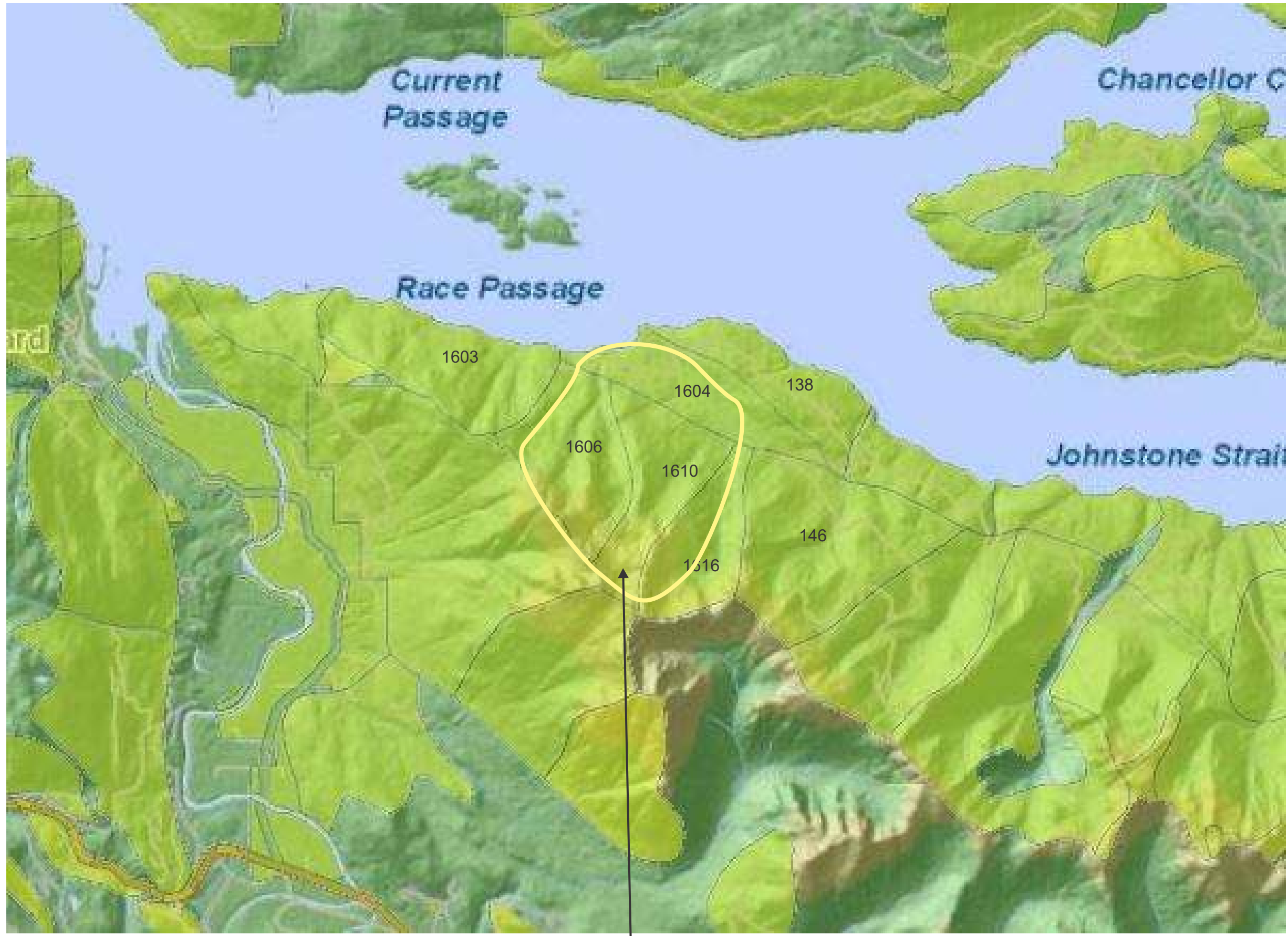
Interfor Visual Assessment Report

Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015

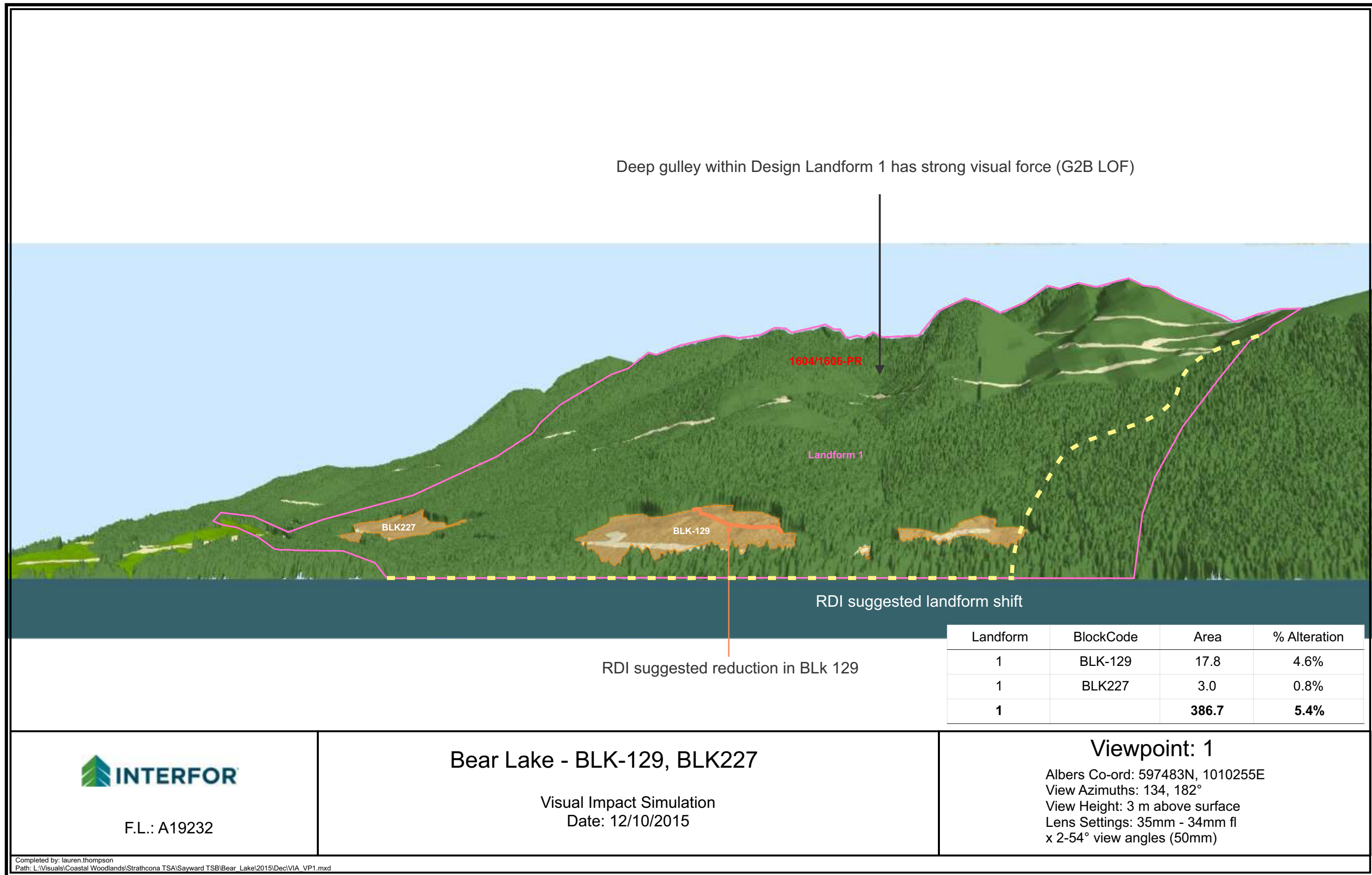


Interfor Original plan in map with greater coverage of terrain to near height of land (not complete) with Landform 1 approximation by RDI

Map, Simulations and Percent Alteration Calculations by Interfor Corp.
 Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015

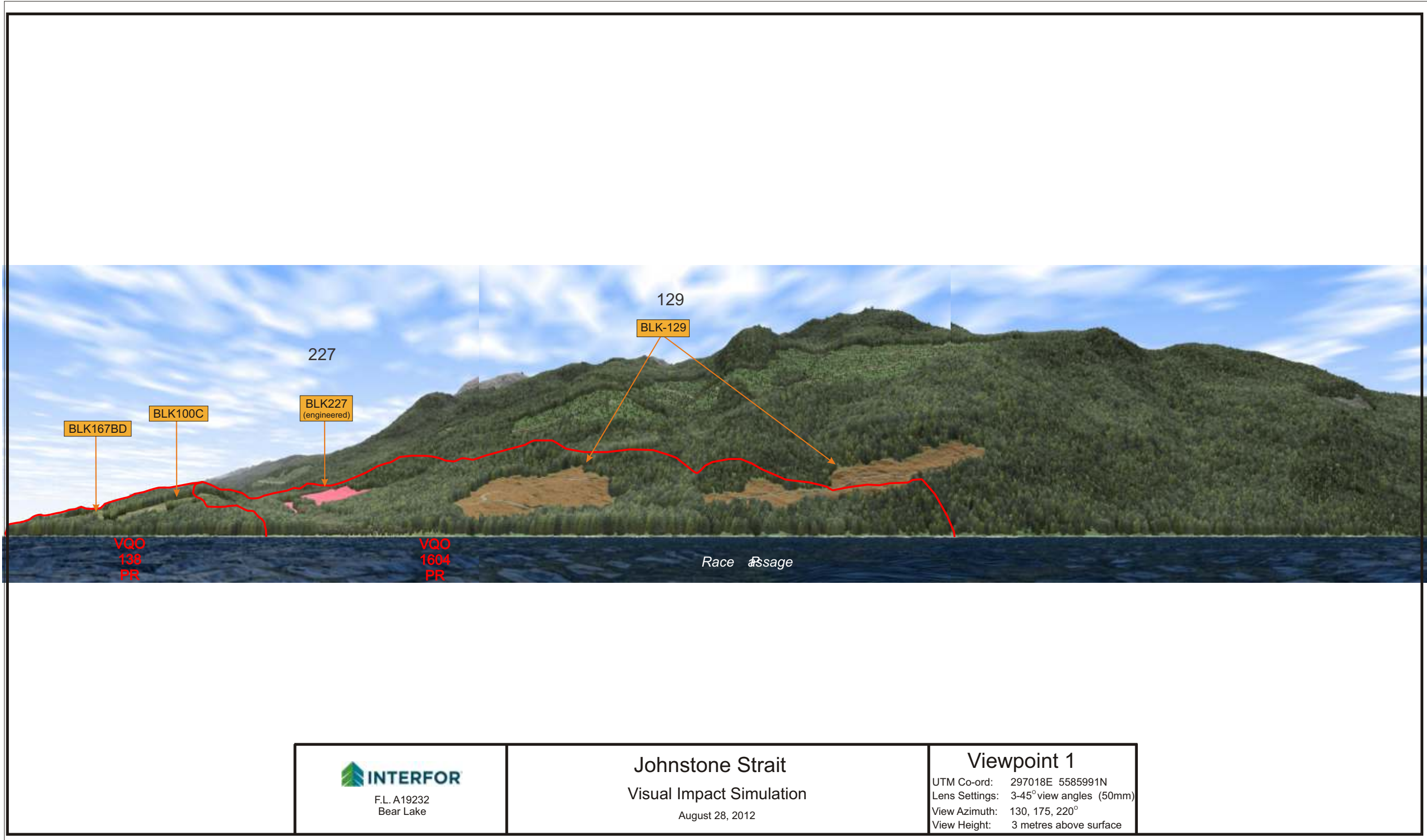


Landform 1 with RDI Suggestion to be verified by Interfor
Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015



Viewpoint 1 with Interfor Current Plan with RDI suggested adjustment in BLK 129 and Landform 1

**Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015**



 F.L. A19232 Bear Lake	<p style="text-align: center;">Johnstone Strait Visual Impact Simulation August 28, 2012</p>	<p style="text-align: center;">Viewpoint 1</p> UTM Co-ord: 297018E 5585991N Lens Settings: 3-45° view angles (50mm) View Azimuth: 130, 175, 220° View Height: 3 metres above surface
--	--	---

Interfor Original plan
 Map, Simulations and Percent Alteration Calculations by Interfor Corp.
 Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015

Deep gulley within Design Landform 1 has strong visual force (G2B LOF)

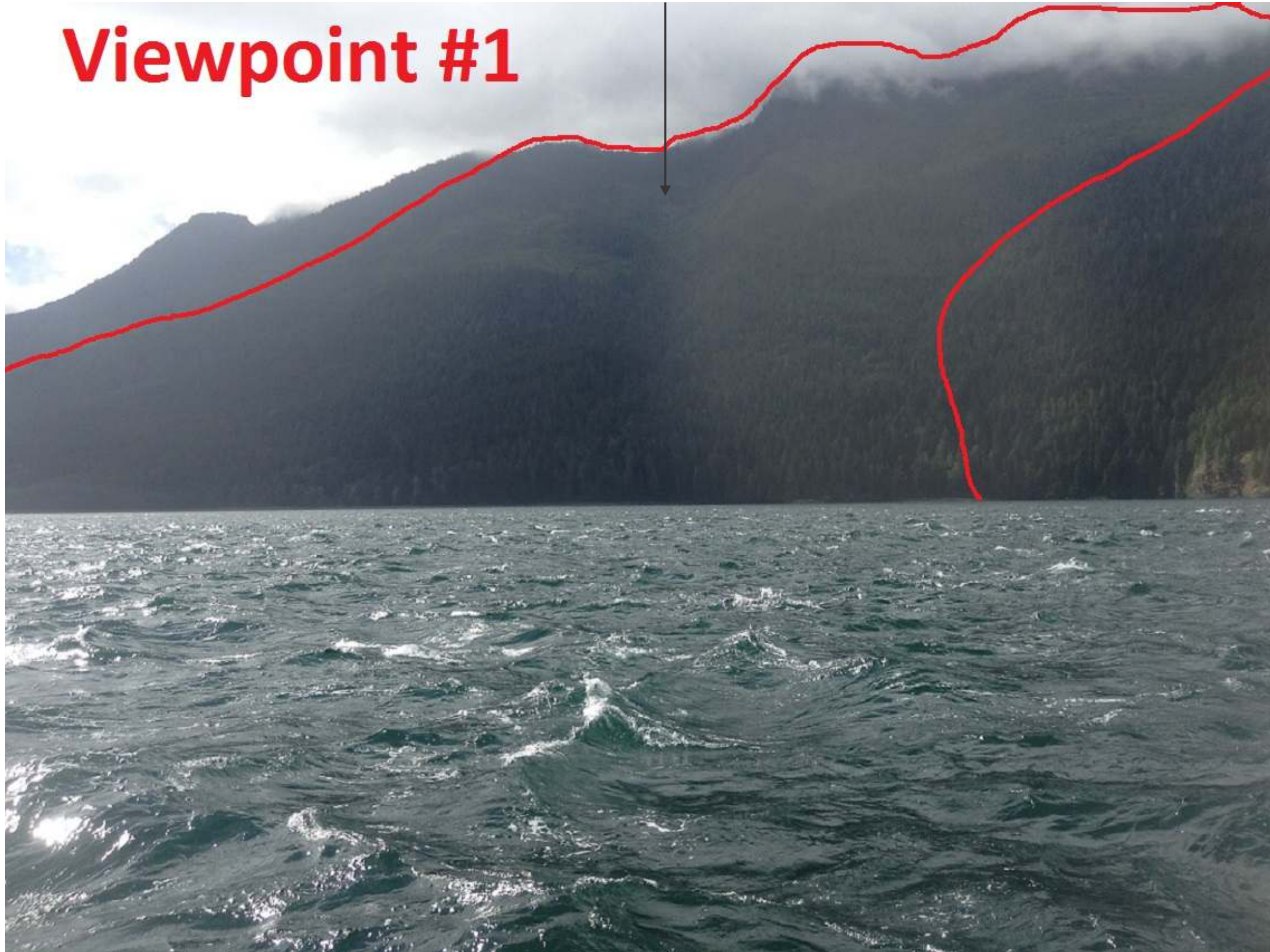


Interfor Photo VP 1

Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015

Deep gulley within Design Landform 1 has strong visual force (G2B LOF)

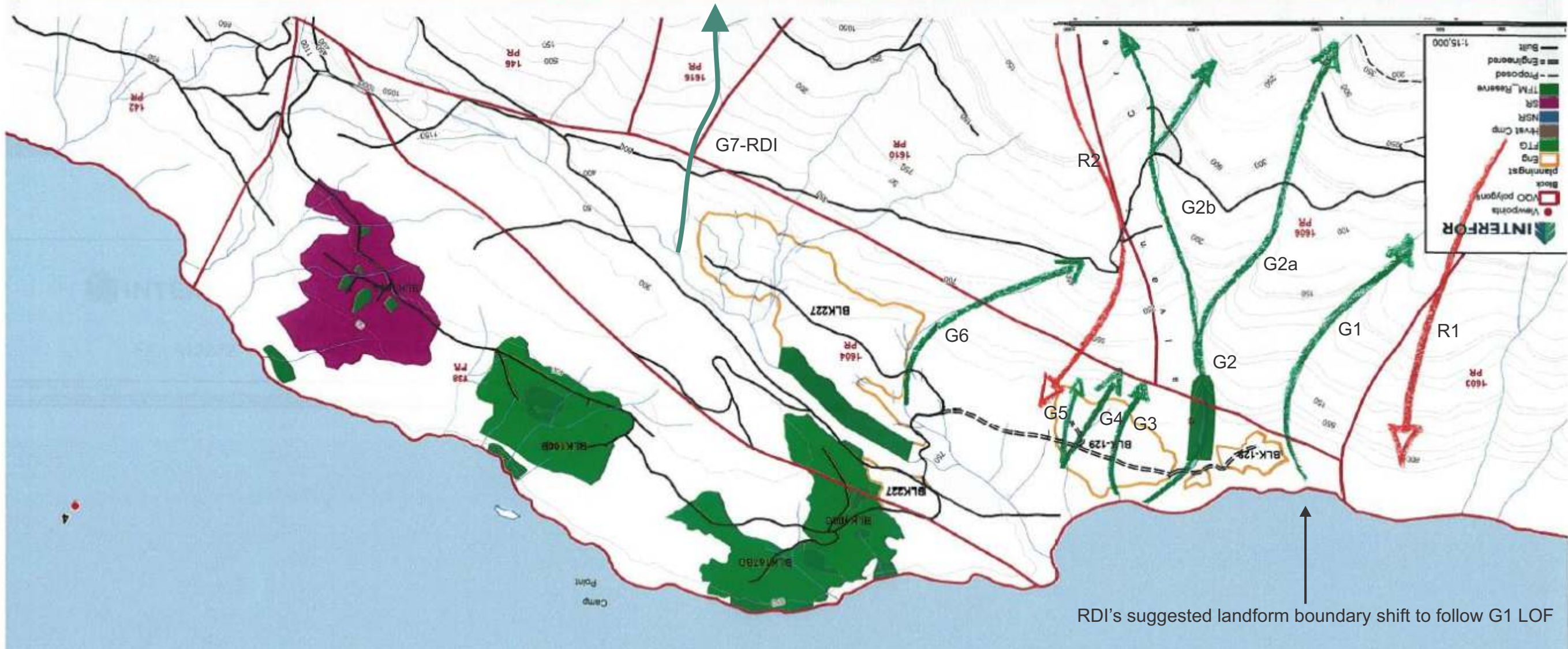
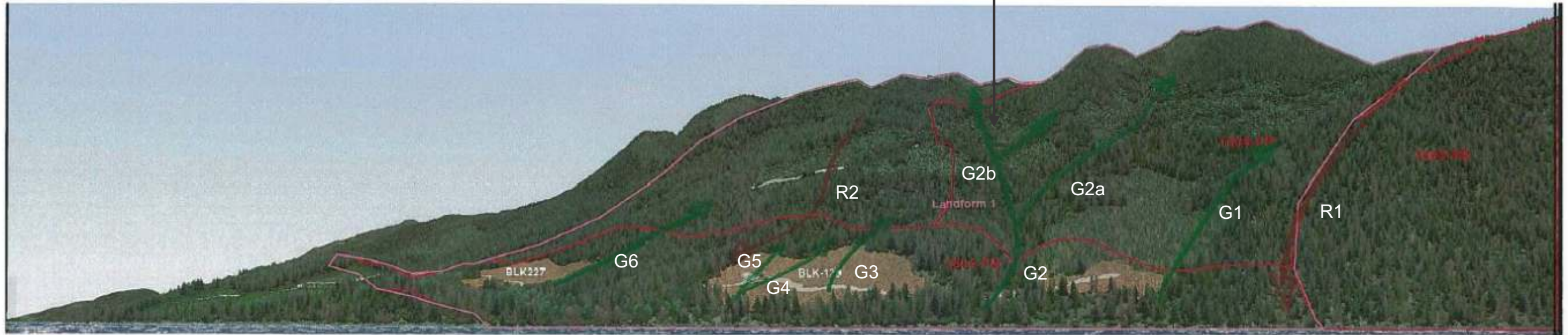
Viewpoint #1



Interfor Photo VP 1 with Interfor Landform 1

Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015

Deep gulley within Design Landform 1 has strong visual force (G2B LOF)

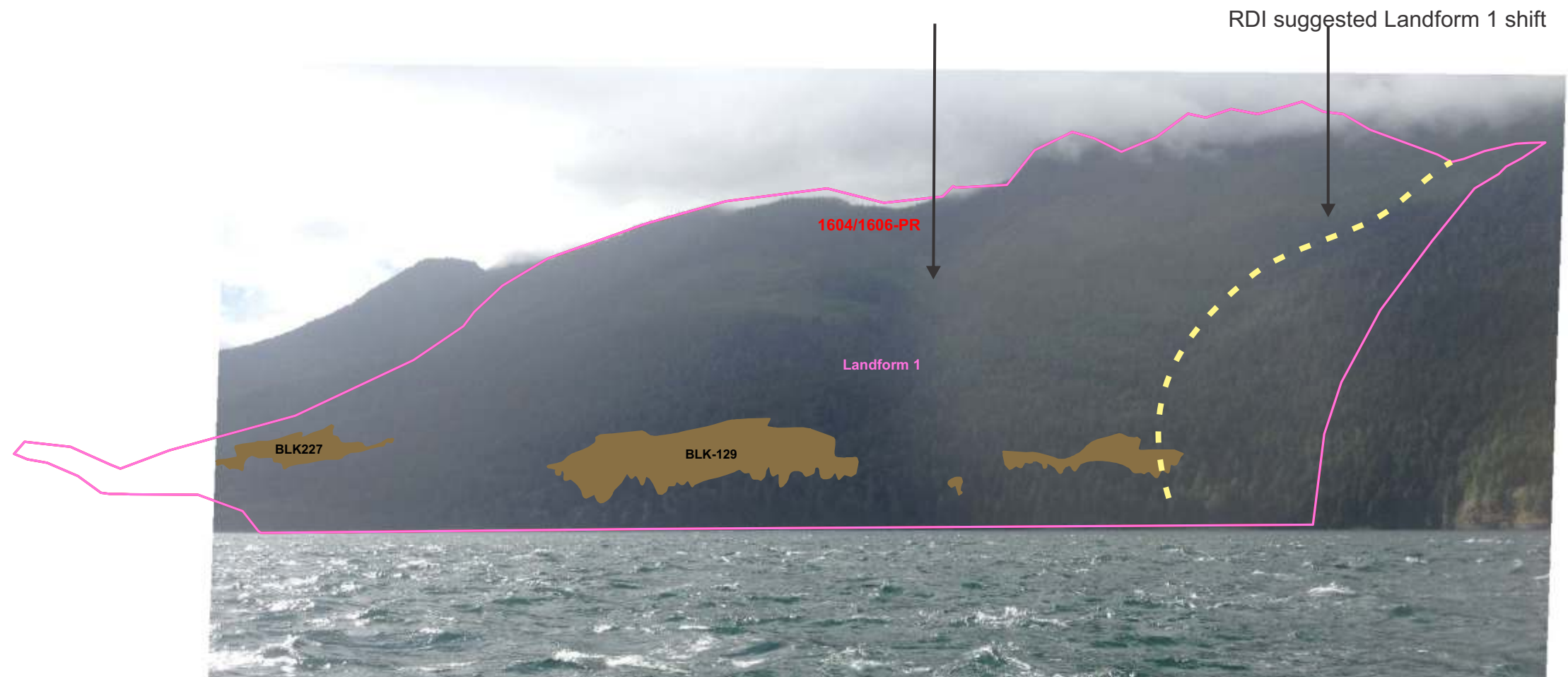


- R1: Convexity
- G1: Concavity

Interfor Visual Force Analysis - Photo VP 1 and Map

Map, Simulations and Percent Alteration Calculations by Interfor Corp.
 Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015

Deep gully within Design Landform 1 has strong visual force (G2B LOF)



F.L.: A19232

Bear Lake - BLK-129, BLK227

Visual Impact Simulation
Date: 12/18/2015

Viewpoint: 1

Albers Co-ord: 597483N, 1010255E
View Azimuths: 134, 182°
View Height: 3 m above surface
Lens Settings: 35mm - 34mm fl
x 2-54° view angles (50mm)

Completed by: lauren.thompson
Path: L:\Visuals\Coastal Woodlands\Strathcona TSA\Sayward TSB\Bear_Lake\2015\Dec\VP1 - Copy.mxd

Interfor Photo VP 1 with Superimposed Cutblocks and Interfor Landform 1 with RDI suggested adjustment

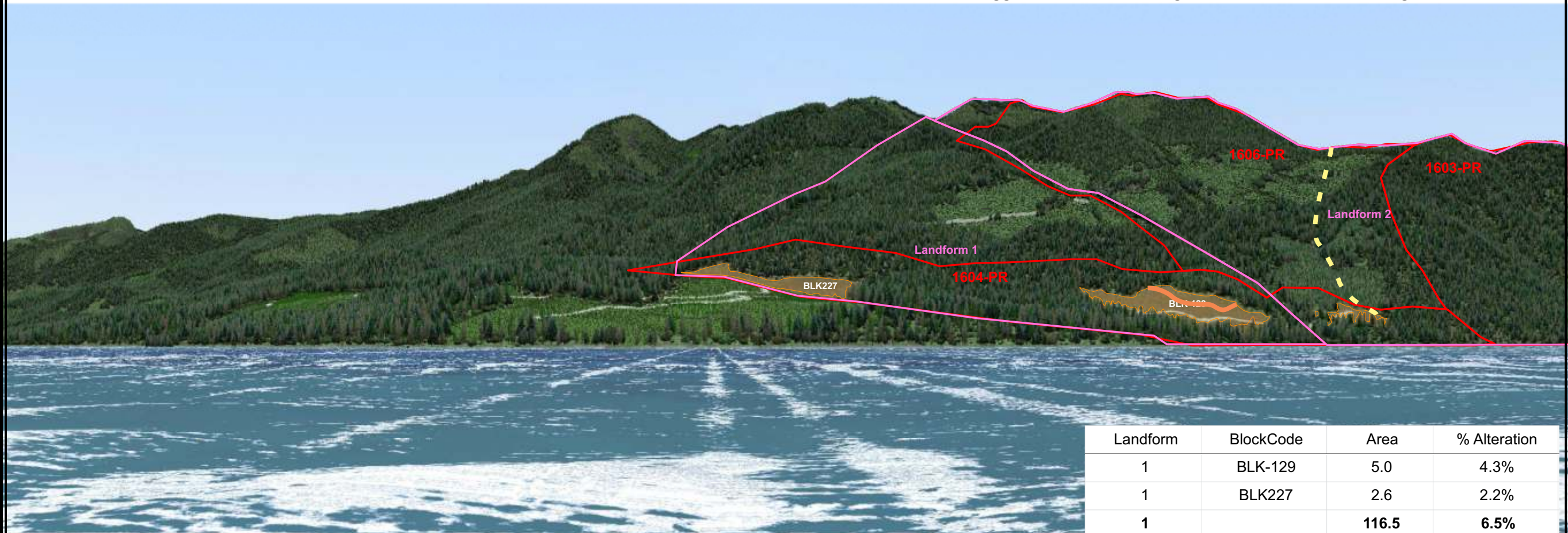
Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015



Interfor Photo near VP 1

**Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015**

RDI suggestion to merge Landform 1 and Landform 2 to yellow dashed line
 RDI suggestion to reduce height of BLK 129 to solid orange line



Landform	BlockCode	Area	% Alteration
1	BLK-129	5.0	4.3%
1	BLK227	2.6	2.2%
1		116.5	6.5%
2	BLK-129	1.6	1.1%
2		147.0	1.1%



F.L.: A19232

Bear Lake - BLK-129, BLK227

Visual Impact Simulation
 Date: 11/16/2015

Viewpoint: 2

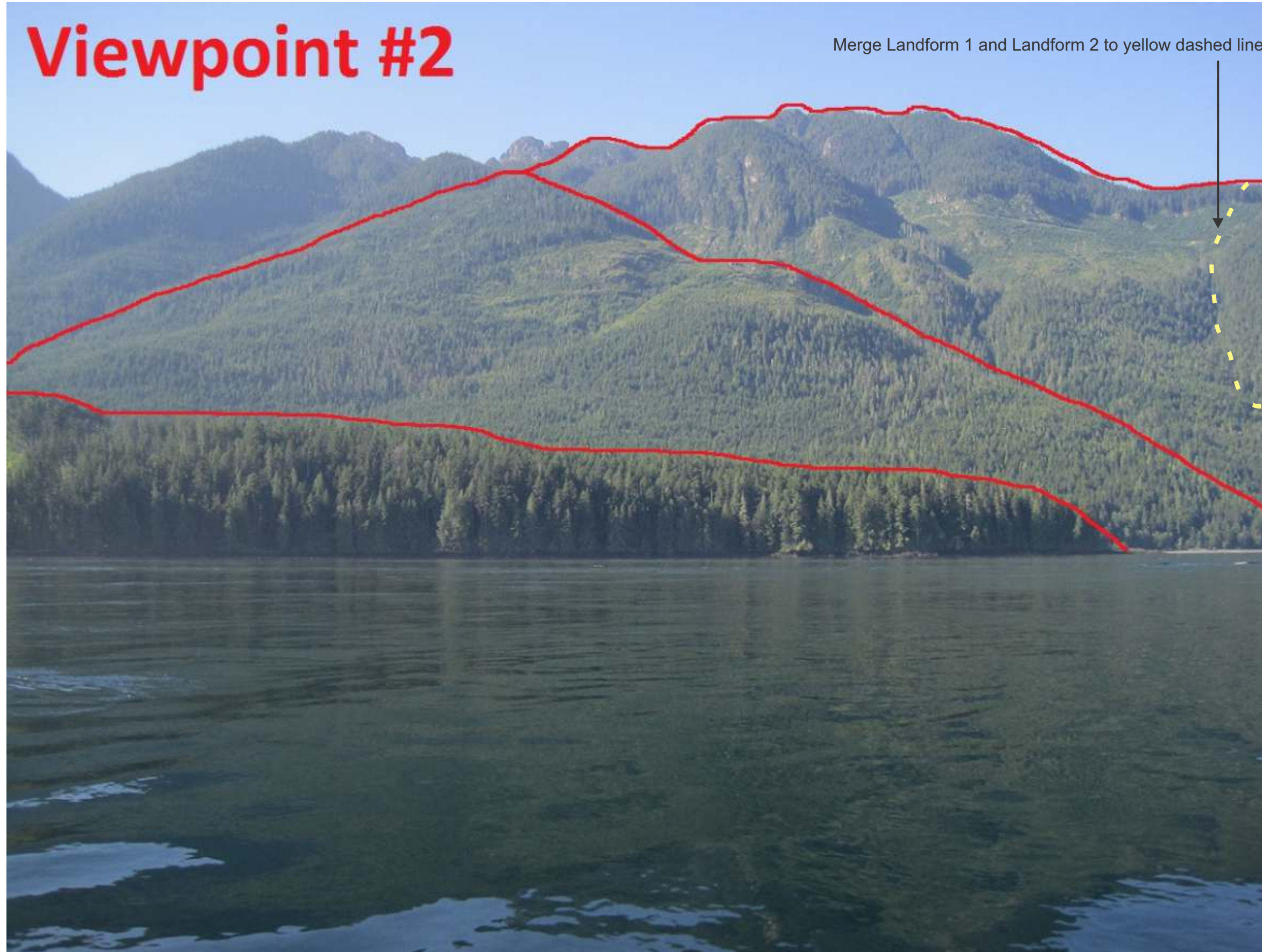
Albers Co-ord: 597979N, 1012011E
 View Azimuths: 206, 163°
 View Height: 3 m above surface
 Lens Settings: 35mm - 34mm fl
 x 2-54° view angles (50mm)

Completed by: lauren.thompson
 Path: L:\Visuals\Coastal Woodlands\Strathcona TSA\Sayward TSB\Bear Lake\2015\November\A19232_VP2.mxd

Interfor Current Plan from Viewpoint 2 with RDI suggested adjustments to BLK 129 and Landform 1

Viewpoint #2

Merge Landform 1 and Landform 2 to yellow dashed line

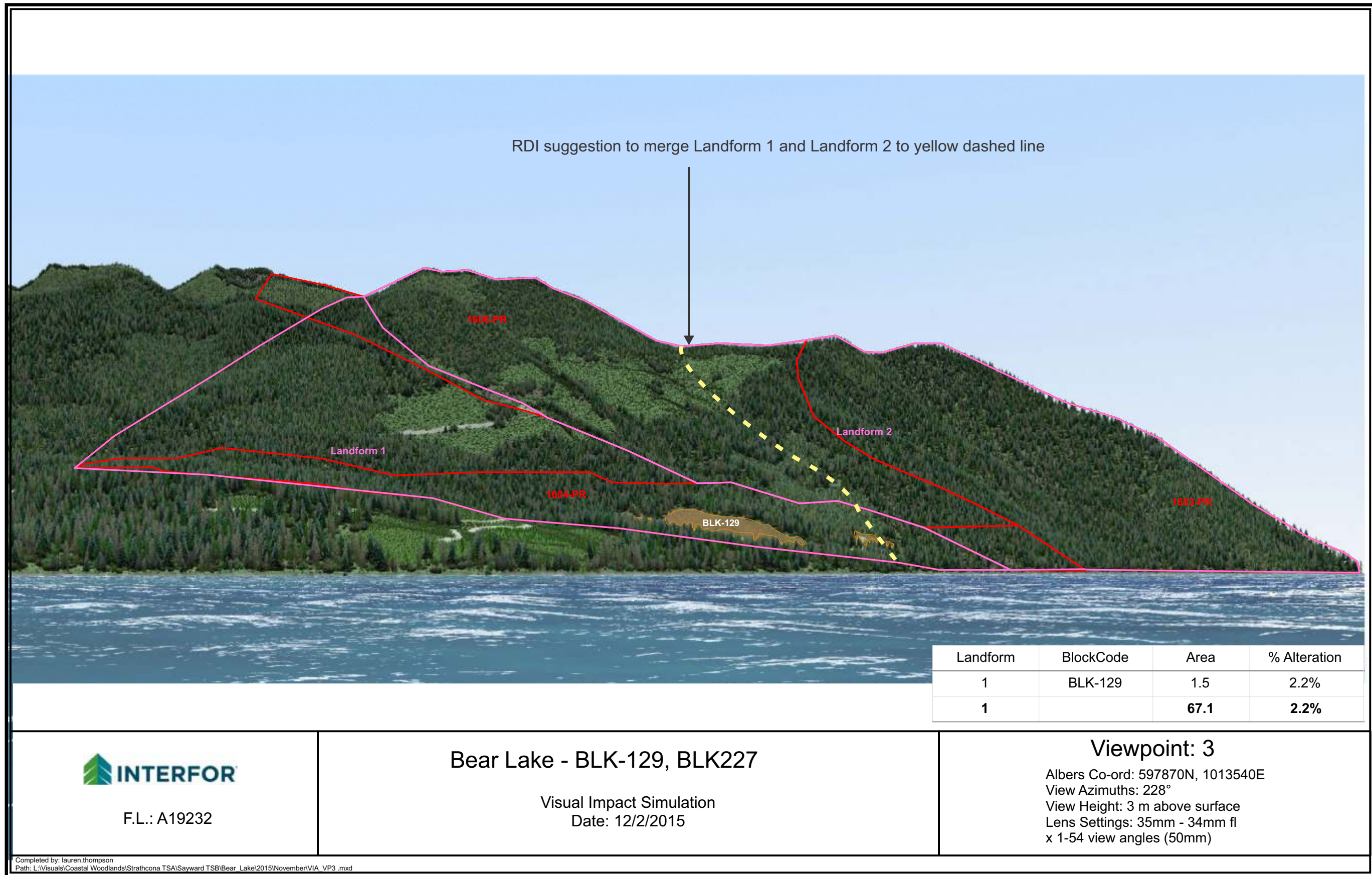


Interfor Photo VP 2 with Interfor Landform 1 and 2 and RDI suggested landform merge and shift
Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015



Interfor Photo VP 2

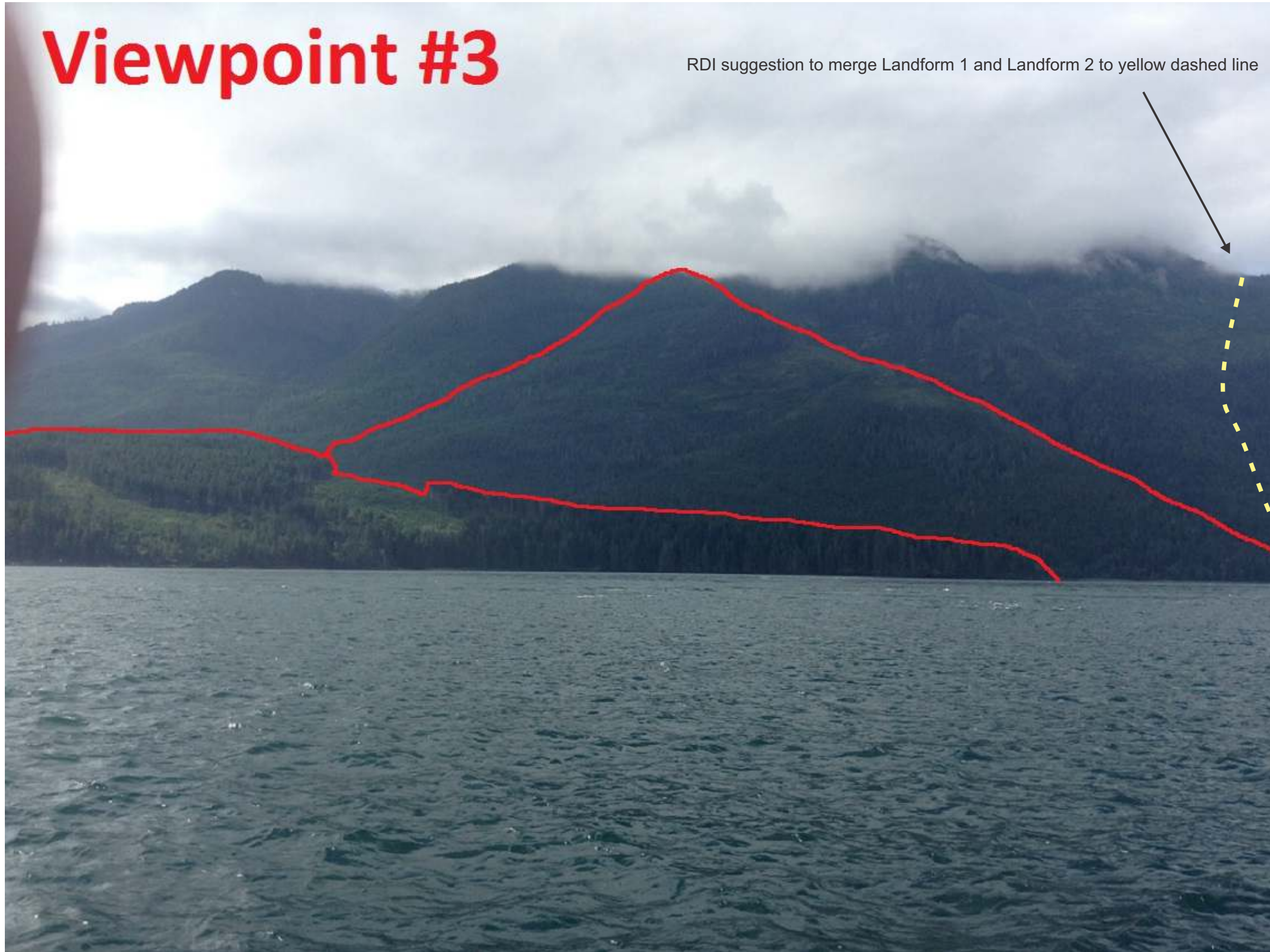
**Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015**



Interfor Current Plan from Viewpoint 3 with RDI suggested merge and shift for Landform 1

Viewpoint #3

RDI suggestion to merge Landform 1 and Landform 2 to yellow dashed line



Interfor Photo VP 3 with Interfor Landform 1 and 2 and RDI suggested landform merge and shift

Map, Simulations and Percent Alteration Calculations by Interfor Corp.
Report Assembly and Analysis by RDI Resource Design Inc, December 21, 2015