STROMEFERRY ROAD BACKGROUND BRIEFING

STROMEFERRY BYPASS OPENED 1970

ONGOING MAINTENANCE WORKS

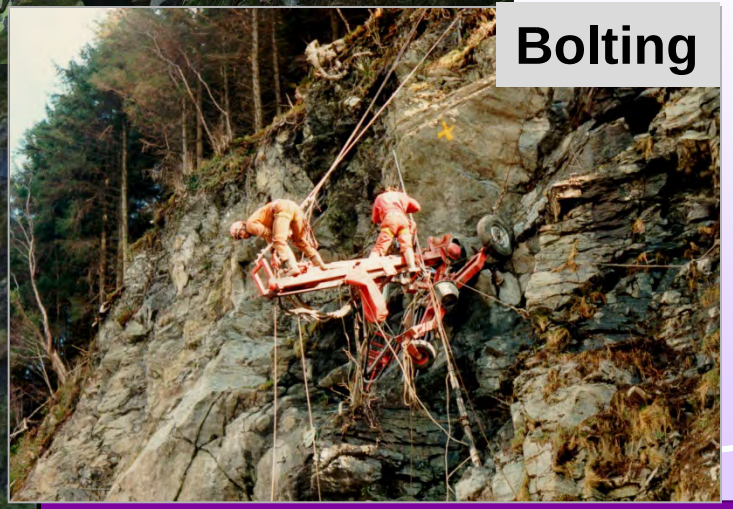
- Daily Driven Rock-slope Inspection – THC
- Monthly Walked Rock-slope Inspection - THC
- Annual Rock-slope Inspection – Specialist Consultant
- Prioritised Rock-slope Maintenance - C£250K/yr

WORKS UNDERTAKEN

De-vegetation

Scaling

Bolting



Rock Netting

ROCK FACE FAILURE DECEMBER 22nd 2011

TRANSPORT MITIGATION

- Additional Early Train
- Passenger Ferry
- Car Ferry
- Additional Buses

CONTRACT TIMETABLE

- Emergency Works from 22nd December 2011
- Tender Return – 20th January 2012
- Award Contract 23rd January 2012
- Start Site Works 30th January 2012
- Road onto Rail 19th March 2012
- Opened to Traffic 23rd April 2012

ROAD ONTO RAIL

FINISHED SLOPE

COSTS OF 2011 FAILURE

- Contractors Costs - £2.24M
- Network Rail Costs - £133K
- Consultants Fees - £136K
- Ferries/Buses Etc. - £203K
- Materials Road/Rail - £131K

- Total - £2.842M

WAY FORWARD

- Review Rockslope Monitoring Regime
- Real Time Monitoring of Weather
- Review Contingency Procedure
- Consider Long Term Solutions
- Public Consultation

System & Process

- Stage I – options and sifting
- Stage II – options appraisal on select options
- Stage III – detailed design
- Stage IV - planning and statutory consent

Stromeferry – Lochcarron Route Options

Garry Smith – June 2012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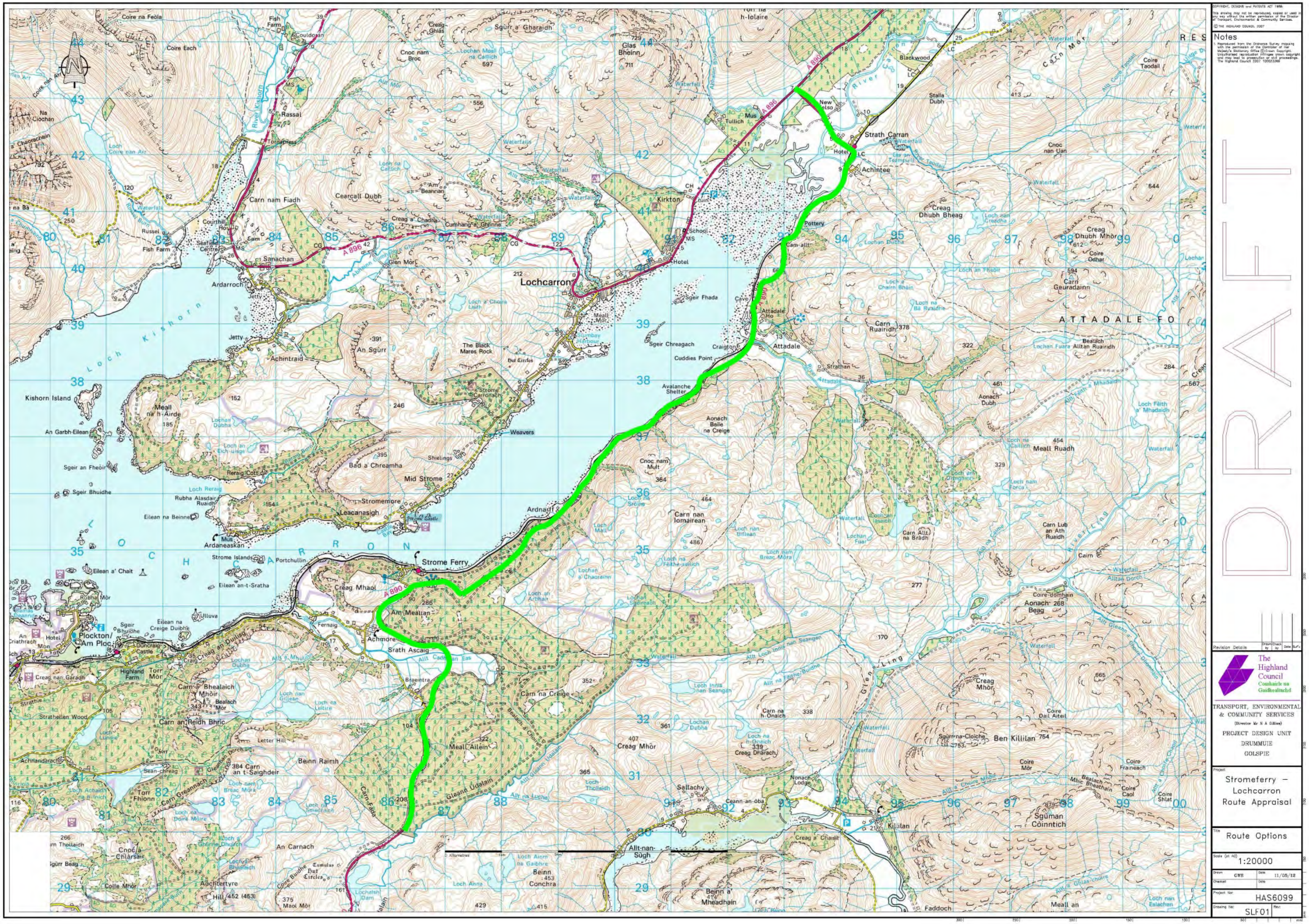
DRAFT
Revision Details
The Highland Council
Comhairle na Gaidhealtachd
TRANSPORT, ENVIRONMENTAL & COMMUNITY SERVICES
(Director Mr N A Gillies)
PROJECT DESIGN UNIT
DRUMMUIE
GOLSPIE
Project
Stromeferry – Lochcarron Route Appraisal
Title
Route Options
Scale (at A0)
1:20000
Drawn GWS
Date 11/05/12
Checked
Date
Project No: HAS6099
Drawing No: SLF01
Rev:
Lochcarron
Strome Ferry
Strath Carran
Attadale
Plockton/
Am Ploc
Loch Kishorn
Loch Carron
A 896
A 890
Kishorn Island
Ardarroch
Achintraid
Kirkton
Achintee
Slumbay Harbour
Stromemore
Strome Castle
Ardaneaskan
Ardnarff
Achmore
Srath Ascaig
Duncraig Castle
Sallachy
Killilan
Glen Ling
River Ling
Meall Ruadh
Ben Killilan
Creag Mhòr
Sgùman Còinntich
ATTADALE FO



DRAFT
Lochcarron
Strome Ferry
Attadale
Strath Carran
Achintee
Plockton/Am Ploc
Loch Carron
Kishorn Island
Kirkton
Craig
The Highland Council
Comhairle na Gaidhealtachd
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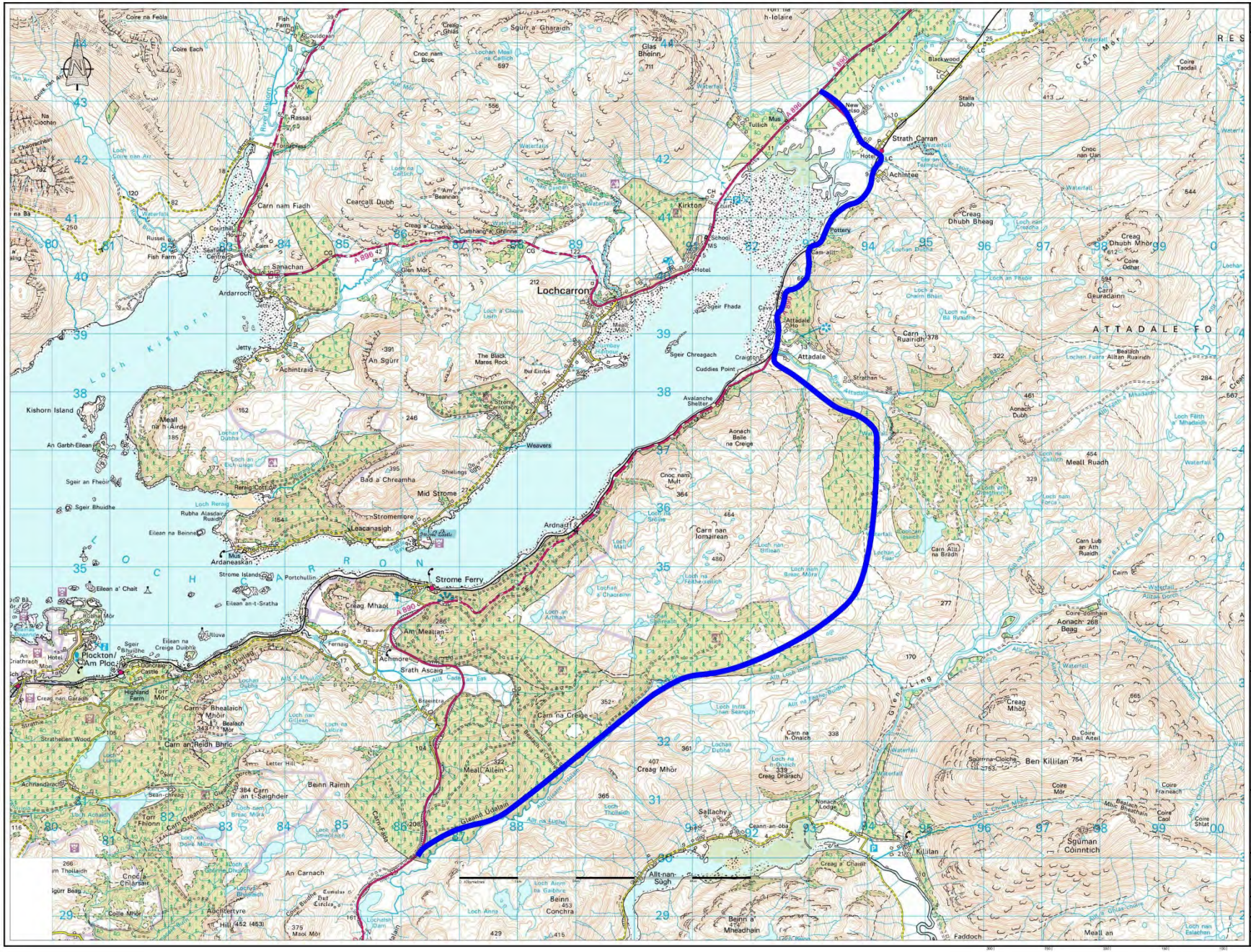

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PROJECT DESIGN UNIT
DRUMMUIE
GOLSPIE

Project: Stromeferry – Lochcarron Route Appraisal

Title: Route Options

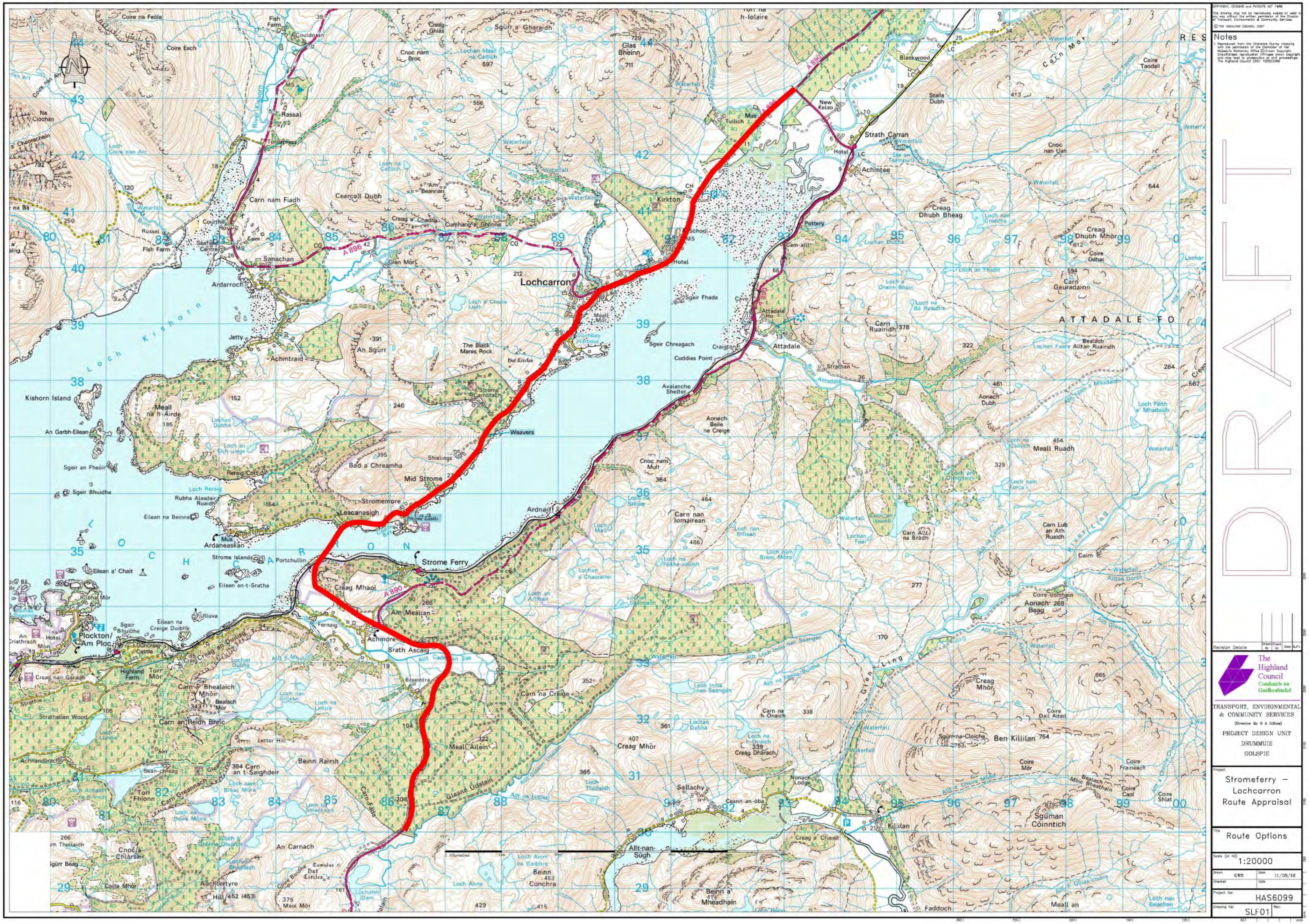
Scale (at A0): 1:20000

Drawn: GWB Date: 11/05/12

Checked: Date:

Project No: HAS6099

Drawing No: SLF01 Rev:


DRAFT
Notes
Lochcarron
Strome Ferry
Stromemore
Mid Strome
Attadale
Strath Carran
Loch Kishorn
Plockton
Ardaneaskan
Revision Details
The Highland Council
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Route Options
Scale (at A0) 1:20000
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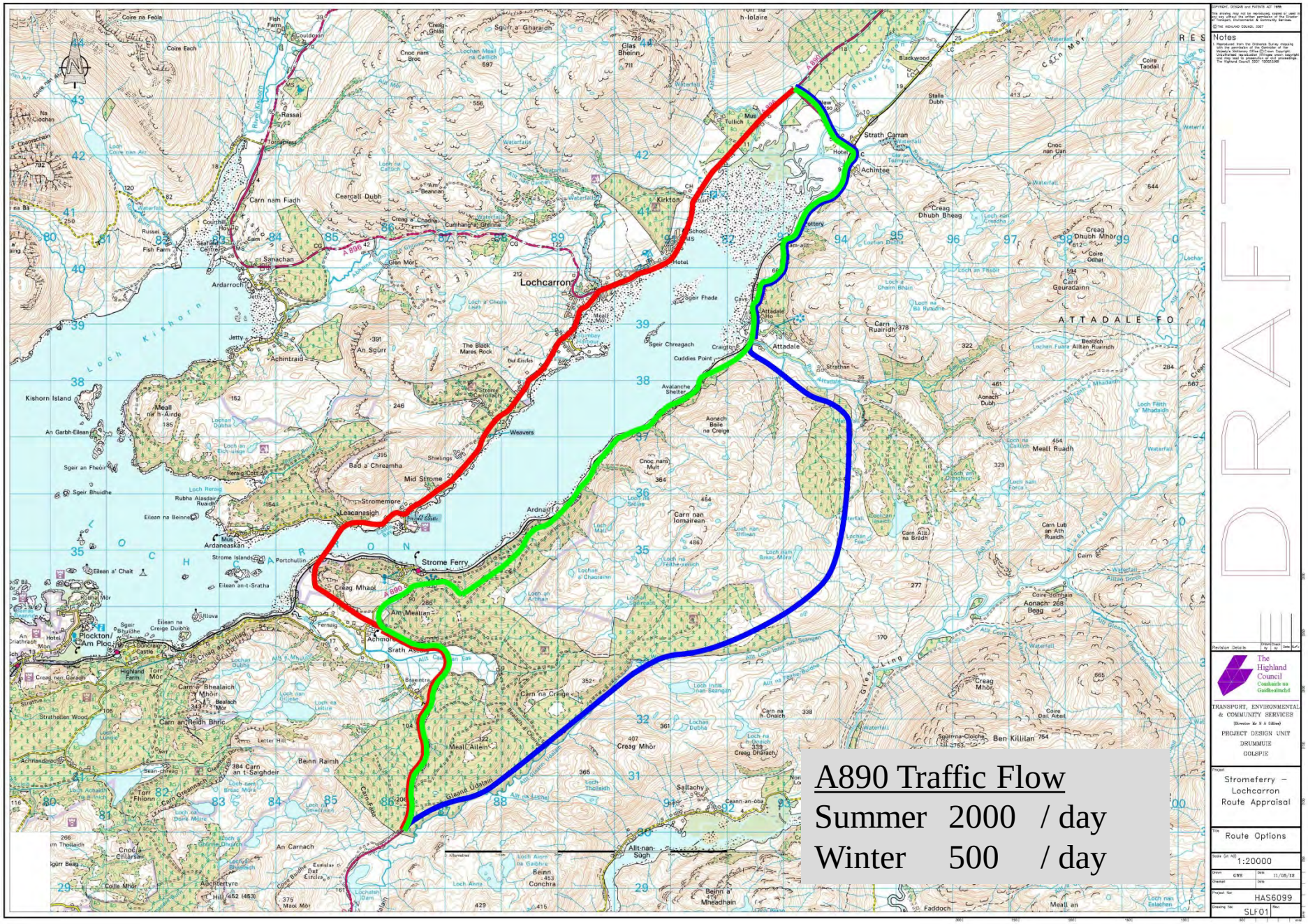
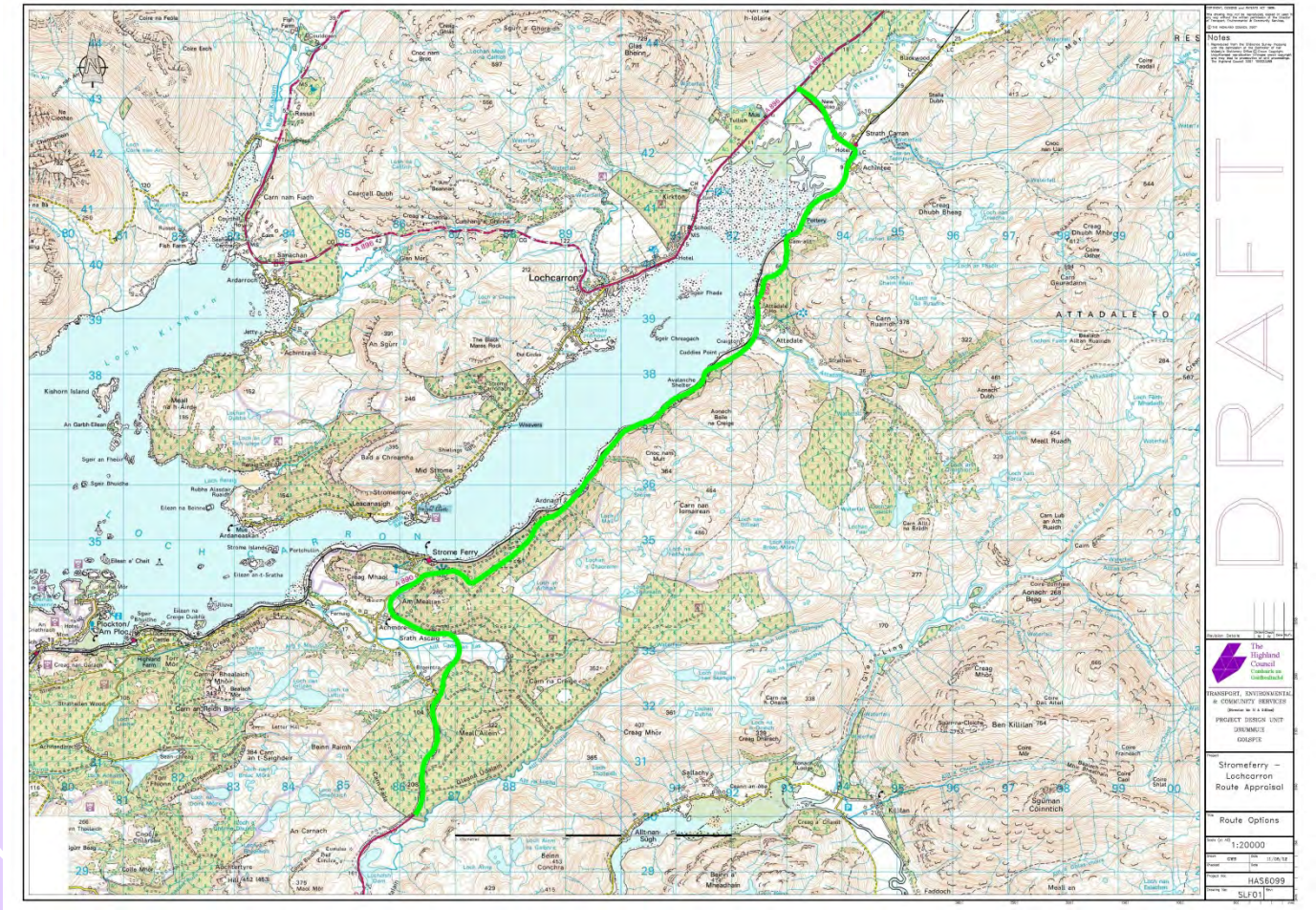

A890 Traffic Flow
Summer 2000 / day
Winter 500 / day
Notes
The Highland Council
TRANSPORT, ENVIRONMENTAL & COMMUNITY SERVICES
PROJECT DESIGN UNIT
DRUMMUIE
GOLSPIE
Stromeferry – Lochcarron Route Appraisal
Route Options
1:20000
HAS6099
SLF01

Green route – Existing road corridor

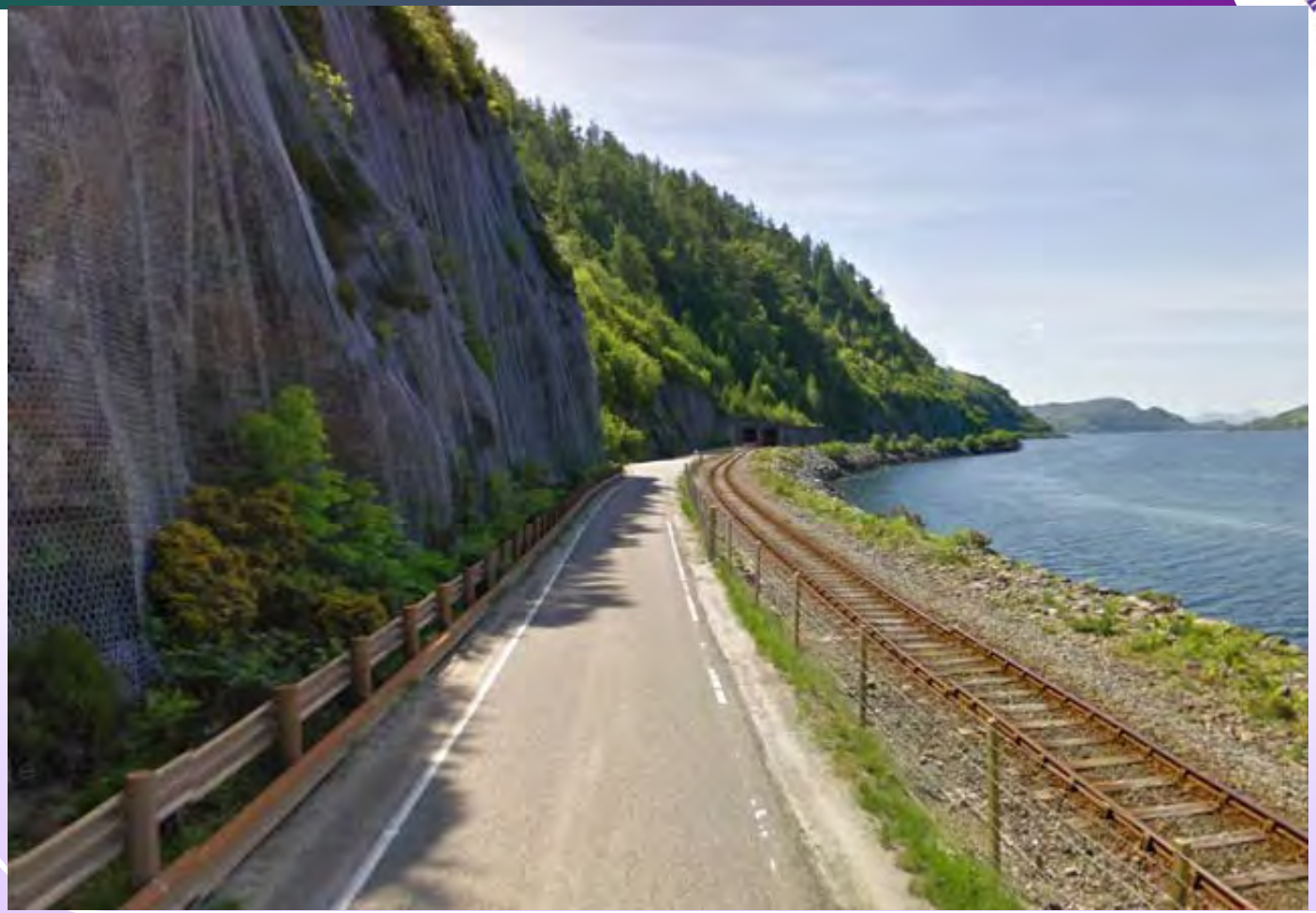


Green route – Existing road corridor

Green route – Existing road corridor

Green route – Existing road corridor

Green route – Existing road corridor



Aerial Photography

Green Route – Existing Road Options available

1. **Stabilise the existing rock face**
2. **Rock cut and widen to 6.0m single carriageway**
3. **Avalanche Shelter Extension**
4. **Tunnel**
5. **Rock fill out into Loch Carron to provide sufficient space for the road and railway**
6. **Do Minimum**

G1 - Stabilise the section of rock face

Works cost in 2012 to repair rock fall = £2.8M

This covered a plan distance of 100m and took 3 months

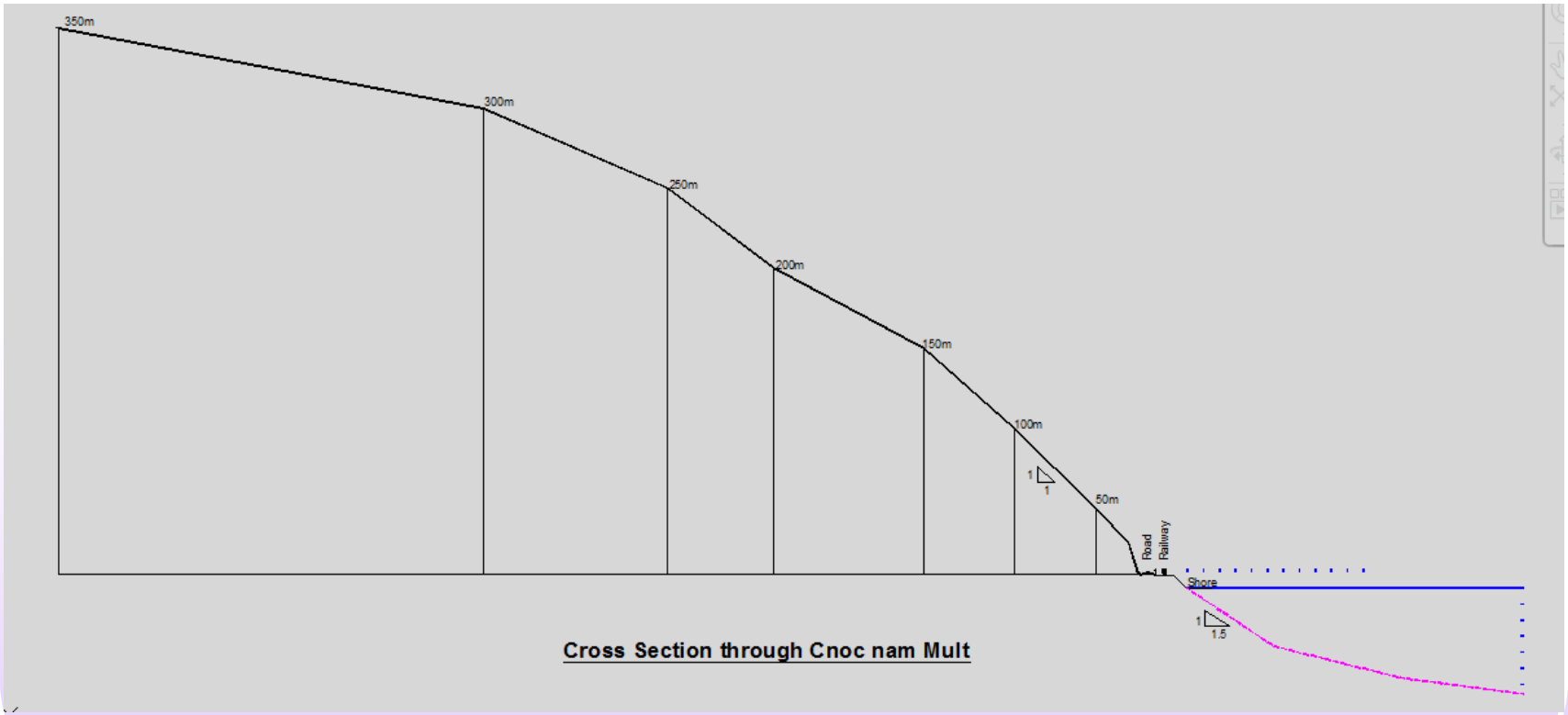
If this were replicated over 2 kilometres of road, the cost could be as high as £50M and take 5 years

G1 - Stabilise the section of rock face

G1 - Stabilise the section of rock face

Option	G1
Cost Estimate	• £50M for 2km of rock face • £17M to bring the rest of the route up to 6m wide single carriageway standard • £2M on River Carron Bridge **£69M Total**
Advantages	• Managed and Planned over a set timescale • Existing route corridor - therefore limited impact on the environment
Disadvantages	• Extended road closure during the works • Possible disruption to train services • Restricted ferry services for local traffic • Long diversions for vehicles unsuitable for the ferry • Road remains single track
Residual Risk	• Maintenance of installed rock retention system / unexpected failure of treated rock face.

G2 - Rock cut and widen to 6.0m single carriageway



Cross Section through Cnoc nam Mult

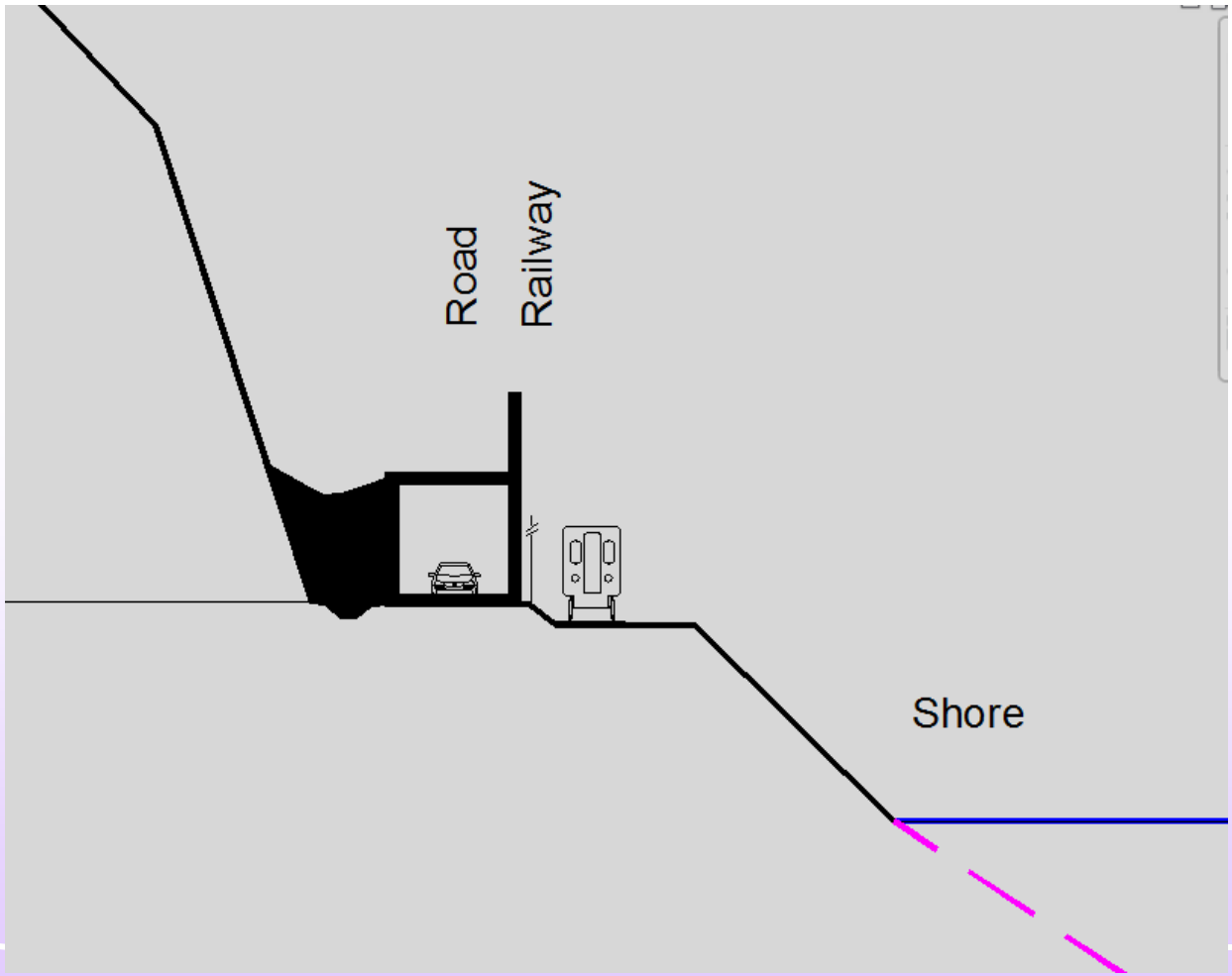
G2 - Rock cut and widen to 6.0m single carriageway

G2 - Rock cut and widen to 6.0m single carriageway

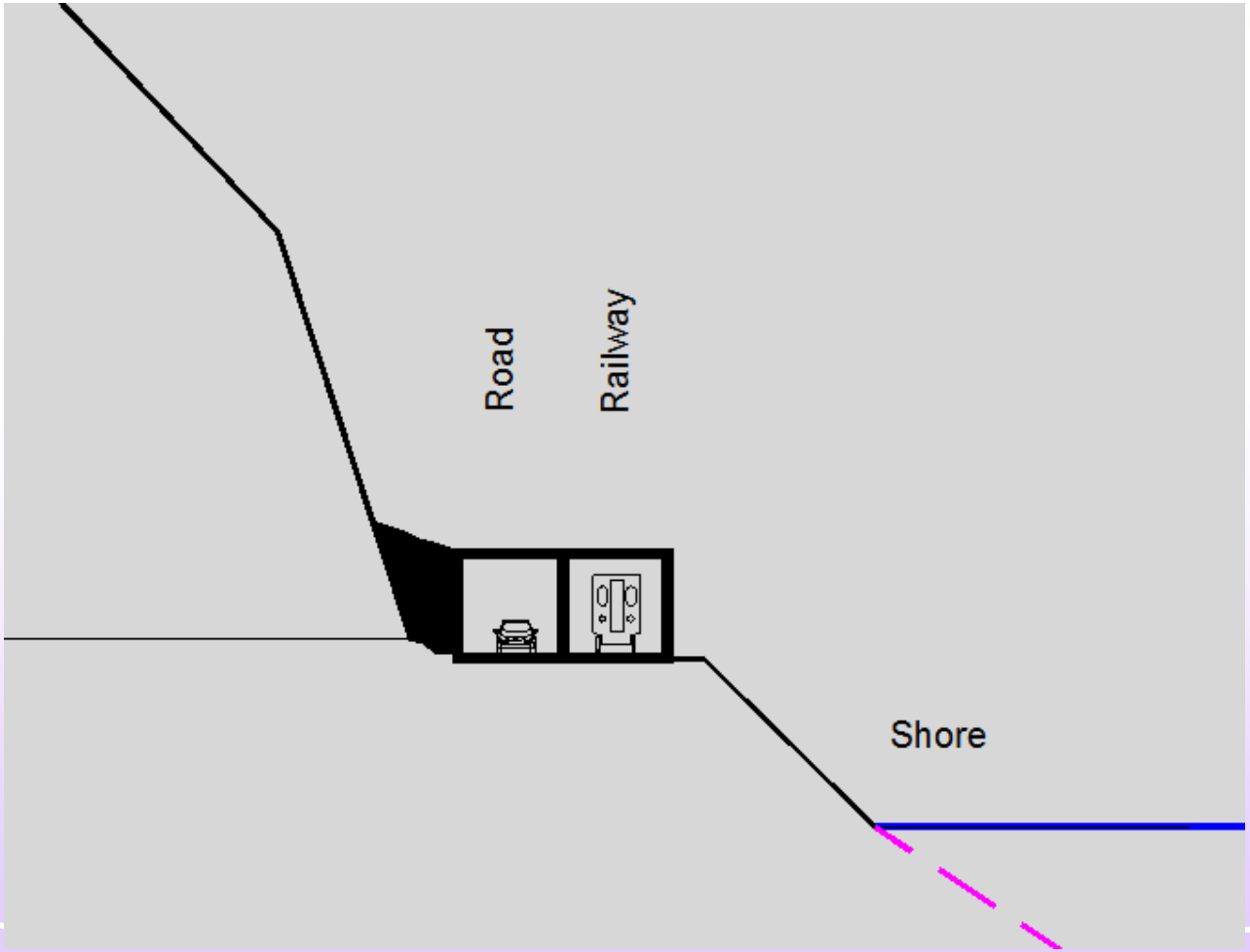
Option	G2
Cost Estimate	• £70M for 2km of rock face(assuming local disposal) • £20M for rock netting and bolting on cut face • £17M to bring the rest of the route up to 6m wide single carriageway standard • £2M on River Carron Bridge **£109M Total**
Advantages	• 6.0m wide single carriageway road on completion • Removal of hazard due to engineered slope
Disadvantages	• Huge volume of material for disposal (impractical) • High risk of causing instability of slope above during works • Extended road closure during the works • Disruption /closure of train services • Restricted ferry services for local traffic • Long diversions for vehicles unsuitable for the ferry • Visually intrusive on the landscape
Residual Risk	• Maintenance of installed rock retention system / unexpected failure of treated rock face.

G3 - Avalanche Shelter Extension

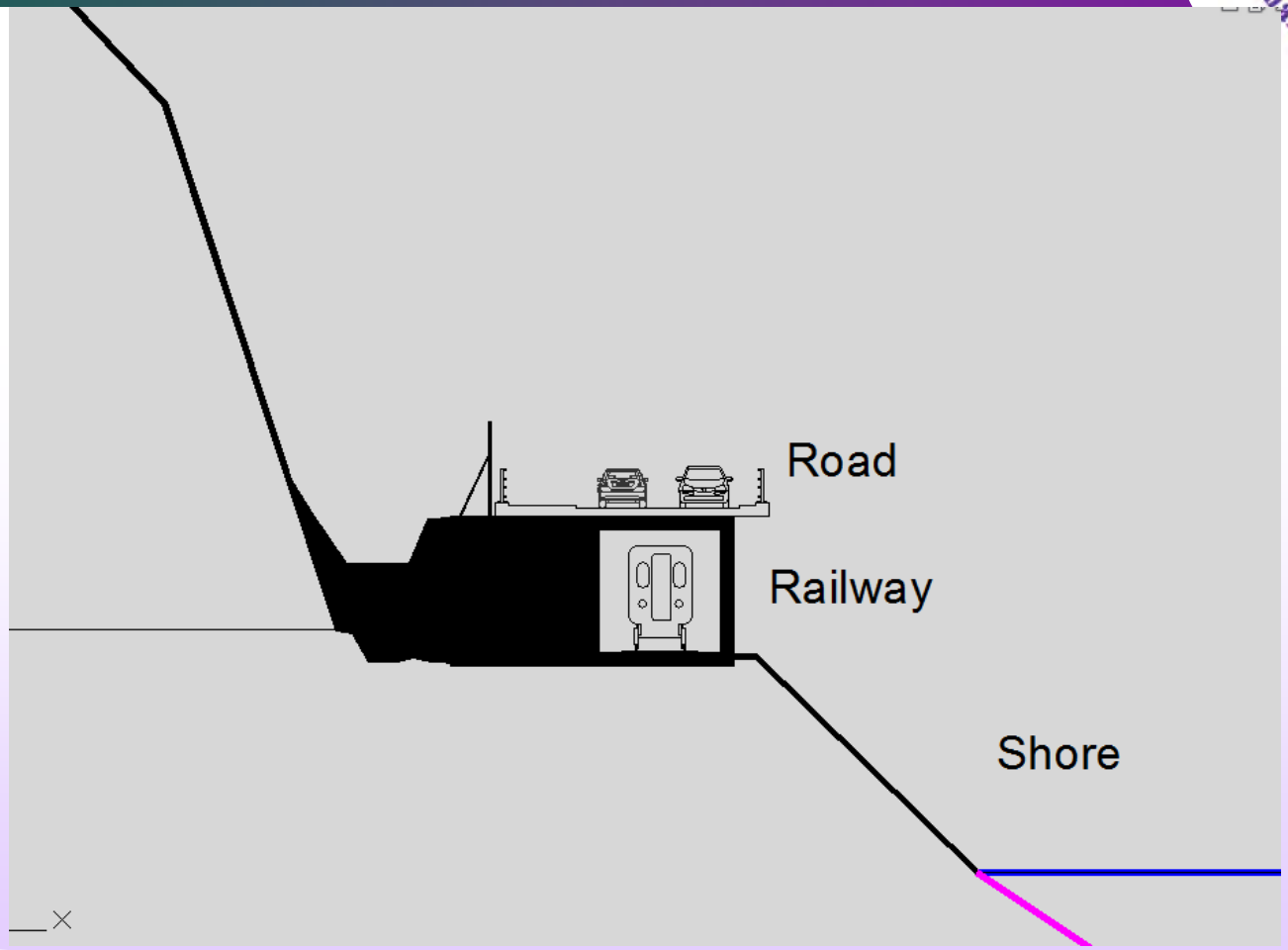
G3/a - Avalanche Shelter Extension



G3/b - Avalanche Shelter Extension



G3/c - Avalanche Shelter Extension



G3/a - Avalanche Shelter Extension

Option	G3/a
Cost Estimate	• £40M for 2km of shelter • £17M to bring the rest of the route up to single carriageway standard • £2M on River Carron Bridge **£59M Total**
Advantages	• Provide safe passage for vehicles by removing hazard • Existing route corridor - therefore limited impact on the environment
Disadvantages	• Extended road closure during the works • Disruption /closure of train services during construction • Long term traffic management delay and disruption • Restricted ferry services for local traffic • Long diversions for vehicles unsuitable for the ferry • Visual amenity of the road diminished • Visually intrusive
Residual Risk	• Railway could still be disrupted if a large rock fall were to occur.

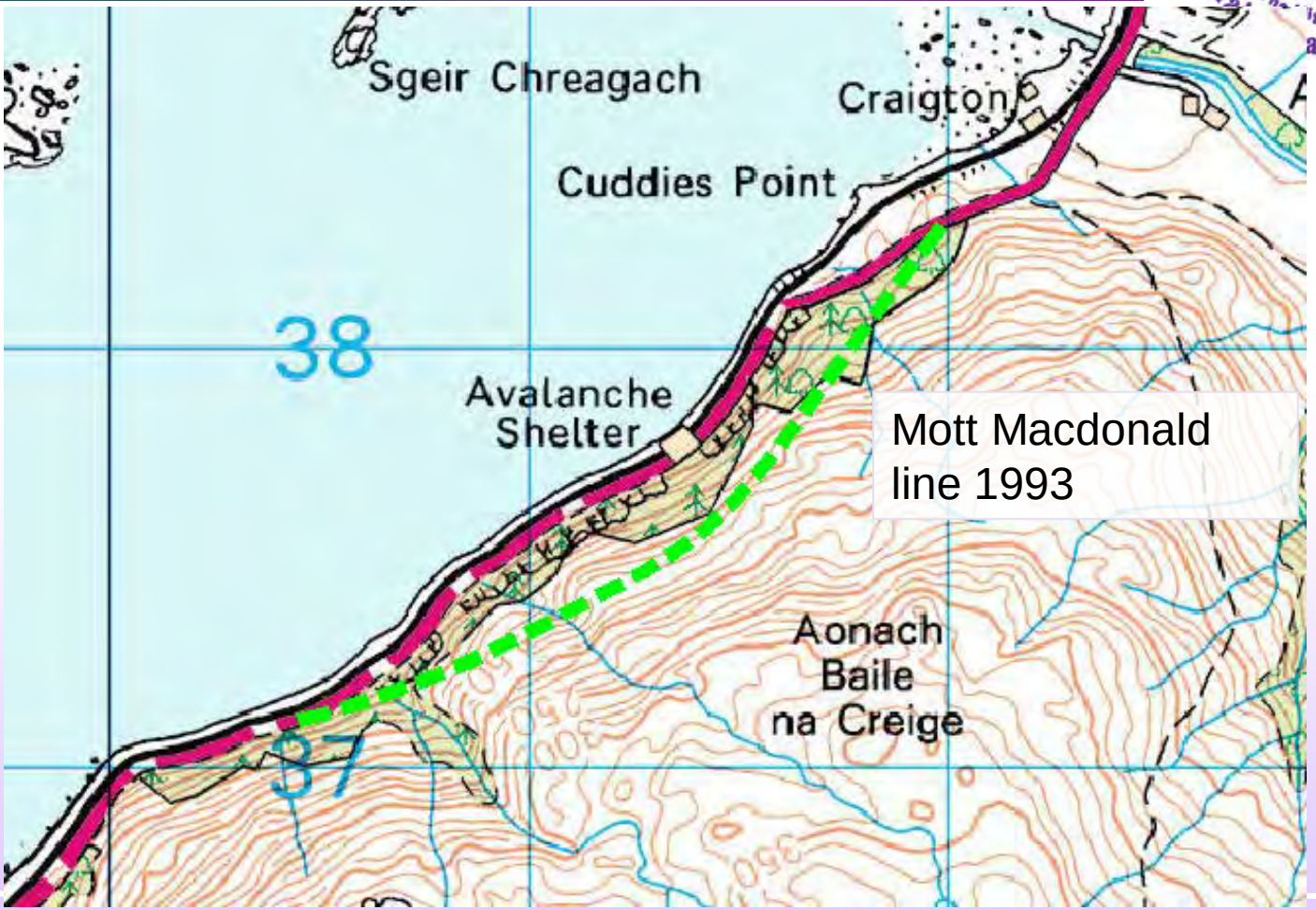
G3/b - Avalanche Shelter Extension

Option	G3/b
Cost Estimate	• £85M for 2km of double shelter • £17M to bring the rest of the route up to single carriageway standard • £2M on River Carron Bridge **£104M Total**
Advantages	• Provide safe passage for vehicles by removing hazard • Existing route corridor - therefore limited impact on the environment • Rail line protected from rock fall
Disadvantages	• Extended road closure during the works • Disruption /closure of train services during construction • Long term traffic management delay and disruption • Restricted ferry services for local traffic • Long diversions for vehicles unsuitable for the ferry • Visual amenity of the road diminished • Visually intrusive
Residual Risk	• Open sections between shelters which will provide passing opportunities will be vulnerable to rock fall

G3/c - Avalanche Shelter Extension

Option	G3/c
Cost Estimate	• £70M for 3.5km of shelter • £10M for on and off ramps • £17M to bring the rest of the route up to single carriageway standard • £2M on River Carron Bridge **£99M Total**
Advantages	• Uses space available over the railway corridor • Existing route corridor - therefore limited impact on the environment • Visual amenity of route enhanced
Disadvantages	• Extended road closure during the works (2yrs +) • Disruption /closure of train services during construction • Restricted ferry services for local traffic during construction • Long diversions for vehicles unsuitable for the ferry
Residual Risk	• Rock fall ditch capacity exceeded which encroaches on the road. Regular maintenance required.

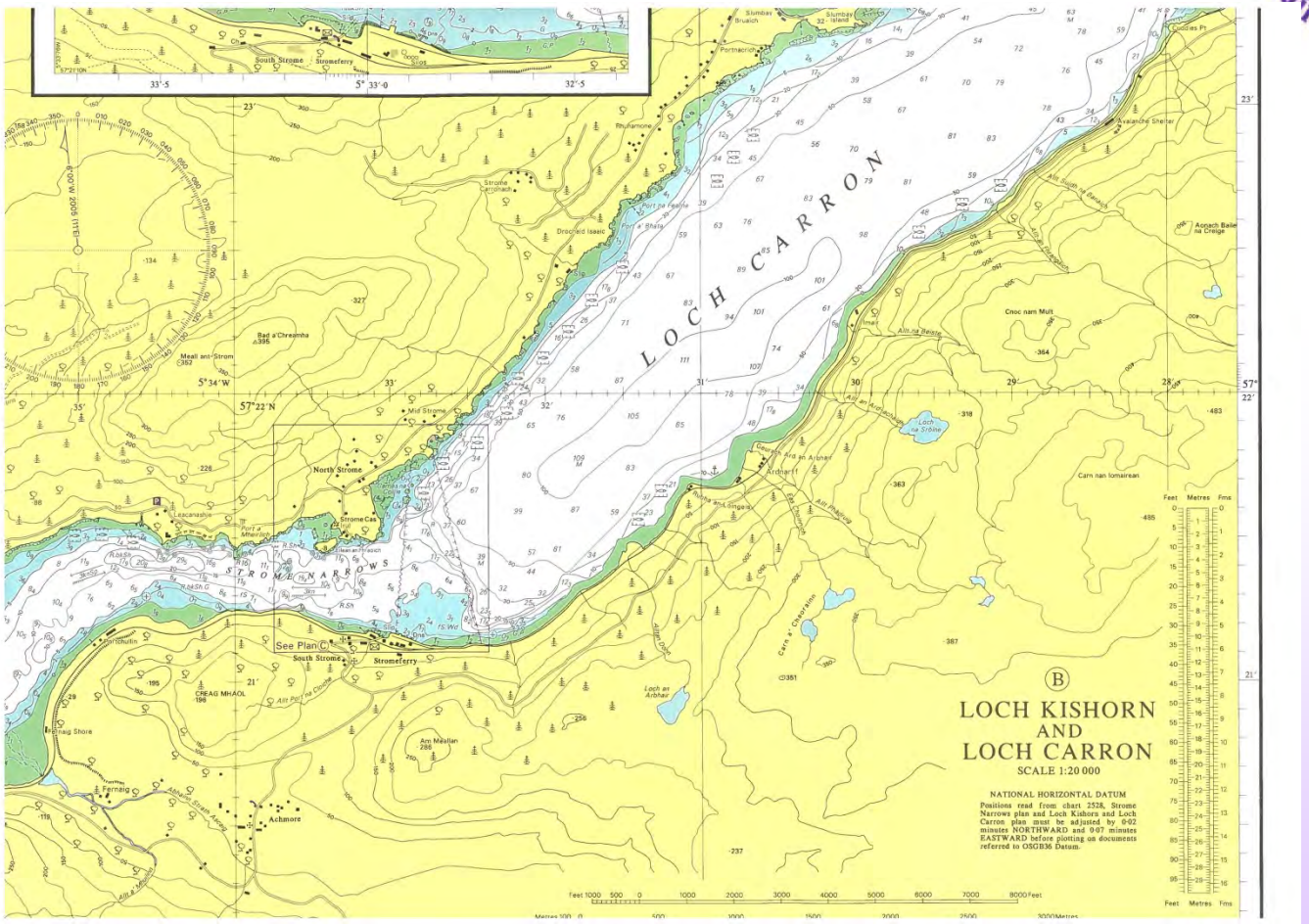
G4 - Tunnel


Sgeir Chreagach
Craigton
Cuddies Point
38
Avalanche
Shelter
Mott Macdonald
line 1993
Aonach
Baile
na Creige
37

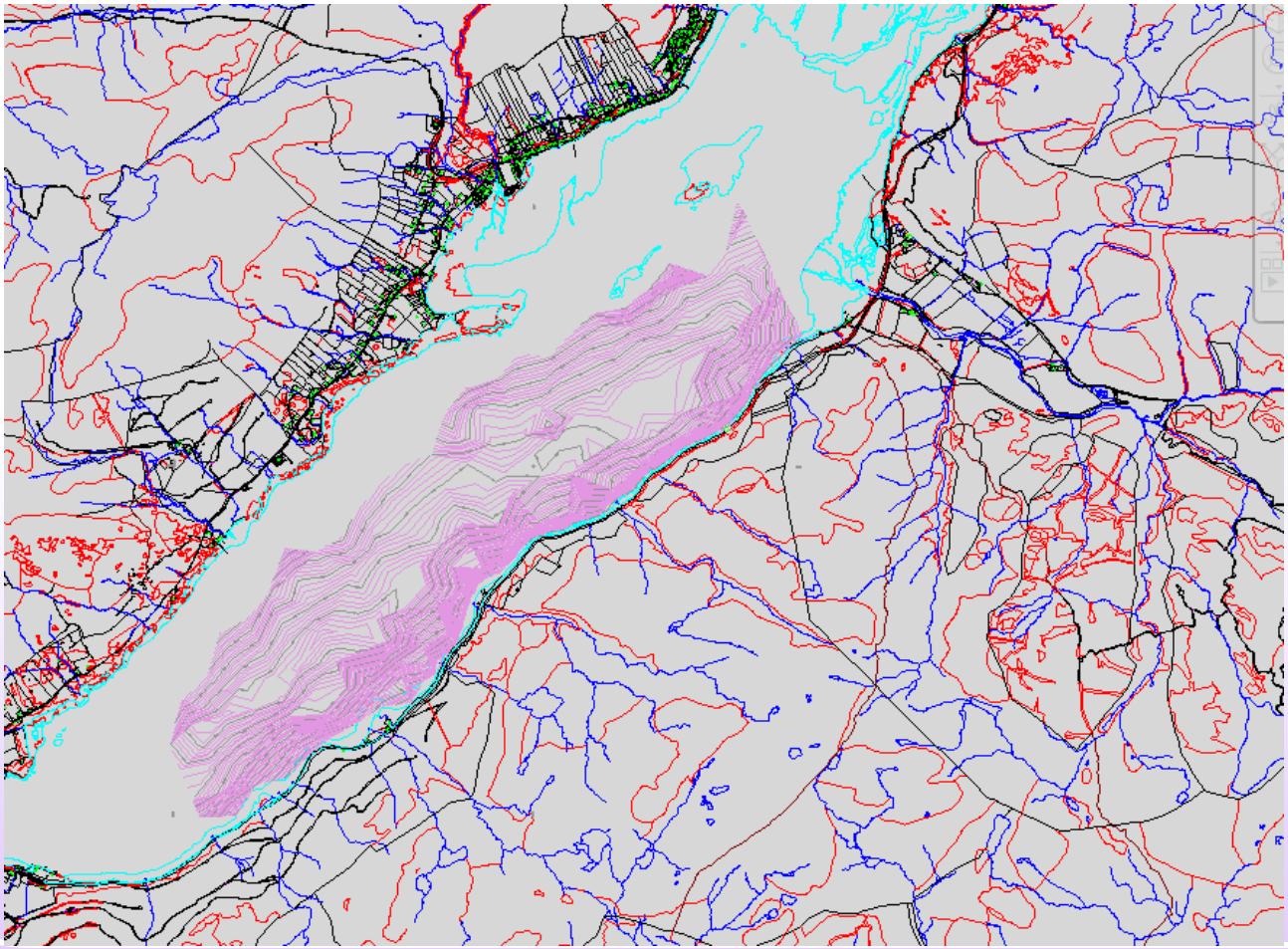
G4 - Tunnel

Option	G4
Cost Estimate	• £75M for 2km of tunnel • £17M to bring the rest of the route up to single carriageway standard • £2M on River Carron Bridge **<u>£94M Total</u>**
Advantages	• Provide safe passage for vehicles by removing hazard • Existing route corridor - therefore limited impact on the environment • May allow use of road and railway during construction depending on risk assessment
Disadvantages	• May involve road closure during the works • May involve disruption/closure of train services during construction • Restricted ferry services for local traffic • Long diversions for vehicles unsuitable for the ferry • Visual amenity of the road diminished • Risk of fire in long tunnel section / ventilation and escape requirements • Risk of collapse during construction
Residual Risk	• Railway could still be disrupted if a large rock fall were to occur. Cost of providing rock catch fencing and protection to the railway when the road is closed

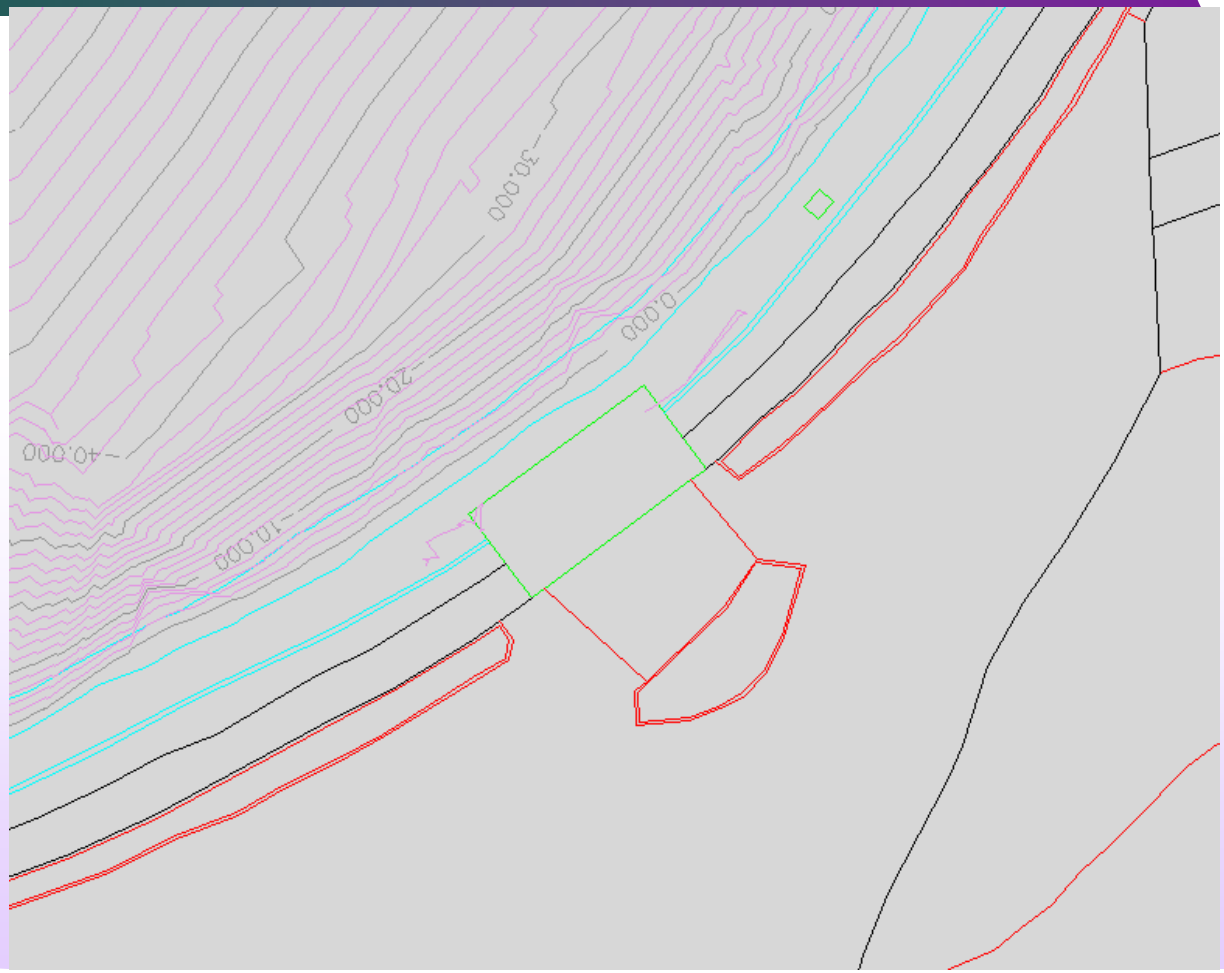
G5 - Rock fill out into Loch Carron to provide sufficient space for the road and railway



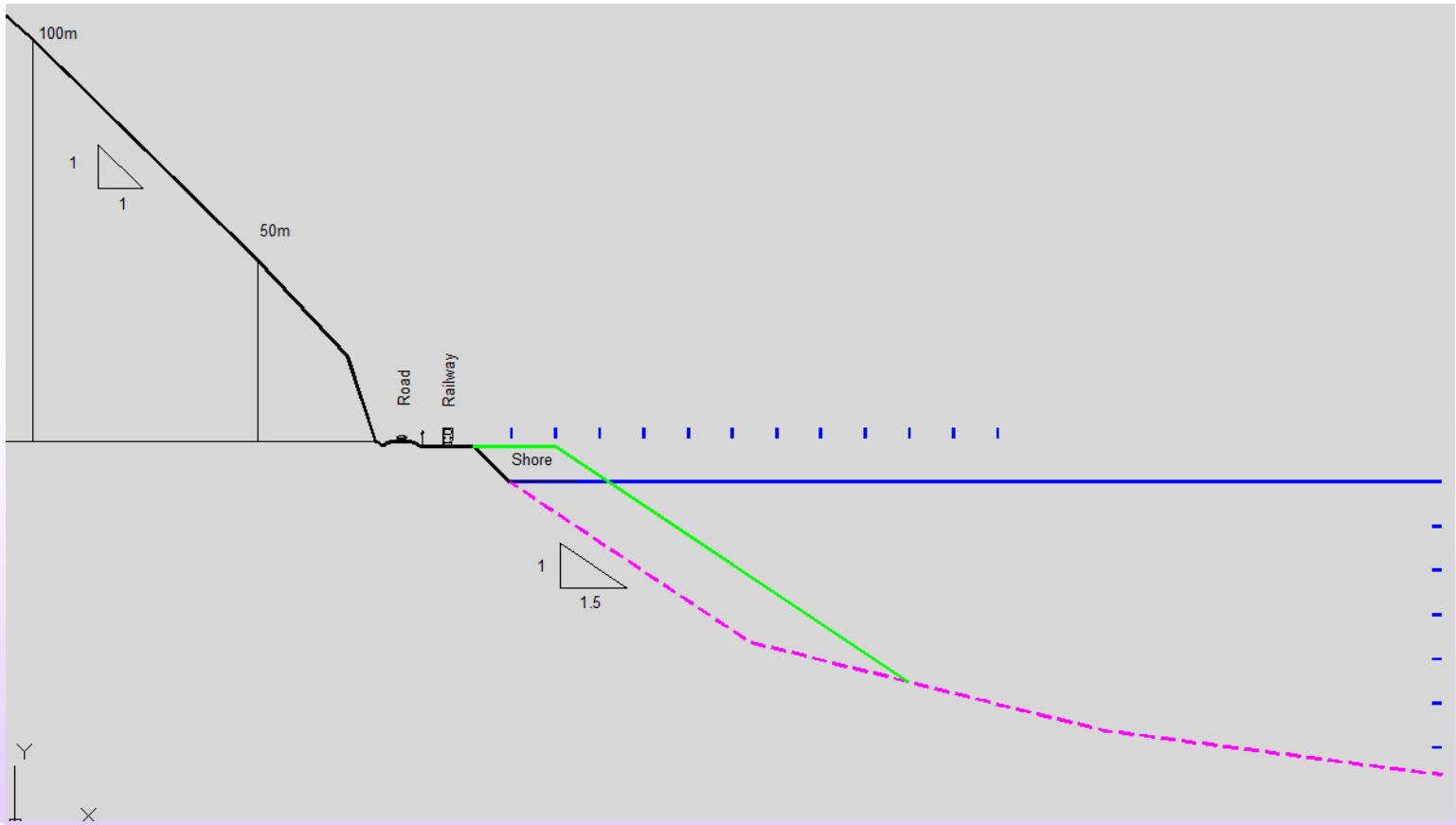
G5 - Rock fill out into Loch Carron to provide sufficient space for the road and railway



G5 - Rock fill out into Loch Carron to provide sufficient space for the road and railway



G5 - Rock fill out into Loch Carron to provide sufficient space for the road and railway



G5 - Rock fill out into Loch Carron to provide sufficient space for the road and railway

Option	G5
Cost Estimate	• £96M for 2km of rock embankment • £17M to bring the rest of the route up to single carriageway standard • £2M on River Carron Bridge • ?Move railway or provide two level crossings? **£115M Total**
Advantages	• Provide safe passage by removing vehicles from hazard
Disadvantages	• Long diversions for vehicles unsuitable for the ferry • Environmental impact on Loch • May have cost of moving railway line or providing level crossing which would increase conflict road/rail
Residual Risk	• Slip failure of submerged rock slope.

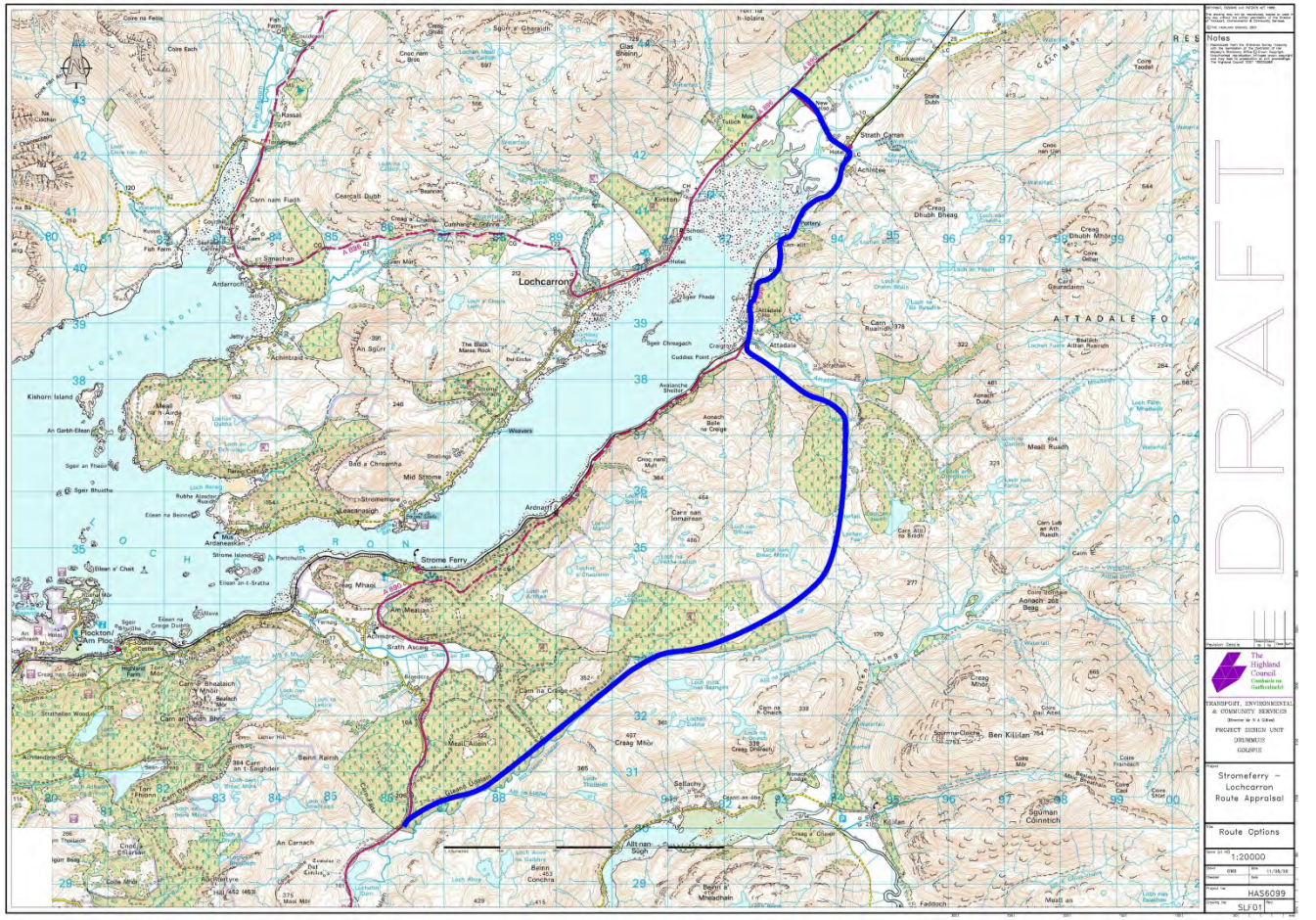
G6 – Do minimum

- Daily Driven Rock-slope Inspection – THC
- Monthly Walked Rock-slope Inspection - THC
- Annual Rock-slope Inspection – Specialist Consultant
- Prioritised Rock-slope Maintenance - C£250K/yr ?

G6 – Do minimum

Option	G6
Cost Estimate	• £250k / year • £2.5M on reactive maintenance following major slip *Averaged over a 20 year period* **£10M Total** (assuming 2 rock falls in a 20 year period)
Advantages	• Only carrying out work that is absolutely necessary.
Disadvantages	• Risk of unexpected rock face failure • Emergency works contract leading to high cost of repair • Unknown level of delay and disruption to traveling public • Unknown cost out come
Residual Risk	• Failure of rock slope

Blue route – Glen Udalain



Blue route – Glen Udalain

Blue route – Glen Udalain

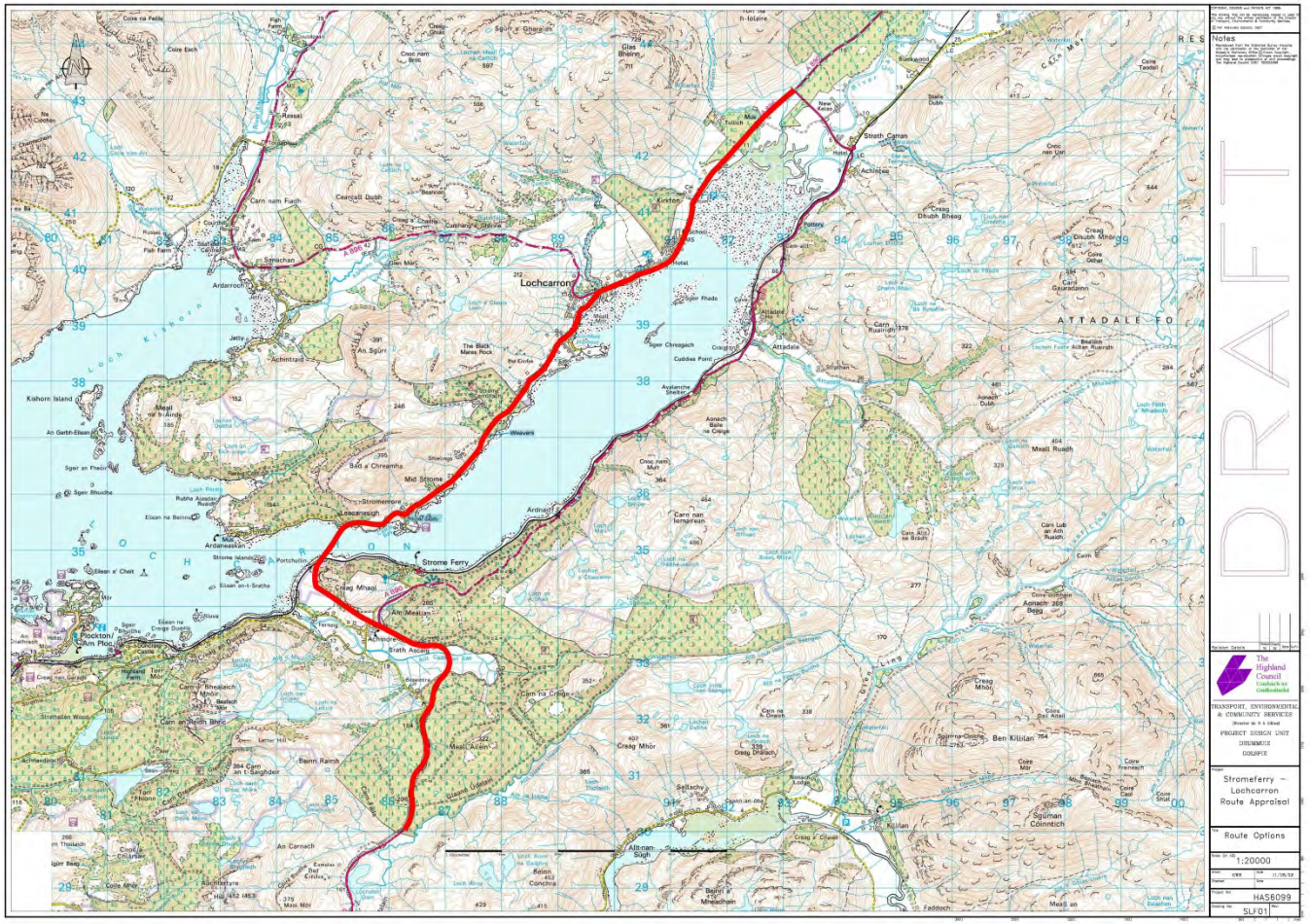
Blue route – Glen Udalain

Blue route – Glen Udalain

Blue route – Glen Udalain

Option	B1
Cost Estimate	• £15M for route in new diversion • £6M to bring the rest of the route up to 6.0m single carriageway standard • £2M on River Carron Bridge **<u>£23M Total (excluding land)</u>**
Advantages	• Bypasses the rock slope causing problems • Traffic flows can be maintained on existing road during the works • Low risk during construction
Disadvantages	• Environmental impact of the project • Longer journey time for local traffic • Winter maintenance issues on a high level route
Residual Risk	• Railway could still be disrupted if a large rock fall were to occur. Cost of providing rock catch fencing and protection to the railway when the road is closed

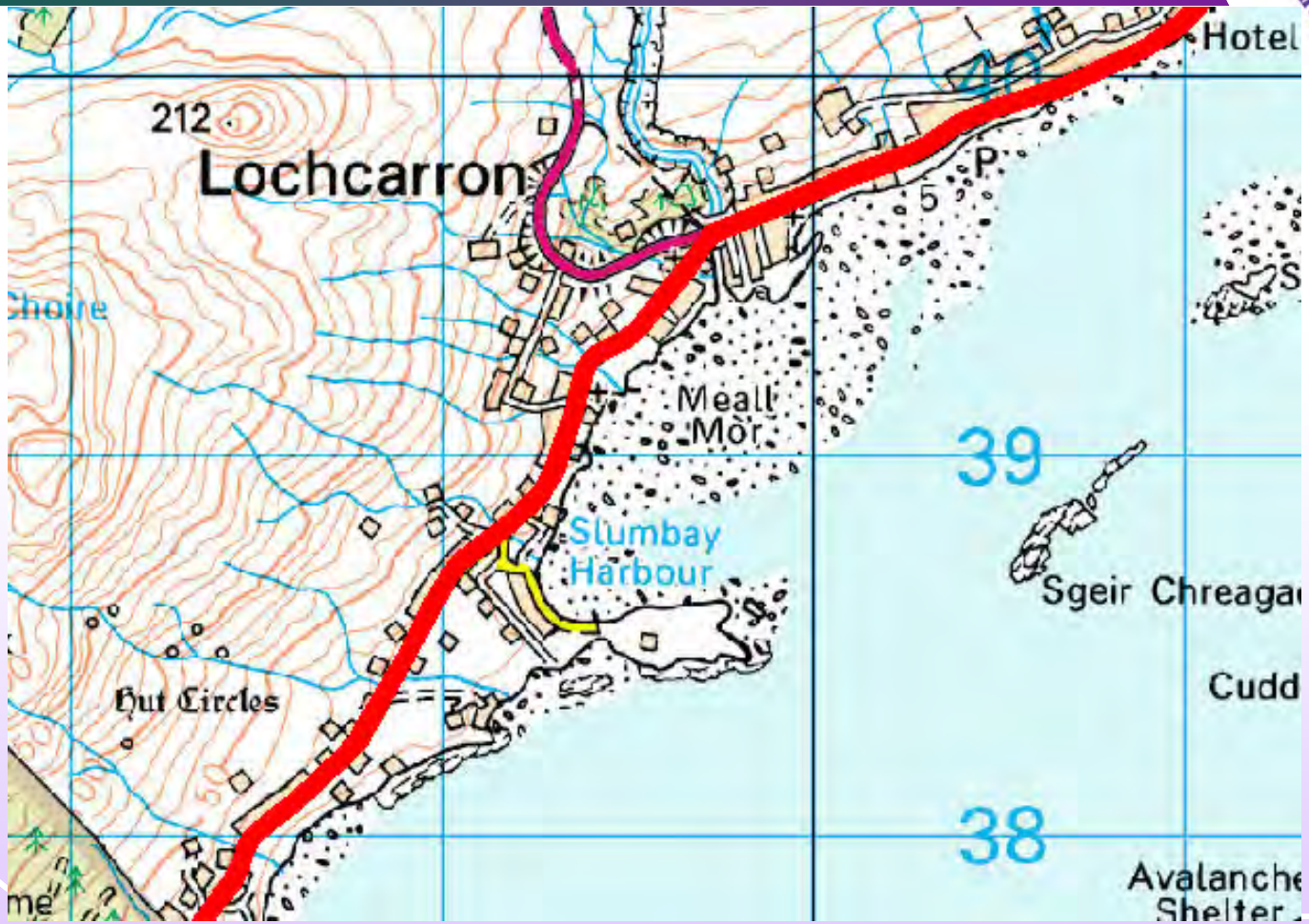
Red route – New Bridge Crossing



Red route – New Bridge Crossing

Red route – New Bridge Crossing

Red route – New Bridge Crossing



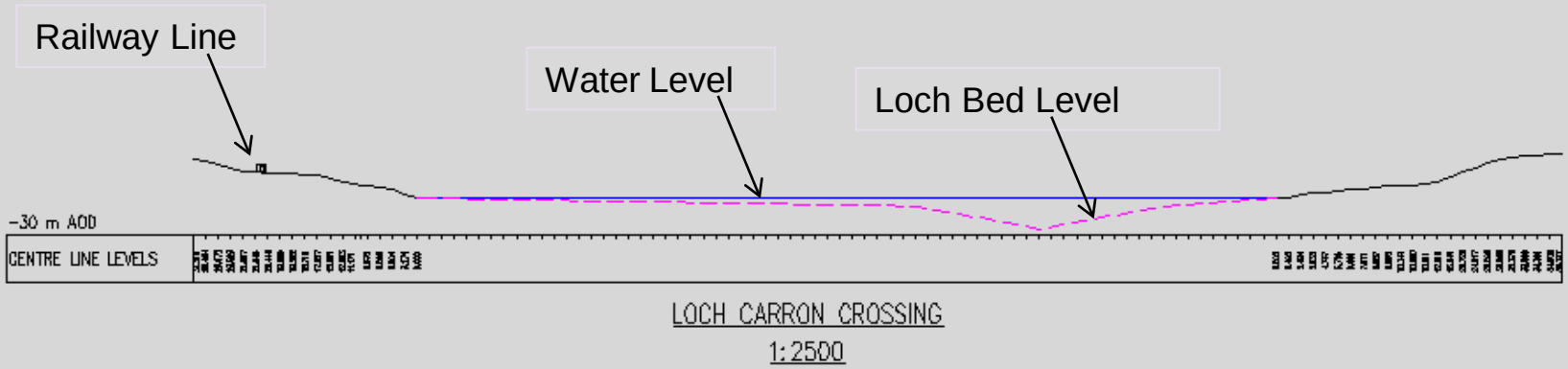
Red route – New Bridge Crossing

Red route – New Bridge Crossing

Red route – New Bridge Crossing

South side of Loch

North side of Loch



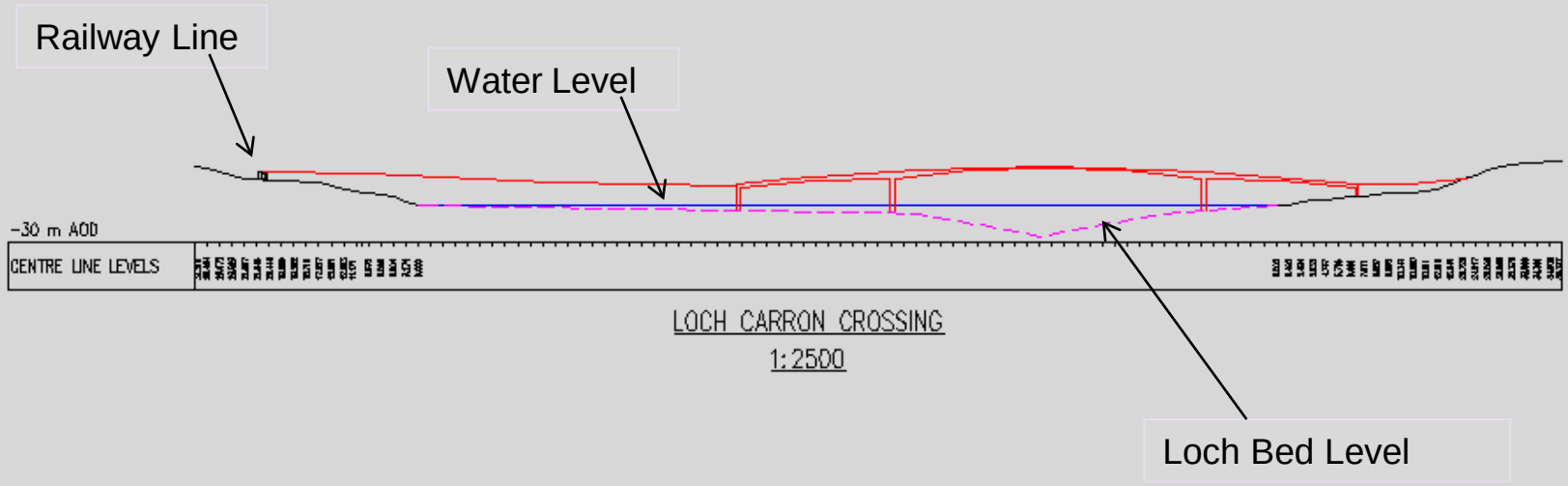
LOCH CARRON CROSSING

1:2500

Red route – New Bridge Crossing

South side of Loch

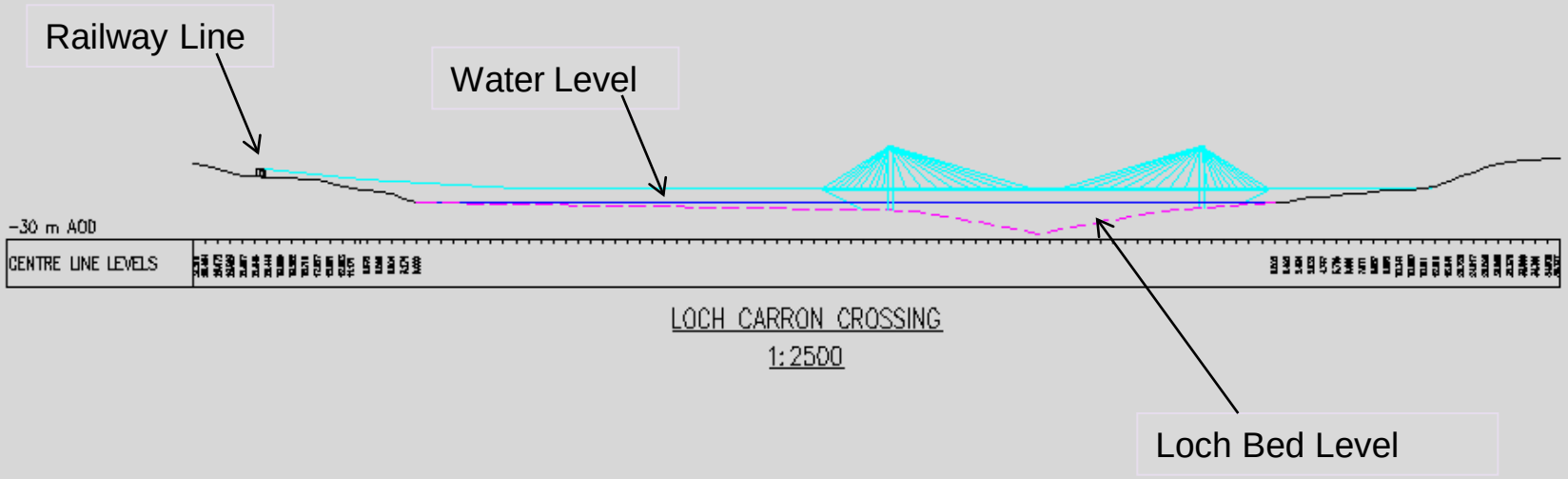
North side of Loch



Red route – New Bridge Crossing

South side of Loch

North side of Loch



Red route – New Bridge Crossing

Option	R1
Cost Estimate	• £40M for new bridge • £2M for new railway bridge • £18M to bring the rest of the route up to 6.0m single carriageway standard **£60M Total (excluding land)**
Advantages	• Bypasses the rock slope causing problems • Traffic flows can be maintained on existing road during the works • Shorter journey times for local traffic • Strategic link to economic development of Kishorn
Disadvantages	• Environmental impact of the project • Impact of increased traffic in Lochcarron • Impact on properties in Lochcarron • Visual impact of new bridge crossing • Sever Lochcarron village from the shore
Residual Risk	Bridge subject to restriction / closure in bad weather. Railway could still be disrupted if a large rock fall were to occur. Cost of providing rock catch fencing and protection to the railway when the road is closed

Summary

Option	Description	Cost Estimate	Comments
G1	Stabilise existing rock face	£69M	High Risk for construction and cost outcome. Disruption during construction
G2	Rock cut into hillside	£109M	High Risk for construction and cost outcome. Disruption during construction
G3/a	Avalanche Shelter Extension (single)	£59M	High Risk for construction and cost outcome. Disruption during and after construction
G3/b	Avalanche Shelter Extension (double)	£104M	High Risk for construction and cost outcome. Disruption during and after construction
G3/c	Avalanche Shelter Extension (road above)	£99M	High Risk for construction and cost outcome. Disruption during construction
G4	Tunnel	£94M	High Risk for construction and cost outcome. Disruption during construction
G5	Rock fill embankment into loch	£115M	High Risk for construction and cost outcome. Stability of embankment uncertain
G6	Do Minimum	£10M in 20 Yr	High Risk of Unexpected failure
B1	Glen Udalain	£23M	Low Risk for construction and cost outcome. Land acquisition required
R1	New bridge crossing Loch Carron	£60M	Medium Risk for construction and cost outcome. Land acquisition / Demolition/ CPO required