Item:
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HI TRANS
THE HIGHLANDS AND ISLANDS TRANSPORT PARTNERSHIP

Report to Partnership Meeting 5 February 2016

RESEARCH AND STRATEGY DELIVERY

BRANCHLINER

Purpose of Report

This report provides Members with information on the Branchliner project.

Current Status

Work Packages 1 and 2 have been completed. WP3-7 are underway. Additionally HITRANS and Highland Timber Transport Group presented to Caithness and Sutherland councillors on 30 November and 7 December last year. The impact on the local roads of unconstrained road access in moving the timber to Inverness was noted.

HITRANS will be presenting the Branchliner work to the Scottish Timber Transport Conference on 10 March.

WP1- Binns Ltd

Site Location and Current Layout

The proposed site for the sidings is immediately south of Kinbrace Station with road access from the B871 road. The railway mileage is approximately 118 miles (Ordnance Survey grid reference 862 313). The propose location is the currently disused lineside loading area.

The railway is single track, running south to north. The line is rising on a 1:160 gradient running south past the proposed sidings. The main line is positioned on sidelong ground, sloping downhill from east to west.

A level crossing (automatic open level crossing plus barrier) is situated immediately north of the station.

The existing loading area is owned by Highland Council with the land to the west and south being owned by Achentoul Estate. Timber loading was previously carried out at the site utilising lineside loading during railway possession, generally at night.

A topographical survey has been carried out of the proposed area, limited at the south end of the site due to access issues.

Proposed Layout Option

Options have been considered for the layout of the loading facility, all of which are based on the current loading area. The options considered are:

1. A connection facing the south (Down) direction of traffic located on an existing straight or potentially the transition out of a right hand curve heading north. Two sidings of circa 440 metres would be provided, with a run round and headshunt facility.
2. As option 1 with a single siding of 440 metres.
3. Lineside loading with no siding.

Option 1 has been chosen for development for reasons discussed under the chapter on rail operations.

The sidings will be located in the area of ground to the west of the line and to the south of the existing connection to the B871 road. The current lineside loading facility is too short to accommodate the proposed facility and will require to be extended both west and south.

The gradient of the sidings will require to be confirmed and for the purposes of this report have been assumed to follow the gradient of the main line. This will mean that they will remain level with the main line and will fall towards the buffers. The sidings would be connected to the main line via a turnout with trap points. The trap points and ground frame controlled turnout would be within Network Rail property and control. Signalling and telecomms issues associated with the provision of the connection are covered in a separate chapter.

An extension to the existing hard standing of approximately 43 metres width and 680 metres length will be required. The hard stand would be a minimum of 17 metres width on the west side of the sidings to allow for a loading road, a delivery road and a timber stack.

Additional land may be required for extra storage hardstanding and buildings. This has been excluded from this report.

Road access will be provided from the existing access point.

Both sidings would be loaded from the adjacent hardstanding to the west. A robust fence would be required between the run round and the main line. For loading of timber it will be necessary to position the loading plant such that it is “failsafe”, i.e. in the event of failure the jib or load cannot fall on or about the main line. Extension and slue limiters may be required to enable this.

There will be significant visual, traffic and noise impacts from the proposal and advice should be sought from the planning authority on any likely mitigations that may be required.

Earthworks

No ground investigations have been carried out for this report. It has been assumed that the existing hardstanding is suitable for use or for building up on. For areas out with the existing hardstanding it has been assumed that one metre depth of material will need to be removed before building up in suitable material to the required level.

The existing ground level in the proposed siding area is below that of the main line and will require to be built up by up to five metres.

The hard standing extension would be located on land that is appears to be currently moor land rough grazing. The topsoil and any soft material beneath would require to be stripped and the level brought up to that of the existing hardstanding in suitable granular fill. A ground investigation would be required to determine the existing ground conditions and the extent of the material to be removed.

It has been assumed that a minimum of 0.75 metre of existing material will require to be removed throughout the proposed area; however this will need to be verified by survey and ground investigation.

The quantity of earthworks has been estimated as per Table 1 and is based on the proposed drawing.

Item	Quantity	Comment
Soil strip	30000m2	680x43m area
Excavation depth	0.75m	
Quantity of excavated material	22000m3	
Quantity of fill material	61500m3	Based on average 2.1m depth

Table 1: Earthworks Quantities

The surface of the hardstanding would be envisaged to be compacted Type 1 material or similar. Concrete loading areas may be beneficial if the area is to be heavily used, but this would have cost implications.

There may be a benefit in using geotextile strengthening materials within the track solum and hardstanding in order to reduce the specification of the fill material and future maintenance.

Drainage

There are two existing cross site culverts which pass beneath the hardstanding. These will require to be extended. There are also a number of minor watercourses in the vicinity of the proposed south extension which will need to be piped.

Any diversion or culverting of the existing watercourses will require to be agreed with the Scottish Environmental Protection Agency (SEPA). Any positive site drainage will be subject to Highland Council approval for quantity.

With the hardstanding area proposed to be constructed from granular fill, positive drainage of the track bed, roads and hardstanding areas may not be required, although this will definitely be required if concrete hardstanding is provided. This will be determined at the design stage following ground investigation.

Contamination of the watercourses will require to be avoided. With no positive drainage of the site currently proposed this should not be a major risk, although ground investigation will determine the permeability of the existing ground.

Permanent Way Works

The connection from the main line is proposed to be from straight track although this may potentially be on the transition out of a right hand curve heading north. The topographical survey carried out did not obtain track alignment details for the southern end of the proposed site.

The connection to the main line and the trap points would be a CV 9.25 (or similar) turn out. The turn outs which are out with Network Rail control are proposed to be BV8. All turn outs would be controlled by ground frames. The sidings would be positioned adjacent to the hardstanding, with the run round adjacent to the main line. The layout of the sidings, run round and headshunt will be able to be optimised once the detailed requirements of the freight operating company are known.

In accordance with Network Rail Standard NR/L2/TRK/2049 "Track Design Handbook", the vertical alignment within sidings should ideally be level, with a gradient of 1:500 being acceptable. It should be noted that the sidings will not be under Network Rail control, however Network Rail will be required to accept the risks associated with new sidings being connected to their infrastructure. It should be acceptable to incorporate a gradient in the sidings to match the main line gradient but this will require to be fully risk assessed and agreed with both Network Rail and freight operating companies.

It is proposed that the track would consist of serviceable materials. There can be a wide variation in costs and availability of serviceable materials, particularly switches and crossings. Consideration of the advantages and disadvantages of timber versus concrete bearers should be made. The design life of the track will be largely dependent on the quality of the serviceable materials used.

Bottom ballast would be provided to a depth of 200 millimetres below the sleeper.

Electrical and Services Requirements

Depending on the usage of the sidings and the requirement for any buildings, there is likely to be a requirement for electrical, water, foul water and telephone services to the site. Lighting would be required where operations are to be carried out at night. The provision of these services has not been investigated in this report or included in the estimate.

Signalling and Telecommunications

See separate chapter by Douglas Kirk.

Cost Estimate

The estimate for the construction costs of the yard are as per Table 2 below and are +/- 50%.

Item	Cost (£k)
P. Way	870
Culverts	70
Earthworks	2660

Fencing	20
Total	**3620**

Table 2: Costs for Yard

Exclusions:

- Connection costs to mainline, all disciplines.
- Project Management costs (by NR and/or others).
- Design costs.
- Ground investigation costs.
- Power supply.
- Site Accommodation.
- Site lighting.
- Remedial works to east side cess, if required.
- Land costs.
- Legal costs.

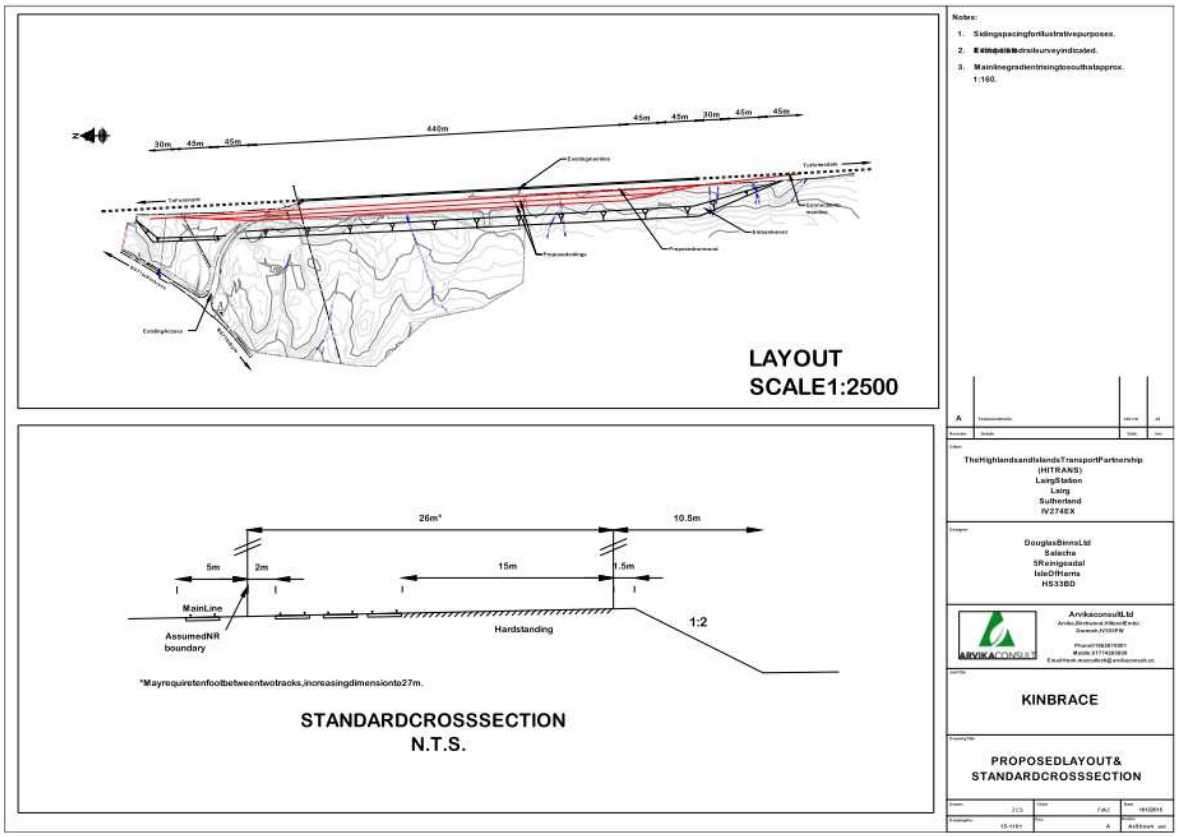
Assumptions:

- Reasonable ground conditions requiring average excavation of 750mm across site.
- Two culverts to be extended across site. Other water courses assumed to be small diameter pipes.
- Excavated material cannot be re-used but can be disposed of on site.
- Serviceable rail, S&C and sleepers used.
- Type 1 granular fill has been costed. There may be an opportunity to obtain local material at a reduced cost.
- Yard levels to match adjacent main line. There may be a cost benefit in lowering the yard to reduce fill costs.

Project management and design costs may be of the order of an additional 20% of the total in Table 2, and ground investigation may cost an additional circa £40k.

Appendix A: Drawing

15-11/01: Proposed Layout and Standard Cross Section



WP 2 DELTIX-EXECUTIVE SUMMARY

In August 2015 HITRANS commissioned Deltix to undertake – as part of the Kinbrace Rail Timber Terminal project study – *Work Package 2: rail operations*, encompassing procurement, wagons, haulage, pathing and possessions required for rail movement of timber from the Flow Country to Inverness and beyond.

At an early stage of the current study it was agreed with HITRANS and Highland Timber Transport Group that a rail target for the core Kinbrace catchment of around 100,000tpa over a 40-week year would be adopted – a relatively conservative figure in light of some recent total demand projections.

The mooted concept of an alliance or joint venture of forestry interests to take forward the rail project represents a departure from standard practice. The rail industry will also need to show

flexibility, in line with Transport Scotland's observation in its recent Rail Freight Strategy consultation document that 'innovation will be the key to unlocking transportation of timber by rail'.

Route capacity and capability:

In terms of capacity, the key characteristic of the Far North Line is that it is a single-track route with 11 intermediate crossing loops (with Britain's longest single-track block section, 24 miles between Helmsdale and Forsinard, through Kinbrace). Train payloads are limited by a Gross Trailing Load (GTL) limit southbound of 1,230t for a standard Class 66-hauled train. The practical payload for timber will depend on the tare weight of the wagon and whether or not container wagons (with the additional tare weight of the containers) are used. The maximum permitted train length is c.320m for normal operation of trains which are required to cross other trains en route – restricting loads to less than those achievable within the GTL limit above except where Network Rail provides dispensation for over-length running.

Exploration of options with the five potential rail hauliers confirmed that two generic types of rail wagon could potentially be used for this traffic flow – namely conventional or intermodal (containers). The key timber carrying capacities etc of the most likely wagon options are set out below:

Generic wagon type	**Conventional**		**Intermodal**
Wagon model	'KFA'	'KSA'	'IKA Megafret twin'
Timber payload per wagon	c.40t	c.45t	c.52t
Maximum no. of wagons within 1,230t GTL	*18*	*16*	*12*
Total train length (excl. loco)	*374m*	*368m*	*437m*
TOTAL TRAIN PAYLOAD	**c.720t**	**c.720t**	**c.624t**
ANNUAL THROUGHPUT (4 trains pw, 40 weeks pa)	**c.115,200t**	**c.115,200t**	**c.99,840t**

Selection of preferred terminal option at Kinbrace:

Terminal type, location, length and design will be a critical element of the rail haulage specification – in terms of train length / capacity, train crew resources etc. A key project objective is to facilitate highly efficient train working in order to achieve the lowest possible rail rate per tonne, as well as safe train operation and safe terminal operation.

The three basic types of terminal / terminal connection outlined below involve different trade-offs between capital cost and operational cost (terminal handling and rail haulage):

- lineside loading – ie loading a train while it is standing on the main line, so no sidings are required

- bespoke sidings connected to the main line by means of a 'semi-permanent' Non-Intrusive Crossover System (NICS) connection

- bespoke sidings connected permanently to the main line by a conventional set of points controlled by a ground-frame.

The innovative Non-Intrusive Crossover System (NICS) concept allows the movement of a train from a main-line track onto a siding without cutting into existing rails. NICS has been successfully deployed on engineering possessions on the West Coast Main Line, extensively on the Nexus Tyne & Wear Metro, and has now secured approval from London Underground. The NICS kit has been endorsed by Network Rail engineers, but its deployment on the network (including the Kinbrace opportunity) will require type approval or – potentially – a pro-active derogation with a site-specific Safety Plan to facilitate innovation at Kinbrace.

The most efficient form of train working is likely to be 'slip' working where there are two sets of wagons circulating and the terminal at Kinbrace is configured to permit the arrival of empty wagons straight into a loading siding, the engine would then be released from this train, running round to the other end and attaching to the pre-loaded wagons ready for departure. For this type of operation bespoke sidings are required.

Advice from Transport Scotland's freight grants team suggests that availability of ongoing revenue subsidy (through the Mode Shift Revenue Support grant) is likely to be relatively more constrained than availability of capital support through Freight Facilities Grant (FFG). For a project of perhaps 10 to 15 years duration, it would in any event clearly be preferable to minimise exposure to annual budgetary constraints, particularly where a greater emphasis on up-front capital expenditure (with FFG support) can be an alternative.

Lineside loading has been dropped as a core terminal option, in light of concerns about: potential difficulties of operational interface between the rail and forest industries; the cost of double handling; the problems and cost of night-time loading; and increased train haulage costs. However, should NICS not secure approval from Network Rail for commencement of operations at Kinbrace in 2016, then an interim arrangement for limited lineside loading for a period of around a year would need to be identified.

In summary, the preferred option(s) for the key elements of the Kinbrace rail terminal are:

- **type:** in the short to medium term, bespoke sidings connected to the main line by means of a 'semi-permanent' NICS connection; in the medium to long term, bespoke sidings connected permanently to the main line by a conventional set of points controlled by a ground-frame

- **location:** south of Kinbrace station, to the west of the railway, in the vicinity of the plot used in the 2002 lineside loading campaign

- **length:** on the assumption that over-length train working will be permitted on the Far North Line, and dependent on the ultimate choice of conventional or intermodal wagons, loading sidings probably in the range 368m-437m long

- **design:** two double-ended loading / stabling sidings of full train length, and a parallel run-round loop (but with just a single connection from the terminal to the main line (to the south of the terminal); design geared to day-time loading of wagons.

Network Rail (NR) is supportive of the project and provided some initial indicative costings and timescale for the provision of a new ground frame and connection at Kinbrace. This is NR's preferred solution and is not seen as particularly complex, although a lot of technical issues need to be resolved before a sidings connection is operational. An indicative estimate of £1.6m plus 'optimism bias' was suggested for the connection and associated signalling alterations (not including the internal track work in the terminal).

Inverness railhead:

The project also requires identification of a suitable Inverness railhead, with sufficient siding length, hardstanding and acceptable road access.

The optimum railhead identified for a *conventional wagon scenario* is a Network Rail pad in the former Up Millburn Yard which has sidings to both the north and south sides. These were formerly used for handling Safeway containers and for timber loading, and their upgrade was part-funded by Freight Facilities Grant provided by the Scottish Executive in 1998, as part of the successful initiative to transfer Safeway supermarket traffic from road to rail.

In terms of an *intermodal wagon scenario*, the greater length, tonne for tonne, of an intermodal train, and the more onerous load-bearing requirements for the hardstanding area (to accommodate container transfer equipment), suggest that the optimum solution would be to utilise the nearby existing John G Russell / DRS intermodal railhead.

Discussions with rail hauliers:

All five major British rail hauliers (Colas, DB Schenker, Direct Rail Services, Freightliner Heavy Haul and GB Railfreight) responded to a questionnaire seeking intelligence on their experience, expertise, and likely capacity and capability to handle this relatively unusual flow – involving both a client new to rail and a 'peripheral' location. In light of (a) the fact that no single potential customer for rail yet exists, and (b) unresolved issues around the terminal capabilities etc, it was decided not to request any indicative rail prices at this stage.

In evaluating these responses, there was a clear distinction between a group of four hauliers scoring at broadly the same level – well above 'pass' marks – and the fifth haulier scoring at around half that level, and well below 'pass' marks.

Summary of main conclusions:

1. Although the business case will not be determined until a later phase of the project, the likely volume and duration of timber traffic from the Flow Country to Inverness represent *prima facie* grounds for anticipating a supporting case for a bespoke rail terminal in the Kinbrace area, serviced by a cost-effective regular train service.

2. A cost-effective train service will be critically dependent on (a) operating long trains with substantial payloads, and (b) a rail terminal design which minimises the time which the locomotive and driver are required to wait before returning to Inverness.

3. The lengthiest trains (with the largest payloads) will be those which are permitted by Network Rail to operate at lengths greater than those of the line's crossing loops. Likely timber payloads range from c.624t to c.1,080t, equating to 100,000tpa or more over a 40-week season.

4. The preferred Flow Country terminal option in the medium-to-long term is the provision of bespoke sidings at Kinbrace, connected permanently to the main line by a conventional set of points controlled by a ground-frame – the terminal type with the highest capital cost, but lowest operating cost and greatest operational flexibility.

5. In the interim period (2016-2017/18) the preferred option is the 'semi-permanent' Non-Intrusive Crossover System (NICS), which would involve medium capital cost, medium operating cost and flexibility – and crucially, the potential for short-to-medium term implementation.

6. NICS, however, will require 'Type Approval' or, potentially, a pro-active derogation with a site-specific Safety Plan to facilitate innovation at Kinbrace.

7. The length of terminal loading sidings required in the medium to long term at the site to the south of Kinbrace station and to the west of the railway, is likely to be in the range 374m to 437m, with two double-ended sidings and a parallel run-round loop within the terminal maximising wagon productivity and simplifying on-site shunting.

8. In the case of an Inverness railhead, the preferred option will primarily rest on (a) whether a conventional or intermodal wagon option is chosen, and (b) in the former case, on alternative accommodation being found for current Network Rail technical train berthing and equipment.

Summary of suggested next steps in project development:

It is suggested that HITRANS undertake the following actions:

1. Continue to facilitate early creation of an alliance or joint venture of forestry interests to take the project forward and enter formal negotiations with rail hauliers.

2. Provide the rail hauliers with (a) greater definition about the proposed capacity and design of the two key rail terminals at Kinbrace and Inverness, and (b) an identifiable path and indicative timeline leading towards the emergence of a defined customer for the rail hauliers to engage with.

3. Prepare a Client Remit for the project so that Network Rail (NR) can allocate appropriate resources to resolving the details of the proposed Kinbrace terminal as soon as possible, moving through the appropriate stages of the GRIP (Governance of Railway Investment Projects) process.

4. Seek further clarification from NR on terminal options at Inverness.

5. Facilitate bringing key NR managers face-to-face, at an early date, with (a) a working example of the NICS kit and (b) NICS Ltd managers, engineers and operators' in order to discuss potential operational deployment at Kinbrace.

6. Keep the relevant Transport Scotland departments appraised of progress and key issues arising.

WP3,4,5

The sourcing of timber and transport to and from the railhead are still under study.

WP6,7

The economic and studieswill use the information above to identify the value of the timber to the Highland economy, and the environmental benefits of the rail haulage option.

Recommendation

1. Members are asked to note the report.

. **Risk**	**Impact**	**Comment**
RTS delivery	√	This project fits well with a number of RTS Horizontal themes.
Policy	√	This project has integration and environmental benefits.
Financial	√	This feasibility project is fully funded to date
Equality	-	No impact on equalities issues.

Report by: Frank Roach
Designation: Partnership Manager
Date: 26 January 2016

Annexe1

Deltix: KINBRACE TIMBER TERMINAL: A SIGNIFICANT OPPORTUNITY FOR SCOTTISH RAIL FREIGHT

Despite an annual harvest of seven million tonnes, no timber is carried by rail in Scotland. The market for the proposed Kinbrace terminal is some **100,000 tonnes pa** to Inverness and beyond, over a period of around **10-15 years**, conveyed on a **daily train service** over some 40 weeks pa – thereby avoiding significant road damage impacts. The forest industry in the Kinbrace area is being encouraged by HITRANS to innovate in order to facilitate rail haulage – by developing an alliance or joint venture of forest owners to operate the terminal and to contract with a rail haulier. The rail industry will also need to show flexibility, in line with Transport Scotland's (TS) observations in its current Rail Freight Strategy consultation document that "innovation will be the key to unlocking transportation of timber by rail" and "[we are] keen for the industry to come forward with proposals for pilot initiatives".

Key project objectives:

- highly efficient train working in order to achieve the lowest possible rate per tonne, thus minimising any need for ongoing Mode Shift Revenue Support grant from TS
- safe train operation and safe terminal operation.

Key train operation principles:

- the optimum train operation, recognising the limitations of the Far North Line (eg Gross Trailing Loads (GTL), loop lengths, and engineering access requirements)
- maximisation of train payload consistent with the loco capability, but also seeking to take advantage of, for example, over-length working to drive down unit costs
- facilitation of round-trip working from Inverness within one driver shift.

Key Kinbrace terminal Issues:

- terminal time to be reduced to the minimum by use of two rakes of wagons (empties in, loads out) and associated 'slip working'
- terminal designed to simplify train operations, with two double-ended loading sidings and an internal run-round loop
- sidings and run-round length of up to 400m+ each, to facilitate maximum train length within GTL limits, including possible use of intermodal wagons
- loading to take place during the day, providing safer terminal working, forest working and road vehicle movements.

Rail industry response to date:

- all five main rail hauliers responded to a questionnaire seeking further intelligence on their experience, expertise, and likely capacity and capability for this flow
- HITRANS has selected four of the hauliers with whom to continue the dialogue, moving towards an invitation to tender from the new forest industry alliance
- discussions are proceeding with Network Rail through Anne Mackenzie.

KEY TIMESCALE ISSUES:

1. A new ground frame connection at Kinbrace is required, linked to Inverness Signalling Centre, ideally for the 2017 season, but certainly no later than 2018.

2. The innovative Non-Intrusive Crossover System (NICS – see overleaf) is required at Kinbrace to enable rail to handle market requirements over the 2016-17/18 period, since 'lineside loading' has been ruled out as a core interim option, due *inter alia* to its requirement for night-time working and extra train crew resources.

Annexe 2

Summary

- *Windblow has created new problems for timber transport in the Flow Country.*
- *Voluntary limit of 10 trucks per day (6 south, 4 north), while demand rises to 50.*
- *Highland Council may move to protect the road.*
- *Timber needs to be extracted while it has value, and the economic benefits to the area are captured.*
- *New freight grant valuation for single track A roads can provide £8/t support.*
- *Landowners/Harvesters could form an alliance to manage operations co-operatively.*
- *Rail operations may well be lineside loading in the first instance, but other options will be explored.*
- *An alliance could provide a partnership for filling train space in conjunction with road space allocation.*
- *Branchliner 1 £30k funding can kickstart the process.*

Branchliner 1 Outline

Branchliner 1 received an STTS award of £20k matched with £5k from each of HITRANS and FCS in order to investigate rail from the Flow Country.

Over the next 10-15 years the timber industry needs to transport 4 million tonnes of timber from the wider Flow Country catchment to distant markets. This will have consequences for the fragile public road network, the environment and the neighbouring communities. The carrying capacity of the road network is a major constraint. The Highland Timber Transport Group's Flow Country Strategy 2014-16 highlights the still unrealised potential for rail to play a part.

This investigative study is a first phase which, if it proves positive, will lead towards a demonstrator project that will trial timber deliveries by rail.

HITRANS will bring together a high level strategic group to establish the importance of the issues at stake – the environmental peatland interest, the economic timber interest and the critical infrastructure constraints – and to ensure there is commitment to finding a viable solution. This group will set the context for and agree a brief for consultants to develop the options and make recommendations.

The consultants will gather existing knowledge and experience of timber transport by rail in the UK to see how it can be best applied to the Far North Line. They will establish gaps in knowledge and understanding of physical, cost, logistical, environmental and community issues and, where necessary, commission consultancy services to fill these gaps.

Suitably experienced consultants will investigate the optimum location and size of loading facilities, the cost of their upgrade or creation. It will take account of train lengths, terminal operation and train path metrics and consider the role of demountable ISO flatracks, conventional dedicated timber wagons and freight multiple units.

All options will be reviewed, to determine the costs and to identify any logistical barriers to delivery of Flow Country timber by rail to Inverness and beyond. The environmental benefits of mode shift to rail from the Flow Country will be calculated. A significant development occurred recently with the DfT decision to value the Mode Shift Benefit value of single-track A roads (with passing places), at £2.35 per lorry mile rather than the standard A road's £0.82 per lorry mile which are found in some parts of peripheral north and west Scotland. Timber moving by rail to Inverness from the Flow Country could attract £8 per tonne in support.