TERM CONTRACT FOR THE MANAGEMENT AND MAINTENANCE
OF THE SCOTTISH TRUNK ROAD NETWORK (NORTH WEST UNIT)

WINTER SERVICE PLAN
01 October 2017 to 15 May 2018

Controlled Copy No.

Client:
Transport Scotland
Trunk Road and Bus Operations
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

Operating Company:
BEAR Scotland Limited
BEAR House
Inveralmond Road
Perth
PH1 3TW

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Appendix A **249**

DOCUMENT CONTROL

	Name	Signature	Date
Prepared by:	[redacted]	[redacted]	31/07/17
Checked by:	[redacted]	[redacted]	31/07/17
Approved by:	[redacted]	[redacted]	31/07/17

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REGISTER OF CONTROLLED COPIES

Ref.	Name of Holder	Designation	Company
1	[redacted]	Managing Director	BEAR Scotland Ltd
2	[redacted]	Operating Company Representative NW	BEAR Scotland Ltd
3	[redacted]	Operating Company Representative NE	BEAR Scotland Ltd
4	[redacted]	Winter Service Manager NW	BEAR Scotland Ltd
5	[redacted]	Operations Manager	BEAR Scotland Ltd
6	[redacted]	Operations Manager	BEAR Scotland Ltd
7	[redacted]	Network Manager	BEAR Scotland Ltd
8a-f	[redacted]	WSDOs	BEAR Scotland Ltd
9a-k	[redacted]	Duty Supervisors	BEAR Scotland Ltd
10	[redacted]	Winter Control Room	BEAR Scotland Ltd
11	[redacted]	Network Impact Manager	Transport Scotland
12	[redacted]	Network Resillience Manager	Transport Scotland
13	[redacted]	Network Resillience Manager	Transport Scotland
14	[redacted]	Network Manager (North)	Transport Scotland
15	[redacted]	Technical Manager	Performance Audit Group
16	[redacted]	Winter Service Manager NE	BEAR Scotland Ltd
17	[redacted]	Winter Service Manager SE	Amey
18	[redacted]	Winter Service Manager SW	Scotland TranServ
19	[redacted]	Winter Service Manager FBU	Amey
20	[redacted]	Director of Community Services	The Highland Council
21	[redacted]	Roads Service Manager	Perth & Kinross Council
22	[redacted]	Head of Roads	Argyll & Bute Council
23	[redacted]	Head of Environment	Stirling Council
24	[redacted]	Trunk Road Traffic Management	Police Scotland

INTRODUCTION AND PURPOSE

This winter service plan is for use on the North West 4G contract from the 1st October 2017 to the 15th May 2018.

The Trunk Roads contained within the North West Trunk Road Unit include significant lengths of exposed roads, bringing attendant problems arising from adverse weather conditions.

Winter Service Operations shall allow the safe movement of Trunk Road users and minimise delays and disruption caused by snow and ice conditions. The incidence and severity of winter conditions vary considerably throughout the season and from year to year and the resource requirement can fluctuate widely.

BEAR Scotland will deliver a level of Winter Service to deal with the winter conditions normally associated with the Unit, with the facility to provide such resources as required to deal effectively with all winter weather conditions which can be expected to arise. The requirements of the Operating Company are provided in Part 2 of Schedule 7 and Part 1 of Schedule 9 of the Contract.

BEAR Scotland has previous experience of successfully managing both Trunk Road and Local Authority Winter Service Operations within the UK. This valuable experience has assisted in shaping this strategy, which details how the Scottish Ministers' Winter Service requirements will be achieved.

This Winter Service Plan serves a number of more specific purposes:

Policy Document
The Plan reflects the Scottish Ministers' policy and objectives in the context of local service delivery.

Contract Document
The Plan outlines the key contractual responsibilities of the Scottish Ministers' and BEAR Scotland.

Quality Plan
The Plan will form part of BEAR Scotland's Quality Management System.

Contingency Plan
The Plan forms part of the Scottish Ministers' wider contingency arrangements, and describes the processes, procedures and operational arrangements for those responsible for delivering winter services. It should be read in conjunction with the Incident Response Plan.

Reference Document
The Plan is a comprehensive reference document for staff involved in winter maintenance.

1. MANAGEMENT ARRANGEMENTS

1.1 Winter Service Manager (WSM)

1.1.1 Name

The Winter Service Manager is [redacted].

1.1.2 Qualifications

[redacted] has a HNC in Civil Engineering which was achieved in June 1993.

1.1.3 Experience

[redacted] has previous experience of providing the winter maintenance service in a local authority environment with Fife Regional Council. [redacted] has been involved in delivering Winter Service Operations within the South East Unit since 2001 and in the North West Unit since April 2013. [redacted] has been formally approved as Winter Service Manager by Transport Scotland (29 May 2013).

1.1.4 Responsibilities

The Winter Service Manager is responsible for producing the Winter Service Plan for approval by Transport Scotland. He is then responsible for the operation, review and development of that Plan throughout the winter season, thus ensuring the Operating Company fully discharges its responsibilities under the Contract.

The Winter Service Manager has overall responsibility for winter maintenance activities including:

- collection and management of weather data
- maintaining salt and other de-icing stock levels and their storage facilities
- achieving response times for precautionary treatment, snow clearance and patrols
- plant and communications
- the ice prediction and weather radar system
- training of staff and operatives
- preparation and updating of rosters for Duty staff
- maintaining electronic records & manual records
- providing an annual winter service report
- liaison with third parties.
- communication with Transport Scotland during severe weather events
- participation in weekly conference call with Transport Scotland
- Implementing additional resources when required.
- Reporting weekly salt stock levels to the National Salt User Group through the DfT portal.
- Ensuring completion of Daily Action Plans and uploading to CMS.

1.1.5 Winter Service WSDOs (WSDOs)

The Winter Service Manager will be supported by six WSDOs working on a rotational basis. These posts are are an integral part of the service as they provide immediate support and guidance to the Winter Control Room staff, allowing them to process the information being received whilst the WSDOs interpret the forecast, make decisions on treatment and prepare the Daily Action Plan.

WSDOs are:

[redacted]

[redacted] undertook the role of Duty Manager in the South East Unit from October 2009 to May 2014. He then carried out the WSDO role in the North West Unit from October 2014 to May 2017. During his three winter seasons in the North West Unit he has mentored less experienced members of staff.

[redacted] is a Journey Time Liaison Officer with our Network Department. [redacted] has completed three full winter seasons as WSDO in the North West Unit.

[redacted] is an Engineer in the Roads Design Team. He worked as a WSDO in the South East Trunk Road Unit and has completed three winter seasons in the North West.

[redacted] is an Engineer in our Roads Design Team. This is [redacted] third winter season. [redacted] attended the IHE Winter Service Training for Decision Makers and Managers course, and this along with his previous experience will see him formally approved as a WSDO.

[redacted] is an Engineer in our Roads Design Team. [redacted] has previous experience of providing the winter maintenance service in a local authority environment with Stirling Council over a period of 13 years. He will be mentored by [redacted].

[redacted] undertook the role as WSDC on the North East Unit from 2013 to 2016 following which he gained promotion to Network Officer. As part of his continual development [redacted] is on his last semester in studying for an HNC in civil engineering. During his time as WSDC whilst predominately working on the North East Unit Ryan also gained experience of winter service on the North West Unit. In his first year as WSDO [redacted] will mentored by [redacted].

In addition to the above there will be a Senior Approver rota in place consisting of [redacted]. All have significant experience in Winter Maintenance.

The Winter Service WSDO can be contacted via the Winter Control Room number provided in 1.3.4. During periods of severe weather the WSDOs will assist in the Winter Control Room.

Winter Service Duty Staff

1.2.1 Winter Service Duty Supervisors

The Duty Supervisor will be available on a 24/7 basis throughout their week on duty. Their primary responsibility is to provide support to the WSDO and ensure that actions are completed within the required timescales.

Winter Service Duty Supervisor / Officer are

1.2.2 Winter Service Duty Controllers (Duty Controllers)

The Duty Controllers will work on a rotational basis in the Winter Control Room located in our Perth Office. There will be one dedicated Duty Controller for each Unit working alongside each other in the Control Room.

The Duty Controllers operate 24 hrs and shall monitor the system, complete all records as required and remain in contact with all winter drivers ensuring any changes to road conditions are reported.

1.2.3 Qualifications

All the WSDOs and Duty Controllers named will be fully trained in basic Road Meteorology including the use, and interpretation, of ice prediction systems.

1.2.4 Experience

All WSDOs shall have previous experience of monitoring the road sensor system and making decisions on treatment resulting from the receipt of the forecast information from the supplier.

1.2.5 Responsibilities

- **WSDO:** the role of the WSDO is primarily to interpret the daily forecast received, liaise with the weather forecaster and decide on required treatment and subsequently prepare the Daily Action Plan. Thereafter the WSDO will be available to advise the Duty Controller on further treatment.

  The WSDO has the authority to mobilise additional support for the control room and additional resources for treatment if required.

Even on nights with little activity the WSDO will be in contact with winter controllers. These calls will be logged.

- **Duty Supervisor:** the primary role of the Duty Supervisor is to receive the Daily Action Plan from the WSDO, contact and liaise with all spreader and patrol drivers relaying this information, ensuring the requirements are met in relation to response and treatment times.

- **Duty Controller:** the Duty Controller will be based in our Winter Control Room with the primary responsibility of monitoring the ice prediction system, surface patrols (mobile sensors) and condition patrols (DSP 310) and notifying the WSDO of any changes. The Duty Controller has authority to escalate any proposed action but cannot reduce this without prior agreement with the WSDO. Monitoring will include determining the ongoing effectiveness of treatments and to instruct further treatment should this be required.

  The WSDO will be available to assist the Duty Controller at all times particularly where there is a high level of activity due to snow or other adverse conditions. The Duty Controller will have the option to call in the WSDO.

1.3 Monitoring Arrangements

1.3.1 Monitoring arrangements during normal working hours

The Winter Control Room is operational for 24 hours a day 7 days a week between 01 November and 31 March.

The WSDO and Duty Supervisor are available through this period should the control room staff have any queries. The WSDO will take appropriate decisions at their workstation and through the use of a dedicated winter laptop when not at their workstation.

The WSDO will have the facility to use the following aids to monitor road conditions and to direct resources as required to treat the carriageway to keep it free from snow and ice:

- Contact with expert weather forecaster provider include “change triggers”
- Feedback from inspectors during normal working hours
- Monitoring of ice sensors
- Surface Patrols and Condition Patrols
- Compilation of daily action plan
- Monitoring RST trend against forecast
- Use of weather & traffic Scotland cameras
- Weather Radar
- Thermal maps where available
- Communications from external parties.

In addition, the forecast provider will call the Winter Control Room or WSDO if temperatures take an unexpected drop towards PLUS 1.

When severe snow conditions are forecast additional control rooms can be set up at other depots to assist with operational decisions & control of operations during the snow event.

1.3.2 Monitoring arrangements outwith normal working hours

The Winter Control Room will provide monitoring facilities 24 hours a day 7 days a week between 01 November and 31 March. The WSDO will monitor road conditions remotely using a laptop and will assess conditions relative to the original forecast.

The following aids will be used to assist in this process:

- Contact with expert weather forecaster provider including “change triggers”.
- Feedback from winter patrols
- Monitoring of ice sensors
- Monitoring RST trend against forecast
- Use of weather & traffic Scotland cameras
- Weather Radar
- Thermal maps where available
- Communications from external parties.
- Mobile surface and air temp gauges via winter service drivers
- Condition Patrols
- Contractual Patrols

In the event of immediate adverse conditions, the WSDO/Controller will call out the relevant stand-by crews directly, instructing them to undertake specified reactive treatment.

During widespread snow events additional control room staff may be mobilised to assist in Perth and when required snow desks may be set up at the Inverness Depot and Corpach Depots. A resilience room is also in operation at Perth during severe weather events and provided assistance to the control room with Senior Management decisions being made in a timeous manner.

1.3.3 Salt Stock Monitoring

Salt stock shall be monitored daily by the Winter Service Manager, WSDOs and Depot Supervisors. Salt stock will be reported through the IBI winter portal weekly for the 2017/ 18 winter season.

1.3.4 Winter Control Room

A joint North West/North East Winter Control Room will be based in BEAR Scotland’s Perth Office and will be operated on a rotational basis by individual Duty Controllers dedicated to each region. This control room also administers the A92 DBFO and M80 DBFO Contracts.

The Winter Control Room will be in operation between 24 hours a day 7 days per week between 01 November and 31 March.

The following number is answered by the Winter Control Room staff.

[redacted]

The Winter Control Room has access to all relevant contact phone numbers and winter maintenance systems such as Vaisala Bureau, Locatu (BEAR Scotland vehicles), communications log database, thermal maps and weather radar.

There is also a dedicated telephone line for Police Scotland within the Winter Control Room. This allows direct contact at all times between Police Scotland and our WSDO. This number will only be issued to Local Police Scotland Services.

1.4 Personnel Resources

The resources detailed below will be the numbers involved in delivering the winter service:

- 1 No. Winter Service Manager, supported by
- 6 No. Winter Service WSDOs

- 5 No. Winter Service Duty Controllers
- 11 No. Winter Service Duty Supervisors
- 84 No. Winter drivers

The Winter Service Manager will prepare a roster assigning sufficient numbers of trained drivers for each precautionary treatment route and patrol route. This roster ensures that on a week to week basis, outside of normal working hours, drivers remain on standby or shift pattern to respond to treatment or patrol instructions. The roster includes the necessary staff location and contact information and is stored on the BEAR Scotland network where it is kept up to date and issued on a weekly basis to the control room staff.

A minimum of three trained and experienced operatives will be employed for each precautionary treatment route, to provide round the clock coverage without compromising Drivers Hours Regulations.

Additionally, every driver based at a vehicle loading point will have a basic knowledge of each precautionary treatment route emanating from that point and will be capable of undertaking treatment on that route if necessary.

In the event of severe weather being forecast in the 5-day advance forecast, additional operatives will be put on standby or shift to ensure adequate resources are available to deal with snow conditions.

1.5 Call-out Arrangements

Communications links and lines of potential information flow are outlined in Figure 5 in Section 5 Liaison.

1.5.1 Call-out arrangements during normal working hours

The winter roster will include contact details for all personnel involved and controlled copies will be issued to each individual prior to the commencement of each winter season.

Any changes to the roster will be communicated to the Duty Supervisor for that week via email, confirming changes and any revised contact details.

During normal working hours it will be the responsibility of the Duty Supervisor to ensure that a clear line of communication is kept to all key personnel involved in providing the winter service for that week.

1.5.2 Call-out arrangements outside normal working hours

It is the role of the Duty Supervisor to contact the appropriate drivers and advise of the required winter action treatment. The personnel on the roster at any point will have to be available at all times to commence treatment on the carriageway within 60 minutes of being required.

1.5.3 Contact arrangements during normal working hours

Each individual involved in providing the winter service shall be issued with a mobile phone to allow easy contact. When drivers are on the roster for any given week, cognisance of this shall be taken into account when planning normal daily duties to ensure that drivers retain the ability to respond quickly to any call to carry out a winter service action at short notice.

1.5.4 Contact arrangements outside normal working hours

A standby roster will be prepared detailing which individuals are to be utilised in the event of action being required. Home and mobile telephone contact numbers will be available for all individuals.

1.5.5 Mobilisation times

Depots have been sited in locations where both the Trunk Road precautionary treatment routes and drivers are easily accessible; this will ensure that drivers are consistently able to access the start of each precautionary treatment within one hour of a call from their home. To assist in the speed of access to the precautionary treatment routes, spreaders will be pre-loaded on any night where action is a possibility.

1.6 Communications Equipment

Good communication systems are essential for effective winter maintenance management and the following systems will be adopted:

- telecommunications – land line and cellular GSM
- Airwave Communication
- satellite tracking of BEAR Scotland vehicles
- email
- Social Media

All depots are contactable by both land line telephone and facsimile. In addition, all managers, supervisors, prime plant and winter maintenance units have individual GSM mobile telephones allowing contact at all times. Hands-free mobile communications systems are available within Front Line, Reserve and Additional Service Plant enabling safe and effective communications between Winter Service operatives and WSDO.

The Airwave communications system, supplied by Transport Scotland, is deployed within all Winter Service Patrol vehicles, which enables communication between Winter Service operatives, Transport Scotland MART and BEAR Scotland WSDO's.

BEAR Scotland vehicles are fitted with an integrated satellite tracking system to deliver our communications needs and management system and produce an auditable trail for the company.

BEAR Scotland implement a policy whereby all users who have a desktop personal computer or a laptop computer have their own individual e-mail address. This is carried out by a Wide Area Network system in which the various secondary depots are linked by ISDN or analogue lines to the Central Office, which is in turn linked by Kilostream or ISDN lines to the main central servers, which control the IT network.

Information and data can be exchanged quickly around the Unit, with our internal and external customers, emergency services, Statutory Authorities and between our shareholders, using Microsoft Outlook as the e-mail software.

1.7 Training for Managers and Other Staff

1.7.1 Details of previous training

All our current WSDOs have been trained in Basic Road Meteorology and the use of Ice Prediction Systems. All our current winter drivers have been trained to a level equivalent to SVQ/City & Guilds in winter maintenance.

All operatives performing Front Line and Reserve Winter Service operations hold an appropriate Class C LGV driving license, are trained and experienced in winter maintenance operations.

1.7.2 Details of proposed training

Prior to or immediately following commencement of the winter season briefings shall be carried out for all personnel involved in providing the winter service. This shall include the following:

- Refresher training for managers and supervisors on decisions, communication, contract requirements etc. provided by the Winter Service Manager.

- Seminar to winter drivers detailing routes, contract requirements, response times, treatment times, communication, health & safety, areas requiring special attention and importance of providing good quality service, this again will be provided by Winter Service Manager.

- New recruits to the winter service shall be fully trained prior to any involvement in providing the winter service. All drivers shall be trained in the safe operation of winter maintenance equipment.

- Snow desk exercise

2. WEATHER FORECASTING

2.1 Purpose

The weather forecasts, compiled by expert meteorologists, provide the winter service personnel with an accurate indication of the forthcoming weather conditions. This enables them to prepare a winter action plan for the pre-treatment of the carriageway prior to the onset of snow or ice.

2.2 Methodology

The method used to produce both the short and long range weather forecasts is via a combination of a number of weather models. These models combine energy balance techniques with current and historic site specific information to provide the most accurate possible forecasts of future road conditions. This accuracy will be enhanced by the implementation of Route Based Forecasting (RBF) which provides forecasts that are specific to the treatment routes, or in some cases part routes. These part routes will be implemented where there are clear distinguishing features in the weather patterns with these distinctions being decided upon by our forecaster using actual data and weather modelling.

The road model forecasts can be updated as frequently as necessary using actual data from road sensors and data from comprehensive meteorological databases, which is monitored and updated by our forecasters around the clock.

2.3 Weather Forecasting Service

An expert weather forecasting service will be provided by Metdesk. The service will consist of the provision of the following:

- 24 hour forecast text
- 36 hour forecasting
- Route Specific Forecasting
- 2-5 day text forecast
- 24 hour forecast graphs for each forecast outstation within the Unit
- 19.00 and 07.00 updates to both 24 hour text & forecast graphs
- Forecast consultancy service for advice 24 hours covering 7days
- Time step thermal maps where available.

The above will allow the WSDO to prepare a daily winter action plan by 1500hrs each day, advising of all carriageway pre-treatments to be carried out for that day.

The Duty Forecaster can be contacted on a 24/7 and a number will be provided on appointment of a weather forecaster.

2.3.1 Route Based Climatic Domains

Route based climatic domains will be related to the 20g treatment routes. Route specific temperature forecasts will be provided for each day of the Winter Service season.

Effective monitoring of this will be carried out by patrol vehicles which are all equipped with Surface Temperature Sensors.

The route specific climatic domains determined for the Unit are depicted on the map shown in Figure 2/1.

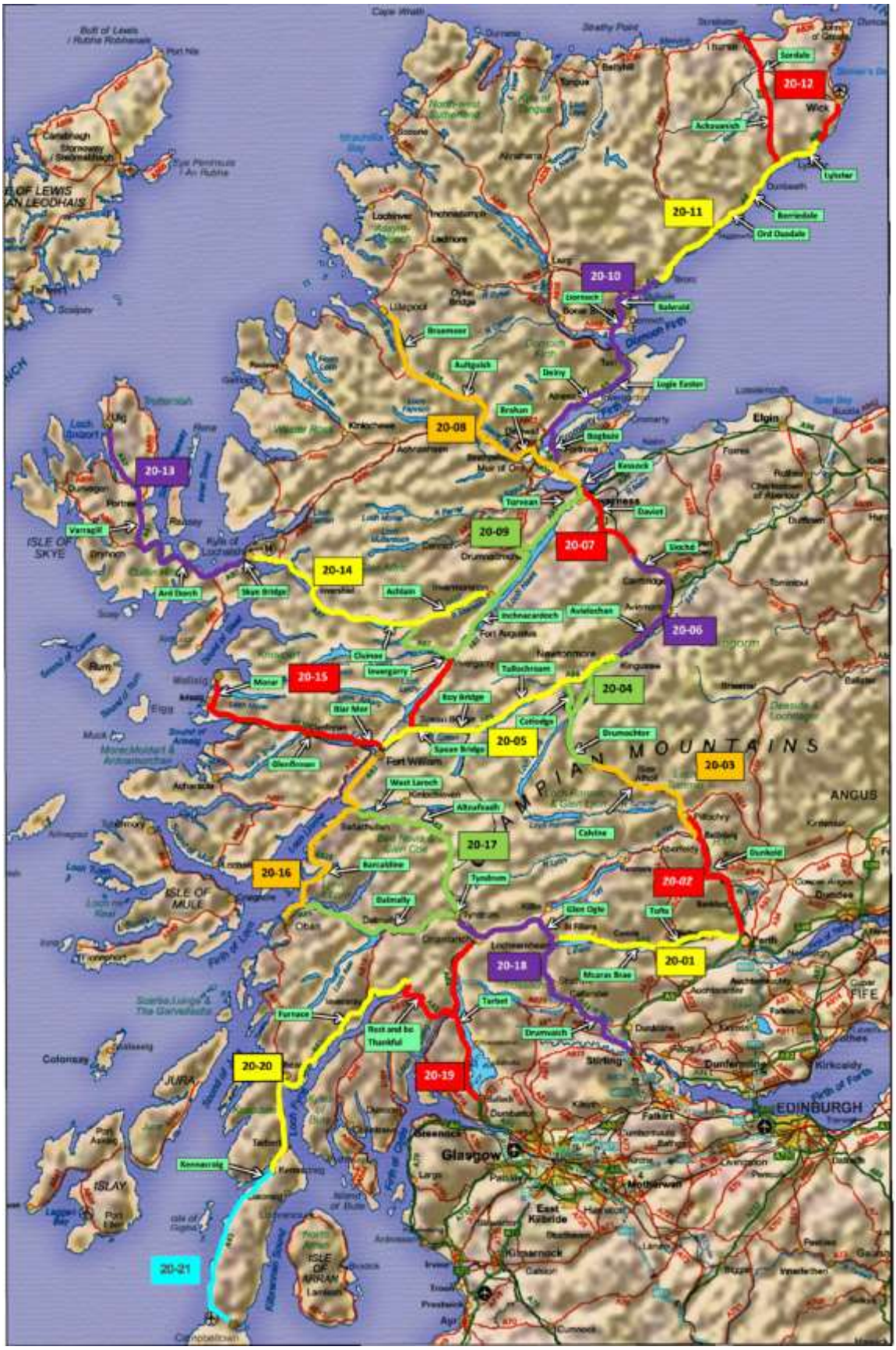


Figure 2/1 – Route Based Climatic Domains

2.3.2 Weather Radar

Weather radar will be used via an internet based site, which gives a short range forecast with the facility to time-step the movement of the prevailing weather conditions**.** The radar will help to improve the accuracy of assessing the timing, nature and intensity of precipitation, particularly snowfall.

2.3.3 Ice Sensors and weather forecast sites

Ice Sensors are strategically placed throughout the network. These sensors will be polled at intervals of 20 minutes between 1 October and 15 May. All data will be collected by the Ice Prediction System's Master Station, accessible by computer. Weather forecast sensors have added functionality to allow modelling of the temperature characteristics of the road pavement. They assist in producing road-specific weather forecasts.

A list of the sensor and forecast sensor locations is given in Figure 2/2 below.

Route Number	Location	Manufacturer	Type
A82	Allt na Feadh	Vaisala	Forecast Site/ Camera
A82	Inchnacardoch	Vaisala	Observational Site
A82	Friars Bridge	Findlay Irvine	Observational Site
A82	Invergarry	Findlay Irvine	Forecast Site
A82	Spean Bridge	Vaisala	Observational Site
A82	Tarbet	Vaisala	Observational Site
A82	Torvean	Findlay Irvine	Observational Site
A82	West Laroch	Vaisala	Observational Site
A82	Tyndrum	Findlay Irvine	Observational Site/ Camera
A83	Furnace	Vaisala	Forecast Site
A83	Rest and Be Thankful	Vaisala	Forecast Site/ Camera
A83	Kennacraig	Vaisala	Observational Site
A83	Clachan	Vaisala	Forecast Site
A830	Blar mor	Vaisala	Observational Site
A830	Morar	Vaisala	Observational Site/ Camera
A830	Glenfinnan	Findlay Irvine	Observational Site/ Camera
A835	Braemore	Vaisala	Forecast Site/ Camera
A835	Brahan	Vaisala	Observational Site
A835	Aultguish	Vaisala	Observational Site/ Camera
A84	Drumvaich	Findlay Irvine	Observational Site
A84	Glenogle	Vaisala	Observational Site/ Camera
A85	Dalmally	Vaisala	Observational Site/ Camera
A85	McAras Brae	Vaisala	Observational Site
A85	Tofts	Vaisala	Observational Site
A86	Roy Bridge	Findlay Irvine	Observational Site
A86	Tullochroam	Vaisala	Observational Site
A87	Cluanie	Vaisala	Forecast Site/ Camera
A87	Glen Varragill	Vaisala	Forecast Site
A87	Ard Dorch	Vaisala	Observational Site/ Camera
A87	Skye Bridge	Vaisala	Observational Site
A887	Achlain	Findlay Irvine	Observational Site/ Camera

Route Number	Location	Manufacturer	Type
A889	Catlodge	Findlay Irvine	Observational Site/ Camera
A9	Achavanich	Findlay Irvine	Observational Site/ Camera
A9	Avielochan	Vaisala	Observational Site/ Camera
A9	Balvraid	Findlay Irvine	Observational Site/ Camera
A9	Berriedale	Vaisala	Observational Site
A9	Bogbuie	Vaisala	Observational Site
A9	Calvine	Vaisala	Observational Site
A9	Daviot	Vaisala	Observational Site/ Camera
A9	Delny	Vaisala	Forecast Site
A9	Dornoch Bridge	Findlay Irvine	Observational Site/ Camera
A9	Drumochter	Vaisala	Forecast Site/ Camera
A9	Dunkeld	Vaisala	Forecast Site
A9	Kessock Bridge	Vaisala	Observational Site
A99	Lybster	Findlay Irvine	Observational Site
A9	Ord Ousdale	Vaisala	Forecast Site/ Camera
A9	Slochd	Vaisala	Forecast Site/ Camera
A9	Sordale	Findlay Irvine	Observational Site
A828	Barcaldine	Vaisala	Forecast Site

Figure 2/2 – Sensor Locations and Type

2.3.4 Location Plans

A location plan of the forecast sites to be used to generate the domain specific forecasts is shown in Figure 2/3.

Figure 2/3 – Location of Forecast Outstations

2.4 Computer Systems

There are a number of computer systems used to interrogate forecast and sensor data to enable the WSDO and Duty Controllers to make the most appropriate decisions for winter service actions. These computerised systems include:

- Bureau Service – for collection of ice sensor data. The bureau service is provided by Vaisala and composes of a large central database which collects data from all ice sensors at up to 20 minute intervals. Our forecasters daily and 2-5 day weather forecasts are also stored on the bureau.

- Vaisala Icecast viewer which allows the Winter Service Manager and Duty Supervisors interrogate the bureau to give the most up to date conditions at the ice sensor locations on the Trunk road network. This allows them to make informed decisions in relation to winter service actions and direct resources appropriately. Forecasts can also be accessed from

the bureau via Icecast viewer allowing action plans to be created and these action plans monitored against forecasts.

- Also in addition to Icecast viewer the bureau sensor data can be accessed via a web based system from any terminal which has internet access and where the user has the appropriate user name and password. The Iceview system gives similar data to the Icecast system without (at present) the ability to use archive data.

- An internet based system supplied by the forecaster and will also be utilised to access forecast data along with weather radar images. Weather radar images are particularly useful for predicting and monitoring precipitation conditions.

- Frontline spreaders will be fitted with road surface temperature measuring equipment that links back through our Locatu system to the Duty Controllers and WSDOs.

2.5 Thermal Mapping

Thermal Mapping is the only proven and established technique to determine surface temperature relationship across an entire road or runway network. Road / pavement surface temperatures may vary by up to 10°C in localised areas creating problems for winter service engineers dealing with snow and ice hazards. Thermal Mapping can become an integral part of an effective Ice Prediction system providing a mechanism for extending point specific sensor site information between individual weather stations and across a road network. The main benefits of Thermal Mapping include:

- Identification of potentially dangerous sections;
- Enables selective anti-icing strategies through Thermal Route design;
- Identifies the optimum location and number of road weather stations;
- Extends ice prediction from site specific weather stations to an entire road network;
- Can be utilised to improve forecasting and development of Climatic Domain design; and
- Provides quantitative reference data.

The power of Thermal Mapping as a decision-making tool is maximised when integrated into the Vaisala's Ice Prediction System. Site specific forecast data from a road weather station can be extended to all roads within a network using Thermal Mapping, enabling accurate and timely treatment of hazards.

3. MONITORING AND RESOURCE ALLOCATION ARRANGEMENTS FOR AREAS REQUIRING SPECIAL ATTENTION

3.1 Monitoring Arrangements

Areas Requiring Special Attention are known locations on the Unit where frost is prone to occur and/or where run off is liable to happen. These areas are identified in Figure 3/1. BEAR Scotland will, throughout the Contract Period review these areas and add other areas to Figure 3/1 as necessary. Figure 3/1 combines the information provided from the Contract as Tables 7.2.F.1, 7.2.F.2 and 7.2.F.3 into a single source for day to day use.

Each area will be monitored effectively. For both frost susceptible areas and known surface water run off locations, the ability to monitor forecast and up-to-date road surface temperatures and states is critical. Each area will be assigned an appropriate road sensor or forecast station, based on location and/or a similar climatic domain. For example the area at A887 Dundreggan will be assigned the road sensor located at A887 Achlain. The area can then be effectively monitored by looking at the forecast and current road surface temperature / state.

In addition to the Winter Service Patrols detailed in Section 7 of this document, the Duty Controller has the authority to instruct the mobilisation of any front line winter service plant to patrol any part of the Unit at any time. This action may be necessary to enable accurate real time visual information such as road surface state observations, surface water run off and precipitation type/intensity to be obtained. This information, combined with data from ice stations allows the Duty Contrller to monitor special areas.

This monitoring feeds information to the decision making process detailed in Section 4 and the decision matrix (Figure 8/1 in Section 8).

A copy of Figure 3/1 will be provided within all front line winter service service plant for drivers to reference.

3.1 Resource Allocation

The maximum resource indicated in the ARSA schedule is reflective of local weather events specific to that location. When the weather event is widespread across the unit then the overall resource will be as indicated in Appendix A figures A/1, A/2, A/3 and A/4 of this document, deployed to locations of highest priority based on weather conditions and strategic importance.

Figure 3/1 – Areas Requiring Special Attention

Area Requiring Special Attention	Assigned Sensor Station	Frost Susceptible or Water Run-Off	Treatment Route		Patrol Route
A9 Latheron to Mybster	Achavanich	Frost	20-12	40-15	PB-1
A9 Achavanich to Tacher	Achavanich	Run-off	20-12	40-15	PB-1
A99 Borrowston Quarry	Lybster	Run-off	20-12	40-14	
A9 Dunbeath Mains	Berriedale	Run-off	20-11	40-14	PB-1
A9 Knockinnon	Berriedale	Run-off	20-11	40-14	PB-1
A9 Newport	Berriedale	Run-off	20-11	40-14	PB-1
A9 Berriedale	Berriedale	Frost & Gradient	20-11	40-14	PB-1
A9 Keepers Cottage Ousdale	Ord	Run-off	20-11	40-13	PB-1
A9 Ord of Caithness	Ord	Gradient	20-11	40-13	PB-1
A9 Kildary to Tain	Delny	Frost	20-10	40-12	
A9 Layby 190	Bogbuie	Run-off	20-10	40-12	
A9 Balvraid	Balvraid	Run-off	20-10	40-12	
A835 West of Tarvie	Aultguish	Run-off	20-08	40-11	PB-2
A835 Inchbae	Aultguish	Frost	20-08	40-11	PB-2
A835 South of Aultguish	Aultguish	Frost	20-08	40-11	PB-2
A835 Corrieshalloch	Braemore	Gradient	20-08	40-11	PB-2
A82 West of Cobb Memorial	Inchnacardoch	Run-off	20-09	40-09	PB-3
A887 Invermoriston - Bunloyne	Achlain	Gradient	20-14	40-18	PB-3
A887 Near Dundreggan	Achlain	Frost	20-14	40-18	PB-3
A87 Invergarry – Shiel Bridge	Cluanie	Gradient	20-14	40-19	PB-4
A87 Glenshiel	Cluanie	Frost	20-14	40-18	PB-4
A87 Kinlochourn	Invergarry	Frost	20-07	40-19	PB-4
A87 Druim na Clochd	Ard Dorch	Gradient	20-13	40-17	
A87 Glen Varragill	Varragill	Frost	20-13	40-16	
A82 Glen Gloy Bends	Spean Bridge	Frost	20-15	40-19	PB-5
A82 Spean Bridge	Spean Bridge	Frost	20-05	40-09	PB-5
A830 Glenfinnan	Glenfinnan	Frost	20-15	40-20	
A830 Mhuidie Hill	Glenfinnan	Frost	20-15	40-20	
A830 West of Loch Elit	Glenfinnan	Frost & Run-off	20-15	40-20	
A86 Near Glen Spean	Roybridge	Frost & Run-off	20-05	40-07	
A86 Tulloch	Roybridge	Frost	20-05	40-07	
A86 Near Comra	Tullochroam	Frost & Run-off	20-05	40-06	
A86 Strathmashie	Tullochroam	Frost	20-05	40-06	
A82 Three Mile Water	West Laroch	Frost	20-16	40-21	PB-5
A82 Glen Coe	Alltnafeadh	Frost	20-16	40-22	PB-6
A82 Bridge of Orchy	Tyndrum	Frost	20-16	40-21	PB-6
A82 Tyndrum – Glen Coe	Tyndrum, Alltnafeadh	Gradient	20-16	40-21	PB-6

Figure 3.1 – Areas Requiring Special Attention

Figure 3/1 – Areas Requiring Special Attention (continued)

Area Requiring Special Attention	Assigned Sensor Station	Frost Susceptible or Water Run-Off	Treatment Route		Patrol Route
A85 Gle Dochart – Lix Toll	Glenogle	Frost & Run-off	20-18	40-24	PB-6
A85 Glen Ogle	Glenogle	Frost & Gradient	20-18	40-24	PB-6
A85 South of Strone	Tyndrum	Frost	20-17	40-23	PB-7
A85 Glen Lochy	Tyndrum	Frost	20-17	40-23	PB-7
A85 Loch Awe to Brander Lodge	Dalmally	Run-off	20-17	40-23	PB-7
A82 Inverarnan to Tarbet	Tarbet	Run-off	20-19	40-26	PB-8
A83 Cairndow Hill	Glen Croe	Run-off	20-19	40-27	PB-8
A83 Rest and be Thankful	Glen Croe	Gradient	20-19	40-26	PB-8
A83 Strone Point to Dunderarve	Furnace	Run-off	20-20	40-27	PB-8
A83 Gertnagrenach to Clachan Hill	Clachan	Run-off	20-21	40-29	
A85 St. Fillans - Lochearnhead	McAras Brae	Frost & Run-off	20-01	40-01	
A85 Dunira	McAras Brae	Frost	20-01	40-01	
A85 Abercairney	McAras Brae	Run-off	20-01	40-01	
A85 Ochtertyre	McAras Brae	Run-off	20-01	40-01	
A85 Cultoquey	Tofts	Run-off	20-01	40-01	
A84 Leny Falls	Drumvaich	Run-off	20-18	40-25	
A84 Dandues Brae, Doune	Drumvaich	Frost	20-18	40-25	
A83 Auchindrain	Furnace	Frost	20-20	40-27	
A83 Artilligan to Stronachullin	Kennacraig	Run-off	20-20	40-28	
A83 Stonefield	Kennacraig	Run-off	20-20	40-28	
A83 Mundells, Tarbert	Kennacraig	Run-off	20-20	40-28	
A9 Loch Faskally	Calvine	Frost	20-02	40-02	PA-1
A9 Killiecrankie	Calvine	Frost	20-03	40-03	PA-2
A9 Calvine - Dalnaspidal	Calvine	Gradient	20-03	40-03	PA-3
A9 Near Dalwhinnie	Drumochter	Frost	20-04	40-04	PA-3
A9 Kingussie	Avielochan	Frost	20-04	40-05	PA-4
A889 Catlodge - Dalwhinnie	Catlodge	Gradient	20-04	40-06	
A9 Avielochan	Avielochan	Run-off	20-06	40-05	PA-4
A9 Slochd	Slochd	Frost	20-06	40-05	PA-4
A9 Findhorn	Slochd	Frost	20-06	40-05	PA-4
A9 Moy	Daviot	Run-off	20-07	40-08	PA-5
A9 Daviot	Daviot	Frost	20-07	40-08	PA-5
A9 Daviot Northbound	Daviot	Run-off	20-07	40-08	PA-5
A9 Drumossie Brae Southbound	Daviot	Gradient	20-07	40-08	PA-5

AREAS REQUIRING SPECIAL ATTENTION SCHEDULES

AREAS REQUIRING SPECIAL ATTENTION SCHEDULE

Reference Number: ARSA/NW/A835 /SCH1 - A835 Aultguish Inn to Corrieshalloch Brae.	
Location	**A835 Aultguish Inn to Corrieshalloch Brae.**
Grid Reference	**237292, 870735 to 219388, 881395.**
Problem	**Single carriageway 13 miles in length at high altitude (284m) prone to snow accumulations, drifting and jack-knifing of articulated vehicles on steep inclines.**
Has this site experienced problems before or is it an identified risk?	**Due to accumulation of snow road has been closed in previous winters.**
Detailed Mitigation Measures	
Optional Mitigation Measures	▪ **Salt Bins positioned at Corrieshalloch Brae and replenished as necessary. Application of additional salt on inclines at drivers discretion.** ▪ **Consideration to the application of Safecote/Brine pre-wetting mix (Alternative De-icer) if very low temperatures are forecast.** ▪ **Front line treatment route 20-08** ▪ **40g treatment route 40-11** ▪ **Cat B Patrol 2. (1st November to 31st March)** ▪ **Monitoring of conditions, including cameras at Aultguish and Braemore, by Duty Supervisor.** ▪ **Deployment of reserve vehicles, located as identified below.** ▪ **Use of patrol vehicles outwith scheduled patrol times.** ▪ **Deployment of snow blower from Bridgepoint Depot.** ▪ **Representative deployed to MART.** ▪ **Deployment of vehicles with welfare kits as standard.**
When enacted	**The measures detailed above will be in place prior to the event based on a forecast of significant snow fall in a short space of time with a high degree of forecaster confidence.** **In cases of low or medium forecaster confidence dialogue may be opened with Transport Scotland regarding extent of mitigation.** **Reactive implementation when monitoring of conditions indicates requirement.**
Who enacts	**Winter Service Duty Supervisor supported by WSDO.**
Who will manage the response	**Winter Service Manager supported by Duty Supervisor based in Control Room.**
Are diversion routes to be used?	**No alternative diversion route available.** **Westbound vehicles will be stacked or turned at Aultguish.**

	Eastbound vehicles will be turned at Braemore.
Deployment of resources	**The following resources are available for deployment:** **1 frontline spreader/plough (Bridgepoint),** **1 patrol spreader/plough (Bridgepoint),** **1 alternative access spreader/plough (Ullapool),** **1 reserve spreader/plough (Bridgepoint), and** **1 snowblower (Bridgepoint) deployed between Aultguish and Corrieshalloch, exact locations at Duty Supervisor discretion.**
Use of VMS	**Contact Traffic Scotland to display messages on VMS/A10 and VMS/X2.**
Other measures put in place	**Closure of snowgates at Aultguish and Braemore.**
Assistance from additional Transport Scotland resources	**Assistance from Transport Scotland Communications to agree message out to be put out to the media.**
Assistance from External Sources	**Assistance from Police Scotland in implementing road closures if deemed necessary.** **End of Route Driver based at Ullapool.** **Vehicle Recovery through Police Scotland Contracts if vehicles become stuck.**

Figure 3/2a: ARSA/NW/A835 /SCH1 - A835 Aultguish Inn to Corrieshalloch Brae

AREAS REQUIRING SPECIAL ATTENTION SCHEDULE

Reference Number: ARSA/NW/A9 /SCH1 - A9 Dalwhinnie to Trinafour	
Location	**A9 Dalwhinnie to Trinafour - Cuaich to South end of Trinafour Dual Carriageway.**
Grid Reference	**273250, 770268 to 265657, 787025**
Problem	**Single and Dual carriageway 12.5 miles in length at high altitude (467m) prone to snow accumulations, drifting and reduced visibility due to wind blown snow.**
Has this site experienced problems before or is it an identified risk?	**Due to accumulation of snow road has been closed in previous winters.**
Detailed Mitigation Measures	
Optional Mitigation Measures	• **Application of additional salt on inclines at drivers discretion.** • **Consideration to the application of Safecote / Brine pre-wetting mix (Alternative De-icer) if very low temperatures are forecast.** • **Front line treatment route 20-04.** • **40g treatment route 40-04** • **Cat A patrols PA-2 and PA-3. (1st November to 31st March)** • **Monitoring of conditions, including camera at Drumochter, by Duty Supervisor.** • **Deployment of reserve vehicles, located as identified below.** • **Use of patrol vehicles outwith scheduled patrol times.** • **Deployment of snow blower from Kingussie Depot. Pre-deployment to Dalwhinnie where possible.** • **Representative deployed to MART** • **Deployment of vehicles with welfare kits as standard.**
When enacted	**The measures detailed above will be in place prior to the event based on a forecast of significant snow fall in a short space of time with a high degree of forecaster confidence.** **In cases of low or medium forecaster confidence dialogue may be opened with Transport Scotland regarding extent of mitigation.** **Reactive implementation when monitoring of conditions indicates requirement.**
Who enacts	**Winter Service Duty Supervisor supported by WSDO.**
Who will manage the response	**Winter Service Manager supported by Duty Supervisor based in Control Room.**
Are diversion routes to be used?	**No alternative diversion route available.** **Northbound vehicles will be stopped at Trinafour and Blair Atholl. Vehicles to be stacked at Bruar and Blair Atholl.**

	Southbound vehicles will be stopped at Dalwhinnie and Ralia. Vehicles to be stacked at Dalwhinnie, Ralia/Newtonmore and on A9 Southbound.
Deployment of resources	**The following resources are available for deployment:** **1 frontline spreader/plough (Kingussie),** **1 patrol spreader/ploughs (1 no. Kingussie and 1 no. Ballinluig),** **2 reserve spreader/ploughs (Kingussie), and** **1 snowblower (Kingussie) deployed between Cuaich and Trinafour, exact locations at Duty Supervisor discretion.**
Use of VMS	**Contact Traffic Scotland to display messages on VMS/A1, VMS/A7, VMS/A5, VMS/A2 and VMS/A3.**
Other measures put in place	**Closure of snowgates at Blair Atholl, Trinafour, Ralia and Dalwhinnie.**
Assistance from additional Transport Scotland resources	**Assistance from Transport Scotland Communications to agree message to be put out to the media.**
Assistance from External Sources	**Assistance from Police Scotland in implementing road closures if deemed necessary.** **Vehicle Recovery through Police Scotland Contracts if vehicles become stuck.**

Figure 3/2b: ARSA/NW/A9 /SCH1 - A9 Dalwhinnie to Trinafour

AREAS REQUIRING SPECIAL ATTENTION SCHEDULE

Reference Number: ARSA/NW/A9 /SCH2 – A9 Ord of Caithness	
Location	**A9 Ord of Caithness**
Grid Reference	**305659, 917975**
Problem	**Single carriageway and climbing lane prone to snow accumulations, drifting and jack-knifing of articulated vehicles on steep inclines.**
Has this site experienced problems before or is it an identified risk?	**Due to accumulation of snow road has been closed in previous winters.**
Detailed Mitigation Measures	
Optional Mitigation Measures	▪ **Application of additional salt on inclines at drivers discretion.** ▪ **Consideration to the application of Safecote/Brine pre-wetting mix (Alternative De-icer) if very low temperatures are forecast.** ▪ **Front line treatment route 20-11** ▪ **40g treatment route 40-13** ▪ **Cat B PB-1 (1st November to 31st March).** ▪ **Monitoring of conditions, including cameras at Ord Ousdale by Duty Supervisor.** ▪ **Deployment of reserve vehicles, located as identified below.** ▪ **Use of patrol vehicles outwith scheduled patrol times.** ▪ **Representative deployed to MART.** ▪ **Deployment of vehicles with welfare kits as standard.**
When enacted	**The measures detailed above will be in place prior to the event based on a forecast of significant snow fall in a short space of time with a high degree of forecaster confidence.** **In cases of low or medium forecaster confidence dialogue may be opened with Transport Scotland regarding extent of mitigation.** **Reactive implementation when monitoring of conditions indicates requirement.**
Who enacts	**Winter Service Duty Supervisor supported by WSDO.**
Who will manage the response	**Winter Service Manager supported by Duty Supervisor based in Control Room.**
Are diversion routes to be used?	**No alternative diversion route available.** **Northbound vehicles will be stacked or turned at Helmsdale.** **Southbound vehicles will be stacked or turned at Dunbeath.**
Deployment of resources	**The following resources are available for deployment:** **1 frontline spreader/plough (Dunbeath),** **1 patrol spreader/plough (Brora),**

	1 alternative access spreader/plough (Thurso), 1 reserve spreader/plough (Dunbeath), and 1 snowblower (Bridgepoint) deployed locations at Duty Supervisor discretion.
Use of VMS	**Contact Traffic Scotland to display messages on VMS X4, X5 and X6.**
Other measures put in place	**Closure of snowgates at Navidale and Berriedale.**
Assistance from additional Transport Scotland resources	**Assistance from Transport Scotland Communications to agree message out to be put out to the media.**
Assistance from External Sources	**Assistance from Police Scotland in implementing road closures if deemed necessary.** **Local Authority (The Highland Council) driver based at Thurso.** **Vehicle Recovery through Police Scotland Contracts if vehicles become stuck.**

Figure 3/2c: ARSA/NW/A9 /SCH2 – A9 Ord of Caithness

AREAS REQUIRING SPECIAL ATTENTION SCHEDULE

Reference Number: ARSA/NW/A9 /SCH3 – A9 Findhorn Bridge to Blackmount junction	
Location	**A9 Findhorn Bridge to Blackmount junction.**
Grid Reference	**280734, 829049 to 287587, 824066.**
Problem	**Single and dual carriageway 10 miles in length at high altitude (409m) prone to snow accumulations, drifting and jack-knifing of articulated vehicles on steep inclines.**
Has this site experienced problems before or is it an identified risk?	**Due to accumulation of snow road has been closed in previous winters.**
Detailed Mitigation Measures	
Optional Mitigation Measures	▪ **Consideration to the application of Safecote/Brine pre-wetting mix (Alternative De-icer) if very low temperatures are forecast.** ▪ **Front line treatment route 20-06** ▪ **40g treatment route 40-05** ▪ **Cat A patrol PA-4. (1st November to 31st March)** ▪ **Monitoring of conditions, including cameras at Slochd by Duty Supervisor.** ▪ **Deployment of reserve vehicles, located as identified below.** ▪ **Use of patrol vehicles outwith scheduled patrol times.** ▪ **Deployment of snow blower from Kingussie or Bridgepoint Depot. Pre-deployment where possible.** ▪ **Representative deployed to MART.** ▪ **Deployment of vehicles with welfare kits as standard.**
When enacted	**The measures detailed above will be in place prior to the event based on a forecast of significant snow fall in a short space of time with a high degree of forecaster confidence.** **In cases of low or medium forecaster confidence dialogue may be opened with Transport Scotland regarding extent of mitigation.** **Reactive implementation when monitoring of conditions indicates requirement.**
Who enacts	**Winter Service Duty Supervisor supported by WSDO.**
Who will manage the response	**Winter Service Manager supported by Duty Supervisor based in Control Room.**
Are diversion routes to be used?	**A86 – A939 – A95** **Or, alternative carriageway on Dual under Police convoy**
Deployment of resources	**The following resources are available for deployment:** **2 frontline spreader/plough (1 no. Kingussie 1 no. Bridgepoint),**

	2 patrol spreader/plough (1 no.Kingussie 1 no. Bridgepoint), 1 reserve spreader/plough (1 no. Kingussie 1 no. Bridgepoint), and 1 snowblower (Kingussie) deployed to location at Duty Supervisor discretion.
Use of VMS	**Contact Traffic Scotland to display messages on A4 and A14**
Other measures put in place	**Traffic held at A9 Longman and Aviemore if required or diversion routes unsuitable due to conditions**
Assistance from additional Transport Scotland resources	**Assistance from Transport Scotland Communications to agree message out to be put out to the media.**
Assistance from External Sources	**Assistance from Police Scotland and The Highland Council in implementing road closures if deemed necessary.** **Vehicle Recovery through Police Scotland Contracts if vehicles become stuck.**

Figure 3/2d: ARSA/NW/A9 /SCH2 – A9 Findhorn Bridge to Blackmount junction

AREAS REQUIRING SPECIAL ATTENTION SCHEDULE

Reference Number: ARSA/NW/A82 /SCH1 – A82 Glencoe to Tyndrum	
Location	**ARSA/NW/A82 /SCH1 – Glencoe to Tyndrum**
Grid Reference	**209902, 758663 to 232529, 730739.**
Problem	**Single carriageway 48 miles in length at high altitude (350m) prone to snow accumulations, drifting and jack-knifing of articulated vehicles on steep inclines.**
Has this site experienced problems before or is it an identified risk?	**Due to accumulation of snow road has been closed in previous winters.**
Detailed Mitigation Measures	
Optional Mitigation Measures	▪ **Salt Bins positioned at Blackmount and Glencoe replenished as necessary. Application of additional salt on inclines at drivers discretion.** ▪ **Snow Depot at Ballachulish.** ▪ **Front line treatment route 20-17** ▪ **40g treatment route 40-21** ▪ **Cat B patrol PB-5. (1st November to 31st March)** ▪ **Monitoring of conditions, including cameras at Alt na Feadh and Tyndrum by Duty Supervisor.** ▪ **Deployment of reserve vehicles, located as identified below.** ▪ **Use of patrol vehicles outwith scheduled patrol times.** ▪ **Deployment of snow blower from Killin Depot. Pre-deployment where possible.** ▪ **Representative deployed to MART.** ▪ **Deployment of vehicles with welfare kits as standard.**
When enacted	**The measures detailed above will be in place prior to the event based on a forecast of significant snow fall in a short space of time with a high degree of forecaster confidence.** **In cases of low or medium forecaster confidence dialogue may be opened with Transport Scotland regarding extent of mitigation.** **Reactive implementation when monitoring of conditions indicates requirement.**
Who enacts	**Winter Service Duty Supervisor supported by WSDO.**
Who will manage the response	**Winter Service Manager supported by Duty Supervisor based in Control Room.**
Are diversion routes to be used?	**A828 – A85 (Height restrictions Connel Bridge)**
Deployment of resources	**The following resources are available for deployment:**

	1 reserve spreader/plough Fort William (Corpach) 1 reserve spreader/ Plough (Killin), and 1 snowblower (Killin) deployed at Duty Supervisor discretion.
Use of VMS	**Contact Traffic Scotland to display messages on C3 and C6**
Other measures put in place	**Closure of snowgates at Glencoe and Tyndrum.**
Assistance from additional Transport Scotland resources	**Assistance from Transport Scotland Communications to agree message out to be put out to the media.**
Assistance from External Sources	**Assistance from Police Scotland in implementing road closures if deemed necessary.** **Vehicle Recovery through Police Scotland Contracts if vehicles become stuck.**

Figure 3/2e: ARSA/NW/A82 /SCH1 – Glencoe to Tyndrum

AREAS REQUIRING SPECIAL ATTENTION SCHEDULE

Reference Number: ARSA/NW/A9 /SCH3 – A9 Drummossie Brae Southbound	
Location	**A9 Drummossie Brae Southbound**
Grid Reference	**269148, 844432 to 270871, 841754**
Problem	**Southbound dual carriageway 3 miles in length at high altitude (210m) prone to snow accumulations, drifting and jack-knifing of articulated vehicles on steep inclines.**
Has this site experienced problems before or is it an identified risk?	**Due to accumulation of snow road has been closed in previous winters.**
Detailed Mitigation Measures	
Optional Mitigation Measures	▪ **Application of additional salt on inclines at drivers discretion.** ▪ **Consideration to the application of Safecote/Brine pre-wetting mix (Alternative De-icer) if very low temperatures are forecast.** ▪ **Front line treatment route 20-06** ▪ **40g treatment route 40-08** ▪ **Cat A patrol PA-4. (1st November to 31st March)** ▪ **Monitoring of conditions, including cameras at Seafield and Daviot, by Duty Supervisor.** ▪ **Deployment of reserve vehicles, located as identified below.** ▪ **Use of patrol vehicles outwith scheduled patrol times.** ▪ **Deployment of snow blower from Bridgepoint Depot. Pre-deployment to Inshes where possible.** ▪ **Representative deployed to MART.** ▪ **Deployment of vehicles with welfare kits as standard.**
When enacted	**The measures detailed above will be in place prior to the event based on a forecast of significant snow fall in a short space of time with a high degree of forecaster confidence.** **In cases of low or medium forecaster confidence dialogue may be opened with Transport Scotland regarding extent of mitigation.** **Reactive implementation when monitoring of conditions indicates requirement.**
Who enacts	**Winter Service Duty Supervisor supported by WSDO.**
Who will manage the response	**Winter Service Manager supported by Duty Supervisor based in Control Room.**
Are diversion routes to be used?	**No alternative diversion route available.**
Deployment of resources	**The following resources are available for deployment:**

	1 frontline spreader/plough (Bridgepoint), 1 patrol spreader/plough (Bridgepoint), 1 alternative access spreader/plough (Bridgepoint), 1 reserve spreader/plough (Bridgepoint), and 1 snowblower (Bridgepoint) deployed, exact locations at Duty Supervisor discretion.
Use of VMS	**Contact Traffic Scotland to display messages on VMS/A11, A6, A8 and A9**
Other measures put in place	**Southbound vehicles stacked on A9 SB**
Assistance from additional Transport Scotland resources	**Assistance from Transport Scotland Communications to agree message out to be put out to the media.**
Assistance from External Sources	**Assistance from Police Scotland in implementing road closures if deemed necessary.** **Vehicle Recovery through Police Scotland Contracts if vehicles become stuck.**

Figure 3/2f: ARSA/NW/A9 /SCH3 – A9 Drummossie Brae Southbound

4. DECISION MAKING

4.1 Role of the Winter Service Manager

The role of the Winter Service Manager is to ensure that all procedures detailed in the winter service plan are adhered to and that the most effective action plans are adopted each day complying with the treatment matrix to keep the carriageways and footways free from snow and ice.

It will be the duty of the Winter Service Manager to hold regular reviews throughout the winter season to address any problems which may have occurred. This will take the form of briefings to all key staff on nights where difficult road conditions have been experienced. The philosophy will be to have a 'preventative' approach rather than 'reactive' approach in all decision making.

Consequently, the Winter Service Manager will always be aware of the daily action plan, which will be prepared and authorised by the WSDO.

4.2 Role of the Winter Service Duty Staff

- **WSDO** - The WSDO is responsible for formulating the daily winter action plan thereafter monitoring the ice detection system, including updated forecasts and any dialogue with the forecaster, to assess whether any changes are required to the daily action plan. Where any changes to the daily action plan are considered necessary then the WSDO will relay this information to the Duty Supervisor and the Duty Controller confirming the decision. The decision making matrix, Figure 8/1 will assist the WSDO with decision making,

  The Duty Controller will assist the WSDO in monitoring the ice detection system. The Duty Controller will contact the WSDO if there is any significant change from the forecast road surface temperatures and precipitation. Particularly overnight the Duty Controller can upgrade actions if conditions deteriorate. The Duty Controller cannot cancel actions without the WSDO's consent.

- **Duty Supervisor** - The Duty Supervisor is responsible for operational matters including ensuring that resources are available (including additional resources during adverse conditions) on receipt of the Daily Action Plan from the WSDO.

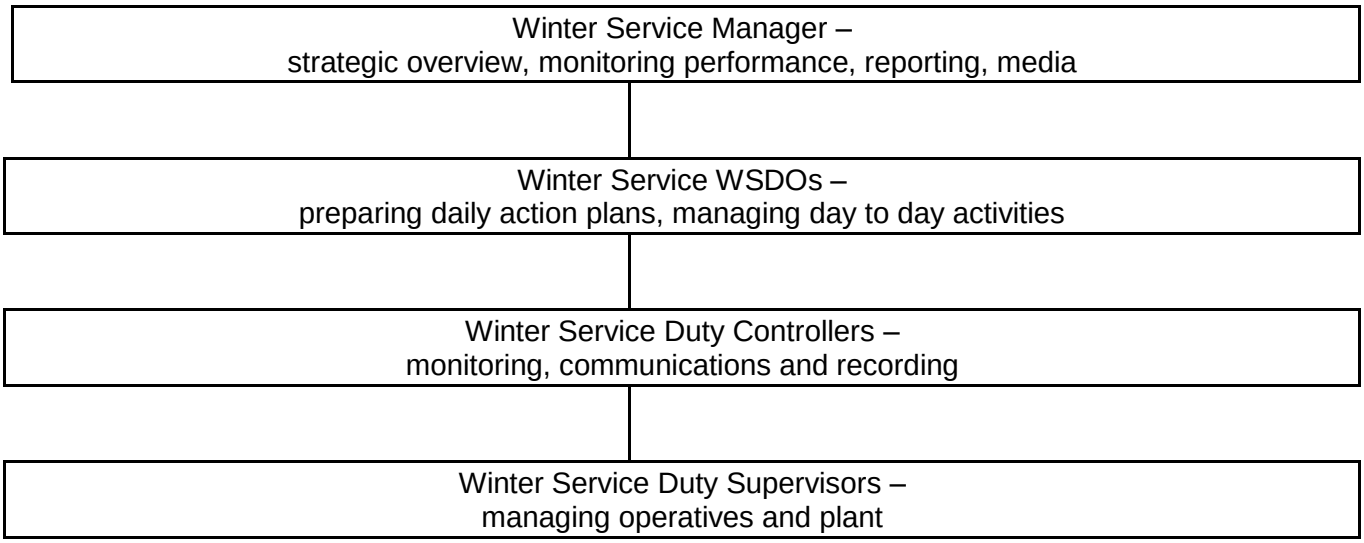
- **Duty Controller** - The Duty Controller will assist the WSDO and Duty Supervisor in providing the winter service. The Duty Controller will have primary responsibility for monitoring the ice prediction system and notifying the WSDO of any changes. The Duty Controller is allowed to escalate any proposed action but cannot reduce this without prior agreement with WSDO. In addition they will be responsible for recording all winter maintenance activities and checking treatment times and salt usage.

  The Duty Controller is responsible for the maintenance and updating of operational records including the following:

  - treatment decisions and how decisions were taken, when and by whom;
  - treatment records and patrol records;
  - material usage;
  - road closure locations and times;
  - logs of communications to and from vehicles on route, duty staff and external callers;
  - software faults;
  - electronic data from data loggers;
  - back up paper records; and

- social media updates.

Summary of the Winter Maintenance Management Arrangements



4.2.1 Winter Service Patrol Mobilisation

The requirement to carry out a Winter Service Patrol will be established as part of the preparation of the daily action plan and instruction will be given as appropriate.

Category B Patrols have been designed to comply with the 3 hour cycle required by the contract once during the 00.00 – 03.00, 03.00 – 06.00 and 06.00 – 09.00 periods specified. The times for the routes ensure that there is adequate time for any treatment or further investigation required as well as giving the driver an appropriate break. The routes will be reversed during the second period to ensure that driver returns to his base depot on completion.

Category A patrols have a response time of 45 minutes and have a 2 hour cycle. The temperature trigger for Category A patrols is +3 RST and below. Shift patterns are 02.00-10.00 and will be operated on a 4 day on / 4 day off basis.

There are also two DSP mobile surface temperature sensors in operation on Patrols PA-3 Kingussie and PB-5 Fort William.

Patrol spreaders will be fitted with road surface and air temperature measuring equipment that links back through our Locatu system to the Duty Controllers and WSDOs.

4.2.2 Proposals for Precautionary and Additional De-icing Treatments when Low Confidence Forecasts shall be issued for Variable Road and Weather Conditions

When low confidence weather forecasts are issued and during marginal conditions, the Duty Controllers will monitor conditions. Figure 8/1 in Section 8 (Winter Service Decision Making Algorithm) accounts for low confidence forecasts and will follow this procedure when considering the original and updated forecasts.

During marginal conditions a conservative approach will always be taken. It is essential that during these periods controllers receive reports and information from the Winter Service Patrols.The WSDO shall instruct patrols to monitor conditions and, if necessary, initiate immediate precautionary treatments in accordance with the proposed de-icing material spread rates detailed in Figure 8/2.

4.2.2.1 Freezing Rain

In this country freezing rain is a rare but exceptionally dangerous condition. Freezing rain occurs when precipitation, which can initially be rain, snow or a combination of both, becomes rain when passing through a warm air layer, before entering a very cold layer of air close to the ground surface. It does not freeze immediately but forms 'black ice' on contact with any road surfaces even when not below freezing temperature.

In general, freezing rain will be treated in a similar manner to snow, i.e. treatment in advance of and during the event and then treatment following as required.

Prior to the arrival of the freezing rain a precautionary treatment will be carried out in the same manner as would be made prior to snow falling. The situation will be constantly monitored, with additional treatment being carried out immediately the rain commences and continuing until such time that the rain has ceased or the temperature of the road has risen above freezing.

Freezing rain usually occurs along the line of an incoming warm front. If possible, to ensure maximum effectiveness of the salt, the precautionary treatment will be made in the same direction and immediately in advance of the weather front. Consideration will also be given to stationing vehicles at the point on the route where the weather front will hit first, in order that timely treatments can be undertaken.

Some salt will inevitably be lost during and following treatment and therefore careful consideration will be given to the requirement for continued successive treatments.

4.2.3 Proposals for monitoring the effectiveness of de-icing materials

Duty Staff will use a variety of methods in assisting the assessment of the effectiveness of the de-icing materials which have been spread on the carriageway. These will be as follows:

- Ice stations detail residual salt and give alarms to indicate low residual salt under certain conditions, however, it should be remembered that particularly in drying out conditions, such readings may be unreliable;
- Weather and Traffic Scotland Cameras;
- Warnings and alarms from ice stations;
- Experience of local areas and previous actions;
- Feedback from patrol drivers and condition patrols (DSP 310);
- Advice from weather forecasters, particularly on likely precipitation (use of weather radar) which may cause salt to be washed from carriageway; and
- Feedback from external parties such as the police.

All of the above can be used by the Duty Staff to make an informed decision to the status of residual salt on the carriageway and whether further pre-treatment is required to be carried out.

4.2.3.1 Proposed De-icing Material Spread Rates for Footways, Footbridges and Cycle Facilities

Precautionary treatments will be carried out on Category A footways, as identified in Figure 8/9 in Sub-section 8.5, when surface temperatures are forecast to fall to less than or equal to plus 1°C or when snow conditions are expected. Following clearance of snow and ice, salt or brine will be spread across the full width of footways, footbridges and cycleways at a minimum spread rate of 20 g/m². Fuller details of the treatment strategy for footways, footpaths and cycle facilities are given in Sections 9.5.

4.2.4 Road Closure and Snow Gate Operational Procedures

Any decision to close a road will normally be taken by Police Scotland, Bear Scotland can also close snowgates after permission from Police Scotland. Where snow gates are present then these will be used to effect road closure. The WSDO, the Director and Traffic Scotland will be informed immediately by telephone, and in writing within 12 hours, of any decision to close a road, or of other major problems encountered within the Unit due to winter weather conditions.

Police Scotland will normally notify the other Emergency Services of road closures and will arrange for the provision of advance warning signs and/or activate variable message signs where appropriate. The Duty Controller will notify the local Roads Authorities of any relevant trunk road closures.

Having decided on the need to close a road, Police Scotland will issue instructions to close snow gates in accordance with their documented Force Orders. This decision will be relayed by Police Scotland to the Duty Controller using a dedicated contact number. The Duty Controller will liaise with and co-operate with Police Scotland to man snow gates, if applicable, until a search of the road between the gates has been undertaken to ensure that no vehicles or pedestrians are trapped within the lengths of closure.

Once it has been ascertained that no-one has been trapped between the snow gates, the gates will be secured and all BEAR Scotland personnel withdrawn except those involved in the clearance of snow. Padlocks for each gate will be operated by identical keys held by both Police Scotland and BEAR Scotland.

When it is considered safe, Police Scotland will request BEAR Scotland assistance to open the gates. The Duty Controller shall immediately inform Traffic Scotland and the Director of the reopening of the road. A written report will be submitted to the Director within 12 hours (or if outside of normal working hours then the morning of the next working day) of Police Scotland instructing road closure

4.2.5 Activation of snow and ice hinged road closed signs

BEAR Scotland will open snow and ice hinged message signs to provide information to the road user regarding weather and road conditions.

4.2.6 Processes and procedures for deciding when to continue operations

BEAR Scotland operates a Target Zero programme in relation to the welfare, health and safety of its employees.

Our winter operatives and staff will liaise closely with Police at all times where conditions deteriorate. Ultimately it will be the decision of Police Scotland when a section of any route is closed or reopened. Decisions to cease or commence will be agreed following consultation between BEAR Scotland and Police Scotland Command. BEAR Scotland will contribute through managed risk assessment by trained and experienced operatives and duty staff.

5. LIAISON

Our plans for liaison with specific individuals and other organisations are as follows:

5.1 The Director

Effective liaison with the Director prior to, during and after the winter service season is essential to the successful delivery of the service. The Director will be consulted during the preparation, approval and review of the Winter Service Plan on an annual basis. Bear Scotland will submit and annual Winter Service Report at the end of each winter season. Bear Scotland will attend and contribute to the MART when required. The Daily Winter Action Plan will be submitted for approval on a daily basis with Bear Scotland participating in the multi agency teleconference on a weekly basis.

Director and PAG will have the capability of remotely accessing electronic winter service records, listed in Section 15, in real time within the Record Centre in BEARnet. Bear Scotland will submit weekly salt stock information to the national portal.

BEAR Scotland will continually review the need for snow fences and shelter belts on the Unit and, where it considers that such provisions are necessary; will notify the Director in writing.

Prior to the commencement of the Winter Service Period, the Director will receive one controlled paper copy and one controlled electronic copy of the Winter Service Plan.

5.2 The Police

In the compilation of the annual Winter Service Plan (WSP) Police Scotland are consulted to capture any suggestions for amendments that can be incorporated into the plan. This consultation is an agenda item during the Traffic Liaison Group Monthly Meeting.

During the winter season it is essential that good communication lines are maintained between BEAR Scotland and Police Scotland. This is particularly the case during periods of severe weather. A dedicated phone line is set up for the emergency services (details of this only being issued to the emergency services) so that Duty Supervisors can clearly identify emergency calls from any emergency service including Police Scotland.

BEAR Scotland will also liaise closely with Police Scotland during severe weather to ensure that a consistent message is given to media and road users as to road conditions at any moment.

5.3 Traffic Scotland Operator

BEAR Scotland will, prior to the commencement of each winter service season, issue Traffic Scotland one controlled paper copy and one controlled electronic copy of the Winter Service Plan.

During the Winter Service Period, the Operating Company shall report the known effect of adverse weather and travelling conditions to the Traffic Scotland Operator. Traffic Scotland will be notified by the WSDO of all planned treatments and patrols by 15:00 each day through the Daily Winter Action Plan. In addition, should messages be required to be displayed on electronic warning systems and variable message signs, Traffic Scotland will be notified by the WSDO.

During periods of severe weather the WSDO will undertake regular reviews, at no less than hourly intervals, of the information published within the severe weather bulletin board, and update this information via the Traffic Scotland roadwork's diary terminal:

- if he is aware of any change in the situation at any location logged on the bulletin board; and
- if he is aware of any other locations where severe weather shall be affecting driving conditions or traffic movements on the Trunk Road network.

5.4 Adjacent road and highway authorities

All adjacent road authorities will be issued with a copy of the Winter Service Plan.

BEAR Scotland will issue daily to all adjacent road authorities its daily winter action plan and receive the same in return.

Winter issues shall also be an item on the agenda at liaison meetings with all adjacent road and highway authorities.

5.5 Adjacent Trunk Road operating companies

All adjacent Trunk Road Operating Companies will be issued with a copy of the Winter Service Plan. BEAR Scotland shall issue daily to all adjacent Trunk Road Operating Companies and DBFO's its daily winter action plan and receive the same in return. Winter issues shall also be an item on the agenda at liaison meetings with all adjacent Trunk Road Operating Companies.

5.6 Network Rail

BEAR Scotland will, in discussion with Network Rail, ensure that appropriate safety precautions are taken when snow ploughing vehicles are negotiating railway level crossings.

5.7 Coordination of Winter Service Operations at Unit Boundaries

A consistent level of service at boundary interfaces with other Trunk Road Operating Companies is essential to allow the safe movement of road users and to minimise delays and disruption caused by winter conditions.

During periods of severe weather, the Duty Controller will liaise with and update other Operating Companies regarding the current status of the prevailing weather conditions and BEAR Scotland's winter service operations. This liaison will extend to the offer or request of mutual aid to ensure consistency of service level at boundary interfaces.

5.7 Other Bodies

Liaison will take place with organisations such as the Media, Road Haulage Association, Freight Transport Association and Community Councils to ensure any issues regarding the delivery of the Winter Service are incorporated, where appropriate, in the WSP.

Figure 5/1 below outlines communications links and lines of potential information flow.

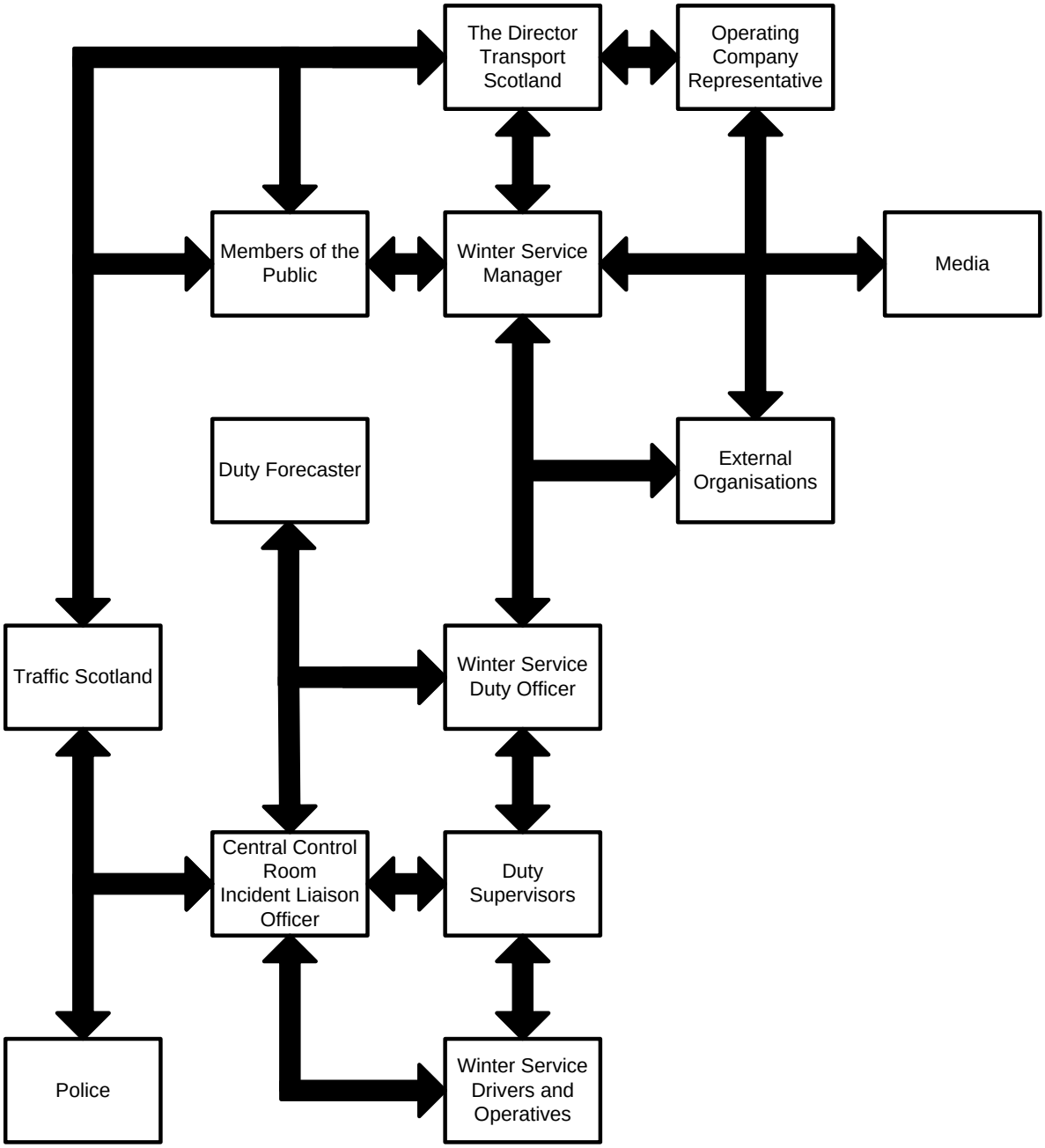


Figure 5/1: Communications Links and Information Flow.

6.0 COLLABORATION AND MUTUAL AID

A list of contacts for adjacent Operating Companies and Local Authorities is held by the Winter Service Manager to allow offers of mutual aid to be made, subject to the availability of resources. This aid may take the form of providing salt stocks or operated winter service plant, including snowblowers. Whenever such a request is received, we will endeavour to make this aid available at the earliest opportunity, without compromising the level of service being provided on the North West Unit.

6.1 Arrangements for identification of mutual aid

BEAR Scotland will continue to supply salt stock information to the Scottish Salt Group. Regular dialogue will be undertaken with stakeholders including Local Authorities and Operating Companies in relation to sharing of resources and forward planning regarding logistical arrangements. Bear Scotland will offer Mutual Aid and consider requests for Mutual Aid on the strength of the 2 – 5 day forecast. Our Control Centre has a full and verified list of contact numbers for stakeholders including local authorities.

Those partners shall include but not be limited to:

(i.) Operating Companies and Trunk Road DBFO companies
(ii.) The Director
(iii.) Traffic Scotland Operator
(iv.) PAG
(v.) Police Scotland
(vi.) The Emergency Services
(vii.) The Scottish Roads Traffic Database Operator
(viii.) Transport Scotland's Customers
(ix.) Local Authorities
(x.) Bridges Authorities
(xi.) The Traffic Customer Care Line Service
(xii.) SEPA
(xiii.) The Highways Agency
(xiv.) DfT
(xv.) Scottish Ministers Authorised Contractors
(xvi.) Undertakers
(xvii.) Statutory Authorities
(xviii.) Network Rail
(xix.) Abellio Scotrail
(xx.) Any other organisation notified to BEAR Scotland by the Director

7. WINTER SERVICE PATROLS

Category A and Category B Winter Service Patrols will be provided on specified routes between 01 November and 31 March. Decisions to mobilise the patrols will be made by the WSDO during preparation of the winter service daily action plan using the following trigger:

- *When the road surface temperature for any climatic area within a Winter Service Patrol route is forecast at any time to be less than, or equal to, three degrees centigrade, a Winter Service Patrol will be mobilised*.

All Frontline, Reserve and Patrol vehicles will carry welfare kits comprising 24 Energy Bars, 24 Bottles of Water and 24 Insulated Blankets.

A winter service patrol report will be issued on a daily basis.

Winter Service Patrols routes are identified in Figure 7/1 below with maps in Section 14.

Category (A/B)	Route	Depot	Route Description	Depot to Route (km)	Time to Route (mins)	Patrol Length (km)	Avg Speed (km/hr)	Route Time (mins)	Route to Depot (km)
PA-1	A9	Perth	Perth - Ballinluig - Perth	1	5	61	61	60	1
PA-2	A9	Ballinluig	Ballinluig - Dalnacardoch – Pitlochry – Ballinluig.	1	1	62	62	60	1
PA-3	A9	Kingussie	Crubenmore - Dalnacardoch	1	5	52	52	60	35
PA-4	A9	Kingussie	Crubenmore - Tomatin - Aviemore	1	5	56	56	60	32
PA-5	A9	Inverness	Inverness - Tomatin - Inverness	1	5	62	62	60	1
PB-1	A9	Brora	Brora - Thurso	1	5	88	56	94	1
PB-2	A835	Inverness	Contin - Ullapool	30	40	61	56	65	30
PB-3	A82	Inverness	Inverness - Lochybridge	7	10	99	56	106	7
PB-4	A87/A82/ A887	Ardelve	Shiel Bridge - Bunloyne - Invergarry - Invermoriston - Bunloyne	13	20	100	56	107	13
PB-5	A82	Fort William (Corpach)	Ballachullish - Crianlarich	31	32	59	56	63	31
PB-6	A85/A82	Killin	Lochearnhead - Crianlarich – Tarbet	10	15	53	56	57	10
PB-7	A85	Oban	Oban – Tyndrum	2	5	58	56	62	2
PB-8	A83	Inveraray	Inveraray - Tarbet	1	5	38	56	41	1

Figure 7/1 – Winter Service Patrol Routes

Type and Registration No	Depot Location	Specification including Capacity	Quantity
9 m³ Pre-wetted Spreader SN13BNV	Perth	9 m³ Pre-wetted Spreader	1
9 m³ Pre-wetted Spreader SN13BNX & SN13BNJ	Kingussie	9 m³ Pre-wetted Spreader	2
9 m³ Pre-wetted Spreader SN13BNU	Ballinluig	9 m³ Pre-wetted Spreader	1
9 m³ Pre-wetted Spreader WX63 YYV	Inverness	9 m³ Pre-wetted Spreader	1
6 m³ Pre-wetted Spreader SN13BOH	Brora	6 m³ Pre-wetted Spreader	1
6 m³ Pre-wetted Spreader SN13BPF	Fort William (Corpach)	6 m³ Pre-wetted Spreader	1
6 m³ Pre-wetted Spreader SN13BOV	Killin	6 m³ Pre-wetted Spreader	1
6 m³ Pre-wetted Spreader SN13BPE	Oban	6 m³ Pre-wetted Spreader	1
6 m³ Pre-wetted Spreader SN13BOJ & WU63CHO	Inverness	6 m³ Pre-wetted Spreader	2
6 m³ Pre-wetted Spreader WU63CHV	Inveraray	6 m³ Pre-wetted Spreader	1
6 m³ Pre-wetted Spreader SN13BOU	Ardelve	6 m³ Pre-wetted Spreader	1

Figure 7/2 – Winter Service Plant for all Winter Service Patrols

Category A Winter Service Patrols operate from 02:00hrs to 10:00hrs at two hourly intervals such that each Winter Service Patrol alternates between a one hour patrol and a one hour stand by on each route. All patrol routes shall be completed within one hour of commencement.

Operating periods for Category A Winter Service Patrols will be:

Start of Period	Finish of Period
02:00	04:00
04:00	06:00
06:00	08:00
08:00	10:00

Routes are designed so that the patrol vehicle, when working, is able to attend any location on its route within 45 minutes of receiving a call from the WSDO.

Category B Winter Service Patrols will operate from 00:00hrs to 09:00hrs at three hourly intervals.

Operating periods for Category B Winter Service Patrols are:

Start of Period	Finish of Period
00:00	03:00
03:00	06:00
06:00	09:00

Winter Service Patrols will allow for rest periods, patrolling both sides of dual carriageways and motorways and undertaking the following:

- patrol all carriageways of Trunk Roads, excluding slip roads
- report on road conditions encountered to, and take instruction on precautionary treatments from, the WSDO
- provide immediate response when instructed to carry out precautionary treatments or other anti-icing Operations by the WSDO
- deal with any situation on the Winter Service Patrol route requiring immediate attention
- pay particular attention to the areas requiring special attention
- undertake short stops for minor maintenance such as clearing grips and removing debris
- provide daily reports

Where any situation on the Winter Service Patrol route cannot be resolved the Winter Service Patrol, additional resources will be deployed to resolve the situation.

8. PRECAUTIONARY TREATMENT ROUTES

The North West Trunk Road Unit precautionary treatment routes have been separated into three distinct categories:

- Carriageway precautionary treatments not exceeding 20g/m² and treatments not exceeding 40g/ m² (Figures 8/1 and 8/2)
- Precautionary treatments of footways, footbridges and cycleways (Figures 4/1 to 4/3 in Section 4)

All precautionary treatment routes have been designed to enable completion of treatment routes, including contiguous laybys but excluding remote laybys, within two hours of commencement of the treatment. Precautionary treatment routes will mobilise, commence and complete before snow and ice conditions are forecast to occur. Immediate responses for unplanned treatments will mobilise and commence within one hour of the WSDO's instruction.

On single carriageways, de-icing material will be spread across the full width of the carriageway in a single pass.

Where the spread rate in Figure 8/2 or Figure 8/3 is greater than 20g/m², the WSDO will instruct one treatment run to be carried out unless the trend from a range of road sensors indicates that the road temperature will remain at least 1°C higher than the intervention level in Figure 8/2.

De-icing vehicles and drivers will be assigned to specific routes to promote route ownership and knowledge, but will have a basic knowledge of every precautionary treatment route emanating from that depot and will be capable of undertaking any such route if necessary.

Care will be taken at roadworks, where in addition to areas currently being trafficked, all other areas, including contraflows, likely to be opened to traffic are treated. Traffic management equipment, including cones and cylinders, may disrupt distribution of salt, and liaison with engineering staff responsible for roadwork sites is essential if correct treatment is to be ensured.

No Winter Service Plant will be driven above the legal speed limit at any time or at a speed greater than 40mph during precautionary treatment operations on de-restricted dual carriageways. On single carriageway roads de-icing material will be spread across the full width of the road in a single pass with the Winter Service Plant travelling at a speed no greater than 30mph.

Precautionary treatment spread rates on Category A footways specified by the WSDO on the daily action plan, will be in accordance with Section 8.5.

8.1 Proposed Spread Rates for Precautionary Treatments of Carriageways

The weather forecast and road surface conditions shown in Figure 8/1 are read into Figure 8/2 to determine the rate of spread of precautionary treatment. The spread rates shown in Figure 8/2 indicate the total weight of material spread. These spread rates assume that there is no residual salt present on the carriageway.

Pre-wetted salt is used for precautionary carriageway treatments, in the proportions 70% dry salt to 30% brine, with the brine being at a concentration of between 20% and 23%. Therefore, a carriageway precautionary treatment under weather forecast D and road condition 2 will comprise 14g/m^2 of dry salt and 6g/m^2 of brine.

The level of moisture is a critical issue affecting the value of rock salt as an anti-icing agent, as dry rock salt (primarily NaCl) has no direct melting action. Melting occurs only after the salt forms a solution by absorbing moisture from the atmosphere or from the road surface. Below an atmospheric relative humidity level of around 80 per cent the absorption of moisture by rock salt decreases rapidly and, at low levels of relative humidity, salt particles remain inert and ineffective. The use of pre-wetted salt will ensure that there is no delay in the formation of salt solution regardless of the level of ambient humidity.

It is recognised that all precautionary treatment routes now contain carriageway surfacing with sections on which negative texture surfacing exists. All precautionary treatment routes will be treated as close as is practicable to the forecast time for road surface temperatures to be at less than or equal to plus 1° C, but will in any case ensure treatment is completed before freezing conditions are forecast to occur

<table>
<tr><th colspan="4">Decision Matrix</th></tr>
<tr><th colspan="4">Predicted Road Conditions</th></tr>
<tr><th>Road Surface Temperature</th><th>Wet</th><th>Wet Patches</th><th>Dry</th></tr>
<tr><td>May fall below 1ºC</td><td rowspan="2">Salt before frost</td><td>Salt before frost (see Note A)</td><td>No action likely, monitor weather (see Note A)</td></tr>
<tr><td rowspan="4">Expected to fall below 1ºC</td><td colspan="2">Salt before frost (see Note B)</td></tr>
<tr><td colspan="3">Salt after rain stops</td></tr>
<tr><td colspan="3">Salt before frost and after rain stops (see Note C)</td></tr>
<tr><td colspan="2">Salt before frost</td><td>Monitor weather conditions</td></tr>
<tr><td>Expected snow</td><td colspan="3">Salt before snow</td></tr>
<tr><td rowspan="3">Freezing rain</td><td colspan="3">Salt before rain (see Note C)</td></tr>
<tr><td colspan="3">Salt during rain (see Note C)</td></tr>
<tr><td colspan="3">Salt after rain (see Note C)</td></tr>
</table>

Figure 8/1 – Decision Matrix

The decision to undertake precautionary treatments may be adjusted to take account of residual salt or surface moisture.

Note A: Particular attention should be given the possibility of water running across carriageways. Such locations will be monitored and treated as required.

Note B: When a weather warning contains reference to expected hoarfrost close monitoring will be required, with particular attention given to timings of precautionary treatments as salt deposited on dry roads may be dispersed before it can become effective.

Note C: Under these circumstances rain will freeze on contact with running surfaces and full pre-treatment should be provided even on dry roads, with continuous monitoring throughout the danger period.

	Forecast weather condition	Frost Susceptible/ surface water run-off area (g/m²)	Road Surface Wet (g/m²)
A	RST higher than plus 1°C	0	0
B	RST lower than or equal to plus 1°C but higher than minus 2°C	10 to 20	10 to 20
C	RST lower than or equal to minus 2°C but higher than minus 5°C	10 to 20	10 to 20
D	RST lower than or equal to minus 5°C	20	20
E	RST lower than or equal to plus 1°C but higher than minus 2°C following rain	20	30
F	RST lower than or equal to minus 2°C but higher than minus 5°C following rain	30	40
G	RST lower than or equal to minus 5°C following rain	40	40
H	Hoar Frost	20	20
I	Freezing Fog	10	20
J	Freezing Rain	40 (See decision matrix)	40 (See decision matrix)
K	Snow Accumulations up to 30mm	30	40
L	Snow Accumulations over 30mm	40	40
M	Hard Packed Snow/Ice	See clearance matrix	See clearance matrix

Figure 8/2 - De-icing material spread rates for precautionary treatment of carriageways

Note 1: Spread rate for pre-wetted salt is the combined weight of dry rock salt and brine combined at 70:30 proportions by weight, with maximum brine concentration of 23% salt.

Note 2: When ice is formed or snow is lying dry salting is the preferred treatment unless the road is closed to traffic when pre-wetted salting may be used. Pre-wetted salting is the preferred treatment in advance of such conditions.

Note 3: Treatments will be carried out, whenever possible, after traffic has dispersed standing water. Successive half rate treatments (for both pre-wetted and dry salt operations) should be considered for lightly trafficked roads at lower ends of temperature bands indicated.

Note 4: Research carried out by the Highways Agency shows that a road can be classed as damp 20 minutes after rain has stopped.

Clearance Matrix			
Minimum Salt Spread rates for Snow or Ice Clearance			
Road Surface Condition	**Treatment**		
	Spreading (grammes/square metre)	**Ploughing**	**Blowing**
	Salt		
Ice Formed	20 to 40	No	No
Snow covering of less than 30mm	20	Yes	No
Snow covering exceeds 30mm	20 to 40	Yes	No
Snow accumulations due to prolonged snowfall	20 to 40	Yes (continuous)	Where applicable
Hard packed snow/ice less than 20mm thick	20 to 40 (successive treatments)	No	No
Hard packed snow/ice	salt/abrasive (successive)	No	No

Figure 8/3 – Clearance Matrix

Note 1: Spread rate for pre-wetted salt is the combined weight of dry rock salt and brine combined at 70:30 proportions by weight, with maximum brine concentration of 23% salt.

Note 2: When ice is formed or snow is lying dry salting is the preferred treatment unless the road is closed to traffic when pre-wetted salting may be used. Pre-wetted salting is the preferred treatment in advance of such conditions.

Note 3: Treatments will be carried out, whenever possible, after traffic has dispersed standing water. Successive half rate treatments (for both pre-wetted and dry salt operations) should be considered for lightly trafficked roads at lower ends of temperature bands indicated

Table 7.2.J.4 - Precautionary Treatment Routes determined by the Operating Company: 20 g /sq m treatment routes

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Route Tonnage @20g/m2	Treatment type
20-1	Killin	A85 Lochearnhead - Perth	11	18	56	41	81	67	Perth	6.0	6.70	Pre-wet
20-2	Perth	A9 Perth – Pitlochry – Perth	2	5	52	55	114	2	Ballinluig	7.5	7.8	Pre-wet
20-3	Ballinluig	A9 Ballinluig – Trinafour – Ballinluig	31	25	40.2	42	95	31	Kingussie	7.5	6.03	Pre-wet
20-4	Kingussie	A9 Kingussie - Dalwhinnie – Trinafour - A889 Drumgask – Dalwhinnie - Kingussie	0.5	1	69.7	52	111	13	Inverness	7.5	10.46	Pre-wet
20-5	Kingussie	A86 Kingussie-Laggan-Spean Bridge A82 Spean Bridge – Invergarry	0.5	1	88	50	106	89	Fort William	6.2	10.91	Pre-wet
20-6	Kingussie	A9 Kingussie – Dalraddy Dual - Tomatin - Dalraddy Dual - Kingussie	2	3	58	55	109	4	Inverness	7.0	7.84	Pre-wet
20-7	Inverness	A9 Tomatin - Tore, incl Slip Roads, Inverness A82 Longman R/A - Telford St	2	5	62	45	98.5	5	Dunbeath	7.5	9.20	Pre-wet & Pot. Acetate
20-8	Inverness	A835 Tore Roundabout – Ullapool	11	13	79	45	106	90	Ullapool	6.5	10.30	Pre-wet
20-9	Inverness	A82 Telford Street - Invermoriston - Invergarry	3	5	88	55	99.0	45	Fort William	6.4	11.26	Pre-wet

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Route Tonnage @20g/m2	Treatment type
		A87 Invergarry - Bunloyne										
20-10	Inverness	A9 Tore – Strathsteven Layby	11	13	71	45	107	87	Dunbeath	6.5	9.20	Pre-wet & Pot. Acetate
20-11	Dunbeath	A99 Burn of Whilk Wind Farm - Latheron A9 Latheron – Strathsteven Layby	18.7	24	66	47	89	55	Inverness	6.5	8.58	Pre-wet
20-12	Dunbeath	A9 Latheron - Scrabster A99 Wick - Burn of Whilk Wind Farm	6	10	55	45	111	19	Wick	6.5	7.15	Pre-wet
20-13	Ardelve	A87 Kyeleakin – Uig	14	15	78	45	104	92	Portree	6.0	9.24	Pre-wet & Pot. Acetate
20-14	Ardelve	A87 Kyleakin – Bunloyne A887 Bunloyne – Invermoriston	9	10	79	50	93	70	Fort William	6.0	9.48	Pre-wet
20-15	Fort William	A82 Spean Bridge A830 Lochybridge – Mallaig	31	31	78	50	93	66	Mallaig	6.3	9.83	Pre-wet
20-16	Fort William	A82 Lochybridge – Ballachulish – A85 Connel – Oban	4	5	75	48	92	77	Oban	6.2	9.00	Pre-wet
20-17	Oban	A85 Connel A82 Tyndrum – Ballachulish	10	15	103	52	118	53	Fort Willian	6.2	12.77	Pre-wet
20-18	Killin	A82 Tyndrum - Crianlarich A85 Crianlarich - Lix Toll - Lochearnhead	30	40	79	50	94	55	Perth	6.3	9.82	Pre-wet

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Route Tonnage @20g/m2	Treatment type
		A84 Lochearnhead – Craigforth										
20-19	Inveraray	A83 Cairndow - Tarbet A82 Alexandria – Tarbet – Crianlarich – RaBT Bus Turning Circle	16	17	76	50	118	56	Chryston	6.5	9.88	Pre-wet
20-20	Inveraray	A83 Cairndow - Kennacraig	15	18	83	50	100	69	Machrihanish	6.2	10.29	Pre-wet
20-21	Machrihanish	Campbeltown Ferry Terminal to Kennacraig	7	9	57.6	50	76	50	Inveraray	6.2	7.14	Pre-wet

Figure 8/4: Carriageway Precautionary Treatment Routes Not Exceeding 20g/m².

Table 7.2.J.4 - Precautionary Treatment Routes determined by the Operating Company: 40 g /sq m treatment routes

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Route Tonnage @40g/m2	Treatment type
40-1	Perth	A85 Perth - St Fillans	4	6	47	50	56.0	62	Killin	6.00	11.28	Pre-wet
40-2	Perth	A9 Perth - Pitlochry - Perth	2	4	52	55	113.6	1	Ballinluig	7.50	15.60	Pre-wet
40-3	Ballinluig	A9 Ballinluig – Blair Atholl - Dalwhinnie – Ballinluig	1	1	52	50	94	1	Kingussie	7.50	15.60	Pre-wet
40-4	Kingussie	A9 Kingussie – Trinafour	1	2	52.8	50	84	12.5	Ballinluig	7.50	15.84	Pre-wet
40-5	Kingussie	A9 Kingussie – Dalraddy Dual - Tomatin - Dalraddy Dual - Kingussie	2	3	58	55	109	3	Inverness	7.0	15.68	Pre-wet
40-6	Kingussie	A86 Kingussie – A889 Jct A889 Laggan – A9 Dalwhinnie Junction	1	1.5	32	50	37.5	25.5	Kingussie	6.00	7.68	Pre-wet
40-7	Kingussie	A86 Laggan Junction - Spean Bridge	18	22.5	45.5	50	55.0	64	Fort William	6.00	10.92	Pre-wet
40-8	Inverness	A9 Inverness – Tomatin	1	2	42	50	98.5	28	Kingussie	7.50	12.60	Pre-wet
40-9	Inverness	A82 Inverness – Fort Augustus (B862)	3	5	55	50	66.0	55	Fort William	6.40	14.08	Pre-wet
40-10	Inverness	A82 Longman – Telford St A9 Inverness – Tore – Ardullie (Kessock and Cromarty Bridges) A835 Tore - Contin	1	2	48	50	96.0	1	Ullapool	7.00	13.44	Pre-wet & Pot. Acetate
40-11	Inverness	A835 Contin - Ullapool	28	30	59	50	70.8	89	Ullapool	6.50	15.34	Pre-wet

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Route Tonnage @40g/m2	Treatment type
40-12	Inverness	A9 Ardullie – The Mound (Dornoch Bridge)	22	24	54	50	64	87	Dunbeath	6.50	14.04	Pre-wet & Pot. Acetate
40-13	Dunbeath	A9 Berriedale – The Mound	9	10	49	50	58	58	Wick	6.00	11.76	Pre-wet
40-14	Dunbeath	A9 Berriedale – A99 Latheron – Wick	9	10	42	50	50	39	Wick	6.40	10.75	Pre-wet
40-15	Dunbeath	A9 Latheron – Scrabster	6	8	41	50	50	47	Wick	6.30	10.66	Pre-wet
40-16	Ardelve	A87 Moll Junction – Uig	38	41	54	50	61	92	Portree	6.00	12.96	Pre-wet
40-17	Ardelve	A87 Glenshiel Battlefield – Moll Junction (Carrick and Skye Bridges)	22	26	60	50	72	39	Portree	6.00	14.40	Pre-wet & Pot. Acetate
40-18	Ardelve	A87 Glenshiel Battlefield – Bunloyne A887 Bunloyne - Invermoriston A82 Fort Augustus - Invergarry	22	26	60	50	83	67	Fort William	6.00	14.40	Pre-wet
40-19	Fort William	A830 Corpach – Lochybridge A82 Lochybridge – Invergarry A87 Invergarry – Bunloyne	1	2	63	50	76	64	Ardelve	6.00	15.12	Pre-wet
40-20	Fort William	A830 Corpach - Mallaig	1	2	62	50	74	63	Mallaig	6.20	15.60	Pre-wet
40-21	Fort William	A82 Ballachulish - A82 Tyndrum	28	34	54	50	65	80	Killin	6.20	13.14	Pre-wet
40-22	Oban	A828 Connel –A82 Ballachullish	10	12	66	50	72	75	Corpach	6.00	15.76	Pre-wet

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Route Tonnage @40g/m2	Treatment type
		Roundabout – A82 Lochybridge										
40-23	Oban	A85 Oban - Tyndrum	1	2	58	50	75	61	Killin	6.20	14.38	Pre-wet
40-24	Killin	A85 St Fillans - Lochearnhead - Lix Toll - Crainlarich A82 Crianlarich - Tyndrum	22	27	43	44	57	30	Oban	6.30	10.83	Pre-wet
40-25	Killin	A84 Lochearnhead – Kildean Roundabout	11	17	44	50	53	55	Perth	6.30	11.08	Pre-wet
40-26	Killin	A82 Crianlarich – Tarbet A83 Tarbet – Rest & Be Thankful	23	28	40	45	53	63	Inveraray	6.50	10.40	Pre-wet
40-27	Inveraray	A83 Achnagoul Junction – Rest & Be Thankful A82 Tarbet – Alexandria – RaBT Bus Turning Circle	6	8	58	50	106	56	Killin	6.30	14.61	Pre-wet
40-28	Inveraray	A83 Achnagoul Junction - Kennacraig	6	8	63	50	76	69	Machrihanish	6.00	15.12	Pre-wet
40-29	Machrihanish	Campbeltown Ferry Terminal to Kennacraig	7	9	57.6	50	76	50	Inveraray	6.2	14.28	Pre-wet

Figure 8/5: Carriageway Precautionary Treatment Routes Not Exceeding 40g/m².

PRECAUTIONARY SALTING ROUTE 20-1

DEPOT: KILLIN					VEHICLE: 26 TONNES GVW 6x4 SN13 BOF	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A827	Killin	A85 Junction Lix Toll	3	22	8
TF	A85	Lix Toll	A85 Junction Lochearnhead	8	44	11
SALT	A85	A82 Junction Lochearnhead	Newhouse Road Roundabout (inc Roundabout)	56	41	81
TF	A85	Newhouse Road Roundabout	A82 Junction Lochearnhead	56	45	75
TF	A82	A85 Junction Lochearnhead	A827 Junction Lix Toll	8	40	12
TF	A827	Lix Toll	Killin	3	26	7

Total time from start to finish of precautionary treatment (mins) : 81
Total length of carriageway salted (km) : 56
Average width of carriageway (m) : 6.0
Total tonnage used at 10gm/m^2 : 3.35
Total tonnage used at 20gm/m^2 : 6.7

Figure 8/6a: Carriageway Precautionary Treatment Route 20 - 1

PRECAUTIONARY SALTING ROUTE 20 - 2

DEPOT: PERTH					VEHICLE: 26 TONNES GVW 6x4 SK65 BOU	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Inveralmond Road	Inveralmond Roundabout	2	30	4
SALT	A9 (N/bound)	Inveralmond Roundabout	Pitlochry South Interchange	37	49	45
SALT	A924 / U/C	Pitlochry South Interchange (Start of N/bound off-slip)	Croftinloan North Junction	1	30	2
TF	A9 (S/bound)	Croftinloan North Junction	Croftinloan South Junction	2	60	2
SALT	A9 (S/bound)	A9 Croftinloan Junction	South End Pitlochry Dual	4	60	4
TF	A9	South End Pitlochry Dual	Layby 20, Dalguise Junction	9	77	7
SALT	Layby 20	Layby 20, Dalguise Junction	Layby 20, Dalguise Junction	0.1	10	0.5
TF	A9	Layby 20, Dalguise Junction	North End Bankfoot Dual	6.5	65	6
SALT	A9 (S/bound)	North End Bankfoot Dual	South End Bankfoot Dual	3	50	3.5
TF	A9	South End Bankfoot Dual	Bankfoot N Junction splitter	2.5	50	3
SALT	A9 (S/bound)	Bankfoot N Junction splitter	Bankfoot N Junction splitter	0.3	45	0.5
TF	A9	Bankfoot N Junction splitter	Bankfoot S Junction splitter	0.8	50	1
SALT	A9 (S/bound)	Bankfoot S Junction splitter	Bankfoot S Junction splitter	0.3	45	0.5
TF	A9	Bankfoot S Junction splitter	North End Luncarty Dual	4	45	3
SALT	A9 (S/bound)	North End Luncarty Dual	Inveralmond Roundabout	4	50	5
TF	A9 (N/bound)	Inveralmond Roundabout	N/bound off-slip to Luncarty	3.5	60	3.5
SALT	A9	N/bound off-slip to Luncarty	Battleby Junction	0.3	36	0.5
TF	A9	Battleby Junction	N/bound on-slip from Luncarty	0.1	10	0.5
SALT	A9	N/bound on-slip from Luncarty	N/bound on-slip from Luncarty	0.1	30	inc

TF	A9	N/bound on-slip from Luncarty	Layby 7, Bankfoot northbound	4	69	3.5
SALT	Layby 7	Layby 7, Bankfoot northbound	Layby 7, Bankfoot northbound	0.1	10	0.5
TF	A9	Layby 7, Bankfoot northbound	Turn at B867 Junction, Birnam	8	80	6
TF	A9	B867 Junction, Birnam	B867 Bankfoot North Junction	7	76	5.5
SALT	A9 offslip	Bankfoot N Junction Offslip	Bankfoot N Junction Offslip	0.1	30	inc
TF	B867	Bankfoot N Junction Offslip	Turn at Innewan Gardens Junction	0.4	30	1
SALT	B867	Innewan Gardens Junction	Bankfoot N Junction Onslip	0.4	10	2.5
SALT	A9	Bankfoot N Junction Onslip	Layby 8, Bankfoot southbound	1	40	1
SALT	Layby 8	Layby 8, Bankfoot southbound	Layby 8, Bankfoot southbound	0.1	10	0.5
TF	A9	Layby 8, Bankfoot southbound	B9099 Luncarty Junction	2	80	1.5
TF	B9099	B9099 Luncarty Junction	S/bound on-slip from Luncarty	2.5	50	3
SALT	A9	S/bound on-slip from Luncarty	S/bound on-slip from Luncarty	0.5	30	1
TF	A9 (S/bound)	S/bound on-slip from Luncarty	Inveralmond Roundabout	3	50	4
TF	U/C	Inveralmond Roundabout	Inveralmond Road	2	30	4

Total time from start to finish of precautionary treatment (mins) : 113.5
Total length of carriageway salted (km) : 52.3
Average width of carriageway (m) : 7.5
Total tonnage used at 10gm/m^2 : 3.9
Total tonnage used at 20gm/m^2 : 7.8

Figure 8/6b: Carriageway Precautionary Treatment Route 20 - 2

PRECAUTIONARY SALTING ROUTE 20 - 3

DEPOT: BALLINLUIG				VEHICLE: 32 TONNES GVW 8x4 SN13 BVE		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A9 (N/bound)	Ballinluig Depot	Ballinluig N/bound Off Slip	1	40	1
SALT	A9 Off Slip	Ballinluig N/bound Off Slip	Ballinluig N/bound Off Slip	0.5	30	1
TF		Ballinluig N/bound Off Slip	Ballinluig N/bound On Slip	0.1	20	0.5
SALT	A9 On Slip	Ballinluig N/bound On Slip	Ballinluig N/bound On Slip	0.5	30	1
TF	A9	Ballinluig N/bound Off Slip	Pitlochry S Interchange	5	60	5
SALT	A9 (N/bound)	Pitlochry S Interchange	N End Pitlochry Dual	0.3	45	0.5
TF	A9	N End Pitlochry Dual	Pitlochry N Interchange	3.5	50	4
SALT	A9 (N/bound)	Pitlochry N Interchange	Pitlochry N Interchange	0.5	45	1
SALT	A9	Pitlochry N Interchange	S End Killiecrankie Dual	1	60	1
SALT	A9 (N/bound)	S End Killiecrankie Dual	N End Killiecrankie Dual	3	50	3
SALT	A9	N End Killiecrankie Dual	B8079 Junction, Essengael	3	50	3.5
SALT	A9	Essengael	South End Drumochter Dual	17.9	50	21
SALT	A9 (N/bound)	South End Drumochter Dual	Trinafour	1.1	30	2
SALT	A9 (S/bound)	Trinafour	South End Drumochter Dual	1.1	30	2
TF	A9	S End Drumochter Dual	N End Killiecrankie Dual	22	65	20
SALT	A9 (S/bound)	N End Killiecrankie Dual	S End Killiecrankie Dual	3	50	4
TF	A9	S End Killiecrankie Dual	Pitlochry N Interchange	1	45	1.5
SALT	A9 (S/bound)	Pitlochry N Interchange Off Slip	Turn at A924 Jn, rejoin A9 on S/bound On Slip	0.5	30	1
TF	A9	Pitlochry North Interchange	Turn at Foss Rd junction	1	45	1.5

TF	A9	Foss Rd junction	Pitlochry N Interchange	1	45	1.5
SALT	A9 (N/bound)	Pitlochry N Interchange Off Slip	Turn at A924 Jn, rejoin A9 on N/bound On Slip	0.5	30	1
TF	A9	Pitlochry N Interchange	Start of layby 41	1	60	1
SALT	Layby	Start of layby 41	End of layby 41	0.1	10	0.5
TF	A9	End of layby 41	Turn at access opposite “Tigh’na’geat” , head south to Start of layby 42	1	40	1
SALT	Layby	Start of layby 42	End of layby 42	0.1	10	0.5
TF	A9	End of layby 42	Pitlochry N Interchange	2	40	3
SALT	A9	Pitlochry N Interchange	N End Pitlochry Dual	3.5	45	5
SALT	A9 (S/bound)	N End Pitlochry Dual	Croftinloan Junction	2.5	60	2.5
TF	A9 (S/bound)	Croftinloan Junction	Start of layby 34	3	50	4
SALT	Layby	Start of layby 34	End of layby 34	0.1	10	0.5
TF	A9 (S/bound)	End of layby 34	South End Pitlochry Dual	1	50	1
TF	A9	South End Pitlochry Dual	Ballinluig Depot	1	1	1

Total time from start to finish of salting operations (mins) : 95
Total length of carriageway salted (km) : 40.2
Average width of carriageway (m) : 7.5
Total tonnage used at 10gm/m^2 : 3.02
Total tonnage used at 20gm/m^2 : 6.03

Figure 8/6c: Carriageway Precautionary Treatment Route 20 - 3

PRECAUTIONARY SALTING ROUTE 20 - 4

DEPOT: KINGUSSIE					VEHICLE: 32 TONNES GVW 8x4 SN13 BTZ	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	B970	Kingussie Depot	A86 Junction Kingussie	0.5	30	1
SALT	A86	B970 Junction	A9 Junction Southbound	1.3	30	2.5
SALT	A9	Southbound Slip Road	A9 Kerrow	0.1	30	0.5
SALT	A9	A86 N Junction Kerrow	North End Ralia WS 2+1	6	51	7
SALT	A9	North End Ralia WS 2+1	South End Ralia WS 2+1	1.4	50	1.5
SALT	A9	South End Ralia WS 2+1	Ralia Junction	0.9	50	1
SALT	A9	Ralia Junction	Etteridge	3	50	4
SALT	A9 (S/bound)	Etteridge	Crubenmore Lodge	2	60	2
SALT	A9	Crubenmore Lodge	Dalwhinnie	11	60	11
SALT	A9	Dalwhinnie	North End Drumochter Dual	10	60	10
SALT	A9 (S/bound)	North End Drumochter Dual	Trinafour	9	60	9
SALT	A9 (N/bound)	Trinafour	North End Drumochter Dual	9	50	10
TF	A9	North End Drumochter Dual Northbound	Dalwhinnie	10	60	10
SALT	A889	Dalwhinnie	A886 Junction Drumgask	14	50	15
TF	A889	A886 Junction Drumgask	Dalwhinnie	14	50	15
TF	A9	Dalwhinnie	Crubenmore Lodge	11	60	11
SALT	A9 (N/bound)	Crubenmore Lodge	Etteridge	2	60	2
TF	A9	Etteridge	A9 South Junction Kerrow	11	60	11
TF	A9	A86 S Junction Kerrow	B970 Junction	1	30	2
TF	B970	A86 Junction	Kingussie Depot	0.5	20	1.5

Total time from start to finish of precautionary treatment (mins)	:	111
Total length of carriageway salted (km)	:	69.7
Average width of carriageway (m)	:	7.5
Total tonnage used at 10gm/m^2	:	5.23
Total tonnage used at 20gm/m^2	:	10.46

Note to Driver: 2nd treat Ralia 2+1 and A9 Junction into Kingussie Northbound

Figure 8/6d: Carriageway Precautionary Treatment Route 20 - 4

PRECAUTIONARY SALTING ROUTE 20 - 5

DEPOT: KINGUSSIE					VEHICLE: 26 TONNES GVW 6x4 SN13 BNK	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	B970	Kingussie Depot	A86 Junction Kingussie	0.5	30	1
SALT	A86	B970 Junction	Spean Bridge	63	50	76
SALT	A82	Spean Bridge	Invergarry	25	50	30
TF	A82	Invergarry	Spean Bridge	25	50	30
TF	A86	Spean Bridge	B970 Junction	63	50	76
TF	B970	B970	Kingussie Depot	0.5	30	1

Total time from start to finish of precautionary treatment (mins)	:	106
Total length of carriageway salted (km)	:	88
Average width of carriageway (m)	:	6.2
Total tonnage used at 10gm/m^2	:	5.5
Total tonnage used at 20gm/m^2	:	10.91

Figure 8/6e: Carriageway Precautionary Treatment Route 20 - 5

PRECAUTIONARY SALTING ROUTE 20 - 6

DEPOT: KINGUSSIE					VEHICLE: 26 TONNES GVW 6x4 SN13 BNX	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	B970	Kingussie Depot	A86 Junction Kingussie	0.5	20	1.5
TF	A86	B970 Junction	A9 Junction Northbound	0.8	30	1.5
SALT	A9	Northbound Slip Road	A9 Kerrow	0.2	30	0.5
SALT	A9	A9 Kerrow	S End Dalraddy to Kincraig Dual	5.5	41	8.0
SALT	A9 (N/bound)	S End Dalraddy to Kincraig Dual	N End Dalraddy to Kincraig Dual	7.2	50	8.5
SALT	A9	N End Dalraddy Dual	Slochd Summit	22	41	32
SALT	A9 (N/bound)	Slochd Summit	Tomatin	6	50	7
SALT	A9 (S/bound)	Tomatin	Slochd Summit	6	45	8
TF	A9	Slochd Summit	N End Carrbridge WS 2+1	6	50	7
SALT	A9 (S/bound)	N End Carrbridge WS 2+1	S End Carrbridge WS 2+1	1.6	44	2
TF	A9	S End Carrbridge WS 2+1	N End Dalraddy to Kincraig Dual	14	50	16.5
SALT	A9	N End Dalraddy to Kincraig Dual	S End Dalraddy to Kincraig Dual	7.2	50	8.5
TF	A9	S End Dalraddy to Kincraig Dual	A86 North.Junction Kerrow	5.5	50	6.5
SALT	A86	Southbound Off Slip	Southbound Off Slip	0.1	30	0.5
TF	A86	A9 North.Junction Kerrow	B970 Junction	1	30	2
TF	B970	A86 Junction	Kingussie Depot	0.5	30	1

Total time from start to finish of precautionary treatment (mins) : 105
Total length of carriageway salted (km) : 56
Average width of carriageway (m) : 7.0
Total tonnage used at 10gm/m^2 : 3.92
Total tonnage used at 20gm/m^2 : 7.84

Figure 8/6f: Carriageway Precautionary Treatment Route 20 - 6

PRECAUTIONARY SALTING ROUTE 20-7

DEPOT: Inverness , Bridgepoint Depot					VEHICLE: 32 TONNES GVW 8x4 COMBI SN63 XUM	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Road	Bridgepoint Depot	Longman Roundabout	1	40	2
SALT	A9 (N/bound)	Longman Roundabout	200m south of Kessock Bridge	0.5	45	0.5
ACETATE	A9 (N/bound)	200m S of Kessock Bridge	North end Kessock Bridge	1.3	56	1.5
SALT	A9 (S/bound)	200m N of Kessock Bridge	Tore Roundabout	7.5	56	8
SALT	A9 (S/bound)	Tore Roundabout	200m N of Kessock Bridge	7.5	56	8
ACETATE	A9 (S/bound)	200m N of Kessock Bridge	South end Kessock Bridge	1.3	56	1.5
SALT	A9 (S/bound)	South end Kessock Bridge	Longman Roundabout	0.7	45	0.5
SALT	A9 (S/bound)	Longman Roundabout (exc Roundabout)	Meall Mhor	15	51	18
SALT	A9	Meall Mhor	Tomatin Junction	6	43	9
TF	A9	Tomatin	Moy WS 2+1	2	60	2
SALT	A9 (N/bound)	Moy WS 2+1	Moy WS 2+1	1	45	2
TF	A9	Moy WS 2+1	Meall Mhor	3	80	3.5
SALT	A9 (N/bound)	Meall Mhor	A82 Longman Roundabout	16	55	18
SALT	A82 (W/bound)	Longman Roundabout	Shore Street Roundabout (exc roundabouts)	1.5	30	3
ACETATE	A82 (W/bound)	Shore Street Roundabout	Telford Street Roundabout	0.5	40	1
ACETATE	A82 (E/bound)	Telford Street Roundabout	Shore Street Roundabout	0.5	40	1
SALT	A82 (E/bound)	Shore Street Roundabout	Longman Roundabout (inc. Shore Street, Rose Street, Harbour Road & Longman Roundabouts)	2.5	40	4
TF	A9	Longman Roundabout	Raigmore Interchange	1	60	1

SALT	A9	Southbound off Slip Road	Southbound on Slip Road	1	30	2
TF	A9	Raigmore Interchange	B9006 Inshes Junction	1	60	1
SALT	A9	Southbound off Slip Road	B9006 Junction Culloden Road	1	30	2
TF	B9006	A9 Slip Road	Beechwood Roundabout	1	30	2
TF	B8082	Beechwood Roundabout	A9 northbound	1	30	2
SALT	A9	Northbound on Slip Road	Main A9 carriageway	1	30	2
TF	A9	Beechwood	Raigmore Interchange	1	60	1
SALT	A9	Northbound off Slip Road	Northbound on Slip Road (inc Raigmore Roundabout)	1	30	2
TF	A9	Raigmore Interchange	Longman Roundabout	1	60	1
TF	A9 (N/bound)	Longman Roundabout	Bridgepoint Depot	0.5	45	0.5

Total time from start to finish of precautionary treatment (mins) : 98.5
Total length of carriageway salted (km) : 62
Total length of carriageway sprayed (km) : 3.6
Average width of carriageway (m) : 7.5
Total tonnage used at 10gm/m^2 : 4.65
Total tonnage used at 20gm/m^2 : 9.2
Total volume of potassium acetate used at 0.01l/m^2 270

Figure 8/6g: Carriageway Precautionary Treatment Route 20 - 7

PRECAUTIONARY SALTING ROUTE 20-8

DEPOT: Inverness , Bridgepoint Depot					VEHICLE: 32 TONNES GVW 8x4 SN13BTY	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Drive / Stadium Drive	Bridgepoint Depot	Longman Roundabout	1.5	45	2
TF	A9	Longman Roundabout	Tore Roundabout	9.8	55	11
SALT	A835	Tore	Ullapool (including Maryburgh roundabout)	79	45	106
TF	A835	Ullapool	Tore Roundabout	79	63	75
TF	A9	Tore Roundabout	Longman Roundabout	9.8	55	11
TF	Longman Drive / Stadium Drive	Longman Roundabout	Bridgepoint Depot	1.5	45	2

Total time from start to finish of precautionary treatment (mins)	:	106
Total length of carriageway salted (km)	:	79
Average width of carriageway (m)	:	6.5
Total tonnage used at 10gm/m^2	:	5.15
Total tonnage used at 20gm/m^2	:	10.3

Figure 8/6h: Carriageway Precautionary Treatment Route 20 - 8

PRECAUTIONARY SALTING ROUTE 20-9

DEPOT: Inverness , Bridgepoint Depot					VEHICLE: 32 TONNES GVW 8x4 SN13 BUA	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Road	Bridgepoint Depot	A82 Telford Street Roundabout Inverness	17	54	19
SALT	A82	Telford Street Roundabout (including roundabout)	A82 Junction Invergarry	67	48	83
SALT	A87	A82 Junction Invergarry	A87 Bunloyne	21	48	26
TF	A887	Bunloyne	A82 Invermoriston	24	55	26
TF	A82	A82 Invermoriston	Bridgepoint Depot	46	55	50

Total time from start to finish of precautionary treatment (mins)	:	109
Total length of carriageway salted (km)	:	88
Average width of carriageway (m)	:	6.4
Total tonnage used at 10gm/m^2	:	5.63
Total tonnage used at 20gm/m^2	:	11.26

Figure 8/6i: Carriageway Precautionary Treatment Route 20 - 9

PRECAUTIONARY SALTING ROUTE 20-10

DEPOT: Inverness , Bridgepoint Depot					VEHICLE: 32 TONNES GVW 8x4 COMBI SN63 XUO	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Drive / Stadium Drive	Bridgepoint Depot	Longman Roundabout	1.5	45	2
TF	A9	Longman Roundabout	Tore Roundabout	9.8	55	11
SALT	A9	Tore Roundabout (inc roundabout)	200m south of Cromarty Bridge	9.0	48	11
ACETATE	A9	200m south of Cromarty Bridge	Ardullie Roundabout	2.1	45	3
SALT	A9	Ardullie Roundabout (inc Roundabout)	Glastullich Roundabout	24.3	45	32
SALT	A9	Glastullich Climbing Lane	Glastullich Climbing Lane	1.2	45	1.5
SALT	A9	Glastullich Climbing Lane	B9165 Junction	0.6	45	1
TF	A9	B9165 Junction	Glastullich Climbing Lane	0.6	45	1
SALT	A9	Glastullich Climbing Lane	Glastullich Roundabout	1.2	45	1.5
SALT	A9	Glastullich Roundabout	Glastullich Roundabout	0.25	30	0.5
TF	A9	Glastullich Roundabout	B9165 Junction	1.8	45	2.5
SALT	A9	B 9165 Junction	200m south of Dornoch Firth Crossing	9.6	45	13
ACETATE	A9	200m south of Dornoch Firth Crossing	200m north of Dornoch Firth Crossing	1.3	40	2
SALT	A9	200m north of Dornoch Firth Crossing	Strathsteven Layby	26	41	38
TF	A9	Strathsteven Layby	Tore Roundabout	76	63	72
TF	A9	Tore Roundabout	Longman Roundabout	9.8	55	11
TF	Longman Drive / Stadium Drive	Longman Roundabout	Bridgepoint Depot	1.5	45	2

Total time from start to finish of precautionary treatment (mins)	:	107
Total length of carriageway salted (km)	:	71
Total length of carriageway sprayed (km)	:	3.4
Average width of carriageway (m)	:	6.5
Total tonnage used at 10gm/m^2	:	4.6
Total tonnage used at 20gm/m^2	:	9.2
Total volume of potassium acetate used at 0.01l/m^2		221

Figure 8/6j: Carriageway Precautionary Treatment Route 20 - 10

PRECAUTIONARY SALTING ROUTE 20 -11

DEPOT: DUNBEATH					VEHICLE: 26 TONNES GVW 6X4 SN13 BNF	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Dunbeath Depot	Dunbeath	1	30	2
TF	A9	Dunbeath	A99 Junction Latheron	5	38	8
TF	A99	A99 Junction Latheron	Burn of Whilk Wind Farm	13	53	14
SALT	A99	Burn of Whilk Wind Farm	A9 Junction Latheron	13	47	16
SALT	A9	A99 Junction Latheron	Strathsteven Layby	53	44	73
TF	A9	Strathsteven Layby	Dunbeath	49	59	53
TF	U/C	Dunbeath	Dunbeath Depot	1	30	2

Total time from start to finish of precautionary treatment (mins) : 89
Total length of carriageway salted (km) : 66
Average width of carriageway (m) : 6.5
Total tonnage used at 10gm/m^2 : 4.28
Total tonnage used at 20gm/m^2 : 8.58

Figure 8/6l: Carriageway Precautionary Treatment Route 20 - 11

PRECAUTIONARY SALTING ROUTE 20-12

DEPOT: DUNBEATH					VEHICLE: 26 TONNES GVW 6X4 SN13 BNE	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Dunbeath Depot	Dunbeath	1	30	2
TF	A9	Dunbeath	A99 Junction Latheron	5	38	8
SALT	A9	A99 Junction Latheron	Scrabster	41	45	55
TF	A9	Scrabster	A882 Junction Georgemas	14	53	16
TF	A882	Georgemas	A9 Junction Wick	23	60	23
SALT	A9	A882 Junction Wick	Burn of Whilk Wind Farm	14	48	17
TF	A9	Burn of Whilk Wind Farm	Dunbeath	18	57	19
TF	U/C	Dunbeath	Dunbeath Depot	1	30	2

Total time from start to finish of precautionary treatment (mins) : 111
Total length of carriageway salted (km) : 55
Average width of carriageway (m) : 6.5
Total tonnage used at 10gm/m^2 : 3.58
Total tonnage used at 20gm/m^2 : 7.15

Figure 8/6k: Carriageway Precautionary Treatment Route 20 - 12

PRECAUTIONARY SALTING ROUTE 20-13

DEPOT: ARDELVE					VEHICLE: 26 TONNES GVW 6x4 SN13 BNL	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A87	Ardelve	Kyleakin Roundabout	14	56	15
SALT	A87	Kyleakin Roundabout (exc Roundabout)	Uig Pier	78	45	104
TF	A87	A87 Uig Pier	Ardelve	92	50	110

Total time from start to finish of precautionary treatment (mins)	:	104
Total length of carriageway salted (km)	:	78
Average width of carriageway (m)	:	6.0
Total tonnage used at 10gm/m^2	:	4.6
Total tonnage used at 20gm/m^2	:	9.2

Figure 8/6m: Carriageway Precautionary Treatment Route 20 - 13

PRECAUTIONARY SALTING ROUTE 20-14

DEPOT: ARDELVE					VEHICLE: 32 TONNES GVW 8x4 COMBI SN63 XUL	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A87	Ardelve	Kyleakin Roundabout	14	56	15
ACETATE	A87	Kyleakin Roundabout	Kyleakin Roundabout	0.1	25	0.5
ACETATE	A87	Kyleakin Roundabout	200m east of Carrich Bridge	1.5	40	2.5
SALT	A87	200m east of Carrich Bridge	A82 Invermoriston	79	50	94
TF	A87	A82 Invermoriston	Ardelve	71	55	77

Total time from start to finish of precautionary treatment (mins)	:	93
Total length of carriageway salted (km)	:	79
Total length of carriageway sprayed (km)	:	1.6
Average width of carriageway (m)	:	6.0
Total tonnage used at 10gm/m^2	:	4.74
Total tonnage used at 20gm/m^2	:	9.48
Total volume of potassium acetate used at 0.0l/ m^2		99

Figure 8/6n: Carriageway Precautionary Treatment Route 20 - 14

PRECAUTIONARY SALTING ROUTE 20-15

DEPOT: CORPACH, FORT WILLIAM					VEHICLE: 32 TONNES GVW 8X4 SN13 BVC	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A830	Corpach	A82 Junction Victoria Bridge	4	48	5
TF	A82	A830 Junction	A82 Commando Memorial Nth of Spean Bridge	13	54	14
TF	A82	A82 Commando Memorial Nth of Spean Bridge	A86 Junction Spean Bridge	1	54	1
SALT	A82	A86 Junction Spean Bridge	A830 Junction	12	50	14
SALT	A830	A830 Junction	Mallaig	66	50	79
TF	A87	Mallaig	Corpach	62	55	68

Total time from start to finish of precautionary treatment (mins) : 93
Total length of carriageway salted (km) : 78
Average width of carriageway (m) : 6.3
Total tonnage used at 10gm/m^2 : 4.9
Total tonnage used at 20gm/m^2 : 9.83

Figure 8/6o: Carriageway Precautionary Treatment Route 20 – 15

PRECAUTIONARY SALTING ROUTE 20-16

DEPOT: CORPACH, FORT WILLIAM				VEHICLE: 32 TONNES GVW 8x4 SN13 BUJ		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A830	Corpach	A82 Junction Victoria Bridge	4	48	5
SALT	A82	A830 Junction	Start of Duelling	1	30	1
SALT	A82 (S/bound)	Start of Dualling	West End Roundabout	1	30	2
SALT	A82 (N/bound)	West End Roundabout (inc Roundabout)	Nevis Bridge Roundabout (inc An Aird and Nevis Bridge Roundabouts)	2	30	4
SALT	A82	Nevis Bridge Roundabout (inc An Aird and Nevis Bridge Roundabouts	Ballachulish Roundabout	20	48	25
SALT	A828	Ballachulish Roundabout	Connel	42	48	52
SALT	A85	Connel	Dunollie Road Junction, Oban)	7	48	8
SALT	A85	Dunollie Road Junction, Oban	Argyll Square (excluding roundabout)	0.8	16	3
TF	A85	Argyll Square	Start of one way section (Gateway)	0.5	30	1
SALT	A85	Start of one way section (Gateway)	Dunollie Road Junction	0.5	10	3
SALT	A85	Dunollie Road Junction	End of two lane section (Gateway)	0.3	9	2
TF	A85	End of two lane section (Gateway)	A828 Connel	7	55	7
TF	A85	A828 Connel	Ballachulish Roundabout	42	55	46
TF	A82	Ballachulish Roundabout	A830 Junction	24	45	32
TF	A830	A82 Junction Victoria Bridge	Corpach	4	48	5

Total time from start to finish of precautionary treatment (mins) : 101
Total length of carriageway salted (km) : 75
Average width of carriageway (m) : 6.0
Total tonnage used at 10gm/m^2 : 4.50
Total tonnage used at 20gm/m^2 : 9.00

Figure 8/6p: Carriageway Precautionary Treatment Route 20 – 16

PRECAUTIONARY SALTING ROUTE 20-17

DEPOT: OBAN					VEHICLE: 32 TONNES GVW 8X4 SN13 BVA	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	McCaig Road	Glenshalloch Ind Estate	Junction A816	1	30	2
TF	A816	Junction A816	Argyll Square	2	50	2
TF	A85	Argyll Square	End of two lane section (Gateway)	0.3	30	1
TF	A85	End of two lane section (Gateway)	Connel	7	62	7
SALT	A85	Connel	A82 Tyndrum	50	52	57
SALT	A82	Tyndrum	Ballachulish Roundabout	53	52	61
TF	A828	A82 Ballachulish	Connel	42	60	42
TF	A85	A828 Connel	Argyll Square	7	55	7
TF	A816	Argyll Square	Junction A816	3	30	2
TF	McCaig Road	Junction A816	Glenshalloch Ind Estate	1	30	2

Total time from start to finish of precautionary treatment (mins) : 118
Total length of carriageway salted (km) : 103
Average width of carriageway (m) : 6.2
Total tonnage used at 10gm/m^2 : 6.39
Total tonnage used at 20gm/m^2 : 12.77

Figure 8/6q: Carriageway Precautionary Treatment Route 20 – 17

PRECAUTIONARY SALTING ROUTE 20-18

DEPOT: KILLIN					VEHICLE: 26 TONNES GVW 6x4 SN13 BNZ	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A827	Killin	A85 Junction Lix Toll	3	22	8
TF	A85	Lix Toll	A82 Junction Crianlarich	19	50	23
TF	A82	A82 Junction Crianlarich	A82 Tyndrum	8	50	9
SALT	A82	A82 Tyndrum	A85 Junction Crianlarich	8	50	9
SALT	A85	A82 Junction Crianlarich	A85 Junction Lix Toll	19	50	23
SALT	A85	A85 Junction Lix Toll	A85 Lochearnhead	8	50	9
SALT	A84	A84 Lochearnhead	A84 Kildean	44	50	53
TF	A84	A84 Kildean	A84 Lochearnhead	44	50	53
TF	A85	A85 Lochearnhead	A85 Junction Lix Toll	8	50	9
TF	A827	Lix Toll	Killin	3	22	8

Total time from start to finish of precautionary treatment (mins) : 94
Total length of carriageway salted (km) : 78
Average width of carriageway (m) : 6.3
Total tonnage used at 10gm/m^2 : 4.91
Total tonnage used at 20gm/m^2 : 9.82

Figure 8/6r: Carriageway Precautionary Treatment Route 20 – 18

PRECAUTIONARY SALTING ROUTE 20-19

DEPOT: INVERARAY					VEHICLE: 32 TONNES GVW 8x4 SN13 BUH	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Inveraray Depot	A83 Inveraray	1	30	1
TF	U/C	A83 Inveraray	Cairndow	15	55	16
SALT	A83	Cairndow	A82 Junction Tarbet	22	52	25
SALT	A82	A82 Junction Tarbet	A82 Crianlarich	26	52	30
TF	A82	A82 Crianlarich	A82 Junction Tarbet	26	64	24
SALT	A82	A83 Junction Tarbet	A811 Junction Tullichewan Roundabout, (exc Roundabout but inc northbound exit to Tullichewan roundabout and roundabout at B831 Arden Junction)	27	52	31
TF	A82	Alexandria	Northbound entry to Arden roundabout	4	60	4
SALT	A82	South end Arden roundabout northbound entry	North end Arden roundabout northbound exit	0.1	30	0.5
TF	A82	Arden	South end A817 Junction Island (Loch Lomond Golf Club)	3	55	3
SALT	A82	South end A817 Junction Splitter Island	North end A817 Junction Splitter Island	0.5	30	1
TF	A82	A817 Junction	Tarbet	18	55	23
TF	A83	Tarbet	RABT Bus Turning Circle	13.3	60	14
SALT	B828	A83/ B828 Junction	RABT Bus Turning Circle	0.25	20	1
TF	A83	RABT Bus Turning Circle	Inveraray	24.3	60	25
TF	U/C	Inveraray	Inveraray Depot	1	30	2

Total time from start to finish of precautionary treatment (mins) : 118
Total length of carriageway salted (km) : 76
Average width of carriageway (m) : 6.5
Total tonnage used at 10gm/m^2 : 4.9
Total tonnage used at 20gm/m^2 : 9.9

Figure 8/6s: Carriageway Precautionary Treatment Route 20 – 19

PRECAUTIONARY SALTING ROUTE 20-20

DEPOT: INVERARAY					VEHICLE: 32 TONNES GVW 8x4 SN13 BNA	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Inveraray Depot	A83 Cairndow	15	50	18
SALT	A83	A83 Cairndow	Kennacraig Ferry Terminal Junction (inc all 3 roundabouts in Lochgilphead)	83	50	100
TF	A83	Kennacraig	Inveraray	68	50	82
TF	U/C	Inveraray	Inveraray Depot	1	30	2

Total time from start to finish of precautionary treatment (mins) : 100
Total length of carriageway salted (km) : 83
Average width of carriageway (m) : 6.2
Total tonnage used at 10gm/m^2 : 5.15
Total tonnage used at 20gm/m^2 : 10.29

Figure 8/6t: Carriageway Precautionary Treatment Route 20 – 20

PRECAUTIONARY SALTING ROUTE 20 - 21

DEPOT: MACHRIHANISH, CAMPBELTOWN					VEHICLE: 32 TONNES GVW 8x4 SN13 BVF	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Depot	A83 Machrihanish Jct	1.5	30	3
TF	A83 (S/bound)	A83 Machrihanish Jct	A83 Lochend Street	4.5	50	4
TF	Lochend Street	A83 Lochend Street	Kinloch Road	0.2	30	1
TF	Kinloch Road	Kinloch Road	Royal Hotel Roundabout	0.6	30	1
SALT	Hall Street	Royal Hotel Roundabout	S/ bound Hall Street Dual Carriageway Campbeltown Ferry Terminal	0.3	30	1
SALT	Hall Street	Turn Campbeltown Ferry Terminal	S/ bound Hall Street Dual Carriageway Campbeltown Ferry Terminal	0.3	30	1
SALT	Kinloch Road	Royal Hotel Roundabout	Lochend Street	0.6	30	1
SALT	Lochend Street	Kinloch Road	A83/ Lochend Street JCT	0.2	30	1
SALT	A83 N/ bound	A83/ Lochend Street JCT	Kennacraig	51	48	63
TF	A83	Kennacraig	Gartnagrenach	3	60	3
SALT	A83	Gartnagrenach	Clachan Hill	5	50	6
TF	A83	Clachan Hill	A83 Machrihanish Jct	39	60	39
TF	U/C	A83 Machrihanish Jct	Depot	1.5	30	3

Total time from start to finish of precautionary treatment (mins)	:	76
Total length of carriageway salted (km)	:	57.6
Average width of carriageway (m)	:	6.2
Total tonnage used at 10gm/m^2	:	3.57
Total tonnage used at 20gm/m^2	:	7.14

Figure 8/1b: Carriageway Precautionary Treatment Route 20 - 21

PRECAUTIONARY SALTING ROUTE 40 - 1

DEPOT: PERTH					VEHICLE: 26 TONNES GVW 6x4 SN13 BUF	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Inveralmond Road	Inveralmond Roundabout	2	30	4
TF	A9	Inveralmond Roundabout	Newhouse Road Roundabout	2	60	2
SALT	A85	Newhouse Road Roundabout (inc Roundabout)	A85 St Fillans	47	50	56
TF	A85	A85 St Fillans	Creiff Road Roundabout	47	50	56
TF	A9	Creiff Road Roundabout	Inveralmond Roundabout	2	60	2
TF	U/C	Inveralmond Roundabout	Inveralmond Road	2	30	4

Total time from start to finish of precautionary treatment (mins) : 56
Total length of carriageway salted (km) : 47
Average width of carriageway (m) : 6.0
Total tonnage used at 40gm/m^2 : 11.28

Figure 8/7a: Carriageway Precautionary Treatment Route 40 – 1

PRECAUTIONARY SALTING ROUTE 40 - 2

DEPOT: PERTH					VEHICLE: 26 TONNES GVW 6x4 SK65 BOU	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Inveralmond Road	Inveralmond Roundabout	2	30	4
SALT	A9 (N/bound)	Inveralmond Roundabout	Pitlochry South Interchange	37	49	45
SALT	A924 / U/C	Pitlochry South Interchange (Start of N/bound off-slip)	Croftinloan North Junction	1	30	2
TF	A9 (S/bound)	Croftinloan North Junction	Croftinloan South Junction	2	60	2
SALT	A9 (S/bound)	A9 Croftinloan Junction	South End Pitlochry Dual	4	60	4
TF	A9	South End Pitlochry Dual	Layby 20, Dalguise Junction	9	77	7
SALT	Layby 20	Layby 20, Dalguise Junction	Layby 20, Dalguise Junction	0.1	10	0.5
TF	A9	Layby 20, Dalguise Junction	North End Bankfoot Dual	6.5	65	6
SALT	A9 (S/bound)	North End Bankfoot Dual	South End Bankfoot Dual	3	50	3.5
TF	A9	South End Bankfoot Dual	Bankfoot N Junction splitter	2.5	50	3
SALT	A9 (S/bound)	Bankfoot N Junction splitter	Bankfoot N Junction splitter	0.3	45	0.5
TF	A9	Bankfoot N Junction splitter	Bankfoot S Junction splitter	0.8	50	1
SALT	A9 (S/bound)	Bankfoot S Junction splitter	Bankfoot S Junction splitter	0.3	45	0.5
TF	A9	Bankfoot S Junction splitter	North End Luncarty Dual	4	45	3
SALT	A9 (S/bound)	North End Luncarty Dual	Inveralmond Roundabout	4	50	5
TF	A9 (N/bound)	Inveralmond Roundabout	N/bound off-slip to Luncarty	3.5	60	3.5
SALT	A9	N/bound off-slip to Luncarty	Battleby Junction	0.3	36	0.5
TF	A9	Battleby Junction	N/bound on-slip from Luncarty	0.1	10	0.5
SALT	A9	N/bound on-slip from Luncarty	N/bound on-slip from Luncarty	0.1	30	inc
TF	A9	N/bound on-slip from Luncarty	Layby 7, Bankfoot northbound	4	69	3.5
SALT	Layby 7	Layby 7, Bankfoot northbound	Layby 7, Bankfoot northbound	0.1	10	0.5

TF	A9	Layby 7, Bankfoot northbound	Turn at B867 Junction, Birnam	8	80	6
TF	A9	B867 Junction, Birnam	B867 Bankfoot North Junction	7	76	5.5
SALT	A9 offslip	Bankfoot N Junction Offslip	Bankfoot N Junction Offslip	0.1	30	inc
TF	B867	Bankfoot N Junction Offslip	Turn at Innewan Gardens Junction	0.4	30	1
SALT	B867	Innewan Gardens Junction	Bankfoot N Junction Onslip	0.4	10	2.5
SALT	A9	Bankfoot N Junction Onslip	Layby 8, Bankfoot southbound	1	40	1
SALT	Layby 8	Layby 8, Bankfoot southbound	Layby 8, Bankfoot southbound	0.1	10	0.5
TF	A9	Layby 8, Bankfoot southbound	B9099 Luncarty Junction	2	80	1.5
TF	B9099	B9099 Luncarty Junction	S/bound on-slip from Luncarty	2.5	50	3
SALT	A9	S/bound on-slip from Luncarty	S/bound on-slip from Luncarty	0.5	30	1
TF	A9 (S/bound)	S/bound on-slip from Luncarty	Inveralmond Roundabout	3	50	4
TF	U/C	Inveralmond Roundabout	Inveralmond Road	2	30	4

Total time from start to finish of precautionary treatment (mins) : 113.5
Total length of carriageway salted (km) : 52.3
Average width of carriageway (m) : 7.5
Total tonnage used at 20gm/m^2 : 15.6

Figure 8/7b: Carriageway Precautionary Treatment Route 40 – 2

PRECAUTIONARY SALTING ROUTE 40 - 3

DEPOT: BALLINLUIG				VEHICLE: 32 TONNES GVW 8x4 SN13 BVE		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A9 (N/bound)	Ballinluig Depot	Ballinluig N/bound Off Slip	1	40	1
SALT	A9 Off Slip	Ballinluig N/bound Off Slip	Ballinluig N/bound Off Slip	0.5	30	1
TF		Ballinluig N/bound Off Slip	Ballinluig N/bound On Slip	0.1	20	0.5
SALT	A9 On Slip	Ballinluig N/bound On Slip	Ballinluig N/bound On Slip	0.5	30	1
TF	A9	Ballinluig N/bound Off Slip	Pitlochry S Interchange	5	60	5
SALT	A9 (N/bound)	Pitlochry S Interchange	N End Pitlochry Dual	0.3	45	0.5
TF	A9	N End Pitlochry Dual	Pitlochry N Interchange	3.5	50	4
SALT	A9 (N/bound)	Pitlochry N Interchange	Pitlochry N Interchange	0.5	45	1
SALT	A9	Pitlochry N Interchange	S End Killiecrankie Dual	1	60	1
SALT	A9 (N/bound)	S End Killiecrankie Dual	N End Killiecrankie Dual	3	60	3
SALT	A9	N End Killiecrankie Dual	B8079 Junction, Essengael	3	50	3.5
SALT	A9	Essengael Junction Off Slip	Essengael Junction Off Slip	0.3	30	0.5
SALT	A9	Essengael	A9 Trinafour	19	50	22
SALT	A9	A9 Trinafour	S End Drumochter Dual	1.2	50	2
TF	A9	S End Drumochter Dual	Essengael Junction Off Slip	17	60	17
TF	A9	B8079 Junction Essengael	N End Killiecrankie Dual	3	45	4
SALT	A9 (S/bound)	N End Killiecrankie Dual	S End Killiecrankie Dual	3	60	3
TF	A9	S End Killiecrankie Dual	Pitlochry N Interchange	1	45	1.5
SALT	A9 (S/bound)	Pitlochry N Interchange Off Slip	Turn at A924 Jn, rejoin A9 on S/bound On Slip	0.5	30	1
TF	A9	Pitlochry North Interchange	Turn at Foss Rd junction	1	45	1.5
TF	A9	Foss Rd junction	Pitlochry N Interchange	1	45	1.5
SALT	A9 (N/bound)	Pitlochry N Interchange Off Slip	Turn at A924 Jn, rejoin A9 on N/bound On Slip	0.5	30	1

TF	A9	Pitlochry N Interchange	Start of layby 41	1	60	1
SALT	Layby	Start of layby 41	End of layby 41	0.1	10	0.5
TF	A9	End of layby 41	Turn at access opposite “Tigh’na’geat” , head south to Start of layby 42	1	40	1
SALT	Layby	Start of layby 42	End of layby 42	0.1	10	0.5
TF	A9	End of layby 42	Pitlochry N Interchange	2	40	3
SALT	A9	Pitlochry N Interchange	N End Pitlochry Dual	3.5	45	5
SALT	A9 (S/bound)	N End Pitlochry Dual	Croftinloan Junction	2.5	60	2.5
TF	A9 (S/bound)	Croftinloan Junction	Start of layby 34	3	50	4
SALT	Layby	Start of layby 34	End of layby 34	0.1	10	0.5
TF	A9 (S/bound)	End of layby 34	South End Pitlochry Dual	1	50	1
TF	A9	South End Pitlochry Dual	Ballinluig Depot	1	40	1

Total time from start to finish of salting operations (mins) : 94
Total length of carriageway salted (km) : 52
Average width of carriageway (m) : 7.5
Total tonnage used at 20gm/m^2 : 15.6

Figure 8/7c: Carriageway Precautionary Treatment Route 40 – 3

PRECAUTIONARY SALTING ROUTE 40 - 4

DEPOT: KINGUSSIE					VEHICLE: 32TONNES GVW 8x4 SN13 BTU	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	B970	Kingussie Depot	A86 Junction Kingussie	0.5	20	1.5
SALT	A86	B970 Junction	A9 Junction Southbound	1.3	30	2.5
SALT	A9	Southbound Slip Road	A9 Kerrow	0.1	30	0.5
SALT	A9	A9 Kerrow	Trinafour	42.6	50	51
SALT	A9 (N/bound)	Trinafour	End of Drumochter Dual N/B	8.2	60	8
TF	A9	End of Drumochter Dual N/B	Crubenmore Lodge	20.2	60	20
SALT	A9 (N/bound)	Crubenmore Lodge	Etteridge	2	60	2
TF	A9	Etteridge	A9 South Junction Kerrow	11	55	13
TF	A9	A86 S Junction Kerrow	B970 Junction	1	30	2
TF	B970	A86 Junction	Kingussie Depot	0.5	20	1.5

Total time from start to finish of precautionary treatment (mins) : 84
Total length of carriageway salted (km) : 52.8
Average width of carriageway (m) : 7.5
Total tonnage used at 40gm/m^2 : 15.84

Figure 8/7d: Carriageway Precautionary Treatment Route 40 – 4

PRECAUTIONARY SALTING ROUTE 40 - 5

DEPOT: KINGUSSIE					VEHICLE: 32 TONNES GVW 8x4 SN13 BTZ	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	B970	Kingussie Depot	A86 Junction Kingussie	0.5	20	1.5
TF	A86	B970 Junction	A9 Junction Northbound	0.8	30	1.5
SALT	A9	Northbound Slip Road	A9 Kerrow	0.2	30	0.5
SALT	A9	A9 Kerrow	S End Dalraddy to Kincraig Dual	5.5	41	8.0
SALT	A9 (N/bound)	S End Dalraddy to Kincraig Dual	N End Dalraddy to Kincraig Dual	7.2	50	8.5
SALT	A9	N End Dalraddy Dual	Slochd Summit	22	41	32
SALT	A9 (N/bound)	Slochd Summit	Tomatin	6	50	7
SALT	A9 (S/bound)	Tomatin	Slochd Summit	6	45	8
TF	A9	Slochd Summit	N End Carrbridge WS 2+1	6	50	7
SALT	A9 (S/bound)	N End Carrbridge WS 2+1	S End Carrbridge WS 2+1	1.6	44	2
TF	A9	S End Carrbridge WS 2+1	N End Dalraddy to Kincraig Dual	14	50	16.5
SALT	A9	N End Dalraddy to Kincraig Dual	S End Dalraddy to Kincraig Dual	7.2	50	8.5
TF	A9	S End Dalraddy to Kincraig Dual	A86 North.Junction Kerrow	5.5	50	6.5
SALT	A86	Southbound Off Slip	Southbound Off Slip	0.1	30	0.5
TF	A86	A9 North.Junction Kerrow	B970 Junction	1	30	2
TF	B970	A86 Junction	Kingussie Depot	0.5	30	1

Total time from start to finish of precautionary treatment (mins) : 105
Total length of carriageway salted (km) : 56
Average width of carriageway (m) : 7.0
Total tonnage used at 40gm/m^2 : 15.68

Figure 8/7e: Carriageway Precautionary Treatment Route 40 – 5

PRECAUTIONARY SALTING ROUTE 40 - 6

DEPOT: KINGUSSIE					VEHICLE: 26 TONNES GVW 6x4 SN13 BNJ	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	B970	Kingussie Depot	A86 Junction Kingussie	0.5	20	1.5
SALT	A86	A86 Junction Kingussie	A86/ A889 Laggan	17.5	50	21
SALT	A889	A889/ A86 Junction	A889/ A9 Junction	13.8	50	16.5
TF	A9	A889/ A9 Junction	A9 Kingussie Junction	24	80	18
TF	A86	A9 Kingussie Junction	A86 Junction Kingussie	1	50	2
TF	B970	A86 Junction Kingussie	Kingussie Depot	0.5	20	1.5

Total time from start to finish of precautionary treatment (mins) : 37.5
Total length of carriageway salted (km) : 32
Average width of carriageway (m) : 6.0
Total tonnage used at 20gm/m^2 : 7.68

Figure 8/7f: Carriageway Precautionary Treatment Route 40 – 6

PRECAUTIONARY SALTING ROUTE 40 - 7

DEPOT: KINGUSSIE				VEHICLE: 32 TONNES GVW 6x4 SN13 BUJ		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	B970	Kingussie Depot	B970 Junction	0.5	20	1.5
TF	A86	B970 Junction	A889 Laggan Junction	17.5	50	21
SALT	A86	A889 Laggan Junction	Spean Bridge	45.5	50	55
TF	A86)	Spean Bridge	B970 Junction	64	50	77
TF	B970	A86 Junction	Kingussie Depot	0.5	20	1.5

Total time from start to finish of precautionary treatment (mins) : 55
Total length of carriageway salted (km) : 45.5
Average width of carriageway (m) : 6.0
Total tonnage used at 40gm/m^2 : 10.92

Figure 8/7g: Carriageway Precautionary Treatment Route 40 – 7

PRECAUTIONARY SALTING ROUTE 40-8

DEPOT: Inverness , Bridgepoint Depot					VEHICLE: 32 TONNES GVW 8x4 SN13 BTY	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Road	Bridgepoint Depot	Longman Roundabout	1	40	2
SALT	A9 (S/bound)	Longman Roundabout (exc Roundabout)	Meall Mhor	15	51	18
SALT	A9	Meall Mhor	Tomatin Junction	6	43	9
TF	A9	Tomatin	Moy WS 2+1	2	60	2
SALT	A9 (N/bound)	Moy WS 2+1	Moy WS 2+1	1	45	2
TF	A9	Moy WS 2+1	Meall Mhor	3	80	3.5
SALT	A9 (N/bound)	Meall Mhor	A82 Longman Roundabout	16	55	18
TF	A9	Longman Roundabout	Raigmore Interchange	1	60	1
SALT	A9	Southbound off Slip Road	Southbound on Slip Road	1	30	2
TF	A9	Raigmore Interchange	B9006 Inshes Junction	1	60	1
SALT	A9	Southbound off Slip Road	B9006 Junction Culloden Road	1	30	2
TF	B9006	A9 Slip Road	Beechwood Roundabout	1	30	2
TF	B8082	Beechwood Roundabout	A9 northbound	1	30	2
SALT	A9	Northbound on Slip Road	Main A9 carriageway	1	30	2
TF	A9	Beechwood	Raigmore Interchange	1	60	1
SALT	A9	Northbound off Slip Road	Northbound on Slip Road (inc Raigmore Roundabout)	1	30	2
TF	A9	Raigmore Interchange	Longman Roundabout	1	60	1

TF	A9 (N/bound)	Longman Roundabout	Bridgepoint Depot	0.5	45	0.5

Total time from start to finish of precautionary treatment (mins)	:	98.5
Total length of carriageway salted (km)	:	42
Average width of carriageway (m)	:	7.5
Total tonnage used at 40gm/m^2	:	12.60

Figure 8/7h: Carriageway Precautionary Treatment Route 40 – 8

PRECAUTIONARY SALTING ROUTE 40-9

DEPOT: Inverness , Bridgepoint Depot				VEHICLE: 32 TONNES GVW 8x4 SN13 BUV		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Road	Bridgepoint Depot	A82 Telford Street Roundabout Inverness	2.5	30	5
SALT	A82	Telford Street Roundabout (including roundabout)	A82 Fort Augustus (B862)	55	50	66
TF	A82	A82 Fort Augustus (B862)	Telford Street Roundabout (including roundabout)	55	55	26
TF	A82	Telford Street Roundabout (including roundabout)	Bridgepoint Depot	2.5	55	50

Total time from start to finish of precautionary treatment (mins) : 66
Total length of carriageway salted (km) : 55
Average width of carriageway (m) : 6.4
Total tonnage used at 40gm/m^2 : 14.08

Figure 8/7i: Carriageway Precautionary Treatment Route 40 – 9

PRECAUTIONARY SALTING ROUTE 40-10

DEPOT: Inverness , Bridgepoint Depot					VEHICLE: 32 TONNES GVW 8x4 COMBI SN13 BNZ	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Drive / Stadium Road	Bridgepoint Depot	Longman Roundabout	1	40	2
SALT	A9 (N/bound)	Longman Roundabout	200m south of Kessock Bridge	0.5	45	0.5
ACETATE	A9 (N/bound)	200m S of Kessock Bridge	North end Kessock Bridge	1.3	56	1.5
SALT	A9 (S/bound)	200m N of Kessock Bridge	Tore Roundabout	7.5	56	8
SALT	A9	Tore Roundabout (inc roundabout)	200m south of Cromarty Bridge	9	48	11
ACETATE	A9	200m south of Cromarty Bridge	Ardullie Roundabout	2.1	45	3
TF	A9	Ardullie Roundabout	Tore Roundabout	11	50	13
SALT	A835	Tore Roundabout	A834 Contin	18	50	22
TF	A835	A 834 Contin	Tore Roundabout	18	50	22
SALT	A9 (S/bound)	Tore Roundabout	200m N of Kessock Bridge	7.5	56	8
ACETATE	A9 (S/bound)	200m N of Kessock Bridge	South end Kessock Bridge	1.3	56	1.5
SALT	A9 (S/bound)	South end Kessock Bridge	Longman Roundabout	0.7	45	0.5
SALT	A82 (W/bound)	Longman Roundabout	Shore Street Roundabout (exc roundabouts)	1.5	30	3
ACETATE	A82 (W/bound)	Shore Street Roundabout	Telford Street Roundabout	0.5	40	1
ACETATE	A82 (E/bound)	Telford Street Roundabout	Shore Street Roundabout	0.5	40	1
SALT	A82 (E/bound)	Shore Street Roundabout	Longman Roundabout (inc. Shore Street, Rose Street, Harbour Road & Longman Roundabouts)	2.5	40	4
TF	Stadium Road / Longman Drive	Longman Roundabout	Bridgepoint Depot	1	40	2

Total time from start to finish of precautionary treatment (mins) : 96
Total length of carriageway salted (km) : 48
Total length of carriageway sprayed (km) : 3.6
Average width of carriageway (m) : 7.0
Total tonnage used at 40gm/m^2 : 13.44
Total volume of potassium acetate used at 0.01l/m^2 270

Figure 8/7j: Carriageway Precautionary Treatment Route 40 – 10

PRECAUTIONARY SALTING ROUTE 40-11

DEPOT: Inverness , Bridgepoint Depot				VEHICLE: 32 TONNES GVW 8x4 SN13 BUA		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Drive / Stadium Drive	Bridgepoint Depot	Longman Roundabout	1.5	45	2
TF	A9	Longman Roundabout	Tore Roundabout	10	60	10
TF	A835	Tore	A834 Contin	18	50	22
SALT	A835	A834 Contin	Ullapool	59	50	71
TF	A835	Ullapool	Tore	79	50	95
TF	A9	Tore	Longman Roundabout	10	60	10
TF	Stadium Road / Longman Drive	Longman Roundabout	Bridgepoint Depot	1	40	2

Total time from start to finish of precautionary treatment (mins) : 71
Total length of carriageway salted (km) : 59
Average width of carriageway (m) : 6.5
Total tonnage used at 20gm/m^2 : 15.34

Figure 8/7k: Carriageway Precautionary Treatment Route 40 – 11

PRECAUTIONARY SALTING ROUTE 40-12

DEPOT: Inverness , Bridgepoint Depot COMBI SM13 BNB				VEHICLE: 32 TONNES GVW 8x4		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	Longman Road	Bridgepoint Depot	Tore Roundabout	11	55	12
TF	A9	Tore Roundabout (inc roundabout)	200m south of Cromarty Bridge	9	48	11
TF	A9	200m south of Cromarty Bridge	Ardullie Roundabout	2.1	45	3
SALT	A9	Ardullie Roundabout (inc Roundabout)	Glastullich Roundabout	17	45	23
SALT	A9	Glastullich Climbing Lane	Glastullich Climbing Lane	1.2	45	1.5
SALT	A9	Glastullich Climbing Lane	B9165 Junction	0.6	45	1
TF	A9	B9165 Junction	Glastullich Climbing Lane	0.6	45	1
SALT	A9	Glastullich Climbing Lane	Glastullich Roundabout	1.2	45	1.5
SALT	A9	Glastullich Roundabout	Glastullich Roundabout	0.25	30	0.5
TF	A9	Glastullich Roundabout	B9165 Junction	1.8	45	2.5
SALT	A9	B 9165 Junction	200m south of Dornoch Firth Crossing	9.6	45	13
ACETATE	A9	200m south of Dornoch Firth Crossing	200m north of Dornoch Firth Crossing	1.3	40	2
SALT	A9	200m north of Dornoch Firth Crossing	The Mound A839 Junction	26	41	38
TF	A9	The Mound A839 Junction	Tore Roundabout	76	63	72
TF	A862	Tore Roundabout	Bridgepoint Depot	11	55	12

Total time from start to finish of precautionary treatment (mins)	:	64
Total length of carriageway salted (km)	:	54
Total length of carriageway sprayed (km)	:	1.3
Average width of carriageway (m)	:	6.5
Total tonnage used at 40gm/m^2	:	14.04
Total volume of potassium acetate used at 0.01l/m^2		97

Figure 8/7l: Carriageway Precautionary Treatment Route 40 – 12

PRECAUTIONARY SALTING ROUTE 40-13

DEPOT: DUNBEATH					VEHICLE: 26 TONNES GVW 6X4 SN13 BNE	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Dunbeath Depot	Dunbeath	1	30	2
TF	A9	Dunbeath	Berriedale	8	38	8
SALT	A9	Berriedale	The Mond A839 Junction	49	50	58
TF	A9	The Mond A839 Junction	Dunbeath Depot	58	50	70

Total time from start to finish of precautionary treatment (mins) : 58
Total length of carriageway salted (km) : 49
Average width of carriageway (m) : 6.0
Total tonnage used at 40gm/m^2 : 11.76

Figure 8/7m: Carriageway Precautionary Treatment Route 40 – 13

PRECAUTIONARY SALTING ROUTE 40-14

DEPOT: DUNBEATH					VEHICLE: 26 TONNES GVW 6X4 SN13 BNF	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Dunbeath Depot	Dunbeath	1	30	2
TF	A9	Dunbeath	Berriedale	8	38	8
SALT	A9	Berriedale	A99 Junction Latheron	15	50	18
SALT	A99	A99 Junction Latheron	Wick	27	50	32
TF	A99/ A9	Wick	Dunbeath Depot	39	55	47

Total time from start to finish of precautionary treatment (mins) : 58
Total length of carriageway salted (km) : 42
Average width of carriageway (m) : 6.4
Total tonnage used at 20gm/m^2 : 10.75

Figure 8/7n: Carriageway Precautionary Treatment Route 40 – 14

PRECAUTIONARY SALTING ROUTE 40-15

DEPOT: DUNBEATH					VEHICLE: 26 TONNES GVW 6X6 WU63 DYV	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Dunbeath Depot	Dunbeath	1	30	2
TF	A9	Dunbeath	A99 Junction Latheron	5	38	8
SALT	A9	A99 Junction Latheron	Scrabster	41	50	50
TF	A9	Scrabster	Dunbeath Depot	47	53	16

Total time from start to finish of precautionary treatment (mins) : 50
Total length of carriageway salted (km) : 41
Average width of carriageway (m) : 6.3
Total tonnage used at 40gm/m^2 : 10.66

Figure 8/7o: Carriageway Precautionary Treatment Route 40 – 15

PRECAUTIONARY SALTING ROUTE 40-16

DEPOT: ARDELVE					VEHICLE: 26 TONNES GVW 6x4 SN13 BNL	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	**A87**	**Ardelve**	**A87 Moll Junction**	**38**	**56**	**41**
SALT	**A87**	**A87 Moll Junction**	**A87 Uig Pier**	**54**	**45**	**70**
TF	**A87**	**A87 Uig Pier**	**Ardelve**	**92**	**50**	**110**

Total time from start to finish of precautionary treatment (mins) : 61
Total length of carriageway salted (km) : 54
Average width of carriageway (m) : 6.0
Total tonnage used at 20gm/m^2 : 12.96

Figure 8/7p: Carriageway Precautionary Treatment Route 40 – 16

PRECAUTIONARY SALTING ROUTE 40-17

DEPOT: ARDELVE					VEHICLE: 32 TONNES GVW 8x4 COMBI SN63 XUL	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A87	Ardelve	A87 Glensheil Battlefield	22	50	26
SALT	A87	A87 Glensheil Battlefield	200m East of Carrick Bridge	35	50	42
ACETATE	A87	200m East of Carrick Bridge	Kyleakin Roundabout	1.6	25	0.5
SALT	A87	Kyleakin Roundabout	A87 Moll Junction	25	50	30
TF	A87	A87 Moll JUnction	Ardelve	39	50	42

Total time from start to finish of precautionary treatment (mins)	:	72
Total length of carriageway salted (km)	:	60
Total length of carriageway sprayed (km)	:	1.6
Average width of carriageway (m)	:	6.0
Total tonnage used at 40gm/m^2	:	14.4

Figure 8/7q: Carriageway Precautionary Treatment Route 40 – 17

PRECAUTIONARY SALTING ROUTE 40-18

DEPOT: ARDELVE					VEHICLE: 32 TONNES GVW 8x4 SN13 BMV	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A87	Ardelve	A87 Glensheil Battlefield	22	56	26
SALT	A87	A87 Glensheil Battlefield	A82 Invermoriston	48	50	58
TF	A82	A82 Invermoriston	A82 Fort Augustus (B862)	10	50	12
SALT	A82	A82 Fort Augustus (B862)	A82 Invergarry	12	50	14
TF	A87	A82 Invergarry	Ardelve	67	50	80

Total time from start to finish of precautionary treatment (mins) : 83
Total length of carriageway salted (km) : 60
Average width of carriageway (m) : 6.0
Total tonnage used at 40gm/m^2 : 14.4

Figure 8/7r: Carriageway Precautionary Treatment Route 40 – 18

PRECAUTIONARY SALTING ROUTE 40-19

DEPOT: CORPACH, FORT WILLIAM					VEHICLE: 32 TONNES GVW 8x4 SN13 BVC	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
SALT	A830	Corpach	A82 Junction Victoria Bridge	4	48	5
SALT	A82	A830 Junction	A86 Junction Spean Bridge	12	50	14
SALT	A82	A86 Junction Spean Bridge	A87 Junction Invergarry	27	50	32
SALT	A87	A87 Junction Invergarry	A87 Bunloyne	21	50	25
TF	A87	A87 Bunloyne	A87 Junction Invergarry	21	50	25
TF	A82	A87 Junction Invergarry	A830 Junction	39	50	80
TF	A830	A830 Junction	Corpach	4	55	5

Total time from start to finish of precautionary treatment (mins) : 76
Total length of carriageway salted (km) : 63
Average width of carriageway (m) : 6.0
Total tonnage used at 20gm/m^2 : 15.12

Figure 8/7s: Carriageway Precautionary Treatment Route 40 – 19

PRECAUTIONARY SALTING ROUTE 40-20

DEPOT: CORPACH, FORT WILLIAM				VEHICLE: 32 TONNES GVW 8x4 SN13 BUJ		
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
SALT	A830	Corpach	Mallaig	62	50	74
TF	A830	Mallaig	Corpach	62	50	74

Total time from start to finish of precautionary treatment (mins) : 74
Total length of carriageway salted (km) : 62
Average width of carriageway (m) : 6.2
Total tonnage used at 20gm/m^2 : 15.60

Figure 8/7t: Carriageway Precautionary Treatment Route 40 – 20

PRECAUTIONARY SALTING ROUTE 40-21

DEPOT: CORPACH, FORT WILLIAM					VEHICLE: 32 TONNES GVW 8x4 SN13 BUO	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A830	Corpach	A82 Junction Victoria Bridge	4	48	5
TF	A82	A82 Junction Victoria Bridge	Nevis Bridge Roundabout	2	50	3
TF	A82	Nevis Bridge Roundabout	A828 Roundabout	22	50	27
SALT	A82	A828 Roundabout (inc Roundabout)	A82 Glen Etive	23	50	28
SALT	A82	A82 Glen Etive	A82 Tyndrum	31	50	36
TF	A82	A82 Tyndrum	A830 Junction	76	50	67
TF	A830	A82 Junction Victoria Bridge	Corpach	4	50	5

Total time from start to finish of precautionary treatment (mins) : 65
Total length of carriageway salted (km) : 54
Average width of carriageway (m) : 6.2
Total tonnage used at 40gm/m^2 : 13.14

Figure 8/7u: Carriageway Precautionary Treatment Route 40 – 21

PRECAUTIONARY SALTING ROUTE 40-22

DEPOT: OBAN					VEHICLE: 32 TONNES GVW 8x4 SN13 BVA	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	McCaig Road	Glenshalloch Ind Estate	Junction A816	1	30	2
TF	A816	Junction A816	Argyll Square	2	50	2
TF	A85/A82/A85	Argyll Square	End of two lane section (Gateway)	0.3	9	2
TF	A85	End of two lane section (Gateway)	A828 Connel	7	55	8
SALT	A828	A828 Connel	A82 Ballachulish Roundabout	42	50	50
SALT	A82	A828 Ballachulish Roundabout	A82 West End Roundabout	20	50	24
SALT	A82	A82 West End Roundabout Start of Dual N/Bound	A82/ A830 Roundabout	3	50	4
TF	A82	A82/ A830 Roundabout Turn at Roundabout	A82 Belford Road Start of Dual Southbound	2.5	50	3
SALT	A82	A82 Belford Road Start of Dual Southbound	A82 West End Roundabout	1	50	1
TF	A82/ A828	A82 West End Roundabout	A828 Connel	64	55	77
TF	A85	A828 Connel	Argyll Square	7	55	7
TF	A816	Argyll Square	Junction A816	2	30	2
TF	McCaig Road	Junction A816	Glenshalloch Ind Estate	1	30	2

Total time from start to finish of precautionary treatment (mins) : 72
Total length of carriageway salted (km) : 66
Average width of carriageway (m) : 6.0
Total tonnage used at 20gm/m^2 : 15.84

Figure 8/7v: Carriageway Precautionary Treatment Route 40 – 22

PRECAUTIONARY SALTING ROUTE 40-23

DEPOT: OBAN					VEHICLE: 32 TONNES GVW 8x4 SN13 BUW	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	McCaig Road	Glenshalloch Ind Estate	Junction A816	1	30	2
TF	A816	Junction A816	Argyll Square	2	50	2
TF	A85	Argyll Square	Start of one way section (Gateway)	0.5	30	1
SALT	A85	Start of one way section (Gateway)	Dunollie Road Junction	0.5	10	3
SALT	A85	Dunollie Road Junction, Oban	Argyll Square (excluding roundabout)	0.8	16	3
TF	A85/A82/A85	Argyll Square	End of two lane section (Gateway)	0.3	9	2
SALT	A85	End of two lane section (Gateway)	Tyndrum	56	50	67
TF	A85	Tyndrum	Glenshalloch Ind Estate	61	50	73

Total time from start to finish of precautionary treatment (mins) : 75
Total length of carriageway salted (km) : 58
Average width of carriageway (m) : 6.2
Total tonnage used at 40gm/m^2 : 14.38

Figure 8/7w: Carriageway Precautionary Treatment Route 40 – 23

PRECAUTIONARY SALTING ROUTE 40-24

DEPOT: KILLIN					VEHICLE: 26 TONNES GVW 6x4 SN13 BOF	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A827	Killin	A85 Junction Lix Toll	3	22	8
TF	A85	A85 Junction Lix Toll	A85 Lochearnhead	8	50	9
TF	A85	A85 Lochearnhead	A85 St Fillans (South Loch Junction)	12	50	14
SALT	A85	A85 St Fillans (South Loch Junction)	A85 Lochearnhead	12	50	14
SALT	A85	A85 Lochearnhead	A85 Junction Lix Toll	8	50	9
SALT	A85	Lix Toll	A82 Junction Crianlarich	19	46	25
SALT	A82	A82 Junction Crianlarich	A82 Tyndrum	8	50	9
TF	A82	A82 Tyndrum	A85 Junction Crianlarich	8	50	9
TF	A85	A82 Junction Crianlarich	A85 Junction Lix Toll	19	57	20
TF	A827	Lix Toll	Killin	3	22	8

Total time from start to finish of precautionary treatment (mins) : 57
Total length of carriageway salted (km) : 43
Average width of carriageway (m) : 6.3
Total tonnage used at 40gm/m^2 : 10.83

Figure 8/7x: Carriageway Precautionary Treatment Route 40 – 24

PRECAUTIONARY SALTING ROUTE 40-25

DEPOT: KILLIN					VEHICLE: 26 TONNES GVW 6x4 SN13 BNZ	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A827	Killin	A85 Junction Lix Toll	3	22	8
TF	A85	A85 Junction Lix Toll	A85 Lochearnhead	8	50	9
SALT	A84	A84 Lochearnhead	A84 Kildean	44	50	53
TF	A84	A84 Kildean	A84 Lochearnhead	44	50	53
TF	A85	A85 Lochearnhead	A85 Junction Lix Toll	8	50	9
TF	A827	Lix Toll	Killin	3	22	8

Total time from start to finish of precautionary treatment (mins) : 53
Total length of carriageway salted (km) : 44
Average width of carriageway (m) : 6.3
Total tonnage used at 20gm/m^2 : 11.08

Figure 8/7y: Carriageway Precautionary Treatment Route 40 – 25

PRECAUTIONARY SALTING ROUTE 40-26

DEPOT: KILLIN					VEHICLE: 26 TONNES GVW 6x6 WU63 CHN	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A827	Killin	A85 Junction Lix Toll	3	22	8
TF	A85	Lix Toll	A82 Junction Crianlarich	19	46	25
SALT	A83	A82 Crianlarich	A82 Junction Tarbet	27	50	32
SALT	A83	Tarbet	Rest and Be Thankful	13	50	21
TF	A83	Rest and Be Thankful	A82 Junction Tarbet	13	55	15
TF	A83	Tarbet	A82 Junction Crianlarich	27	50	32
TF	A85	A82 Junction Crianlarich	A85 Junction Lix Toll	19	57	20
TF	A827	Lix Toll	Killin	3	22	8

Total time from start to finish of precautionary treatment (mins) : 53
Total length of carriageway salted (km) : 40
Average width of carriageway (m) : 6.5
Total tonnage used at 40gm/m^2 : 10.40

Figure 8/7z: Carriageway Precautionary Treatment Route 40 – 26

PRECAUTIONARY SALTING ROUTE 40-27

DEPOT: INVERARAY					VEHICLE: 32 TONNES GVW 8x4 SN13 BUH	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Inveraray Depot	A83 Inveraray	1	30	1
TF	U/C	A83 Inveraray	A83 Auchnagoul Junction	8	50	15
SALT	A83	A83 Auchnagoul Junction	Rest and Be Thankful	30	50	36
TF	A83	Rest and Be Thankful	A82 Junction Tarbet	13	55	15
SALT	A82	A83 Junction Tarbet	A811 Junction Tullichewan Roundabout, (exc Roundabout but inc northbound exit to Tullichewan roundabout and roundabout at B831 Arden Junction)	27	55	29
TF	A82	Alexandria	Northbound entry to Arden roundabout	4	55	4
SALT	A82	South end Arden roundabout northbound entry	North end Arden roundabout northbound exit	0.1	30	1
TF	A82	Arden	South end A817 Junction Island (Loch Lomond Golf Club)	3	55	20
SALT	A82	South end A817 Junction Splitter Island	North end A817 Junction Splitter Island	0.5	30	1
TF	A82	A817 Junction	Tarbet	18	55	23
TF	A83	Tarbet	RABT Bus Turning Circle	13.3	60	14
SALT	B828	A83/ B828 Junction	RABT Bus Turning Circle	0.25	20	1
TF	A83	RABT Bus Turning Circle	Inveraray	24.3	60	25
TF	U/C	Inveraray	Inveraray Depot	1	30	2

Total time from start to finish of precautionary treatment (mins) : 106
Total length of carriageway salted (km) : 58
Average width of carriageway (m) : 6.3
Total tonnage used at 20gm/m^2 : 14.61

Figure 8/7aa: Carriageway Precautionary Treatment Route 40 – 27

PRECAUTIONARY SALTING ROUTE 40-28

DEPOT: INVERARAY					VEHICLE: 32 TONNES GVW 8x4 SN13 BNA	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	A83	Inveraray Depot	A83 Auchnagoul Junction	6	50	7
SALT	A83	A83 Auchnagoul Junction	Kennacraig Ferry Terminal Junction (inc all 3 roundabouts in Lochgilphead)	63	50	76
TF	A83	Kennacraig	Inveraray	68	50	82
TF	U/C	Inveraray	Inveraray Depot	1	30	2

Total time from start to finish of precautionary treatment (mins) : 76
Total length of carriageway salted (km) : 63
Average width of carriageway (m) : 6.0
Total tonnage used at 20gm/m^2 : 15.12

Figure 8/7ab: Carriageway Precautionary Treatment Route 40 – 28

PRECAUTIONARY SALTING ROUTE 40 - 29

DEPOT: MACHRIHANISH, CAMPBELTOWN					VEHICLE: 32 TONNES GVW 8x4 SN13 BVF	
Action	**Road**	**From**	**To**	**Distance (km)**	**Average speed (km/hr)**	**Time (mins)**
TF	U/C	Depot	A83 Machrihanish Jct	1.5	30	3
TF	A83 (S/bound)	A83 Machrihanish Jct	A83 Lochend Street	4.5	50	4
TF	Lochend Street	A83 Lochend Street	Kinloch Road	0.2	30	1
TF	Kinloch Road	Kinloch Road	Royal Hotel Roundabout	0.6	30	1
SALT	Hall Street	Royal Hotel Roundabout	S/ bound Hall Street Dual Carriageway Campbeltown Ferry Terminal	0.3	30	1
SALT	Hall Street	Turn Campbeltown Ferry Terminal	S/ bound Hall Street Dual Carriageway Campbeltown Ferry Terminal	0.3	30	1
SALT	Kinloch Road	Royal Hotel Roundabout	Lochend Street	0.6	30	1
SALT	Lochend Street	Kinloch Road	A83/ Lochend Street JCT	0.2	30	1
SALT	A83 N/ bound	A83/ Lochend Street JCT	Kennacraig	51	48	63
TF	A83	Kennacraig	Gartnagrenach	3	60	3
SALT	A83	Gartnagrenach	Clachan Hill	5	50	6
TF	A83	Clachan Hill	A83 Machrihanish Jct	39	60	39
TF	U/C	A83 Machrihanish Jct	Depot	1.5	30	3

Total time from start to finish of precautionary treatment (mins) : 76
Total length of carriageway salted (km) : 57.6
Average width of carriageway (m) : 6.2
Total tonnage used at 40gm/m^2 : 14.28

Figure 8/1b: Carriageway Precautionary Treatment Route 40 - 29

8.2 Contingency plans for alternative access to precautionary treatment routes

BEAR Scotland have put in place arrangements and resources which will ensure that carriageway precautionary treatments will be provided for sections of Trunk Roads on the Unit where normal access is prevented due to weather or other related incidents.

These contingency arrangements provide resources for precautionary treatments using an alternative access. Front Line Winter Service Plant is strategically located to enable routes most at risk from restricted access to be treated, should, for whatever reason, precautionary treatment not be able to be carried out in accordance the Route Cards shown in Figure 8/6 and 8/7.

For the majority of the Unit there are alternative routes available to enable treatment routes to be completed by the de-icing vehicle allocated to that particular route. Roads on the Unit that BEAR Scotland consider are most at risk from restricted access, due to weather or other related incidents, are those with no local suitable alternative routes. Figure 8/8 identifies such routes on the Unit and describes where resources will be available to enable alternative access.

Road No.	Description	Resource
A9	Latheron to A839 Mound Junction	Front Line Winter Service Plant at Thurso.
A835	Tore to Ullapool	Front Line Winter Service Plant at Ullapool.
A87	Ardelve to Uig	Front Line Winter Service Plant at Portree (A855 provides alternative access to Uig)

Figure 8/8: Roads most at risk from restricted access

8.3 Locations of De-icing Material Loading Points

Our depots at Dunbeath, Brora (Strathsteven), Bridgepoint, Ardelve, Fort William (Corpach), Oban, Kingussie, Killin, Inveraray, Perth, Ballinluig, Ballahulish, Thurso, Ullapool, Arisaig and Machrihanish are all de-icing material loading points. Figure 8/12 shows the locations of these depots.

8.4 Precautionary Treatment Routes Using Pre-Wetted Salt

BEAR Scotland proposes to use pre-wetted salt on all precautionary carriageway treatment routes for de-icing.

8.5 Precautionary Treatment Routes of Category A Footways, Footbridges and Cycle Facilities

Precautionary treatments will be carried out on Category A footways, as identified in Figure 8/9, when surface temperatures are forecast to fall to less than or equal to plus 1°C or when snow conditions are expected.

Precautionary treatment on Category A footways in Crieff, Callander, Inverness and Dunbeath will be carried out as a separate operation to carriageway precautionary treatments utilising Snowex SL 80 Brine Sprayers based at Perth, Killin, Inverness (Bridgepoint) and Dunbeath depots. The minimum spread rate for treating footways, footbridges and cycleways will be 20 g/m² of brine with a minimum concentration of 23 percent.

Location No.	Route	Location	Details of Footway		Length (m)
			Start	Finish	
10	FW1	A82 Inverness	10898/05 (Rose Street Roundabout)	10899/05 (Harbour Rd Roundabout)	1100
28	FW2	A84 Callander	16215/38 ch 115 (Menteith Crescent)	16220/04 ch 120 (Ancaster Road)	825
39	FW3	A85 Crieff	13915/67 ch 0 (Dollerie Street)	13915/80 ch 130 (Burrell Street)	738
54	FW4	A9 Thurso & Scrabster	10530/05 ch 225 (Janet Street)	10530/11 ch 50 (Olrig Street, Thurso)	335

Figure 8/9: Locations of Category A Footways, Footbridges and Cycleways

To ensure consistent precautionary treatments are applied to carriageways and footways, footway precautionary treatment routes will receive the same spread rate as the adjacent carriageway and in any case a minimum spread rate of 20 g/m², as shown in Figure 4/2.

		Spread Rate (g/m²)			
Footway Route No.	FW1	20	20	30	40
Adjacent Carriageway Treatment Route	20-8	10	20	30	40
Footway Route No.	FW2	20	20	30	40
Adjacent Carriageway Treatment Route	20-17	10	20	30	40
Footway Route No.	FW3	20	20	30	40
Adjacent Carriageway Treatment Route	20-1	10	20	30	40
Footway Route No.	FW4	20	20	30	40
Adjacent Carriageway Treatment Route	20-11	10	20	30	40

Figure 8/10: Carriageway and Footway Precautionary Treatment Consistency

Footway precautionary treatments routes are listed in Figure 8/11. Spread patterns will be adjusted to suit the footway width.

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	De-icing Length (km)	Average Speed (kph)	Route Time (mins)	Route to Depot (km)	Average Width of Route (m)	Route Tonnage at 20g/m^2 (tonne)	Treatment Type
FW1	Inverness	A82 Inverness 10898/05 (Rose Street Roundabout) to 10899/05 (Harbour Rd Roundabout)	1	2	1.1	2	30	2	2.4	0.04	Brine
FW2	Killin	A84 Callander 16215/38 ch 115 (Menteith Crescent) to 16220/04 ch 120 (Ancaster Road)	38	36	0.825	2	25	38	3.8	0.06	Brine
FW3	Perth	A85 Crieff 13915/67 ch 0 (Dollerie Street) to 13915/80 ch 130 (Burrell Street)	26	24	0.738	2	22	26	2.2	0.02	Brine
FW4	Dunbeath	A9 Scrabster & Thurso 10530/05 ch 225 (Janet Street)10530/11 ch 50 (Olrig Street, Thurso)	47	36	0.335	2	15	47	2.2	0.016	Brine

Figure 8/11: Footway Precautionary Treatment Routes

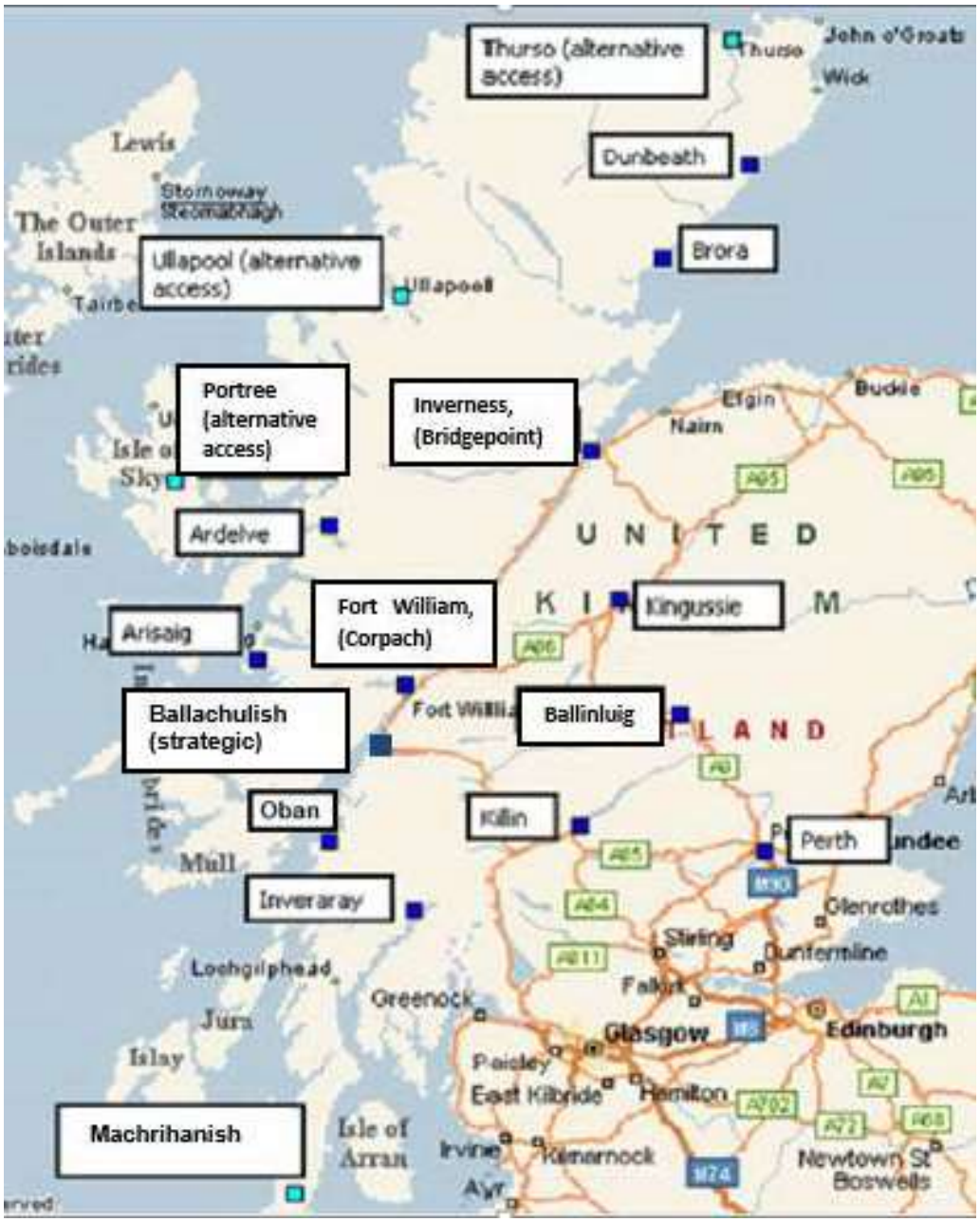


Figure 8/12: Location of Depots

9 SNOW AND ICE CLEARANCE

9.1 Snow Clearing

All Front Line, Reserve and Additional Winter Service Plant, apart from snow blowers, will be equipped with snow ploughs to effectively clear ice and snow. Details of Service Winter Plant are provided in Section 12 of this document. Ploughing routes can be found in Section 13

Figure 9/1 sets out the conditions and de-icing spread rates for snow and ice clearance of carriageways.

Road Surface Condition	Clearance Matrix		
	Spreading (g/m²)	Ploughing	Blowing
	Salt		
Ice formed	20 to 40	No	No
Snow covering of less than 30mm	20	Yes	No
Snow covering exceeds 30mm	20 to 40	Yes	No
Snow accumulations due to prolonged snowfall	20 to 40	Yes (continuous)	Where applicable
Hard packed snow/ice less than 20mm thick	20 to 40 (successive treatments)	No	No
Hard packed snow/ice	salt/abrasive (successive)	No	No

Figure 9/1: Conditions and de-icing spread rates for snow and ice clearance of carriageways.

Where hard packed snow and ice not exceeding 20mm thick has formed, and the air temperature is above minus 5°C, removal will be achieved by successive spreading of de-icing material. Below minus 5°C or where the snow or ice is more than 20mm thick great care will be taken as the use of de-icing material alone can result in an uneven and slippery surface. A single sized abrasive aggregate of particle size of 6mm, or 5mm sharp sand and having low fines content will be added to the de-icing material on a 1:1 ratio. Reversion to the use of de-icing material only will be made as soon as possible. Abrasive aggregates will be considered as a supplement in urban areas where de-icing material alone would provide an unacceptably slippery surface.

During prolonged periods of snowfall at locations where the use of salt for de-icing is prohibited, ploughing will be continuous followed by repeated applications of de-icing chemical. If snow becomes hard packed consideration will be given to applying 5mm sharp sand to aid traction while snow clearing operations are being carried out.

9.2 Description of Arrangements and Resources for Snowfall

BEAR Scotland will, so far as is reasonably practicable, ensure sufficient resources are mobilised to prevent snow or ice from remaining on Trunk Roads, and put into place specific arrangements to ensure that these resources are mobilised to ensure that the timescales for snow clearance laid out in Figure 9/2 are achieved.

The WSDO will determine the requirements to mobilise sufficient resources and fit ploughs from the 2-5 day weather forecast. Winter Service shifts and the preparation of de-icing and ploughing equipment will be instructed by the WSDO, subject to prior approval by the WSM.

Details of snow blowers, loading shovels, de-icing vehicles fitted with plough blades and other Winter Service Plant provided directly by BEAR Scotland and through Supply Chain Arrangements can be found in Section 12 of this document.

Condition Criteria	Category A Patrol Routes		Non Category A Patrol Routes	
	Dual Carriageways & Motorways		Dual Carriageways	Wide Single 2+1 (WS 2 + 1) & Single Carriageways
	Number of Existing Lanes		Number of Existing Lanes	
	2	3 or More	2	1 or 2 (WS 2 + 1)
	Minimum number of lanes in each direction free from ice and snow as far as is reasonably practicable		Minimum number of lanes in each direction free from ice and snow as far as is reasonably practicable (except where snow gates)	
Snow at any time	1	2	1	1
Following clearance of minimum lanes or the cessation of snow fall all lanes are to be clear of snow	6 hours	6 hours	12 hours	12 hours

Figure 9/2: Timescales for Snow Clearance

9.3 Road Closure Procedure Including Use of Snow Gates

When Police Scotland, in consultation with the WSDO, consider that weather conditions have made a road unsafe to vehicular traffic, arrangements will be made with Police Scotland to close the road as detailed in paragraph 4.2.6.

9.4 Prolonged Snowfall Strategy

During prolonged periods of snowfall, ploughing will be continuous from the onset of snow to prevent a build-up of snow and compaction by traffic. Ploughing will continue until the Trunk Roads are clear of snow and ice. Reserve and Additional Winter Service Plant will be used, as necessary, to supplement Front Line Winter Service Plant in snow conditions. Extra resilience is added in the A82 Glencoe area with the provision of a snow depot at Ballachulish.

When planning and carrying out snow clearance, BEAR Scotland will pay particular attention to the layout of the carriageway in terms of the overall number of lanes and the location of entrance and exit slip lanes. Snow clearance of slip roads will be co-ordinated with main carriageway clearance, and a clear path kept open between those entry and exit points where frequent lane changes are necessary.

For dual carriageways and wide single carriageway roads, echelon ploughing will be carried out utilising two snow plough vehicles moving in the same direction, one behind the other in adjacent lanes.

Irregular windrows caused by ploughing passes, especially those that weave from one lane to another are dangerous, and will be avoided, as they may tempt drivers to overtake by squeezing into the partly cleared lane. Lanes will be completely cleared, such that any windrows of snow remaining form a smooth and continuous line with no sudden encroachments into the cleared path. Clearance of snow from contiguous and remote laybys will be carried out once the main carriageway, junction areas and crossovers have been cleared of snow.

In extremis conditions BEAR Scotland will supply bulk bag salt supplies to communities to enable self help where approved by Transport Scotland

Care will be taken to avoid damage to road surfaces, road studs, roadside furniture and structures. At roadworks, traffic management equipment must not be disrupted. An accumulation of ploughed snow creating a ramp adjacent to safety fences and concrete barriers will be avoided.

Where conventional ploughing or snow ploughing is not possible, for example:

- in built up areas,
- in exceptional circumstances when the snow on the road is deep and cannot be removed by conventional ploughing or snow blowing
- when de-icing treatment over packed snow is likely to provide an unacceptable surface,
- when the traffic is insufficient to disperse the snow,

BEAR Scotland will lift, remove and dispose of snow and ice and/or utilise snow blowers, with the snow being directed onto adjacent land (where BEAR Scotland has obtained the prior agreement of the landowner and the Scottish Environmental Protection Agency). Such operations will be followed by de-icing treatment.

When snowploughing or snow blowing operations are undertaken care will be taken that snow does not build up across:

- railway tracks or against gates
- bridges
- parapets
- fences and safety fences
- walls and other boundaries

Speeds of ploughing vehicles will be regulated, particularly at features such as underbridges where snow could be thrown over the bridge parapet, and adjacent to the central reserve where snow could be pushed into the opposing carriageway. When ploughing snow, other vehicles will not be overtaken unless stationary.

Recognising that additional resources may be required for echelon ploughing in snow conditions, Figure 9/3 details snow ploughing routes.

BEAR Scotland will immediately notify the Traffic Scotland Operator by telephone following a major incident which has caused or will cause significant disruption to traffic flow

Plough Routes

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Comments
P40-1	Perth	A85 Perth - St Fillans	4	6	47	50	56	51	Killin	6.00	
P40-2	Perth	A9 Perth - Pitlochry - Perth	2	4	52	55	114	1	Ballinluig	7.50	Supported by PA-1 to carry out echelon ploughing
P40-3	Ballinluig	A9 Pitlochry – Trinafour	1	1	40	50	94	21	Kingussie	7.50	Supported by PA-2 to carry out echelon ploughing
P40-4	Kingussie	A9 Kingussie – Trinafour	1	2	51	50	110	2	Perth	7.50	Supported by PA-3 to carry out echelon ploughing
P40-5	Kingussie	A9 Kingussie – Dalraddy Dual - Tomatin - Dalraddy Dual - Kingussie	2	3	58	55	109	3	Inverness	7.00	Supported by PA-4 to carry out echelon ploughing
P40-6	Kingussie	A86 Kingussie – A889 Jct A889 Laggan – A9 Dalwhinnie Junction	1	1.5	32	50	37.5	25.5	Kingussie	6.00	
P40-7	Kingussie	A86 Laggan Junction - Spean Bridge	18	22.5	45.5	50	57.0	64	Fort William	6.00	
P40-8	Inverness	A9 Inverness – Tomatin	1	2	42	50	98	28	Kingussie	7.50	Supported by PA-5 to carry out echelon ploughing
P40-9	Inverness	A82 Inverness – Fort Augustus (B862)	3	5	55	50	66	55	Fort William	6.40	Supported by PB-3

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Comments
P40-10	Inverness	A82 Longman – Telford St A9 Inverness – Tore – Ardullie (Kessock and Cromarty Bridges) A835 Tore – Contin	1	2	48	50	96	1	Ullapool	7.00	
P40-11	Inverness	A835 Contin – Ullapool	28	30	59	50	71	89	Ullapool	6.50	Supported by PB-2
P40-12	Inverness	A9 Ardullie – The Mound (Dornock Bridge)	22	24	54	50	64	87	Dunbeath	6.50	
P40-13	Dunbeath	A9 Berriedale – The Mound	9	10	49	50	58	58	Wick	6.00	Supported by PB-1
P40-14	Dunbeath	A9 Berriedale - Latheron A99 Latheron – Wick	9	10	42	50	50	39	Wick	6.40	Supported by PB-1
P40-15	Dunbeath	A9 Latheron – Scrabster	6	8	41	50	50	47	Wick	6.30	Supported by PB-1
P40-16	Ardelve	A87 Moll Junction – Uig	38	41	54	50	61	92	Portree	6.00	
P40-17	Ardelve	A87 Glenshiel Battlefield – Moll Junction (Carrick and Skye Bridges)	22	26	60	50	72	39	Portree	6.00	

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Comments
P40-18	Ardelve	A87 Glenshiel Battlefield – Bunloyne A887 Bunloyne - Invermoriston A82 Fort Augustus - Invergarry	22	26	60	50	83	67	Fort William	6.00	Supported by PB-4
P40-19	Corpach, Fort William	A830 Corpach – Lochybridge A82 Lochybridge – Invergarry A87 Invergarry – Bunloyne	1	2	63	50	76	64	Ardelve	6.00	Supported by PB-5
P40-20	Corpach Fort William	A830 Corpach - Mallaig	1	2	62	50	74	63	Mallaig	6.20	
P40-21	Fort William	A82 Ballachulish - A82 Tyndrum	28	34	54	50	65	80	Killin	6.20	
P40-22	Oban	A828 Connel – A82 Ballachullish Roundabout – A82 Lochybridge	10	12	65	50	72	75	Corpach	6.00	
P40-23	Oban	A85 Oban - Tyndrum	1	2	58	50	75	61	Killin	6.20	Supported by PB-7
P40-24	Killin	A85 St Fillans - Lochearnhead - Lix Toll - Crainlarich A82 Crianlarich - Tyndrum	22	27	43	45	57	30	Oban	6.30	Supported by PB-6
P40-25	Killin	A84 Lochearnhead - Kildean	11	17	44	50	53	55	Perth	6.30	
P40-26	Killin	A82 Crianlarich – Tarbet	23	28	40	45	53	63	Inveraray	6.50	Supported by PB-8

Route No.	Depot	Description	Depot to Route (km)	Time to Route (mins)	Salting Length (km)	Aver Speed (km/hr)	Route Time (mins)	Route to Depot (km)	Alternative Access	Average Width of Route	Comments
		A83 Tarbet – Rest & Be Thankful									
P40-27	Inveraray	A83 Achnagoul Junction – Rest & Be Thankful A82 Tarbet – Alexandria	6	8	58	50	106	56	Killin	6.30	Supported by PB-8
P40-28	Inveraray	A83 Achnagoul Junction - Kennacraig	6	8	63	50	76	69	Kennacraig	6.00	Supported by PB-8
P40-29	Machrihanish	Campbeltown Ferry Terminal to Kennacraig	7	9	57.6	50	76	50	Inveraray	6.2	

Figure 9/3: Ploughing Routes

9.5 Treatment Strategy for Footways, Footpaths and Cycle Facilities

The response times for snow and ice clearance for footways, footbridges and cycle facilities will be as follows:

- Category A: clear all snow and ice by 08:00 hours or within two hours of snow ceasing to fall during the period 06:00 hours to 18:00 hours.
- Category B: clear all snow and ice by 08:00 hours or within two hours of snow ceasing to fall during the period 06:00 hours to 18:00 hours.
- Category C: clear all snow and ice by 17:00 hours the following week day (if the following day is a Saturday or Sunday then the area shall be cleared on the next week day i.e. Monday).

Footway tractors will be utilised for all Category A, B and C footway snow and ice clearance across the Unit. Operatives will be placed on standby to clear snow and ice from footways where this is anticipated, with mobilisation of footway crews being based on network condition reports received by the Duty Supervisor from winter operatives on the network.

Reactive snow and ice clearance within the Highland Council area will be supplemented by additional plant owned and operated by the Council.

Clearance of snow from footways will also be undertaken using a dedicated footway blower capable of removing up to 70 tonnes of snow per hour. This has been supplied as part of a trial in conjunction with Transport Scotland and as a mobile resource will be able to be allocated across the network as required to optimise usage.

There are no salt bins associated with footways, footpaths and cycle facilities within the North West Unit.

For reactive snow and ice clearance of all categories of footways, footbridges and cycleways the spread rates in Figure 9/4 will apply.

	Spread Rate (g/m²)
During snow clearance	20
Following clearance of ice and snow	20

Figure 9/4: Conditions and de-icing spread rates for snow and ice clearance of footways.

9.6 Arrangements for procurement of additional resources in exceptional Severe Weather

BEAR Scotland has plant and labour resources detailed in this Plan which will be adequate for reasonably expected winter conditions, including periods of prolonged heavy snowfall. This includes the facility for reallocation of treatment vehicles to parts of the network which are under extreme pressure during severe conditions. Plant resources are detailed in Appendix A figures A/1 (Front Line) and A/3 (Reserve).

However, in exceptional circumstances of Unit wide severe and prolonged weather conditions, such as exceptionally heavy snowfall with drifting, which may close roads,

additional resources will be procured to assist in reopening roads in the shortest practical time. BEAR Scotland will achieve this with Supply Chain Partners agreements and contact with national resources through the JV partner companies.

Appendix A, Figure A/4 lists additional Winter Service Plant available for the Winter Service for carriageways, footways, footbridges and cycle facilities either directly under the control of BEAR Scotland, or through contingency arrangements with third parties, to deal with snow of a depth of more than 100 mm, and any other winter weather conditions which cannot be dealt with by Front Line or Reserve Winter Service Plant.

Procurement of additional resources is pre-planned and arrangements have been made with Supply Chain Partners, local contractors and plant hire companies, and these arrangements (including 24 hour contact details) will be provided to all the staff involved in winter service management. Where Local Authority Winter Service Plant is used these vehicles will normally be manned by Local Authority employees. Agreements and protocols have been established with Local Authorities to ensure that the Contract requirements are met. These may include for both Local Authority and BEAR Scotland Service Plant to be manned by employees of either organisation.

In circumstances where additional resources are deemed necessary, the WSDO will refer to the 24 hour contact call out list and mobilise the most appropriate plant for the location and nature of the circumstances.

9.7 Plans Showing the Location of the Footways, Footbridges and Cycle Facilities in Categories A, B, C and D

The maps included in Figure 14/3 in Section 14 shows the location of Category A, B C and D footways, footbridges and cycle facilities within the North West Unit.

10. DE-ICING MATERIALS

10.1 Type

De-icing materials will primarily comprise rock salt and potassium acetate. In extreme conditions, such as when temperatures drop below levels at which sodium chloride is effective, BEAR Scotland will consider the use of alternative de-icing materials such as Safecote, in accordance with the guidance on use of such materials which has been provided by the Director and subject to his written consent. In such an event, BEAR Scotland will provide the Director with a method statement on how the alternative de-icing material is to be used and liaise closely with SEPA in the event of its usage.

10.2 Specification

Potassium Acetate used for de-icing Operations will comply with the Ministry of Defence Specification 68-118 (De-icing/Anti-Icing Fluid for Run Ways).

Potassium Acetate will be applied to the locations given in Figure 10/1, including 200 metres in advance of each bridge in both directions.

Location	Depot	Carriageway Precautionary Treatment Route applying Potassium Acetate (See Figure 8/4 and 8/5)
A9 Kessock Bridge	Inverness	Route 20-7 / 40-10 (dual purpose de-icing vehicle)
A82 Friars Bridge & Approaches		
A9 Cromarty Bridge	Inverness	Route 20-10 / 40-12 (dual purpose de-icing vehicle)
A9 Dornoch Bridge		
A87 Carrich Bridge	Ardelve	Route 20-14 / 40-17 (dual purpose de-icing vehicle)
A87 Skye Bridge		

Figure 10/1: Potassium Acetate Treatment Locations

Precautionary treatment using potassium acetate will be spread at a rate of 0.01 litres/m2.

Salt for de-icing, including brining salt for use in pre-wetting, will be 6.3mm grading particle size complying with BS 3247 and treated with an anti-caking agent.

For pre-wetting salt, the percentage of salt brine added to salt for spreading Operations will be 30% of the total weight of spread material, and the saturated salt in the brine solution before combination will be between 20% and 23%. Brine will be produced in purpose built salt saturators sited at Dunbeath, Inverness (Bridgepoint), Kingussie, Ardelve, Fort William (Corpach), Oban, Perth, Killin and Inveraray depots. These saturators will automatically produce and store brine of the correct concentration and transfer it to saddle tanks located on the spreaders by means of an integrated pump. Daily checking of brine concentration in the saturators will be carried out by Depot Supervisors by means of a refractometer, and records held electronically. The saturators will be serviced on an annual basis.

Typical analyses from our salt suppliers are shown in Figures 10/2 and 10/3.

Chemical Analysis	BS3247	SSC typical
	percent	percent
Total Chlorides expressed as NaCl	90.0 minimum	91.0
Insolubles	7.0 maximum	6.5
$CaSO_4$	2.5 maximum	2.5
H_2O	4.0 maximum	

Particle size distribution	BS3247	SSC typical
Mesh size (mm)	% retained	% retained
+6.30	0	0
+5.60		0
+2.36	20 – 70	30
+1.18		0
+0.30	80 minimum	87

Reagent Addition	Typical (ppm)
Anti-caking agent	80ppm

Figure 10/2: Typical Specification for Dry Salt Supplied by Salt Sales Co

Chemical Analysis	BS3247	PS typical
	percent	percent
Total Chlorides expressed as NaCl	90.0 minimum	98.5
Insolubles	7.0 maximum	0.5
$CaSO_4$	2.5 maximum	1.0
H_2O	4.0 maximum	1.0

Particle size distribution	BS3247	PS typical
Mesh size (mm)	% retained	% retained
+6.30	0	0
+5.60		1
+2.36	20 – 70	35
+1.18		63
+0.30	80 minimum	90

Reagent Addition	Typical (ppm)
Anti-caking agent	30ppm

Figure 10/3: Typical Specification for Brining Salt Supplied by Peacock Salt

10.3 Storage and Testing Methods

BEAR Scotland will undertake environmental risk assessments of all depots to identify measures necessary to ensure that SEPA guidelines and requirements are adhered to. Materials will be stored in a dry condition and in accordance with current planning and environmental regulations.

As de-icing salt is removed from storage areas, a positive slope will be maintained to avoid danger to operatives and Winter Service Plant from the collapse of stockpile cliff walls. BEAR Scotland will ensure that de-icing material stockpiles are managed and safeguarded effectively and those stockpiles do not become contaminated with foreign matter likely to cause damage to Winter Service Plant and affect other Trunk Road users, by storing all salt on either a concrete or bituminous base.

At all loading points, the moisture content of the stored salt will not exceed 4%. This will be achieved by either storing the salt under a covered structure, or by covering the stockpiles utilising the 'Drystore' sheeting system, which is a patented system featuring an integral air vent and weighting system, and which has proved to be a safe and effective means of managing moisture content of salt stockpiles.

Moisture content at existing salt stocks will be measured at monthly intervals throughout each Winter Period. As a minimum, the salt will be tested at the base of the stockpile. The results will be recorded on an electronic data base which will be available for access at any time by the Director and PAG. Should the moisture content of salt used for de-icing exceed 4%, spread rates will be increased by 100% for spread rates up to and including 20gm/m2.

Within 10 days of new salt deliveries, salt will be tested in accordance with BS3247:2011 at a UKAS accredited laboratory operated by The Highland Council (Inverness), Tayside Contracts (Perth) or Weeks (Glasgow), and results recorded to ascertain:

- Moisture content (1 test per 500 tonnes)
- Particle size distribution (1 test per 500 tonnes)
- Chloride content (1 test per 1500 tonnes)
- Soluble sulphate compounds (1 test per 1500 tonnes)

To ensure that BEAR Scotland does not receive salt which does not comply with BS 3247, all our salt suppliers will be ISO 9001 accredited. In the event that a supplier delivers de-icing salt which is non-compliant, the following procedure will be implemented:

- The supplier will be notified as soon as possible
- The severity and type of failure will be analysed
- If the failure can be rectified (i.e. moisture content) then a solution will be sought with the supplier
- If the failure cannot be corrected, arrangements will be made with the supplier to deliver further supplies of de-icing salt and remove the supplies which failed.

Salt stored in depots found, through monthly testing, to be non-compliant with BS 3247, will be quarantined in a separate stockpile and will not be used for treating the Unit.

10.4 Suppliers

BEAR Scotland has developed arrangements with national de-icing material suppliers:

- Salt Sales Co., Fort Road, Kilroot, Carrickfergus, Co. Antrim BT38 9BT
- Peacock Salt, Jura Terminal, North Harbour, Ayr, KA8 8AE
- OMEX Environmental Ltd, Bardney Airfield, Tupholme, Lincoln LN3 5TP
- Safecote Ltd, Winnington Hall, Northwich, Cheshire, CW8 4DU

10.5 Stock Levels

Salt stocks will be continuously monitored and managed. During the winter period, a detailed weekly return of salt received and salt used will be made by each WSS to the WSM, utilising a standard form. During snow conditions a daily report of salt usage will be submitted. This continuous monitoring will ensure salt stocks are replenished timeously. Salt stocks will be surveyed midway through, and at the end of, each season to verify the actual tonnages remaining at each depot, and allow any necessary stock reconciliation to be made.

The procurement of salt will be on a call off basis and triggered by minimum stock levels at each depot. The WSM is responsible for the ordering of salt. The salt is predominantly shipped in by our supplier and constant dialogue ensures that when ships are available, including 'ship sharing' with Highland and Argyll and Bute Councils, salt is delivered.

During the winter period, salt stock monitoring reports will be made to the Director using the salt reporting system portal at http://winter.atkinsglobal.com/Scotland/ on the first working day of each month.

When requested by the Director, daily or weekly salt monitoring reports will be provided.

The minimum cumulative stock levels of de-icing material which will be held throughout the winter season are detailed in Figures 10/4 and on a depot by depot basis in Figure 10/6 Minimum Depot Salt Stock Levels and Figure 10/7 Brine Production Storage.

Year	Minimum stock level
October 2017	32,600

Figure 10/4: Minimum Salt Stock Levels

Quantities of alternative de-icing materials stored at Kingussie and Bridgepoint, Inverness depots are detailed in Figure 10/5.

Type	Location	Type	Min (Tonnes) at 1st October
Safecote Supamix	Kingussie	IBCs	23000 ltrs
Safecote Supamix	Inverness (Bridgepoint)	IBCs	10000 ltrs

Figure 10/5: Safecote Stock Levels

Type	Location	Type	Min (tonnes) 1st October 2017
Dry Salt 6.3mm	Dunbeath	Covered structure	2,500
Dry Salt 6.3mm	Bridgepoint, Inverness	Covered structure	6,000
Dry Salt 6.3mm	Corpach, Fort William	Covered structure	3,500
Dry Salt 6.3mm	Kingussie	Covered structure	4,000
Dry Salt 6.3mm	Ardelve	Covered structure	1,500
Dry Salt 6.3mm	Killin	Covered structure	2,600
Dry Salt 6.3mm	Oban	Covered structure	2,000
Dry Salt 6.3mm	Ballinluig	Covered structure	1,000
Dry Salt 6.3mm	Inveraray	Covered structure	2,500
Dry Salt 6.3mm	Machrihanish	Covered Structure	2,500
Dry Salt 6.3mm	Perth	Covered structure	3,000
Dry Salt 6.3mm	Ballachulish	Sheeted	600
Dry Salt 6.3mm	Thurso	Sheeted	150
Dry Salt 6.3mm	Ullapool	Sheeted	150
Dry Salt 6.3mm	Portree	Sheeted	150
Dry Salt 6.3mm	Arisaig	Sheeted	150
Dry Salt 6.3mm	Kennacraig	Sheeted	150
Dry Salt 6.3mm	Chryston	Sheeted	150

Figure 10/6: Minimum Depot Salt Stock Levels

Location	Type (saturator / storage)	Capacity (litres)	Min (litres)
Dunbeath	saturator/storage	15,000 / 15,000	19,883
Bridgepoint, Inverness	saturator/storage	15,000 / 15,000	26,264
Corpach, Fort William	saturator/storage	15,000 / 15,000	18,979
Kingussie	saturator/storage	15,000 / 15,000	22,146
Ardelve	saturator	15,000	14,276
Killin	saturator	15,000	14,452
Oban	saturator	3,200	2,439
Ballinluig	saturator	3,200	2,439
Inveraray	saturator	15,000	13,548
Perth	saturator	30,000	30,000
Machrihanish	saturator	10,000	9,000
Thurso	storage only	3,000	2,287
Ullapool	storage only	3,000	2,287
Portree	storage only	3,000	2,287
Arisaig	storage only	3,000	2,287
Kennacraig	storage only	3,000	2,287
Chryston	storage only	3,000	2,287

Figure 10/7: Brine Production and Storage

11. STRATEGIC SALT STOCKS

Where ordered by the Director, BEAR Scotland will procure and store strategic salt stocks by:

- seeking prices from all salt suppliers to ensure value for money,
- arranging haulage from delivery point to strategic salt depots,
- managing and maintaining the stockpile,
- maintaining accurate stock records,
- monitoring stock using an approved weighbridge facility,
- rotating stock to avoid deterioration,
- liaison with third parties to determine requirements for supply of strategic salt,
- arranging loading and haulage of strategic salt to third party depots, and
- invoicing third parties for all costs related to the provision of strategic salt.

Strategic salt stocks which have not been utilised at the end of each Winter Service Period will be transferred to the nearest BEAR Scotland depot for operational use during the next Winter Service Period.

New supplies of strategic salt will be procured to replace such transferred stock, where ordered by the Director.

12. WINTER SERVICE PLANT

12.1 Front Line Winter Service Plant

Front Line Winter Service Plant will undertake precautionary treatments and snow and ice clearance to the total width of carriageways including slip roads, hard strips, turning lanes, central reserve crossovers, lay-bys, bus bays and the like.

All front line plant will be fitted with brine saddle tanks to allow the use of pre-wetted salt.

Frontline spreaders will be fitted with air and road surface temperature measuring equipment that links back through our Locatu system.

Front line Winter Service Plant for carriageways is detailed in Appendix A, Figure A/1.

Front Line Winter Service Plant for footways, footbridges and cycling facilities is detailed in Appendix A, Figure A/2.

12.2 Reserve Winter Service Plant

Appendix A, Figure A/3 lists Reserve Winter Service Plant permanently available within the Unit for treatment of carriageways, footways, footbridges and cycle facilities in the event of unavailability of Front Line Winter Service Plant, and to supplement front line plant during snow conditions.

All reserve plant will be fitted with brine saddle tanks to allow the use of pre-wetted salt.

12.3 Additional Winter Service Plant

Appendix A, Figure A/4 lists additional Winter Service Plant available for the Winter Service for carriageways, footways, footbridges and cycle facilities either directly under the control of BEAR Scotland, or through contingency arrangements with third parties, to deal with snow of a depth of more than 100 mm, and any other winter weather conditions which cannot be dealt with by Front Line or Reserve Winter Service Plant.

Where Local Authority Winter Service Plant is used these vehicles will normally be manned by Local Authority employees. Agreements and protocols have been established with Local Authorities to ensure that the Contract requirements are met. These may include for both Local Authority and BEAR Scotland Service Plant to be manned by employees of either organisation.

Mobilisation of additional resources is pre-planned and arrangements have been made with Supply Chain Partners, local contractors and plant hire companies, and these arrangements (including 24 hour contact details) will be provided to all the staff involved in winter service management.

A list of Additional Plant is detailed at Appendix A, Figure A/4. In circumstances where additional resources are deemed necessary, the WSDO will refer to the 24 hour contact call out list and mobilise the most appropriate plant for the location and nature of the circumstances.

12.4 Loading Winter Service Plant

Details of loading winter service plant available within the Unit for loading front line, reserve and additional winter Service plant are shown in Appendix A, Figure A/5.

12.5 Calibration Arrangements and Procedures

In September and January of each Annual Period, the Operating Company shall calibrate all equipment for spreading de-icing material:

(i) in accordance with the requirements of British Standard 1622:1989, or
(ii) where British Standard 1622:1989 does not provide for the calibration of any de-icing spreading equipment, in a manner proposed in writing by the Operating Company and consented to in writing by the Director. As a minimum the Operating Company shall provide details of the Winter Service Plant supplier's calibration method to the Director, and
(iii) in accordance with the requirements of the specific material being used.

September testing shall comply with the requirements of tests 'A' and 'B' and January testing shall comply with the requirements of test 'B' of British Standard 1622:1989.

Re-calibration and testing shall be carried out after repairs to the spreading equipment and at other times when necessary to ensure the accuracy of de-icing material spreading.
All calibration and re-calibration shall be independently carried out and certified. Calibration certificates shall be held in accordance with the requirements of the Winter Service Plan and the Operating Company's Management System.

12.6 Calibration Certification

Calibration of spreaders will be carried out in accordance with the National Winter Service Research Group document ‘Best Practice Guidance for Spreading Salt’.

All calibrations will be carried out in BEAR Scotland depots. The certification for these calibrations will be held in the Central Office, in accordance with our documented Quality Management System. Copies of the calibration certificates will be held in the relevant depot for the vehicle. Calibration Certificates will be available for inspection by the Director and the Performance Audit Group at any time.

Re-calibration and testing will be carried out after repairs to the spreading equipment and at other times when necessary to ensure the accuracy of de-icing material spreading.

13. Compounds Depots and Facilities

A schedule of compounds, depots and facilities covering the network within the North West Unit is included in Figure 13/1.

Compound, Depot/Facility	Owner	Postal Address	Purpose	Access Arrangements	Contact Details	Facilities
Dunbeath	Dunbeath Partnership	Markethill Houstry Road Dunbeath Caithness KW6	Operational and Winter Depot	A9 24 hours	Depot Supervisor	Office Welfare/ Mess
Bridgepoint, Inverness	William Gray Limited	Bridgepoint House, 23a Longman Drive, Inverness, IV1 1SU	Operational and Winter Depot	A82 and A9 24 hours	Depot Supervisor	Office Welfare/ Mess
Ardelve	The Highland Council	Ardelve Industrial Estate Kyle Highland IV40 8DY	Operational and Winter Depot	A87 24 hours	Depot Supervisor	Office Welfare/ Mess
Corpach, Fort Willaim	Clydeport Properties Limited	Corpach Depot, Fort William, Highland, PH33	Operational and Winter Depot	A830 24 hours	Depot Supervisor	Office Welfare/ Mess
Kingussie	The Highland Council	Market Lane, Kingussie Highland PH21	Operational and Winter Depot	A86 24 hours	Depot Supervisor	Office Welfare/ Mess
Ballinluig	Robert Laird Contractors	Tulliemet Farm, Ballinluig, Pitlochry PH9 0NN	Winter Depot	A9 24 hours	Perth Depot Supervisor	Welfare/ Mess
Killin	Stirling Council	Station Road Depot, Killin, Stirling FK21	Operational and Winter Depot	A827/A85 24 hours	Depot Supervisor	Office Welfare/ Mess
Oban	Strathclyde Scaffolding Services	Strathclyde Scaffolding, Glenshellach, Oban PA34	Operational and Winter Depot	A85 24 hours	Depot Supervisor	Office Welfare/ Mess
Inveraray	Argyll and Bute Council	Chalmers Court, Inveraray, Argyl and Bute PA32	Operational and Winter Depot	A83 24 hours	Depot Supervisor	Office Welfare/ Mess
Perth	Morris Leslie Plant Limited	Inveralmond Rd, Inveralmond Industrial, Estate, Perth, Perth and Kinross PH1 3TY	Central Office, Operational and Winter Depot	A9 24 hours	Depot Supervisor	Office Welfare/ Mess
Machrihanish	MACC Developments	Machrihanish Airbase Campbeltown Argyll PA28 6NU	Operational and Winter Depot	A83 24 hours	Depot Supervisor	Office Welfare/ Mess

Compound, Depot/Facility	Owner	Postal Address	Purpose	Access Arrangements	Contact Details	Facilities
Ballachulish	The Highland Council	Ballachulish Depot West Laroch Ballachulish Inverness-shire PH49 4JP	Strategic Salt Depot	A82 24 hours	Corpach Depot Supervisor	Welfare/ Mess
Thurso	The Highland Council	Council Depot, Janetstown, Thurso, Caithness	Winter Alternative Access Point	A836/A9	Dunbeath Depot Supervisor	
Ullapool	The Highland Council	Ullapool Depot, Ullapool Highland	Winter Alternative Access Point	A835 24 hours	Bridgepoint Depot Supervisor	
Portree	The Highland Council	Portree Depot, Portree, Highland	Winter Alternative Access Point	A87 24 hours	Ardelve Depot Supervisor	
Arisaig	The Highland Council	Arisaig Depot, Arisaig, Highland	Winter Alternative Access Point	A830 24 hours	Corpach Depot Supervisor	
Chryston	Aggregate Industries	Auchengeich Road, Glasgow, North Lanarkshire G690JL	Operational and Winter Depot	M80/M8/A82 24 hours	Depot Supervisor	Office Welfare/ Mess
Errol	Morris Leslie Limited	Errol Brickworks, Errol, Perth and Kinross PH2 7 RB	Strategic Salt Store	24 hours	Winter Service Manager	

Figure 13/1: Schedule of Compounds, Depots and Facilities

14. Maps Drawings and Graphical Information

14.1 Maps

Maps indicating treatment routes and other winter maintenance facilities are shown in this section as follows:

(i) Precautionary Treatment Routes for Carriageways are shown in Figure 14/1.

(ii) Precautionary Treatment Routes for Footways, Footbridges and Cycleways are shown in Figure 14/2.

(iii) Reactive Treatment Routes for Footways, Footbridges and Cycleways are shown in Figure 14/3.

(iv) Winter Service Patrol Routes are shown in Figure 14/4.

(v) Road Sensor locations including sensor types are shown in Figure 14/5.

(vi) Snow gate locations of are shown in Figure 14/6.

(vii) Snow fence locations are shown in Figure 14/7.

(viii) Shelter belt locations are shown in Figure 14/8.

(ix) Snow pole locations are shown in Figure 14/9.

(x) Snow, ice and hidden message sign locations are shown in Figure 14/10.

(xi) Salt bins locations are shown in Figure 14/11.

14/1Figure 13/1a: 20g Precautionary Salting Routes Dunbeath Depot

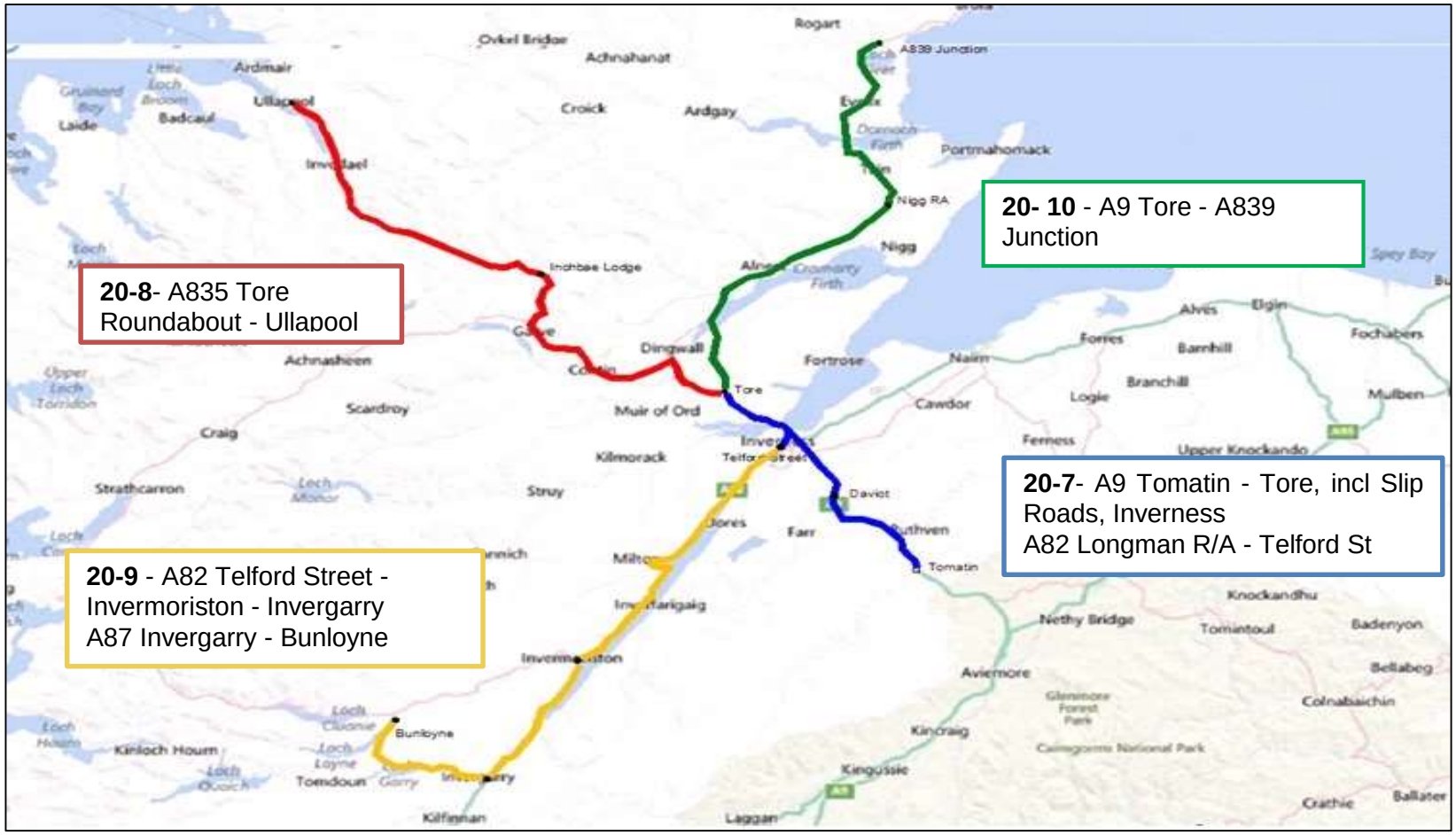


Figure 14/1b: 20g Precautionary Salting Routes, Bridgepoint Depot (Inverness)

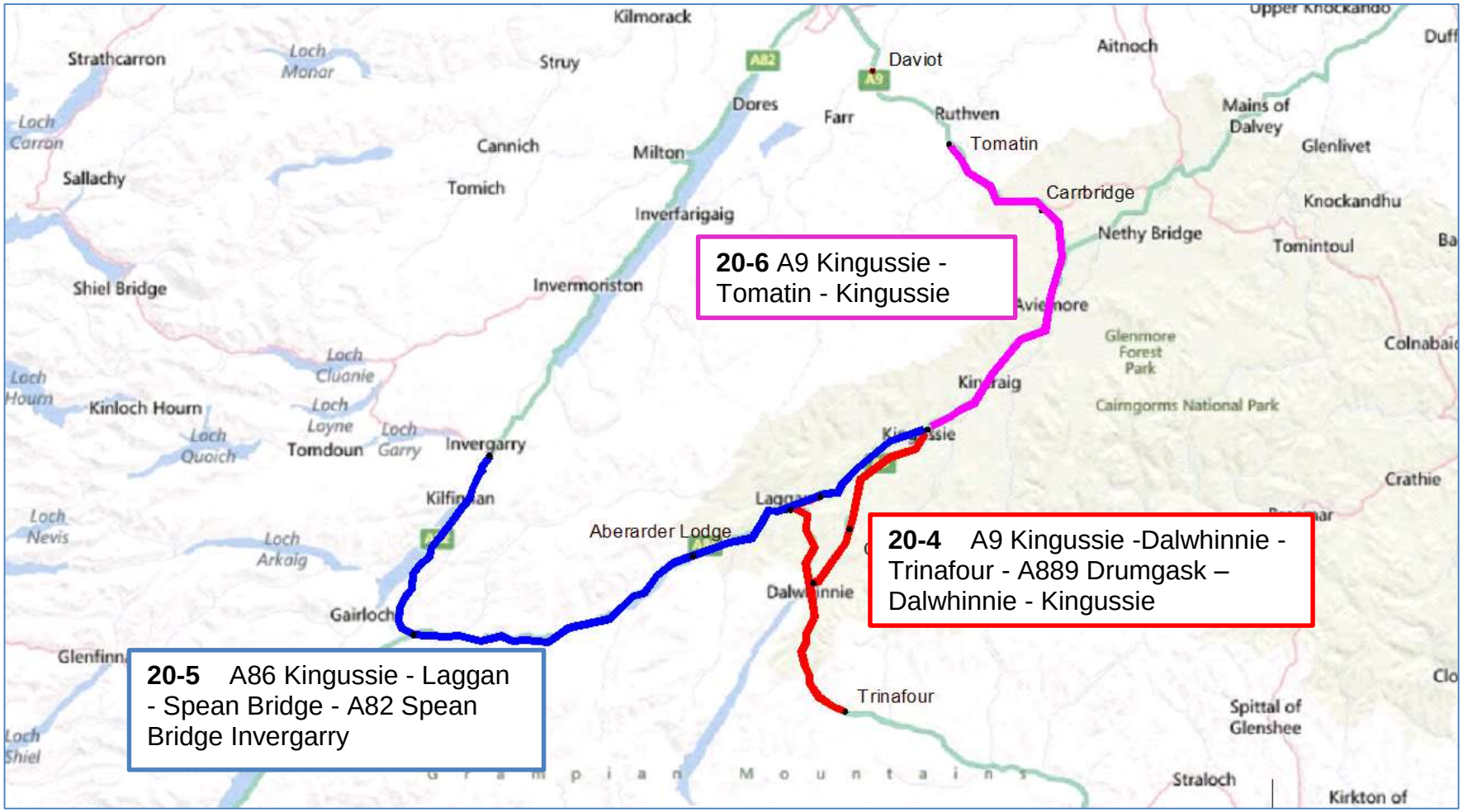


Figure 13/1c: 20g Precautionary Salting Routes Kingussie Depot

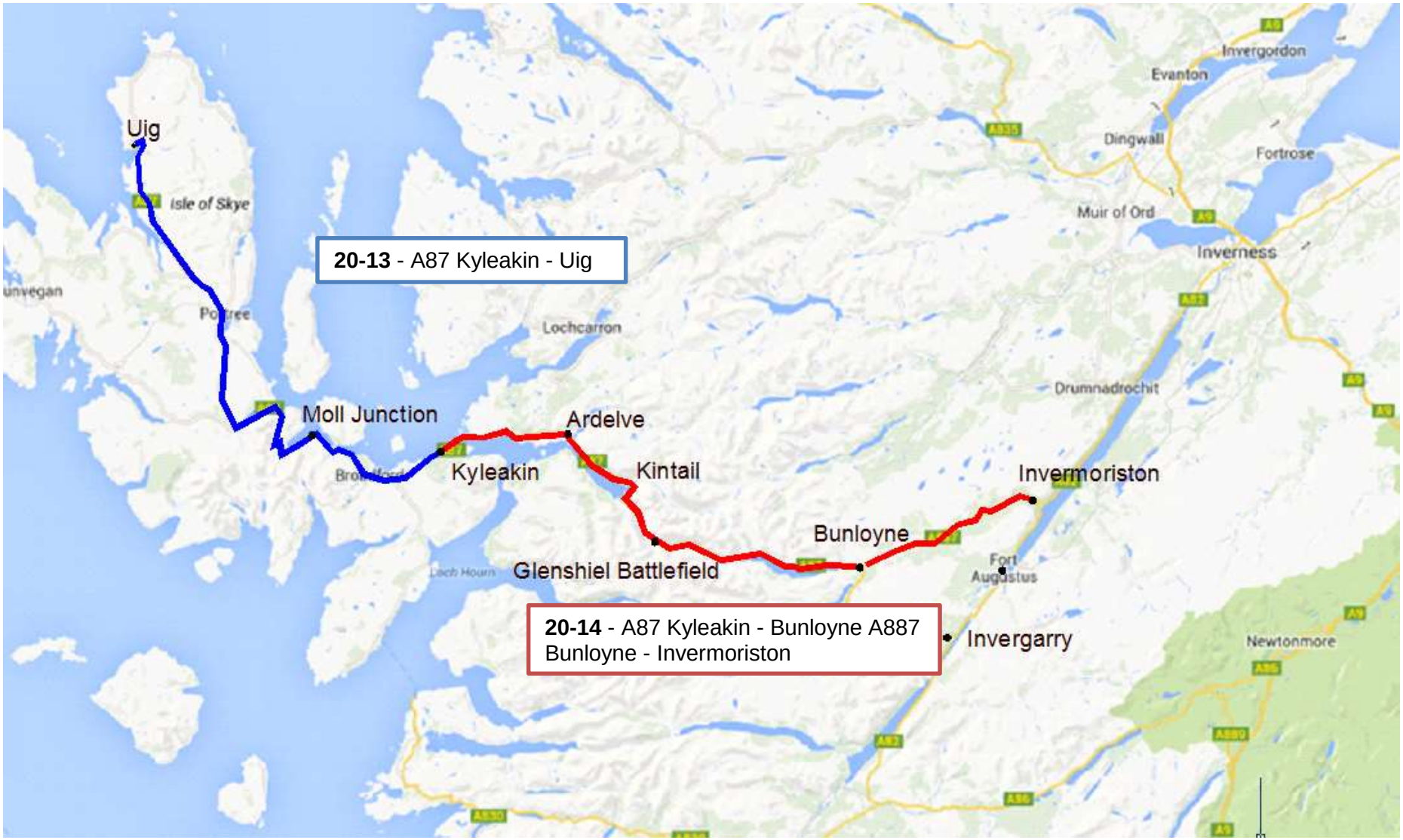


Figure 14/1d: 20g Precautionary Salting Routes Ardelve Depot

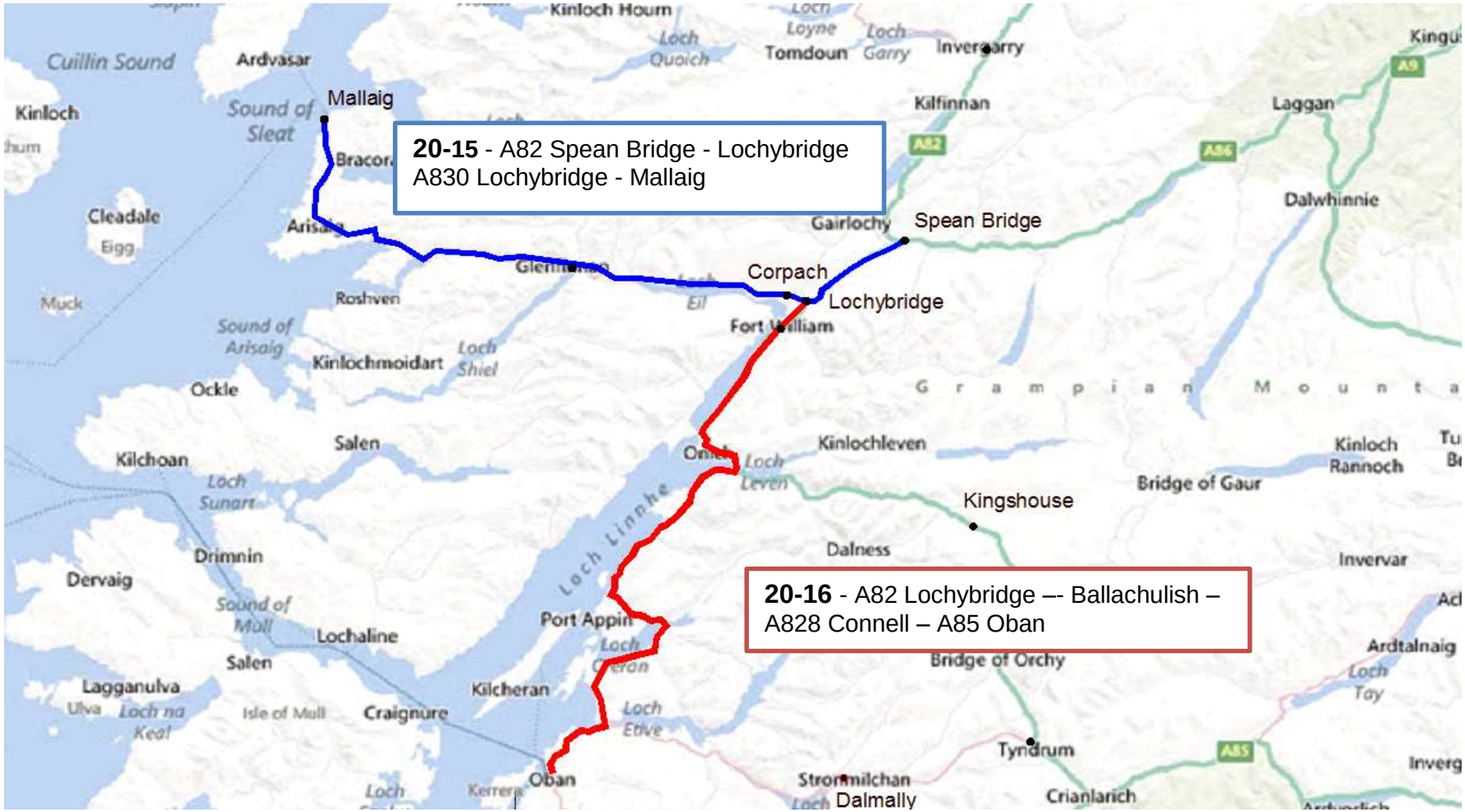


Figure 14/1e: 20g Pre Salting Routes Corpach Depot (Fort William) Depot

Figure 14/1f: 20g Precautionary Salting Routes Oban Depot

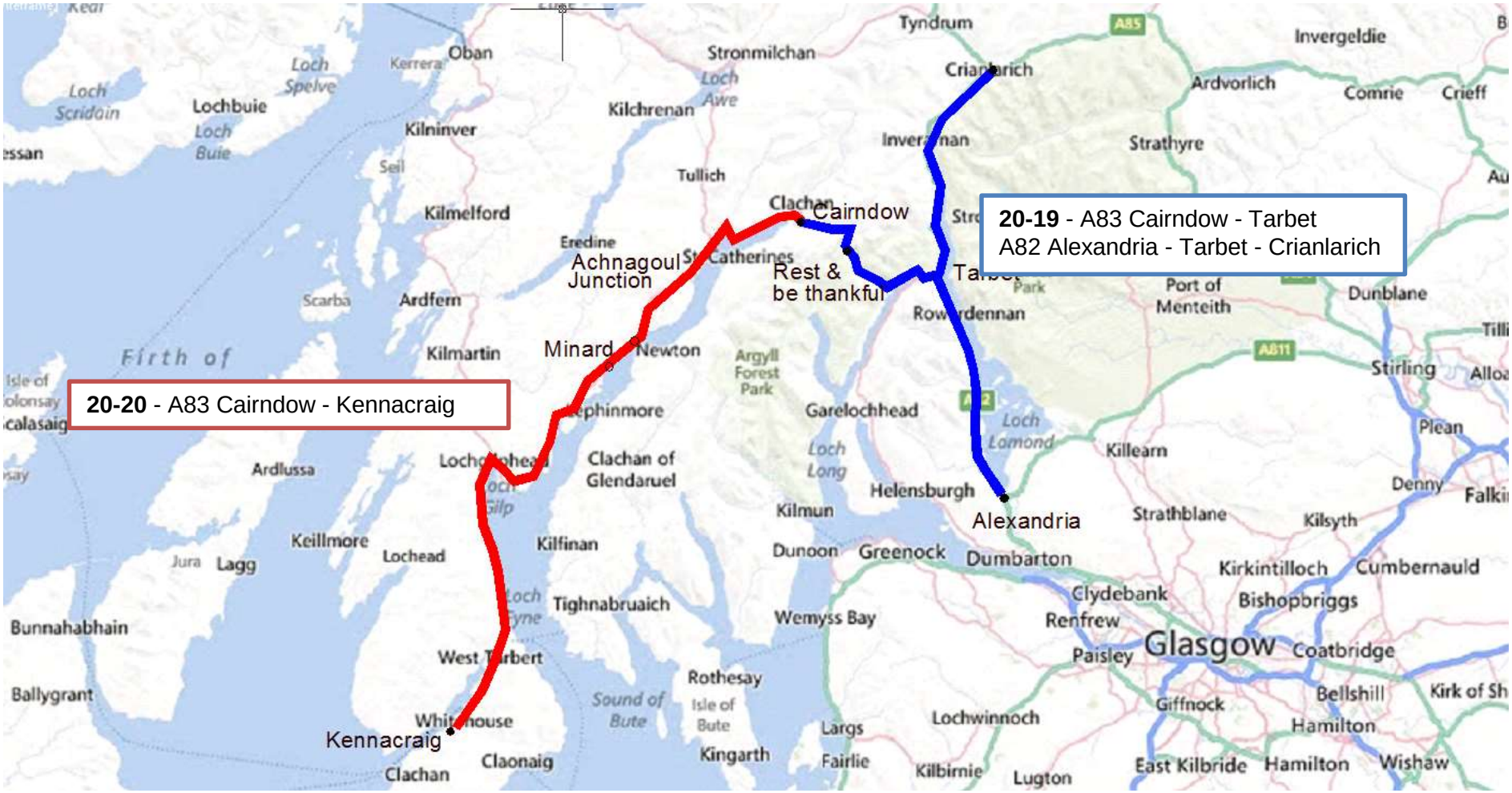
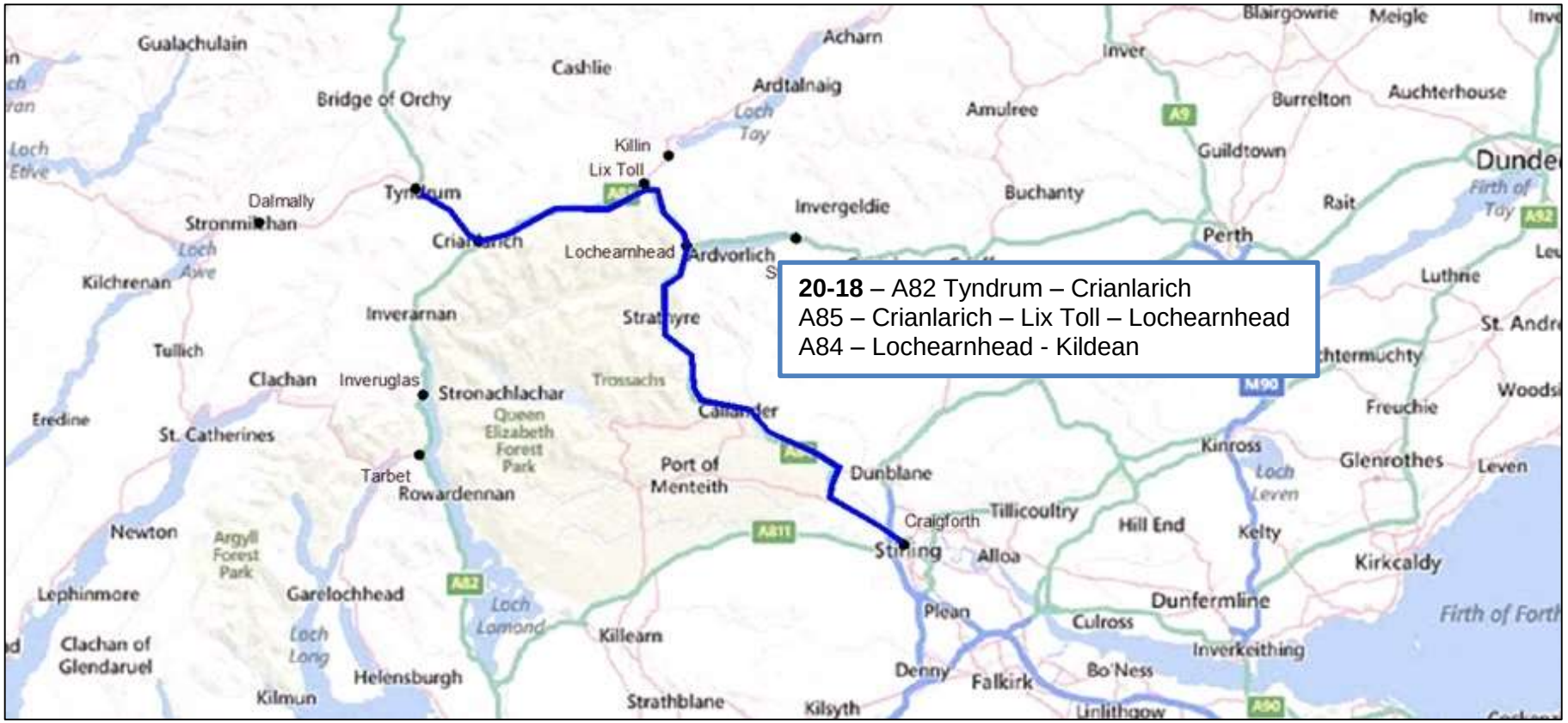


Figure 14/1g: 20g Precautionary Salting Routes Inveraray Depot

20-21 - A83 Campbeltown Ferry Terminal - Kennacraig

Figure 13/1h: 20g Precautionary Salting Routes Machrihanish



20-18 – A82 Tyndrum – Crianlarich
A85 – Crianlarich – Lix Toll – Lochearnhead
A84 – Lochearnhead - Kildean

Figure 14/1i: 20g Precautionary Salting Routes Killin Depot

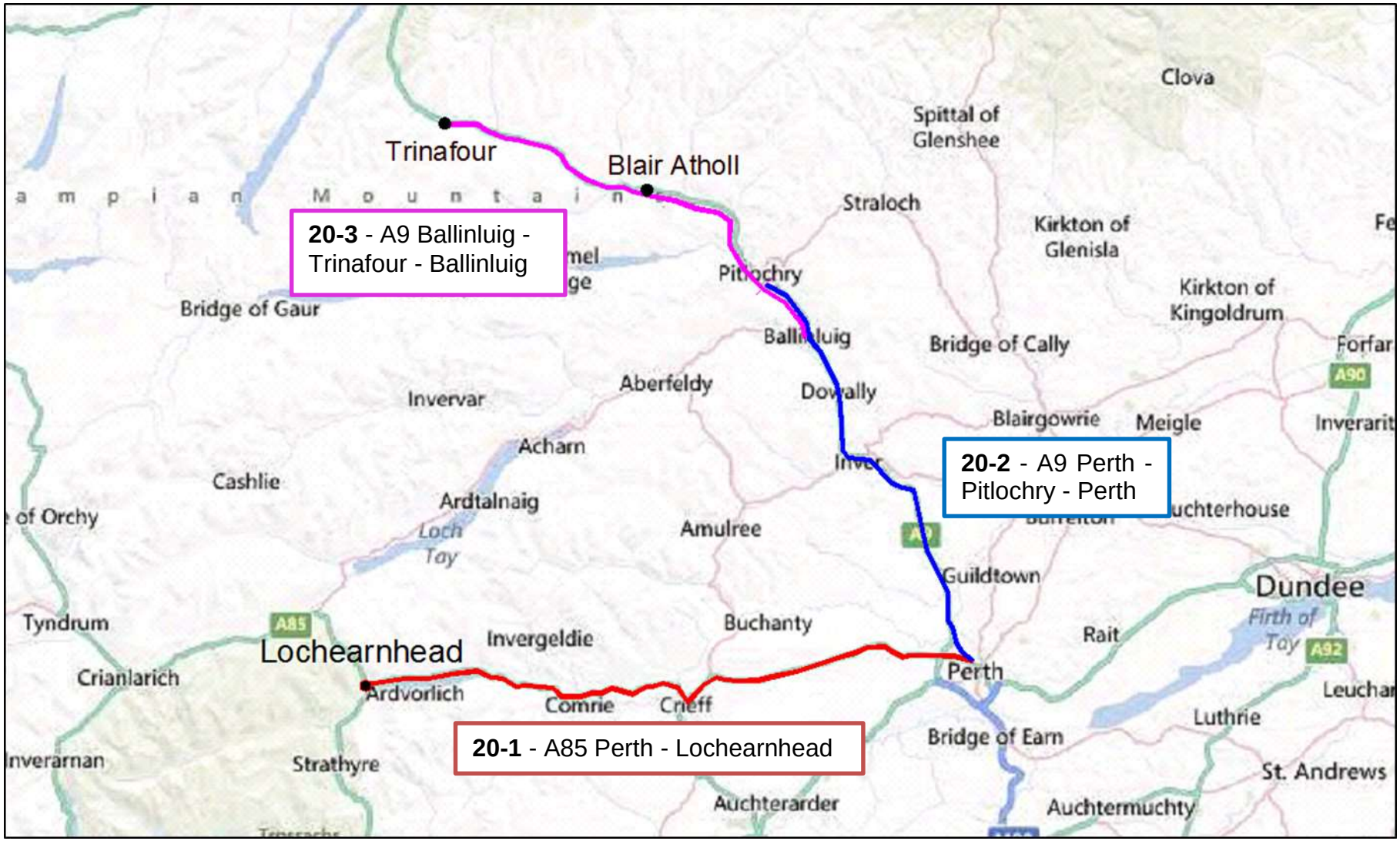


Figure 14/1k: 20g Precautionary Salting Routes **Perth Depot: 20-1 and 20-2 / Ballinluig Depot: 20-3**

Figure 14/1l: 40g Precautionary Salting and Plough Routes Dunbeath Depot

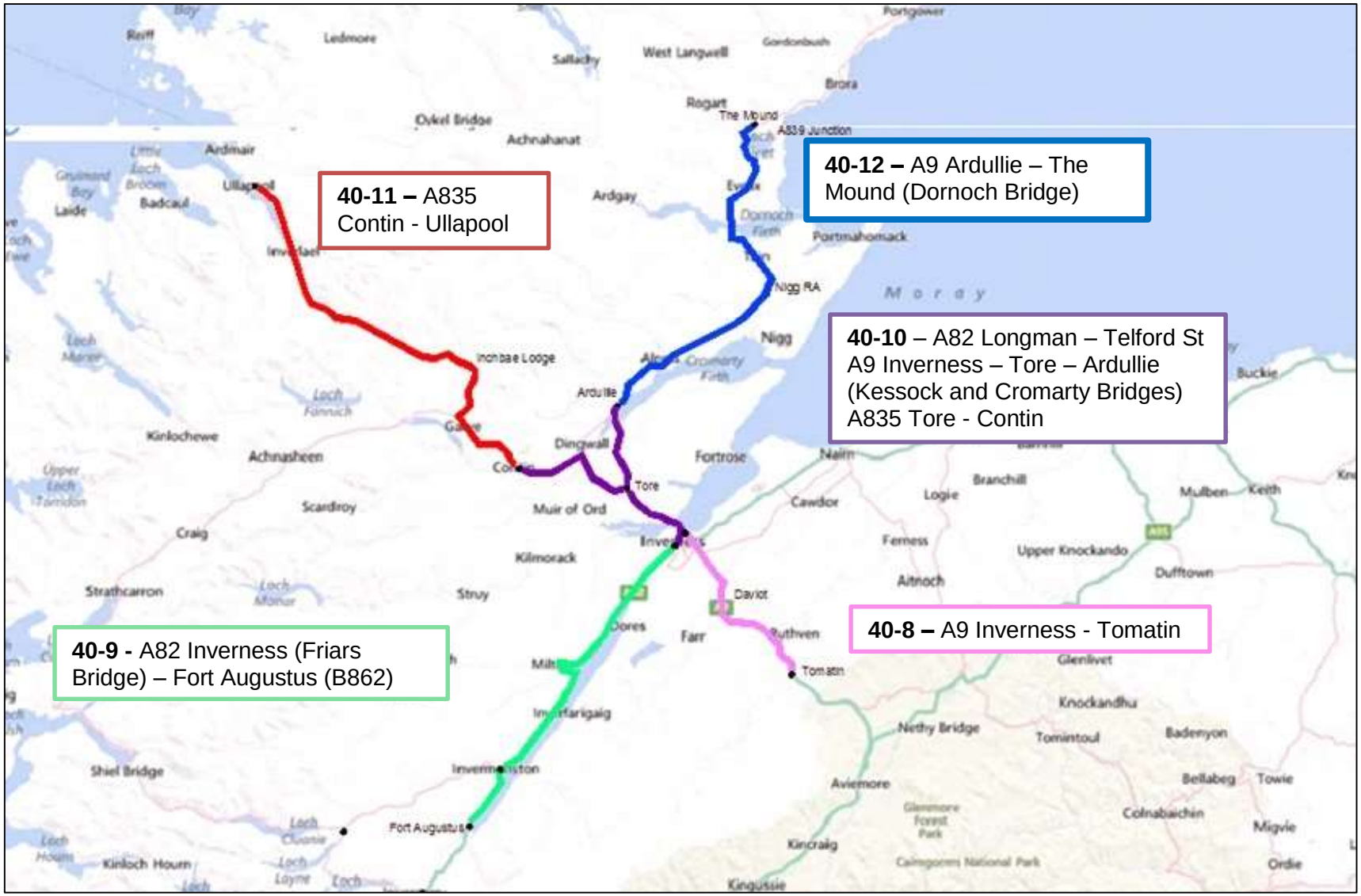


Figure 14/1m: 40g Precautionary Salting Routes, Bridgepoint Depot (Inverness)

Figure 14/1n: 40g Precautionary Salting and Plough Routes Kingussie Depot

Figure 14/1o: 40g Precautionary Salting and Plough Routes Ardelve Depot

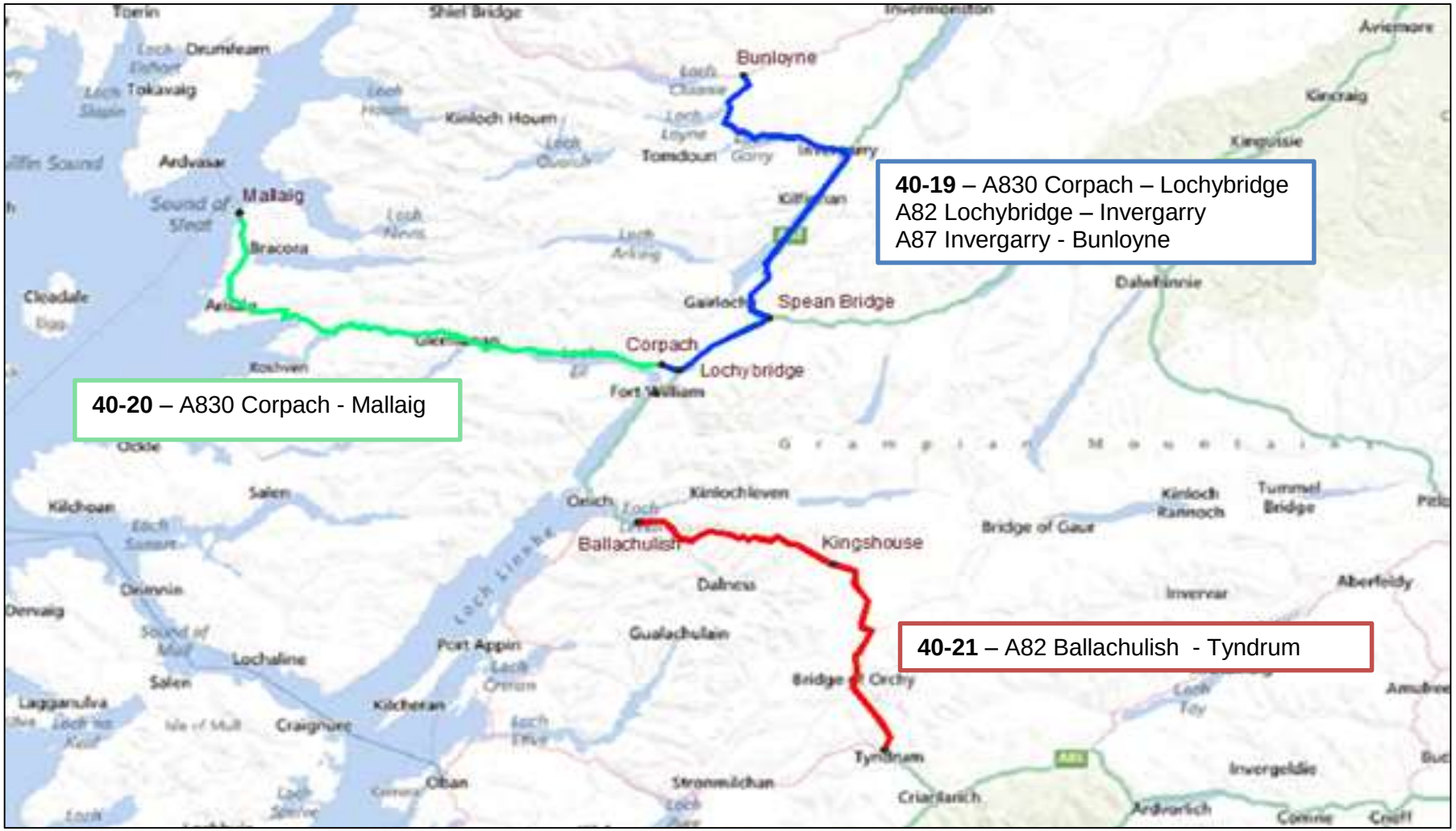


Figure 14/1p: 40g Precautionary Salting and Plough Routes Corpach Depot (Fort Willaim)

Figure 14/1q: 40g Precautionary Salting and Plough Routes Oban Depot

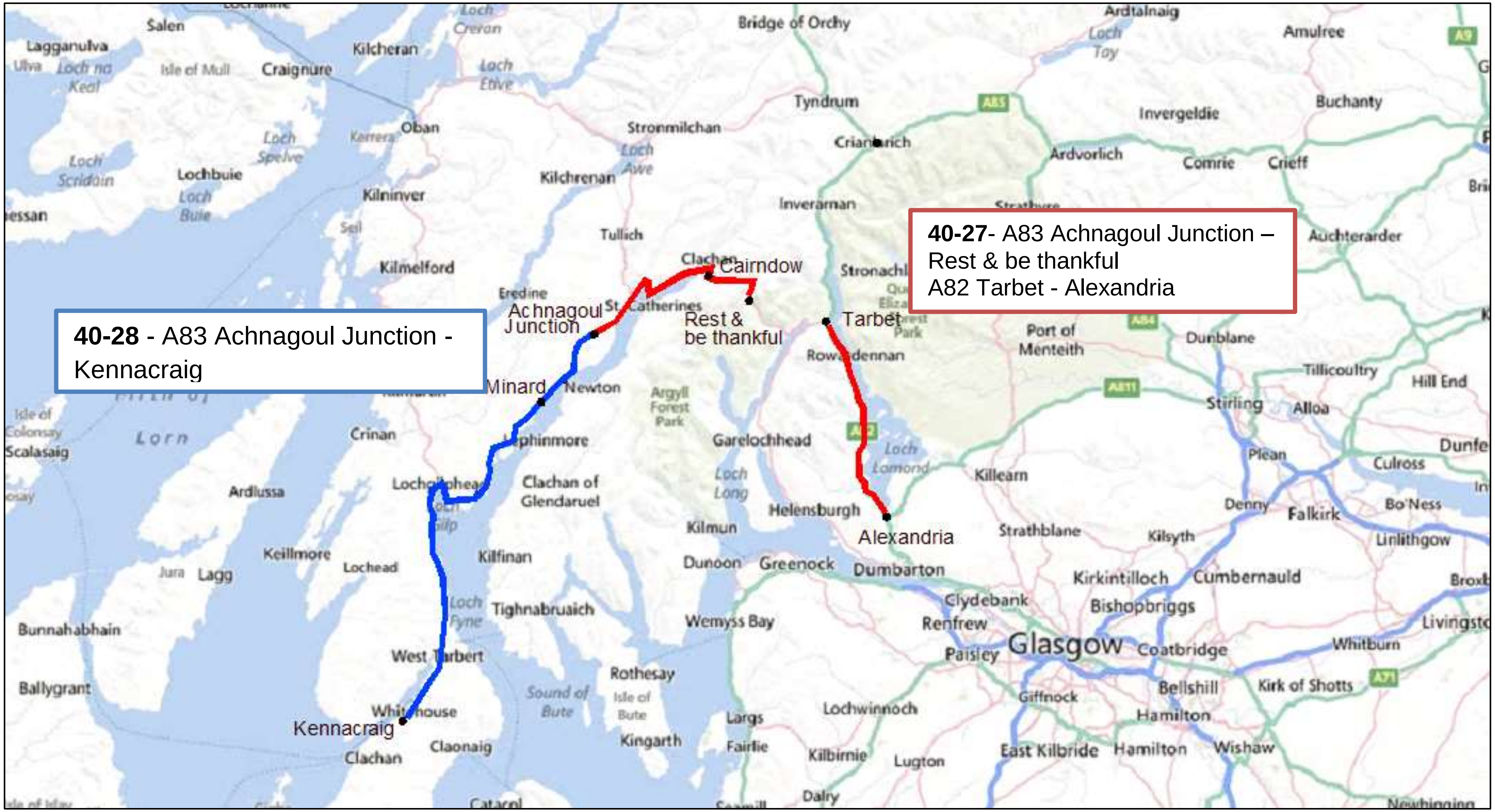


Figure 14/1r: 40g Precautionary Salting and Plough Routes Inveraray Depot

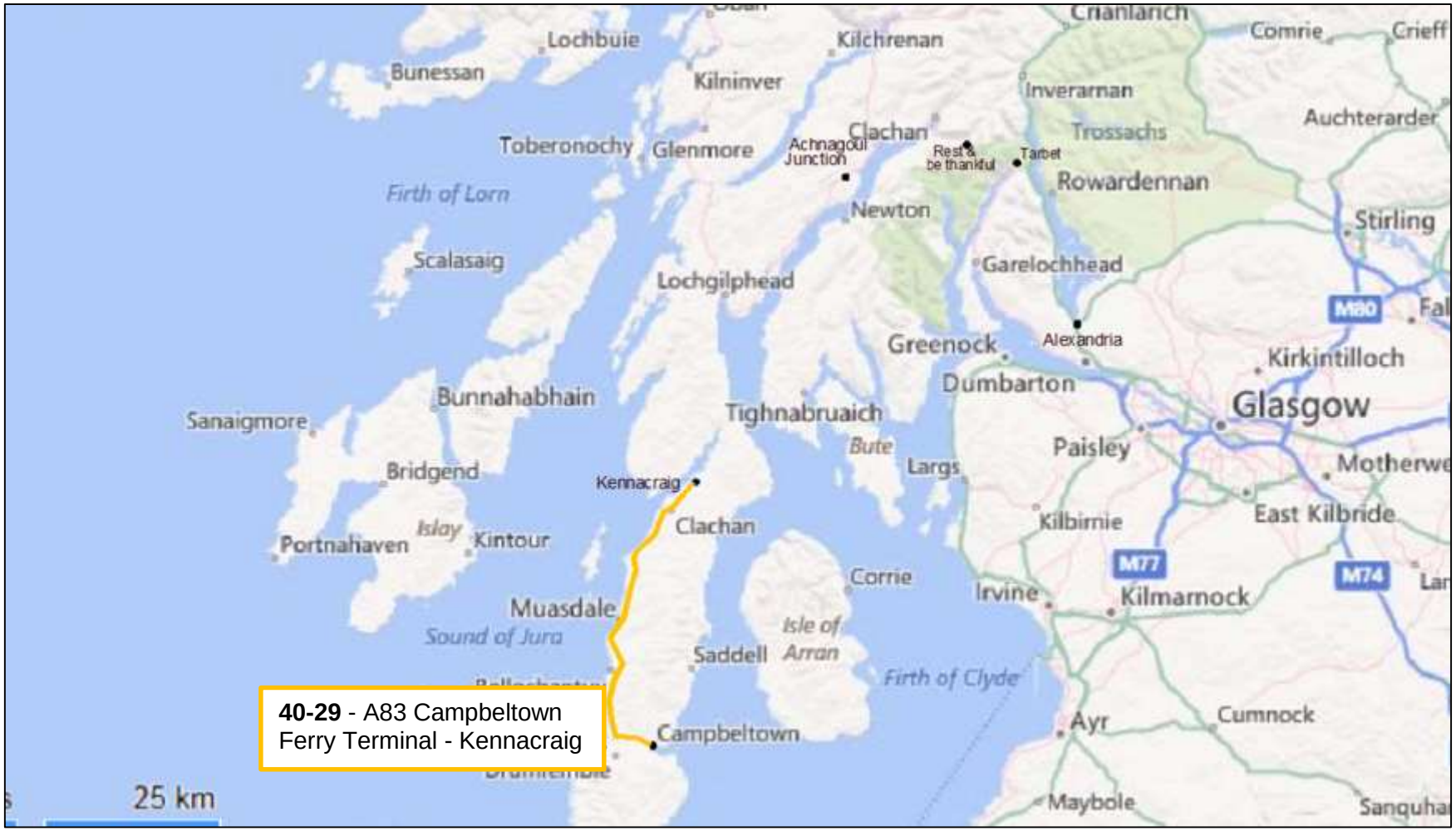


Figure 13/1s: 40s Precautionary Salting and Plough Routes Machrihanish Depot

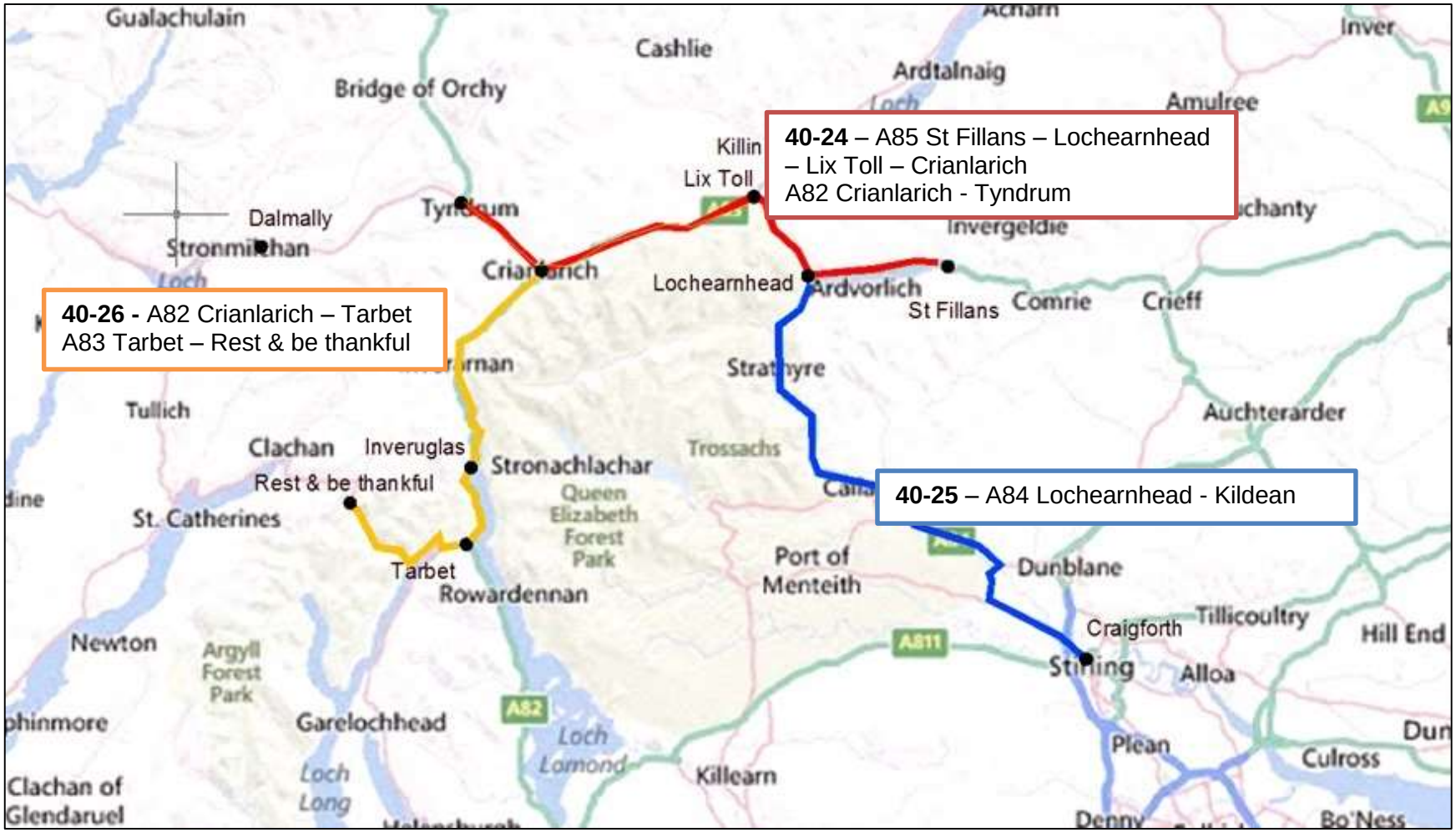


Figure 14/1t: 40g Precautionary Salting and Plough Routes Killin Depot

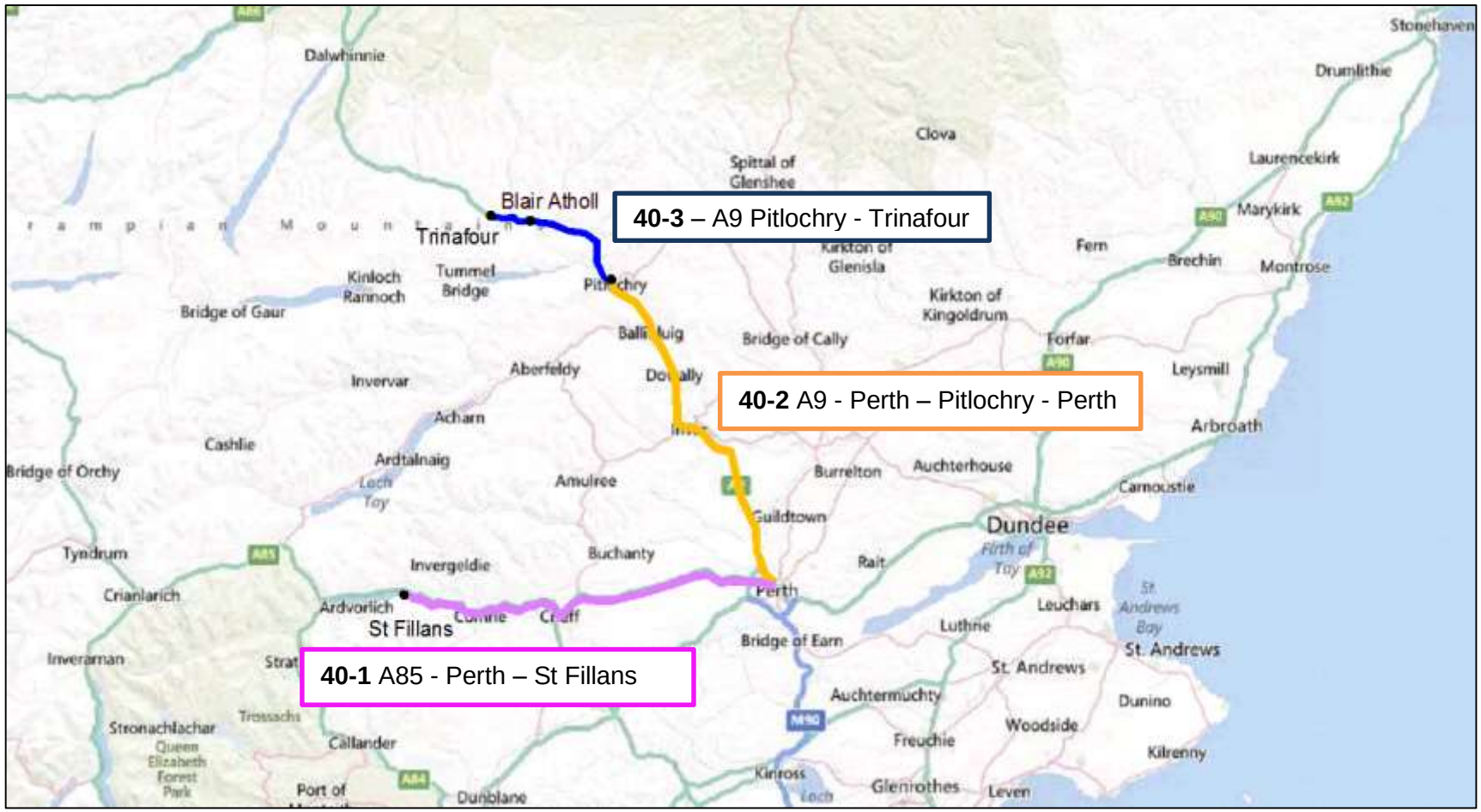


Figure 14/1u: 40g Precautionary Salting and Plough Routes **Perth Depot: 20-1 and 20-2 / Ballinluig Depot: 20-3**

Figure 14/2a: Precautionary Salting Route FW1 (A84 Callander)

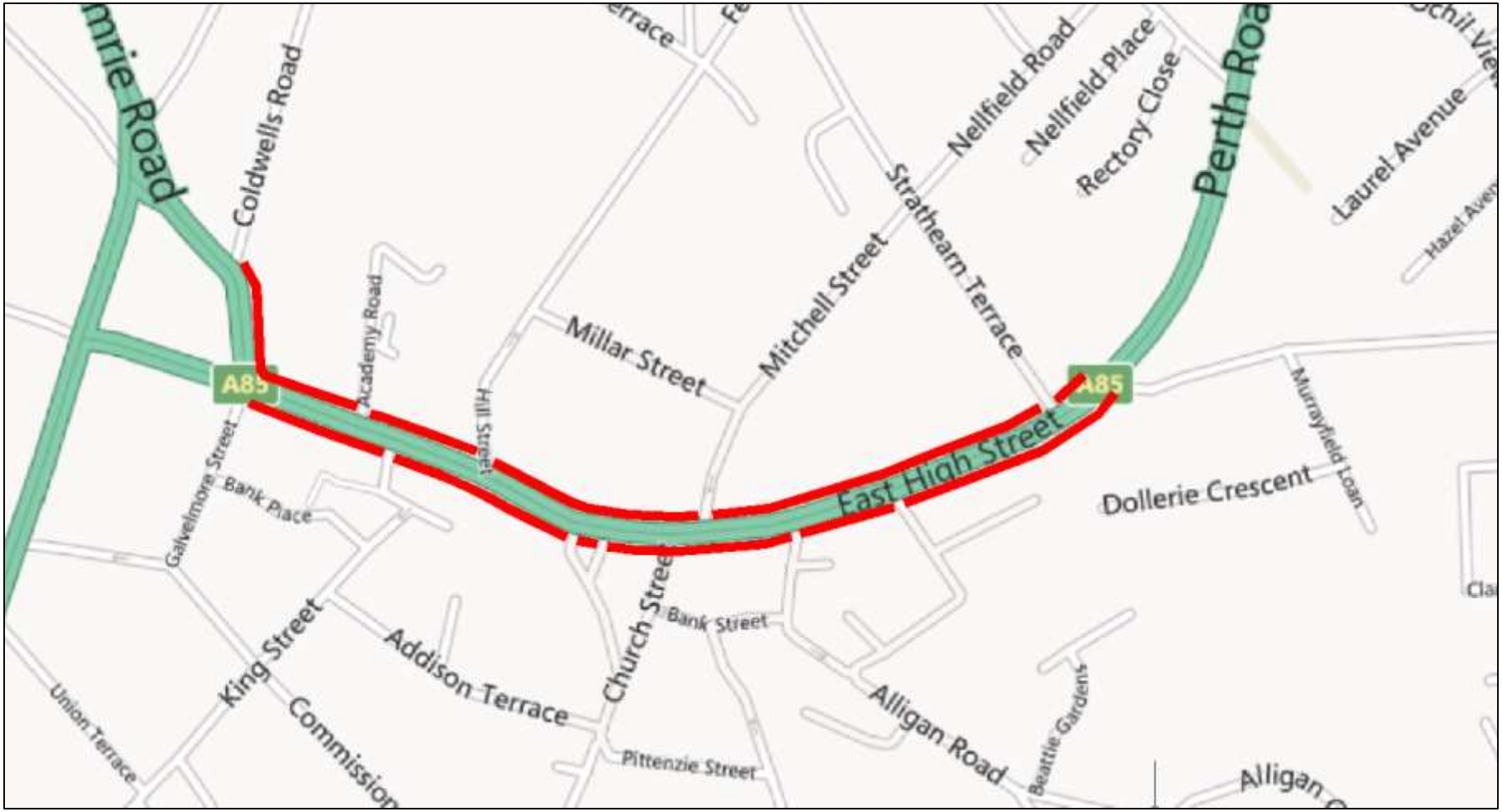


Figure 14/2b: Precautionary Salting Route FW2 (A85 Crieff)

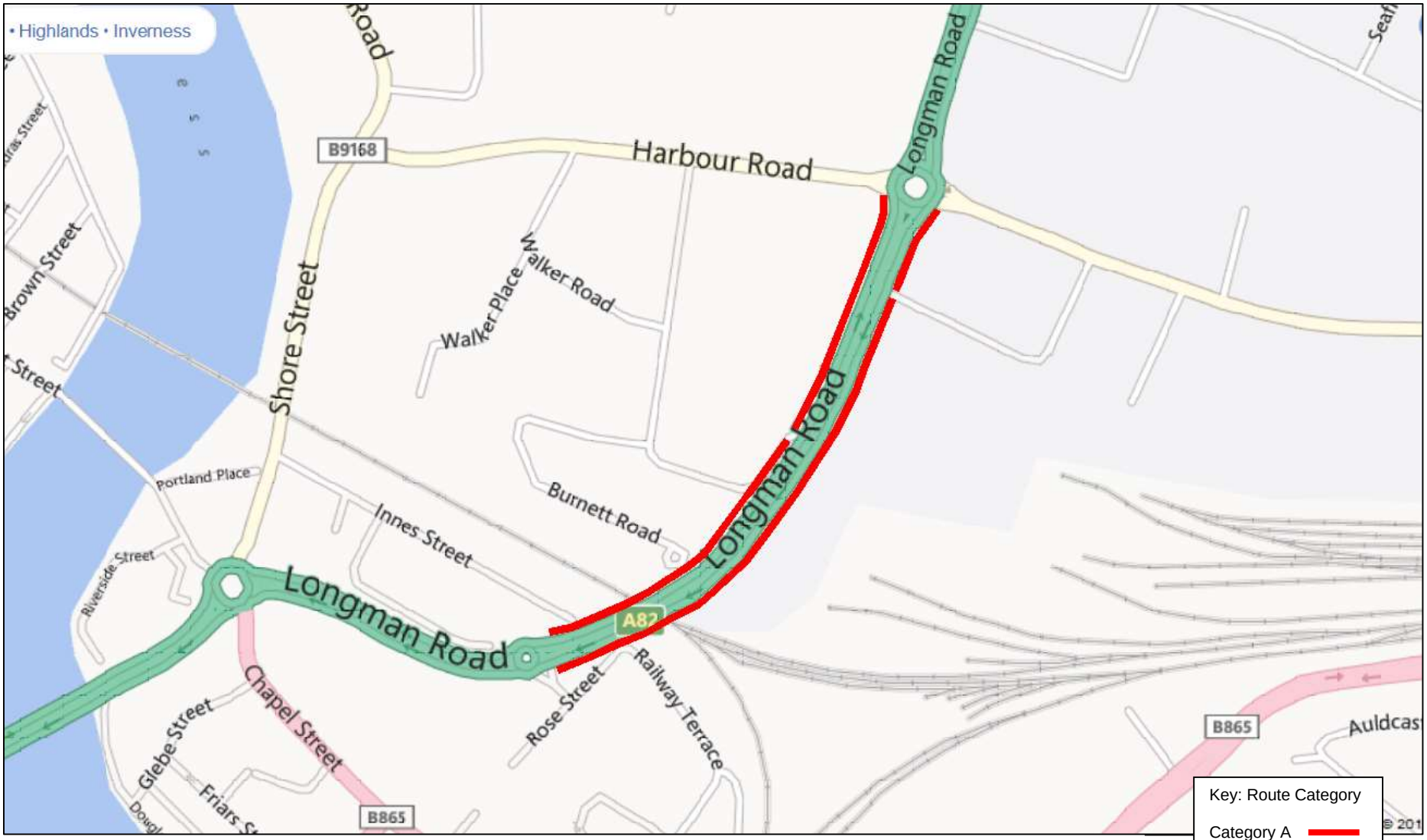


Figure 14/2c: Precautionary Salting Route FW2 (A82 Inverness)

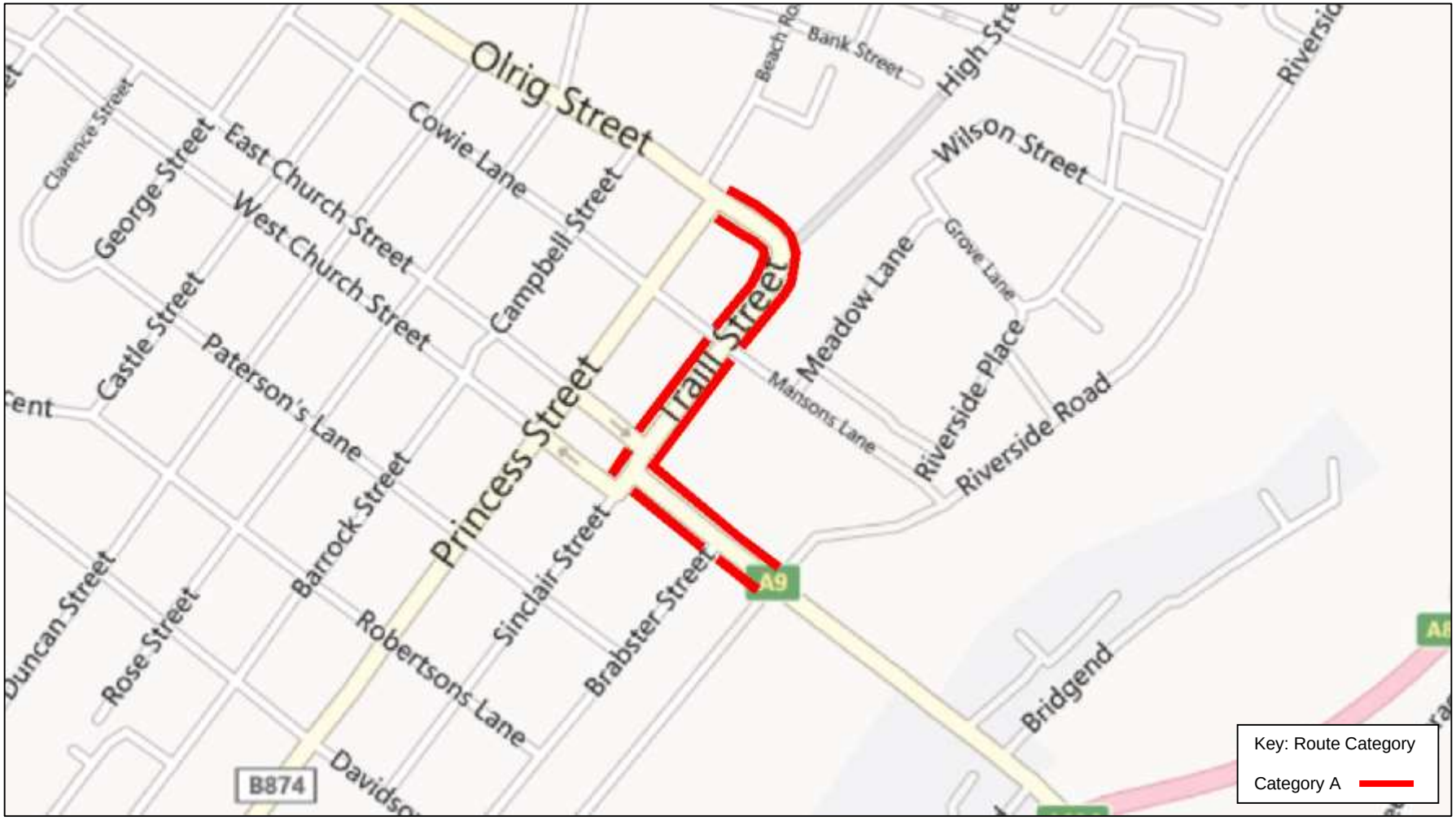


Figure 14/2d: Precautionary Salting Route FW2 (A82 Thurso)

Figure 14/3a: Footway Location 1, A82/A83 Tarbet (Category C)

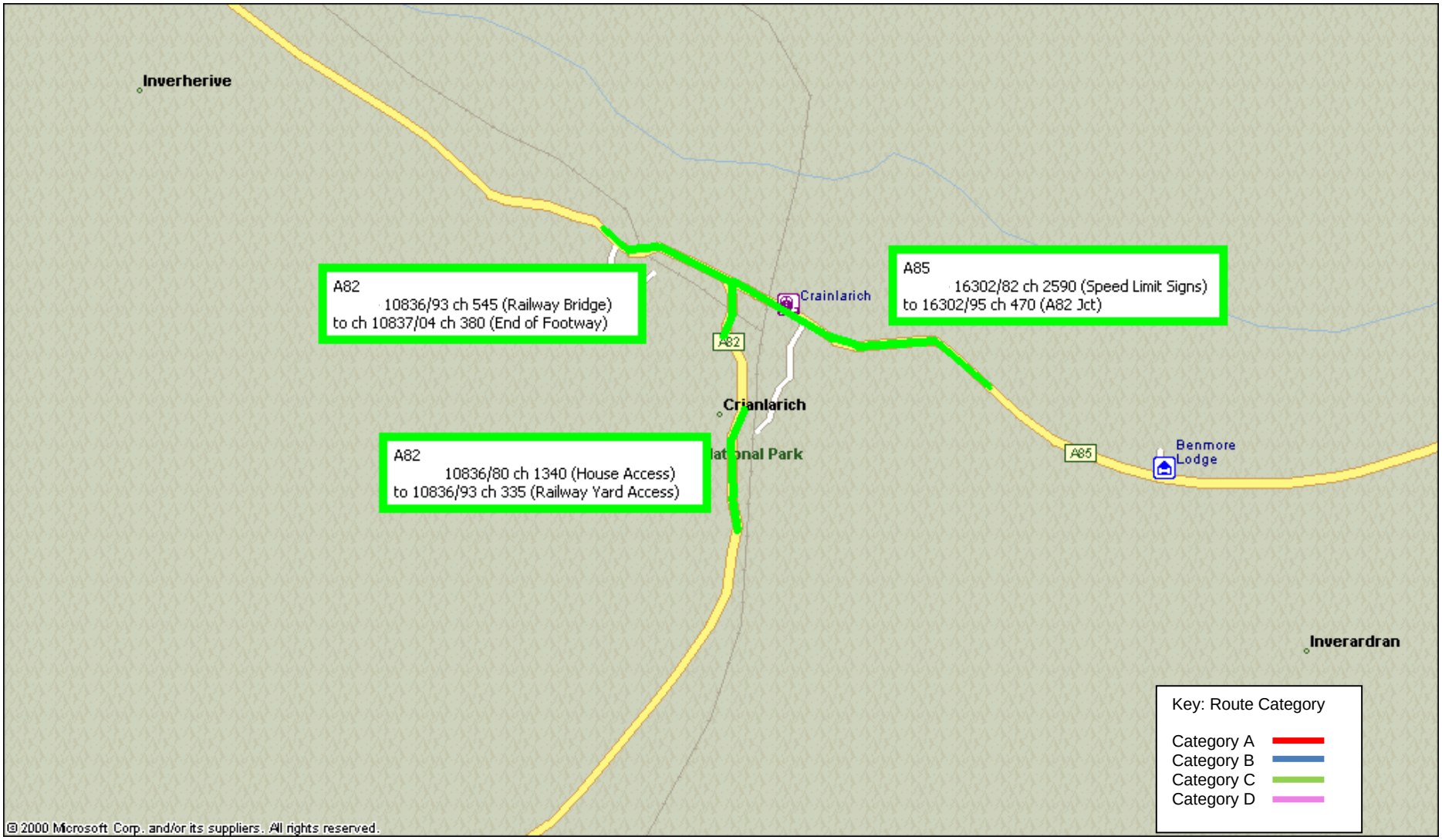


Figure 14/3b: Footway Location 2, A82/A85 Crianlarich (Category C)

Figure 14/3c: Footway Location 3, A82 Tyndrum (Category C)

Figure 14/3d: Footway Location 4, A82 Onich (Category C)

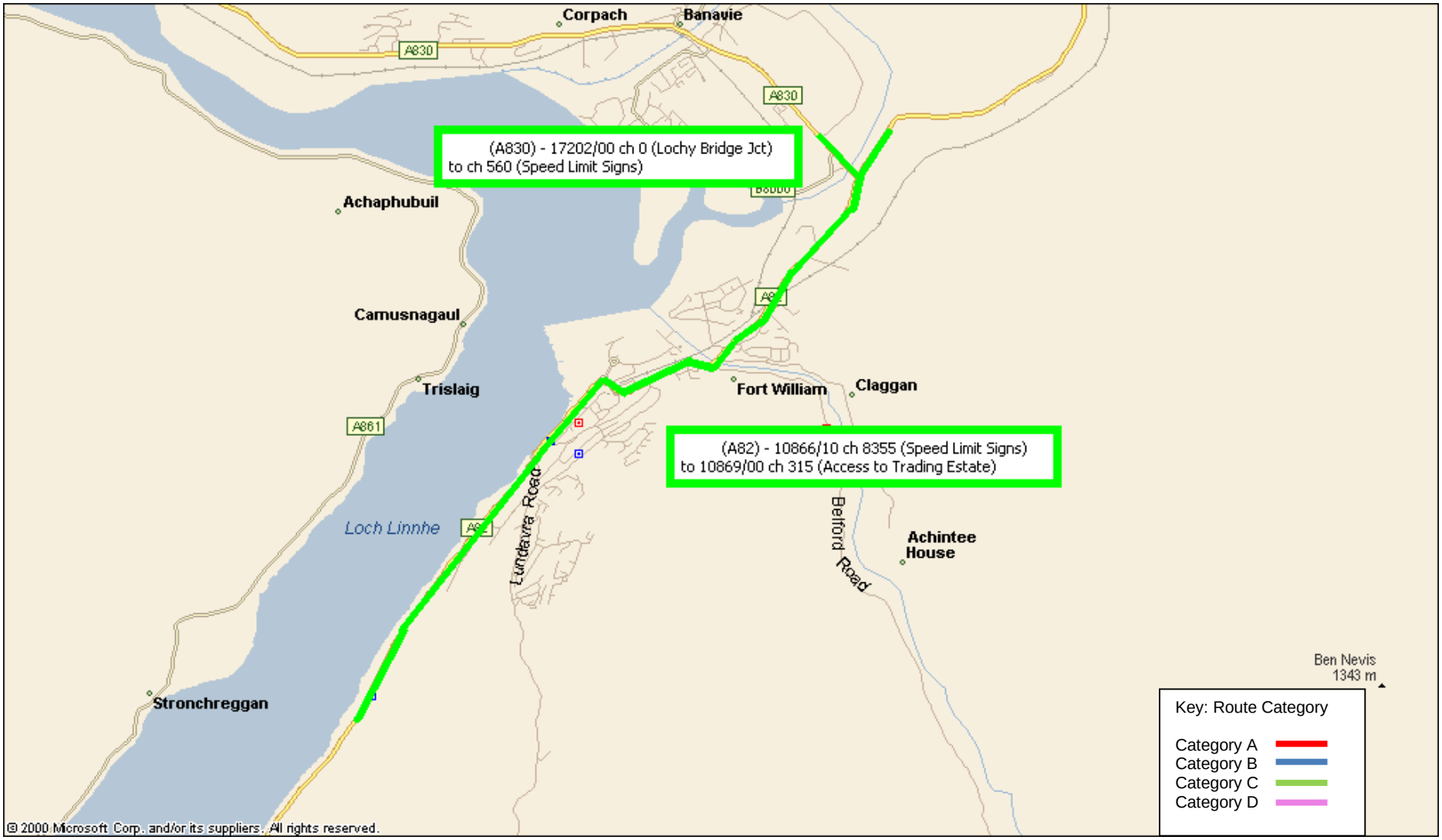


Figure 14/3e: Footway Location 5, A82/A830 Fort William (Category C)

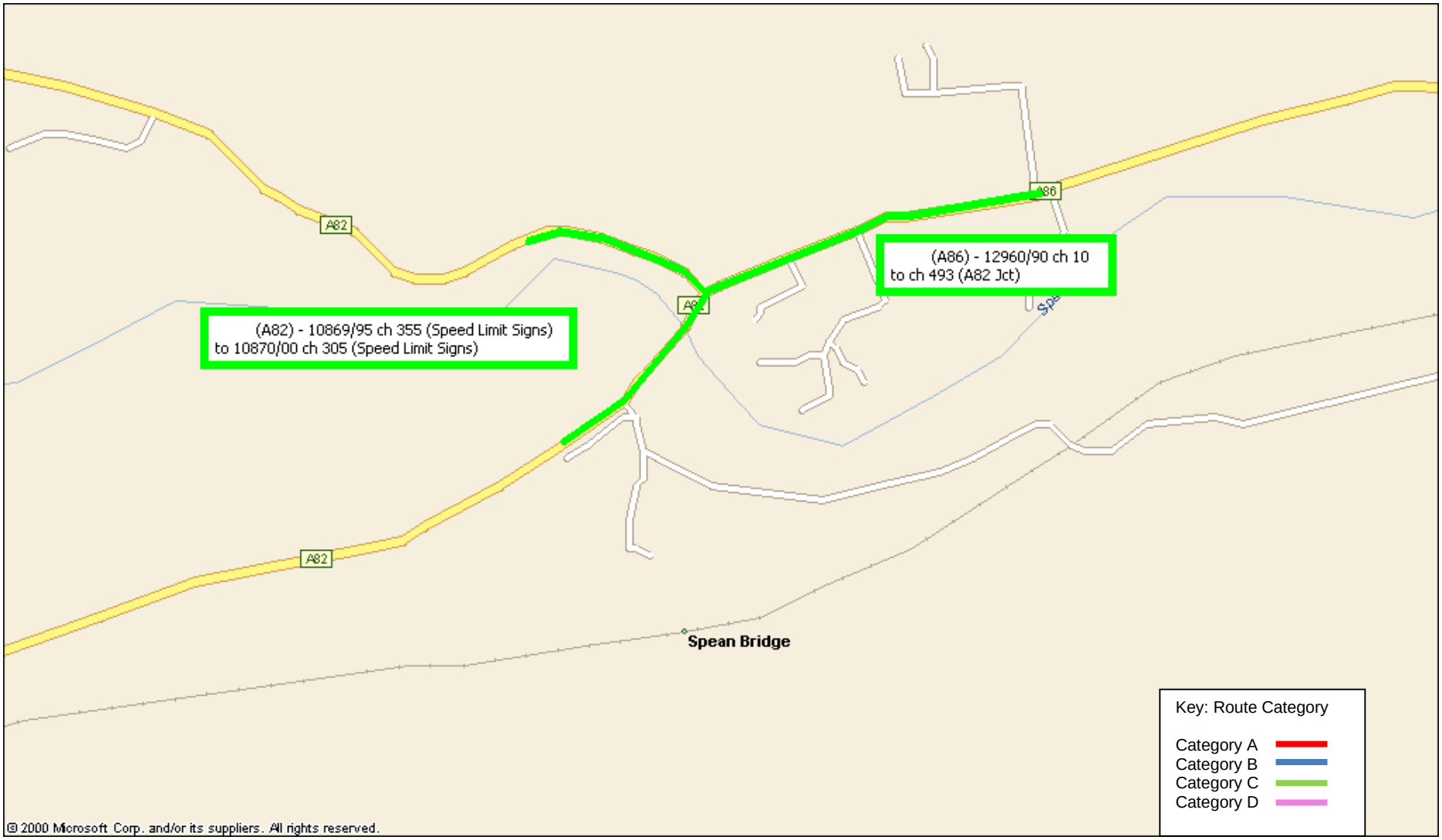


Figure 14/3f: Footway Location 6, A82/A86 Spean Bridge (Category C)

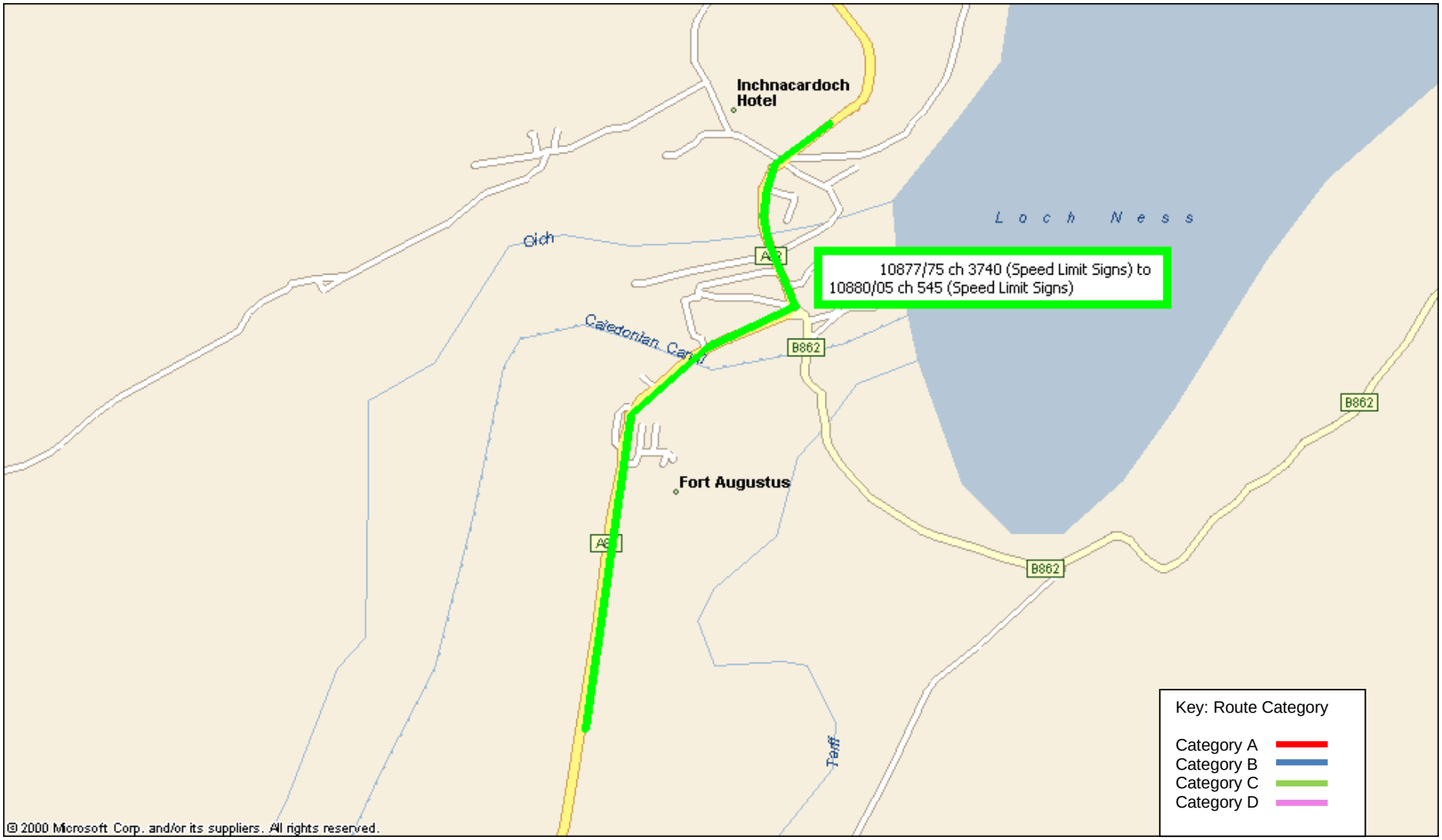


Figure 14/3g: Footway Location 7, A82 Fort Augustus (Category C)

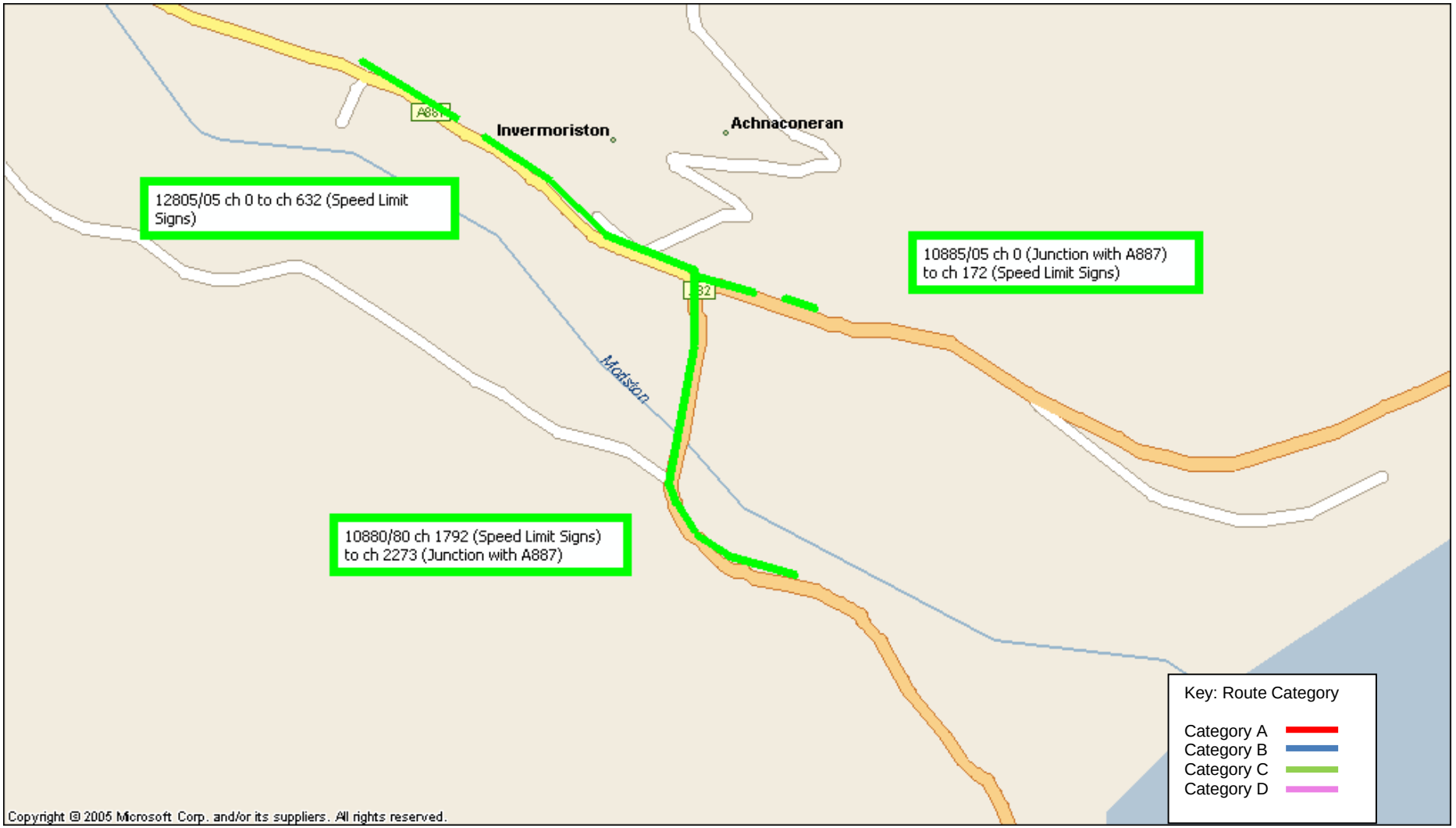


Figure 14/3h: Footway Location 8, A82/A887 Invermoriston (Category C)

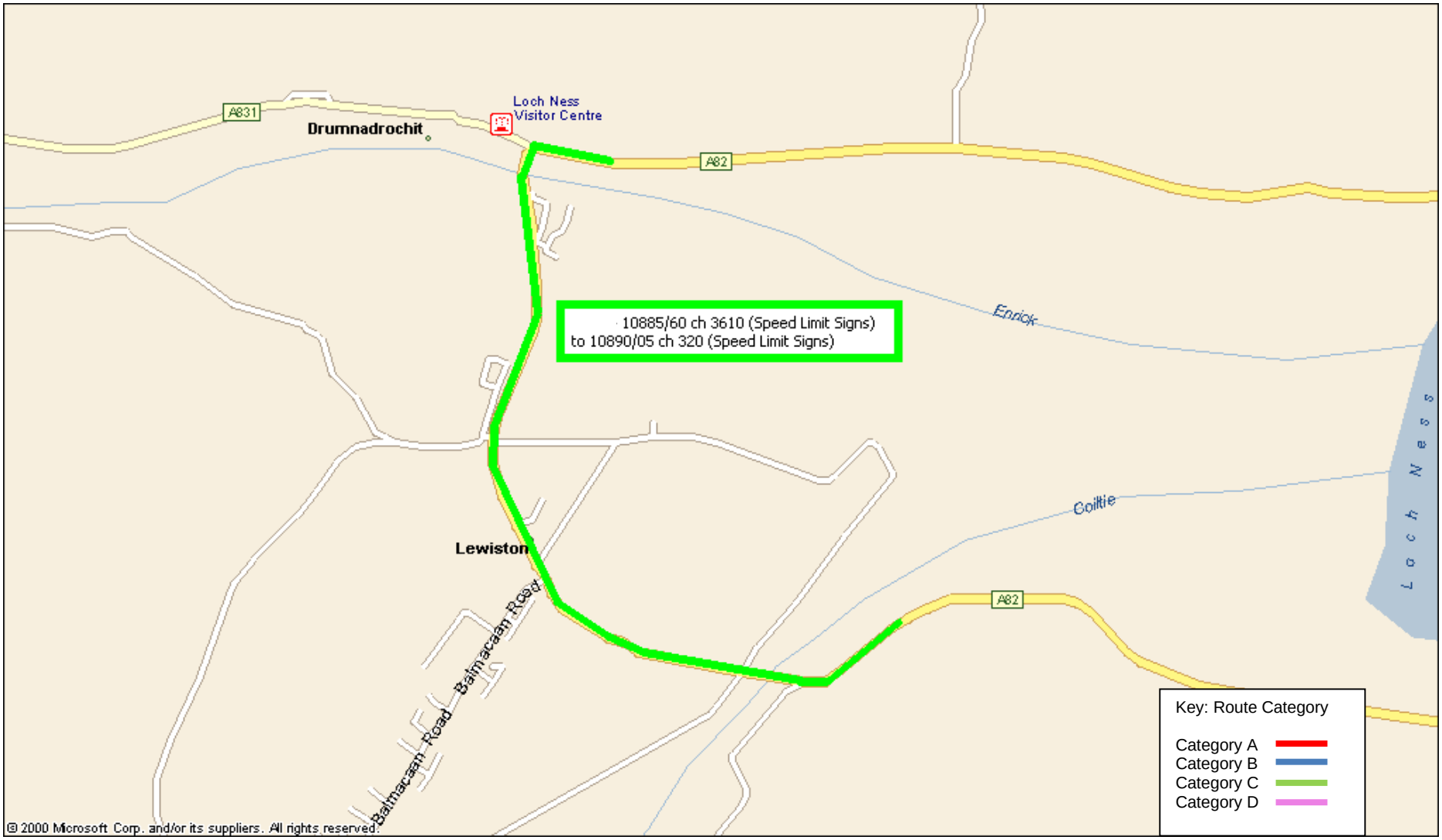


Figure 14/3i: Footway Location 9, A82 Drumnadrochit (Category C)

Figure 14/3j: Footway Location 10, A82 Inverness (Category A, B and C)

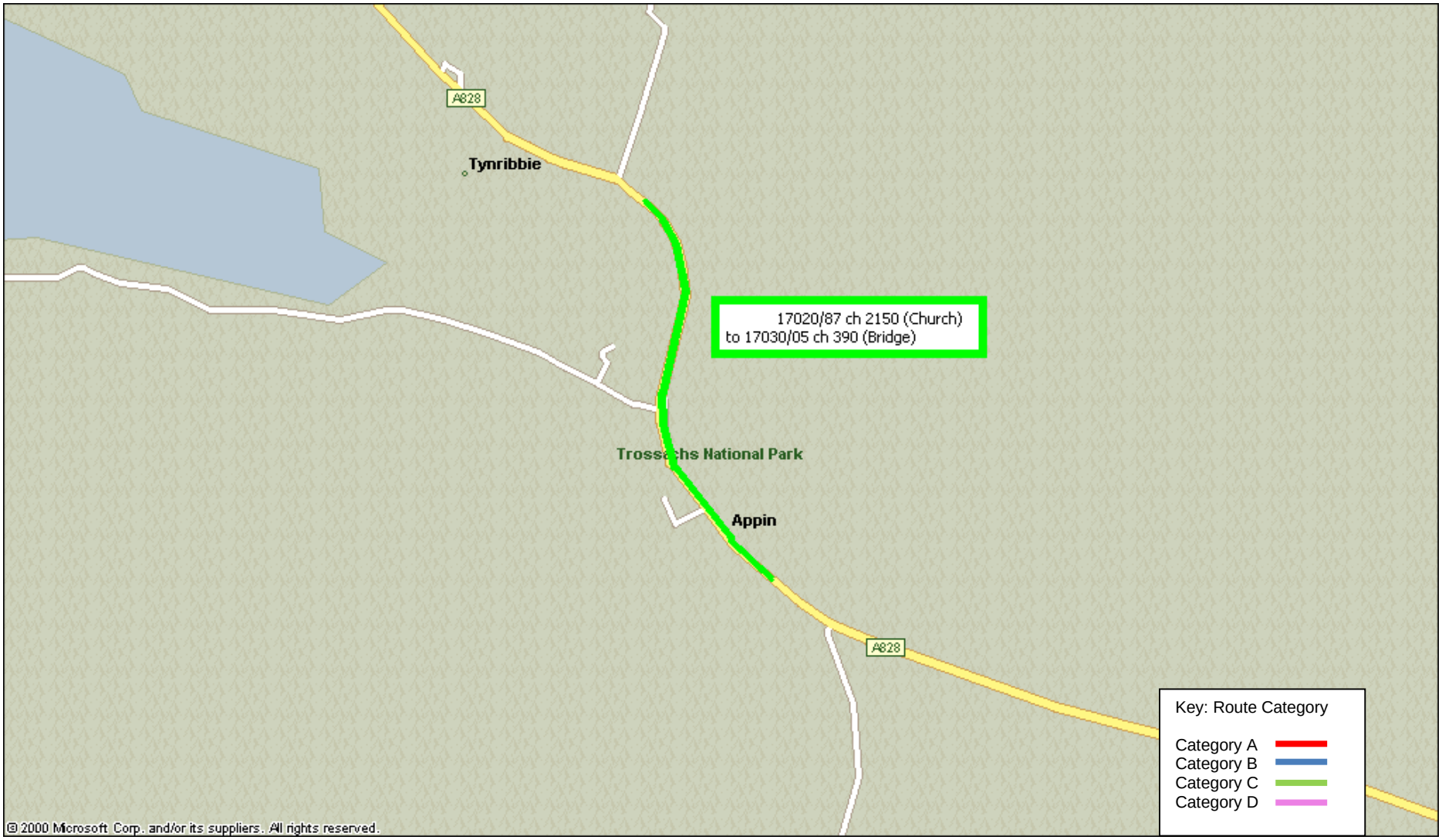


Figure 14/3k: Footway Location 11, A828 Appin (Category C)

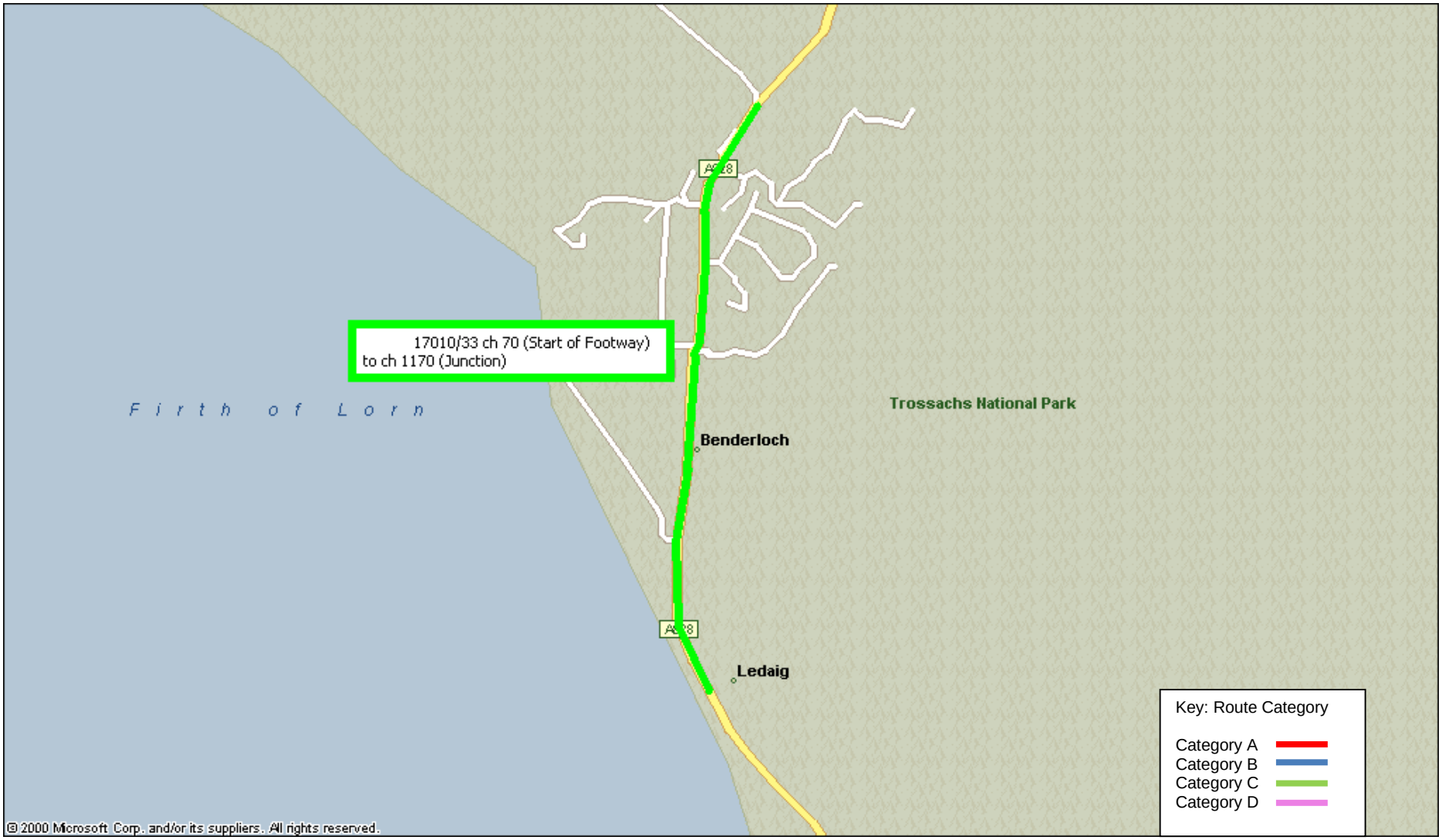


Figure 14/3l: Footway Location 12, A828 Benderloch and Ledaig (Category C)

Figure 14/3m: Footway Location 13, A83 Tarbert (Category C)

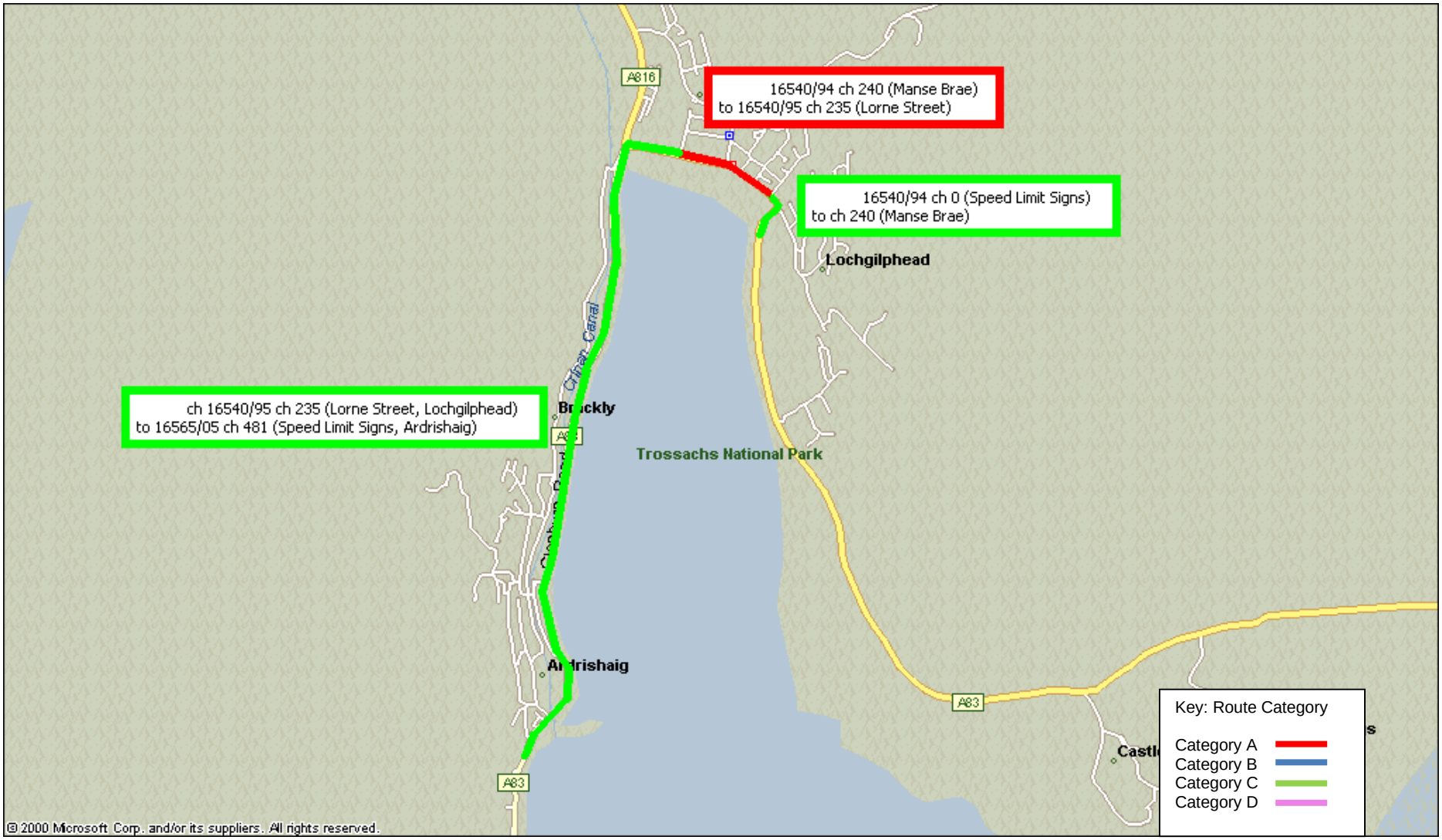


Figure 14/3n: Footway Locations 14 & 15, A83 Ardrishaig and Lochgilphead (Category B and C)

Figure 14/3o: Footway Location 16, A83 Minard (Category C)

Figure 14/3p: Footway Location 17, A83 Furnace (Category C)

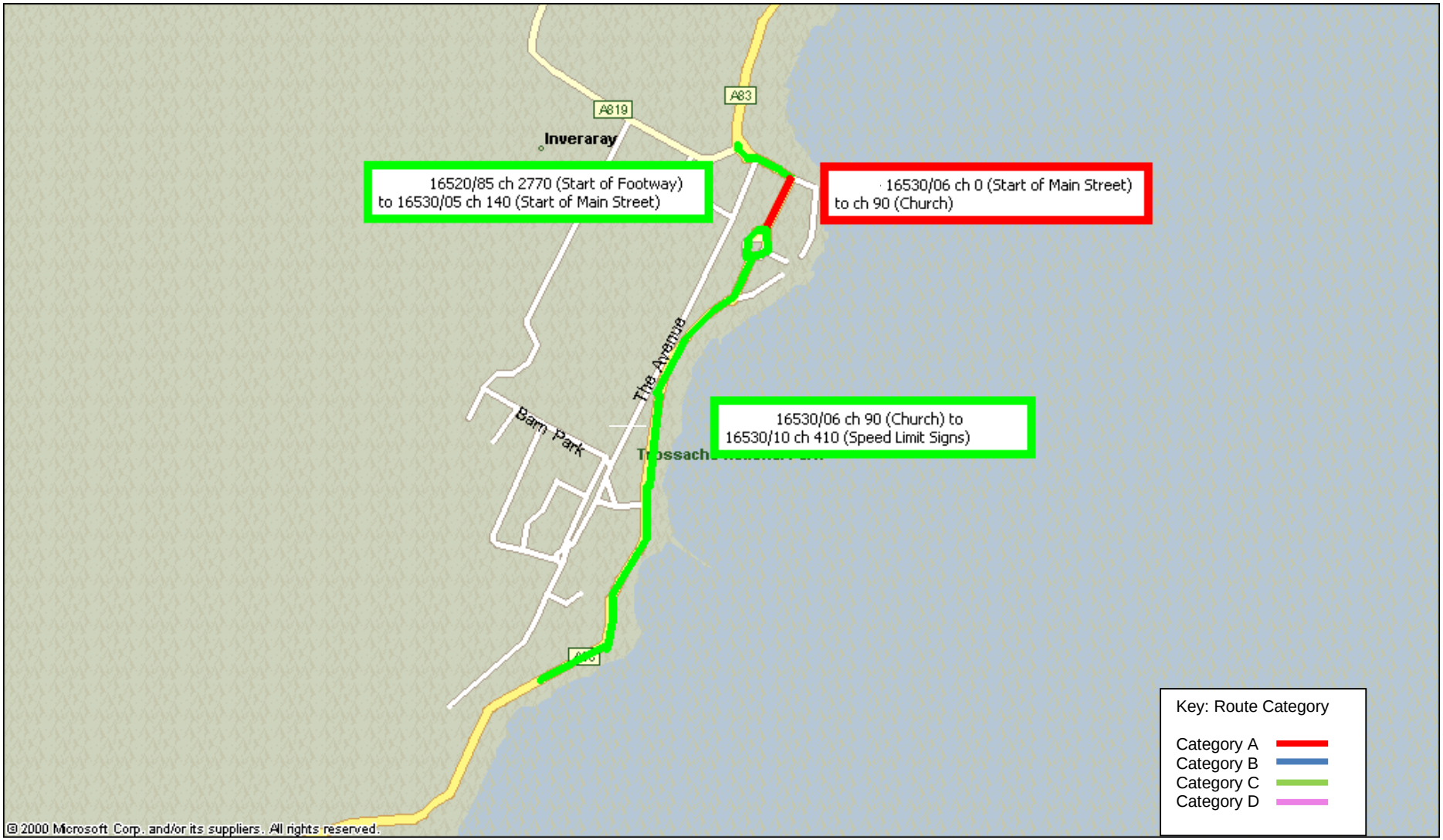


Figure 14/3q: Footway Location 18, A83 Inveraray (Category B and C)

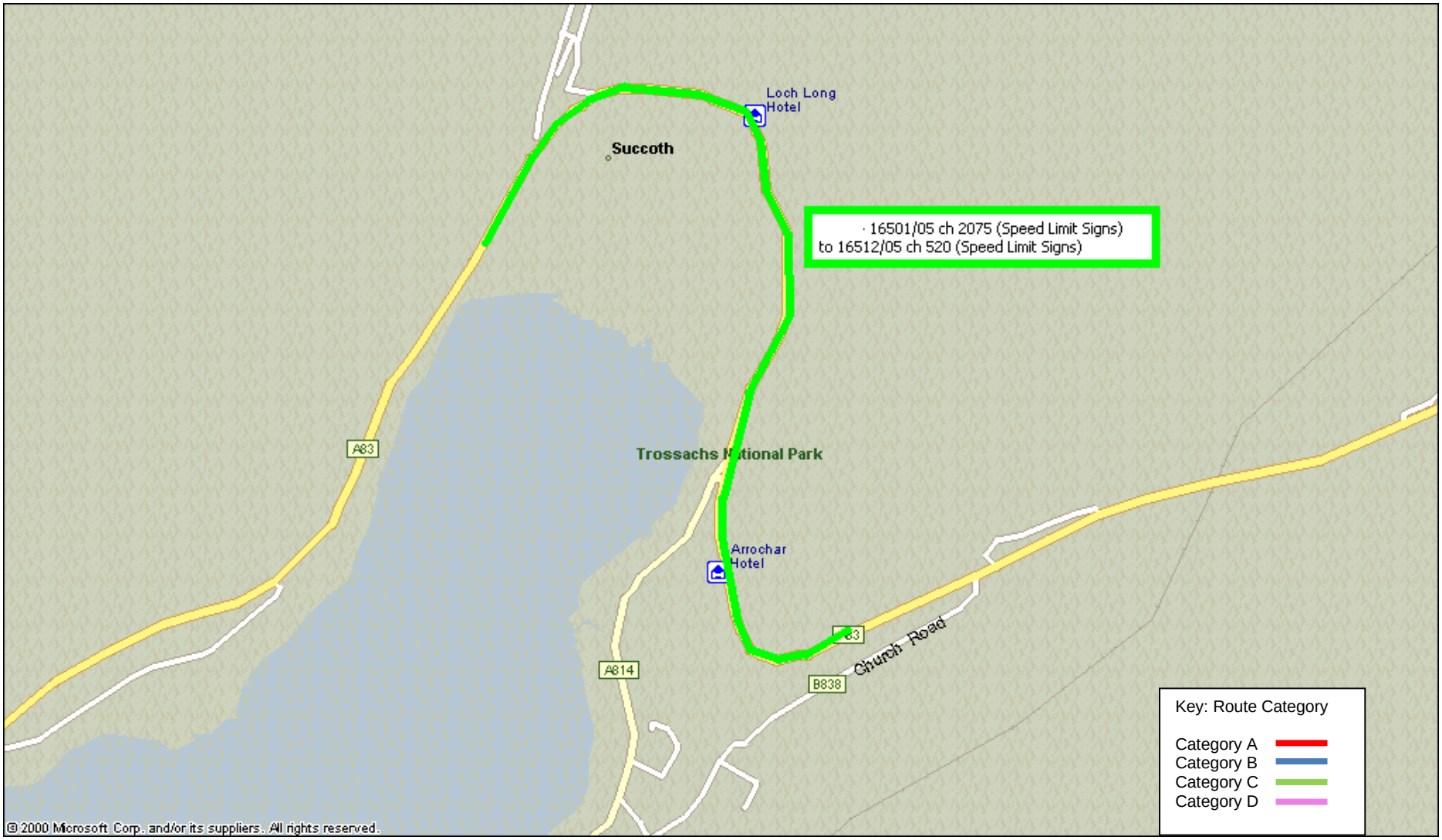


Figure 14/3r: Footway Location 19, A83 Arrochar & Succoth (Category C)

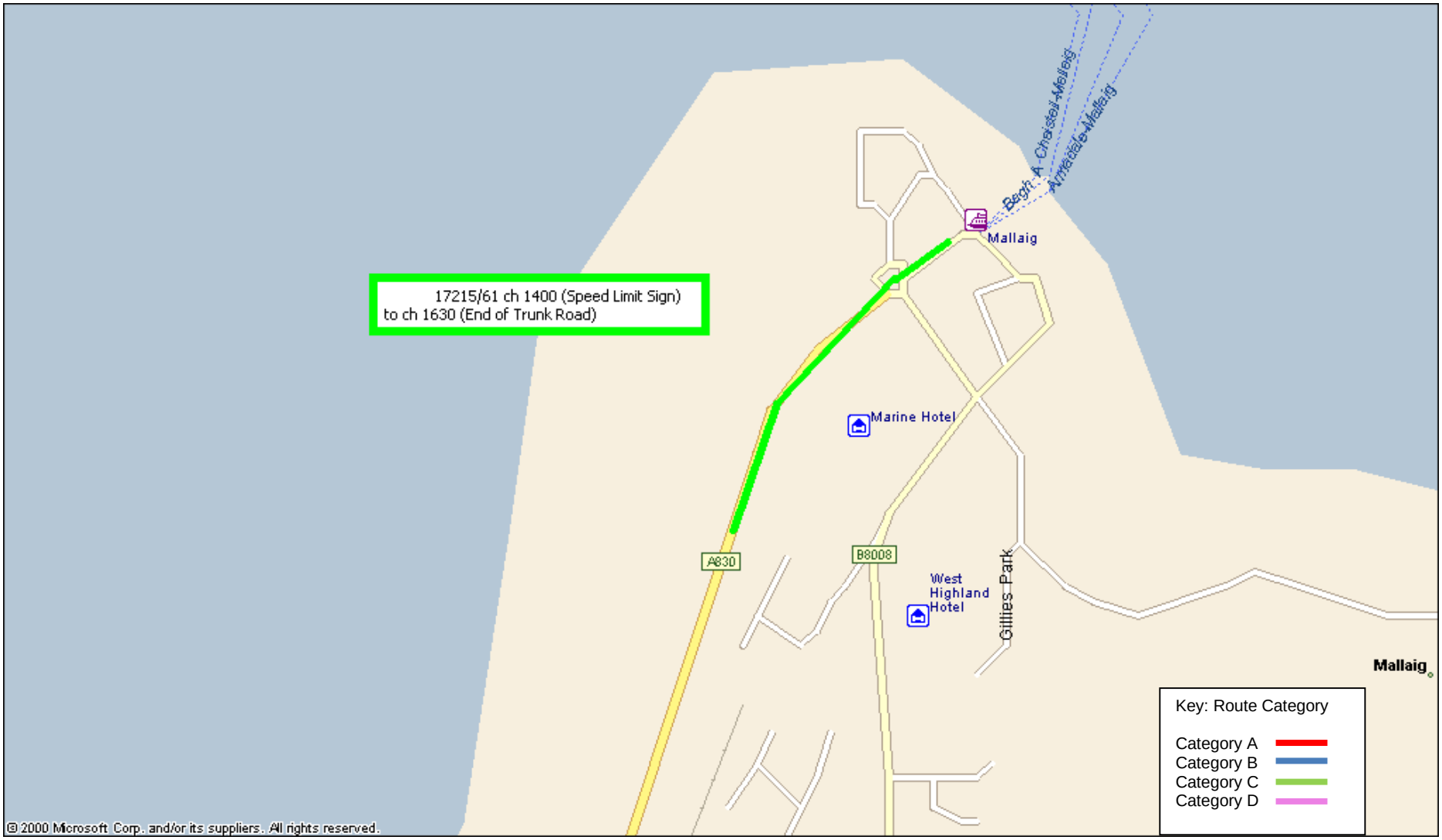


Figure 14/3s: Footway Location 20, A830 Mallaig (Category C)

Figure 14/3t: Footway Location 21, A830 Arisaig (Category C)

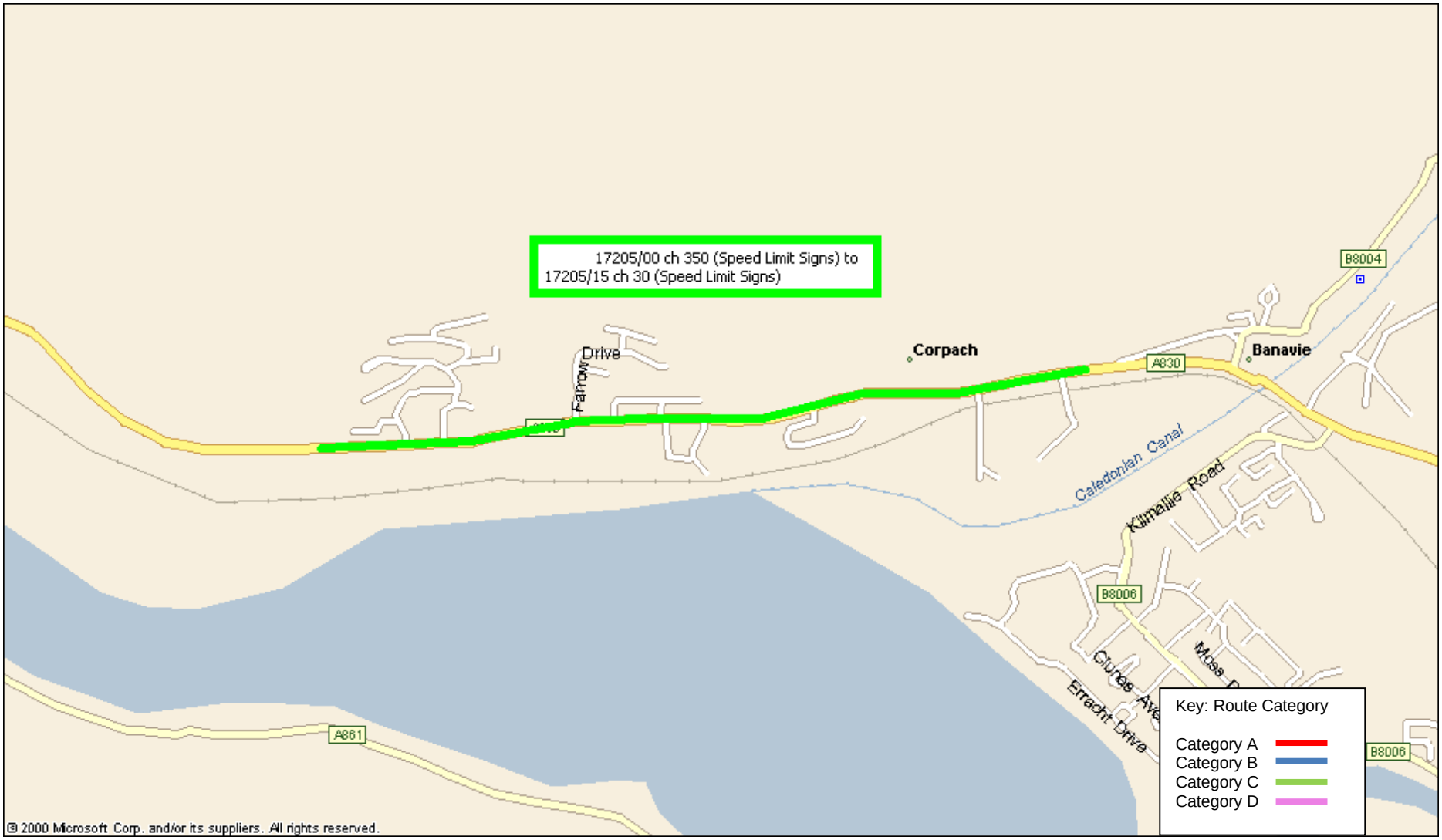


Figure 14/3u: Footway Location 22, A830 Corpach (Category C)

Figure 14/3v: Footway Location 23, A835 Contin (Category C)

Figure 14/3w: Footway Location 24, A835 Garve (Category C)

Figure 14/3x: Footway Location 25, A835/A893 Ullapool (Category B and C)

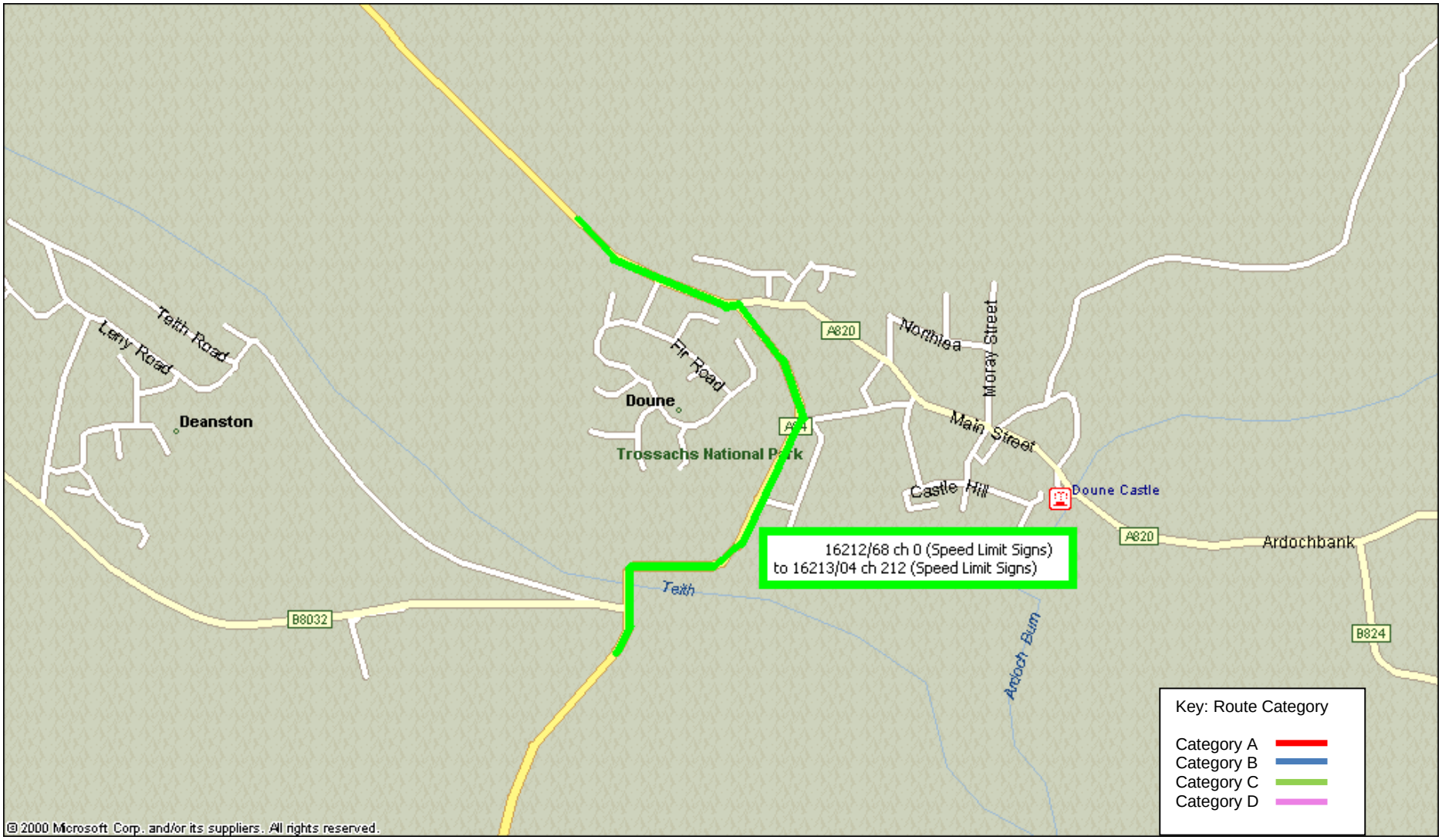


Figure 14/3y: Footway Location 26, A84 Doune (Category C)

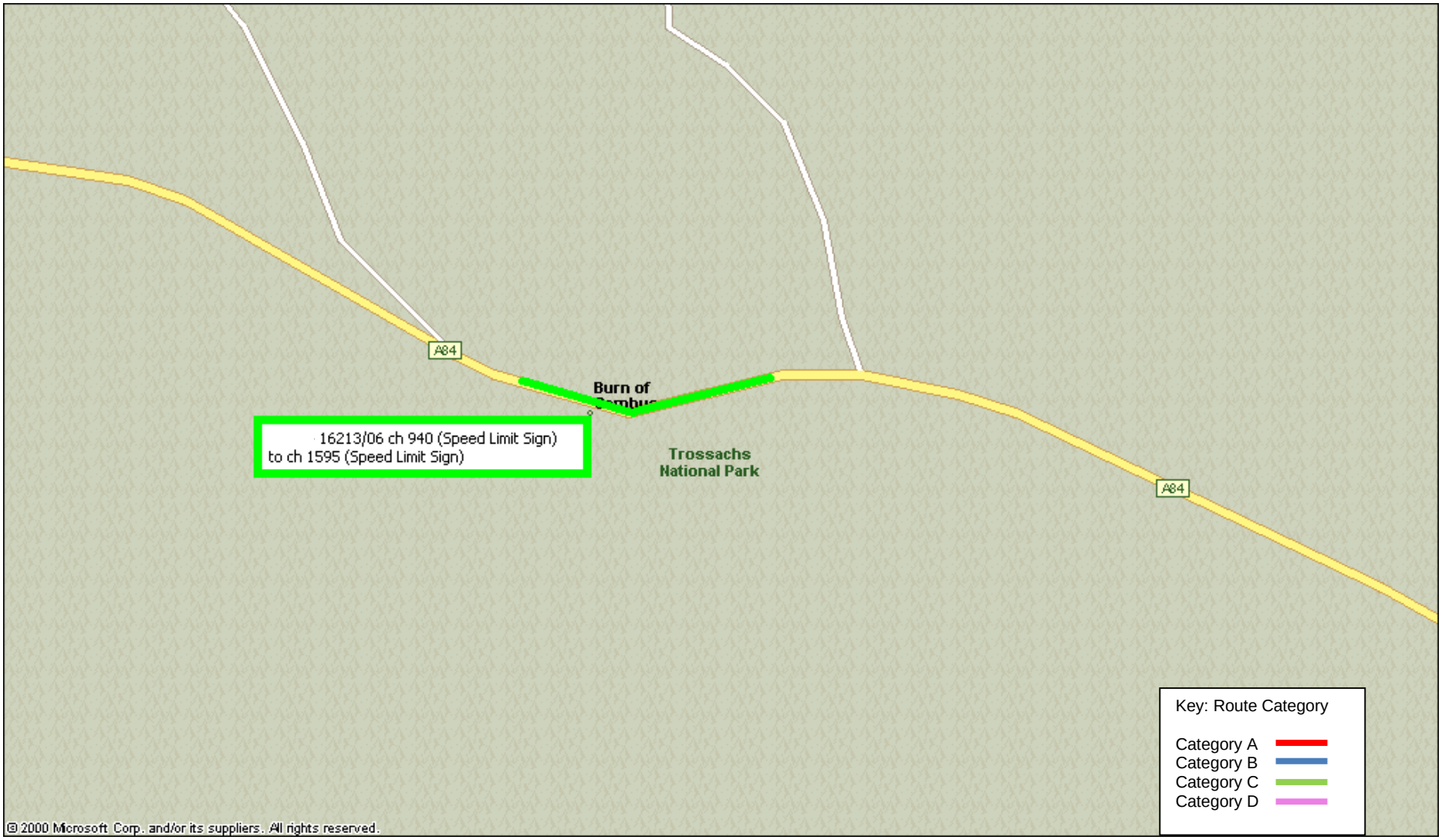


Figure 14/3z: Footway Location 27, A84 Burn of Cambus (Category C)

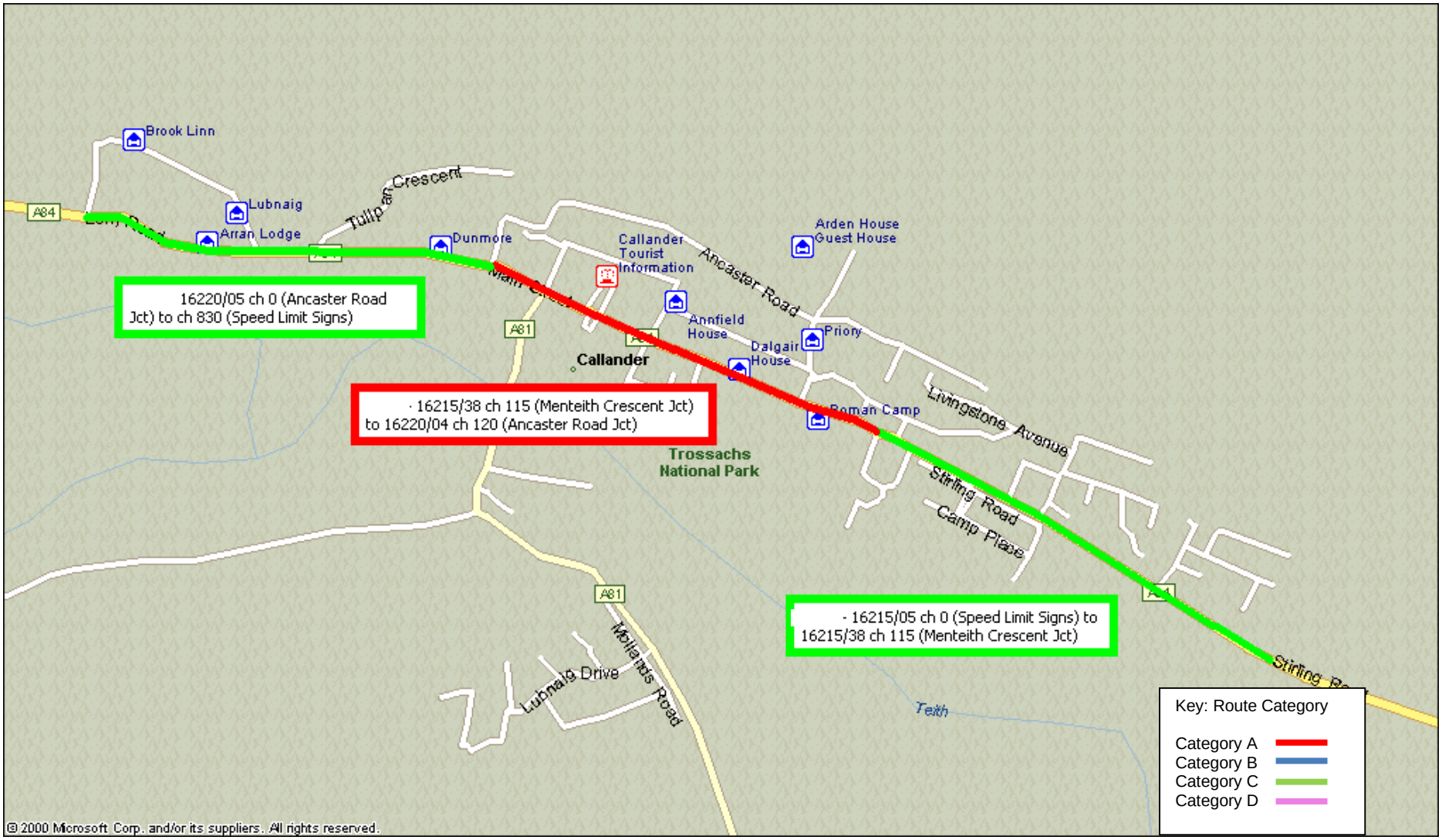


Figure 14/3aa: Footway Location 28, A84 Callander (Category A and C)

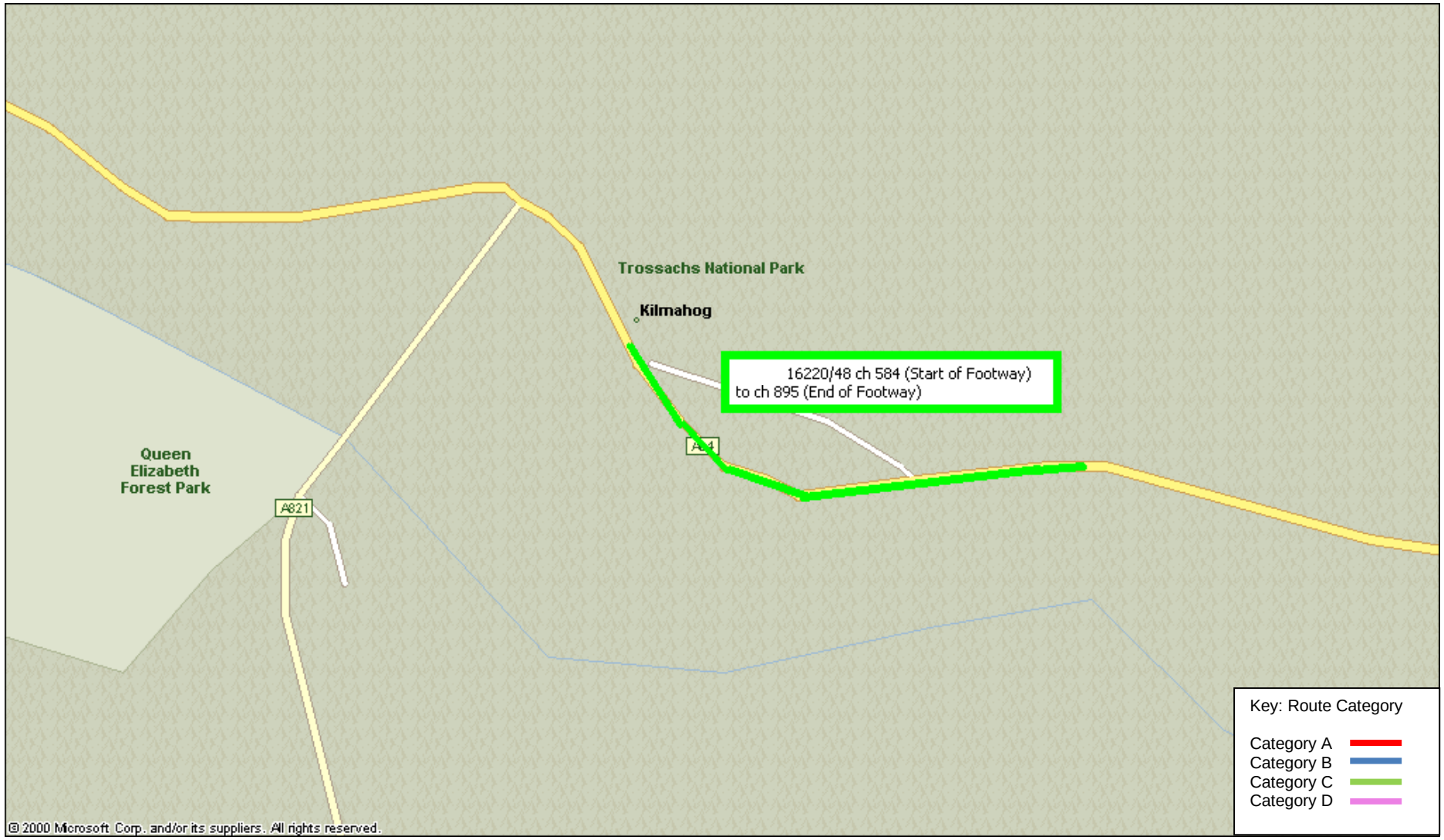


Figure 14/3ab: Footway Location 29, A84 Kilmahog (Category C)

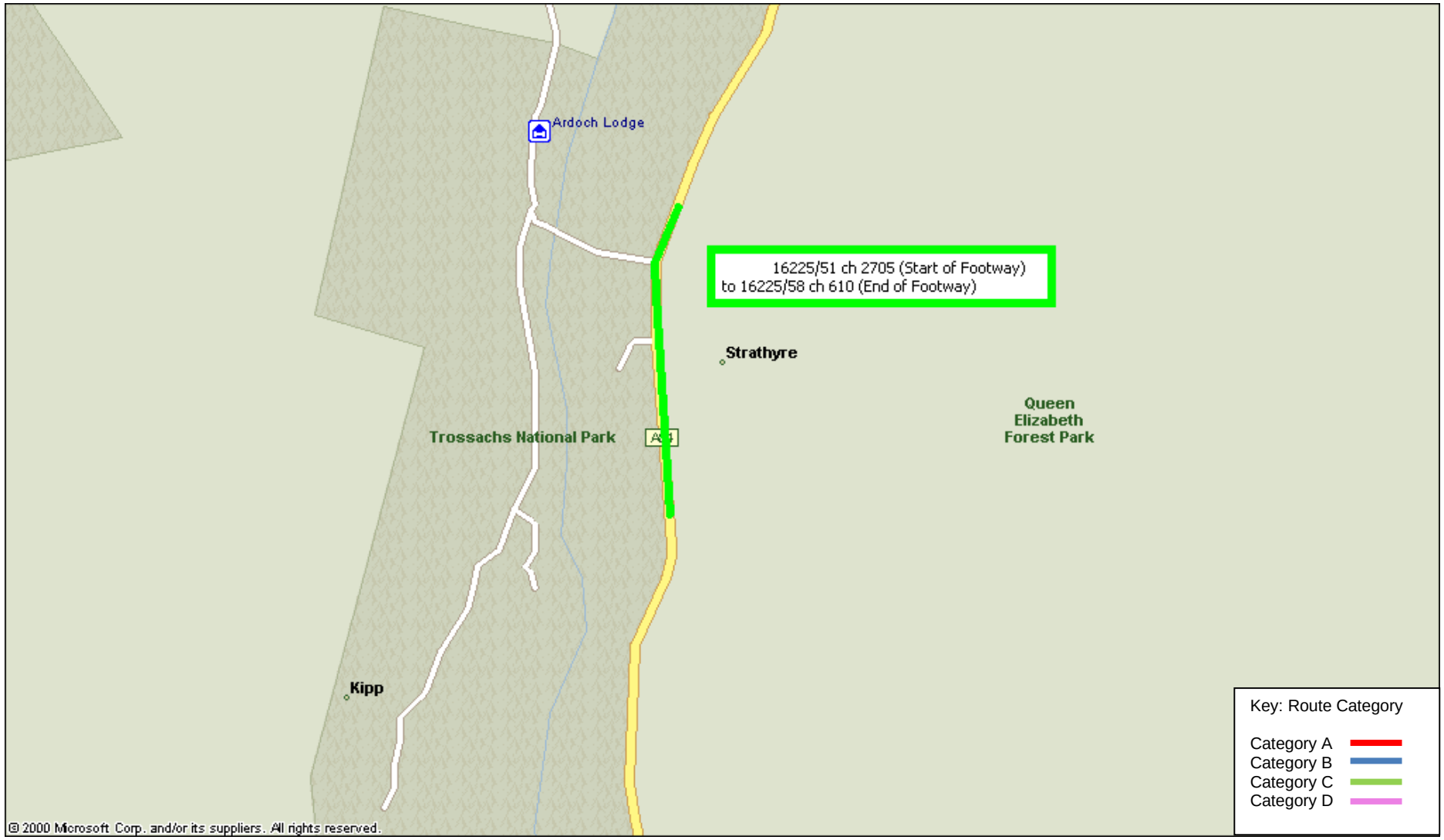


Figure 14/3ac: Footway Location 30, A84 Strathyre (Category C)

Figure 14/3ad: Footway Location 31, A84/A85 Lochearnhead (Category C)

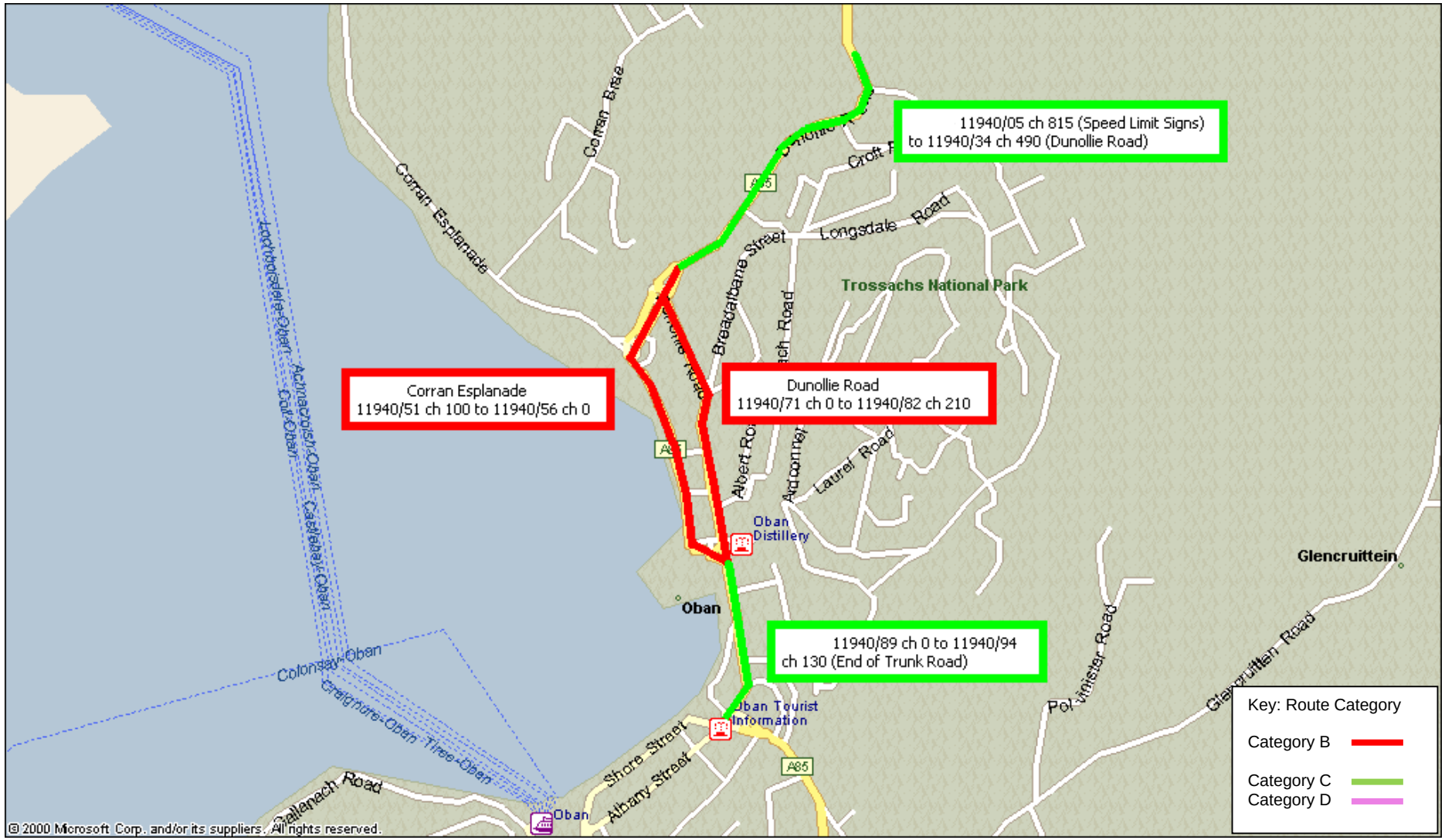


Figure 14/3ae: Footway Location 32, A85 Oban (Category B & C)

Figure 14/3af: Footway Location 33, A85/A828 Connel (Category C)

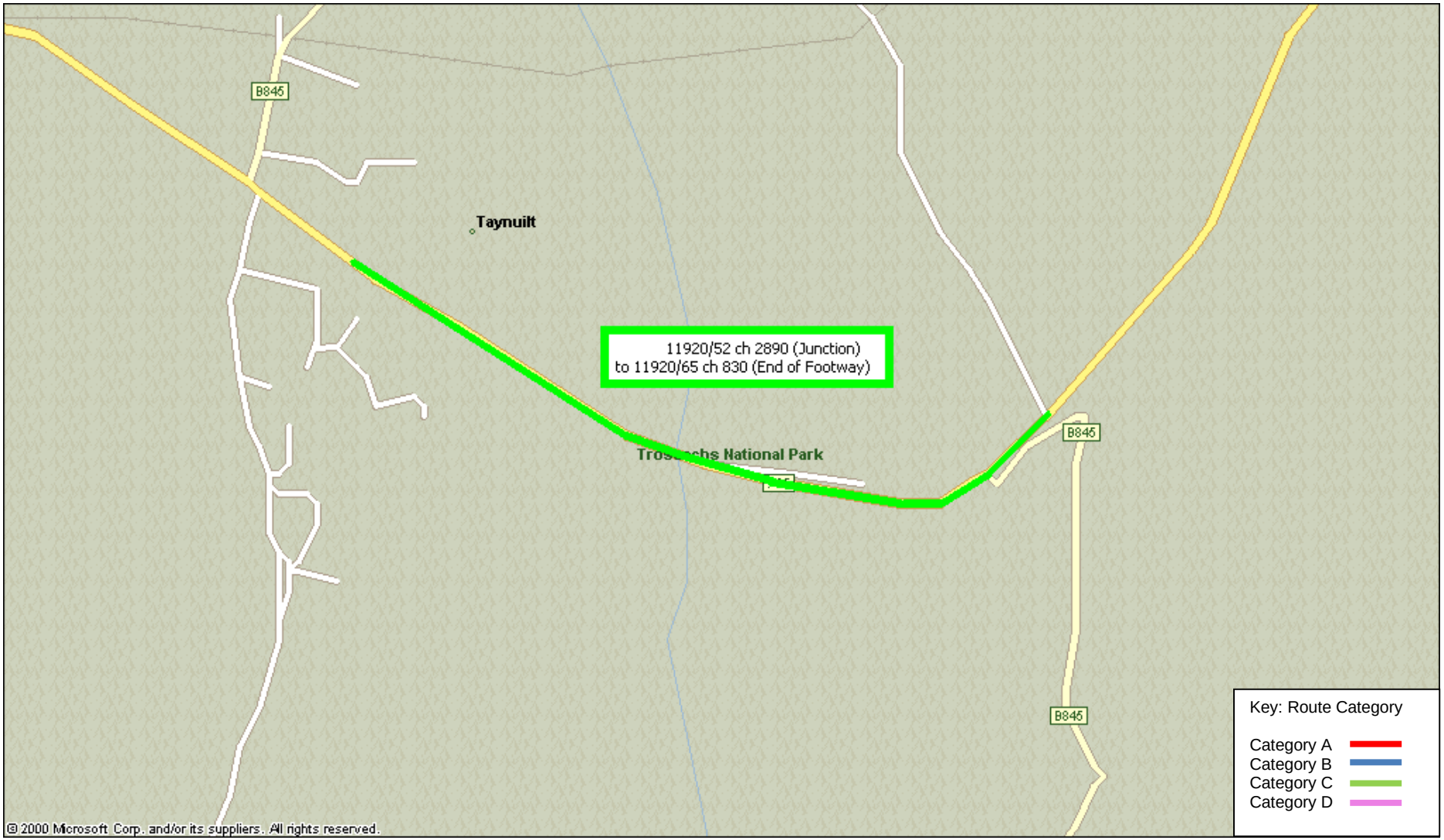


Figure 14/3ag: Footway Location 34, A85 Taynuilt (Category C)

Figure 14/3ah: Footway Location 35, A85 Lochawe (Category C)

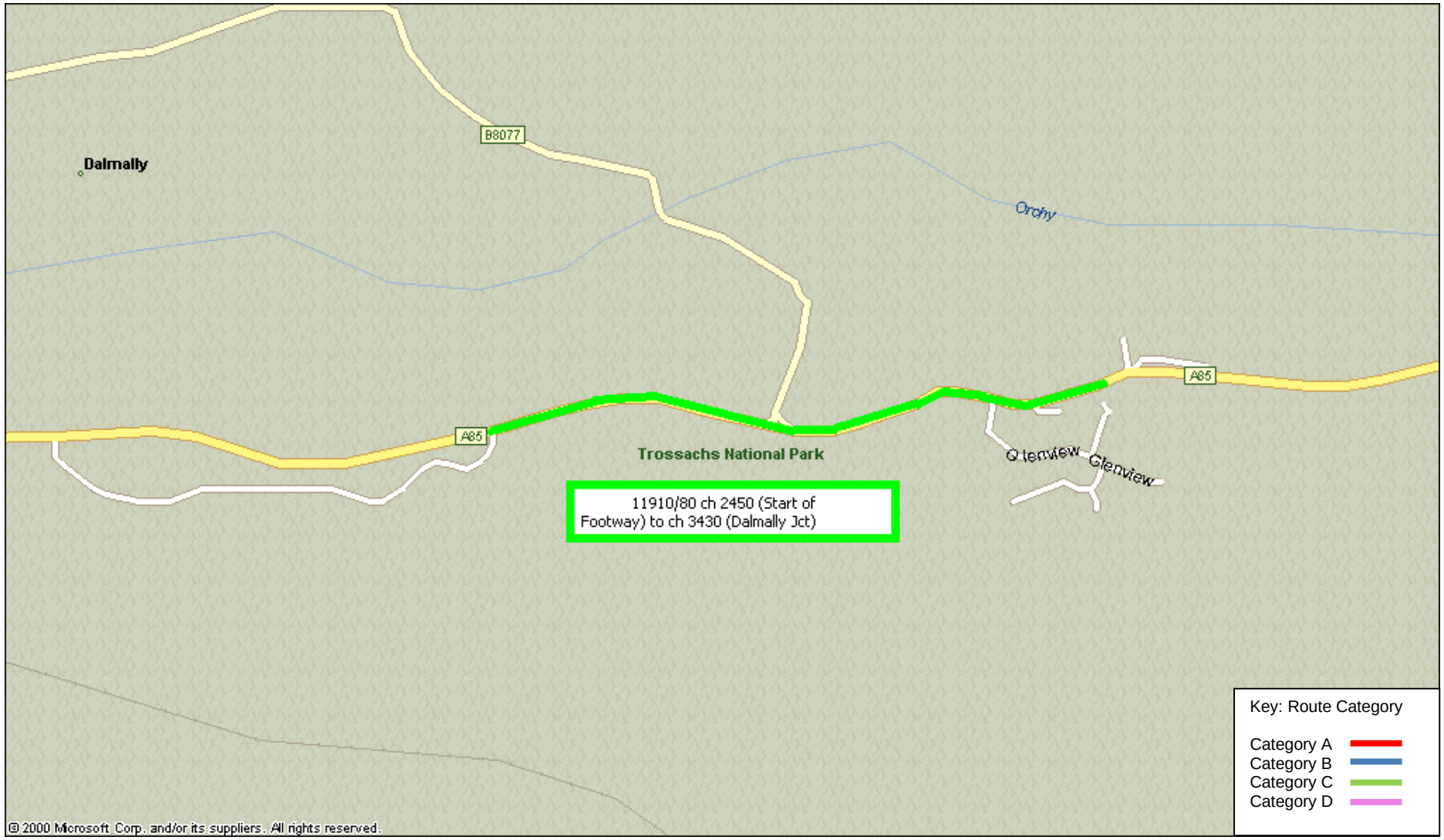


Figure 14/3ai: Footway Location 36, A85 Dalmally (Category C)

Figure 14/3aj: Footway Location 37, A85 St Fillans (Category C)

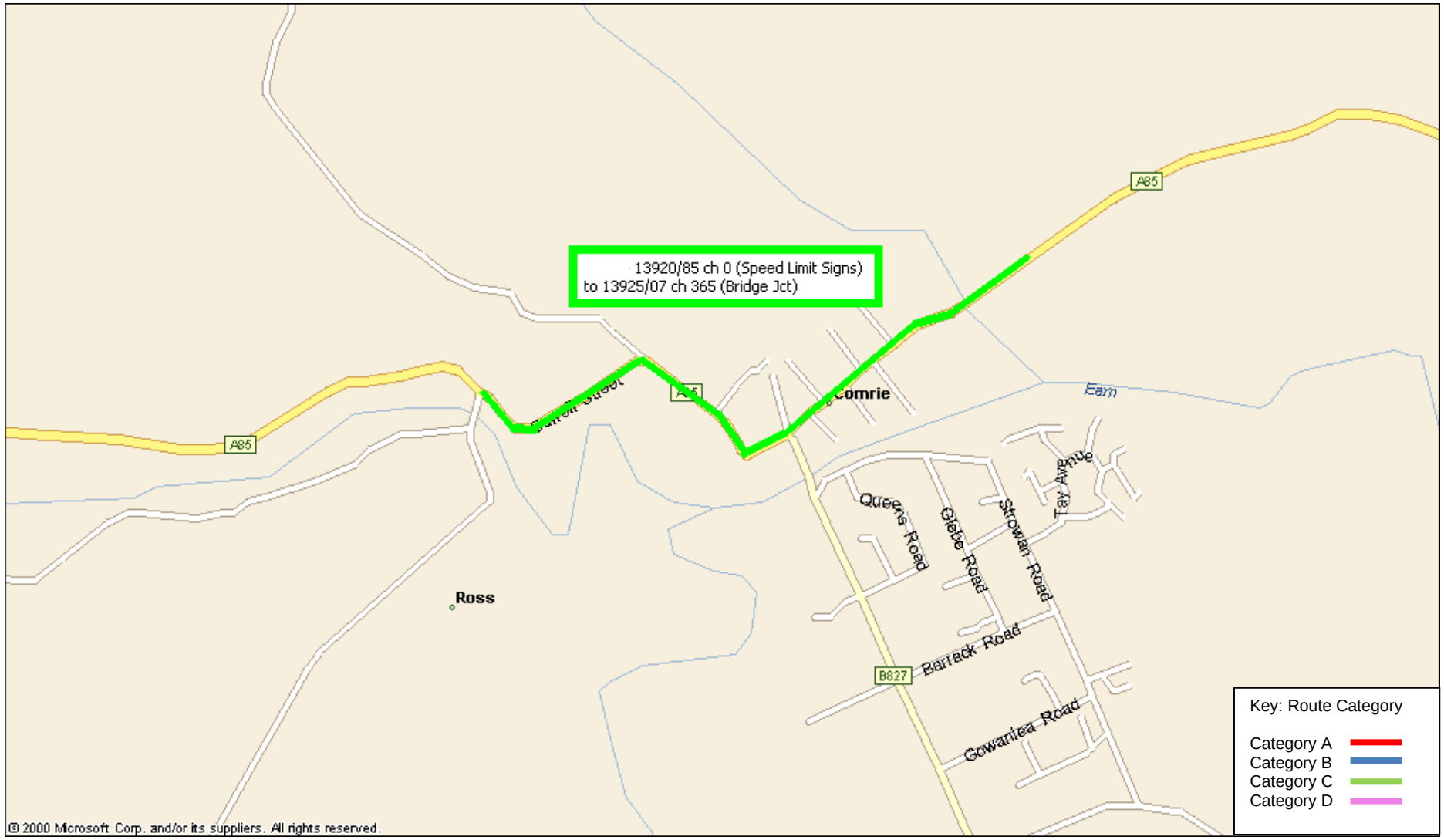


Figure 14/3ak: Footway Location 38, A85 Comrie (Category C)

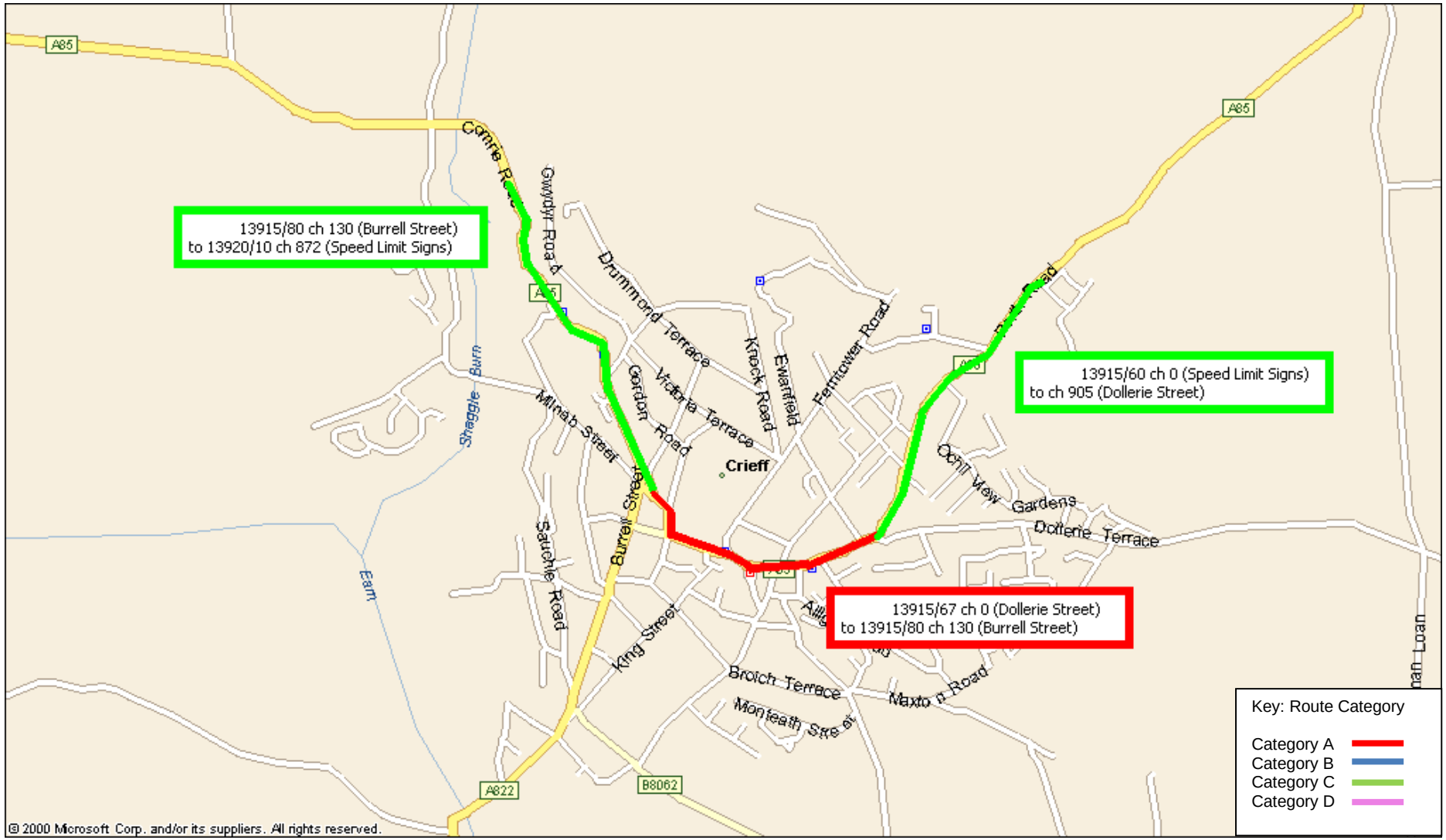


Figure 14/3al: Footway Location 39, A85 Crieff (Category A & C)

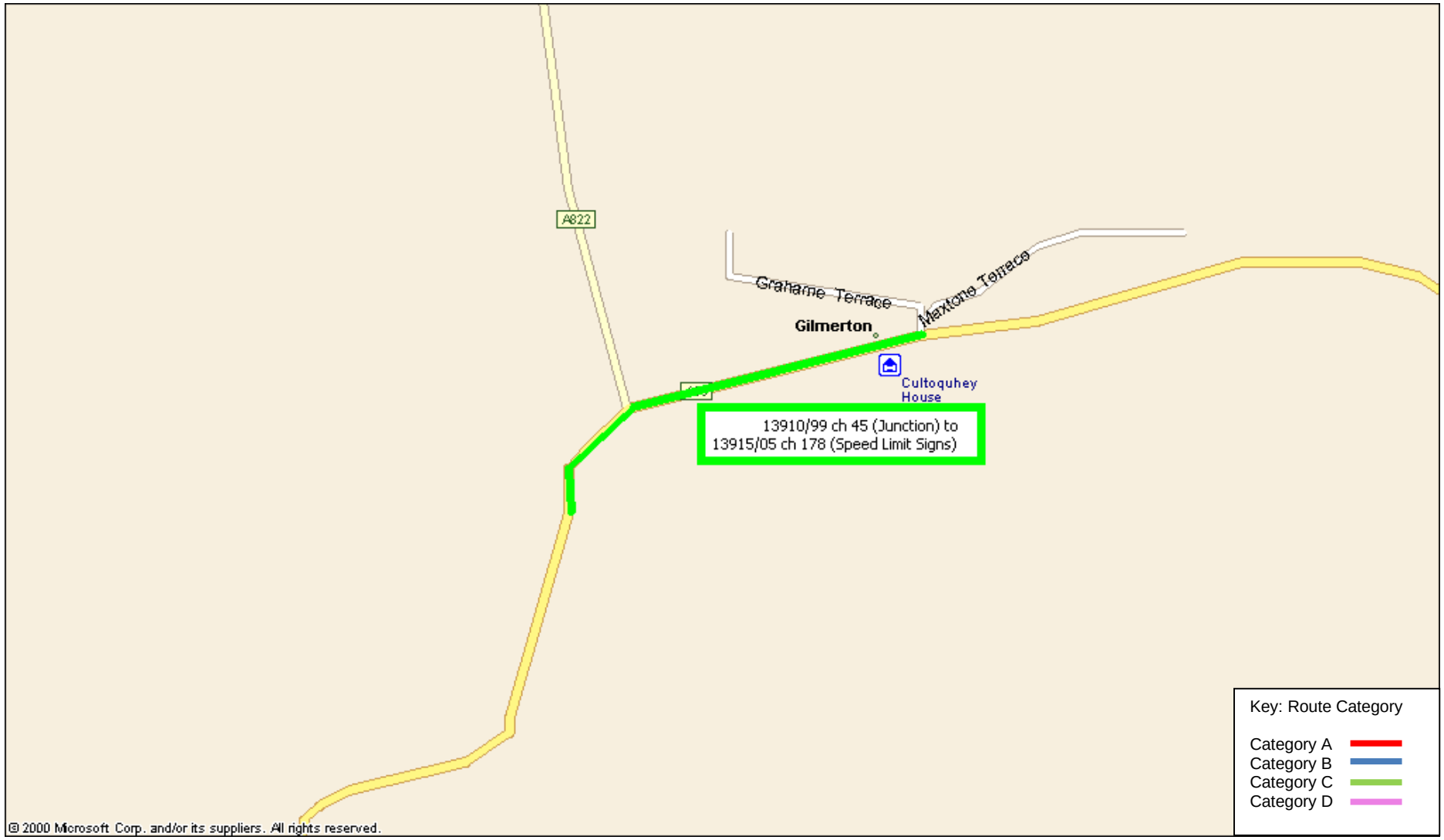


Figure 14/3am: Footway Location 40, A85 Gilmerton (Category C)

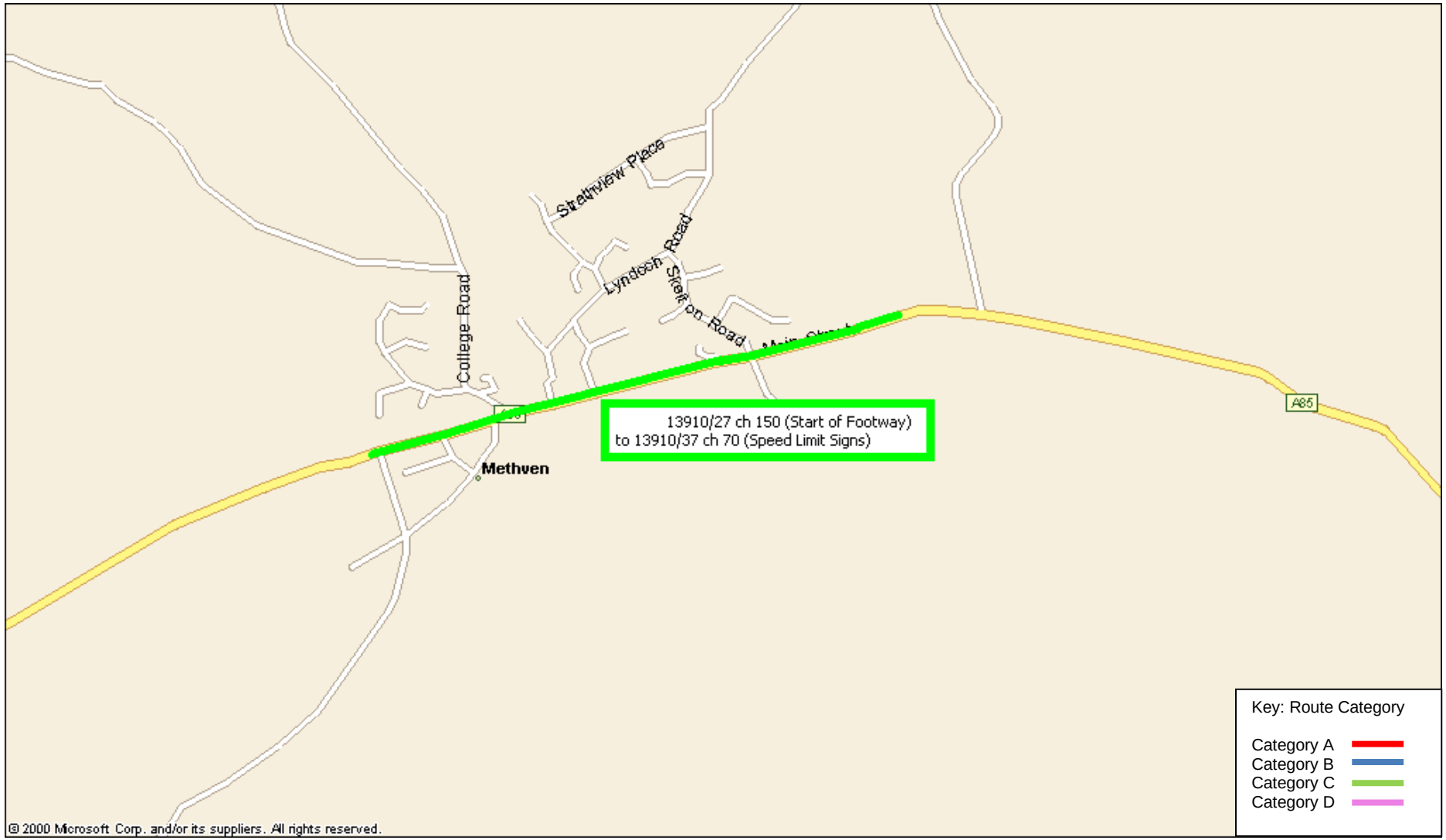


Figure 14/3an: Footway Location 41, A85 Methven (Category C)

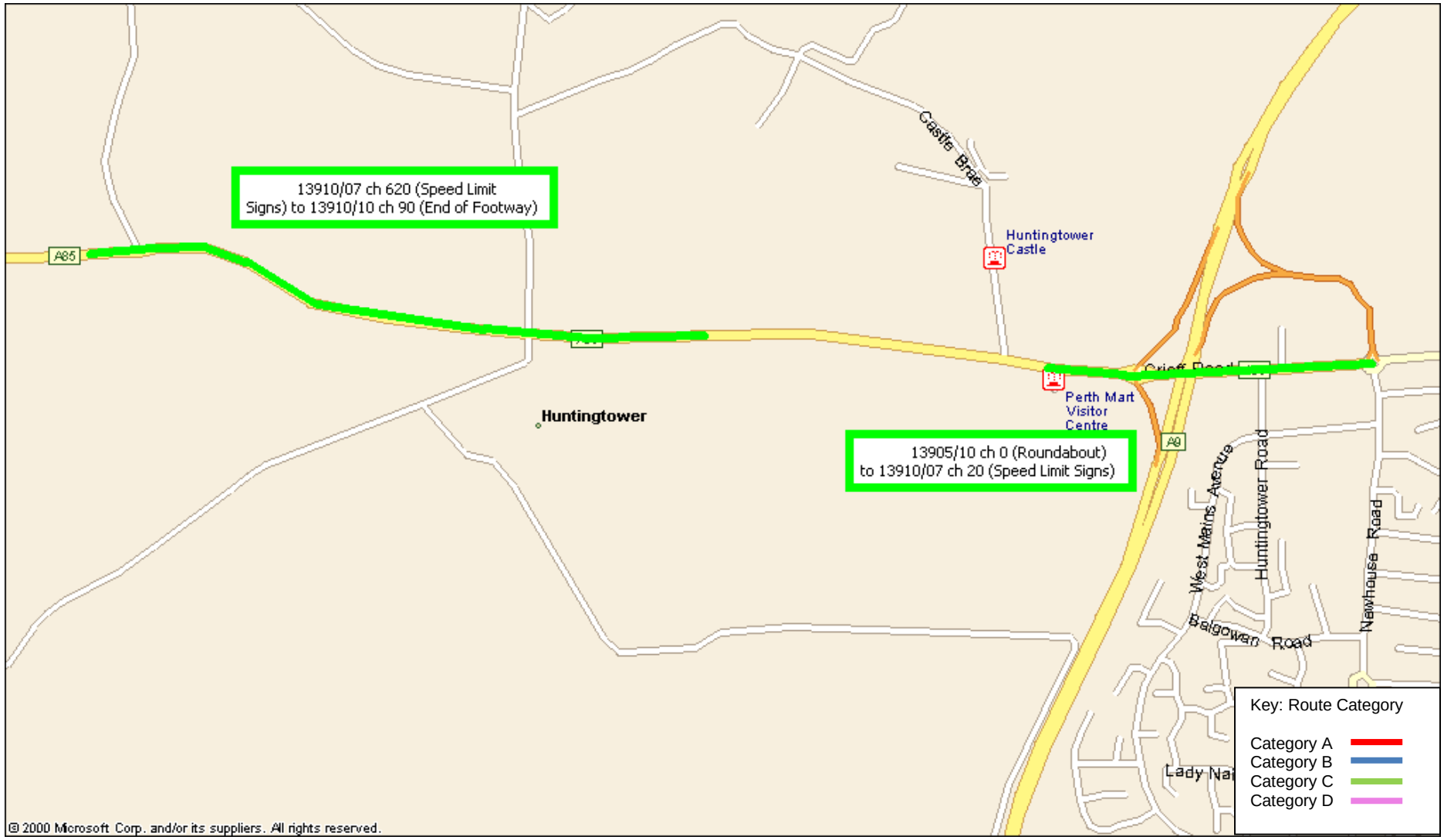


Figure 14/3ao: Footway Location 42, A85 Perth & Huntingtower (Category C)

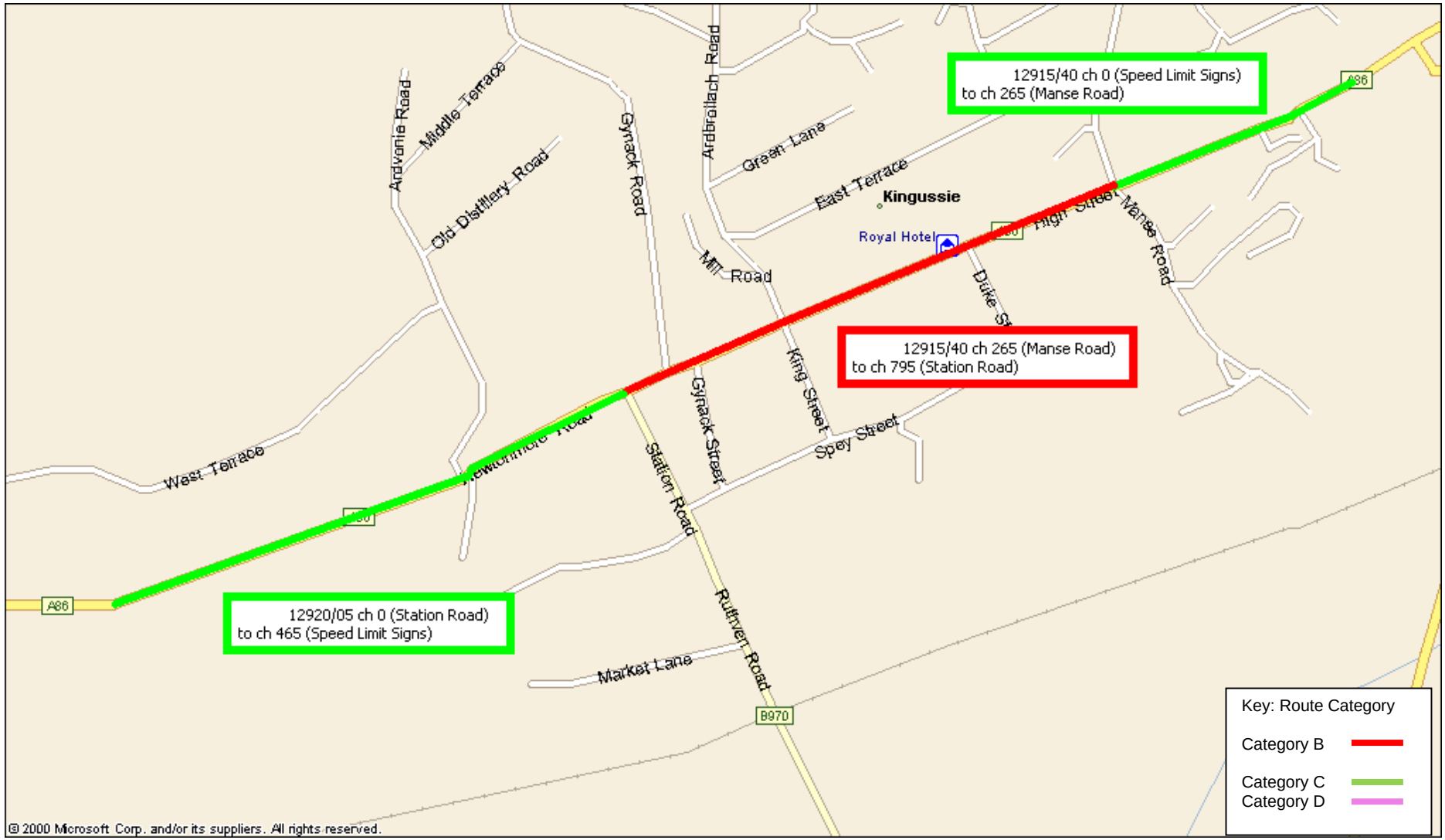


Figure 14/3ap: Footway Location 43, A86 Kingussie (Category B & C)

Figure 14/3aq: Footway Location 44, A86 Newtonmore (Category B & C)

Figure 14/3ar: Footway Location 45, A87 Portree (Category C)

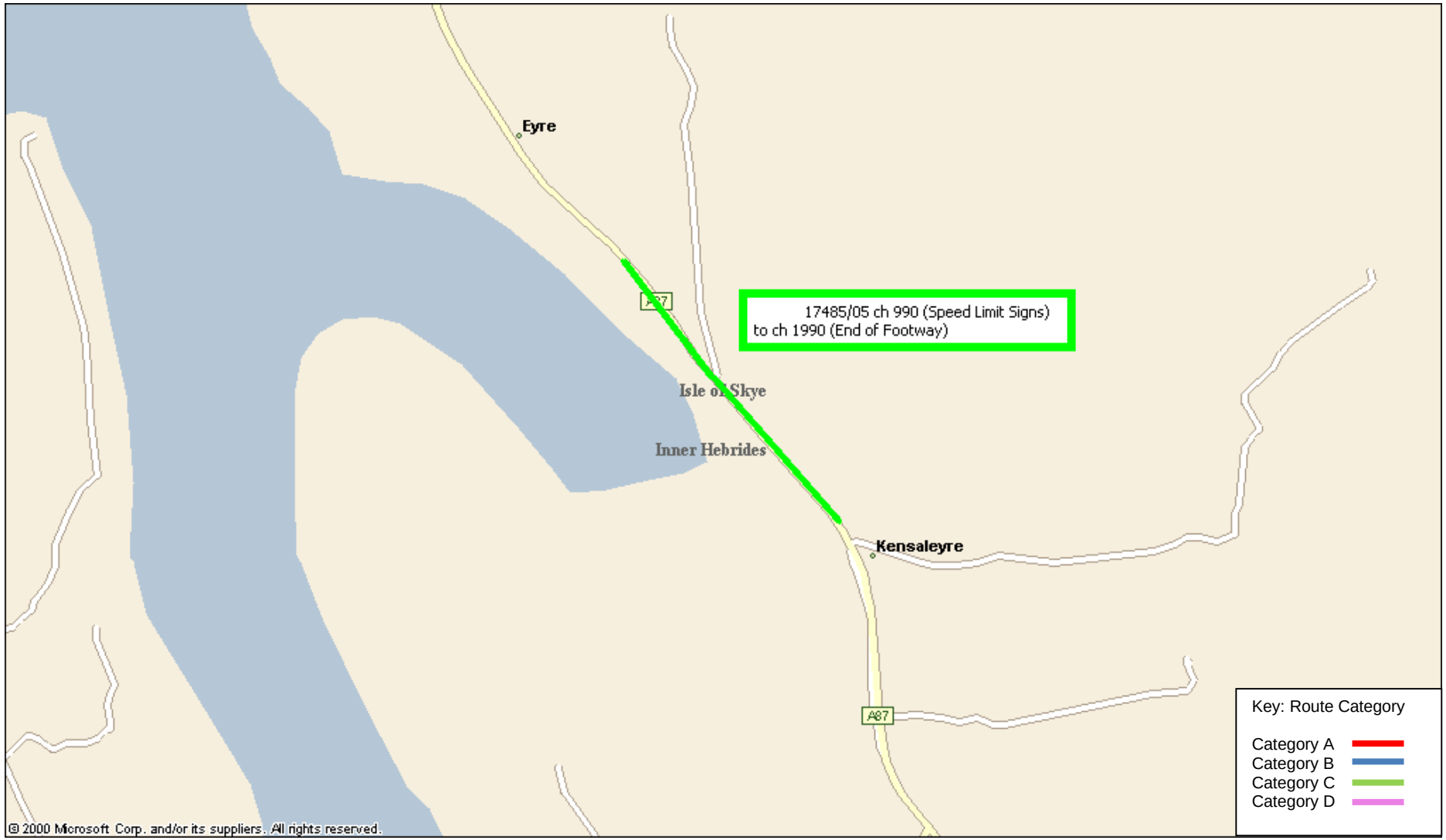


Figure 14/3as: Footway Location 46, A87 Kensaleyre (Category C)

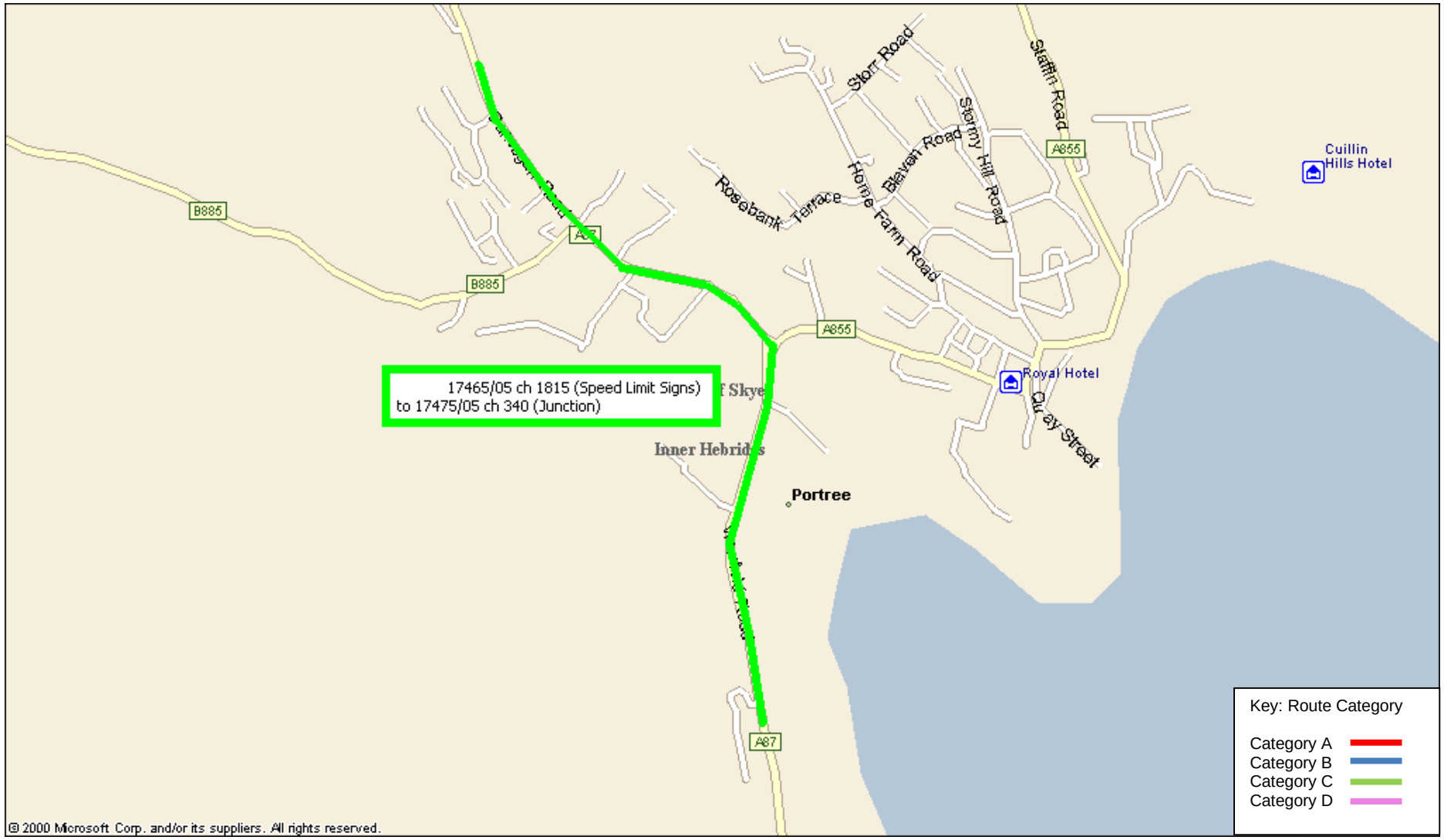


Figure 14/3at: Footway Location 47, A87 Portree (Category C)

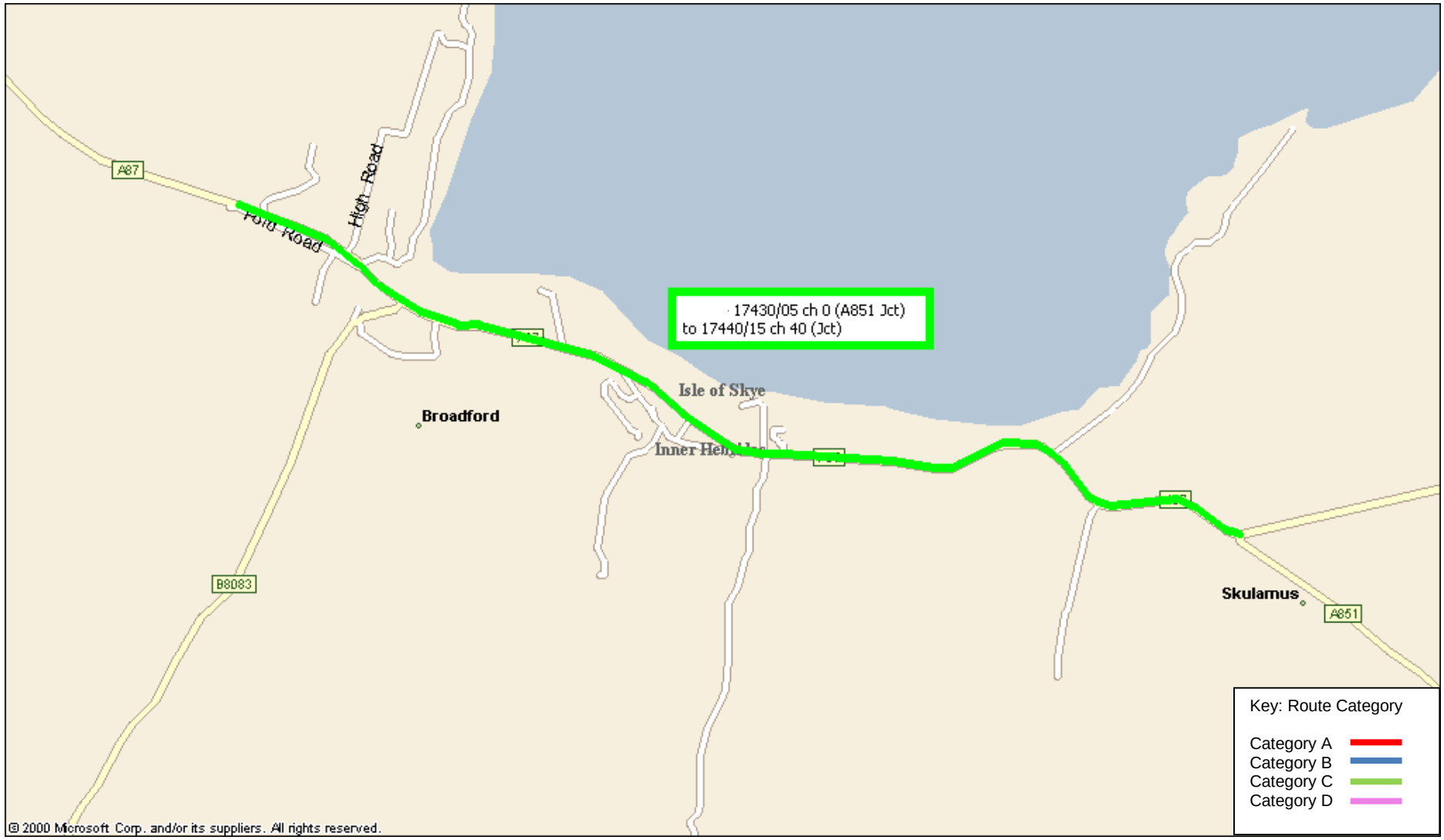


Figure 14/3au: Footway Location 48, A87 Broadford (Category C)

Figure 14/3av: Footway Location 49, A87 Kyle of Lochalsh & Kyleakin (Category C)

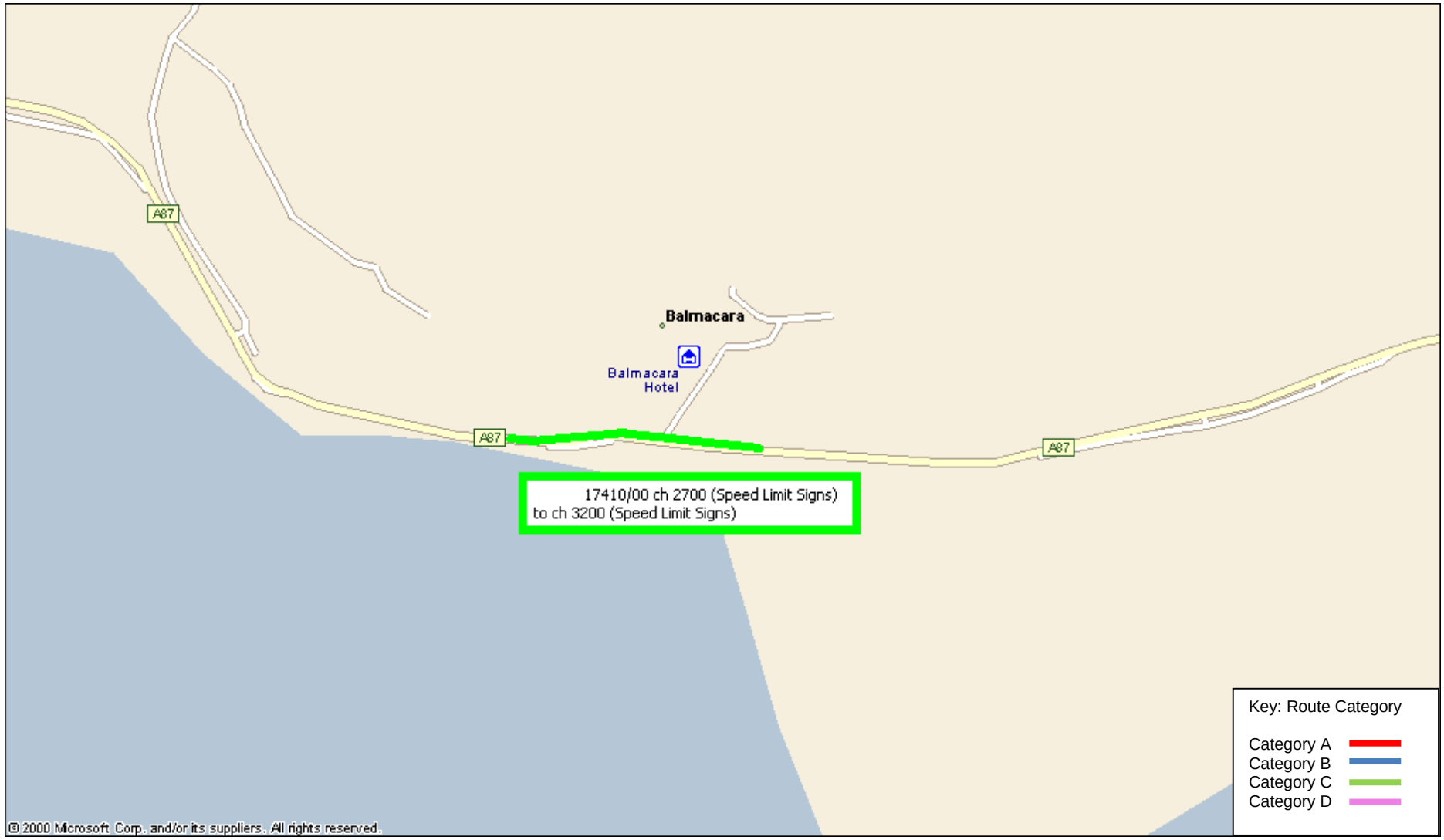


Figure 14/3aw: Footway Location 50, A87 Balmacara (Category C)

Figure 14/3ax: Footway Location 51, A87 Inverinate (Category C)

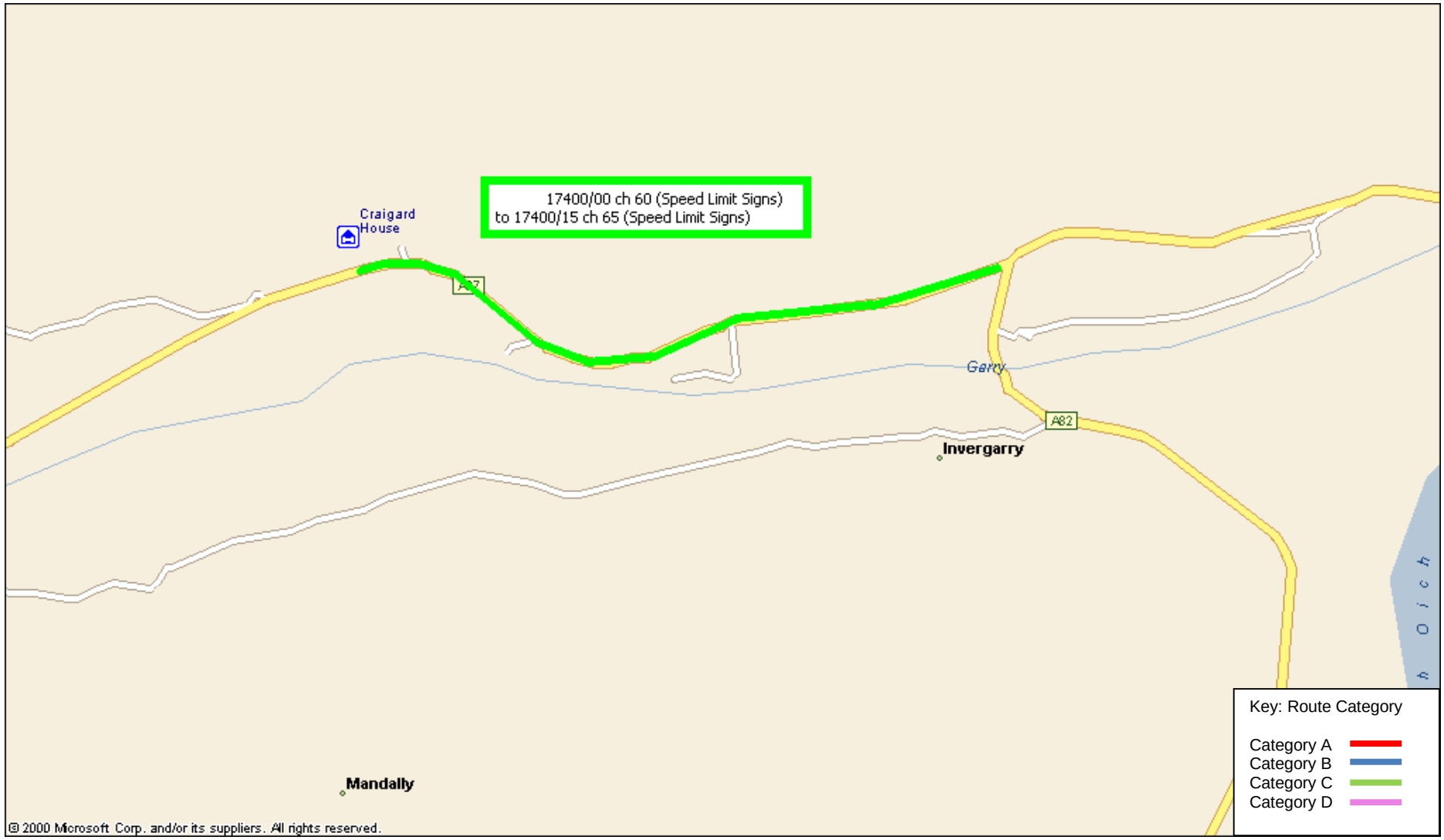


Figure 14/3ay: Footway Location 52, A87 Invergarry (Category C)

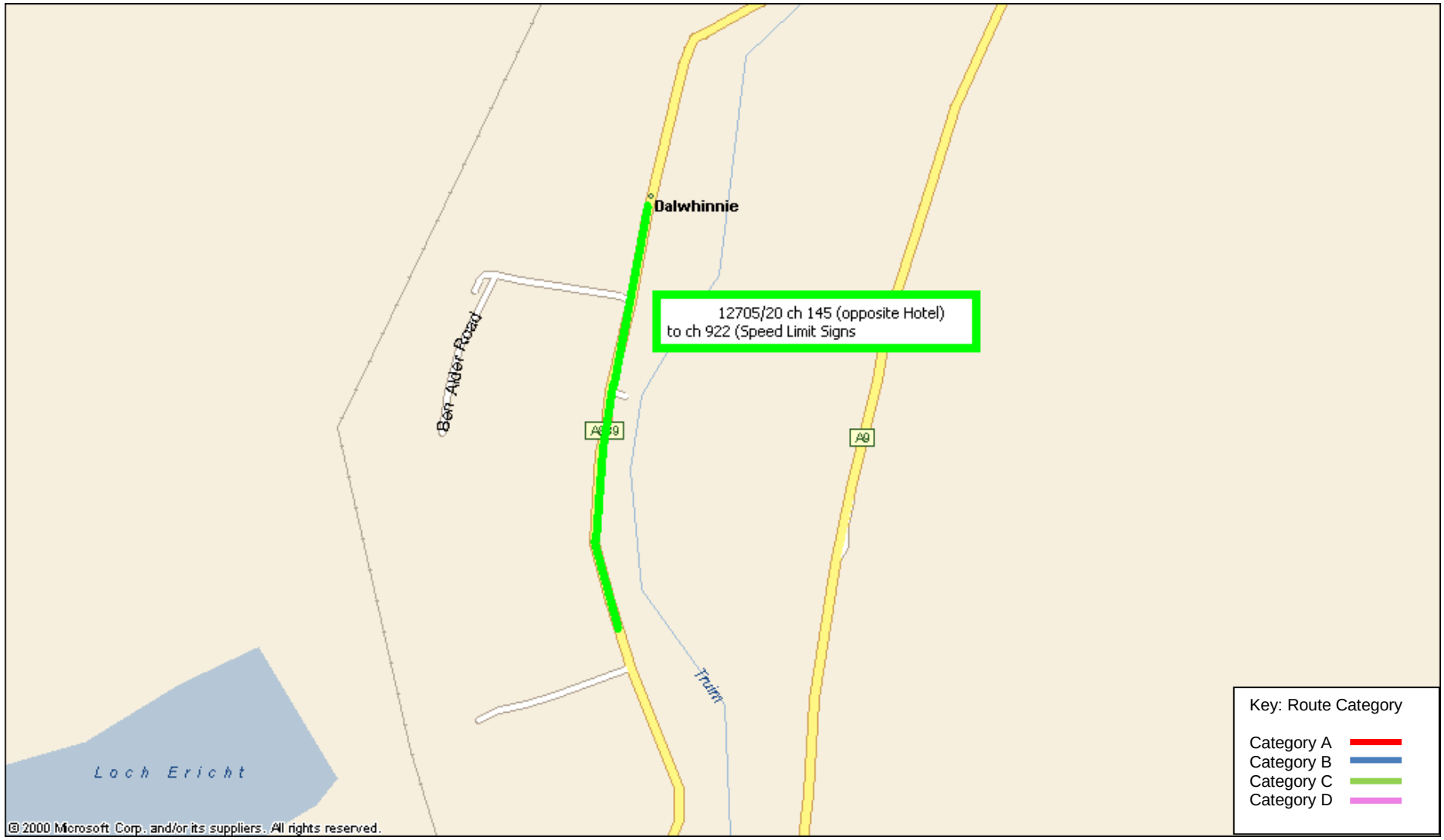


Figure 14/3az: Footway Location 53, A889 Dalwhinnie (Category C)

Figure 14/3ba: Footway Location 54, A9 Thurso & Scrabster (Category B & C)

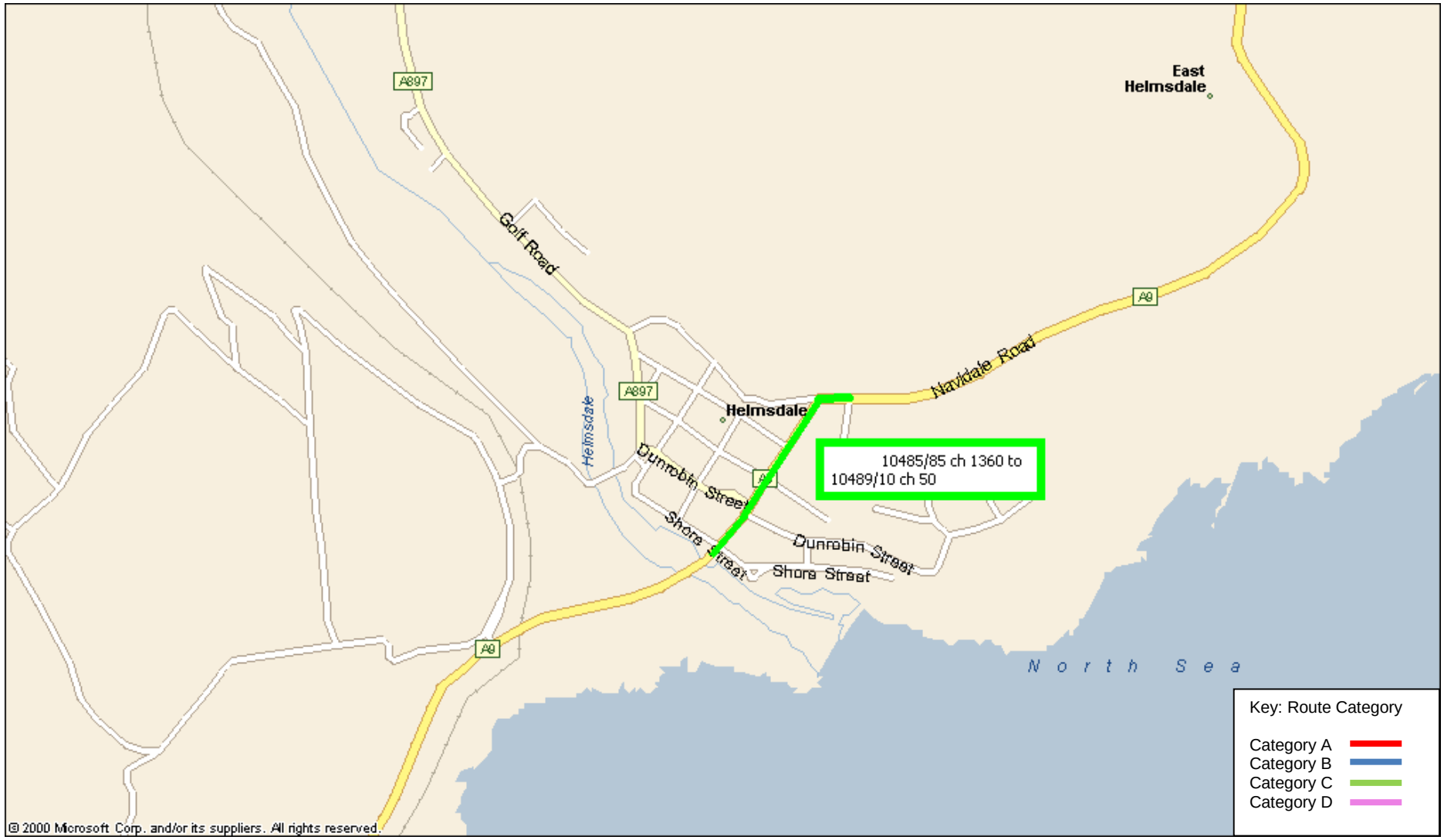


Figure 14/3bb: Footway Location 55, A9 Helmsdale (Category C)

Figure 14/3bc: Footway Location 56, A9 Portgower (Category C)

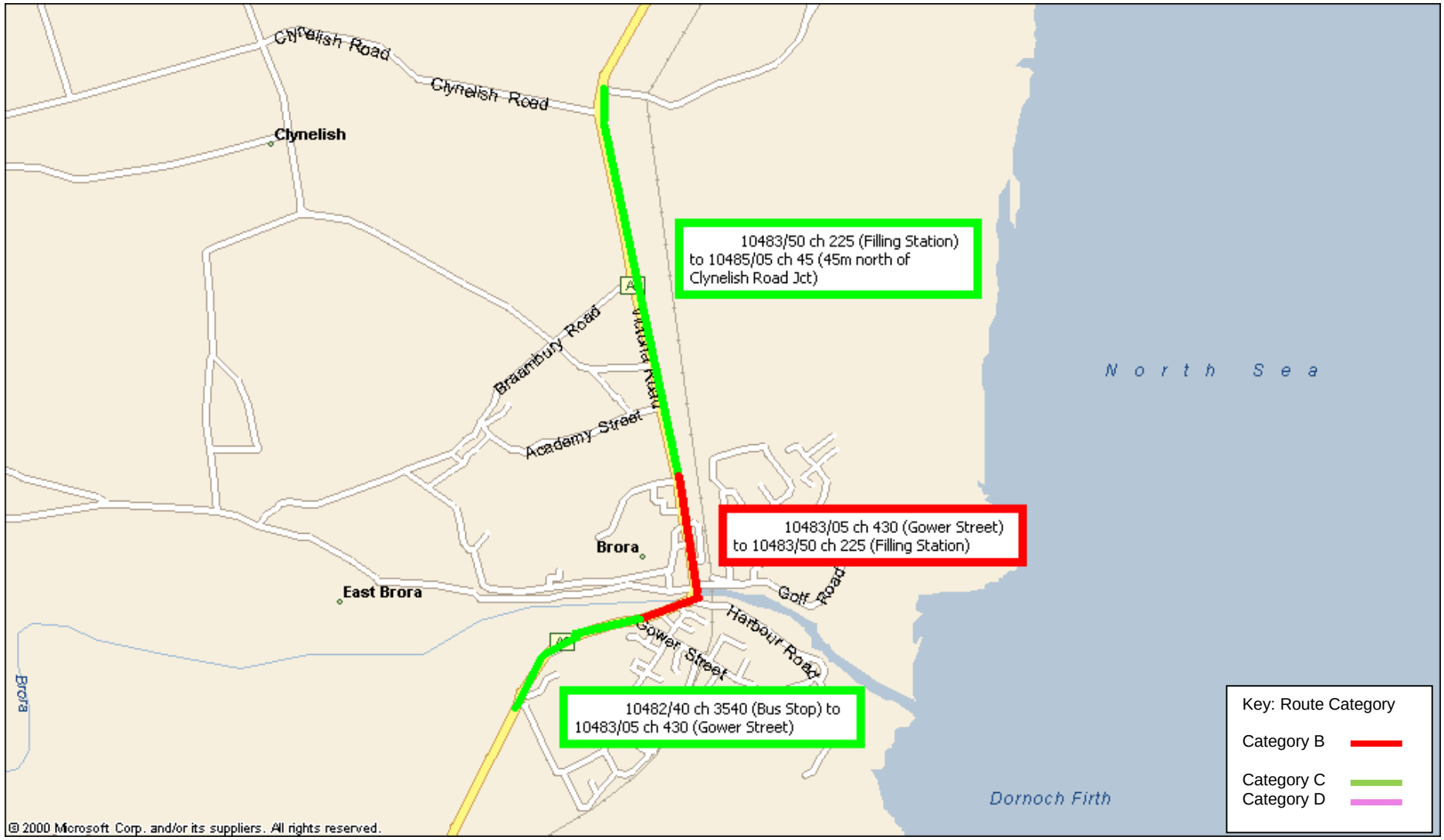


Figure 14/3bd: Footway Location 57, A9 Brora (Category B & C)

Figure 14/3be: Footway Location 58, A9 Golspie (Category B & C)

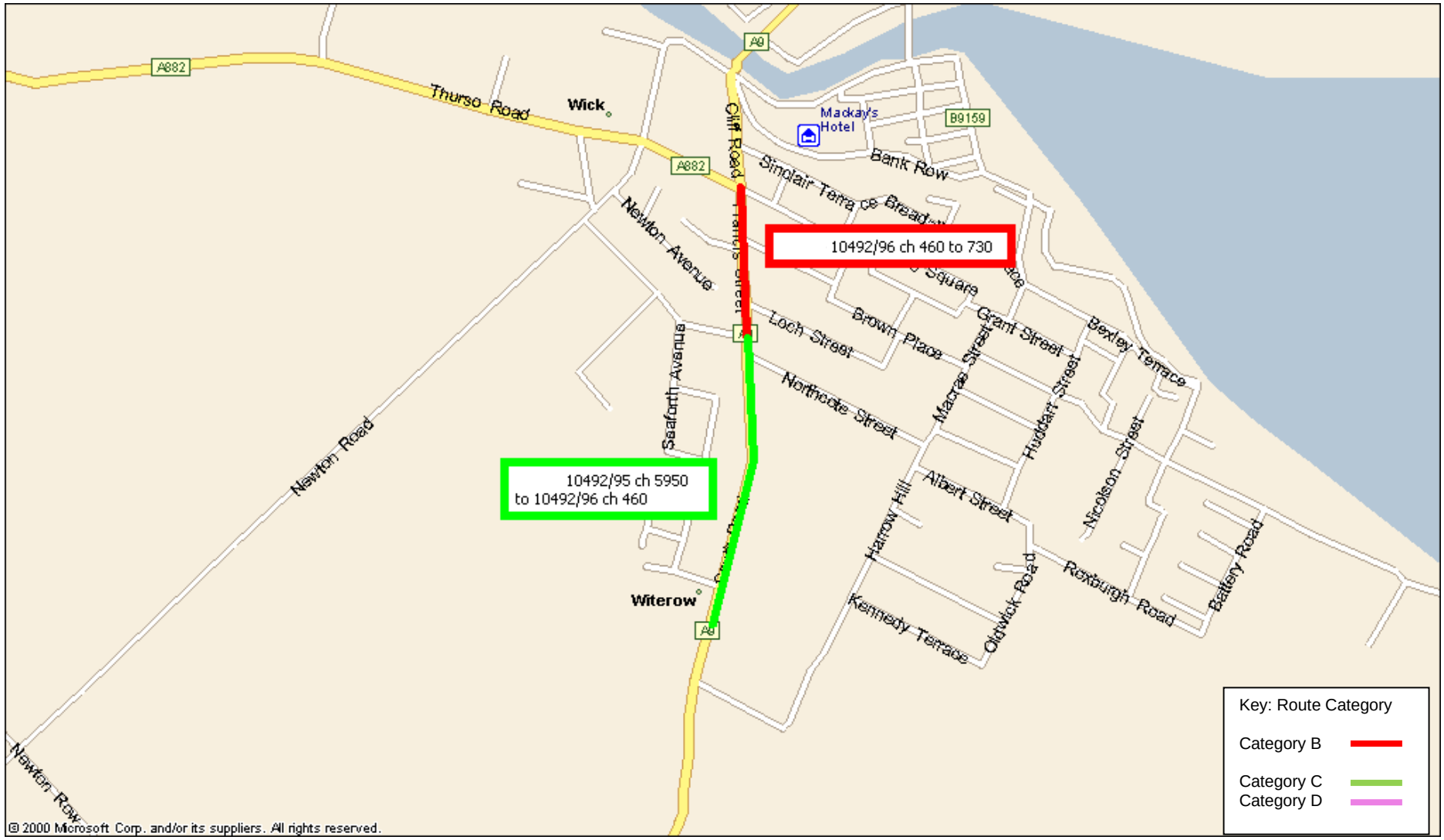


Figure 14/3bf: Footway Location 59, A99 Wick (Category B & C)

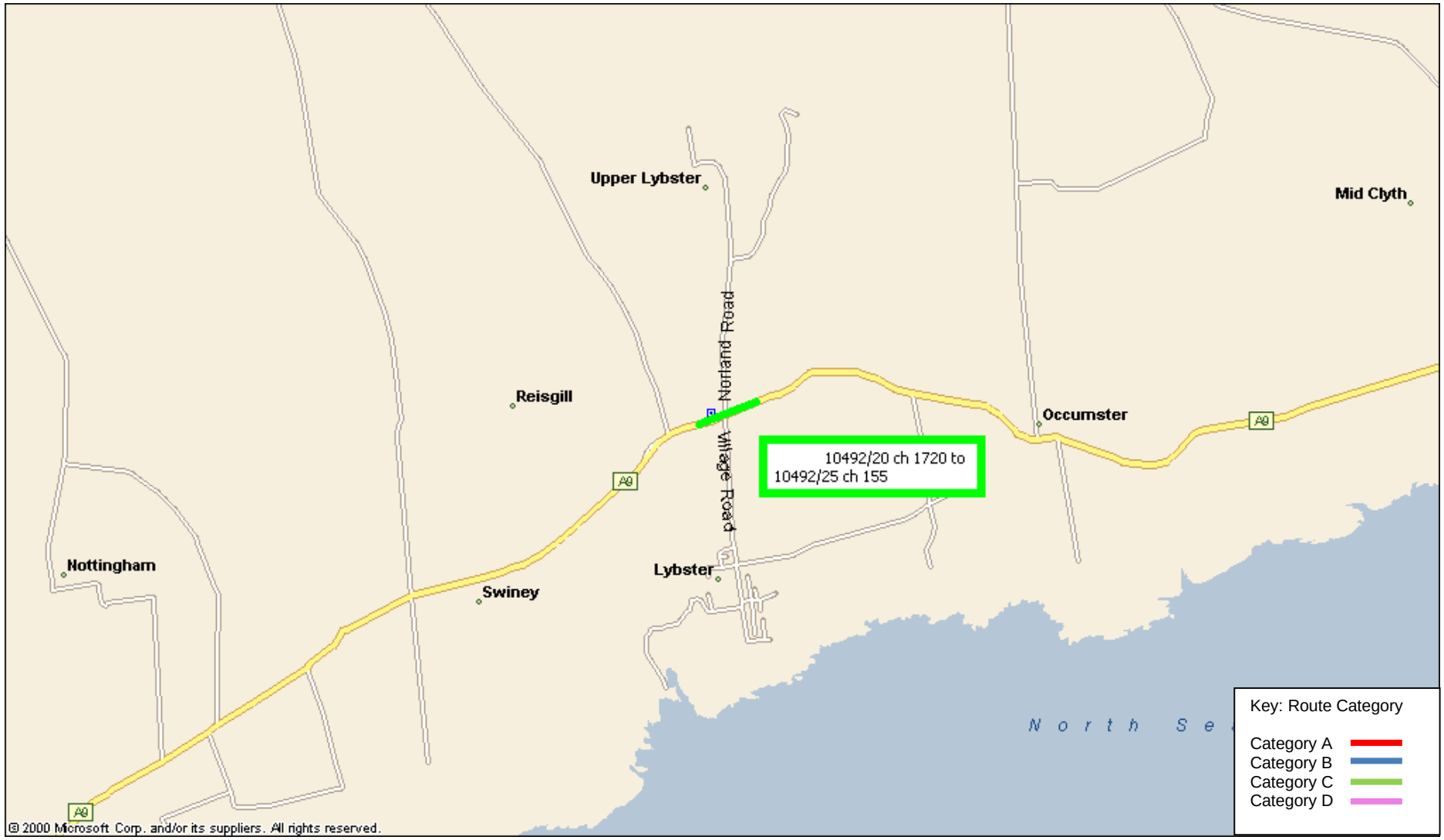


Figure 14/3bg: Footway Location 60, A99 Lybster (Category C)

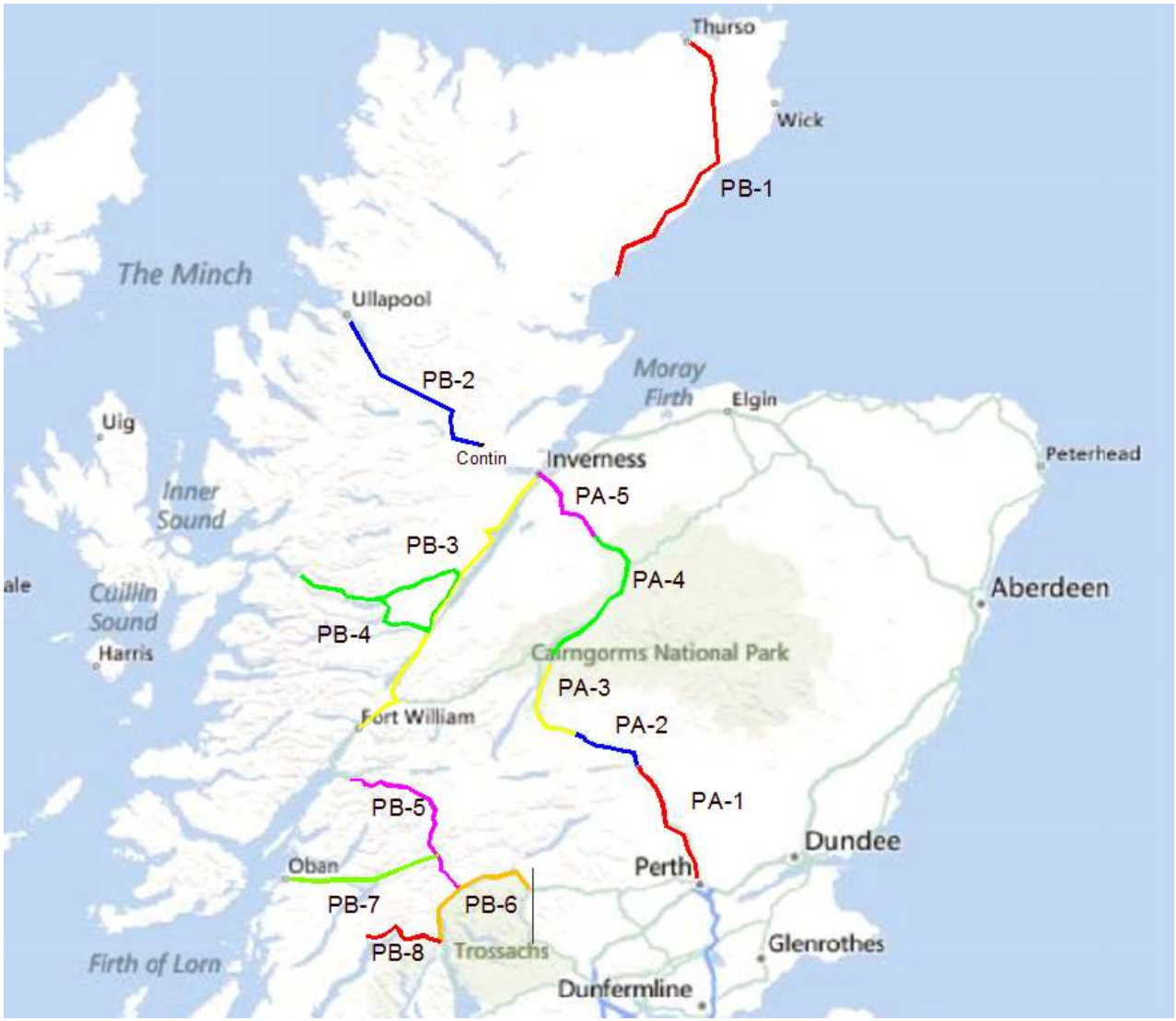


Figure 14/4: Patrol Routes

Figure 14/5a: Road Sensor Locations (North)

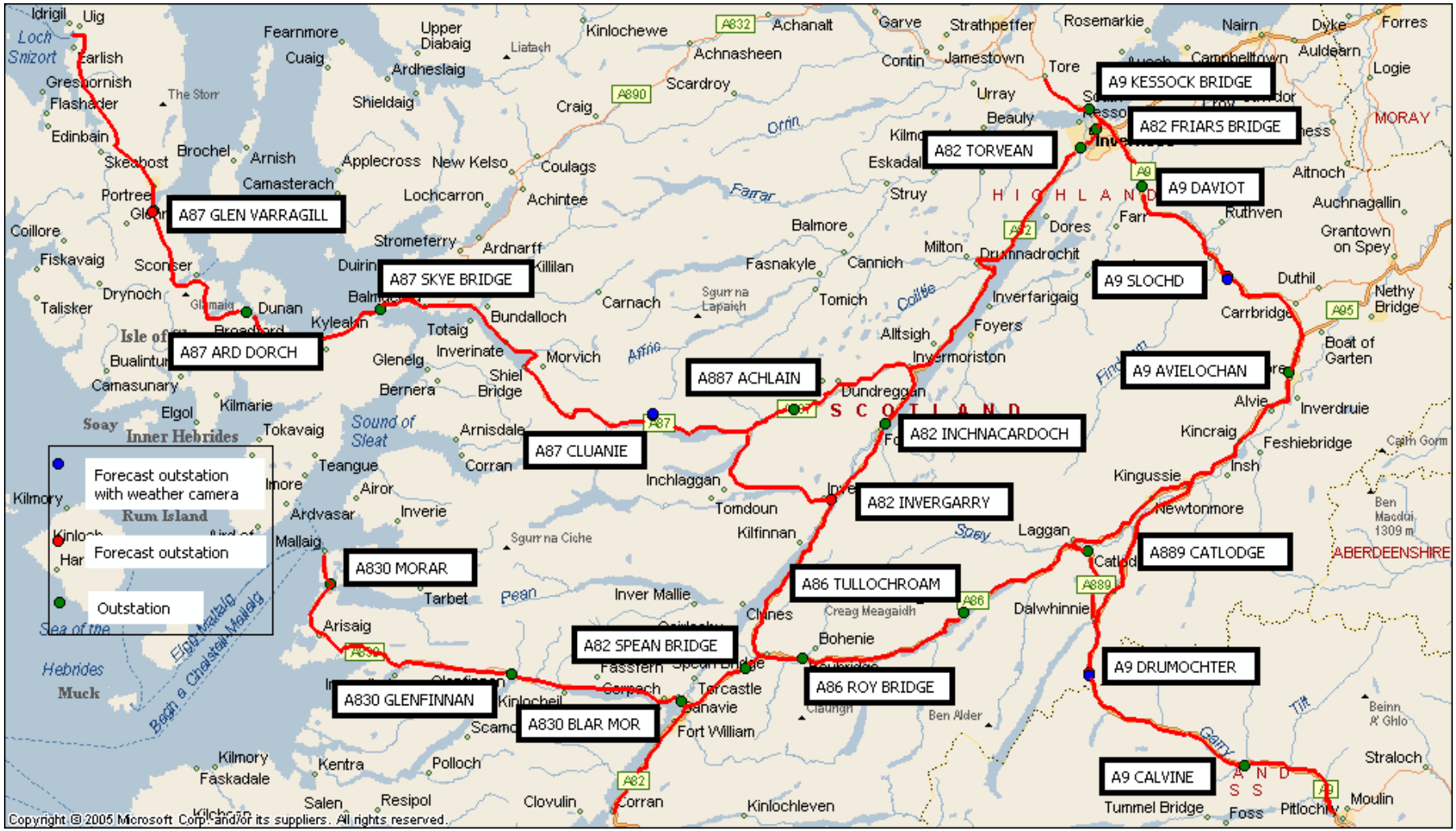


Figure 14/5b: Road Sensor Locations (Central)

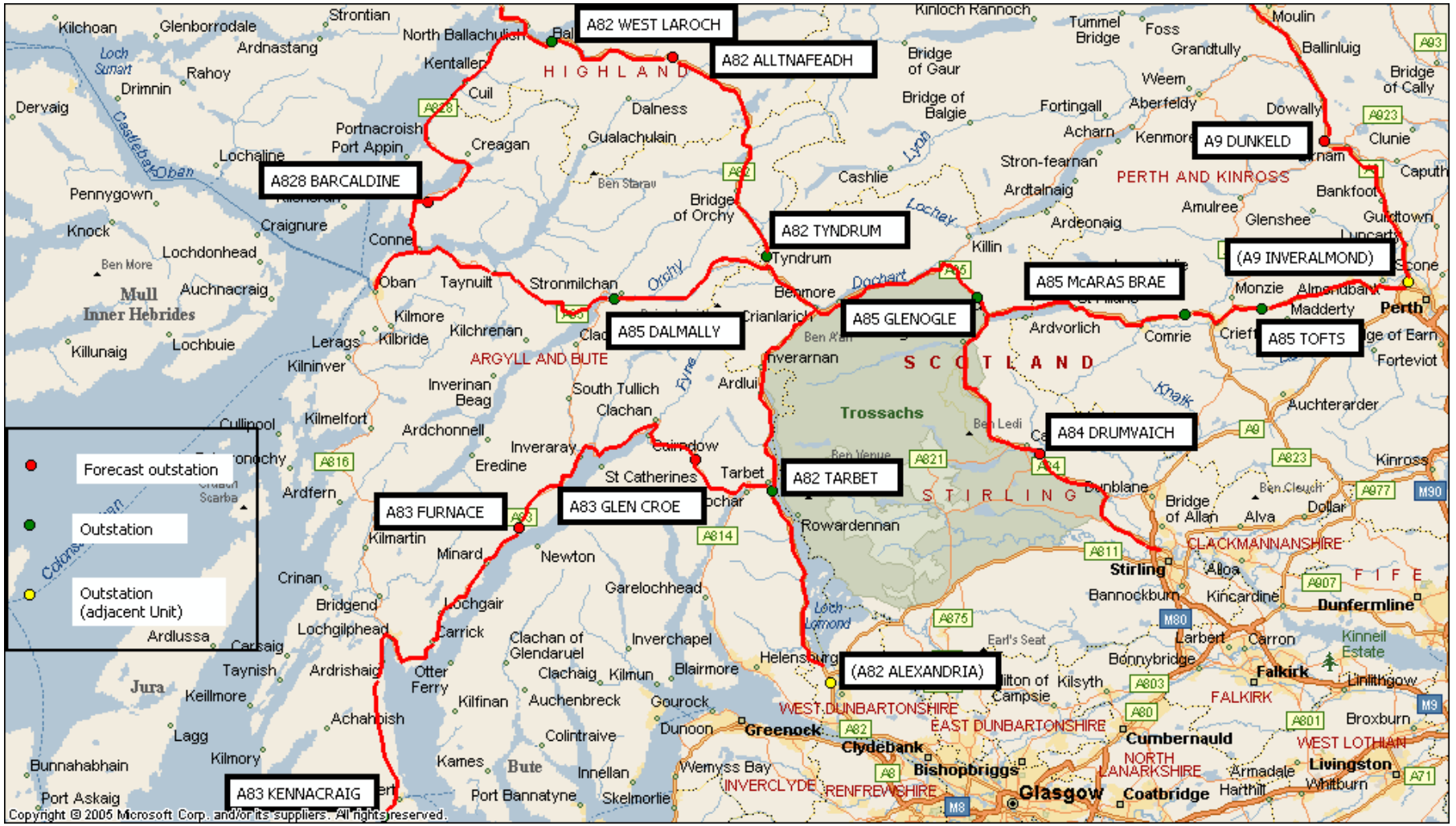


Figure 14/5c: Road Sensor Locations (South)

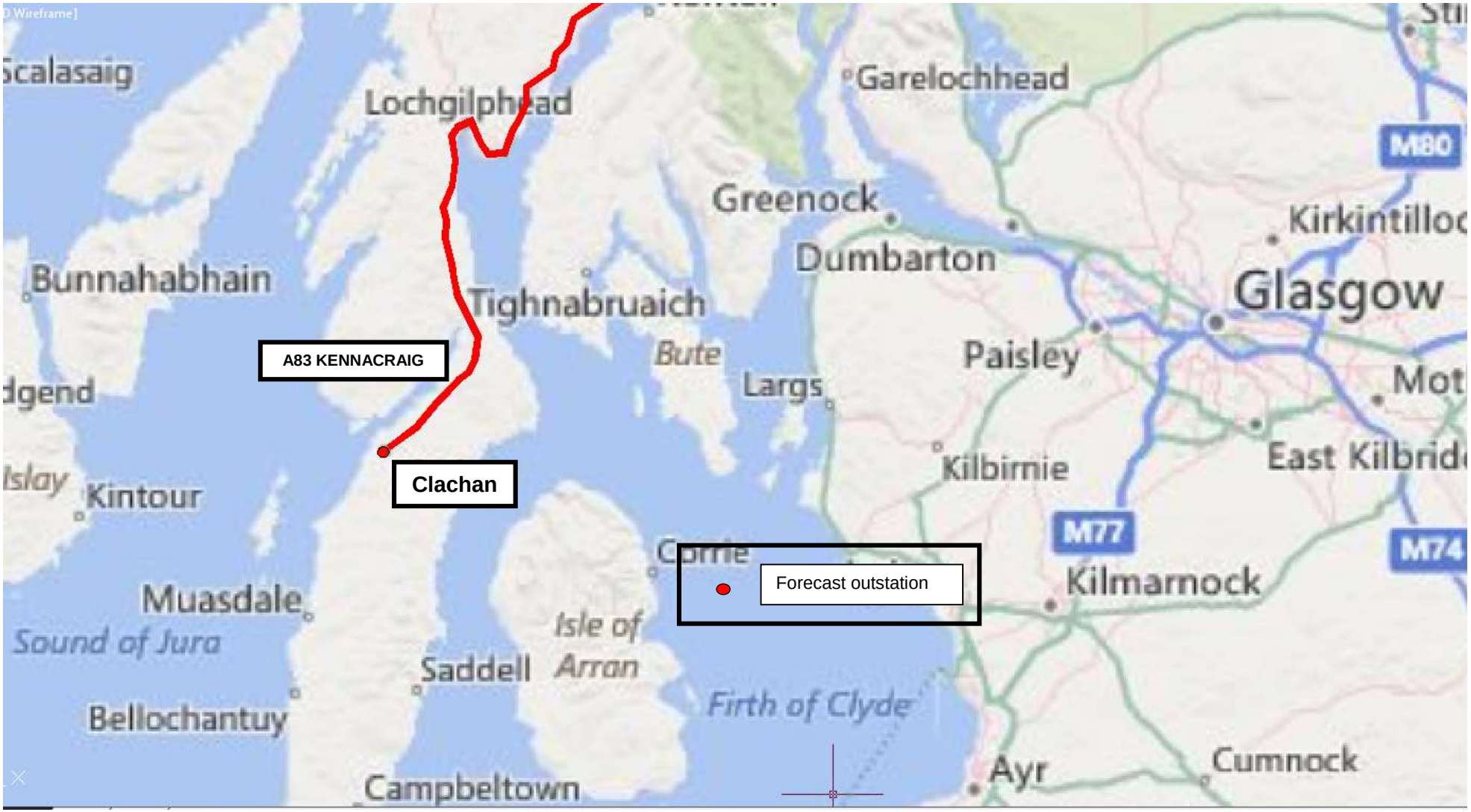


Figure 14/5d: Road Sensor Locations (South)

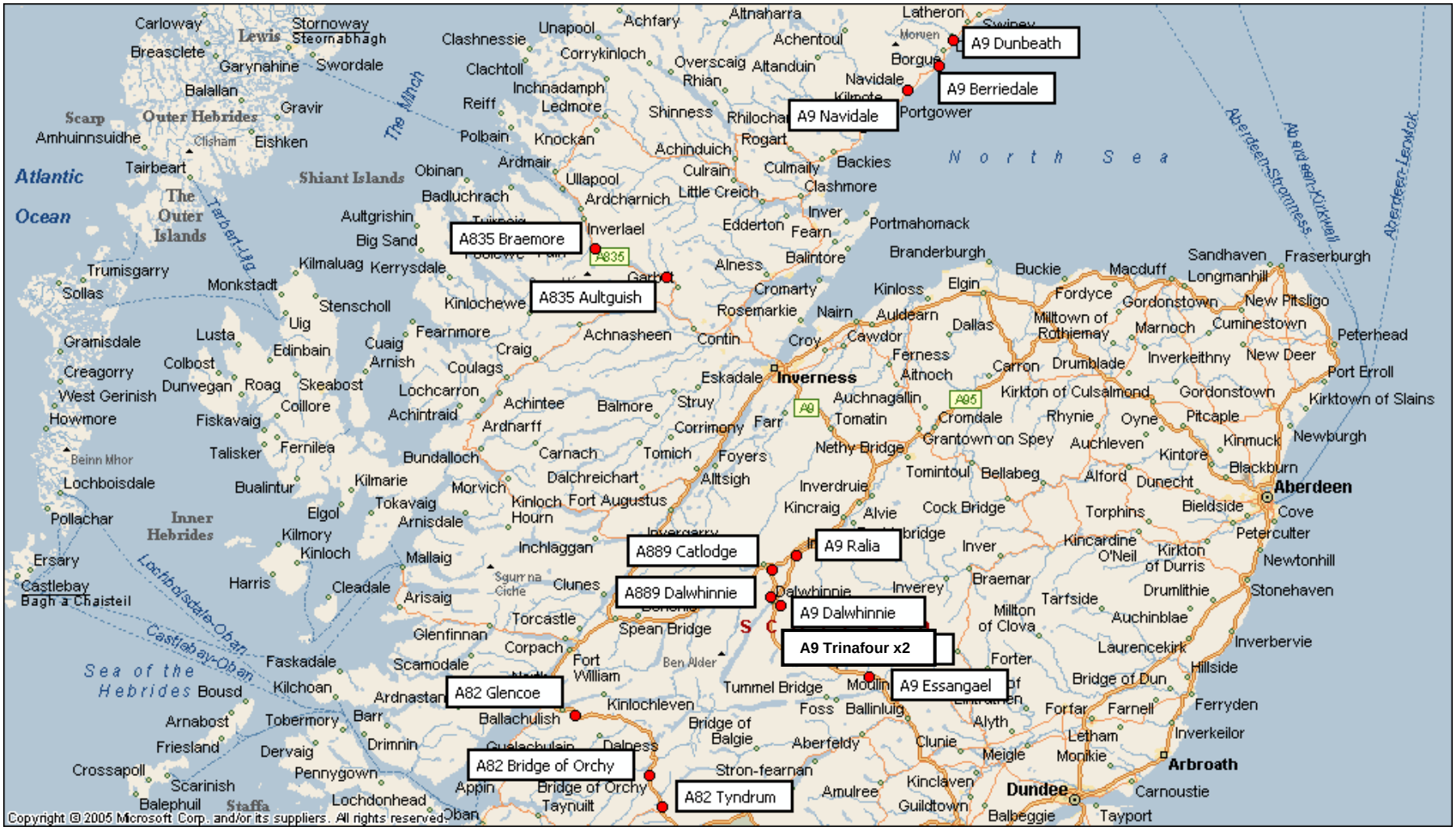


Figure 14/6: Locations of Snow Gates

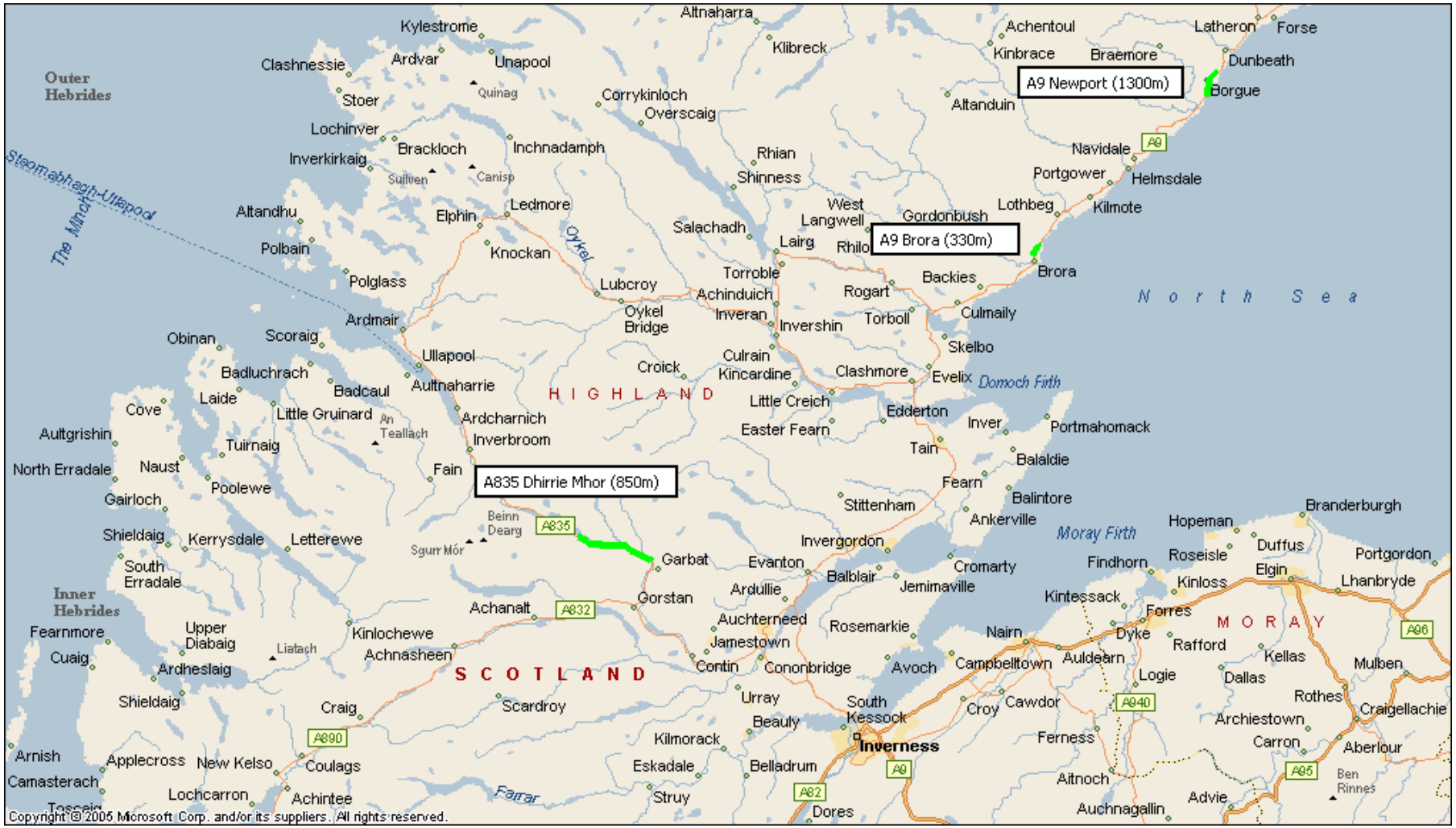


Figure 14/7: Locations of Snow Fences

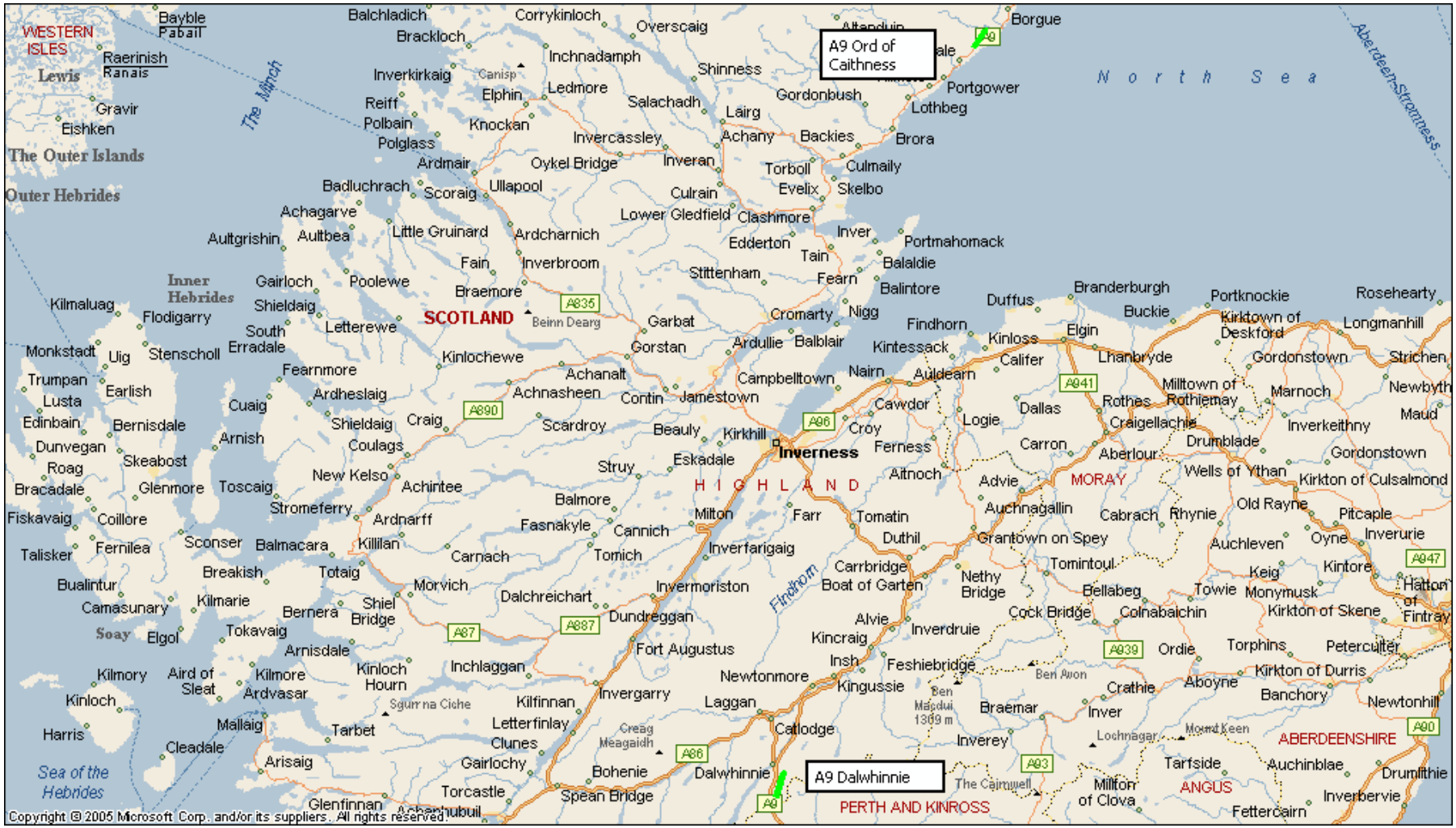


Figure 14/8: Locations of Shelter Belts

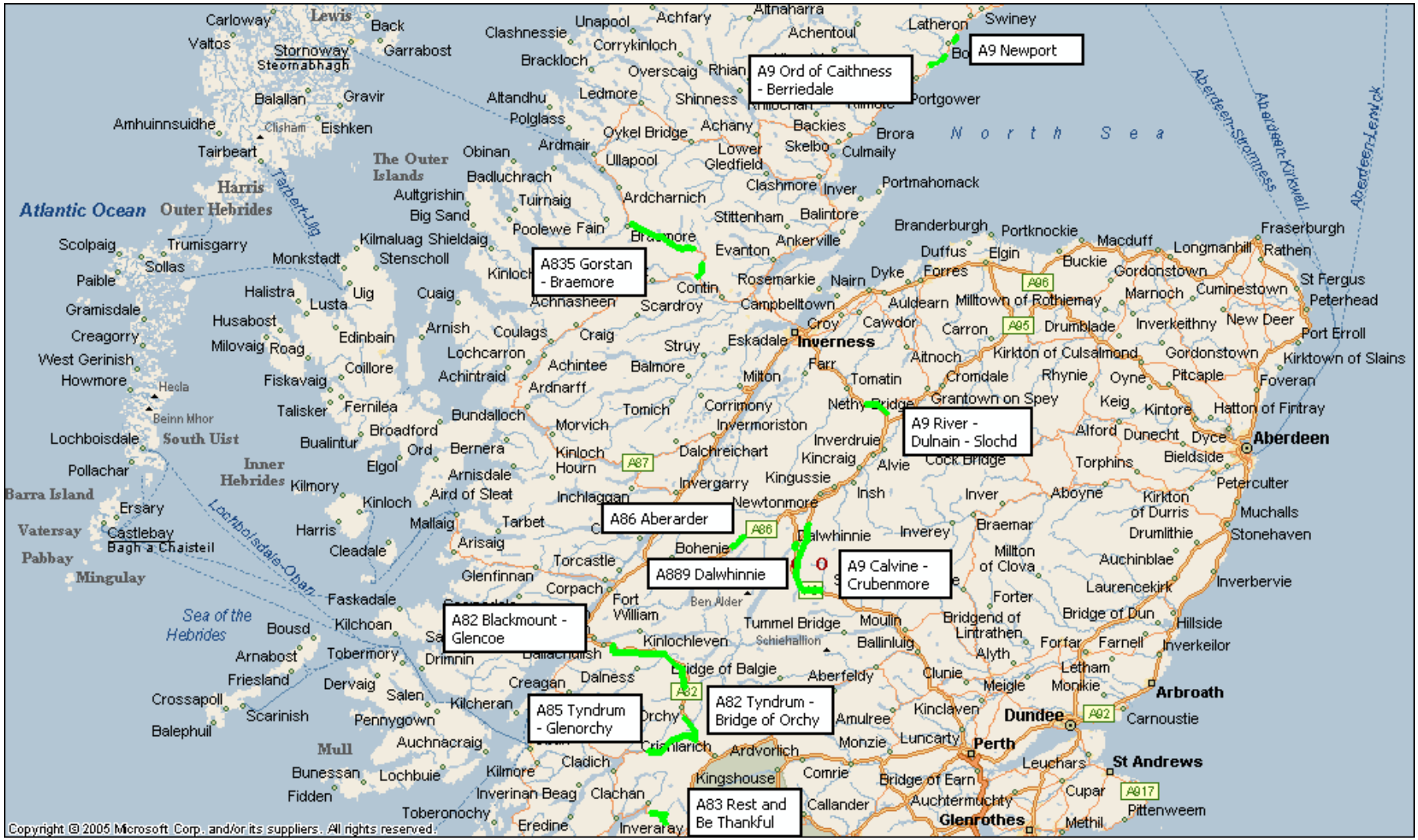


Figure 14/9: Locations of Snow Poles

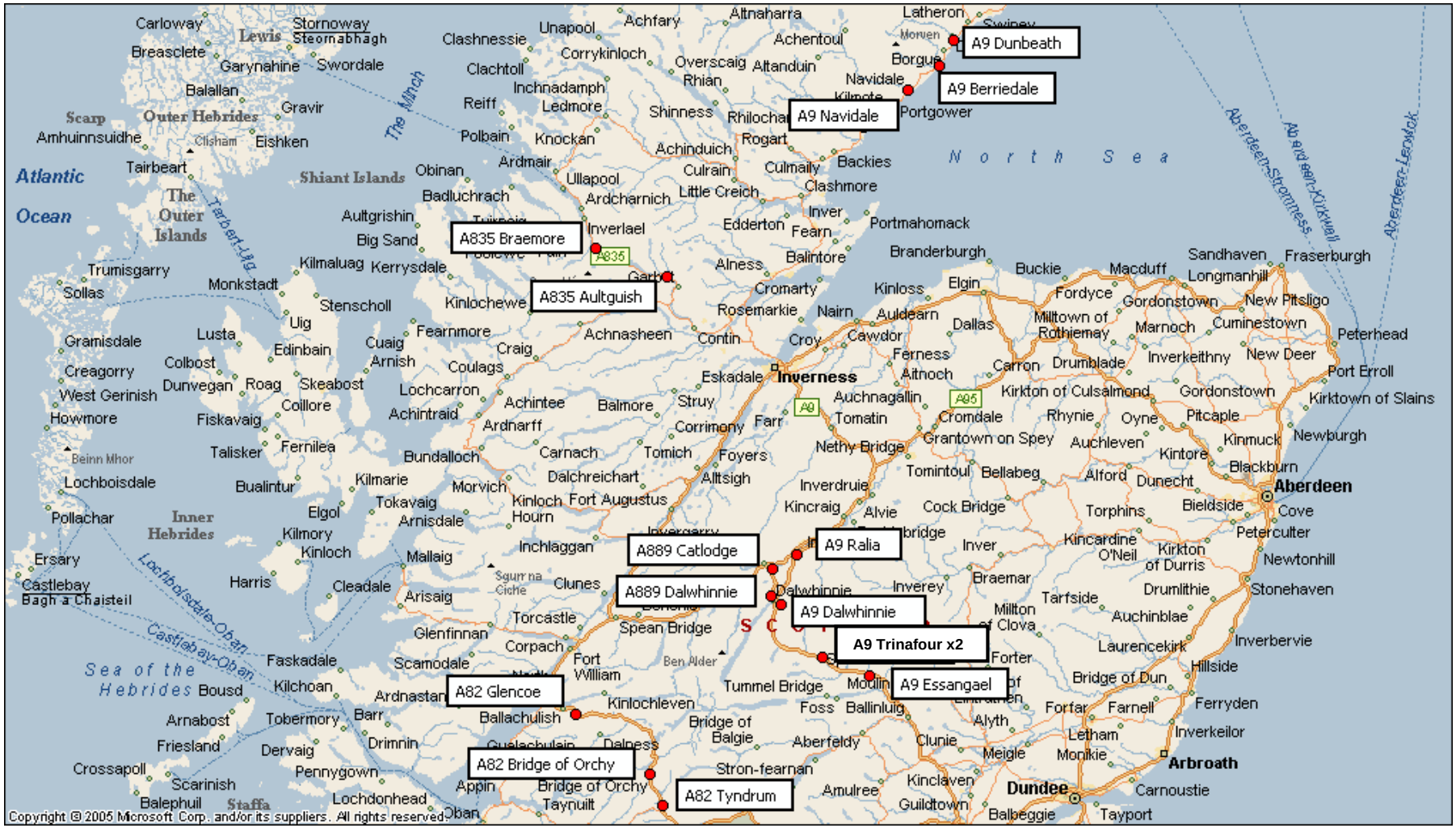


Figure 14/10a: Locations of Snow Gate Signs

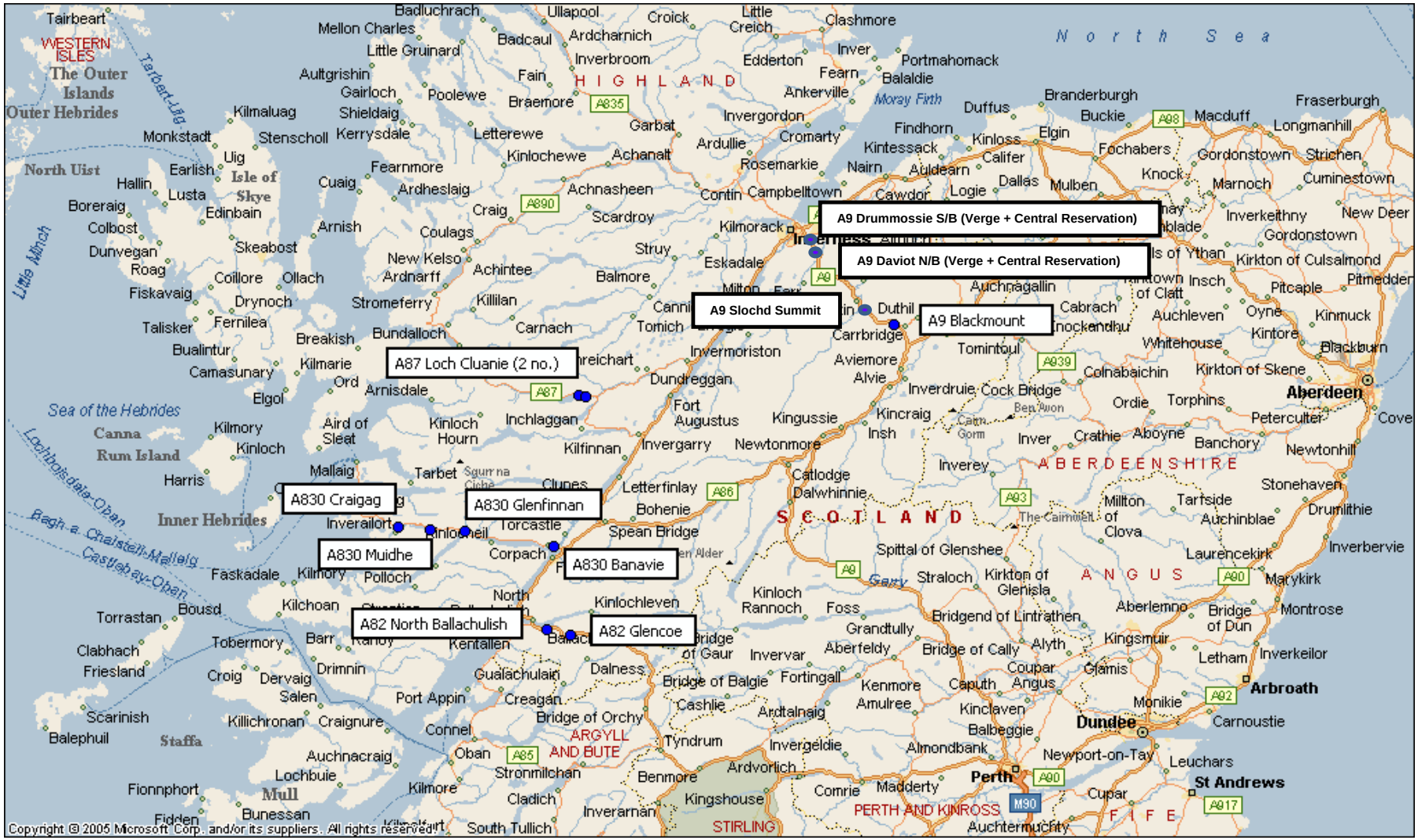


Figure 14/10b: Locations of Diagram 554 Signs

Figure 14/11: Locations of salt bins

15. COMPILING AND MAINTAINING RECORDS

The Duty Controller will complete, collate and keep daily records for the Winter Service which will be held electronically, in accordance with the Quality Plan. The processes will ensure that all the required records are complete, correct and available for inspection. The Director and the Performance Audit Group are provided with:

- Remote access facility to view the Winter Service Records on the shared server, and
- Web interface access to BEAR Scotland's Locatu system

Supply Chain Partners providing and undertaking Winter Service Operations will be required, in their agreement with BEAR Scotland, to provide all the relevant information detailed below.

Records of Winter Service include:

- Decisions taken when and by whom
- Decision Methodology
- Planned and actual treatment records
- Planned and actual response times achieved
- Planned and actual commencement times
- Planned and actual route times
- Planned and actual spread rates
- Observations and actions taken by the Winter Service Patrols
- Output from Winter Service Plant on-board data capture devices
- Winter Service Plant down time and software faults
- Winter Service Plant deployment records (including Global Positioning System records) and driver/operator logs
- Weights and volumes as appropriate for the amount of de-icing material(s) spread for each route
- Logs (both manual and electronic) for telephone electronic mail and two way communication calls
- Loading point de-icing stocks and replenishment orders
- Ice prediction system records
- Weather forecasts and actual weather experienced
- Complaints by members of the public and Trunk Road users
- Accidents during winter conditions
- Road closures due to winter conditions
- Pre- and mid-season road sensor calibration systems
- Winter Service Plant calibration certificates
- Actual salt stocks held including strategic salt stocks
- Performance Indicator for planned (precautionary treatment) or unplanned (call out) operations completed within required treatment timescale
- Performance Indicator for full Data Capture Device downloads achieved
- Performance Indicator for unplanned (call out) treatments commenced within required timescale

Planned and actual treatment records will be uploaded daily on to the Transport Scotland website.

16. SNOW POLES

16.1 Locations of Snow Poles

Snow pole are located on the A83, A85, A835, A86, A889, A82 and A9 as included in Figure 16/1 and as illustrated in Figure 14/9 in Section 14.

16.2 Maintenance

Snow poles will be maintained in accordance with Part 1 of Schedule 7 of the Contract. Inspection teams will undertake and complete detailed inspections of snow poles during June to August each year. Inspections will preferably be completed by mid-July, which will allow up-to-date Category 2 defects to be incorporated into bids submitted to the Director by 7 August of each Annual Period. The Director will issue Orders to enable snow poles to be repaired or replaced prior to the commencement of the Winter Service Period.

16.3 Replacement of Damaged or Missing Snow Poles

During the Winter Service Period missing or damaged snow poles will be treated as Category 1 defects. Where possible a temporary repair will be undertaken by the Safety Inspection Team, and in any case within 24 hours of the identification of the defect. A permanent repair will be undertaken within 28 days of the identification.

16.4 Refurbishment

The refurbishment of snow poles will be undertaken prior to each Winter Service Season as a result of submitted annual bids (no later than 7 August) and Orders received issued by the Director.

16.5 Reserve Stocks

Within Central, Subordinate and Area depots a reserve stock of 40 snow poles will be stocked at the commencement of each Winter Service Season to ensure that damaged or missing snow poles can be replaced quickly and efficiently.

Route	Link	Section	Start Chainage	End Chainage	Spacing (metres)	Number
A83	16512	19	4400	6930	50	50
	16512	19	4400	6930	50	50
	16512	59	0	2370	50	47
	16512	59	0	2370	50	47
	16512	73	0	3600	50	72
	16512	73	0	3600	50	72
	A83 Total			**338**		
A85	11910	05	0	680	50	14
	11910	05	0	680	50	14
	11910	08	0	2608	50	52
	11910	08	0	2608	50	52
	11910	20	0	3206	50	64
	11910	20	0	3206	50	64
	11910	37	0	4964	50	99
	11910	37	0	4964	50	99
	11910	59	0	3957	50	79
	11910	59	0	3957	50	79
	A85 Total			**616**		
A835	18010	05	30	2040	50	40
	18010	10	80	200	50	2
	18010	50	2335	4240	50	38
	18010	50	3779	4240	50	9
	18010	60	0	6470	50	129
	18010	60	0	6470	50	129
	18010	70	0	7880	50	157
	18010	70	0	7880	50	157
	A835 Total			**661**		

Route	Link	Section	Start Chainage	End Chainage	Spacing (metres)	Number
A86	12940	65	90	3236	50	64
	12940	65	90	3236	50	64
	12940	65	200	400	50	5
	12940	65	100	400	50	4
	A86 Total			**137**		
A889	12705	05	0	180	50	3
	12705	05	0	180	50	3
	12705	05	865	1170	50	6
	12705	05	865	1170	50	6
	A889 Total			**18**		
A82	10838	05	0	2632	50	52
	10838	05	0	2632	50	52
	10850	05	260	3156	50	57
	10850	05	260	3156	50	57
	10850	11	15	3214	50	63
	10850	11	15	3214	50	63
	10850	45	45	3165	50	62
	10850	45	45	3165	50	62
	10850	56	16	1097	50	21
	10850	56	16	1097	50	21
	10861	00	41	8981	50	178
	10861	00	41	8981	50	178
	10861	25	0	2515	50	50
	10861	25	0	2515	50	50
	10861	35	0	5797	50	115
	10861	35	0	5797	50	115
	10861	45	0	1200	50	24
	10861	45	0	1200	50	24
	A82 Total			**1244**		

Route	Link	Section	Start Chainage	End Chainage	Spacing (metres)	Number
A9	10489	20	0	2120	50	42
	10489	25	350	740	50	7
	10489	25	1135	1404	50	5
	10489	30	0	1130	50	22
	10489	60	165	330	50	3
	10440	44	765	1315	50	11
	10440	44	3300	3800	50	10
	10440	44	4170	4460	50	5
	10440	44	6860	8255	50	27
	10440	44	6860	8255	50	27
	10440	66	0	1317	50	26
	10440	67	0	1312	50	26
	10440	70	0	4540	50	90
	10440	70	5350	8481	50	62
	10440	81	0	8446	50	168
	10440	92	0	3250	50	65
	10440	92	0	3250	50	65
	10441	0	0	7269	50	145
	10441	0	0	7269	50	145
	10442	05	0	4356	50	87
	10442	05	0	4356	50	87
	10442	25	0	5233	50	104
	10442	25	0	5233	50	104
	10442	50	0	1344	50	26
	10442	51	0	1338	50	26
	10446	75	1600	1920	50	6
	10446	75	1800	2630	50	16
	10447	05	0	851	50	17
	10447	10	260	900	50	12
	A9 Total			**1465**		

Figure 16/1: Locations of Snow Poles

17. SNOW GATES, SNOW FENCES AND SHELTER BELTS

17.1 Locations

Snow gate numbers and snow fence lengths are given in Figure 17/1 and are shown located in Figure 14/6 and 14/7 in Section 16. Shelter Belt locations on the A9 at the Ord of Caithness and the A9 Dalwhinnie are shown on Figure 14/8 in Section 16.

17.2 Maintenance

Snow gates and snow fences will be maintained in accordance with Part 1 of Schedule 7 of the Contract. Inspection teams will undertake and complete detailed inspections of snow gates during June or July each year, including checks to determine their structural condition and integrity. Inspections will preferably be completed by mid-July which will allow up-to-date Category 2 defects to be incorporated into bids submitted to the Director by 7 August of each Annual Period. The Director will issue Orders to enable snow gates to be repaired or replaced prior to the commencement of the Winter Service Period.

During the Winter Service Period, missing or damaged snow gates will be treated as Category 1 defects. Where possible a temporary repair will be undertaken by the Safety Inspection Team, and in any case within 24 hours of the identification. A permanent repair will be undertaken within 28 days of the identification.

17.3 Operation of Snow Gates

This Section should be read in conjunction with paragraph 4.2.4 in Section 4 of this document. The liaison arrangements in paragraph 4.2.4 of this document will be used to affect a road closure using snow gates. Padlocks for each gate will be operated by identical duplicate keys held by both Police Scotland and BEAR Scotland.

Once a decision has been made to affect a road closure using snow gates due to weather conditions making the road unsafe for vehicular traffic, Police Scotland will issue an instruction to BEAR Scotland to close the relevant snow gates.

The Duty Supervisor will instruct Winter Service Operatives to close the relevant snow gates. This resource will then remain at the snow gates until Police Scotland ascertain that no person has been trapped between the snow gates.

Snow clearing operations will continue between the snow gates until BEAR Scotland and Police Scotland, in consultation together, deem the road safe for vehicular traffic. Police Scotland will then request BEAR Scotland open the snow gates.

The WSDO will instruct Winter Service Operatives to open the snow gates.

17.3 Liaison

The Duty Controller, on behalf of BEAR Scotland will liaise and co-operate with Police Scotland during the closure and opening of snow gates. Refer to Section 4.2.4 of this document for further details on snow gate liaison.

Road Number	Snow Gates (Number)	Snow Fence (Metres)
A9	8	1630
A99	0	0
A82	3	0
A83	0	0
A830	0	0
A835	2	850
A84	0	0
A85	0	0
A86	0	0
A87	0	0
A887	0	0
A889	2	0
A893	0	0
A828	0	0

Figure 17/1 Locations of Snow Gates and Snow Fences

18. VARIABLE MESSAGE SNOW ICE AND HIDDEN MESSAGE SIGNS

There are a number of Variable Message Signs (VMS) and snow and ice hidden message signs on the North West Trunk Road Unit on which information such as road and weather conditions can be displayed. The VMS are part of the national driver information system controlled both by Police Scotland and Traffic Scotland.

Hidden message signs are located on the A82, A830, A835, A87 and A9 as included in Figure 18/1 and as illustrated in Figure 14/10a and 14/10b in Section 14.

Snow and ice hidden message signs will be maintained in accordance with the Contract receiving detailed inspections, cyclic maintenance and, where necessary, permanent defect repairs. The WSM is responsible for arranging for all snow and ice hidden message signs to be opened or erected before the start of the Winter Service Period, or as shall be necessary as conditions dictate, to provide information for weather and road conditions as required during the Winter Service Period.

Route Number	Location	Detailed Description
A82	Tyndrum	Snow Gate
A82	Bridge of Orchy	Snow Gate
A82	Glencoe Garage	Sign Type 554
A82	North Ballachullish	Sign Type 554
A82	Clifton	Snow Gate
A82	Glencoe Police Station	Snow Gate
A830	Muidhe	Sign Type 554
A830	Craigag Bridge	Sign Type 554
A830	Glenfinnan	Sign Type 554
A830	Banavie	Sign Type 554
A835	Altguish Hotel	Snow Gate
A835	Braemore Junction	Snow Gate
A87	Cluanie (2 no.)	Sign Type 554
A9	Berriedale	Snow Gate
A9	Dunbeath	Snow Gate
A9	Daviot Brae N/B Left Verge	Sign Type 554
A9	Daviot Brae N/B Central Reservation	Sign Type 554

Route Number	Location	Detailed Description
A9	Drummossie Brae S/B Left Verge	Sign Type 554
A9	Drummossie S/B Central Reservation	Sign Type 554
A9	Slochd Summit	Sign Type 554
A9	Blackmount Junction	Sign Type 554
A9	Dalwhinnie Junction	Snow Gate
A9	Blair Atholl South Junction	Snow Gate
A9	Navidale	Snow Gate
A9	Ralia Junction	Snow Gate
A9	Trinafour Northbound	Snow Gate
A9	Trinafour Southbound	Snow Gate
A9	Essangael	Snow Gate

Figure 18/1: Locations of Hidden Message Signs

19. SALT BINS

A rationalisation exercise carried out on the North West Unit during 2008 resulted in the elimination of self help salt heaps on both environmental and safety grounds.

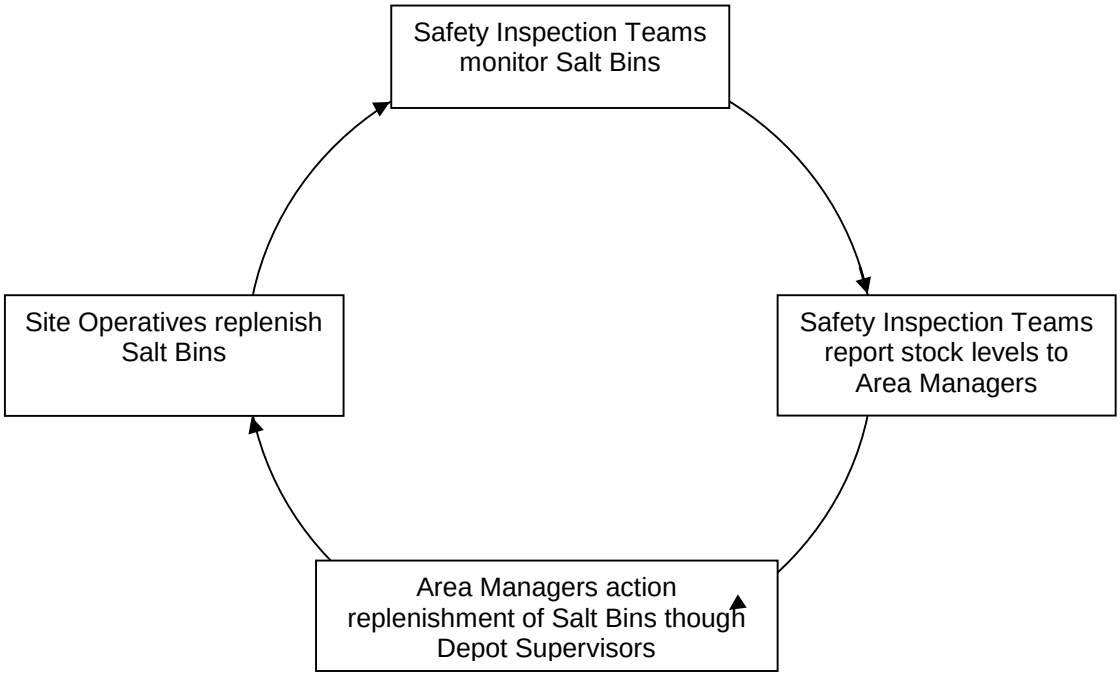
These heaps, together with the previous locations of salt bins, were superseded by a lesser number of new salt bins sited at strategic locations as detailed in Figure 19/1 and shown located in Figure 14/11 in Section 14. The locations of salt bins will be reviewed annually.

The salt bins shall be placed at the strategic locations included in Figure 14/11 by 30th September at which time the bins will be filled with salt.

Figure 19/1: Locations of Salt Bins

Road Number	Salt Bins (Number)
A9	10
A99	0
A82	7
A83	4
A830	0
A835	4
A84	2
A85	4
A86	3
A87	6
A887	0
A889	2
A893	0
A828	0

Stock levels of salt bins will be monitored by Safety Inspection teams on a monthly basis throughout the Winter Service Period. Frequency of monitoring may be increased to weekly during periods of particularly adverse weather. Details of stock levels will be recorded by Safety Inspection teams and the details passed to the relevant Area Manager to action replenishment by Depot Supervisors and Site Operatives. Any damaged or vandalised or missing bins will be replaced 48 hours of the damage, vandalism or absence becoming known.



20. SALT MEASUREMENT APPARATUS

Weighbridges located at each operational depot are used to measure and record the quantity of de-icing material spread on each occasion on each precautionary treatment route. The weighbridges are calibrated in September and January.

Recording of de-icing quantities on the weighbridges is carried out electronically with the spreader fob activating the weighbridge as each measurement is recorded into the system.

Equipment for Salinity testing is held at each operational depot. Salinity Testing is carried out as detailed in sub-section 10.2 Specification using the following equipment:

- JC Peacock Salinity Refractometer

Salt Moisture content testing is carried as detailed in sub-section 10.3 Storage and Testing Methods. Accredited laboratory facilities are provided by The Highland Council.

The WSS at each depot is responsible for the control and submission of testing results to the WSM at the required intervals.

APPENDIX A

Winter Service Plant	Depot Location	Vehicle Capacity	No. of Vehicles	Registration Number	Plant Use (*see key below)
6m³ Pre-Wet Spreader 4x2	Dunbeath	6m³	4	SN13 BOH	(ii)
9m³ Pre-Wet Spreader 6x4		9m³		SN13 BNE	(i)
9m³ Pre-Wet Spreader 6x4		9m³		SN13 BNF	(i)
9m³ Pre-Wet Spreader 6x6		9m³		WU63 YYV	(i)
6m³ Pre-Wet Spreader 4x2	Inverness (Bridgepoint)	6m³	9	SN13 BOJ	(ii)
6m³ Pre-Wet Spreader 4x4		6m³		WH63 CHO	(ii)
9m³ Pre-Wet Spreader 6x6		9m³		WH63 DYJ	(ii)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BTY	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BUA	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BTX	(i)
12m³ Combi Spreader 8x4		12m³		SN63 XUM	(i) and (iii)
12m³ Combi Spreader 8x4		12m³		SN63 XUO	(i) and (iii)
9m³ Pre-Wet Spreader 6x6	Kingussie	9m³	6	WX63 DYM	(ii)
9m³ Pre-Wet Spreader 6x4		9m³		SN13 BNJ	(ii)
9m³ Pre-Wet Spreader 6x4		9m³		SN13 BNX	(i)
12m³ Pre-Wet Spreader 6x4		12m³		SN13 BUJ	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BTU	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BTZ	(i)
6m³ Pre-Wet Spreader 4x2	Fort William (Corpach)	6m³	5	SN13 BPF	(ii)
9m³ Pre-Wet Spreader 8x4		9m³		SN13 BNK	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BVC	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BUP	(i)
6m³ Pre-Wet Spreader 4x2	Ardelve	6m³	4	SN13 BOU	(ii)
9m³ Pre-Wet Spreader 6x4		9m³		SN13 BNL	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BMV	(i)
12m³ Combi Spreader 8x4		12m³		SN63 XUL	(i)
6m³ Pre-Wet Spreader 4x2	Oban	6m³	3	SN13 BOV	(ii)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BVA	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BUW	(i)
6m³ Pre-Wet Spreader 4x4	Inveraray	6m³	4	WV63 CHV	(ii)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BUH	(i)
12m³ Pre-Wet Spreader 8x4		12m³		SN13 BNA	(i)
12m³ Pre-Wet Spreader 8x4	Machrihanish	12m³	2	SN13 BVF	(i)
9m³ Pre-Wet Spreader 8x4		9m³		SW58 BXB	(i)

Key:

(i) Precautionary treatments and clearance of snow or ice with a fallen or formed depth up to 100 millimetres.
(ii) Winter Service Patrols
(iii) Other arrangements to comply with the requirements of this Schedule 7 Part 2

Winter Service Plant	Depot Location	Vehicle Capacity	No. of Vehicles	Registration Number	Plant Use (*see key below)
6m³ Pre-Wet Spreader 4x2 9m³ Pre-Wet Spreader 6x4 9m³ Pre-Wet Spreader 6x4 9m³ Pre-Wet Spreader 6x6	Killin	6m³ 9m³ 9m³ 9m³	4	SN13 BPE SN13 BOF SN13 BNZ WV63 CHN	(ii) (i) (i) (i)
9m³ Pre-Wet Spreader 6x4 9m³ Pre-Wet Spreader 6x4 12m³ Pre-Wet Spreader 8x4	Perth	9m³ 9m³ 12m³	3	SN13 BNV SN13 BNY SN63 XUP	(ii) (i) (i)
9m³ Pre-Wet Spreader 6x4 12m³ Pre-Wet Spreader 8x4	Ballinluig	9m³ 12m³	2	SN13 BNU SN13 BVE	(ii) (i)
6m³ Pre-Wet Spreader 4x2	Thurso	6m³	1	GK02 NZR	(iii)
6m³ Pre-Wet Spreader 4x2	Portree	6m³	1	FJ54 ZND	(iii)
6m³ Pre-Wet Spreader 4x2	Arisaig	6m³	1	FJ54 ZNE	(iii)
6m³ Pre-Wet Spreader 4x2	Ullapool	6m³	1	GK02 NZS	(iii)
6m³ Pre-Wet Spreader 4x2	Chryston	6m³	1	TS55 RHS	(iii)

Figure A/1: Front Line Winter Service Plant permanently available and located in the Unit for Winter Service for Carriageway

Key:

(i) Precautionary treatments and clearance of snow or ice with a fallen or formed depth up to 100 millimetres.
(ii) Winter Service Patrols
(iii) Other arrangements to comply with the requirements of this Schedule 7 Part 2

Winter Service Plant	Depot Location	Vehicle Capacity	No. of Vehicles	Plant Use
Footway Tractor Spreader and plough	Bridgepoint	1m³	2	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Killin	1m³	2	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Inveraray	1m³	1	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Dunbeath	1m³	1	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Brora	1m³	1	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Ardelve	1m³	1	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Perth	1m³	2	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Kingussie	1m³	2	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Fort William (Corpach)	1m³	2	Precautionary Treatments & Snow Clearance
Footway Tractor Spreader and plough	Oban	1m³	1	Precautionary Treatments & Snow Clearance

Figure A/2: Front Line Winter Service Plant permanently available and located in the Unit for Winter Service for footways, footbridges and cycling facilities

Winter Service Plant	Depot Location	Vehicle Capacity	No. of Vehicles	Registration Number	Plant Use (*see key below)
12m³ Pre-wetted spreader	Perth	12m³	1	SK65 BOU	(i) and (ii)
12m³ Pre-wetted spreader	Fort William (Corpach)	12m³	1	SN13 BUO	(i) and (ii)
12m³ Pre-wetted combi spreader	Inverness	12m³	1	SN13 BUV	(i) and (ii)
9m³ Pre-wetted demount	Inveraray	12m³	1	SN63 XUP	(i) and (ii)
Fastrac with Plough and Raiko Icebreaker Attachment	Kingussie	Various Attachments	1	tbc	Snow Clearance
Case Tractor with Plough and Snowblower Attachment	Inverness (Bridgepoint)	Various Attachments	1	SP13 AZN	Snow Clearance
Fastrac with Plough and Snowblower Attachment	Kingussie	Various Attachments	1	SP07 FBA	Snow Clearance
Case Tractor with Plough and Snowblower Attachment	Killin	Various Attachments	1	SP13 AZO	Snow Clearance

Figure A/3: Reserve Winter Service Plant

Key:

(i) Precautionary treatments and clearance of snow or ice with a fallen or formed depth up to 100 millimetres.
(ii) Winter Service Patrols

Service Plant (Type & Registration No.)	Depot Location & Operator	No. of Vehicles	Mobilisation Time (hrs)
Snowblower	Kingussie BEAR Scotland	1	1
Snowblower	Bridgepoint BEAR Scotland	1	1
Snowblower	Killin BEAR Scotland	1	1
Raiko Icebreaker plough	Kingussie BEAR Scotland	1	1
Excavator / Loading Shovel	Breedon – Furnace	1	1
Excavator / Loading Shovel	Breedon – Daviot	1	1
Excavator / Loading Shovel	Breedon – Dunbeg	1	1
Excavator / Loading Shovel	Breedon – Shierglas	1	1
Excavator / Loading Shovel	Breedon – Banavie	1	1
JCB Excavator	Breedon – Furnace	1	1
JCB Excavator	Breedon – Daviot	2	1
JCB Excavator	Breedon – Banavie	1	1
Various	RA Laird - Pitlochry	tbc	2
Various	Daviot Farms Limited – Inverness	tbc	2
Various	King Contractors Limited – Perth	tbc	2
Various	JM Dure Contractors – Crieff	tbc	2
Various	DA MacDonald Contractors – Inveraray	tbc	2
Various	D Gunn - Lybster	tbc	2
Footway Tractor Spreader and Plough SK52 RVU	Thurso Highland Council	1	2
Footway Tractor Spreader and Plough SK52 RVR	Brora Highland Council	1	2
Footway Tractor Spreader and Plough SK52 RSZ	Ullapool Highland Council	1	2
Footway Tractor Spreader and Plough SK52 RRZ	Portree Highland Council	1	2
Footway Tractor Spreader and plough SK52 RSO	Broadford Highland Council	1	2

Service Plant (Type & Registration No.)	Depot Location & Operator	No. of Vehicles	Mobilisation Time (hrs)
Footway Tractor Spreader and Plough J662 FAS	Kyle of Lochalsh Highland Council	1	2
Footway Tractor Spreader and Plough SK53 RSY	Fort William Highland Council	1	2
Footway Tractor Spreader and Plough SK52 RSU	Kingussie Highland Council	1	2
Footway Tractor Spreader and Plough SK52 RUA	Inverness Highland Council	1	2
Footway Tractor Spreader and Plough J661 FAS	Mallaig Highland Council	1	2
Loading Shovel	Inverness Highland Council	1	2
Loading Shovel	Wick Highland Council	1	2
Loading Shovel	Silverbridge Highland Council	1	2
Loading Shovel	Greenhill Highland Council	1	2
Loading Shovel	Portree Highland Council	1	2
Loading Shovel	Broadford Highland Council	1	2
Loading Shovel	Grantown Highland Council	1	2
Loading Shovel	Lochgilphead Argyle & Bute Council	1	2

Figure A/4: Additional Winter Service Plant.

Service Plant (Type & Reg No.)	Depot Location & Operator	Vehicle Capacity	No. of Vehicles
Loading Shovel	Perth BEAR Scotland	1m³	1
Loading Shovel	Chryston BEAR Scotland	1m³	1
Loading Shovel	Dunbeath BEAR Scotland	1m³	1
Loading Shovel	Inverness (Bridgepoint) BEAR Scotland	1m³	1
Loading Shovel	Kingussie BEAR Scotland	1m³	1
Loading Shovel	Ballinluig BEAR Scotland	1m³	1
Loading Shovel	Fort William (Corpach) BEAR Scotland	1m³	1
Loading Shovel	Oban BEAR Scotland	1m³	1
Loading Shovel	Ardelve BEAR Scotland	1m³	1
Loading Shovel	Killin BEAR Scotland	1m³	1
Loading Shovel	Strathsteven BEAR Scotland	1m³	1
Loading Shovel	Arisaig BEAR Scotland	1m³	1
Loading Shovel	Fort William (Corpach) BEAR Scotland	1m³	1
Loading Shovel	Portree BEAR Scotland	1m³	1
Loading Shovel	Inveraray BEAR Scotland	1m³	1
Loading Shovel	Machrihanish BEAR Scotland	1m³	1
Loading Shovel	Thurso Highland Council	1m³	1
Loading Shovel	Ullapool Highland Council	1m³	1
Loading Shovel	Ballachulish BEAR Scotland	1m³	1

Figure A/5: Loading Winter Service Plant available within the Unit for loading Front Line, Reserve and Additional Winter Service Plant

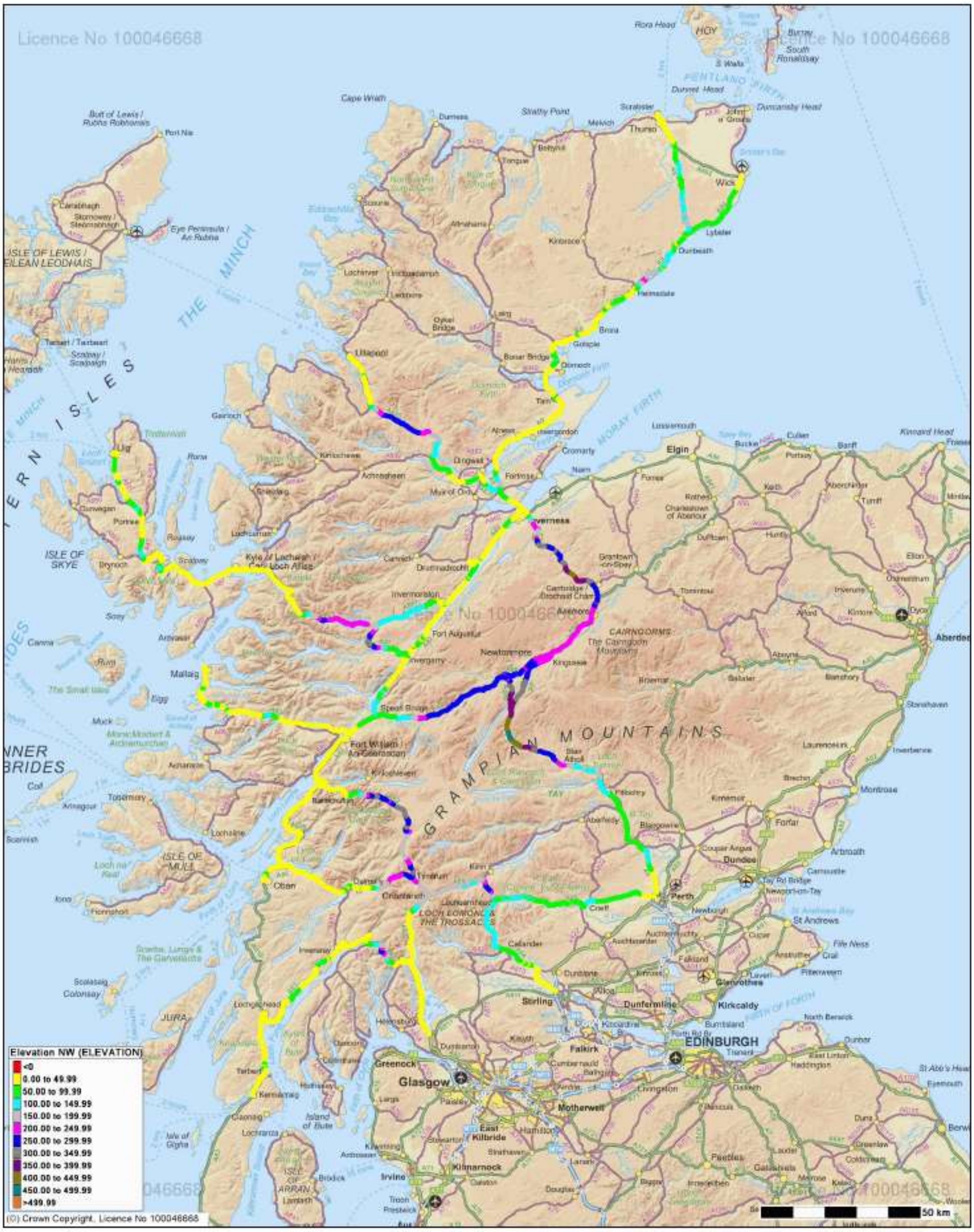


Figure A/6: North West Unit Route Altitude Map