

Winter Roads Services Plan for 2023 to 2024

Operational Details



**Roads & Transportation
Infrastructure**

WINTER ROADS SERVICES SUPPLEMENT WINTER ROADS SERVICES PLAN FOR 2023/2024

OPERATIONAL DETAILS

Well-managed Highways – Code of Practice Part B – Highways Oct 2016 current version recommends the following are included in the Authority's Winter Roads Services Policy and Plan.

Statement of Policies and Responsibilities

- Policies and priorities – as set out in 23/24 Committee report.
- Client and Service Provider risks and responsibilities:

The Client (Angus Council) is responsible for decision making and the Contractor (Tayside Contracts) for undertaking the works requested. The Contractor is also responsible for the training of operatives carrying out gritting and snow clearing and checking the road worthiness of the plant used.

- Decision making process and responsibilities:

Decision making will be based on the chart enclosed subject to local knowledge and experience.

- Liaison and communication arrangements with other authorities and other public services:

Daily action plans are supplied to the Trunk Road Authority's agent (Amey), Perth & Kinross Council (PKC); Dundee City Council (DCC) and Aberdeenshire Council. Some cross-boundary work takes place between PKC and DCC. The

- Winter risk period:

The winter risk period is detailed this year as 5am 23 October 2023 to 11pm 14 April 2024 with a 2-week lead in and out period with reduced treatment coverage. (Internal Core period first week Dec to first week Mar).

- Resilience standard:

Resilience Standard – 2.5 weeks 5,500 Tonnes of salt

- Legislative background:

Roads (Scotland) Act 1984, Section 34.

Route Planning for Roads, Pavements and Cycle Routes

- Road routes by risk level:

The Plan includes road routes for pre-treatment (i.e. Category 1) – minimum winter network; road routes for post treatment by risk level (high land bus (Category 2) and lower-priorities (Category 3). Road routes for snow clearing by risk level are as for pre-treatment, etc., as above.

- Response and treatment times for all road treatments:
1-hour response time from when called at home to get to depots.
- Routes for footbridges, subways and other high-risk pedestrian areas:
Pavement routes for treatment by risk level which include high risk pedestrian areas (Category 1) – minimum winter network; and then other lower-priority pavement routes (Category 3) by risk level are also detailed.
- Response and treatment times for pavement and cycle route treatments:
As soon as reasonably practicable.
- Routes for other pavements and cycle route treatment by risk level:
Cycle route treatment is covered within pavement and road treatment routes in the relative priorities.
- Allocation of plant, vehicles, equipment and materials to routes:
Information available within this document or from Tayside Contracts.
- Location and maintenance of salt bins and grit heaps:
Grit bin locations are detailed on the council website – www.angus.gov.uk - search "grit bins".
- Special sites or features:
Special sites or features (e.g. near railways or traffic calming) are treated as part of the pavement and road routes. Level crossings are not treated between the gates.

The A92 Arbroath to Dundee carriageway and cycleway is treated as a priority by the managing agent, Amey.

Weather Prediction and Information

- The decision-making process:
The decision-making process is detailed in the matrix included within these Operational Details.
- Road weather information bureau service:
Vaisala provide a road weather information bureau service and maintain the weather ice stations.
- Road weather stations:
Road weather ice stations are detailed within these Operational Details.

- Timing and circulation of information:

As detailed in the procedural process included within these Operational Details.

- Road weather forecast:

Road weather forecasts provided by a specialist forecaster, Met Desk procured through Tayside Procurement Consortium.

- Reporting procedure:

Information is detailed on the daily action plan which is circulated to various parties daily through the winter period.

The daily action plan is normally circulated before 2:00 pm every day through the winter period.

Details of gritting start and finish times; salt usage; and plant and labour used are maintained for reference by the Roads & Transportation service.

- Thermal mapping:

Thermal mapping has been undertaken previously.

- Maintenance of ice detection equipment:

Ice detection equipment is maintained under contract by Vaisala currently.

Organisational Arrangements and Personnel

- Command, control and operational organisation:

The procedure included within this Plan covers Operational Details for decision making, record keeping, reporting, standard operating procedures and operational monitoring including command, control and operations organisation including employee roles and responsibilities.

- Arrangements with other authorities:

Liaison regarding forecast with neighbouring authorities takes place regularly (Perth and Kinross (PKC); Dundee City Council (DCC) and Aberdeenshire Council (AbC)

- Arrangements with other public services:

Liaison takes place with the Emergency Planning Section of the council in poor conditions and generally through them with Police Scotland.

- Decision making:

Recorded.

- Operational record keeping and reporting:

Recorded.

- Plant and vehicle manning arrangements, including management of drivers' hours regulations:

By Tayside Contracts.

- Materials management:

Materials management in terms of stocks of salt held, location and re-ordering are as detailed here. Salt ordered and stored by Tayside Contracts. All Scottish Authorities share information regularly throughout the winter period on salt stocks and levels of resilience.

- Training and development arrangements:

Training and development arrangements for operatives are carried out by Tayside Contracts. Angus Council client staff receive appropriate training in terms of forecast interpretation etc. and decision making. Regular refresher training takes place 3 yearly normally.

- Schedules of Staff Contacts, Contract and Voluntary Personnel (CVP):

Contact details will be available to key staff prior to the start of winter period and updated as required.

- Employee roles and responsibilities:

The guidelines on supply of ploughs to self-help operators are also detailed in this Plan.

- Contact and commissioning arrangements for CVP:

As above.

- Employee duty schedules, rotas and standby arrangements:

Duty schedules, rota, and standby arrangements will be detailed prior to the start of the winter period by Angus Council and Tayside Contracts as appropriate.

- Winter Roads Services exercising arrangements:

The council does not normally undertake exercises to test its capability due to the high level of operational activity annually.

- Standard operating procedures:

Regarding escalation and emergency operating procedures and contingency arrangements, these issues are addressed in the Committee Report.

- Escalation and emergency operating procedures:

As above.

- Operational monitoring:

As procedure included within these Operational Details.

- Health and safety procedures:

With regard to Health and Safety, contractors are required to follow current legislation. Angus Council client staff are required to follow relevant Safe Working Procedures. Driver training need is monitored to enhance experience already gained by staff 'in the job' for many years. Gritter driver training is carried out by Tayside Contracts. Angus Council staff must comply with the Risk Assessment for driving.

- Contingency arrangements.

As above.

Facilities, Plant, Vehicles and Equipment

The following are dealt with by the Contractor, Tayside Contracts in liaison and agreement with Council staff:

Winter Roads Services compounds and facilities;
Calibration procedures;
Fleet inventory including licence requirements and capacity;
Fuel stocks and locations.
Location of plant, vehicles, snow blowers and other equipment;
Contingency arrangements;
Garaging, servicing and maintenance arrangements;
Contract and hire arrangements for contract plant;
Sufficient capacity is deemed available to cover for breakdown for priority roads.
No cover for pavement. Tayside Contracts expertise is relied on in the purchase of specialist equipment, driver training, drivers' hours, calibration of equipment, etc. Also, the best value hire of additional equipment.

Salt and Other De-Icing Materials

Similarly, the following are generally dealt with by Tayside Contracts (TC) with liaison and agreement with Council staff as follows unless noted otherwise:

Location and capacity for stocks of salt and other materials;
Contracts and purchasing arrangements for supplies;
Min pre-season and in season stock levels (Angus Council (AC) and TC joint checks); via weigh bridge.
In season re stocking arrangements (AC see restocking table);
Testing arrangements;
Stock level monitoring (TC) and forecasting procedures (by AC staff);
Loading arrangements;
Treatment requirements including spread rates detailed in the Plan are determined by Angus Council staff in the action decision making procedure. Angus Council also determines minimum preseason salt quantities and restocking levels while Tayside Contracts carries out stock level checks.

Operational Communications

Communication issues as follows:

Mobile telephones are used by both client and contractor staff.

Gritter drivers are required to telephone client supervisory staff at the start and at the end of each route to detail timescales, tonnages of salt used and any problems or poor conditions encountered.

Contingency Plan

Salt supply through Tayside Contracts/ other/ salt conservation measures – as per Committee Report.

Additional plant brought in as required through Tayside Contracts normally.

No minimum network (Category 1 networks can be used as minimum winter network).

Mutual aid through TC network – PKC/DCC.

Business Continuity Plan in place for Winter Maintenance.

Cat1/2 emergency responders - discussion through Emergency Planning.

Information and Publicity

Local press and broadcast contract information - this is dealt with through the council's Communication Team.

Information placed on council's website.

Other key local and national contact information - through Communications Team.

Public self-help – Where resources permit the council is prepared to engage with and support local groups who are interested in undertaking self-help measures. This may include the provision of equipment and guidance. Also grit bins are provided for self-help on public areas on roads and pavements listed as maintained by Angus Council.

Thermal mapping – undertaken previously.

Responsibilities and guidance for providing information - as above. Client staff update the Council in snow conditions of roads blocked, etc.

The decision-making process - as Operational Details in this Plan.

Information to be provided - as Operational Details in this Plan.

Road weather stations – as Operational Details in this Plan.

Road weather info bureau service – Vaisala at present.

Timing and circulation of information - as Operational Details in this Plan.

Road weather forecast - as Operational Details in this Plan.

Notification arrangements for failure to maintain the published network – through Angus Council's Communications Team as required.

Reporting procedure - as Operational Details in this Plan.

Maintenance of ice detection equipment - Vaisala at present.

Quality Management

- Quality management regime;
- Distribution of documents;
- Information recording and analysis;
- Arrangements for performance monitoring, audit and updating;
- Procedure for deviation from the Winter Roads Services Plan - Committee Report; and
- Service Review following significant events and at the end of season.

Monitoring routes started on time 100% target.

Salt usage is recorded and checked against targets and reviewed and reported and routes re-run if necessary.

Quality Procedure

- 1.1 Duty Officer (officer with authority to decide on what action to take in relation to weather conditions) shall devise a daily action plan normally before 2pm based on information available – namely from weather forecast (received from Council's weather forecast provider); from Ice Alert stations; from Thermal Maps; from local knowledge (own and reports from Supervisors); and from knowledge of plant availability and treatment techniques and capabilities. Duty Officer shall then update this daily action plan as necessary for through the next 24 hours as conditions and knowledge change.
- 1.2 Duty Officer shall distribute the daily action plan (decision on action to be taken to deal with weather conditions) to the relevant interested parties including the Contractors required to undertake the work; other authorities bounding Angus and to management and staff involved with the service.
- 1.3 The appropriate Roads & Transportation staff (Superintendent and Supervisors) shall then monitor that the work (gritting and snow clearing) is provided as required and is modified as necessary in light of updates and emergencies.
- 1.4 Staff/contractors shall keep records of forecasts/action taken/complaints and any other relevant information.
- 1.5 Budget monitoring shall be carried out.
- 1.6 Annually the Winter Maintenance Policy and Plan shall be reviewed and reported to Elected Member Committee for approval.

- 1.7 Each year the plant available shall be checked and renewed, provision and maintenance needs, together with costs, and agreed with Tayside Contracts.
- 1.8 The weather forecast service provision and Ice Alert station maintenance and calibration service shall be reviewed regularly.
- 1.9 Prior to the Winter Maintenance period (which normally runs between the start of November and end of March) publicity on the service provided and advice on safe travel shall be issued to the public and other stakeholders by means of press release and through the internet, etc.

Service Resilience

A resilience standard is recommended of 6 days of 6 treatments per day of the Category 1 & 2 network at 20g/m² during the core winter period (beginning of Dec to beginning of March). For Angus this is 5,500Tonnes.

Winter Maintenance Service

1. Level of Service

Winter maintenance has historically been carried out by the local councils' Direct Labour Organisations (DLOs), and a balance has to be struck between the level of service which can be provided on winter maintenance and the manpower resources that can be gainfully employed on other work during periods of more clement weather in winter, and which can also be sustained during the rest of the year taking into account the overall financial resources available to the council and the potential workload available to the DLO from all client sources.

In order to maintain the balance between the workforce required for summer and winter activities, other cyclic maintenance work (e.g. gully cleaning, emergency patching, drainage investigation, etc) and a proportion of routine and structural road maintenance work is awarded directly to Tayside Contracts in accordance with the Council's Financial Regulations.

In order to ensure value for money on these awarded work activities the prices quoted by Tayside Contracts are benchmarked against prices for similar work obtained through competitive tendering where possible and for other activities where there is no viable external provider (e.g. winter maintenance) through benchmarking with other Councils or cost plus.

In this way, maximum use is made of Tayside Contracts available resources. In prolonged snow conditions it may be necessary to supplement these resources by the re-deployment of Parks operatives or by employing private contractors to assist with snow clearing.

Discussions with Tayside Contracts on the fixed costs and operational rates for the coming winter are currently in hand and the Director of Infrastructure and Environment anticipates that the level of service proposed in Annex 1 can be contained within the available budget subject to the weather conditions which prevail over the winter period.

Annex 2 details the normal level of plant and vehicles available.

2. A90 Trunk Road

Responsibility for maintenance (including winter maintenance) of the A90 Trunk road within Angus rests with the Scottish Government and the day to day operational management and maintenance is carried out on their behalf by Amey (previously BEAR Scotland Limited).

Amey provide 24-hour cover on the A90 between 1 October and 15 May (inclusive). Report No. 1345/01 presented to the Roads Committee on 22 November 2001 authorised operational decisions at officer level taking into account all prevailing circumstances whereby assistance may be provided to Amey (previously BEAR Scotland Limited) in clearing snow from the A90.

There has been no requirement to assist BEAR Scotland Ltd (the predecessor to Amey until Summer 2023) during previous winter seasons.

3. Assistance from Other Departments/Sub-Contractors

Tayside Contracts undertake the winter maintenance service and are assisted through sub-contracts and other sections of the Council.

Other sections also have responsibility in the interests of public safety for winter maintenance on the areas which they look after (e.g. schools, parks and cemeteries, council owned housing schemes, day-care centres).

On occasion winter weather and in particular heavy snowfall conditions can prevent normal work activities (e.g. bin collection, street sweeping, ground maintenance, other paid contract work) from being carried out and additional resources from the Environmental Services workforce may be usefully employed to assist with snow clearing on public roads and council car parks. In these circumstances, payroll costs are allowed for within the overall council budget. Overtime and standby payments however which have not been otherwise budgeted for would be charged to the Roads winter maintenance budget.

Tayside Contracts also employ other sub-contractors from the local farming community. These operators are local based and treat selected routes on a routine basis. Details of the routes treated by farmers are given in Annex 1. Sub-contractors have been assessed to ensure health and safety requirements are fulfilled. Existing sub-contracted farmers and relief drivers are currently offered a contribution to gaining the correct driving licences for themselves and staff to ensure availability in terms of sickness and holiday to operate the scale of plant needed.

4. Communications and Publicity

4.1 Mobile Telephones

Good communications are vital in the control of winter maintenance operations. Both Tayside Contracts and Angus Council Roads staff rely on mobile technology throughout the winter.

4.2 Liaison with Police Scotland

In severe weather conditions liaison with Police Scotland must be maintained at all times. The Police in turn collate this information together with feedback from their own patrols and other sources and forward details to the media, motoring organisations and other emergency services, etc. These arrangements have worked well in previous years and will continue.

4.3 Publicity

In order to provide the public with information regarding the level of service to be provided and to help to ensure that the public's expectations are reconciled with the council's policy and available resources, it has been customary to publish details of the hours of cover, priority routes, winter maintenance policy, etc in advance of the start of the winter maintenance period through press releases. For maximum impact this information will be released around the middle of October. Information is now primarily available on the Council's website.

During heavy snow conditions (and indeed other severe weather emergencies) the council's Communications Unit will be supplied with general background information in support of press releases and social networking. Information on roads "closed", "open" and "passable with care" is made available to allow departmental managers to make decisions affecting their staff and to the ACCESSLine staff to allow them to advise callers. This is updated during office hours in severe weather conditions.

5. Supervision of Winter Roads Services Operations

Roads & Transportation has out-of-hours arrangements through standby rotas to supervise winter roads services operations, monitor road conditions and weather forecasts, and deal with emergencies. The costs of standby allowances, etc. are allowed for within the section's budget.

6. Ice Prediction System

The council has an Ice Prediction System based on real-time data received from automated "outstations" that measure weather conditions and road surface state at dispersed locations on the road network. These outstation monitoring points are located at:

- Balgavies on the A932 between Forfar and Friockheim
- Balshando on the A923 between Muirhead and Coupar Angus
- Forebank on the A933 between Brechin and Friockheim
- Upper Dysart on the A92 between Inverkeilor and Montrose
- Upper Victoria on the A92 between Monifieth and Muirdrum
- Lochlair on the B9128 between Craichie and Muirdrum
- Ruthven Crossroads between Alyth and Kirriemuir

Information from additional outstations on the Trunk Roads and within adjacent council areas are also accessible to staff.

These remote outstations record and transmit data to central bureau computers operated with technical support by the council's Ice Prediction System service provider. This data can then be accessed by computers to download information on:

- Road Surface State (dry, moist, wet, frost, black ice, snow)
- Road Surface Temperature
- Below-surface Road Temperature
- Air Temperature
- Dew Point
- Relative Humidity
- Precipitation Intensity
- Wind Speed and Direction *
- Gust Speed*
- Presence and Concentration of Salt

(*Not recorded at Forebank, Lochlair, Upper Victoria, Balshando or Ruthven)

The “outstations” are maintained and calibrated by the contractor, Vaisala.

As well as being available via computer screens in real time to Angus Council’s roads staff responsible for the day-to-day management of winter roads services operations, the data from the “outstations” is also made available to the weather forecast service provider to allow computer generated weather forecasts (both area based and site specific).

These forecasts allow prediction (with approximately 85-90% accuracy) of sub-zero temperatures and (with approximately 50% accuracy) the probability and depth of snow.

The site-specific forecasts are linked via computer modelling to the thermal mapping data (undertaken several years ago) which was compiled for the priority route network to allow extrapolation of road surface temperatures, both actual and predicted, over the network. This in turn allows much greater confidence and accuracy in decision-making regarding where, when, and how much salting is required to prevent ice forming on priority routes with consequent economies in salt usage.

In winter 2021/22, a camera is to be installed at Balshando which helps with gritting knowledge and need especially where we rely on colleagues from Perth & Kinross Council gritting part of this area for Angus Council.

7. Salt and Gritting Materials

7.1 Salt Specification

Salt is ordered through Tayside Contracts. Tayside Contracts order salt for Angus Council, Dundee City Council and Perth and Kinross Council and therefore gain the benefits of economies of scale. Salt for road purposes varies depending on the source of supply. Particle shape, size grading, uniformity, insoluble content (clay/dirt), tendency to “cake”, resistance to weathering, and spreadability all vary depending on the source. Trials in the past have shown that 6mm imported marine salt, although more expensive than UK mined salt, has superior purity and weather-resistant qualities (can be stored uncovered with good thatching properties).

However, in recent years escalating shipping costs together with a fluctuating exchange rate has led to increasing marine salt costs. This combined with improvements in the quality of mined UK (rock) salt, and its lower price in comparison to marine salt and evidenced effectiveness by a neighbouring Council has led to a strategy of using both marine and rock salt albeit with an increased reliance on rock salt. This will be

monitored and reviewed across the 2023/24 winter period.

7.2 Storage

Marine salt for road use to BS3247:1991 is supplied with an anti-caking chemical additive, which is designed to prevent the salt consolidating into a solid mass in a stockpile or clogging the delivery system in a gritter. A useful side-effect of this is that when this chemical is washed through the outer layer of the stockpile by rain the remaining additive-free salt forms a crust which then protects the rest of the stockpile from further weathering.

Rock salt is mined in the UK and is used in either dry, pre-wetted and treated salt spreading. It is available as a 100mm or 6.3mm graded product. The grading sizes of rock salt have been evidenced to find benefits such as better spread patterns from gritters and also effective in penetrating snow and ice.

7.3 Salt Stock Holdings

The rules of "supply and demand" apply to the purchase of salt in a similar way to other commodities. Advance orders for salt delivered during the summer months can be purchased at more favourable rates than salt ordered during the height of winter. The marine salt used is imported and delivery (by boat) is fairly slow and not geared up to urgent orders. It is prudent therefore to store supplies of salt in advance of winter in sufficient quantity to meet the anticipated need for the whole of the winter roads service period. 12,331 tonnes of salt have been ordered for the winter of 2023/24, which is lower than in previous years however an additional order has been placed for 4,000 tonne of rock salt to be delivered in January 2024. In severe winters however, where salt levels fall below predetermined levels at specific times through the winter period additional salt will be ordered. Experience of an excessively bad winter has shown 5,500 Tonnes of salt could be used quickly at peak usage, therefore this has been recommended as a minimum to be held to the end of March to cope with any bad spell of weather at any time of year. Tayside Contracts are responsible for purchasing and stockpiling the salt. Measurement of use is by weighbridge at the depots in Forfar and Arbroath.

7.4 Salt Usage

Weighbridges are used in Forfar and Arbroath to determine salt usage, where software has been installed to reduce human error.

8. Self-Help

8.1 Grit Bins

8.1.1 The provision of grit bins for use by the local community offers a practical low cost supplement to the use of the council's own limited resources. However, grit bins also have disadvantages:

- keeping bins filled puts additional pressure on stretched resources during continuing severe weather conditions
- some grit bin locations have a history of vandalism and litter nuisance

- salt/grit provided for use on public roads is sometimes taken for private use
- grit bin locations are sometimes a source of complaint on the grounds of environmental damage (salt damage to hedges, gardens etc) and aesthetics ("eye sores")
- although the bins are provided for general community use in practice this very often relies on one or two individuals, and some grit bins are hardly used at all.

8.1.2 Notwithstanding the above the view is that the proper use of grit bins is to be encouraged and it is proposed therefore to continue to provide grit bins in accordance with the following criteria:

- (1) Grit bins will not be provided on priority routes (since these are adequately covered under the winter roads services policy and proposed level of service).
- (2) Grit bins can be provided on "adopted" Category 1 & 3 routes:
 - where there are tight bends (if location relates to road), steep inclines (greater than 10% normally), junctions, turning areas, "residential homes" (sheltered or managed housing) or other sections particularly prone to icing-up and is a main link to local shops or public transport.
 - within the public road boundaries
 - where there is some confidence that the grit bins will be properly used
- (3) Grit bins can be provided at other locations on public roads where there is a special need and where agreement has been reached with the local residents regarding a suitable location within the road boundary (e.g. at sheltered housing, school crossing patrol points, steps on public footpaths, etc).
- (4) Grit bins are not provided on unadopted roads (grit bins are provided where required on prospective public roads by the developer under Road Construction Consent requirements).
- (5) Grit bins will be stocked and re-filled with a salt/grit mixture, normally 1 salt/6 grit.
- (6) The policy of leaving grit bins in place all year round (Report No. 909/00 to the Roads Committee of 24 August 2000 refers) has proved to be cost effective, however in some residential and tourist areas increasing concerns have been expressed over the unsightly nature of such bins through vandalism (although perhaps still serviceable), and litter, etc particularly in the summer months. Given this discretion to remove certain bins through the summer months remain with the Service to consider each case on its merits.
- (7) Grit bins are provided for community use. Where the community is unable to look after the bins or where they have suffered from the effects of repeated vandalism (two separate occasions), the bins will be removed.

When a new bin is provided, a letter is issued to the person(s) requesting the bin stating that the bin is provided for community use but will be removed if subject to repeated vandalism.

Similarly, for existing bins, following vandalism, a standard letter is issued to adjacent residents stating that repeated vandalism (two occasions) will result in the grit bin being removed.

8.1.3 As a result of the review of winter road services in 2021/22, an increase in grit bins for self-help has been agreed – see section 8.1 of this Plan - from the current 600 with a need to consider how these are filled in times of great demand when there is also a great demand for road and pavement treatment although this may be an area for self-help/ community involvement /improvement/help.

8.2 Roadside Grit Heaps

Grit heaps on rural road verges have fallen into disuse as roads have received more regular treatment (especially high land Category 2 routes) and the practice of leaving grit heaps has therefore all but ceased.

Roadside grit heaps can be provided where requested and determined appropriate on rural routes.

8.3 Farmers' Snowploughs

Since 1996 Angus Council has operated a self-help scheme whereby snow ploughs are issued to farmers for use by them on agreed lengths of public road at minimal cost to the council (initial purchase and annual maintenance costs). The council provides insurance for the farmer's tractor while clearing snow on public roads and it is accepted that the farmer will also use the plough for clearing his own access and private roads. This system has worked over past winters, and this will continue and may be extended if more farmers are prepared to volunteer their services and if additional ploughs can be purchased within the available budget.

9. Snow Conditions

9.1 The application of salt to icy roads or precautionary salting when icy conditions are predicted is generally effective and can remain effective over a period of time depending on prevailing weather conditions.

9.2 Snow conditions on the other hand can require continuous treatment while snowfalls persist and if snow is allowed to become hard-packed effective treatment requires more intensive use of resources (with associated increased costs). It should also be borne in mind that icy roads are always passable (albeit with extreme care on the part of the road user); heavy snow on the other hand, particularly when combined with high winds and drifting, can block roads to all traffic with consequential impacts on public health and safety and with detrimental effects on the local economy albeit of a transient nature.

9.3 There are real benefits therefore in dealing with snow as quickly as possible by making maximum use of available resources while conditions persist.

9.4 Lists of external contractors hired through Tayside Contracts and areas to place snow are available through Tayside Contracts for exceptional conditions.

9.5 In abnormally severe conditions, situations may arise involving life and limb emergencies or serious damage to property that require Angus

Council/Tayside Contracts assistance in getting to a casualty/patient or property. Requests for emergency action will normally only be accepted from the emergency services. Supply of feedstuffs to animals will not normally be considered an emergency.

9.6 Once the main transport routes are in an acceptable condition, noting that with further low temperatures or additional snow they may require re-treatment, in heavy snow conditions (as experienced in the winter of 2010/11) resources will be used to address the following in general order. The hierarchy below will be followed in principle and will be delivered in a practical and economic way subject to the prevailing circumstances. The process will be in accordance with the council's incident management procedures and will seek to maximise the productivity of the resources whilst focussing on the hierarchy and operational management is delegated to officers.

- Snow clearance of town centre areas;
- Treatment of areas of public transport difficulties (i.e. at or around bus stations, widening of specific routes to enable safe passage of buses);
- Routes to schools – see below;
- Areas requiring clearance for specific road safety issues (such as narrowing routes due to continued ploughing), particularly for school transport routes;
- Town centre car parks, once other services are being restored to enable off street parking;
- Health care areas such as doctors' surgeries, improved access to hospitals;
- Nursing homes and elderly resident areas (through customer contact and specific requests);
- Residents/business requests – whilst these are the majority of our ACCESSLine calls, we will have to limit our response to (potentially) serious issues. Life and limb situations will be assessed and addressed as appropriate.

9.7 This process is the basis of the hierarchy followed in snow events and consequently snow clearance is initially focussed on town centres and then radiated out of town centres to areas of public transport, schools and health centres.

9.8 As part of the actions to clear Category 1 & 3 pavement routes, and in order to maximise the effect as quickly as possible, pavements on one side of the road only are cleared. This doubles the length of pavements which can be cleared with the available resources, allowing increased access to services for the public.

9.9 As a consequence of the 2010 event, certain pedestrian areas for snow clearance around schools have been agreed with the Children and Learning Services and school head teachers. These areas are those considered to be a priority by the head teacher where they are part of the adopted road. Depending on the school they may include walking routes, bus drop off points and areas used by parents to drop off children. They do not, however, imply the clearance of all routes to the school or in some cases continuous routes. The priorities for Children and Learning Services are that services are restored to secondary schools ahead of primary schools such that the disruption to pupils preparing

course work or undertaking preliminary examinations is minimised.

- 9.10 Children and Learning Services have in place processes for making decisions regarding school closures and notifying the media and parents. These are not detailed in this report. Schools and Learning arranges for the snow clearance of school grounds as deemed appropriate.
- 9.11 Subsequent to the agreed areas at schools being cleared; restoration of school transport services is Children and Learning Services' next priority. While some of these routes are Category 2 Road routes, additional clearance works may be required to provide safe passage of school transport including widening at corners and clearance of passing places on narrow roads often made narrower by accumulations of snow including from ploughing operations. Again, priority is given to transport routes for secondary school pupils.
- 9.12 As in previous years, staff and plant resources from Parks Service staff may be available to assist in snow clearance. Where operatives are unable to carry out their normal activities due to the weather, they may be available to assist in snow clearance activities. Parks already undertake third party contracts for winter treatment and these remain their priority due to established contractual commitments. These contracts include access and car parks for the health service and servicing of grit bins for housing associations. When available these resources are utilised in snow clearance operations for the council on a wider basis than duties under the Roads (Scotland) Act 1984. This includes clearance of council staff office car parks and council business/industrial estates. This increases the council's winter resilience and assists in restoring council services affected by the weather-related issues. These resources are managed through the council's incident management team during extreme weather conditions as appropriate. Operational issues are coordinated but there are resource implications, particularly the ability for operatives to be transported which limits their actual availability for use.
- 9.13 Assistance has been provided in the past by Community Service Criminal Justice Services operatives and in future events any resources made available will be utilised on a self-managed basis.

10. Snow Fencing

Snow fencing does not prevent the deposition of snow on a road completely but can reduce the depth to a level which can be ploughed. Drifting snow which can be a problem long after fresh snow has ceased falling can be controlled by the use of fencing erected on the windward side of likely affected areas. Their use has proved beneficial in the past and it is proposed to continue with permanent snow fencing in high areas. Such fencing can be provided at minimal cost, and costs can be contained within the winter roads services budget. However, the erection of temporary fencing is now no longer carried out on agricultural land given farmers' concerns over damage to crops and drainage and the fact that most locations for temporary fencing were on lower land where more effective treatment practices have led to a reduced need for snow fencing.

11. Weather Forecasts

- 11.1 An essential requirement for ensuring a state of preparedness and a quick response in marginal conditions is the availability of accurate local weather forecasts. Forecasts of freezing temperatures after rain allow precautionary salting to be carried out before ice forms dependent on operational working hours. Forecasts of early evening or early morning frost or ice allow instructions to be given for operatives on standby to report to depots at a pre-set time to allow a quick response as temperatures drop. Snow forecasts allow vehicles to be prepared in advance (fitting of snow ploughs, demountable gritters etc.)
- 11.2 As stated in section 6 of this Plan, the Winter Weather Forecast Service Provider also makes use of data from the Ice Prediction System as input to its computerised weather forecasting models. Forecasters also have access to weather radar, satellite, and data from a network of weather stations and observation points.
- 11.3 Weather forecasting has been tendered along with Perth and Kinross, Dundee City, Aberdeenshire, Aberdeen City, Moray and Highland through the Tayside Procurement Consortium.

12. Route Optimisation

- 12.1 A route optimisation exercise was carried out by Vaisala as an element of the provision of the Ice Prediction System prior to and during the winter of 1998/99.
- 12.2 The priority (Category 1) gritting routes were again studied for running lengths, gritting lengths, distance from the depots and some rearrangements were carried out to produce improved efficiency. Software called "Routesmart" was used to review the gritting routes as part of a service review and this led to a reduction in priority routes from 11 to 10 for 2013/14. Appendix 2 contains the priority routes covered.

13. High land bus routes (Category 2)

- 13.1 These roads are generally at a higher altitude than the rest of the network and are therefore more prone to icing. They are lightly trafficked compared to Category 1 routes. These routes are generally treated in advance of the school bus Monday to Friday.
- 13.2 The Infrastructure Services Committee on 28 August 2007 in the report on Winter Roads Service Policy and Provision for 2007/08, agreed to treat all high road glen auxiliary (now Category 2) routes north of the A928/B957/A90 on Saturday and Sunday mornings and public holiday mornings for access and tourism reasons only when priority routes were being treated. In 2008/09, the C52 Westhills to Cockhill from the B9128 at Draffin to Redford on the B961 was added to ensure consistency. In 2010/11, Auchterhouse Brae was added on a similar basis.
- 13.3 At the Special Budget Meeting of Angus Council 21 Feb 2019 Provisional Revenue and Capital Budget 2019/20 – Background Report 57/19 Agenda Item No 5F as part of the 19/20 budget process the following winter inflationary savings accepted:

- Reduce part of the route (A19, Inverarity, Kellas, Murroes, Greystone) to Category 3 as no longer used by the school bus and remainder would be delivered by sub-contracting. Resulting in a savings of £0.049 million.
- Sub-contract K39 (Kirriemuir, Memus, Noranside, Glen Moy) this would produce a saving of £0.049 million.
- Further savings have been identified of £6k for 2020/21 from moving some plant from 6x6 to 6x4 vehicles.

14. Tayside Contracts Working Hours

14.1 Tayside Contracts operate seasonal working hours arrangements which included a period of reduced working hours during the winter period.

14.2 For seven weeks each side of the winter solstice (i.e. 14 weeks in total), the working hours are reduced to 32½ hours per week (from 39 giving an annual average of 37 hours per week).

14.3 Drivers Hours Regulations have been considered in determining the operational aspects of the winter roads service provision.

15. Pre-wetted salt

Pre-wetting of salt with brine can improve salt spreading efficiency by reducing the amount of salt required, helping to target the salt to the road surface making it move to solution quicker and therefore become effective quicker than dry salt. Salinity tanks have been installed at Arbroath and Forfar depots and with priority gritters already fitted with brine tanks. During the winter of 15/16 pre wetting on priority routes was introduced and continues.

16. Hours of Cover

16.1 Roads (Scotland) Act 1984 Section 34 requires the authority to take such steps as they consider **reasonable** to prevent snow and ice endangering safe passage of pedestrians and vehicles. In considering the hours of cover, the council are required to deliver the winter roads service that is therefore reasonable which has to be practicable operationally and within other legislative requirements such as those laid down in Drivers' Hours legislation.

16.2 The hours of cover detailed below indicate the times when no services are provided. The times within the hours of cover are the overall period in which services may be delivered but are not the definitive start and finish times for the individual route treatments or the times that routes will necessarily be getting treated.

16.3 In practical terms where the hours of cover commence, i.e. at 5.00/6.00 a.m., these times are the earliest time that vehicles would leave the depot and treatment of all of the priority network, which may be some distance away from the depot, will be significantly later as determined by the vehicle journey time.

16.4 Similarly the hours of cover are not continuous, in that vehicles cannot grit constantly between the hours of cover. Vehicles need to refill with salt and fuel, drivers require breaks and legislatively drivers are restricted to

the number of hours that can be driven. Therefore, whilst there are double crews for priority roads on weekdays neither the priority road or priority pavement network can reasonably be treated constantly within the hours of cover and the operational hours are more limited. Further, conditions are likely to change throughout the period of cover thereby obviating the need for continuing treatment as milder conditions prevail.

- 16.5 The hours of cover are also subject to available resources and in the case of vehicle breakdowns or significant driver shortages (such as sickness, particularly pandemic flu, or industrial action).
- 16.6 Therefore, due to operational constraints, including resources, it cannot be guaranteed that cover commences at the times given or is continuous throughout the period of cover. The actual periods of treatment are based on the weather forecast and actual weather experienced.
- 16.7 Salting/gritting operations are not continuous over the hours of cover as vehicles need to refill with salt and fuel and conditions are likely to change throughout the period of cover obviating the need for continuing treatment as milder conditions prevail. Within these Operation Details, it is noted that the start and end times are not definitive and are not continuous. The council's Policy also states to use resources available for winter maintenance in the most efficient, effective and economic way to prevent, as far as considered reasonably possible by Angus Council, snow and ice endangering the safe passage of pedestrians and vehicles over public roads.
- 16.8 Giving an example of where continuous treatment on priority pavements would not be appropriate for instance would be say on a Saturday in January (Policy coverage Category 1 Pavements 0600 to 1500) where the forecast is for sub-zero temperatures and scattered snow showers. The controller would request a mini gritter (for the one weekend priority route in question). The operative would undertake gritting from 0600 and would expect to complete the route by 0930 approx. For all treatments the operatives check the performance of their equipment and ensures the correct amount of salt/grit is spread. The forecast snow showers later in the afternoon would have been pre-treated as far as considered to be practically effective. Thus, the single weekend priority route would have been treated as appropriate for the weather forecast and further treatment would have had no additional benefit. Therefore, the Policy "to use resources available for winter maintenance in the most efficient, effective and economic way to prevent, as far as considered reasonably possible, snow and ice endangering the safe passage of pedestrians..." in this illustrative example the Policy would have been met. To continue to treat continuously would not be necessary or beneficial.

16.9 Tayside Contracts drivers are covered by the Domestic Drivers Hours Regulations In normal circumstances drivers can work 11 hours and drive for 10 hours in any 24-hour period. These rules apply to any full-time drivers (i.e. a driver who has driven for more than 4 hours in any working day of that week). Only in the event of an emergency can a driver exceed those limits. In an emergency Tayside Contracts apply the ruling that a driver can be on duty for up to 16 hours but must be given 8 consecutive hours rest before resuming work. Emergencies are defined as an unforeseen event and therefore must not be allowed to exceed a reasonable length of time (normally 24 hours but this is not defined in law) as it should be possible to make adequate and on-going arrangements beyond that. Therefore, outside an emergency situation, if the decision is made to work to 11pm in line with Angus Council Policy extreme care needs to be exercised to ensure compliance with the Drivers Hours Regulations and in the lead in it may be necessary to send drivers home to have sufficient rest beforehand. This may leave other parts of the network without resource, i.e. not enough men to operate minis, etc. If the weather forecast is not sufficiently accurate and such a decision has to be made late in the working day operatives may have been working on other operations and are unable therefore to work on until 11pm (or possibly before). By this time, they may have already worked a full day and then can only perform one grit run at 3 hours.

16.10 Category 1 Roads - Hours of Cover

16.10.1 To be fully effective salt spread on road surfaces requires the action of traffic to aid dispersal and to assist the break-up of ice and snow. There is therefore little benefit and high cost in treating roads at times when traffic is very light. Also, by definition, the risk of incidents reduces as traffic volumes decrease.

16.10.2 The weekday hours of cover for treatment of Category 1 Road routes for are 05.00 - 23.00 hours as detailed in Annex 1 in that gritting does not commence unless operations can be completed by 23.00. This reflects the reality of the current level of service whereby gritting does not commence unless operations can be completed by 23.00 hours. Effectively, with a typical 2.5 to 3-hour route treatment time gritters are therefore not sent out after 20.00 hours. In practice precautionary salting treatment is normally undertaken earlier in the evening. The need to grit later in the evening is only required when rain is forecast to precede freezing temperatures. Early treatment might then result in the salt being washed off the road leaving no protection later in the evening. Whilst precautionary salting treatments are normally carried out in the early evening, when the forecast indicates rain followed by freezing temperatures gritters will commence treatment up to 20.00 hours (finishing up to 23.00 hours). Rain until after 20.00 hours followed by freezing temperatures before 05.00 means that priority roads would remain untreated and possibly icy with treatment not starting until 0500.

16.10.3 In 2011/12, one of the priority gritting routes was altered to include a section of the C60 and C59 known locally as Balcathie from the A92 south of Arbroath to Arbirlot aiding access for the school bus and also a section of the C1 from the A92 from Upper Victoria to Craigton known as The Marches for operational and safety reasons was added.

16.11 Category 1 Roads - Weekend Cover and Public Holidays

Weekend and public holiday traffic levels on priority routes are approaching those during weekdays and therefore weekday hours of cover are continued for Saturdays and Sundays, i.e., 05.00 hours till 23.00 hours (latest time for mobilisation 20.00 hours (see Section above)).

16.12 Category 2 Roads - Hours of Cover

The publicised hours of cover for treatment of these high level routes, including bus routes to the Glens for weekdays are as detailed in Appendix 1 Monday to Friday. The timing of treatment for these routes is in-line with the bus operators' times for school transport services. Category 2 high level routes are treated Saturday and Sunday and public holidays' **mornings only** at the same time as priority routes for reasons of supervision efficiency.

16.13 Category 3 Roads – Hours of Cover

Category 3 routes can only start after Category 1 and Category 2 routes have been treated successfully.

16.14 Category 1 & 3 Pavement Routes - Hours of Cover

16.14.1 On Category 1 Pavements, the hours of cover are between 06.00 and 15.00 hours on weekdays and Saturdays, and between 08.00 and 15.00 hours on Sundays. The change to 15.00 reflects the reality of the service in recent years in terms of actual need. In accordance with the 18/19 Committee report, all priority pavement routes have been prioritised on retail, schools and health Monday to Friday. On Saturdays and Sundays there are changes given that the demand on school routes is reduced. Remaining pavements will be picked up as lower-priority Category 3. Category 3 Pavement gritting will commence at 08.00 until 15.00 hours. Category 3 routes can only start after Category 1 routes have been treated successfully. These reflect actual needs.

16.14.2 Pavement treatment is usually carried out either early mornings or during the day.

16.14.3 It should be noted that the width of treatment on pavements will be dependent on the width of spreader used.

16.14.4 There is no pavement treatment on Public Holidays

17. In broad terms Angus Council's Policy and Plan generally accord with the current recommendations in the Code.

1. Authorities should formally approve and adopt policies and priorities for Winter Roads Service, which are coherent with wider objectives for transport, integration, accessibility and network management, including strategies for public transport, walking and cycling. They should also take into account the wider strategic objectives of the authority.

This is the function of the annual Policy and Plan including Operational Details.

2. Authorities should develop local service standards for resilience of their winter roads service in terms of number of days continuous

severe conditions salting on a defined Minimum Winter Roads Network for Overall Winter Period and for the Core Winter Period.

Since the start of Angus Council, the salt anticipated for use has been purchased ahead of the season.

The Code suggests a resilience benchmark of 12 days/48 runs for full pre-season salt holding by 1 November for English authorities and 6 days resilience for salt and other resources, (fuel, etc) is recommended.

The salt quantities have been reviewed in light of the past five winters the overall holding is 19,000 tonnes with a minimum holding of 5,500 Tonnes for any period of extreme weather compared to an average season. The quantity of 5,500 tonnes represents the amount of salt used for an 18-day severe spell of weather without conservation measures (as experienced in December 2009/January 2010).

Angus Council consults with Tayside Police as part of its annual review of winter maintenance policy presented to Committee each year.

3. Authorities should consider whether collaborative arrangements such as shared services, lead authority arrangements, collaborative service procurement, and sharing depots and salt stock, would provide an effective and value for money approach to increasing winter roads service resilience.

The council has collaborative arrangements in place through Tayside Contracts which leads to an effective and value for money approach to increasing winter roads service resilience including procurement of salt and plant for the region.

Tayside Procurement Consortium has procured the weather forecast, Bureau and ice station maintenance service for the former Tayside and Grampian region council areas. There are also cross boundary gritting arrangements.

4. Authorities should determine critical areas and infrastructure in conjunction with key public services and other stakeholders and seek to ensure that appropriate winter roads treatment has been considered by the appropriate party.

Angus Council has previously consulted with Police Scotland, NHS Tayside, bus service providers, Education and Passenger Transport colleagues to determine critical areas and infrastructure. Regular contact before and during winter is maintained with neighbouring roads authorities.

5. Authorities should consider sharing depots.

This is not appropriate geographically for Angus at present although under continuous review with collaboration in mind.

6. Authorities should ensure effective communication of information for the public before and during both normal and severe winter weather conditions and establish ties with the media.

Angus Council publishes weather information on its website.

The council continues to issue press releases, occasionally in conjunction with the police during the winter and responds to press inquiries. In addition, the council has developed the use of social networking. Advice on self-help is given and encouraged.

7. Authorities should ensure that there is appropriate consultation and communication with other highway authorities, key public services and other stakeholders to ensure improved service for the public.

See response to Recommendation 6 above.

8. Authorities should formally approve, adopt, and publish, in consultation with users and key stakeholders, a Winter Roads Services Plan based on the principles of the Code.

This is a function of the annual Policy and Plan.

9. Authorities should define treatment route plans for carriageways, cycle routes and footways for pre-treatment and snow conditions, based upon the general maintenance hierarchy, but adapted to take into account the factors identified by the Code.

Angus Council's routing strategy generally accords with the road hierarchy as treatment routes already take account of traffic levels. This Plan contains the agreed priority routes. Lower-priority routes are those routes that are on the list of roads maintained by Angus Council as local roads authority that are not priority or High land routes. The route hierarchy generally takes on board the factors highlighted in the Code such as transport strategies, climatic conditions, other authorities, consistency, topological factors, footways, cycleways and accessibility dependencies for remote communities. The latter issue may be argued in the case of the high-level glen routes at weekends.

10. Authorities should prepare contingency Winter Roads Service Plans for severe weather conditions which include possibilities such as salting a Minimum Winter Road Network. Authorities should seek agreement on Operational Details in advance with other highway authorities and key public services such as hospitals and public transport providers. There should be a co-ordinated approach to implementing Minimum Winter Road Networks across adjacent highway authorities.

The council adopted the salt conservation measures in previous seasons when salt was limited and has a long-established priority route network.

This approach was replicated in adjacent authorities and on a national basis through SCOTS.

Monitoring of resilience and contingency is carried out through the Scottish salt cell of Transport Scotland.

11. Authorities should explore the potential for mutual aid in salt supply and other aspects of winter roads service and should make contingency arrangements in advance.

The council procures salt through Tayside Contracts and there is consequently some sharing of deliveries if required as well as limited sharing of salt stocks.

12. Authorities should take full advantage of decision support systems and services to enable timely, efficient and accurate decision making.

Angus Council have tried and tested decision-making processes.

13. Authorities should continually monitor performance during service delivery and respond effectively to changing conditions or network incidents.

The authority has in place supervisory and management systems in order to ensure performance is monitored and adapted to the prevailing conditions.

14. Authorities should make use of GPS where possible.

Tayside Contracts have GPS fitted to all gritters.

15. Authorities should prepare Health and Safety policies, etc. and discuss with contractors to ensure implemented.

Angus Council requires compliance from Tayside Contracts.

16. Authorities should consider qualifications and experience, record and ensure competence and need for refresher training

Angus Council staff are given training particularly in gritting decision making based on the information from forecasters and detection equipment. Tayside Contracts' operational staff undergo competence-based training. This training is not City and Guilds but is deemed to be of sufficient quality for the tasks required. Route based training is also given and covers farmers, etc used on certain routes and operations. Tayside Contracts have in place Safe Working Arrangements.

17. Authorities and relevant organisations should provide training and conduct periodic exercising to test plans for responding to severe weather events.

Given the frequency of weather events in Scotland this recommendation is not considered as necessary.

18. Authorities should consider their approach to salt supply – service rather than commodity purchase; summer restocking; develop close relationships.

This is considered through the arrangements with Tayside Contracts that the council has benefited from purchasing through a broker rather than direct with suppliers. The service currently received is considered appropriate. By utilising Tayside Contracts, they have access to more than one supplier.

19. Authorities should consider whether efficiency benefits can be obtained from collaborative salt procurement and should also consider ways to improve the balance of risk between salt suppliers and themselves, e.g. longer contracts, performance contracts with minimum guaranteed purchase and supply, and contracts that include supply of salt and investment in facilities.

This is considered through the arrangements with Scotland Excel.

20. All aspects of the Winter Roads Services Plan, including service delivery arrangements, should be reviewed annually in consultation with key stakeholders to take account of changing circumstances.

As part of the Committee process the service as detailed in the Policy and Plan is reviewed annually before being recommended for approval by Committee.

Angus Council listens to the comments made by its customers and incorporates changes as determined necessary. This included the review of winter road services in 2022/23. Annual "wash-up" meetings are held with Tayside Contracts to review the winter past and preparation for the next.

Angus Council consults with Police Scotland as part of its annual review of winter maintenance policy presented to Committee each year and shares information with its neighbours Perth & Kinross and Dundee City Councils as well as publishing information on the web and through a leaflet. There is also collaboration of services with neighbouring authorities for salt/forecast procurement along with cross boundary routes and the use of Parks Services.

18. Decision Making Treatment Matrix

- 18.1 A few years ago the SCOTS Winter Service Subgroup had been in consultation with the National Winter Service Research Group (NWSRG) concerning the implementation of Appendix H of the previous Well Maintained Highways Code of Practice. This document contained a number of suggestions developed by the SCOTS Winter Service Subgroup to implement Appendix H, which had been commented on by the NWSRG. These comments indicated where the NWSRG agreed with the SCOTS Winter Service Subgroup interpretation of Appendix H, where they did not agree and where they indicated that they would review the text of Appendix H in relation to these matters. The primary residual issues that the SCOTS Winter Service Subgroup had identified with Appendix H were noted.

- 18.2 Having considered the feedback from the NWSRG on the review of Appendix H, the SCOTS Winter Service Subgroup provided advice that Scottish Local Roads Authorities adopt the variations to Appendix H of Well Maintained Highways. The SCOTS Winter Service Subgroup provided the following reasoning for advising these variations and sought Scottish Local Authority views for the winter 2015/16. Feedback from the group on numbers of authorities taking up the advice was sought with substantial numbers indicating they complied of those responding. Angus Council approved these as policy in its August Committee Report 295/15 and since.

- Review conclusions based on significant experience of delivering winter service in by Scottish local Authorities.
- Review conclusions based on developed best practice within Scottish local Authorities.
- Recognition that going forward that these variations to Appendix H, and the successor document, need to be monitored in relation to the development of equipment, research undertaken and revisions to Appendix H.
- These variations to Appendix H of Well Maintained Highways need to be kept under review by the SCOTS Roads Group/SCOTS Winter Service Subgroup to continue to inform the most appropriate approach to Winter Roads Service to be taken by Scottish Roads Authorities.

18.3 The National Winter Service Research Group NWSRG have updated their practical guide and have so far published 13 sections as follows:

Section 1. Using the Guide – advice being followed

Section 2. Planning for winter service delivery – extremely detailed – Angus broadly follow but not in total specific detail.

Section 3. De-icer types – sodium chloride most common – used in Angus.

Section 4. Salt storage – main issues for Angus Council are moisture content. Where such is exceeded spread rates should be adjusted to take account of poorer distribution on a risk-based approach. Angus Council adheres to this.

Salt should be tested for moisture content – Angus tests on arrival.

Salt from unprotected piles will not normally be spread at less than 10 to 15 g/m² which again Angus complies with at least on first application.

Section 5. Treatment Methods and Technologies – provides guidance on the principal methods of spreading de-icing materials applied by vehicles or other mechanical means – Angus principally use gritters.

Section 6. Spreader Management – calibration and testing – it is important to demonstrate the correct amount of de-icer has been used and is being discharged in the right places - Angus Council requires their contractor to carry out pre calibration checks on priority spreaders. Also dynamic testing. This is checked. Visual checks on salt distribution is carried out on footway gritters and farmer towed gritters.

Section 7. Winter Service Decision Making – information and guidance relating to the winter service treatment decision making process – Angus has a tried and trusted process developed and checked over the years which takes account of training.

Section 8. Spread Rates for Precautionary Salting – spread rates for precautionary salting operations undertaken in response to predictions of frost and ice formation in normal winter weather conditions on the UK road network - the previous Appendix H rates have now been amended with the following tables and the Angus Council spread rates shown in [

] which generally accord with the previously agreed SCOTS rates agreed previously and used over a number of years.

18.4 Main differences between this section of the NWSRG Practical Guide and Appendix H/ SCOTS advice:

1. Spreaders now 'Good' or 'Fair' – no 'Poor' coverage anymore.
2. Spread rates based on 'Medium Traffic' (at time of spreading) situations (20 to 250 vehicles per lane per hour – most local authorities including Angus) – can have 'Light' (increase spread rates by 25%), 'High' (only Good and use rates for Tr Rds) and 'Congested' (avoid but if need to increase by 20%) situations.
3. Updated advice on wind speed - some gritters take account of wind (Angus priority use pre wetted; dry salt more susceptible to high winds; not always practicable to change rates to account but may be possible; try to avoid spreading in high winds.
4. If relying on residual salt – ensure clear what you take into account in decision making process and essential good records. Remember residual salt notoriously difficult to measure and changes with precipitation, time, traffic, location.
5. Road surfacing types and bridges - temperatures likely to be different – Angus – see 9 below.
6. Snow and freezing rain - different Practical Guide.
7. Process (1) Develop spread rate Matrix – see attached; (2) Assess salt condition moisture content (m/c) as above; (3) Assess spreader performance- calibration and monitoring;(4) Assess expected traffic levels – Medium, etc; (5) Check for other special conditions – asphalt, etc; (6) Assess forecast.
8. New Spread Rate Matrices – salt becomes less effective at -7(-5 in low humidity situations) - utilise alternative de icers below this level – Angus do not use such.
9. Key Guidance: (a) may round for practicality but not below 8g/sqm or 7g/sqm for treated; (b) salt in matrices assumed to be UK rock salt – can reduce slightly if purer; (c) m/c less than 4% if outside limits increase salt by 20%; (d) Porous asphalt increase rates by 25% and keep doing 1km past end of porous asphalt; e) other negatively texture surfaces 10 to 25% may reduce as such grows older; In Angus all such roads are old and no problems reported (f) bridge decks – consider alternatives – in Angus no different treatments used as no problems experienced(g) see above for other than 'Medium Traffic' levels – Angus use Medium; (g) treat after rain if possible; (h) wind as noted above; (i) residual salt as above.

18.5 Decision Making Treatment Matrix Notes

- (a) Particular attention should be given to possibility of water running across carriageways and other surfaces e.g., off adjacent fields after heavy rains, washing off previously deposited salt. Such locations should be closely monitored and may require further treatments.
- (b) When a weather warning contains reference to expected hoar frost, considerable deposits of frost are likely to occur. Hoar frost usually occurs in the early morning and is difficult to cater for because of the probability that any salt deposited on a dry road too soon before its onset, may be dispersed before it can become

effective. Close monitoring is required under this forecast condition which should ideally be treated just as the frost is forming. Such action is usually not practicable and salt may have to be deposited on a dry road prior to and as close as possible to the expected time of the condition subject to the Council's hours of cover (5:00am to 11:00pm). Hoar frost may be forecast at other times in which case the timing of the salting operations should be adjusted accordingly.

- (c) When rain is forecast prior to frost, treatment should be timed to commence at the cessation of rainfall subject to being completed within the council's hours of cover (5:00am to 11:00pm). Please see Sec 16.1 where it may not be possible to treat frozen surfaces until 5am.
- (d) If rain is forecast to fall on frozen surfaces then treatment should take place on the dry roads prior to the commencement of the rain and again during the rainfall until temperatures are above 0°C, subject to being completed within the council's hours of cover (05:00 a.m. to 11:00p.m.).
- (e) Proposed action plans should take into account the hours of cover provided by Angus Council. If possible treatment should be brought forward to ensure treatment before hours of cover are exceeded.

Target Spread Rates of Salt - Included in table. For salt stored under cover a pre-treatment can be 10g/m²; for salt stored outside, the first pre-treatment should be 15g/m².

18.6 Precautionary Spread Rates for Dry Salting

The matrix below provides recommended spread rates for precautionary dry salting operations on local authority roads in response to predictions of ice and frost formation.

Recommended Spread Rates – Dry Salting (g/m ²) Treatment Matrix						
Road Surface Temperature (RST) when frost/ice is predicted	Spreader Capability					
	Fair					
	Dry/Damp Road			Wet Road		
At or above - 1.0°C	8	(8)	[15→10]	8	(11)	[15]
-1.1°C to -2.0°C	8	(8)	[15→10]	11	(11)	[15]
-2.1°C to -3.0°C	9	(14)	[15]	17	(2 x 28)	[20 + monitor + treat as required]
-3.1°C to -4.0°C	12	(14)	[15]	23	(2 x 28)	[20 + monitor + treat as required]
-4.1°C to -5.0°C	14	(14)	[15]	28	(2 x 28)	[20 + monitor + treat as required]

-5.1°C to -7.0°C	20	(27)	[20 + monitor + treat as required]	39	(2 x 27)	[20 + monitor + treat as required]
-7.1°C to -10.0°C	27	(27)	[20 + monitor + treat as required]	54	(2 x 27)	[20 + monitor + treat as required]
-10.1°C to -15.0°C	38			75		

() = Old Appendix "H" Spread Rates

[] = Angus Council Spread Rates

Damp roads – a road which is clearly dark but traffic does not generate any spray – well drained

Wet road – a road that traffic produces a fine spray

18.7 Precautionary Spread Rates for Pre-Wetted Salting

The matrix below provides recommended spread rates for precautionary pre-wetted salting operations on local authority roads in response to predictions of ice and frost formation.

The spread rates in the matrix below apply to pre wetted treatments comprising a 70:30 ratio by weight of dry salt to sodium chloride brine (sometimes denoted as FS30), with a maximum dry salt component moisture content of 4% and a brine concentration of between 20 and 23%. Before adopting the pre-wetted spread rates in the matrix below, authorities should therefore satisfy themselves that the treatments they are using meet these criteria.

Recommended Spread Rates – Pre-Wetted (g/m ²) Treatment Matrix						
Road Surface Temperature (RST) when frost/ice is predicted	Spreader Capability					
	Fair					
	Dry/Damp Road			Wet Road		
At or above -1.0°C	8	(8)	[15→10]	8	(10)	[15]
-1.1°C to -2.0°C	8	(8)	[15→10]	10	(10)	[15]
-2.1°C to -3.0°C	8	(14)	[15]	16	(27)	[20 + monitor + treat as required]
-3.1°C to -4.0°C	11	(14)	[15]	21	(27)	[20 + monitor + treat as required]
-4.1°C to -5.0°C	14	(14)	[15]	27	(27)	[20 + monitor + treat as required]
-5.1°C to -7.0°C	19	(27)	[20 + monitor + treat as required]	37	(2 x 27)	[20 + monitor + treat as required]
-7.1°C to -10.0°C	27	(27)	[20 + monitor + treat as required]	53	(2 x 27)	[20 + monitor + treat as required]

-10.1°C to -15.0°C	n/a			n/a		
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() = Old Appendix "H" Spread Rates

[] = Angus Council Spread Rates

ANGUS COUNCIL			
WINTER TREATMENT SPREAD RATE MATRIX			
ANGUS COUNCIL REFERENCE	SALT TYPE	PRECAUTION TREATMENT FOR FROST / ICE	SPREAD RATE IN GRAMS
A1, A2, A3, B1, C1, D1	Pre-Wet Salt	Road Surface dry. No Action needed even when conditions are below zero	0
A1, A2, A3, B1, C1, D1	Dry Salt		
B2	Pre-Wet Salt	RST at or above -2 Degrees and damp road conditions	10 (7 salt 3 brine)
B2	Dry Salt		10
B3	Pre-Wet Salt	RST at or above -2 Degrees and wet road conditions	15 (10 salt 5 brine)
B3	Dry Salt		15
C2	Pre-Wet Salt	RST below -2 Degrees and above -5 Degrees and damp road conditions	15 (10 salt 5 brine)
C2	Dry Salt		15
C3	Pre-Wet Salt	RST below -2 Degrees and above -5 Degrees and wet road conditions	20 (13.5 salt 6.5 brine) then monitor and treat as required
C3	Dry Salt		20 then monitor and treat as required
D2	Pre-Wet Salt	RST below -5 Degrees and above -10 Degrees and damp road conditions	20 (13.5 salt 6.5 brine) then monitor and treat as required
D2	Dry Salt		20 then monitor and treat as required
D3	Pre-Wet Salt		

D3	Dry Salt	RST below -5 Degrees and above -10 Degrees and wet road conditions	20 (13.5 salt 6.5 brine) then monitor and treat as required 20 then monitor and treat as required
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DECISION MAKING TREATMENT MATRIX

Forecast or Actual Condition		Reactive Treatment	
A	Road Surface temperature above 1°C	L	Snow accumulations over 30mm
B	Road Surface temperature 1°C to -2°C	M	Hard Packed Snow/Ice
C	Road Surface temperature -2°C to -5°C		
D	Road Surface temperature below -5°C		
E	Road Surface temperature 0°C to -2°C following rain		
F	Road Surface temperature -2°C to -5°C following rain		
G	Road Surface temperature below -5°C following rain		
H	Hoar Frost		
I	Freezing Fog		
J	Freezing Rain		
K	Snow Accumulations		

Road Surface Condition

1	Road Surface Dry
2	Frost Susceptible area / known surface water run off
3	Road Surface Wet

	Road Surface Condition 1		Road Surface Condition 2		Road Surface Condition 3	
	Dry	Pre wet	Dry	Pre wet	Dry	Pre wet
A	0	0	0	0	0	0
B	0	0	15→10	15→10	15	15
C	0	0	15	15	20	20
D	0	0	20	20	20	20
E	15	15	15	15	20	20
F	15	15	15	15	20	20
G	20	20	20	20	20	20
H	15	15	15	15	20	20
I	15	15	15	15	20	20
J	20	20	20	20	30	30
K	20	20	20	20	20	20
L	20	20	20	20	20	20
M	40	N/A	40	N/A	40	N/A

All Spread rates in gm / m²

For Reactive treatments L and M treatment should include ploughing operations.

The intervention Matrix assumes no residual de-icing material on the carriageway. The presence of residual de-icing material will be taken into account and spread rates adjusted in preparing proposed action plans.

All decisions should be taken with reference to Notes (a) to (e) above

De-Icing Materials

Materials used are detailed.

Negative texture thin surfaces are monitored to ensure effectiveness of treatment.

Section 9. Treatments for Snow and Ice – provides guidance on effective treatments for snow, ice and freezing rain based on the operational experience of practitioners - Angus pretty much complies but the recommendation for treatment on compacted snow requires further consideration as conditions dictate.

Salt Type	Precautionary Treatments Before Snow or Freezing rain	
Dry Salt	Light to Moderate Snow/Heavy Snow Forecast	20 -40g/m ²
Pre-wet Salt		20- 40g/m ²
Dry Salt	Freezing rain Forecast	2x20g/m ² [AC1x20g/m ² then monitor]
Pre-wet Salt		2 x20g/m ² [AC1x20g/m ² then monitor]

Treatments during snow and freezing rain – to provide debonding layer spread for dry and pre wet at 20 to 40 g/m² where no ice or compacted snow on surface and similar where ice or compacted snow on surface likely to be compacted by traffic in subsequent snowfall before further ploughing possible.

Where hard packed snow and ice have formed and cannot be removed by ploughing, a salt sand mix can be used in successive treatments at a spread rate of 20 – 40 g/m². This aids vehicle traction and acts to break up the snow and ice.

Sand used in mixes shall be single sized abrasive such as 5mm sand having a low fines content. The particles should be angular in shape and suitable to create an abrasive surface. The sand can be added to salt at a rate of 1:1 by weight.

In relation to ploughing across rail – agree with Network Rail – Angus Council do not plough across rail lines.

Section 10 Treatments for Extreme Cold - In this section is considered extreme cold conditions when more generally available treatments are less effective – Angus Council generally acknowledge there is little that can be done other than management of public expectations and warnings as no specialist treatments are held other than to close roads.

Section 11 Treatments for Footways and Cycleways - The Footways & Cycleways Management Group (FCMG) pedestrian and cycle infrastructure definitions apply to this guidance and are shown below. These definitions are consistent with those presented in the Well-managed Highway Infrastructure Code of Practice. Angus Council have prioritised treatment of Category 1 Pavements.

Section 12 Weather Forecasting and Road Weather Info Systems – Angus broadly align.

Section 13 Route Selection and Optimisation – Angus broadly align.

Priority Footway Gritting Decision Making – Angus procedure

1. On issuing the daily action plan the Angus Council duty controller considers the 5-day forecast noting that Tayside Contracts require 36hours notice for priority footway treatment. If forecast suggests wet surfaces and sub-zero temps or snow/ice he puts priority footway crews on standby for 6am treatment (i.e. in approx. 36 hours' time). The controller has the option of not placing minis on standby where he is able to justify this decision, e.g. weather conditions, residual salt, etc and reasons must be recorded.
2. On issuing the daily action plan the day before the planned treatment (i.e. in approx 18 hours' time) the duty controller determines whether or not forecast still suggests wet surfaces and sub-zero temps or snow/ice, hoar frost, then priority footway crews remain on stand by for 6am treatment. If there is a significant change to forecast whereby wet surfaces and sub-zero temps no longer apply then priority footway crews are removed from stand by requirement.
3. On the actual day where priority footway crews report at 6 a.m. the Angus Council supervisors will check areas and call salt runs on priority footways as required. The supervisors have the ability to decide not to treat if the weather or conditions are such that treatment is not needed or there is sufficient residual salt already down although all such decisions must be recorded. It is noted that spread rates for minis are not given. The controller also has the option of not placing minis on standby where he is able to justify this decision, e.g. weather conditions, residual salt, etc and again reasons must be recorded.

19. Salt Conservation

Where grit/salt conservation is required it must be agreed with the Manager – Roads Assets to deviate from the gritting/salting matrix and introduce salt conservation techniques in accordance with advice on salt conservation as current in the Code of Practice or as deemed appropriate.

ANNEX 1

WINTER ROADS SERVICES 2023/24 LEVEL OF SERVICE AND PERFORMANCE STANDARDS

(a) Period of Cover

Based on past experience the probability of wintry weather is very low before the end of October/ beginning of November and after the first week in April. Personnel will therefore be required to standby to provide cover out with normal working hours for priority routes

From – 6 November 2023 5am

To – 31 March 2024 11pm

It is intended to run a reduced service of four gritters in the two weeks before and after these dates and with limited resources response times will be slower. The four gritters are used to cover the main priority A, B and C class high speed rural roads. Not all A, B and C class roads or high speed ones are covered. Thereafter they are deployed as required. It should be made clear that that they do not treat all the priority Category 1 & 2 routes in the timescales as would be expected in the core winter period. This reduction in performance is however considered reasonable given the reduced and ever-decreasing likelihood of wintry conditions away from these dates.

The proposed coverage during the Christmas/New Year Holiday Period is detailed in Appendix 2(c).

(b) Hours of Cover

To be fully effective salt spread on road surfaces requires the action of traffic to aid dispersal and to assist the break-up of ice and snow. There is therefore little benefit and high cost in treating roads at times when traffic is very light. Also, by definition, the risk of accidents reduces as traffic volumes decrease. The following hours of cover are therefore considered reasonable:

Day 6 Nov 23 to 31 Mar 24	Category 1 Roads	Category 2 Roads	Category 1 Pavements	Category 3 Roads and Pavements
Monday - Friday	05.00 – 23.00*	06.00 – 16.00	06.00 - 15.00	08.00 - 15.00
Saturday	05.00 – 23.00*	05.00 - 08.00**	06.00 – 15.00	Nil
Sunday	05.00 – 23.00*	05.00 - 08.00**	08.00 – 15.00	Nil
Public Holidays	05.00 – 23.00*	05.00 - 08.00**	Nil	Nil

Public holidays – 25 and 26 Dec 2022 and 1 and 2 Jan 2023

*Latest time for start of treatment with completion by 23.00 is 20.00

**Category 2 Roads north of A926/B957/A90 + C52 (B961 to B9128) + U338 Auchterhouse Brae

When snow or icy road surfaces are forecast standby crews will be required to report to their depots at pre-set times within the above hours of cover. If circumstances change or adverse conditions occur unexpectedly standby crews will be called out from home in which case longer response times will

delay the commencement of treatment. However, given the increased sophistication of weather forecasting and the ice prediction system the probability of unforeseen adverse conditions is low. Therefore, compared to the alternative "fail-safe" option of having people standing-by in their depots at all times out with normal working hours even during clement weather (with associated cost implications) this increase in response time in a call-out situation is considered reasonable.

(c) Christmas and New Year Holiday Period Hours of Cover

During the Christmas and New Year Holiday period Tayside Contracts operate normal working on the working days between Christmas and New Year. Coverage for priority and lower - priority routes will therefore be as follows:

Day		Category 1 & 2 Roads +C52 + U338)Sat/Sun +pub hols am only)	Category 1 Pavements	Category 3 Roads and Pavements
Fri	22.12.23	05.00 – 23.00	06.00 – 15.00	08.00 – 15.00
Sat	23.12.23	05.00 – 23.00	06.00 – 15.00	08.00 – 15.00
Sun	24.12.23	05.00 – 23.00	06.00 – 15.00	08.00 – 15.00
Mon	25.12.23	05.00 – 23.00	Nil	Nil
Tues	26.12.23	05.00 – 23.00	Nil	Nil
Weds	27.12.23	05.00 – 23.00	Nil	Nil
Thurs	28.12.23	05.00 – 23.00	06.00 – 15.00	Nil
Fri	29.12.23	05.00 – 23.00	06.00 – 15.00	08.00 – 15.00
Sat	30.12.23	05.00 – 23.00	06.00 – 15.00	08.00 – 15.00
Sun	31.01.23	05.00 – 23.00	06.00 – 15.00	08.00 – 15.00
Mon	01.01.24	05.00 – 23.00	Nil	Nil
Tues	02.01.24	05.00 – 23.00	Nil	Nil
Weds	03.01.24	05.00 – 23.00	Nil	Nil
Thurs	04.01.24	05.00 - 23.00	Nil	Nil

(d) Standby Requirements

In order to ensure availability of drivers, mechanics and supervisory staff it is necessary to put personnel on "standby" on a rota basis – i.e. to require personnel to remain available and contactable by telephone or pager at all times out with normal working hours. To compensate for this restriction of freedom standby allowances are paid. These costs are fixed costs (whether or not the operatives are called out) and have to be allowed for in the budget. Taking into account the resources available and the need for a guaranteed response on priority routes out with normal working hours the following standby arrangements are considered reasonable.

6 November 2023 – 31 March 24

	No of people per week	
Gritter Drivers (0800-2300)	10	(Total No = 30 on 1 in 3 rota)
Gritter Drivers (0500-0800)	10	a.m. only
High Land Bus Route Drivers	1	a.m. only (2 for rota)

Pavement Snowplough Drivers	10*	(= Total No)
Pavement Snowplough Back-up	5*	(= Total No)
Mechanics	2	(Total No = 7 on separate 1 in 4 and 1 in 3 rotas)
Supervisors (i.e. Tayside Contracts' Supervisors)	1	(Total No = 5 on 1 in 5 rota)

* Pavement Snowplough Drivers and Back-up Crews are put on standby on a day-to-day basis depending on the weather forecast.

(e) Salt Stocks

These are as described in Section 7. A salt stock holding at the start of the winter maintenance period which should be sufficient for the start is held.

(f) Response Time

The "response time" is the period between decisions being taken to begin treatment and vehicles leaving the depot. This must take into account distance between operatives' homes and depots in a call-out situation, pre-start checks on vehicles, and time required to load up with salt and fuel.

A maximum response time of:

One Hour is considered reasonable from home to depot.

(g) Treatment Time

The "treatment time" is the period between vehicles leaving the depot and the completion of treatment on all priority routes for salting and gritting. (Treatment times for snow-clearing will vary considerably depending on the depth and persistence of the snow fall). The aim is to complete salting and gritting of priority carriageways before the major peak traffic flows.

Treatment times will depend on route length, distance to start of route from depot, carrying capacity of gritter, speed limits, prevailing weather conditions, driver experience etc. Unrealistically short target treatment times will have disproportionate cost implications. Relaxed (long) target treatment times will mean either completion after traffic has built up or extended working at overtime rates (with associated cost implications).

(h) Assistance from Other Departments

This is described in Section 3 of this report.

Routes treated by farmers acting as sub-contractors to Tayside Contracts are:

Category 2 Roads including bus routes in Glens

Route B22A – UC445/447 Aberlemno
Route B24 - C34 Glen Lethnot
Route B25 - C36 Glenesk

Routes M48 & M46 - Montrose area
Routes T51A & T51 - Muirhead/Birkhill areas
Route K44 - B955 Glen Clova
Route K45 - C27 & C28 Glen Prosen
Route K43 - Kilry/Lintrathen areas
Route B23A – Ogil/Quiech
Route A19 – Inverarity, Murroes, Greystone & Kellas
Route K39 – Kirriemuir, Memus, Noranside & Glen Moy

Category 3 - Farmers/Contractors for gritting Burghs and Villages

Route K37 & K38 - Kirriemuir Burgh
Route T52 - Wellbank and Tealing areas
Route F30 - West half of Forfar, Glamis & Padanaram
Route F31 - East half of Forfar, Lunanhead and Kingsmuir
Route B28 - Brechin
Route A13- Arbroath East
Route A14 - Arbroath West
Route A15 - Arbroath West
Routes K37 & K38 - Kirriemuir extra when snow.

WINTER ROADS SERVICES 2023/2024
PLANT AND VEHICLES

Depending on the prevailing conditions an effective Winter Roads Service requires a range of specialised plant, adapted operational vehicles, and normal operational vehicles. The level of service which can be provided is directly related to the plant available and the costs (both fixed and variable) of providing this plant, keeping it in serviceable condition, and operating it when required. Because of the hostile environment (freezing temperatures, slippery road conditions, high exposure to salt, heavy loading and traction etc) in which this plant operates maintenance costs are significantly higher than for normal vehicles. Efficiency and reliability deteriorates rapidly with age and allowance must be made for renewal of worn out plant. Taking into account the resources available and experience of winter weather encountered in previous years, provision of the following vehicles and plant is considered reasonable:

Snow blower attachment	2 No
Purpose Built 6 x 6 Gritters (9m ³)	1 No
Purpose Built 4 x 4 Gritters (6m ³)	1 No
Purpose Built 6 x 4 Gritters (9m ³)	7 No
Purpose Built 4 x 2 Gritters (6m ³)	2 No
Operational Lorries with Demountable Gritters (9m ³)	2 No
Operational Lorries with Demountable Gritters (6m ³)	6 No
Hired Tractors with Trailing Gritters	23 No
Tractor Shovels	1 No
Loading Shovels	3 No
Tractor Digger / Loaders	4 No
Pavement Tractor Snowploughs	10 No

Above numbers may vary as farmers take over two auxiliary routes

Tayside Contracts manage and maintain the winter maintenance fleet on a Tayside-wide basis. Vehicle replacements are prioritised on the basis of availability of capital, age, condition, cost of repair, serviceability, etc.

WINTER ROADS SERVICE
PRIORITY ROUTES

CATEGORY 1 ROADS

Priority gritting routes have to be carefully planned to minimise the “unproductive travel” (distance from depot to start/end of route, sections of route covered twice, one-way traffic systems, sections of route overlapping with other gritting routes, etc). Routes must also be practical for the size and type of plant deployed. Optimum gritting routes have been drawn up to maximise the inclusion of strategic routes. However, these will inevitably include lengths of less important roads linking strategic routes and necessarily covered for overall routing efficiency. For obvious reasons the gritting route is treated (unless already covered) over its full length (including these less important roads).

The following roads including both strategic routes and non-strategic roads required for routeing efficiency are therefore proposed as PRIORITY ROADS:

URBAN ROADS**ARBROATH**

Abbey Park	Emislaw Drive	Ladyloan
Abbey Path	East Abbey Street	Lamley Terrace
Abbey Street	East Grimsby	Leonard Street
Abbot Street	East Kirkton Road	Ladybridge Street
Academy Lane	East Muirlands Rd	Lochlands Drive
Addison Place	Fisheracre	Lochlands Street
Alexandra Place	Flairs Avenue	Lordburn
Arbirlot Road	Gallowden Road	Millgate
Arbirlot Road West	Glenogil Drive	Millgate Loan
Barngreen	Guthrie Port	Montrose Road
Benedict Road	Grant Road	Ness Drive (Part)
Bloomfield Road	Gravesend	Newton Avenue
Brechin Road	Greenbank Brae	Nolt Loan Road
Bruce Road	Great Michael Road	Patrick Allen Fraser Street
Brothock Bridge	Hamilton Green	Ponderlaw
Brothock Way	Hamilton Street	Rosemount Road
Burnside Drive	Hayshead Road	Seaton Road
Cairnie Loan	Hill Street	Springfield Terrace
Cairnie Road	Hill Place	St Ninians Road
Cairnie Street	High Street	St Vigeans Road
Catherine Street	Horologe Hill (part)	Stanley Street
Charles Avenue	Hospitalfield Road	Tarry Road
Clova Avenue	Infirmery Brae	Viewfield Road
Cliffburn Road	Keptie Road	Walker Place
Commerce Street	Keptie Street	West Abbey Street
Culloden Terrace	Kinghorn Street	West Port
Doocot Place	Kirk Square	West Way
Elmfield Avenue	Kirkton Road	

BRECHIN

Airlie Street
Bridge Street
Caledonian Road
Castle Street
Church Street
Clerk Street
Commerce Street
Cookston Road
Distillery Road
Drumachlie Loan
Duke Street
East Mill Road
Eddie Avenue
High Street

Infirmiry Road
Infirmiry Street
Latch Road
Market Street
Montrose Street
North Latch Road
Panmure Street
Park Place
Park Road
Park View

Pittendreich Road
Provost Buchan Road
Provost Millar Avenue
River Street
St David Street
St Mary Street
Scott Street
Southesk Street
Swan Street
Trinity Fields Cres
Union Street
Wards Road
Witchden Road

CARNOUSTIE

Arbroath Road
Balmachie Road
Barry Road
Carlogie Road
Church Street
Dundee Street

Ferrier Street (top half)
High Street
Ireland Street
Kinloch Street
Newton Road
Panbride Road
Queen Street

Station Road
Thomas Street
Victoria Street
West Path
West Haven Park
Shanwell Road
David Moyes Road

FORFAR

Academy Street
Airlie Crescent
Arbroath Road
Castle Street
Coutties Wynd
Brechin Road
Craig O' Loch Road
Dundee Loan
Dundee Road
East High Street
Gallowshade Road
Glamis Road
Glenclova Terrace
Glenmoy Terrace
Glenogil Terrace

Gordon Street
Jamieson Street
Jeanfield Road
Kirriemuir Road
Lilybank Crest/Road
Market Street
Montrose Road
North Loch Road
North Street
Old Brechin Road
Old Halkerton Road
Orchard Loan
Orchardbank Loan
Prior Road
Queenswell Road

Restenneth Drive
Robertson Terrace
St James Road
South Street
Station Road
Strang Street
Strathmore Avenue
Taylor Street
Threewells Drive
Turbeg Road
Victoria Street
Westfield Loan (Whole)
West High Street
Yeaman Street

KIRRIEMUIR

Angle Road
Bank Street
Bellies Brae
Brechin Road
Cortachy Road
Easthill Road
Forfar Road
Glamis Road

Glengate
Golf Road
High Street
Kinnordy Road
Lindsay Street
Lochmill
Marywell Brae
Morrison Street

Reform Street
Roods
St Malcolm's Wynd
School Wynd
Shielhill Road
Slade Road
Tannage Brae
West Hill Road

MONIFIETH

Albert Street (part) Maule Street to Durham Street
Bank Street
Broomhill Drive
Buddon Drive
Church Street
East Navarre Street
Durham Street (part) Bank Street to Albert Street
Ferry Road
Grange Road (part)
West Grange Road to Ferry Road
High Street
Hill Street

Lorne Street
North Balmossie Street
North Union Street
Panmurefield Road
Panmure Street
Reform Street
South Street
The Fairway
Union Street
Victoria Street
West Grange Road

MONTROSE

Academy Square
Annat Road
Basin View
Brechin Road
Bridge Street
Broomfield Road
Caledonia Street
Castle Place
Charleton Road
Christies Lane
Coronation Avenue
Dorward Place
Dorward Road
Erskine Place
Erskine Street
Faulds Road (Part)
Ferry Street
Garrison Road (Part)
George Street

High Street
Hill Street
Hume Street
John Street
India Street
Links Avenue
Lower Hall Street
Medicine Well Drive
Murray Street
Newhame Road
New Wynd
North Esk Road
North Street
Panmure Place
Panmure Terrace
Patons Lane
Provost Reids Road

Provost Scott Road
Rosehill
Rosehill Road (Part)
Rossie Island Road
St Peter's Place
St Peter's Road
Traill Terrace
Union Place
Union Road
Union Row
Union Street
Waterside Road
Wharf Street
Western Road
Whites Place
Craig Road (part)

RURAL ROADS

A CLASS

A92
A94
A923
A926
A928
A929
A930
A932
A933

A934
A935
A937

C CLASS

C1 Part B978 to B961
C45
C2 Part A92 to A930
C4 Part A92 to B961
C5
C6
C7
C9
C11
C13
C16
C12
C22
C29 Part B9128 to B957
C32 Part A90 to B957
C35 part A90 to B966
C37
C38
C39 (Dubton)
C44
C46
C47
C48
C51
C53 Bractullo Mill
C54
C61
C62 Part A92 to A930
C445
C59
C60
C8

B CLASS

B954 (South section only)
B955 (Part Northmuir only)
B961
B957
B962
B965
B966
B978
B9113

B9127 (Part Arbroath to B961)
B9127 (Douglstown to A90)
B9128
B9134

UNCLASSIFIED

U302
U305 (from A92 via Dobbies to C4)
U307
U322 UP TO C6
U324
U329
U334
U337
U339
U339(2)
U357
U359
U375
U376
U462
U463
U485
U489
U494
U522
U552
U327

(b) **CATEGORY 1 PAVEMENTS - MONDAY TO FRIDAY**

The priority pavement routes are designed to include main retail, schools and health care routes as follows. The council will encourage community self-help where possible.

ARBROATH

Abbey Street	Elgin Place	Lochlands Street
Abbey Park	Ernest Street	Lochlands Drive
Abbey Path	Fisheracre	Lordburn
Abbot Street (part)	Glen Isla Drive (Part)	Market Place
Applegate	Grant Road	Mayfield Shops
Academy Street	Gravesend	Millgate
Addison Place	Guthrie Port	Millgate Loan
Allan Street	Hamilton Green	Montrose Road
Arbirlot Road	Hamilton Street	Ponderlaw
Arbirlot Road West	Hume Street	Ponderlaw Lane
Bakers Wynd	Hayshead Road	Rosemount Road
Barbers Croft	Hays Lane	Seaton Road
Barngreen	Hays Terrace	Spink Street
Brechin Road	Hayswell Road	Springfield Terrace
Brothock Bridge	Helen Street	Stanley Street
Burnside Drive (part)	Hill Place	St Abbs Road
Cairnie Road	Hill Street	St Ninians Road
Cairnie Street	Hill Terrace	Timbergreens
Catherine Street	High Street	Timmergreens shops
Charles Avenue	Horologe Hill	Viewfield Road
Commerce Street	Keptie Street	Warddykes Avenue (part)
Culloden Terrace	Keptie Road	Walker Place
Emislaw Drive	Kirk Square	Wesley Gardens
East Abbey Street	Kirkton Road (part)	West Abbey Street
East Kirkton Road	Ladyloan	West Port
	Leonard Street	Westway
	Linton Road	
	Link path to Inverbrothock School	

BRECHIN

Airlie Street	High Street	Panmure Street
Castle Street	Infirmay Road	Southesk Street
Church Street	Infirmay Street	St Davids Street
City Road	Latch Road	St Mary Street
Clerk Street (incl McGregor St)	Link Path to School (Strachans Park to Drumachlie)	St Ninians Square
Distillery Road	Market Street	Trinity Road (part)
Duke Street	Montrose Street	Swan Street
Gallowhill		Trinity Road
		Union Street

CARNOUSTIE

Anderson Street (part of)	Kinloch Street/Park	Station Road
Balmachie Road	Lochty Street	Thomas Street
Barry Road	Links Avenue	Victoria Street
Carlogie Road	Maule Street	West Path
Church Street	Newton Road	James Street
Dundee Street	Queen Street	
Ferrier Street	Ruxton Place	
High Street	Shanwell Road	

FORFAR

Academy Street	Glamis Road	Robertson Terrace
Bankhead Road	Kirriemuir Road (part of)	St James Road
Boyles Close	Lowson Avenue	Station Road
Brechin Road	Lentlands Road	Taranty Road
Castle Street	Market Street	Taranty Place
Craig O'Loch Road	Myre Road (part)	Taylor Street
Coutties Wynd	New Road	The Cross
Dundee Loan	North Street	West High Street
Dundee Road (part of)	Prior Road	Fyfe St + path + Service Rd
East High Street	Queenswell Road	

KIRRIEMUIR

Bank Close	Isla Road	Roods
Bank Street	Jamieson Close	School Wynd
Bellies Brae	Kirkton Court	Shielhill Road
Brechin Road	Knowehead	Sidlaw Range
Clova Road	Lesser Roods	St Malcolm's Wynd
Crofthead	Lindsay Street	St Colme's Close
Cumberland Close	Manse Close	Tannage Brae
Glamis Road (part of)	Ogilvy's Close	Whiteside
Glengate (part of)	Prosen Road	
Gordon Park	Reform Street	
High Street	Rogers Close	

MONIFIETH

Albert Street (Maule Street to Hill Street)	High Street	Panmure Street (part)
Brook Street (Tay Street to Reform Street)	Hill Street	Panmurefield Road
Church Street	Lorne Street (Hill Street to High Street)	Reform Street (High Street to Brook Street)
East Navarre Street	Maule Street	Tay Street (High Street to Brook Street)
Ferry Road	North Balmossie Street	Victoria Street
Grange Road	North Union Street	

MONTROSE

Baltic Street
Basin View – cycle track
to Medicinewell Park
Brechin Road
Bridge Street
Broomfield Road
Castle Place

George Street
High Street
Hume Street
John Street Kincardine
Street
Lower Hall Street
Market Street
Mill Road

Murray Street
Newhame Road
New Wynd
Northesk Road
Upper Hall Street
Victoria Bridge
Western Road
Western Road North

Villages that receive Category 1 Gritting Mon – Friday

BIRKHILL AND MUIRHEAD

Coupar Angus Road
Dronley Road
Footpath from Dronley Road to Keithall Gardens
Liff Road

EDZELL

High Street

FERRYDEN

Burnside Place
Burnside Place
Craig Crescent
Craig Road
Ogilvie Terrace
Southesk Place
West Terrace

FRIOCKHEIM

Gardyne Street
Westgate

LETHAM

Auldbar Road (Part)
Blairs Road
Braehead Road
Dundee Road
Gardyne Street
The Square

WELLBANK

Kellas Road
Mattocks Road
School Road

(c) **CATEGORY 1 PAVEMENTS – SATURDAY TO SUNDAY**

The priority pavement routes are designed to include main retail, schools and health care routes as follows. The council will encourage community self-help where possible.

ARBROATH

Abbey Street	Gravesend	Ponderlaw
Abbey Park	Guthrie Port	Ponderlaw Lane
Abbey Path	Hamilton Green	Rosemount Road
Applegate	Hill Place	Seaton Road (part)
Academy Street	Hill Street	Springfield Terrace
Addison Place	High Street	Timmergreens shops
Allan Street	Keptie Street	West Abbey Street
Bakers Wynd	Keptie Road	West Port
Barbers Croft	Kirk Square	
Barngreen	Kirkton Road (part)	
Brothock Bridge	Leonard Street	
Burnside Drive (part)	Lochlands Street	
Cairnie Loan	Lordburn	
Cairnie Road	Market Place	
Cairnie Street	Mayfield Shops	
Catherine Street	Millgate	
Commerce Street	Millgate Loan	
Elgin Place	Montrose Road (part)	
Fisheracre		
Grant Road		

BRECHIN

Church Street	Market Street
City Road	Montrose Street
Clerk Street (incl	Panmure Street
McGregor St)	Southesk Street
Commerce Street	St Davids Street
Distillery Road	St Mary Street
Gallowhill	St Ninians Square
High Street	Swan Street
Infirmay Road	Trinity Road (part)
Infirmay Street	Union Street
Latch Road	

CARNOUSTIE

Balmachie Road
Barry Road (part)
Bonella Street
Carlogie Road (part)
Church Street
Dundee Street
Ferrier Street
High Street
West Path

FORFAR

Academy Street	Glamis Road (part)	South Street (part)
Boyles Close	Kirriemuir Road (part of)	The Cross
Brechin Road	Market Street (part)	West High Street
Castle Street	Montrose Road (part)	
Craig O'Loch Road	Myre Road (part)	
Coutties Wynd	New Road	
Dundee Loan	North Street	
Dundee Road (part)	Queenswell Road	
East High Street		

KIRRIEMUIR

Bank Street	Knowehead	Roods
Bellies Brae	Lesser Roods	School Wynd
Glamis Road (part)	Lindsay Street	Shielhill Road (part)
Glengate	Marywell Brae	St Malcolm's Wynd
High Street	Ogilvy's Close	Tannage Brae
	Reform Street	

MONIFIETH

Brook Street (Tay Street to Reform Street)	Panmure Street (part)
Ferry Road	Reform Street (High Street to Brook Street)
High Street	Tay Street (High Street to Brook Street)
Maule Street	Victoria Street
North Union Street	

MONTROSE

Bridge Street	Lower Hall Street
Castle Place	Murray Street Northesk Road
George Street	Western Road (up to Lower Hall Street)
High Street	
Hume Street	

Villages that receive Category 1 gritting on a Saturday and Sunday

BIRKHILL AND MUIRHEAD

Coupar Angus Road
Dronley Road
Liff Road

EDZELL VILLAGE

High Street

FRIOCKHEIM

Gardyne Street
Westgate

LETHAM

Auldbar Road (Part)
Gardyne Street
The Square

d)

CATEGORY 2 ROADS - 7-day cover – Glens and higher routes

06.00 - 16.00 Hrs Monday to Friday and 05.00 – 08.00 Sat and Sun

Route K39

B955
C30
U412
C31
C32
U400
C29
U401
U402

Route K42

B951
C25
U90(part)
U389
C26
U92
U388

Route K43

B954
C24
U391
U392(1)
U392
U388
U388(2)
U388(1)
U390 (bottom section)

Route K44

B955
U405

Route K45

C25
C27
U394
U404
C28

B23A

U409
U409(1)
U410
U410(1)
U411
U411(1)

Route B21

C30
U406
U371
U407
C31
U415
U416
C33

Route B24

C35
C34
Church Street, Edzell
Dalhousie Street, Edzell
U428
U419
U420
U422

Route B25

C36
U424
U425
U426
U427
U429 (C30 to C35)

Route T1W

U338 Sat/Sun only

Route A4W

C52 Sat/Sun only

(d) **CATEGORY 2 ROADS – 5-day cover**

MONDAY - FRIDAY - 06.00 - 16.00 Hrs

Route M 48

C35
C40
C41
U433
U434
U435
U437
U442
U444
U444(1)
U519

Route A19

B9127
C52
U308
U308(3)
U310
U499
U499(2)

Route T51A

U340
C10
U342
U341
U331
U330(1)
U330
U329(2)
C11
U327
U343 +U338

Route B22A

U454
U455
U457
U457(1)
U457(2)