

# Road winter maintenance in Finland

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Finnish Transport  
Infrastructure Agency



# Winter maintenance of the road network as of 2024

## Road type and the winter maintenance category



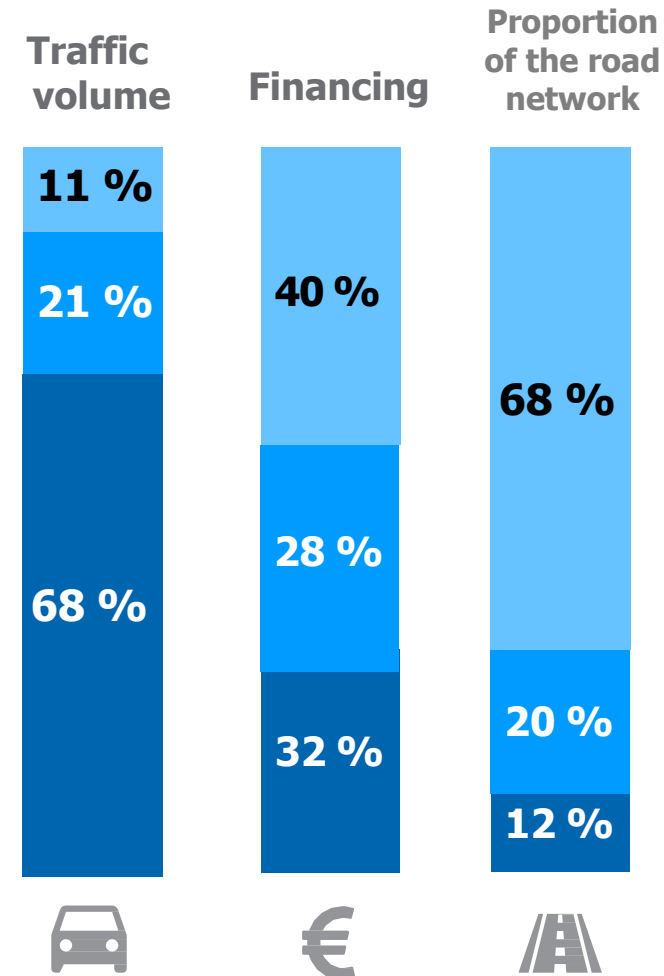
**Low-volume road network**  
Winter maintenance categories II and III  
52,800 km



**Medium-volume road network**  
Winter maintenance categories Ib and Ic 15,600 km



**High-volume road network**  
Winter maintenance categories Ise and Is 9,500 km



Finland has approx.

**78 000** km

Motorways

**935** km

Pedestrian and  
bicycle lanes

**6 000** km



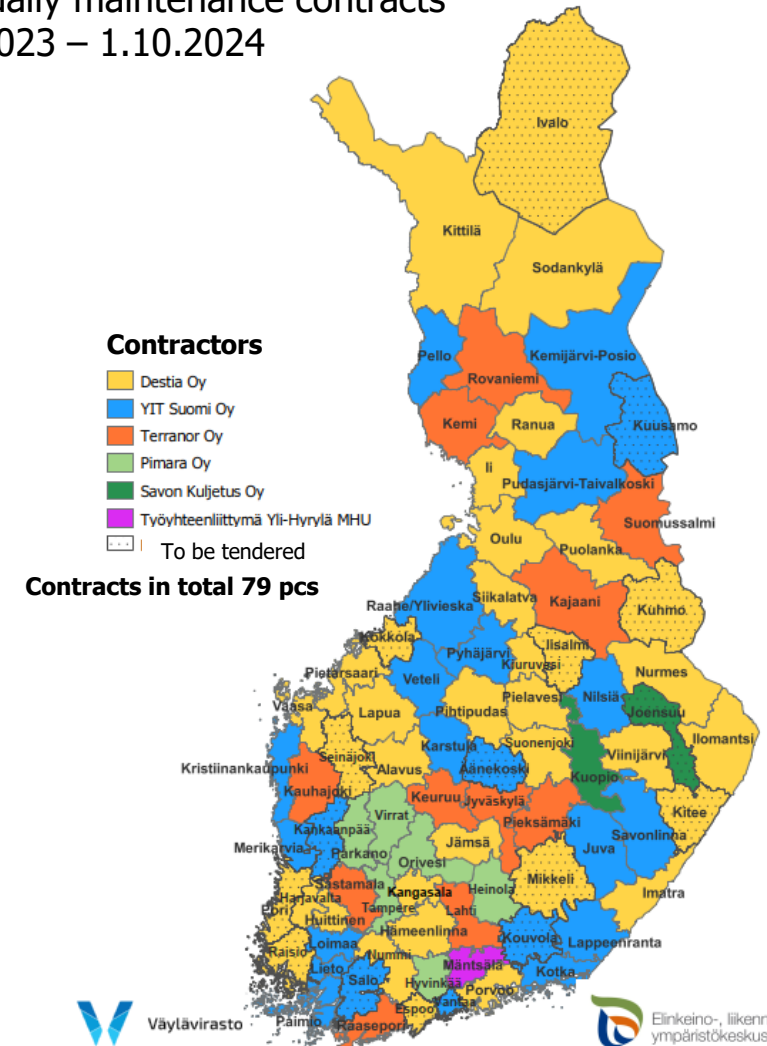
# Maintenance area contracts (state)



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- 79 area contracts, 78 000 km  
(51 000 km pavement, 27 000 km gravel roads)
- A contract includes 500-2300 km roads
- Daily maintenance 24/7/365 x 5 years
- Target price contract model
- Costs 210 M€ / year, about 2300 €/km/year
- 6 main road winter maintenance categories  
(Ise, Is, Ib / Ic, II, III)
- 3 Pedestrian and cycling winter maintenance  
categories (L, K1, K2)
- <https://vayla.fi/en/maintenance/road-network/winter-maintenance>

Road daily maintenance contracts  
1.10.2023 – 1.10.2024

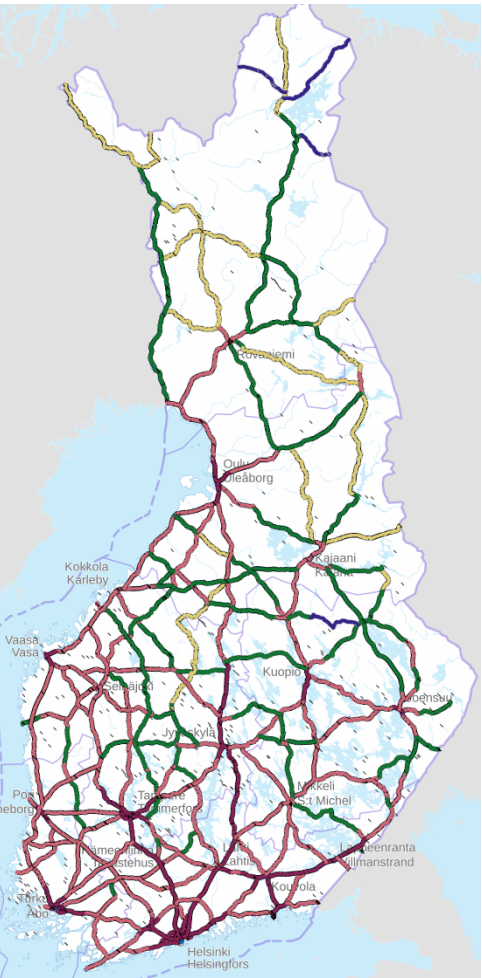




Winter maintenance category

- (Ise) Slip prevention without operation time
- (Is) Normally completely free of ice and snow
- (I) Normally free of ice and snow
- (Ib) Maintained using mainly salt, occasionally slightly slippery
- (Ic) Maintained using mainly sand, thin packed snow on the road allowed
- (II) Mostly covered with packed snow
- (III) Mostly covered with packed snow, longest operation time
- (L) Quality corridors of pedestrian and bicycle
- (K1) Quite busy pedestrian and bicycle lanes
- (K2) Basic winter maintenance level of pedestrian and bicycle lanes

# Winter maintenance categories on main roads



AADT	Highways	Main roads	Regional roads	Connecting roads	AADT heavy / AADT trailer
100,000		Ise			
12,000		Is			1350/ 750
3,000		Ib/Ic			330/ 170
800					70/ 40
350		II			25/ 12
200			III		
0					



# Winter road maintenance categories



## **Maintenance category Ise**

(1,591 km: 2% of road length, 31% of traffic, 28% of heavy traffic)

The road is mainly uncovered. Snow removal starts once snowfall begins. Slipperiness is prevented in advance. The aim is to keep the road always in the condition defined in the quality requirements. The time allocated to snow removal is a couple of hours. When the weather changes, some slightly slippery conditions may occur. During long periods of subzero temperatures, when salting is not possible, the road surface may also be icy in places. Maintenance rounds on maintenance category Ise roads are short, so that busy roads can be quickly maintained to the condition defined in the quality requirements.



## **Maintenance category Is.**

(7,905 km: 10% of road length, 37% of traffic, 43% of heavy traffic)

The road is mainly uncovered. Snow removal starts soon after snowfall begins. Slipperiness is mainly prevented in advance. When the weather changes, some slightly slippery conditions may occur. During long periods of subzero temperatures, when salting is not possible, the road surface may also be icy in places. The time allocated to snow removal and anti-skid treatment is a couple of hours. Maintenance rounds on maintenance category Is roads are fairly short, so that the maintenance round can be completed in the time allocated.

# Winter road maintenance categories



## Maintenance category 1b

(11,209 km: 14% of road length, 16% of traffic, 16% of heavy traffic)

Most of the time, the road is mainly uncovered, but in subzero temperatures, there may occasionally be low and narrow lines of packed snow located between the carriageways and between the driving ruts. The aim is to keep the packed snow thin with the fast removal of loose and packed snow. Anti-skid treatment is mainly done by salting. The aim is to prevent slipperiness in advance. During long periods of subzero temperatures, when salting is not possible, the road surface may be icy in places. Slippery conditions that may occur during subzero temperatures are prevented by gritting, as necessary. The time allocated to snow removal and anti-skid treatment is a few hours.

The contract tendering process will involve a transition to the use of operating methods that ensure that there will be hardly any roads covered entirely with packed snow.



## Winter maintenance category 1c

(4,460 km: 6% of road length, 5% of traffic, 4% of heavy traffic)

The road is usually partly covered with packed snow and sometimes or completely covered with packed snow. The ruts and surface of the packed snow are levelled as much as possible. The road pavement condition and road edge depressions affect the levelness of ploughing. For the most part, anti-skid treatment involves point and line gritting and the roughening of packed snow. In winter conditions, traction is not good at all points, which should be taken into account in driving behaviour. The occurrence of black ice is also prevented by salting. Especially in the autumn before actual winter conditions and in the spring when subzero temperatures occur at night, anti-skid treatment is done by salting. Salting can also be used in anti-skid treatment at other times if the conditions are favourable. The time allocated to snow removal and anti-skid treatment is a few hours. The intensity of snowfall affects the time when ploughing starts.



# Winter road maintenance categories



## Maintenance category II

(15,601 km: 20% of road length, 7% of traffic, 5% of heavy traffic)

The surface of the road is mostly covered with packed snow and there may also be ruts in places. It may snow several centimeters before maintenance procedures are started. In the newest contracts, the procedures will be started a little sooner than this in the period between 2 a.m. and 8 p.m. Road surfaces are roughened and the intersection areas, hills and curves are gritted regularly. During the most problematic road conditions, the roads are also gritted completely. The need for gritting is determined according to the conditions. The road network's ploughing and anti-skid treatment routes are long, which means that they take several hours to drive through.

In normal situations, the road has sufficient friction and smoothness for moderate traffic. In difficult weather conditions, such as during a sudden rise in temperature or immediately after snowfall, caution is required from all road users.

## Maintenance category III

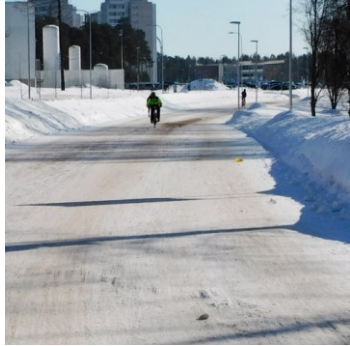
(37,219 km: 48% of road length, 4% of traffic, 3% of heavy traffic)

The road surface is covered in packed snow most of the time and there may also be ruts in places. The quality level is mostly the same as on maintenance category II roads, but snow ploughing may take up to one hour longer and anti-skid treatment up to two hours longer. A little more snow is also allowed than in the maintenance category II. When the weather changes, the road conditions can be problematic for several hours, which means that extra caution must be taken when driving.



# Winter maintenance categories

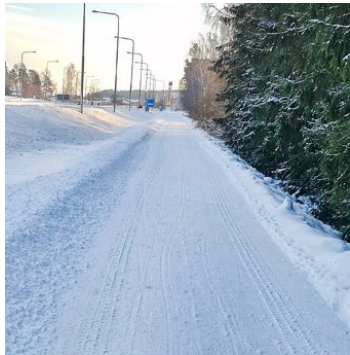
## Pedestrian and cycling routes



### Maintenance category L

(157 km: 3% of pedestrian or cycling route length)

The route-like quality corridors for pedestrians and cycling are located in major urban areas. The requirements for quality corridors are defined on a case-by-case basis so that they are consistent with the cycling route network in the municipalities on the quality corridor and the requirements are in some respects higher than in the maintenance category K1. For instance, the slipperiness of the quality corridor may be prevented by brush salting, the allocated times may be shorter or in the spring, grit may be removed from the quality corridors earlier to promote cycling. Quality corridors may also have night-time quality requirements.



### Maintenance category K1

(3,244 km: 53% of pedestrian or cycling route length)

In winter conditions, pedestrian and cycling routes are mainly covered with packed snow. Anti-skid treatment procedures start within two hours. Slipperiness on pedestrian and cycling routes is prevented by gritting or roughening. There may be a few centimeters of loose snow on pedestrian and cycling routes before maintenance starts routes paths must be ploughed within three hours of the start of maintenance. At night between 10 p.m. and 6 a.m., quality may be lower but the surface of the route must still be safe.



### Maintenance category K2

(2,742 km: 45% of pedestrian or cycling route length)

In winter conditions, pedestrian and cycling routes are mainly covered with packed snow. The quality level is mostly the same as on maintenance category K1 routes, but snow ploughing and anti-skid treatment may take up to one hour longer. At night between 10 p.m. and 7 a.m., quality may be lower but the surface of the route must still be safe.

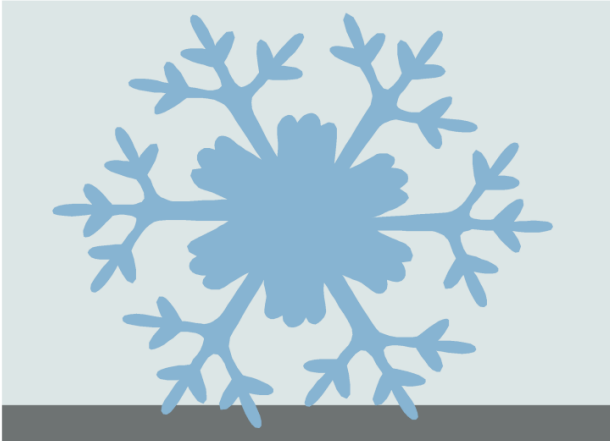




Policies for winter maintenance



Road winter maintenance  
Quality requirements



# Policies and guidance

MAIN QUALITY REQUIREMENTS FOR FRICTION							
Winter maintenance category	Ise ja Is	Ib	Ic	II	III	K1	K2
Friction requirement	<b>0,3</b>	<b>0,25</b>	<b>0,25</b> (start operations)	<b>Roughened surface, problematic locations are spot sanded</b>		<b>Enough good for traffic needs</b>	
	road surface below -6 °C <b>0,25</b>	road surface below -4 °C <b>0,22</b>	spot sanding <b>0,25</b> line treatment <b>0,22</b>			after 10 pm <b>K1 before 6 am</b> <b>K2 before 7 am</b>	
Cycle time	<b>Ise 0 h</b> <b>Is 2 h</b>	salting <b>3h</b> sanding <b>4h</b>	sanding <b>4h</b> (salting <b>3h</b> )	sanding <b>5h</b>	sanding <b>7h</b>	<b>2 h</b>	<b>3 h</b>

MAIN QUALITY REQUIREMENTS FOR SNOW REMOVAL							
Winter maintenance category	Ise ja Is	Ib	Ic	II	III	K1	K2
Maximum snow depth	4 cm	4 cm	4 cm	8 cm	10 cm	3 cm	4 cm
Cycle time	2,5 h (slush 2 h)	3 h (slush 2,5 h)	3 h	4 h	5 h	3 h	4 h
<ul style="list-style-type: none"> <li>- Snow plowing must be in progress when half of the maximum snow depth has accumulated somewhere on the route. However, from 2 am to 8 pm snow plowing must be started for cat. II at 3 cm and for cat. III at 4 cm.</li> <li>- The max snow depth must not be exceeded during the rain and during the operation.</li> <li>- Only half the amount of snow is allowed for slush.</li> <li>- The operations starts when the rain stops and ends when the driving lanes have been cleaned from snow. The operation must still be in progress after the start threshold has been met somewhere on the snow plowing route.</li> <li>- In the quality corridors for pedestrian and bicycle lanes (L), the quality requirements are defined on a case-by-case basis so that they are consistent with the street network, the quality requirements are in some respects higher than in the maintenance category K.</li> <li>- When the rain ends after 10 pm, cat. K1 should be cleaned from snow before 6 am and cat. K2 before 7 am.</li> <li>- In cat. K1 and K2, the max snow depth is at night time from 10 pm to 6 am (7 am) is 8 cm.</li> </ul>							

Backed snow depth should be under 5 cm in the spring before the snow melts



# During snowstorms, the quality requirements are not valid



Principle is that roads are open all the in winter but can be rarely closed short time by accident or an event.

Maintenance contracts are dimensioned according to normal weather conditions. In the winter, weather conditions may change rapidly, making it very difficult for the maintenance contractor to be responsible for road maintenance according to the quality requirements. During heavy snowfall (10 cm in 4 hours) or during rain of supercooled water, roads fall below the quality requirements quickly after maintenance. In these situations, the quality requirements defined in the maintenance categories are not valid. The contractor will work continuously with all their fleet. Roads will be maintained to their normal condition when conditions return to normal (max 12 hours in main roads and 24 hours lower-level roads).

# Gravel roads in the thaw

- On the gravel roads, the first plowing of winter is often a challenge, so the work is worth it do with caution, e.g. with underbody mounted blades. The surface of the road is still melted and not for it has not had time to form backed snow layer. In this case, the plow can easily cause unevenness on the road surface and damage. At the beginning of winter, the aim is to make gravel roads as smooth as possible soon.



# Bus routes in Finland

- In Finland, there are commercial bus routes and routes that are organized by the municipality and the state
- Commercial bus routes are in busier areas and in cities (the municipality is often involved in the routing)
- Municipalities organize public transport related to the municipality's needs
- Centres for Economic Development, Transport and the Environment (ELY-centres) organize bus routes to low-traffic areas, where there is no commercial supply
- According to the revised law (entered into force in 2021), elementary school students under the age of 18 receive a free-of-charge school transport
- Organizing school transport is the responsibility of municipalities





# Bus routes for the needs of school children

- Municipalities decide the routes within their own municipality
- School transport is based on selected bus routes, which are adjusted to meet the needs of school children, especially in cities
- In smaller municipalities, there is less or no scheduled bus service. In these municipalities, bus traffic must be organized directly to meet the needs of school children
- Municipalities negotiate with the state about the bus routes organized by the states so that they also serve school transport needs
- In sparsely populated areas, school trips can be long and individual school children might be on different sides of the area. In these areas, children can also be gathered together by taxi and then be transported to the school by bus



# Road maintenance on school bus routes

- Most of the school routes are on street networks under the responsibility of the municipalities, for which the municipality decides the treatment category. In the municipalities' treatment categories, school routes are typically seen as better categories
- School routes do not directly affect the maintenance classification. However, there are discussions with municipalities about the level of maintenance on certain school routes
  - Maintenance categories can be raised on some routes
  - School opening hours are considered in maintenance contracts
  - Specific treatment procedures can be carried out on the routes
- School transport has some way been taken into account in the states bus routes. The equipment defined in the contract must be suitable for Finland's winter conditions
  - For example, low-floor buses are not accepted, and buses must have winter tires





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