M50 Concession Limited

M50 UPGRADE PPP CONTRACT

OPERATION & MAINTENANCE PROCEDURES
Winter Maintenance Strategy 2023-2024

QEMS M50OP-313 - Revision 21
31st August 2023

M50 Concession Limited
Luttrellstown Road
Diswellstown,
Castleknock, Dublin 15

DOCUMENT CONTROL

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Document Approval			
Role	Position	Signature	Date
Reviewer	O&M Manager		31/08/2023
Checker	Network/Winter Manager		31/08/2023
Approval	General Manager		31/08/2023

TURTLE DIAGRAM

Resources – Personnel, Equipment Materials

Personnel:
- O & M Manager
- Winter Maintenance Manager
- Network Manager
- Works Manager
- Duty Engineer
- ISU Driver
- Works Supervisor
- Vaisala Manager
- Gritter Driver
- Gardai
- Emergency Services

Equipment:
- Vaisala Software
- Computer
- Phone/Mobile/Radio
- Gritting Trucks & Ploughs
- Teleporter
- Salt
- Brine

Risks and Opportunities

Risks:
- Breakdowns
- Duty Engineers
- Gritter Drivers
- Power Failure
- Weather Station Failure
- Software Failure
- Salt Stock
- Traffic/Accidents
- Water Run Off
- Forms not been available/completed correctly

Opportunities:
- Staff Training
- Software Upgrade
- Auto Logic

Inputs

- Gritting Notification
- QEMS M50 OP 307.01
- QEMS M50 OP 307.02
- QEMS M50 OP 307.03
- M50CL QEMS Policy & Procedures
- Oncall Roster
- Contract Schedule 7 (O&M)
- QEMSM50MP-06.01
- Met Eireann
- Route Maps

Process

Procedure Name: Winter Maintenance Strategy 2023-2024

Outputs

- QEMS M50 OP 313 F77
- F2 Operations Record Sheet
- Risk Assessment
- Vaisala Operations
- Lantra Gritter & Plough Ticket
- Driver Licence for Gritter Operation
- Review of Annual Performance Report and 5 Year Mgt Plan

Performance Indicators

- Gritting Time (KPI)
- Internal Audit Compliance
- Annual Performance Report
- 5 year Management Plan

Method

- As per QEMS M50 OP-313 – Winter Maintenance Strategy 2023-2024

REGISTER OF COPIES ISSUED TO RELEVANT PERSONS

This Register highlights the named recipients of this Winter Maintenance Strategy. Hard copies will be issued to the named holders on each revision of the document.

ISSUED TO	COMPANY / ORGANISATION	LOCATION
Winter Maintenance Manager	M50 Concession Ltd	M50 Office
General Manager	M50 Concession Ltd	M50 Office
O&M Manager	M50 Concession Ltd	M50 Office
Works Manager	M50 Concession Ltd	M50 Office
Network Engineer	M50 Concession Ltd	M50 Office
Works Supervisor	M50 Concession Ltd	M50 Office
Authority's Representative	Transport Infrastructure Ireland	Parkgate Street Dublin 8
Authority's Site Representative	Atkins	Swords
Traffic Inspector	An Garda Síochána	Dublin Castle
Traffic Inspector	An Garda Síochána	Blackrock
Traffic Inspector	An Garda Síochána	Terenure
Traffic Inspector	An Garda Síochána	Blanchardstown
Traffic Inspector	An Garda Síochána	Santry
Chief Operating Officer	Egis Road & Tunnel Operation	Dublin Port Tunnel
Chief Ambulance Officer	HSE Ambulance Service	Ambulance HQ Dublin
Chief Fire Officer	Dublin Fire Brigade	Dublin Fire Station
Director of Services	Fingal County Council	County Hall Blanchardstown
Director of Services	South Dublin County Council	County Hall, Tallaght
Chief Executive	Dun Laoghaire Rathdown County Council	County Hall, Dun Laoghaire
Head of Forecasting	Met Eireann	Glasnevin Hill, Dublin 9
Manager	Motorway Traffic Control Centre	Dublin Port Tunnel, Dublin 3
General Manager	MMaRC Network A Operator	Castleknock Office

TABLE OF CONTENTS

1. PURPOSE AND SCOPE

1.1 The purpose of this document is to identify the processes, procedures and control measures employed by M50 Concession Ltd, the Company, to ensure that Winter Maintenance and associated elements under the M50 PPP Contract are carried out in accordance with contractual requirements.

2. HEALTH & SAFETY

2.1 The Company will ensure so far, as is reasonably practicable:

- Safe and healthy working conditions,
- Safe equipment and systems of work,
- Provision of appropriate information, instruction, training and supervision,
- Provision, where necessary, of a competent person to advise and assist in securing the health, safety and welfare of employees and others.
- This procedural document should be read in conjunction with the Company's Policies and Procedures for Health & Safety;
    - QEMS M50MP-07. 01 - Safety Statement.
    - QEMS M50MP-07. 02 - Management Responsibilities.
    - QEMS M50MP-07. 03 - Emergency Response Procedures

3. ASSOCIATED RISKS & SAFE WORKING

3.1 This document should be read in conjunction with the Company Policy and Procedures for Associated Risk with Activities.

4. ENVIRONMENTAL POLICY

4.1 The Company regards environmental protection as an integral and essential part of good business practice. We are committed to achieving and maintaining a high standard of environmental quality in our operations.

4.2 This document should be read in conjunction with the Company Environmental Policy, Procedures and Control Measures QEMS M50MP-06.01 - Environmental Operating Plan.

5. PROCEDURE PERSONNEL

5.1 In addition to the permanent and temporary employees of the Company, personnel of any relevant subcontractors may also be involved in the procedures and activities described in this document.

6. RESPONSIBILITIES

O&M Manager

6.1 The responsibilities of the O&M Manager are:

- To ensure a Winter Maintenance Manager is nominated.
- To ensure sufficient resources are available to carry out Winter Maintenance Operations efficiently.

Winter Maintenance Manager

6.2 The Winter Maintenance Manager for the 2023/24 Winter Maintenance Season will be the M50 Concession Ltd's Network Manager. His responsibilities are:

- To ensure a Winter Maintenance Strategy is produced prior to the start of each winter maintenance season.
- To ensure suitably experienced Duty Engineers are placed on a rota to ensure availability of Decision Maker throughout entire Winter Season.
- To ensure suitably trained Gritter Drivers are placed on a rota to ensure availability of labour throughout entire Winter Season.
- To ensure an Ice Prediction System and Weather Forecasting is available throughout the entire Winter season.
- To ensure suitable plant, equipment and salt supplies are available to undertake effective winter maintenance operations for the duration of the Winter Season.

Duty Engineer

6.3 The winter maintenance Duty Engineer's role is carried out by a suitably qualified person within the Operations and Maintenance department with adequate technical ability to understand the forecast information and make the decision to treat the Project Road. Their responsibilities are:

- Receive text forecast and graph site forecasts from forecast provider via the Vaisala Manager system.
- Make an initial decision based on the forecast data and inform the Works Manager of the treatment for that day/night.
- Monitor the weather during the day/night and ensure that any changes to the forecast are identified and instructions communicated to mobilise operatives to commence gritting.
- Communicate with other 3rd parties and M50CL Management.

7. WINTER MAINTENANCE

Objectives

7.1 Winter maintenance operations shall allow the safe movement of users of the Project Road and shall keep to a minimum, delays caused to such users by adverse winter weather (ice and snow) in accordance with the Contract specification as detailed in Schedule 7 of the M50 PPP Contract.

7.2 The purpose of this document is to identify the processes, procedures and control measures employed by M50 Concession Ltd (M50CL) to ensure that all Winter Maintenance Activities associated with the Project Road under the M50 PPP O&M Contract are addressed and managed in accordance with best practice, statutory duty and contractual requirements as outlined in contract Schedule 7, Part 1 and as otherwise defined within the contract document and associated schedules.

Winter Maintenance Strategy

7.3 The Winter Maintenance Strategy will contain all the necessary detailed arrangements for all aspects of winter maintenance as set out in the Contract. All members of staff being involved with Winter Maintenance shall be fully acquainted with this Winter Maintenance Strategy and will have access to copies of it.

7.4 The timely response by M50CL personnel and its sub-contractors will be vital in protecting the safety of the travelling public and minimising the disruption to Users of the Project Road.

7.5 As part of an agreement with the MMaRC Network A Operator, M50CL will also treat within its winter routes the M50 interchanges and several stretches of motorway outside the Project Road which are adjacent to the M50 and radiate out from the M50 but remain within the same climatic/urban domain as the Project Road.

7.6 The integration of the Project Road and interchanges into the same winter service routes is the only practical way to deliver a comprehensive winter maintenance service to the M50, while ensuring consistency of treatment. In this approach, mainline and interchanges are being treated at the same time. There are also synergies to be achieved in combining routes in respect to prevent dead mileage and wasted travel time, providing a quicker response, earlier treatment and ensuring a seamless co-ordination in decision making and treatment implementation.

7.7 The current Winter Maintenance Strategy 2023-2024 document only refers to the Project Road. The winter service specifications for the areas treated by M50CL that don't form part of the Project Road are included under the MMaRC Network A's Winter Maintenance Strategy 2023-2024.

Resources

7.8 Adequate resources will be made available to treat the Project Road within the 2-hour requirement

7.9 Resources will be made available to cope both with those winter conditions normally associated with the particular areas of the Motorway and will be identified to manage all the weather conditions, which might apply from time to time. Resources and facilities will be available to enable reactionary salting to be completed within 3 hours of a decision to begin treatment, i.e. 1 hour to commence the operation and 2 hours to completion of gritting. The operational winter maintenance period shall be 1st October 2023 to 15th May 2024 however should extreme conditions demand, this may be extended depending on particular conditions.

Weather Forecasting

7.10 A specialist weather forecasting service provider has been appointed to utilise information, initially from the existing ice sensor network, to give detailed forecasts for each identifiable climatic domain within the area. Facilities will also be provided in order that information from Met Eireann and/or other Weather Radars available and thermal mapping if utilised, can be applied to give the best information concerning existing or anticipated conditions. Use will be made of Met Eireann and/or other Weather Radars available for forecasting services together with Vaisala for ice alert and data collection.

Winter Maintenance Depot

7.11 Proposed depot location to enable provision of winter service, emergency response and all other specified services is to be at the Company's Depot at Luttrellstown Road, Diswellstown, Castleknock, Dublin 15.

Management Structure – during working hours

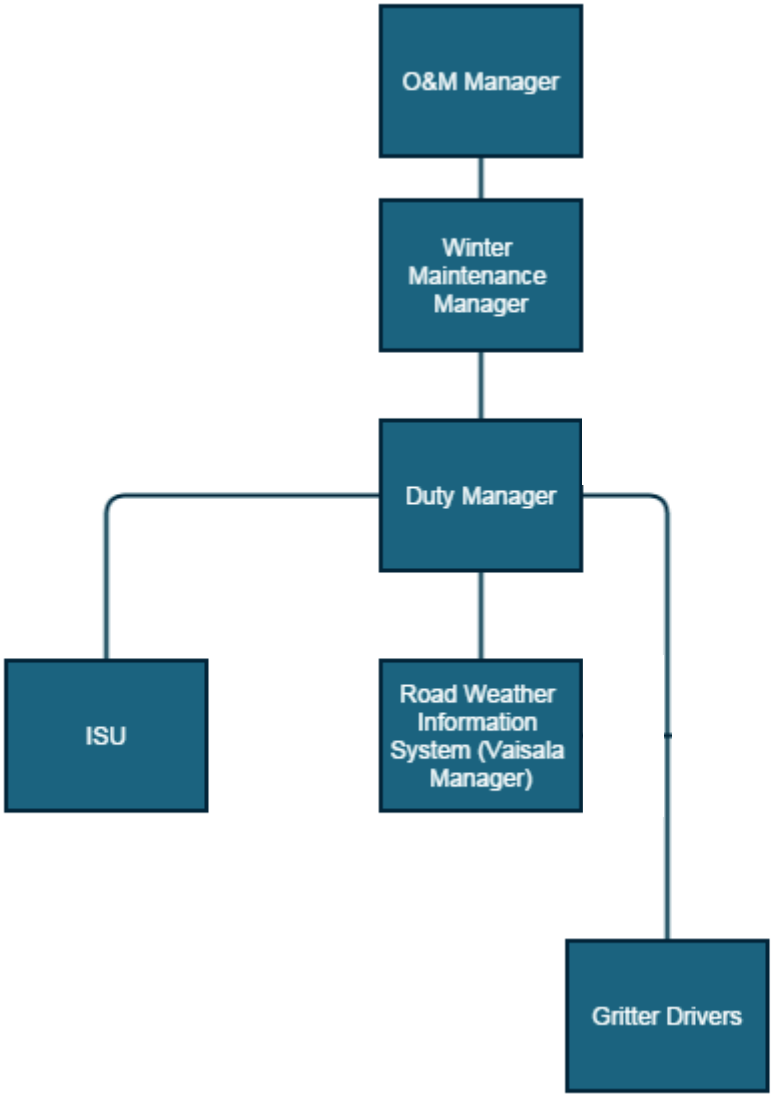
7.12 Members of the Winter Maintenance Team based at the M50 depot in Castleknock will carry out the management of the Winter Maintenance Service provision.

7.13 The information gathering and decision-making process will be managed by the O&M Network Manager who will assume the role of Winter Maintenance Manager having specific responsibility for service provision.

7.14 A roster of Duty Engineers to give 24-hour coverage will be agreed to manage information from the forecaster and Vaisala. The Duty Engineer will have authority to instruct treatment as required. Consultation with the Winter Maintenance Manager will be carried out as necessary.

7.15 The Duty Engineer will also ensure plant and personnel are mobilised. The Duty Engineer will instruct the Works Manager when a decision to treat has been made. The Works Manager will ensure the drivers are instructed and ready to treat the road at the time required. The Works Manager will take instruction from the Duty Engineer.

7.16 The management and reporting structure will be as the following flowchart:



Management Structure – Out with working hours

7.17 In order to provide the required response to weather conditions, operational staff required to drive the gritters will operate a combination of standby at home, standby at compounds, normal dayshifts, nightshifts and continuous shifts. Manning arrangements are defined as follows:

- Call Out - available off-duty personnel if demand arises, contacted by the Duty Engineer.
- Standby - personnel available at home or at a compound for immediate duty outside normal working hours or shifts, contacted by the Duty Engineer.
- Normal Shifts - maintenance compounds manned during normal working hours.
- Continuous Shifts - 24 hour manning at the maintenance compound.

7.18 The Duty Engineer will confirm to the Works Manager the particular manning arrangements required each day by 15:00 hours.

Monitoring of Weather Conditions

7.19 It is the responsibility of the Duty Engineer to ensure that forecast and information from the Weather Stations are monitored at all times. The Duty Engineer working a dayshift (08:30 to 18:00 hours Monday to Friday) will monitor the weather conditions in the M50 Office from the 1st October to 15th May. During the night (18:00 hrs to 08:30 hrs) and at weekends the task of monitoring the road temperatures will done by the Duty Engineer from home. It will remain the responsibility of the Duty Engineer to review the forecast and data available and make the initial decision on the action for that day or night. The Duty Engineer who will have access to a laptop and internet connection will access the updated information and take the appropriate action. If adverse weather conditions are forecast the Duty Engineer will report to the M50 Office.

7.20 Monitoring of actual road conditions during adverse weather will be carried out by a driver in a loaded gritter. Areas susceptible to ice will be monitored closely.

7.21 The Vaisala Manager system which is available to each Duty Engineer, will be set up with an alarm which will give an audible warning & text/email message function. When pre-set parameters are breached the system will warn the user. This gives a further level of monitoring to ensure human error is minimised.

7.22 The Duty Engineers will work to a roster system, the list of Duty Engineers and contact numbers is provided below in list of contacts and in **Appendix 5**.

7.23 In all cases a Duty Engineer and sufficient labor resources will be provided to ensure that treatment of the Project Road will be completed within 2 hours of work starting on salting runs. The Duty Engineer will record the response times achieved for reactionary treatment or snow ploughing.

7.24 In the event of severe winter weather being forecast a decision will be made and the Duty Engineer will be present in the Castleknock Depot to co-ordinate all operations. Operatives will be put on either a continuous 12 hour or 8 hour shift pattern depending on the forecast and duration of event to ensure an immediate response on a 24 hour basis.

Reaction Time for Call Outs

7.25 The requirement of the contract is to commence gritting within 1 hour of a call to treat being received.

List of contact numbers with post names/locations/tel. no. (24 hours)

7.26 Please refer to **Appendix 5**.

Liaison with other parties:

Liaison with Adjoining Local Councils / Maintaining Agents

7.27 Contact will be made by telephone, fax or e-mail with the Winter Maintenance Duty Engineers of adjacent authorities if the need arises. Copies of the agreed Winter Maintenance Strategy will be provided to the Local County Councils, MMaRC Network A Operator and other emergency services.

7.28 The Duty Engineer will advise the Winter Maintenance Duty Engineers of local authorities by email of M50CL's decision regarding precautionary treatment on a daily basis.

Across Boundary Contacts:

7.29 Please refer to **Appendix 5**.

Liaison with the Garda Siochana:

7.30 Copies of the agreed Winter Maintenance Strategy will be provided to the Garda Síochána and other emergency services.

7.31 Garda Traffic Patrols on the network may be requested to report any local adverse conditions to the service provider in order that appropriate action can be taken and resources deployed.

7.32 In the event of severe weather conditions Gardai assistance may be requested when moving winter maintenance equipment, arranging for any required road closures or for dealing with any abandoned vehicles.

7.33 In difficult conditions a Garda presence may be requested to accompany the snow clearing or gritting plant until a reasonable passage for traffic has been obtained. The Duty Engineer will make requests for Garda presence to the appropriate Garda Control Room.

Gardai Contacts:

7.1 Please refer to **Appendix 5**.

8. WEATHER FORECAST PROVIDER

Provider Contact Details

8.1 24 hour weather forecast updates will be provided by the Forecast Provider, namely:

Met Eireann
Glasnevin Hill
Dublin 9
Ireland
Tel No: 01 806 4200
Fax No: 01 806 4247

8.2 Facilities will also be provided on site for the display of weather radar from Met Eireann and other weather radar providers.

8.3 A full forecast service shall be available throughout the period 1st October to 15th May, although outside this period a road danger warning system service shall be utilised. The provider shall be Met Eireann, Dublin.

Description of Service Received

8.4 Met Eireann provide on a daily basis, to be delivered to the internet-based Ice Prediction System, the following:

- Site specific ice prediction graphs
- 24 hour text forecasts for operational areas within the network including expected minimum road surface temperatures and weather hazards, issued by 15:00 hours daily
- Routine updates for operational areas including expected minimum road surface temperatures and weather hazards, issued by 20:00 hours daily.
- Non routine amendments to the text forecasts as required.

8.5 The forecaster shall telephone the M50CL Duty Engineer and shall issue non-routine amendments to the site-specific forecasts graphs and revisions to the 24-hour text forecast if:

- there is, or the forecaster expects there to be, deterioration in the forecast road surface state i.e. a change from no-frost to frost, on either the 24-hour text forecast or any of the site-specific forecast graphs.
- there is, or the forecaster expects there to be, an improvement in the forecast road surface state i.e. a change from frost to no-frost, on either the 24-hour text forecast or on any site-specific forecast graphs.
- there is, or the forecaster expects there to be, a difference of at least 1 hour between the original forecast onset of freezing conditions and the revised onset of freezing conditions, except where a precautionary salting has already been carried out, or is planned to be carried out prior to the onset of freezing conditions, and no precipitation is forecast for the intervening period.
- Snow, ice, hoarfrost or freezing rain which were in the original forecast and are now not expected, but only if the relevant Service Providers nominated out of hours personnel can be contacted before 24:00 hours.
- The timing of rainfall changes such that rain is now expected after the planned time for precautionary gritting, but only if relevant Service Providers nominated out of hours personnel can be contacted before 24:00 hours.
- The amount of snow changes from light to moderate or from moderate to heavy.

  Light = less than 3cm
  Moderate = 3 to 10cm
  Heavy = greater than 10cm

8.6 Notwithstanding the above, the forecaster shall immediately telephone the Duty Engineer, to advise them of a deterioration in the prevailing weather and surface conditions when the actual road surface temperature on any site specific forecast graph falls to zero degrees Celsius or lower and this has not been forecast beforehand.

8.7 The Duty Engineer will record the receipt of verbal updated forecast information provided by forecaster. This will be recorded real time on the Vaisala Diary function.

8.8 Met Eireann shall prepare and issue severe weather warnings of heavy rain, as necessary, to M50CL Duty Engineers. This service shall be provided throughout the year.

8.9 Met Eireann shall prepare and issue severe weather warnings of gales, as necessary, to the M50CL Duty Engineers. This service shall be provided throughout the year.

8.10 Gale warnings shall be issued up to 24 hours in advance when gusts of 50 miles per hour or more are expected. The warning will detail the expected wind speeds and the validity time.

8.11 Meetings will be held as necessary between M50CL and the forecasting agency to discuss the forecast accuracy and level of service provided. An annual meeting will be held each year during the summer to discuss the forecasting during the previous winter season and to discuss problems and issues and to look at improvements or changes to the service in the coming season.

9. ICE PREDICTION SYSTEM

Sensor Locations

9.1 The relevant Road Sensors and Ice Stations for the provision of the winter services are installed at the following locations:

- M1/M50 Interchange J3 (non-Project Road)
- Blanchardstown, between J6 (N3) and J7 (N4)
- Ballymount between J9 (N7) and J10
- Ballinteer, at J13.
- Sandyford, Between J14 and J15
- Bray, at J5 of the N11 (non-Project Road)

Highlight Forecast Sites

9.2 The location of the existing sensor locations with forecast sites is detailed in **Appendix 2.**

Road Weather Information System Arrangements

9.3 An Ice Prediction System will be supplied by:

Vaisala TMI Ltd
Vaisala House
349 Bristol Road
Birmingham
B5 7SW

Tel No: +44 (0)121 683 1200
Fax No: +44 (0)121 683 1299

9.4 The server for the network Ice Prediction System will be housed at the Vaisala office in Birmingham

9.5 The Ice Prediction System will poll the outstations on the network at maximum intervals of one hour. This may be reduced to shorter intervals depending on conditions during the winter season.

9.6 Any faulty sensors detected by the forecaster shall be notified to M50CL on the morning summary and a member of the O&M team will arrange for sensor repairs.

9.7 Access to the Vaisala Manager website will be available to all the responsible Duty Engineers. Access to the Vaisala Manager website is available from any computer with internet access.

Weather Radar

9.8 Access to weather radar information is available to the Duty Engineer through the Eireann met.ie and/or Metoffice.gov.uk Web Site to assist in response arrangements and to give maximum warning of the arrival time of inclement weather to permit resource mobilisation. Other web-based weather imaging sites are available and will be utilized to improve the service.

Existing Thermal Map Coverage

9.9 Existing thermal mapping will not be used as route-based forecasting is not carried out and all five routes are treated when a decision is made to treat.

9.10 Updating and upgrading will take place as required if and when new products and technologies are available.

Thermal Map Usage

9.11 Thermal mapping can be used as an additional tool in the decision-making process in relation to Precautionary Salting. Thermal mapping, if available, can be used to highlight potentially hazardous areas or cold spots on the Project Road requiring additional or specific treatment. The thermal mapping system can be designed to be driven from the forecast minimum temperatures from out station data with an updated thermal map produced at the time of each revised forecast. However, thermal mapping it is not currently utilised by M50CL due to the five routes being in the same single climatic zone, their short length, weather uniformity and lack of particular hazardous areas or cold spots.

10. DECISION MAKING

Roles and responsibilities related to management structure

10.1 The Duty Engineer at the M50 Office or at home will be responsible for:

- Receiving and disseminating weather forecast information
- Keeping the Winter Maintenance Manager informed with current status
- Liaison with the Gardai
- Maintaining records of all messages and movements of all operational plant
- Keeping records of road conditions and of any blocked lanes
- Providing factual information concerning the network to the Gardai for onward distribution to the press, local radio, RTE, AA and giving a response to any public enquiries
- Dealing with any difficulties or complaints from the general public which may arise
- Receiving and disseminating information from the appointed specialist forecast analyst
- Keeping all other records as required.

10.2 The Duty Engineer will maintain a log of all messages from patrol vehicles or vehicles engaged on snow clearing and record them on the Vaisala diary function.

10.3 The Winter Maintenance Manager will be responsible for ensuring delivery of the specified winter maintenance operations and will appoint Duty Engineers who will work to an agreed roster to ensure that full time cover is provided in the event of inclement weather. The Duty Engineer will issue instructions for required winter maintenance based on specialist forecasts and local information.

10.4 Duty Engineers, also working to an agreed roster will arrange for mobilisation of resources at the maintenance depot and also have overall responsibility for monitoring progress and managing change.

10.5 A report on the Winter Maintenance operations undertaken will be submitted to TII each year within the PPP Co's Annual Report and 5 Year Management Plan.

Decision Making Procedure

10.6 The decision to carry out treatment will be made by the Duty Engineer who will phone the required operatives to give them instructions.

10.7 Provisional Arrangements to commence Winter Maintenance Operations will be made during each afternoon based on information from the forecaster augmented by information from the Weather Bureau Service (Vaisala). Decisions will be regularly monitored to include for variations in the forecast weather or to reflect actual conditions on site and confirmed at the latest by 20:00 hours daily. These decisions will be reviewed on receipt of non-routine weather forecast updates. The decisions will be recorded on the salting decisions form which will form the basis of the action plan.

10.8 Forecasted information to be utilised will include weather radar to give the Duty Engineer maximum warning of the arrival time of inclement weather to permit resource mobilisation.

10.9 Detailed information will be available from Winter Patrols when operating on the Project Road 24 hours per day during adverse weather.

10.10 The exact time at which precautionary salting will take place, to all, or part of the Project Road will be determined from forecast and local information available. A roster for the operatives will be held at the M50 Office and will be updated by the Works Manager as appropriate.

10.11 On receipt of a forecast of abnormal weather/snow the decision will be taken to implement the prolonged snowfall strategy. Operational staff will be instructed to commence a 12 hour or 8 hour shift pattern depending on forecast and be on a 24 hour rota to cover the period of the adverse weather.

Record of events

10.12 The following list identifies typical records required:

- Decisions taken when and by whom
- Treatment Records
- Ice detection records
- Weather forecasts and actual weather experienced
- Response times achieved
- For each depot quantities of de-icing materials used in stock and on order
- Plant and equipment deployment records and driver / operator logs
- 'Dry Run' Records

10.13 These records will be stored on the Vaisala Manager system. It is the responsibility of the Duty Engineer to ensure details of decisions, treatment records, quantities of salt used, etc. are entered into Vaisala Manager on a daily basis and to utilise the diary function to record decisions made, and of the Winter Maintenance Manager to ensure records are up to date.

10.14 For each treatment undertaken the operator will log the details of the treatment on Standard Form QEMS M50OP-313 F.77 Operator Daily Plant & Equipment Log & Times.

10.15 By 10am the following working day of completing each precautionary salting operation, or other snow or ice removal, a treatment report will be generated from the Vaisala system and held electronically. These reports will be held electronically on the server and available for inspection by any interested party.

Notification

10.16 TII shall be notified immediately by telephone of any major incident arising on the Project Road as a result of winter conditions and in particular of any parts of the Project Road closed to traffic followed up with written confirmation.

10.17 During normal working hours the Authority's Site Representative will be contacted by telephone. For out of normal working hours or if for any reasons the above contact cannot be made then the Authority's Site Representative will be emailed directly. Please refer to **Appendix 5** for contact details.

Accuracy of forecast, justification for changing decisions

10.18 Monitoring of the actual road surface temperatures in relation to the forecast road surface temperatures will determine the accuracy of the forecast and will provide the necessary information for the Duty Engineer to amend the treatment requirements.

Arrangements for continuous monitoring of forecasts

10.19 Winter Maintenance operations will be administered from the M50 Office situated on Luttrellstown Road, Diswellstown, Castleknock, Dublin 15.

10.20 Weather conditions during the winter maintenance period will be continuously monitored.

10.21 This will be achieved by:

- The duty forecaster.
- Expert weather forecast providers will regularly access ice sensors / ice prediction system to monitor road and weather conditions.
- The Duty Engineer will also access the ice sensors / ice prediction system to monitor road and weather conditions.
- Feedback of road condition information from patrol vehicles, Gardai reports and calls from members of the public.

Spread rates

<u>Precautionary Salting</u>

10.22 The philosophy behind Winter Maintenance operations is, wherever possible, to carry out pre-salting before ice can form or snow settles and compacts on the road. To enable this to be undertaken effectively depends on a mixture of local knowledge and experience, good local weather forecasts, and knowledge of the state of the road at the time through patrols (i.e. is it wet or dry, salt covered or not etc.).

10.23 If no forecast is available for whatever reason and the temperature has fallen to +1ºC, then precautionary salting in the Project Road shall take place unless:

- No moisture is or is expected on the road
- There is enough residual salt on the road to deal with the expected conditions.
- There is enough cloud cover to suggest that temperatures will not fall any further.

Rates of Spread for Precautionary Salting

10.24 For precautionary salting the preference will be for pre-wet treatment. Pre-wet treatment involves spraying the de-icing salt with a brine solution before the salt is applied to the road surface. This is more effective than traditional dry salting as the wet salt adheres to the road surface instead of bouncing off or being swept off by traffic. The other benefit is that dry salt requires moisture to be effective as a de-icing agent. By pre-wetting the salt this ensures moisture is always present and that it is effective as a de-icer immediately.

10.25 For pre-wet treatment the quoted spread rate is the combined weight of dry rock salt and brine, combined in a 70:30 ratio of dry salt to brine. The brine is composed of water and marine salt, with a salt concentration of 20 to 23%.

10.26 Spread rates for precautionary treatment are described in the table below.

10.27 If freezing conditions are expected after rain salting will be delayed as long as possible to reduce loss of salt by run off, unless freezing conditions coincide with rainfall. If freezing conditions coincide with rainfall then the salting will be timed to be complete prior to freezing but with an increased spread rate.

10.28 If continuous snow is forecast, salt shall be spread at 20-40g/m^2 according to the anticipated severity of the snowfall. Every effort will be made to ensure enough salt is applied before snow starts to adhere to the road to melt the initial snowfall and to provide a wet treated surface.

10.29 Elevated sections of road, including bridges and sections of low-lying ground or where the local topography channels windborne cold air is more prone to freezing and drifting of snow and may need special treatment and specific attention. These areas will be identified through local knowledge and real time reports from the winter maintenance patrol drivers.

10.30 It is intended that Precautionary Action forms the major part of winter operations.

10.31 A matrix showing the proposed levels of treatment in the Project Road is shown below. These treatments are only a guide and actual conditions and information from forecasters, patrol drivers and real time data may mean that a different treatment may be applied

Weather conditions	**Definition**	**Spread Rates**	
		Salt (gram /square metre)	**Pre-wetted salting (gram /square metre) (see Note 1)**
Light	Frost and/or light snow	10	10
Moderate	Freezing conditions after rain	20 to 30	20 to 30
Severe	Continuous snow	30 to 40	30 to 40
Note 1: Spread rates for pre-wetted salting are the combined weight of dry salt and brine combined in proportion 70:30 by weight with brine of concentration 20 to 23%.			

Winter Maintenance Precautionary Treatment Spread Rates

10.32 A matrix showing the proposed levels of treatment between 10g/m^2 and 40g/m^2 in the Project Road is shown below. These treatments are only a guide and actual conditions and information from forecasters, patrol drivers and real time data may mean that a different treatment may be applied.

Road Surface Conditions	Air Temp	Treatment			
		Spreading gram/square metre	Spreading gram/square metre	Ploughing	Blowing
		Salt	Pre-wetted Salting		
Ice formed	less than minus 5ºC and stable	20 to 40	20 to 40	No	No
Snow covering exceeds 30 to 50 millimetres thick	less than minus 5ºC and stable	10	10	Yes	No
Snow covering exceeds 30 to 50 millimetres thick	less than minus 5ºC and dropping	10 to 40	10 to 40	Yes	No
Snow accumulations due to prolonged falls	less than minus 5ºC and stable	20 to 40	20 to 40	Yes (continuous)	Where applicable
Hard packed snow/ice less than 20 millimetres thick	greater than minus 5ºC	30 (successive)	30 (successive)	No	No
Note 1: Spread rates for pre-wetted salting are the combined weight of dry salt and brine combined in proportion 70:30 by weight with brine of concentration 20 to 23%.					

Note: Wet / moist road conditions will be determined by weather forecast interpretation supplemented by information obtained from winter patrols, gritting operations, other operational crews and inspection teams.

Treatment of ice already on the Road

10.33 If ice has already formed on the road, salt shall be spread up to a rate of 40g/m^2 depending on the amount of ice present and the air temperature to ensure a rapid melt. Particular attention will be paid to lengths of the Motorway, which are known to be susceptible to poor run-off.

10.34 Application of salt at 40g/m² will be made in severe conditions where road surface temperatures falls to below -5°C or where hard packed snow is present on the network.

Treatment of snow already on the road after Precautionary Salting

10.35 Snow ploughs will be fitted to vehicles when snow is forecast and ploughing shall commence as soon as snow depths allow or as directed by the Duty Engineer.

10.36 Each pass of the plough may be supplemented by an application of salt at a rate of 10-40g/m² depending upon the temperature trend and prevailing condition and will be instructed by the Duty Engineer depending on the accumulations and forecasted snow fall. Information from the Ice Prediction System together with temperature measurements at the depot will be available.

10.37 Special salting may be necessary to deal with melted water from snow, which may freeze at night, and such conditions will be monitored closely.

10.38 Snow ploughing routes will be as the precautionary salting routes for simplicity of driver training.

Treatment of Hard-Packed Snow and Ice

10.39 If the above procedures are carried out successfully then the formation of hard-packed snow and ice should be rare. However, should these conditions occur provided that the ice is no more than 20mm thick and the air temperature is below -5ºC, then removal shall be carried out by successive salt applications of 20-40g/m^2.

10.40 The use of salt spread at the upper limits of 40g/m² is however applied selectively in the following circumstances:

10.41 Precautionary salting of the Project Road in those areas where continuous heavy snow is forecast. The intention is to melt the initial snowfall to make operation of snow ploughing more effective.

10.42 Treatment of ice formed on relatively lightly trafficked sections of the Motorway when the temperature is sustained and below -5°C.

10.43 Successive treatment for areas of hard packed snow or ice less than 20mm thick with temperatures above -5°C. Local observations and local experience will essentially identify these areas. A timely application of precautionary treatment should make the formation of hard packed snow/ice a rare event.

10.44 When temperatures fall below -10°C or where snow is more than 20mm thick a single sized abrasive aggregate of particle size up to 6mm shall be added as necessary to the salt. A reversion to the use of salt only is to be made at the earliest opportunity to avoid the possibility of blocked drains or gullies.

11. SALTING ROUTES

Routes for Precautionary Salting

11.1 To complete precautionary salting on the Project Road within the contract requirements five routes have been proposed.

11.2 All five routes will operate from the Castleknock depot and decision making will be made by the M50CL Duty Engineer.

11.3 The five routes are designed to treat the entire Project Road as well as the adjoining Interchanges and radial routes within the MMaRC Network A as per the following split:

- Route 1: M50 J5 To J2 and M1 to J2

- Route 2: M50 J7 to J5 and M3 to J6
- Route 3 M50 J7 to J10 and N4 to J4
- Route 4 M50 J10 to Edmondstown O/B J12 – J13 and N7 to J3
- Route 5: M50 Edmondstown O/B J12-J13 to J17 and N11 to J5 Bray

11.4 A general map of the routes is included in **Appendix 1**. The detailed drawings and descriptions of these routes are in **Appendix 3**.

Routes for Reactive Salting

11.5 In the event of prolonged snowfall and the necessity to complete 40g/m^2 dry salt treatments then the five routes used for precautionary treatment will be utilized. The five routes are as per **Appendix 3**.

Philosophy for Reactive Salting

11.6 Following the route optimisation exercise it has been decided that only one set of reactive routes will be implemented at this stage.

11.7 Due to the necessity to potentially carry out a 40 g/m^2 salting exercise and this being the most onerous to achieve in the timescale because of the implications for the likelihood to re-loading, these routes should be considered as the primary reactionary salting routes.

11.8 Reactionary salting at 10 - 25 g/m^2 will be carried out on these routes which will obviously mean that they can be completed quicker and without re-loading.

'Dry Runs'

11.9 Prior to 1st October each year a 'dry run' and route familiarisation of each route will be carried out which will include the fitting and removal of plough to every vehicle. Records will be kept of these dry runs detailing times taken to traverse the route, fit the plough, and any other relevant comments.

12. PATROLS & PATROL ROUTE

Policy for Patrolling in adverse weather.

12.1 Patrolling of the Project Road will be carried out during the period 1st October to 15th May when adverse weather is being experienced or is predicted. Periods of adverse weather are those when the Project Road is likely to be affected by snow or severe frost/freezing conditions.

Patrolling when Very Low Temperatures and Hoar Frost Predicted

12.2 The Company will put out one patrol vehicle to cover all routes when a forecast is predicting temperatures lower than -4oC or severe hoar frost. The Patrol will be undertaken in a loaded gritter to enable timely spot treatment of potentially hazardous conditions as opposed to full blanket precautionary salting.

Patrolling when Snow or Freezing Rain is Predicted

12.3 The Company will put out one patrol vehicle per route (5 gritters in total) when a forecast is predicting snow or freezing rain. Patrols will be undertaken in loaded gritters with ploughs fitted to enable timely commencement of treatment of potentially hazardous conditions when they occur.

12.4 Patrols shall be carried out to ensure that the whole route or individual routes are covered at intervals not exceeding 4 hours.

12.5 Priority on patrol runs will be given to main carriageways; slip roads will be patrolled where their condition cannot be assessed from the main carriageway and where they are found to be abnormally prone to icing.

12.6 Patrol drivers will report on conditions to the Control Room and Duty Engineer if conditions require a gritter to be actioned.

13. SNOW CLEARING STRATEGY

Description of arrangements and resources for snowfall

13.1 To assist in route familiarity for operations it is intended that snow ploughing of single lanes will be carried out on the same routes as for reactionary salting. This readily enables ploughing and salting.

13.2 Ploughing of snow will normally commence at a snow depth of 30mm and will be accompanied by salt applications at 10-40 g/m2. Should snow depth on the carriageway exceed 100mm then salting may be suspended and ploughing carried out without the application of salt. The application of salt shall be recommenced as soon as practicable.

13.3 In consideration of carriageway lanes, traffic volumes and the incidence of slip roads, salting vehicles and other vehicles with plough attachment fitted will team up to enable echelon ploughing (two or more vehicles moving in the same direction, one behind each other, each on different lanes). Care will be taken to coordinate slip road clearance with main carriageway clearance. Where echelon ploughing is deployed salting may take place over the full carriageway width by the trailing vehicle but where ploughing over a single lane width salt will normally be spread only on the ploughed width.

Prolonged snowfall strategy

13.4 In the event that extreme weather conditions are forecast or experienced, a dedicated 'snow' control room will be established at the M50 Office.

13.5 All Winter Maintenance Operations on the Project Road would be controlled by the Winter Maintenance Manager or by allocated staff (Duty Engineer) to ensure that the optimum use is made of dedicated and any externally resourced plant items on the Project Road.

13.6 Routine and Cyclical works will cease. All operational staff will commence a 12 hour shift rota for forecasted snowfall lasting 1-4 days to allow 24 hour working. If snowfall is forecasted to last longer than 4 days then staff will commence 8 hour shift rota and this shift pattern will be maintained until the adverse weather has finished.

13.7 The five routes will be precautionary treated with salt in accordance with the above spread rates. The routes will be patrolled throughout the period of the forecasted adverse weather and otherwise the winter trucks will be on standby at the following locations:

- Route 1- J3 M50/J1 M1
- Route 2- J6 M50 - J1 N3
- Route 3- J7 M50 - J1 N4
- Route 4- J11 M50
- Route 5- J13 M50

13.8 The roster of Duty Engineers will be available to give continual management presence in periods of extreme weather. The appointed drivers of winter maintenance equipment will be

available to operate the equipment on a 24-hour operation should conditions require. Stocks of salt and winter quality fuel will be maintained at sufficient levels in the depots over the winter period to permit full-scale operations for an extended period.

13.9 During severe weather conditions the Winter Maintenance Manager will liaise directly with the Gardai to ensure that up to date information is available regarding travel conditions and blocked highways. All media enquiries will be directed to the Company's General Manager.

13.10 The Winter Maintenance Manager will, where considered to be appropriate, make suggestions to TII in relation to the broadcasting of information during or in response to forecast severe winter weather conditions and shall advise winter controllers of adjacent authorities or agents accordingly.

13.11 Where extreme conditions persist and road closures or partial closures have to be considered, then the Winter Maintenance Manager will contact the TII and advise them accordingly.

13.12 Where appropriate and after consultation with the Gardai the Duty Engineer shall arrange for installation of signs that clearly show the road closure, with reason for the closure and where appropriate, diversion routes.

13.13 TII's Authority's Site Representative shall be notified immediately of any major incident arising on the Project Road as a result of winter conditions and in particular of any parts of the Project Road closed to traffic followed up with written confirmation the next working day.

13.14 During normal working hours the Authority's Representative on Site will be contacted by phone. For out of normal working hours or if for any reasons the above contact cannot be made then the Authority's Representative on Site will be emailed.

13.15 During heavy prolonged snowfall it may be not possible to keep all lanes clear of snow at all times. In that situation, the Company will prioritize auxiliary lane and lane 1 and endeavour to keep them open at all times. Once these lanes are safe and allow traffic to move freely the other lanes will then be cleared of snow to allow traffic to move freely.

13.16 For clearing the other lanes a strategy of echelon ploughing will be implemented. To avoid snow accumulations in the fast lane and up against the median wall all snow will be ploughed from the fast lane across the other lanes using the echelon ploughing method and into the hard shoulder/verge. The timing of this type of echelon ploughing is dependent on many factors and the decision to implement this operation will be made by the Duty Engineer in conjunction and with liaison with TII and the Gardai.

Arrangements for procurement of back-up resources in severe conditions

13.17 The Company will make the necessary arrangements with local contractors to supply qualified and trained labour during prolonged adverse weather events in order to ensure continuity of the level of resources described in this Winter Maintenance Strategy.

13.18 Contact and negotiations with a number of plant suppliers will be made to ensure that equipment can be made available at short notice to respond to emergency situations or to protracted periods of inclement weather.

13.19 Loading shovels and trucks as appropriate will be utilised from local quarry operators, local contractor operations and haulage companies and external plant hirers.

14. LABOUR

Numbers Available

14.1 The required resources are based on 3 trained and qualified drivers per spreading vehicle. Drivers are trained to the standards required by City & Guilds (Winter Maintenance Operations).

14.2 Current permanent staffing levels are at 15 number staff with HGV license and qualifications/experience to operate winter maintenance equipment.

Training

14.3 Training of Winter Maintenance Operatives will consist of informal 'Tool Box' talks, formal training courses (City & Guilds Winter Maintenance Operations, or equivalent), and hands on experience.

'Tool Box' Talks

14.4 'Tool Box' talks consisting of Specific Procedures, Method Statements, Risk Assessments, and other related information. This will be given by the operatives Supervisor on a regular basis to ensure Operatives are aware of relevant information and hazards. The patrolling in loaded gritters when adverse weather conditions are being experienced or predicted will emphasised to ensure all operators are aware of when to treat the road and also to communicate the conditions to the Control Room Operator.

14.5 Records of these informal 'Tool Box' talks will be kept to ensure compliance.

Hands on Experience

14.6 Dry runs of salting routes will take place in the autumn for driver training in route familiarisation and to demonstrate compliance with the specified response times.

14.7 The three new Schmidt winter spreading units described in clause 15.2 will have an autologic system which will allow for automated route selection and GPS controlled route guidance. Lane widths and routes are pre set and once spread rate is selected the operator does not have to touch any spreader controls and follows the pre-set route.

Formal Training

14.8 All operatives' formal training will conform to the following training matrix:

	Gritter Operator	Snow Plough Operator	Telehandler Operator
City & Guilds Winter Service – Spreader (fixed/demount)	Yes	Yes	
City & Guilds Winter Service – Snowplough (angle/vee)	Yes	Yes	
RTITB Telescopic Handler – Forks/Bucket			Yes
Schmidt Autologic Control System	Yes	Yes	

Call Out Procedures

14.9 Call out of the required level of resources will be coordinated by the Duty Engineer and Works Manager.

14.10 The decision to carry out treatment will be made by the Duty Engineer who will instruct the Works Manager to mobilise resources and give the instruction to carry out the appropriate treatment at the specified time. The Works Manager will then contact the required operatives who will proceed to the depot to start the treatment.

Adverse Weather

When snow or adverse weather is forecast a 12 hour or 8-hour shift pattern rota will be introduced depending on the duration of the extreme forecast to ensure there is cover 24 hours a day with 7 men on each shift. This will ensure that each of the routes can be patrolled and treated immediately and also have drivers for the plough only vehicles to ensure snow clearance can commence immediately and be maintained.

15. PLANT, EQUIPMENT AND DEPOTS

15.1 The fleet size and its replacement is reviewed after each Winter Maintenance season.

15.2 3 No. new winter maintenance units were purchased in 2019 and delivered in February 2020. The units are 26T Mercedes chassis fitted with Schmidt hoppers, brine tanks, ploughs and associated operating controls which include Autologic for GPS controlled route guidance and treatment.

15.3 To carry out the gritting on the other two routes, 2 No. gritters will be provided by the MMaRC Network A Operator, these are Romaquip Spreaders on Volvo 26T chassis.

15.4 To supplement the 5 No. units, the existing 2 No. 9m3 demountable units will be kept in service as back up units.

15.5 The Loadall-Telescopic Handler was replaced in 2020 for a secondhand JCB unit.

15.6 A brine saturation plant is located in the Castleknock Depot and is capable of generating the correct brine solution and storing 28,000 litres (18,000 litres in main saturation tank and 10,000 litres in 2no. 5000 litre tanks). The plant is manually filled with white marine salt and the brine making process is automatic and shuts down when the tank is full.

15.7 The brine station will be monitored on a daily basis during the winter season to ensure that levels are adequate for the forecasted weather. The brine levels will be maintained at maximal levels when the forecast is predicting sub-zero temperatures over the preceding days. On Fridays the brine levels will be maximized to ensure that enough brine is present over the weekend. If extreme weather is expected then personnel will be tasked with ensuring that brine levels are maintained during the weekend.

Number, capacity and location of vehicles available for precautionary/reactive salting

15.8 The following tables give an indication of the plant which will be dedicated to the winter routes.

15.9 Location and Type of Loading Shovel

Location	Type / Capacity	Number
Castleknock Depot	JCB Telescopic Handler / 3.2T	1

15.10 Location and Type of Spreading Vehicles

Location	Vehicle Type	Snowplough	Capacity	Number of Snowploughs	No of Gritters
Castleknock Depot	26T HGV with Permanent Mounted Gritter	Yes	$9m^3$	5	5
Castleknock Depot	26T HGV with Demountable Gritter	Yes	$9m^3$	2	2

Castleknock Depot	18T Traffic Management Wagon	Yes	0	3	0
	Total:			10	7

Number, capacity and location of vehicles available for winter maintenance patrols

15.5 Patrol vehicles will be the ISU which is available to patrol at any time 24 hours per day.

15.6 In adverse weather conditions one of the gritters loaded with salt will patrol the winter routes.

15.7 When adverse weather is forecast and snow is likely then five gritters will patrol the Project Road during the timing that the adverse weather is forecasted. The two spare demountable units will be fitted to the wagons and ploughs attached. The ploughs will be also fitted to the 2No. 18T TM Wagons in preparation for a snow event.

Additional equipment/plant/labour

15.8 In the event that extreme conditions are experienced, sufficient trained labour will be available within the scope of the operation to operate all plant.

15.9 M50CL have trained operatives from selected subcontractors and have arrangements in place to call on these operatives when adverse weather conditions are forecasted.

Vehicle servicing and maintenance

15.10 Servicing and maintenance will be coordinated by the Works Manager.

15.11 Gritting vehicles will be mechanically maintained by the manufacturer's agents who will call on local resources. Drivers will be responsible for daily maintenance and for vehicle washing after each salt operation. Qualified motor fitters will be on call at all times during the Winter Maintenance period. The Works Manager will be responsible for calling out fitters and will have contact numbers.

Calibration of equipment

15.12 Calibration checks will be carried out on the spreading equipment of winter maintenance vehicles at the final service before the winter maintenance season of each winter maintenance period. Schmidt or other suitable contractor will carry out the calibrations. Calibration records for all gritters to be utilised will be held at the M50 Office.

15.13 Spot checks will be carried out on the calibration at least three times during the season. Once prior to the start of the season (after Schmidt has carried out calibration), once at the beginning of December and once at the beginning of February.

15.14 The Company will appoint Vaisala Ltd to carry out annual detailed inspections and calibration checks on all ice sensors in accordance with the manufacturer's recommendations (Aug/Sept). Repairs and re-calibration of faulty equipment will be carried out within 14 days of defect notification.

On board data capture equipment

15.15 All salt spreading vehicles are fitted with data loggers which will provide an accurate record of driver time distance traveled when salting / not salting, rate of spread, and width of spread. Data logger information is kept by and accessed through the GPS tracking company's web portal and is available for inspection.

15.16 In the event of a GPS/data logger malfunction, equivalent manual records will be produced.

15.17 The data collected will help in the salt reconciliation system which is developed and based on information from the on board data collection equipment, individual driver logs and controls on material deliveries.

Communication equipment

15.18 All Winter Maintenance vehicles and patrol vehicles will carry a two way radio system and operatives will be trained in the effective use of the provided system. During the course of normal daily usage, any faults in the communication system will be reported to the Duty Engineer who will instigate any repairs necessary.

15.19 Contact with maintenance staff during and outside normal work hours will be made by the cellular telephone system. Staff will operate on a roster basis.

Depots and storage facilities

15.20 Depot location to enable provision of winter service, emergency response and all other specified services are to be located at M50 Concession Ltd, Luttrellstown Road, Diswellstown, Castleknock, Dublin 15.

16. DE-ICING MATERIALS

Salt stock quantities

16.1 The rock salt will be stored at the Castleknock Depot. Salt is delivered from Salt Sale Co in Belfast.

16.2 Marine Salt will be stored at the MMaRC Network A Balbriggan Depot. Salt will be delivered/collected to Castleknock when required. Five tonnes will be stored at Castleknock as back up.

16.3 Details of the proposed stock level for the Winter Maintenance Operations for the Project Road at the Castleknock Depot is as below:

Period	Minimum Stock Level (T) – Rock Salt	Minimum Stock Level (T) – Marine Salt
Location	Castlecknock	Balbriggan
1st October	898	88
Oct – March	513	51
April & May	256	25

Salt testing

16.4 Rock salt supplied will be compliant with BS 3247.

16.5 Salt Sales Co. who supply the Company with salt for spreading on highways are BS 3247:2011 compliant and a letter of conformity from Salt Sales Co. is held with the winter maintenance records.

16.6 An accredited testing laboratory will be used to provide chemical analysis and grading of salt supplied. A sample will be taken from one of the deliveries and sent for testing. Details of testing will be kept in the winter maintenance file.

Salt management strategy

16.7 Prior to the commencement of the season on 1st October M50CL will ensure there is sufficient salt in the Project Road stock to complete 63 no. 25g/m^2 runs on the Project Road as per TII advice note. Each treatment requires 14.25 Tonnes of 6mm rock salt, equating to 898 Tonnes. During the winter maintenance season this will not be allowed to drop below the stock required to complete 36 no. 25g/m^2 runs on the Project Road, 513 tons, except in April and May when that may drop to 18no. runs which is equal to 256 tons.

16.8 M50CL will order stock on a regular to replenish what has been used, this will keep stock at a high level and mitigate the effects of any supply problems during periods of exceptionally high demand.

16.9 Salt storage areas will be maintained to ensure the following:

- It is stored in dry conditions
- No sheer faces left in stock piles
- Salt stockpiles do not become contaminated.
- Salt stockpiles or adjacent operations do not affect the environment.
- Salt Storage

16.10 The salt will be stored at the Castleknock Depot in a purpose build storage facility with hard standing to ensure the salt pile is kept dry. This is capable of storing up to 1700T.

16.11 The marine salt will be stored at the Balbriggan depot and collected when required and has access to at least 100 T. at any time. A stock of 5 tons will be kept at Castleknock as backup.

16.12 The brine solution generated from the marine salt is kept in tanks totaling 28,000 litres and pumped into the brine tanks on the gritters.

Other materials – Fuels

16.13 Fuel is stored at the Castleknock depot in a 10,000 litre bunded tank and a computerised delivery system. A minimum level of 5000 litres of fuel will be stocked to ensure continuity of operations in severe weather conditions.

17. PUBLICITY

Arrangements for informing media and public

17.1 The Company will work closely with the Gardai who may supply information to the media regarding traveling conditions during periods of adverse weather.

17.2 The Duty Engineer will be responsible for providing factual information concerning the network to the Gardai for onward distribution to the press, local radio, RTE, AA, and giving a response to any public enquiries.

18. LOCATIONS FOR SPECIAL TREATMENT

Ice susceptible areas- Inclines/Declines

18.1 During heavy periods of snow and with freezing conditions the action of the vehicles can turn the snow into ice. On areas of the Project Road where there are steep inclines and declines the formation of ice will cause traction problems either preventing vehicles from gaining grip and unable to climb the gradient or loosing grip and being unable to stop.

18.2 A number of these locations exist on the Project Road. When snow is forecast and during snow fall these areas will be given priority and the spread of salt will be increased to ensure there is adequate application of salt.

18.3 These areas include

- Exit Slips at J13 Ballinteer/Sandyford, J9 N7, J7 N4 and J6 N3
- Entry Slips at J13 Ballinteer/Sandyford
- Inclined Carriageway between J14 N31 and J13 Ballinteer northbound and between J12 Firhouse and J13 Ballinteer/Sandyford heading southbound.
- Sheltered areas between J14 N31 and J12 Firhouse and in particular where the camber falls to the median
- J6 N3 slip roads with steep incline/decline and crossfall.
- Areas liable to seepage from double skinned concrete barrier particularly at J14 N31 northbound, between J13 Ballinteer/Sandyford and J12 Firhouse, at J5 N2 and J3 M1.

Frost susceptible areas

18.4 Areas susceptible to frost shall be identified by inspectors/patrols and reported to the Duty Engineer for inclusion in the daily action plan, and precautionary gritting routes:

18.5 These areas include:

- Elevated sections of trunk roads or bridges
- Exposed sections of trunk road
- Frost hollows

Known surface water run off locations

18.6 Areas susceptible to surface run off shall be identified by inspectors/patrols and reported to the Duty Engineer for inclusion in the daily action plan and precautionary gritting routes.

18.7 These areas include:

- Sections of Project Road in low ground
- Areas susceptible to water run-off from side roads
- Known drainage design problematic areas.

Areas Prone to Snow Drifting

18.8 During heavy snow events combined with strong winds there are areas of the motorway that can be susceptible to snow drifting and large deep accumulation of snow settling on the on the carriageway.

18.9 These locations are hard to predict and are dependent on the direction of the prevailing wind, however they tend to be in areas where the adjoining lands are open fields or parkland. During snow events, areas of drifting will be identified early to ensure ploughing is carried out effectively. This will prevent large accumulations from forming which require shovels and excavators to remove.

19. OTHER COMMENTS

Movement of Abnormal Loads

19.1 When conditions due to ice and snow become too severe for the safe movement of heavy or abnormal loads and it is known that a movement is imminent or in progress, the Duty Winter Manager will inform the appropriate Gardai Control Room.

19.2 A request will be made for Gardai co-operation in advising the driver of the abnormal load of the road conditions in order to encourage him to cease traveling until the road is considered safe. If the movement has not commenced or is due on the network within 24 hours the Network Manager will inform the haulage contractor of problems on the network.

Salt Usage Prohibitions

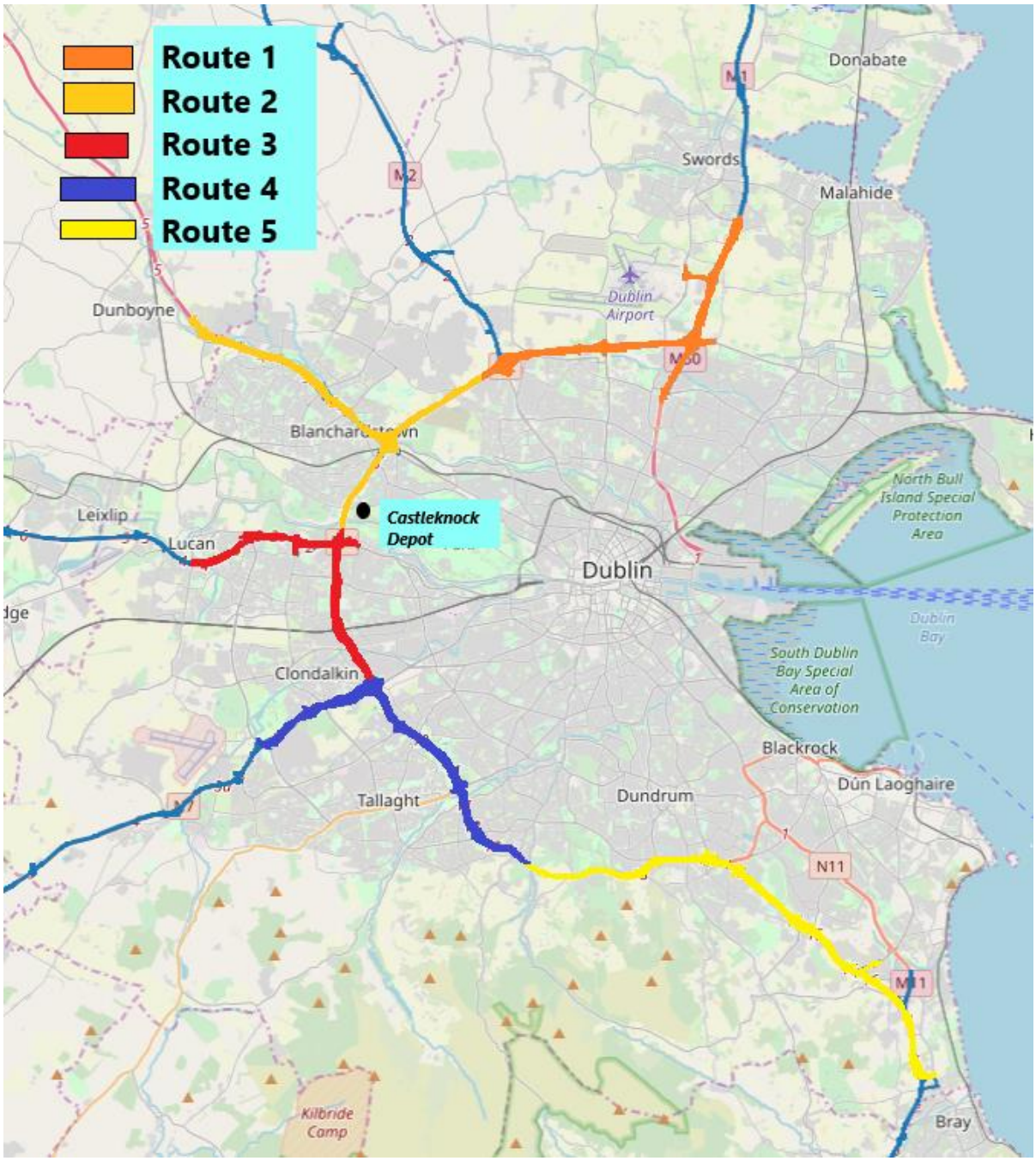
19.3 There are no salt prohibitions on the Project Road.

Annual Review

19.4 A report on the winter maintenance management Operations and winter maintenance Operations for the period ending 31st December will be prepared and submitted as part of the Annual Performance Report and the 5 Year Management Plan.

19.5 An annual review of the previous winter maintenance season will take place mid-summer. All interested parties will be invited to forward their comments and to participate. Minutes of the review will be written and any actions carried out prior to the season commencement.

APPENDIX 1 - MAP OF TREATMENT ROUTES



APPENDIX 2: WEATHER STATIONS LOCATIONS

APPENDIX 3 -TREATMENT ROUTES

M50 ROUTE 1

M50 Route 1				
Primary Station	M50 J3/Airport			
Secondary Station	Blanchardstown		Average Non Salting Speed (km/hr)	70
Salting Depot	Castleknock		Average Salting Speed (km/hr)	50
Route No:	1		Route time to end salting (hr)	1hr 48mins
Rate of Spread	10 - 25g/m2		Dry 10g Treatment Tonnes	1.50
Depot to Route (km)	5.9		Route tonnage Pre-Wet (10g, 15g, 20g& 25g) Rock Salt (70% ratio)	1.06T/1.58T/2.11T/2.63T
			Route Tonnage Pre-Wet (10g, 15g, 20g, & 25g) Marine Salt in Brine (10% ratio)	0.11T/0.16T/0.21T/0.26T
Time to Route (min)	6 min		Brine Volume (10g, 15g 20g & 25g) 4 X Salt weight	451l/676l/902l/1127l
Treated Length (m)	54700	1 Hour 7 min	Route to depot (km)	6.3
Dead Length (m)	53150	0 Hour 46 min	Square Meter of surface Treated m2	150,171
Total Route Time	107850	1 Hour 53 min	Average Spread width (m)	8.78

M50 Route 1 Page 1

No	Start	Chainage	End	Chainage	Project Road	Dist Liv	Dist Dead	Dead/ Live	width spread	Area m2
1	Castleknock Depot	13300	J5 Offslip	7400	travel M50 mainline n/b		5,900	Dead		
2	M50 J5 Offslip	7400	J3 Free flow	1400	treat M50 mainline n/b J5 - J3	6,100		Live	11	64,050
3	M50 J3 Free flow	1400	J3 Rotary	1000	treat to j3 rotery n/b	500		Live	7	
4	J3 Rotary	1000	J3 Rotary		treat J3 rotary	500		Live	11	
5	J3 Rotary		J3 Rotary		travel west to east rotary		200	dead	-	
6	J3 Rotary		N32 Hotel Roundabout		treat R139 w/b to rotary	550		Live	7	
7	N32 Hotel Roundabout		J3 Rotary		treat R139 w/b to J3 rotary	550		Live	7	
8	J3 Rotary		J3 Rotary		travel rotary J3		200	dead	-	
9	J3 Rotary	1000	M50 Mainline CH 1300	1300	treat M50 S/b from J3 Rotary s/b	300		live	7	
10	M50 J3 S/B Mainline	1300	M50 J6 S/B Offslip	6000	treat M50 mainline s/b J3 - J5	4,700		Live	11	49,350
11	M50 J5 S/B Offslip	6000	N2 N/B	N2 N 0.2	treat off slip to N2 n/b	1,200		Live	7	
12	N2 N/B	N2 N 0.2	N2 N/B Mainline to turn North Road	N2 N 2.2	travel cold winter		2,000	Dead	-	
13	Turn at North Road TLs	N2 N 2.2	N2 S/B freeflow slip to M50 S/B	N2 S 0.7	travel cold winter		2,000	dead	-	
14	N2 S/B freeflow slip to M50 S/B	N2 S 0.7	M50 N/B J5 Onslip Aux Lane	5900	treat N2 s/b freeflow to m50 N/B	500		Live	7	
15	M50 N/B J5 Onslip Aux Lane	5900	J4 Offslip	4200	treat M50 Aux Lane to n/b j5-j4	1,700		Live	4	5,950
16	J4 N/B Off slip	4200	J4 Rotary	3600	treat slip off to J4	600		Live	7	
17	J4 Rotary	3600	J4 Rotary	3600	treat rotary J4	500		Live	7	
18	J4 Rotary	3600	R108 at TL's to NCT Centre		treat R108 N/B from Rotary to TL,s and turn	200		Live	4	
19	R108 at TL's to NCT Centre		J4 Rotary		treat R108 S/B to J4 Rotary	200		Live	7	
20	J4 Rotary North Side		J4 Rotary south side		travel		200	dead	-	
21	J4 Rotary south side		R108 S/B for 200m		Treat S/B R108	200		live	7	
22	R108 S/B for 200m		TLS on R108 @ IKEA Jnct		travel R108 S/B		150	dead	-	
23	TLS on R108 @ IKEA Jnct		R108 N/B 200m prior to J4 Rotary		travel R108 N/B		150	dead	-	
24	R108 N/B 200m prior to J4 Rotary		J4 Rotary		treat R108 N/B to J4 Rotary	200		live	7	
25	J4 Rotary		J4 Rotary @ on slip N/B		Travel J4 Rotary to N/B onslip		250	dead	-	
26	J4 Rotary @J4 onslip	3600	M50 N/B mainline Aux lane	2900	treat on slip J4 n/b	700		Live	7	
27	J4 Mainline onslip Aux lane	2900	J3 Free flow to airport	1700	treat M50 Aux Lane n/b j4-j3	1,200		Live	4	4,200
28	J3 Free flow to airport	1700	M1 N/B J3 to airport	M1 N1.5	treat freeflow M50 N/B to M1 to airport	1,500		Live	7	
29	M1 N/B J3 to airport	M1 N 1.5	J3 Drinan off slip N/B	M1 N4.2	treat M1 mainline n/b 3 lane J1 - J3	2,700		Live	11	
30	J3 Drinan off slip N/B	M1 S4.2	M1 J3 Rotary Drinan	M1 S 4.5	treat n/b slip M1 j3	300		Live	4	
31	J3 Rotary Drinan		J3 Rotary		treat J3 rotary	100		Live	7	
32	J3 Rotary onslip S/B M1	M1 S 4.5	M1 J3 S/B mainline	M1 S 4.2	treat onslip J3 s/b	400		Live	4	
33	M1 J3 S/B onslip mainline	M1 S 4.2	M1 J3 S/B Off slip	M1 S 1.2	treat M1 s/b mainline	2,800		Live	11	
34	M1 J3 S/B Off slip	M1 S 1.2	M1 S/B at merge with M50 freeflow	M1 S 0.1	treat M1 s/b mainline	1,100		Live	7	
35	M1 S/B at merge with M50 freeflow	M1 S 0.1	M50 Tunnel Entrance	M50 N 5.3	treat M50 s/b mainline	1,200		Live	11	
36	M50 Tunnel Entrance	M50 N 5.3	N1 to Whitehall	M50 N 5.0	treat M50 tunnel entrance to Whitehall	300		Live	7	
37	N1 to Whitehall		Whitehall TL's		travel s/b to whitehall		1,400	Dead	-	
38	Whitehall TL's		N1 N/B At Tunnel Exit		travel from whitehall n/b		1,400	Dead	-	
39	N1 N/B before Tunnel Exit		M50 N/B at Tunnel Exit	M50 S 5.4	treat mainline to tunnel exit	300		Live	7	
40	M50 N/B at Tunnel Exit	M50 S 5.4	M50 N/B Mainline at Freeflow	M50 S 6.7	mainline m50 s/b J2-j3	1,300		Live	11	
41	M50 N/B Mainline at Freeflow J3	M50 S 6.7	M50 free flow S/B M50	1500	treat freeflow m50 at j3	900		Live	7	
42	M50 free flow S/B M50	1500	J4 Off slip M50 N/B	3000	Treat M50 Aux Lane s/b j3-j4	1,500		Live	4	5,250
43	J4 Off slip M50 N/B	3000	J4 Rotary	3600	treat Slip Road off J4 s/b	600		Live	7	
44	J4 Rotary	3600	J4 On slip S/B	3700	Travel Rotary J4		100	Dead	-	
45	J4 On slip S/B	3700	M50 Mainline S/B J4 onslip	4200	treat R108 start treatment at freeflow Mainline S	500		Live	7	
46	M50 Mainline S/B J4 onslip	4200	J5 Offslip S/B to N2	6000	treat M50 Aux Lane J4 - J5 S/B	1,900		Live	4	6,650
47	J5 Offslip S/B to N2	6000	Diverge of Offslip J5 S/B offslip	6400	Travel off slip		400	dead	-	
48	Diverge of Offslip J5 S/B offslip	6400	N2 S/B meets M50 offslip TLs	N2 S 0.2	treat off slip to N2 TL,s	300		live	4	
49	N2 S/B meets M50 offslip TLs	N2 S 0.2	N2 S/B Roundabout and Turn		travel N2 S/B and turn at R/B		1,000	dead	-	
50	N2 S/B Roundabout and Turn		N2 N/B J5 diverge freeflow to M50 N/B	N2 N 0.4	turn at R/B and travel N2 N/B		1,100	Dead	-	
51	N2 S/B at on slip to M50 N/B freeflow	N2 S 0.4	M50 freeflow J5 onslip merge from N2 S/B	6200	treat frreflow n/b M50	700		live	4	
52	M50 freeflow J5 onslip merge from N2 S/B	6200	J4 Off slip N/B	4200	travel M50 N/B J5-J4		2,000	dead	-	
53	J4 Off slip N/B	4200	J4 N/B offslip at Freeflow slip to R108	3700	travel M50 offslip J4		500	dead	-	
54	J4 N/B offslip at Freeflow slip to R108	3700	R108 N/B		treat Freeflow slip N/B to R108	300		Live	4	
55	R108 N/B		R108 S/B		turn at TL,s		100	dead		
56	R108 S/B		R108 S/B Freeflow onslip to M50 N/B at J4	3600	Turn at TL's and travel R108 S/B		100	dead	-	

	M50 Route 1: Page 2									
No	Start	Chainage	End	Chainage		Dist Live	Dist Dead	Dead/ Live	width spread m	Area m2
57	R108 Freeflow onslip J4 to M50 N/B	3600	Merge with J4 Onslip N/B from Rotary	3400	treat freeflow m50 n/b	300		Live	4	
58	J4 Onslip from Rotary	3400	J3 M50 Mainline at diverge	1300	travel J4 on slip and m50 mainline		2,000	dead	-	
59	J3 M50 Mainline at diverge	1300	M50/M1 Merge	M1 S 0.2	Treat Free flow to port tunnel	1,600		Live	7	
60	M50/M1 Merge	M1 S 0.2	Offslip to Coolock J2 M50	M50 N 6.0	travel M50 N/B J3 - J2		600	dead	-	
61	Offslip to Coolock J2 M50	M50 N 6.0	Coolock Rotary J2	M50 N 5.5	treat Offslip to Coolock	500		Live	4	
62	Coolock Rotary J2	M50 N 5.5	Coolock Rotary		treat Coolock Rotary	500		Live	7	
63	Coolock Rotary		Coolock Rotary		travel part of rotary		150	dead	-	
64	Coolock Rotary	M50 N 5.4	Slip onto N1 City Bound	M50 N 5.1	treat on slip to N1 from Coolock	250		Live	4	
65	Slip onto N1 S/B City Bound	M50 N 5.1	Turn at Whithall Junction		travel to whitehall N1		1,400	dead	-	
66	Turn at Whithall Junction		slip to Coolock rotary N1 N/B		travel from whitehall to coolock Int N1		1,400	dead	-	
67	slip to Coolock rotary N1 N/B	M50 S 5.1	Coolock Rotary	M50 S 5.4	treat off slip from N1to Coolock rotary	250		Live	4	
68	Coolock Rotary	M50 S 5.4	Coolock Rotary	M50 S 5.5	travel part of Coolock rotary		150	dead		
69	Coolock Rotary	M50 S 5.5	Onslip to M50 N/B	M50 S 6.2	treat on slip from coolock rotary to M50 S/B	600		live	4	
70	Onslip to M50 N/B	M50 S 6.2	M1 Main line at m50 freeflow	M1 N 0.2	travel M50 S/B J2 to J3		900	dead	-	
71	M1 Main line at m50 freeflow	M1 N 0.2	M1 Mainline at m50 freeflow merge	M1 N 1.6	Treat M1 N/B from freeflow to freeflow under J3	1,400		live	7	
72	M1 Mainline at m50 freeflow merge	M1 N 1.6	M1 free flow to airport	M1 N 2.1	travel M1 N/B J1 - J2 airport freeflow		500	dead	-	
73	M1 free flow to airport	M1 N 2.1	Airport link road merge with slip from J2		treat M1 free flow to airport link road	800		live	7	
74	Airport link road merge with slip from J2		Airport Roundabout		treat airport link road to R/B	400		Live	11	
75	Airport Round		Airport Roundabout		treat Airport roundabout	250		live	11	
76	Airport Roundabout		Airport Roundabout		travel airport roundabout		200	dead		
77	Airport Roundabout		J2 Rotary		treat from airport R/B to J2 Rotary	700		Live	11	
78	J2 Rotary		J2 Rotary		Treat J2 Rotary	600		Live	7	
79	J2 Rotary		J2 Rotary		Travel J2 Rotary		500	dead	-	
80	J2 Rotary		Link road to airport R/B		treat slip road link to airport	300		Live	4	
81	Link road to airport R/B		Airport link rd slip to R132 S/B		travel link road to airport from J2		150	dead	-	
82	Airport R/B slip to R132 S/B		R132 S/B		treat freeflow to R132	350		live	4	
83	R132 S/B		R132 S/B TL's turn		travel S/B and turn on R132 TL's		250	dead	-	
84	R132 S/B TL's turn		R132 N/B airport R/B		travel n/b R132 to aiport R/B		350	dead	-	
85	R132 N/B airport R/B		airport roundabout		travel airport R/B		150	dead	-	
86	airport roundabout		R132 North R/B		travel R132 N/B to R/B and turn		600	dead	-	
87	R132 North R/B		R132 S/B freeflow slip to link road to M1 J2		travel S/B R132 R/B to airport R/B		300	dead	-	
88	R132 S/B freeflow slip to link road to M1 J2		link road to J2 from airport		treat R132 freeflow road to m1 J2 Rotary	500		Live	4	
89	link road to J2 from airport		M1 J2 Rotary	M1 N 2.6	travel link road to J2		500	dead	-	
90	M1 J2 Rotary	M1 N 2.6	M1 N/B Onslip J2	M1 N 3.5	treat M1 N/B onslip from J2	900		Live	7	
91	M1 N/B Onslip J2	M1 N 3.5	J3 N/B junction Drinham	M1 N4.5	travel M1 N/B and turn at J3 Drinham		1,000	dead	-	
92	J3 N/B junction Drinham	M1 S 4.5	M1 S/B off slip to J2	M1 S 3.5	turn at Drinham and travel on slip and M1 S/B		1,000	dead	-	
93	M1 S/B off slip to J2	M1 S 3.5	J3 Rotary	M1 N 2.6	treat M1 off slip to J2 Rotary	900		Live	7	
94	J3 Rotary	M1 N 2.6	J3 Rotary	M1 N 2.5	Travel part of J2 Rotary		100	dead	-	
95	J3 Rotary	M1 N 2.5	M1 S/b onslip to mainline	M1 S2.0	treat J2 onslip to M1 S/B	500		live	7	
96	M1 S/b onslip to mainline	M1 S2.0	M1 S/B freeflow slip to M50 S/BM1 S 1.4	M1 S 1.4	Aux Lane M1 S/B J2 - J1	600		Live	4	
97	M1 S/B freeflow slip to M50 S/BM1 S 1.4	M1 S 1.4	M50 S/B merge at J3	1300	Treat freeflow from M1 S/B to M50 S/B	1,600		Live	7	
98	M50 S/B merge at J3	1300	J4 off slip and Rotary	3600	travel J3- J4 S/B M50		2,300	dead	-	
99	J4 off slip and Rotary	3600	J3 Rotary N/B M50	1000	travel J4-J3 M50 N/B		2,600	dead	-	
100	J3 Rotary N/B M50	1000	J3 Rotary @ onslip to tunnel	900	Travel part of J3 Rotary		300	dead	-	
101	J3 Rotary @ onslip to tunnel	900	Onslip merge with M1/S/B	M1S 0.2	Treat Onslipfrom J3 Rotary to M1/M50 to tunnel	400		Live	4	
102	Onslip merge with M1/S/B	M1S 0.2	J2 Coolock Rotary	M50 N 5.5	travel M50 N/B to coolock and turn		1,300	dead	-	
103	J2 Coolock Rotary	M50 N 5.5	J3 Rotary off slip	M1 N 0.3	travel coolock to J5 M50 S/B		1,400	dead	-	
104	J3 Rotary off slip	M1 N 0.3	J3 Rotary	1000	treat offslip from M1/M50 N/B to J3 Rotary	300		live	4	
105	J3 Rotary	1000	J4 M50 S/B offslip	3500	travel M50 S/B J3 rotary to J4 offslip		2,500	dead		
106	J4 M50 S/B offslip	3500	R108 S/B merge		treat freeflow J4 S/B to R108	300		live	4	
107	R108 S/B merge		R108 TL's for IKEA		travel R108 S/B to TL's and turn		350	dead	-	
108	R108 TL's for IKEA		R108 N/B J4 freeflow slip to M50		turn and travel R108 N/B to freeflow slip		250	dead	-	
109	R108 N/B J4 freeflow slip to M50		J4 onslip S/B merge	3800	treat freeflow slip R108 to J4 onslip M50 S/B	400		live	4	
110	J4 onslip S/B merge	3800	J5 offslip at N2 TL's	6700	travel M50 S/B to J5 offslip at TL's with N2 S/B		2,900	dead	-	
111	J5 offslip at N2 TL's	6700	R/B on N2		travel S/B N2 into city and turn at R/B		900	dead	-	
112	R/B on N2		N2 N/B slip to M50 S/B	N2 N 0.0	travel from R/B on N2 N/B to onslip S/B M50		700	dead	-	
113	N2 N/B slip to M50 S/B	N2 N 0.0	M50 S/B freeflow from N2 S/B	7000	treat slip road to the merge with M50 S/B onslip from N2 S/B	400		Live	4	
114	M50 S/B freeflow from N2 S/B	7000	Castleknock Depot	13300	Travel M50 S/B J5 to Depot		6,300	dead	-	
115										
						54,700	**53,150**			**135,450**
			Slip Roads to and from J3 Rotary. S/B off slip and N/B onslip. Treated by Globalvia Jons					**Adjusted Area**		**150,171**

M50 Route 2

M50 Route 2				
Primary Station	**Blanchardstown**			
Secondary Station	**M50 J3/Airport**		Average Non Salting Speed (km/hr)	**70**
Salting Depot	Castleknock		Average Salting Speed (km/hr)	**50**
Route No:	**2**		Route time to end salting (hr)	**1 hr 41 mins**
Rate of Spread	**10 - 25g/m2**		Dry 10g Treatment Tonnes	**1.47**
Depot to Route (km)	**0.3**		Route tonnage Pr-Wet (10g, 15g, 20g& 25g) Rock Salt (70% Ratio)	**1.04T/1.55T/2.07T/2.59T**
			Route Tonnage Prewet (10g, 15g, 20g, & 25g) Marine Salt in Brine (10% ratio)	**0.11T/0.16T/0.21T/0.26T**
Time to Route (min)	**1**		Brine Volume (10g, 15g & 20g) x4 salt weight	**443l/664l/885l/1106l**
Treated Length (m)	**55150**	1 Hour 06 min	Route to depot (km)	**2.2**
Dead Length (m)	**42300**	0 Hour 36 min	Square Meter of surface Treated m2	**147,454**
Total Route Time		1 Hour 42 min	Average Spread width (m)	7.84

M50 Route 2: Page 1

No	Start	Chainage	End	Chainage	Project Road	Distance Live	Distance Dead	Dead/ Live	spread width	Area m2
1	Castleknock Depot	13300	M50 N/B J6 Onslip	13000	travel M50 N/B Depot to J6 N/B north side at on slip		300	Dead	0	
2	M50 N/B J6 Onslip	13000	J5 N/B Offslip start	7400	Treat M50 N/B mainline J6 to J5	5600		Live	10.5	58800
3	J5 N/B Offslip start	7400	J4 N/B off slip	4200	travel M50 N/B To J4 Ballymun		3200	dead	0	
4	J4 N/B off slip	4200	J4 Rotary	3600	travel slip to J4 N/B		700	dead	0	
5	J4 Rotary	3600	M50 S/B Onslip	4200	Travel slip on from J4 S/B		700	dead	0	
6	M50 S/B Onslip	4200	M50 S/B offslip to J5	6000	Travel M50 S/B J4 to J5		1800	dead	0	
7	M50 S/B offslip to J5	6000	M50 S/B J6 offslip to J6	10000	Treat M50 S/B J5 - J6	4000		Live	10.5	42000
8	M50 S/B J6 offslip to J6	10000	N3 N/B at off slip to J2	N3 N 0.4	Treat M50 S/B J6 offslip	1000		Live	3.5	
9	N3 N/B at off slip to J2	N3 N 0.4	N3 N/B at off slip to J2	N3 N 1.0	Treat N3 N/B mainline	600		Live	7	
10	N3 N/B at off slip to J2	N3 N 1.0	M3 Onslip from J 4 Clonee	N3 N 7.5	Treat M3 N/B mainline J2 to J5	5800		Live	7	
11	M3 Onslip from J5 Clonee west	N3 N 7.5	M3 J6 Rotary		travel J5 to J6 and turn		2700	dead	0	
12	M3 J6 Rotary		M3 Off slip to J5 Clonee west	N3 S 7.5	turn and travel J6 to J5		2700	dead	0	
13	M3 Off slip to J5 Clonee west	N3 S 7.5	M3 J5 roundabout S/B off slip	M3 S 6.9	treat M3 off slip to J5 off slip	500		Live	3.5	
14	M3 J4 roundabout S/B	M3 S 6.9	M3 J4 roundabout N/B		J5 treat North Roundabouts S/B link road	300		Live	3.5	
15	M3 J4 roundabout N/B		M3 J4 roundabout S/B		J5 treat south Roundabouts and N/B link road	300		Live	3.5	
16	M3 J4 roundabout S/B		M3 J4 roundabout N/B	M3 N 6.9	travel between roundabouts		300	dead	0	
17	M3 J4 roundabout N/B	M3 N 6.9	M3 Onslip from J 4 Clonee	N3 N 7.5	Treat J5 N/B onsluip	500		Live	3.5	
18	M3 Onslip from J 4 Clonee	N3 N 7.5	M3 J5 Rotary		travel J5 to J6 and turn		2700	dead	0	
19	M3 J5 Rotary		M3 Off slip to J4 Clonee	N3 S 7.5	turn and travel J6 to J5		2700	dead	0	
20	M3 Off slip to J4 Clonee	N3 S 7.5	M3 S/B at slip to hospital	M3 S 1.5	Treat M3 mainline S/B J5 to J2	6000		Live	7	
21	M3 S/B at slip to hospital	M3 S 1.5	M3 S/B deverge	M3 S 0.4	Treat M3 mainline S/B J2 to J1	1100		Live	10.5	
22	M3 S/B deverge	M3 S 0.4	N3 S/B TL's Auburn Av	M3 S 0	Treat M3 mainline S/B J1	400		Live	7	
23	N3 S/B TL's Auburn Av	M3 S 0	N3 Interchange Rail Stn		Travel N3 S/B and turn at interchangeturn		1000	dead	0	
24	N3 Interchange Rail Stn		N3 N/B TL's Auburn Av	M3 N 0	Interchange turn and travel N3 N/B		1000	dead	0	
25	N3 N/B TL's Auburn Av	M3 N 0	J6 Rotary	M3 N 0.3	Treat M3 N/B Auburn Rd to J6 Rotary	300		Live	10.5	
26	J6 Rotary	M3 N 0.3	J6 Rotary	M3 N 0.3	Treat J6 Rotary	600		Live	10.5	
27	J6 Rotary	M3 N 0.3	Rotary Onslip N/B to M50	10900	Travel part of Rotary		400	dead	0	
28	Onslip N/B to M50	10900	M50 N/B on slip	10700	Treat M50 N/B onslip from J6 Rotary	200		Live	7	
29	M50 N/B on slip	10700	M50 N/B Start of Aux lane	9800	Treat M50 N/B onslip from J6 Rotary	800		Live	3.5	
30	M50 N/B Start of Aux lane	9800	M50 N/B Off slip	7400	Treat M50 N/B Aux Lane J6 - J5	2400		Live	3.5	8400
31	M50 N/B Off slip	7400	M50 offslip N/B diverge	6900	Treat M50 N/B offslipSlip to diverge	500		Live	7	
32	M50 offslip N/B diverge	6900	N2 S/B J5	N2 S 0.3	Treat M50 S/B offslip loop to N2 S/B	600		Live	3.5	
33	N2 S/B J5	N2 S 0.3	N2 S/B J5	N2 S 0.2	Travel across 2 lanes on N2 S/B		100	dead	0	
34	N2 S/B J5	N2 S 0.2	M50 Freeflow on slip S/B		Treat M50 S/B J5 onslip from N2		300	dead	0	
35	M50 Freeflow on slip S/B		M50 S/B Aux -mainline	7400	Treat M50 S/B onslip from N2		600	dead	0	
36	M50 S/B Aux -mainline	7400	M50 S/B off slip to J6	10000	Treat M50 S/B Aux lane J5 - J6	2600		Live	3.5	9100
37	M50 S/B off slip to J6	10000	J6 Rotary	10900	Treat M50 S/B offslip to J6 Rotary	800		Live	7	
38	J6 Rotary	10900	J6 Rotary N3 S/B		Travel part of Rotary		100	dead	0	
39	J6 Rotary N3 S/B	M3 S 0.3	N3 N/B TL's Auburn Av	M3 S 0	Rotary J6 to N3 Auburn Av	300		Live	7	
40	N3 S/B TL's Auburn Av	M3 S 0	N3 Interchange Rail Stn		Travel N3 S/B and turn at interchangeturn		1000	dead	0	
41	N3 Interchange Rail Stn		N3 N/B TL's Auburn Av	M3 N 0	Interchange turn and travel N3 N/B		1000	dead	0	
42	N3 N/B TL's Auburn Av	M3 N 0	Slip Road to M50 Freeflow S/B	M3 N 0.2	Treat M50 onslip to N3 freeflow to M50 S/B	350		Live	3.5	
43	Slip Road merge with M50 Freeflow S/B	M3 N 0.2	M50 S/B merge J6	11600	Treat M50 S/B onslip from N3	500		Live	7	
44	M50 S/B merge J6	11600	J6 Off slip S/B to N7	13800	Treat M50 S/B Aux Lane J6 - J7	2200		Live	3.5	7700
45	J6 Off slip S/B to N7	13800	J6 Off slip S/B to N7 W/B diverge	1400	M50 S/B offslip to J7	200		Live	3.5	
46	J6 Off slip S/B to N7 W/B diverge	1400	J6 Off slip to N4 merge	N4 W 0.6	Treat free flow slip to N4 W/B from M50 S/B	300		Live	3.5	
47	J6 Off slip to N4 merge	N4 W 0.6	J2 offslip W/B	N4 W 1.5	Travel to J2 Liffy Valley W/B off slip		1000	dead	0	
48	J2 offslip W/B	N4 W 1.5	J2 Liffy Valley Interchange	N4 1.8	Travel J2 off slip Interchange		300	dead	0	
49	J2 Liffy Valley Interchange	N4 1.8	J2 offslip W/B	N4 W 1.5	Travel J2 on slip Interchange		300	dead	0	
50	J2 offslip W/B	N4 E 1.5	N4 E/B off slip to M50 N/B	N4 E 1.1	Travel N4 E/B mailine		400	dead	0	
51	N4 E/B off slip to M50 N/B	N4 E 1.1	N4 slip onto M50 N/B	13800	Treat N4 E/B freeflow to M50 N/B J7	700		Live	3.5	
52	N4 slip onto M50 N/B	13800	M50 Offslip to J6 Rotary	11800	Treat M50 N/B Aux lane J7 - J6	2000		Live	3.5	7000
53	M50 Offslip to J6 Rotary	11800	J6 Rotary	11000	Treat M50 N/B offslip J6 to Rotary	700		Live	3.5	
54	J6 Rotary		J6 Rotary		Travel part of J6 Rotary		100	dead	0	
55	J6 Rotary		Blanchardstown Village Entrance	N3 N 0.5	Treat Link Rd to Blanch from J6 Rotary	400		Live	10.5	
56	Blanchardstown Village Entrance	N3 N 0.5	Blanchardstown Village Entrance	N3 N 0.9	Turn at Blanchardstown Village		200	dead	0	

	M50 Route 2: Page 2									
	Start	Chainage	End	Chainage		Distance Live	Distance Dead	Dead/ Live	spread width	
57	Blanchardstown Village Entrance	N3 N 0.9	J6 Rotary	N3 S 0.5	Treat Link Rd to Blanchardstown to J6 Rotary	400		Live	7	
58	J6 Rotary	N3 S 0.5	J6 Rotary	N3 S 0.3	Travel J6 Rotary		200	dead	0	
59	J6 Rotary	N3 S 0.3	Dunsink Lane TL's	N3 S 0	Treat slip to Dunsink Lane	300		Live	7	
60	Dunsink Lane TL's	N3 S 0	J6 Rotary	N3 N 0.4	Travel Auburn Av to J6 Rotary		400	dead	0	
61	J6 Rotary	N3 N 0.4	N3 N/B prior to Blanch Village Tl,s	N3 N 0.8	Travel J6 Rotary to Blanchardstown TL,s		600	dead	0	
62	N3 N/B prior to Blanch Village	N3 N 0.8	N3 N/B lane drop after Blanch village	N3 N 1.2	Treat N3 onto N3 past Blanch Tl,s	400		Live	7	
63	N3 N/B lane drop after Blanch village	N3 N 1.2	J2 N3 N/B off slip	N3 N 1.5	Travel N3 N/B Blanch to J2		300	dead	0	
64	J2 N3 N/B off slip	N3 N 1.5	J2 S/B offslip TL's	N3 N 2.0	Treat N3 N/B offslip J2 to Snughborough	500		Live	10.5	
65	J2 S/B offslip TL's		Roundabout Blanch Shopping Cent		Travel to R/B in Blanch Shopping Centre		300	dead	0	
66	Roundabout Blanch Shopping Cent		J2 S/B offslip TL's		Travel from R/B in Blanch Shopping Centre		300	dead	0	
67	J2 S/B offslip TL's	N3 N 2.0	J2 N/B r/b for onslip	N3 S 2.0	Treat J2 Overbridge West to East	250		Live	10.5	
68	J2 N/B r/b for onslip	N3 S 2.0	N3 S/B onslip	N3 S 1.5	Treat Rotary and On slip N3 S/B	500		Live	7	
69	N3 S/B onslip from J2	N3 S 1.5	N3 S/B slip off to Hospital Connelly	N3 S 1.2	Travel N3 S/B J2 to offslip for Hospital		300	dead	0	
70	N3 S/B slip off to Hospital Connelly	N3 S 1.2	N3 S/B TLs Connelly Hosp	N3 S 0.9	Treat slip off N3 S/B to TLs at Hospital	300		live	3.5	
71	N3 S/B TLs Connelly Hosp	N3 S 0.9	N3 Junction with Blanch Village Rd	N3 N 0.7	Treat road from Hospital to Naven Rd N3	300		Live	10.5	
72	N3 Junction with Blanch Village Rd	N3 N 0.7	Blanch Village Main street	N3 N 0.9	Travel and turn at Blanch TL's Main Street		400	dead	0	
73	Blanch Village Main street	N3 N 0.9	N3 Junction with Blanch Village Rd	N3 N 0.9	Treat slip rd accessto N3 N/B from Blanch Village	100		Live	3.5	
74	N3 Junction with Blanch Village Rd	N3 N 0.9	N3 N/B Offslip to J3	N3 N 2.5	Travel N/B N3 J1 to J3		1800	dead	0	
75	N3 N/B Offslip to J3	N3 N 2.5	spur into Blanch shopping cent	off slip	Treat off slip N3 N/B	300		Live	3.5	
76	spur into Blanch shopping cent		roundabout in Blanch Shop cent		Treat spur into Blanchards town Shopping	200		Live	3.5	
77	roundabout in Blanch Shop cent		off slip J3 N/B		Treat spur from Blanchards town Shopping	200		Live	3.5	
78	off slip J3 N/B		J3 N/B N3 TL's at Junt with R121		Treat off slip N3 N/B to TL's J3	100		Live	10.5	
79	J3 N/B N3 TL's at Junt with R121		R121 J3 N3	J3 overbridge	Treat R121 Over bridge E/B	200		Live	10.5	
80	TL's on R 121 S/B slips		TL's on R121		Travel R121 E/B and Turn		400	dead	0	
81	TL's on R121		TL's on R 121 S/B slips		Turn and Travel R121 W/B W/B		400	dead	0	
82	TL's on R 121 S/B slips		J3 N/B N3 TL's at Junt with R121	J3 overbridge	Treat R121 Over bridge W/B	200		Live	10.5	
83	J3 N/B N3 TL's at Junt with R121	N3 N 2.9	N3 N/B on slip mainline	N3 N 3.2	Treat J3 N/B onslip 2 lanes	200		Live	7	
84	N3 N/B on slip mainline	N3 N 3.2	N3 N/B on slip mainline	N3 N 3.5	Treat J3 N/B onslip 1 lanes	300		Live	3.5	
85	N3 N/B on slip mainline	N3 N 3.5	N3 N/B J4 Off slip	N3 N5.2	Travel N3 N/B J3 to J4		1800	dead	0	
86	N3 N/B J4 Off slip	N3 N5.2	J4 Int TL's S/B	N3 S 5.7	Treat N3 N/B off slip to J4	500		Live	7	
87	J4 Int TL's S/B	N3 S 5.7	J4 Int TL's N/B	N3 S 5.7	J4 over bridge	150		Live	10.5	
88	J4 Int TL's N/B	N3 S 5.7	J5 S/B Int Roundabout	N3 S 6.9	Treat R156 N/B Link Road J4 - J5	1200		Live	7	
89	J5 S/B Int Roundabout	N3 S 6.9	J4 Int TL's N/B	N3 S 5.7	Travel R156 S/B link Rd J5-J4		1200	dead	0	
90	J4 Int TL's N/B	N3 S 5.7	M3 S/B on slip to mailine	N3 S 5.2	Treat N3 S/B J4 Onslip	500		Live	3.5	
91	M3 S/B on slip to mailine	N3 S 5.2	Westfield junct ind est	N3 S 4.6	Treat Aux Lane N3 S/B from J4 to Westfield Jnct	600		Live	3.5	
92	spur into Westfield N/B		spur into Westfield S/B		Treat off slip into Westfield/Services	150		Live	3.5	
93	spur into Westfield S/B		Turn at Rounabout Damastown Rd		Travel to Damastown Rd R/B		250	dead	0	
94	Turn at Rounabout Damastown Rd		spur into Westfield S/B		Travel From Damastown R/B		250	dead	0	
95	spur into Westfield S/B		N3 S/B mainline	N3 S 4.5	Treat On slip from Westfield/Services	150		Live	3.5	
96	N3 S/B mainline	N3 S 4.5	N3 S/B offslip J3	N3 S 3.3	Treat Aux Lane N3 S/B Westfield to J3	1300		Live	3.5	
97	N3 S/B offslip J3	N3 S 3.3	TL,s J3 Interchange offslip		Treat J3 S/B off slip	400		Live	7	
98	TL,s J3 Interchange		J3 S/B onslip		Travel through TL's S/B to J3 S/B Onslip and turn	300		Live	10.5	
99	J3 S/B onslip		TL,s J3 Interchange at offslip		Travel through TL's N/B to TL's at offslip from N3 S/B	300		Live	10.5	
100	TL,s J3 Interchange at offslip		TL,s J3 Interchange at offslip		Turn at TLs		100	dead	0	
101	TL,s J3 Interchange at S/B offslip		J3 S/B Onslip	N3 S 2.7	Travel trough TLs to S/B onslip J3		300	dead	0	
102	J3 S/B Onslip	N3 S 2.7	J3/S/B Mainline	N3 S 2.3	Treat J3 S/B onslip to N3	400		Live	3.5	
103	J3/S/B Mainline	N3 S 2.3	J2 S/B Mainline at onslip	N3 S 1.6	Treat N3 S/B Aux Lane J3 -J2 S/B	700		Live	3.5	
104	J2 S/B Mainline at onslip	N3 S 1.6	Connelly Hospital		Travel M3 S/B J2 to Slip to Connelly Hospital and Turn		1000	dead	0	
105	Conelly Hospital		J3 N/B offslip		Travel N3 N/B Connelly to J3 offslip		1900	dead	0	
106	N3 N/B Offslip to J3	N3 N 2.5	spur into Blanch shopping cent		Travel N3 N/B offslip to slip off to Blanch Shopping		300	dead	0	
107	N3 J 3 Off slip @ spur into Blanch		N3 J 3 Off slip @ spur from Blanch		Treat N3 N/B offslip between off and on slips Blanch Shopping	100		Live	7	
108	N3 J 3 Off slip @ spur from Blanch		TL's at J3 R121		Travel N3 N/B off slip to TL's with R121		100	dead	0	
109	TL's at J3 R121		Onslip J3 N3 S/B Loop		Travel R121 E/B to onslip S/B onslip to N3		100	dead	0	
110	Onslip J3 N3 S/B Loop		N3 S/B onslip to mainline	N3 S 2.7	Treat N3 S/B onslip from J3 to N3 S/B	500		Live	3.5	
111	N3 S/B onslip to mainline	N3 S 2.7	N3 S/B freeflow to M50 N/B	N3 S 0.6	Travel S/B N3 to freeflow slip to M50 N/B		2100	dead	0	
112	N3 S/B freeflow to M50 N/B	N3 S 0.6	N3 S/B free flow merge with on slip	11000	Treat Freeflow N3 S/B to M50 S/B at merge Slip from Auburn	600		Live	7	
113	N3 S/B free flow merge with on slip	11000	Depot Castleknock	13300			2200	dead	0	
						55,150	42,300			133,000
								Adjusted Area		**147,454**

M50 Route 3

M50 Route 3				
Primary Station	**Blanchardstown**			
Secondary Station	**Ballymount**		Average Non Salting Speed (km/hr)	**70**
Salting Depot	Castleknock		Average Salting Speed (km/hr)	**50**
Route No:	**1**		Route time to end salting (hr)	**1hr 36 mins**
Rate of Spread	**10 - 25g/m2**		Dry 10g Treatment Tonnes	**1.85**
Depot to Route (km)	**0.5**		Route tonnage Pre-Wet (10g, 15g, 20g& 25g) Rock Salt(70% ratio)	**1.3T/1.95T/2.6T/3.24T**
			Route Tonnage Pre-Wet (10g, 15g, 20g, & 25g) Marine Salt in Brine (10% ratio)	**0.13T/0.2T/0.26T/0.32T**
Time to Route (min)	**1**		Brine Volume (10g, 15g & 20g) x 4salt weight	**556l/833l/1111l/1389l**
Treated Length (m)	**54400**	1 Hour 05 min	Route to depot (km)	**1**
Dead Length (m)	**37550**	0 Hour 32 min	Square Meter of surface Treated m2	**185,094**
Total Route Time		1 Hour 37 min	Average Spread width (m)	9.12

Project Road

M50 Route 3: Page 1

No.	Start	Chainage	End	Chainage		Distance Live	Distance Dead	Dead/ Live	width spread	Area m2
1	Castle knock depot	13300	M50 S/B at offslip to J7	13800	Travel Depot M50 S/B		500	dead	0	
2	M50 S/B at offslip to J7	13800	M50 S/B at CH 16900 at Ronans Town Rail Bridge	16900	Treat mainline M50 S/B J7 to CH 16900 Ronanstown Rail Bridge	3100		Live	10.5	32550
3	M50 S/B at CH 16900 at Ronans Town Rail Bridge	16900	M50 J10 S/B offslip	19900	Travel Ch 16900 to J10 M50 S/B offslip		3000	dead	0	
4	M50 J10 S/B offslip	19900	J10 Off slip TL's @R838	20300	Treat J10 S/B Offslip	400		Live	7	
5	J10 Off slip TL's @R838	20300	J10 Onslip TL's @ R838	20300	Travel R838 overbridge		100	Dead	0	
6	J10 Onslip TL's @ R838	20300	M50 N/B mainline at J10 onslip	19800	Treat J10 N/B Onslip	500		Live	7	
7	M50 N/B mainline at J10 onslip	19800	M50 N/B mainline at CH13000	13000	Treat Mainline M50 N/B J10 - J6(north side)	6800		Live	10.5	71400
8	M50 N/B mainline at CH13000	13000	M50 N/B J6 offslip for N3	11800	Travel M50 N/B to J6 off slip for N3		1200	dead	0	
9	M50 N/B J6 offslip for N3	11800	N3 N/B mainline at merge	N3 N 0.5	Treat M50 N/B J6 freeflow to N3 N/B	1200		live	7	
10	N3 N/B mainline at merge	N3 N 0.5	N3 J2 Interchange Snugborough Turn	N3 N 2.0	Travel N/B N3 to J2 and turn		1600	dead	0	
11	N3 J2 Interchange Snugborough Turn	N3 S 2.0	N3 S/B Mainline at freeflow to M50 N/B	N3 S 0.7	N3 J2 Interchange and travel S/B to N3 freeflow to N/B M50		1400	dead	0	
12	N3 S/B Mainline at freeflow to M50 N/B	N3 S 0.7	M50 N/B J6 onslip to mainline	9900	Treat Ns S/B freeflow On slip to M50 N/b at J6	1000		live	3.5	
13	M50 N/B J6 onslip to mainline	9900	M50 N/B J6 off slip	7500	Travel M50 Mainline N/B J6 - J5		2400	dead	0	
14	M50 N/B J6 off slip	7500	M50 N/B J6 off slip at diverge N2 Freeflows	7000	Travel N/B M50 J5 Off slip To diverge		500		0	
15	M50 N/B J6 off slip at diverge N2 Freeflows	7000	N2 N/B	N2 N 0.6	Treat N/B M50 Freeflow to N2 N/B from diverge	450		Live	3.5	
16	N2 N/B	N2 N 0.6	N2 Coldwinters Junction	N2 N 2.4	Travel N2 to Coldwnter Junct and turn		1800	dead	0	
17	N2 Coldwinters Junction	N2 S 2.4	N2 S/F Freeflow to M50 S/B	N2 S 0.3	Travel N2 S/B from Coldwinters to J5 M50 S/B onslip		2100	dead	0	
18	N2 S/B Freeflow to M50 S/B	N2 S 0.3	M50 S/B at Onslip from N2 S/B	7400	Treat N2 S/B freeflow on slip tp M50 S/B	600		live	7.5	
19	M50 S/B at Onslip from N2 S/B	7400	M50 S/B at Offslip to N3	10000	Travel M50 S/B J5 - J6		2600	dead	0	
20	M50 S/B J6 at Offslip to N3	10000	M50 S/B at offslip to J7	13800	Treat M50 S/B Mainline J6-J7	3800		live	10.5	39900
21	M50 S/B at offslip to J7	13800	M50 S/B J6 offslip to N4 diverge slips	14100	Travel M50 S/B J off slip to diverge of N4 slips		300	dead	0	
22	M50 S/B J6 offslip to N4 diverge slips	14100	N4 E/B merge with mainline	N4 E 0	Treat Freeflow offslip M50 S/B J6 to N4 E/B	600		Live	3.5	
23	N4 E/B merge with mainline	N4 E 0	N4 Traffic Lights Palmerstown		Travel N4 E/B and turn at Palmerston TL's		250	dead	0	
24	N4 Traffic Lights Palmerstown		N4 W/B Mainline	N4 W 0	Palmerstown TL's Travel N4 W/B		250	dead	0	
25	N4 W/B Mainline	N4 W 0	M50 S/B onslip from N4 J7	14800	Treat N4 W/B freeflow slip to M50 S/B aux lane	1000		live	3.5	
26	M50 S/B onslip from N4 J7	14800	M50 S/B offslip to N7 J9	18200	Treat M50 S/B Aux lane J7 - J9	3400		Live	3.5	11900
27	M50 S/B offslip to N7 J9	18200	M50 S/B Offslip diverge N7 E&W	18750	M50 S/B Offslip to diverge of N7 slips	550		Live	10.5	
28	M50 S/B Offslip diverge N7 E&W	18750	N7 W/B entrance to Luas	N7 W 0.7	M50 S/B Freeflow to N7 W/B at Luas	800		Live	7	
29	N7 W/B entrance to Luas	N7 W 0.7	Luas station entrance R/B		Sliproad from N7 into Luas	200		Live	7	
30	Luas station entrance R/B		Luas station entrance R/B		Treat R/B at Luas Station	100		Live	7	
31	Luas station entrance R/B		Monastry Road R/B		Treat Bowstring bridge	250		Live	7	
32	Monastry Road R/B		Monastry Road R/B		Treat R/B Monastry Road	100		Live	7	
33	Monastry Road R/B		M50 S/B on slip Monastry Rd	N7 E 0.5	Treat Monastery Road E/B	200		Live	7	
34	M50 S/B on slip Monastry Rd	N7 E 0.5	M50 J9 on slip N/B merge with slip	18600	Treat Onslip Monastery Rd to M50 Onslip N/B	400		Live	3.5	
35	M50 J9 on slip N/B merge with slip	18600	M50 N/B onslip merge with mainline	18100	Treat Slip on to M50 S/B from N7	500		Live	7	
36	M50 N/B onslip merge with mainline	18100	M50 N/B offslip to J7 N4	14900	Treat Aux lane N/B J9 -J7	3200		Live	3.5	11200
37	M50 N/B offslip to J7 N4	14900	M50 Off slip to N4 slips diverge	14400	Treat M50 N/B J7 offslip to diverge of slips	550		Live	7	
38	M50 Off slip to N4 slips diverge	14400	N4 W/B onslip @ bus stop	N4 W 1.0	Treat freeflow M50 N/B J7 to N4 W/B	300		Live	3.5	
39	N4 W/B onslip @ bus stop	N4 W 1.0	N4 W/B offslip to J4	N4 W 4.7	Treat N4 W/B mainline J1 to J4	3700		Live	10.5	
40	N4 W/B @ onslip from J4	N4 W 4.7	J4 OffslipW/B at TLs R403	N4 W 5.3	Treat J4 W/B N4 offslip	600		live	7	
41	J4 OffslipW/B at TLs R403	N4 W 5.3	J4 Onslip at TL's R403	N4 E 5.3	Treat Overbridge J4 R403 N/B	100		Live	7	
42	J4 Onslip at TL's R403	N4 E 5.3	N4 E/B Mainline at off slip to J4	N4 E 4.8	Treat N4 E/B onslip to mainline	500		Live	3.5	
43	N4 E/B Mainline at off slip to J4	N4 E 4.8	N4 E/B Mainline at freeflow to M50 N/B	N4 E 1.1	Treat mainline N4 E/B J4 - J1	4800		Live	10.5	
44	N4 E/B Mainline at freeflow to M50 N/B	N4 E 1.1	N4 E/B Mainline	N4 E 0	Treat Mainline N4 E/B J1 over M50 Interchange	1100		Live	7	
45	N4 E/B Mainline	N4 E 0	N4 Traffic Lights Palmerstown		Travel N4 E/B and turn at Palmerston TL's		250	dead	0	
46	N4 Traffic Lights Palmerstown		N4 W/B Mainline	N4 W 0	Palmerstown TL's Travel N4 W/B		250	dead	0	

	M50 Route 3: Page 2									
No.	Start	Chainage	End	Chainage		Dist Live	Dist Dead	Dead/ Live	width spread	
47	N4 W/B Mainline	N4 W 0	N4 W/B onslip @ bus stop	N4 W 1.0	Treat Mainline N4 W/B through J1	1000		Live	7	
48	N4 W/B onslip @ bus stop	N4 W 1.0	N4 W/B Mailine off slip to J2	N4 W 1.5	Traet Aux lane J1 - J2 N4 W/B	500		Live	3.5	
49	N4 W/B Mailine off slip to J2	N4 W 1.5	J2 Rotary freeflow slip to Liffey Valley		Treat N4 W/B offslip to J2 Liffey Valley	250		Live	7	
50	J2 Rotary freeflow slip to Liffey Valley		Free flow into Liffey Shopping center		Treat J2 Aux lane Rotary to Liffy V shopping centre	300		Live	3.5	
51	Free flow into Liffey Shopping center		Roundabout in ind est		travel into liffy valley shopping and turn at R/B		200	dead	0	
52	Roundabout in Ind est		Roundabout on R113		travel out of liffy valley shopping to R/B R113		250	dead	0	
53	Roundabout on R113		Roundabout on R113 Enterance to Liffy Valley		Treat R113 roundabout	200		Live	10.5	
54	Roundabout on R113 Enterance to Liffy Valley		R113 x 2 roundabouts to E/B side under N4		Treat link road R113 N/B at J2 and under N2	500		Live	7	
55	R113 x 2 roundabouts on E/B side under N4		Roundabout on R113 Enterance to Liffy Valley		Treat link road S/B J2 under N2 to R/B R113	500		Live	7	
56	Roundabout on R113 Enterance to Liffy Valley		N4 W/B onslip from J2	N4 W 2.0	Treat N4 EW/B J2 onslip	500		Live	7	
57	N4 W/B onslip from J2	N4 W 2.0	N4 W/B offslip to J3	N4 W 3.0	Treat Aux Lane N4 W/B J2- J3	900		Live	3.5	
58	N4 W/B offslip to J3	N4 W 3.0	J3 Interchange Traffic Lights @ R136	N4 W 3.4	Treat N4 W/B offslip to J3	400		Live	7	
59	J3 Interchange Traffic Lights R136	N4 W 3.4	N4 W/B Mainline at on slip from J3	N4 W 3.9	Treat N4 W/B J3 onslip	500		Live	7	
60	N4 W/B Mainline at on slip from J3	N4 W 3.9	N4 W/B mainline at off slip to J4	N4 W 4.9	Treat N4 W/B Aux/Bus Lane J3 - J4	1000		Live	3.5	
61	N4 W/B mainline at off slip to J4	N4 W 4.9	N4 J4 Offslip at TL's	N4 W 5.3	Travel N4 W/B J4 offslip		300	dead	0	
62	N4 J4 Offslip at TL's	N4 W 5.3	J4 Interchange overbridge R120	N4 E 5.3	Travel Over bridge J4		100	dead	0	
63	J4 Interchange overbridge R120	N4 E 5.3	N4 Mainline E/B at Onslip from J4	N4 E 4.9	Travel N4 E/B on slip		400	dead	0	
64	N4 Mainline E/B at Onslip from J4	N4 E 4.9	N4 mainline E/B at offslip to J3	N4 E 3.9	Treat N4 W/B Aux/Bus Lane J4 - J3	1000		Live	3.5	
65	N4 mainline E/B at offslip to J3	N4 E 3.9	N4 E/B J3 Offslip to TL's	N4 E 3.4	Treat N4 E/B J3 off slip	400		Live	7	
66	N4 E/B J3 Offslip at R136	N4 E 3.4	R136 n/b to TL's at Lucan Road		Treat R136 N/B link road from J2 to Lucan Rd	200		Live	7	
67	R136 n/b to TL's at Lucan Road		R/B at end of Lucan Road on slip to N4 J2		Treat Lucan Rd from R136 to Onslip	200		Live	7	
68	R/B at end of Lucan Road on slip to N4 J3		roundabout N4 J3 E/B		Treat roundabout	100		Live	7	
69	roundabout N4 J3 E/B	N4 E 3.2	N4 E/B mainline on slip from J3	N4 E 2.9	Treat n4 J3 E/B Onslip	300		Live	7	
70	N4 E/B mainline on slip from J3	N4 E 2.9	N4 E/B mainline at onslip from J2	N4 E 1.0	Treat N4 E/B Aux/Bus Lane J2 -J1	1400		Live	3.5	
71	N4 E/B mainline to diverge J1 for M50 S/B freeflow	N4 E 1.0	M50 Mainline S/B at onslip J7	14400	Treat N4 E/B freeflow to M50 S/B j7 Loop	900		Live	7	
72	M50 Mainline S/B at onslip loop	14400	M50 Mainline S/B at onslip loop	14800	Treat M50 S/B aux lane	400		Live	3.5	
73	M50 Mainline S/B at onslip loop	14800	M50 J9 S/B Off slip at Diverge to N7	18600	Travel M50 S/B J7 - J9		3900	dead	0	
74	M50 J9 S/B Off slip at Diverge to N7	18600	N7 E/B onto Nass Road	N7 E 0.0	Treat M50 S/B freeflow offslip to N7 E/B City	300		Live	3.5	
75	N7 E/B onto Nass Road	N7 E 0.0	Longmile Rd on N4		Travel N4 E/B longmile rd and turn		1000	dead	0	
76	Longmile Rd on N4		N7 W/B Nass Road	N7 W 0.0	Longmile Rd W/B N4		1000	dead	0	
77	N7 W/B Nass Road	N7 W 0.0	M50 N/B Mainline at onslip	18600	N4 W/B to M50 S/B freeflow loop	700		Live	3.5	
78	M50 N/B Mainline at onslip	18600	M50 N/B off slip to N4 J7	14800	travel M50 N/B J9 -J7		3800	dead	0	
79	M50 N/B off slip to N4 J7	14800	M50 offslip to N4 at Diverge	14400	W/E		400	dead	0	
80	M50 offslip to N4 at Diverge	14400	N4 E/B mainline merge with slip	M4 E0.5	Treat M50 N/B freeflow to N4 E/B merge with mainline	400		Live	3.5	
81	N4 E/B mainline merge with slip	M4 E0.5	Palmerstown TL's N4		Travel N4 E/B to Palmerstown TL's and Turn		800	dead	0	
82	Palmerstown TL's N4		N4 J3 Off slip at TL's on interchange	N4 W 3.4	Travel N4 W/B Palmerstown TL's to N4 J3		3700	dead	0	
83	N4 J3 Off slip at TL's on interchange	N4 W 3.4	R136 Over bridge at off slip from N4 E/B	N4 E 3.4	Treat R136 Overbridge N/B J4	100		live	10.5	
84	R136 Over bridge at off slip from N4 E/B	N4 E 3.4	Junction with Lucan Road		Travel R136 N/B from J4 Interchange to Lucan Rd		150	dead	0	
85	Junction with Lucan Road		Lucan Road E/B		Treat small slip to Lucan Road W/B	50		live	3.5	
86	Lucan Road E/B		N4 E/B J4 Onslip		Travel Lucan Road E/B		250	dead	0	
87	N4 E/B J4 Onslip	N4 E 3.2	N4 E/B J2 offslip to liffy valley	N4 E 2.1	Travel N4 E/B Mainline J3 - J2		200	dead	0	
88	N4 E/B J2 offslip to liffy valley	N4 E 2.1	r/b at J2 Liffy Valley E/B	N4 E 1.8	Treat N4 E/B J2 offslip to Liffy Valley	300		Live	7	
89	r/b at J2 Liffy Valley E/B	N4 E 1.8	r/b at J2 Liffy Valley E/B	N4 E 1.8	Travel part of Rotary J2		50	dead	0	
90	r/b at J2 Liffy Valley E/B	N4 E 1.8	N4 E/B mainline	N4 E 1.5	Treat N4 E/B J2 Onslip to mainline	300		Live	7	
91	N4 E/B mainline	N4 E 1.5	N4 E/B palmerston Tls	13300	Travel N4 E/B to Palmerstown TL's and turn.		1800	dead	0	
92	N4 E/B palmerston Tls		N4 W/B freeflow to M50 N/B Loop	N4 W 0.5	Travel N4 W/B to Freeflow slip Loop to M50 N/B		750		0	
93	N4 W/B freeflow to M50 N/B Loop	N4 W 0.5	M50 Mainline On slip from J6 N4	14300	Treat N4 W/B freeflow loop to M50 N/B	500		live	3.5	
94	M50 Mainline On slip from J6 N4	14300	M50 Depot at Castleknock	13300	Travel N4 E/B - M50 N/B to depot.		1000	dead	0	
						54,400	37,550			166,950
								Adjusted Area		**185,094**

M50 Route 4

M50 Route 4				
Primary Station	**Ballymount**		Average Non Salting Speed (km/hr)	70
Secondary Station	**Sandyford**		Average Salting Speed (km/hr)	50
Salting Depot	Castleknock			
Route No:	4		Route time to end salting (hr)	1hr 38 mins
Rate of Spread	10 - 25g/m2		Dry 10g Treatment Tonnes	2.08
Depot to Route (km)	3.6		Route tonnage Pre-Wet (10g, 15g, 20g& 25g) Rock Salt(70% ratio)	**1.46T/2.19T/2.92T/3.64T**
			Route Tonnage Pre-Wet (10g, 15g, 20g, & 25g) Marine Salt in Brine (10% ratio)	**0.15T/0.22T/0.29T/0.36T**
Time to Route (min)	3		Brine Volume (10g, 15g & 20g) x 4 salt weight	**624l/936l/1248l/1560l**
Treated Length (m)	49800	1 Hour 00 min	Route to depot (km)	5.3
Dead Length (m)	51450	0 Hour 44 min	Square Meter of surface Treated m2	207,988
Total Route Time		1 Hour 44 min	Average Spread width (m)	9.63

Project Road

M50 Route 4: Page 1

No.	Start	Chainage	End	Chainage		Dist Live	Dist Dead	Dead/ Live	width spread m	M2 Area
1	Castle knock depot	13300	M50 S/B at CH 16900 at Ronans Town Rail Bridge	16900	travel M50 S/B mainline		3600	dead	0	
2	M50 S/B at CH 16900 at Ronans Town Rail Bridge	16900	M50 Edmondstown O/B	26400	Treat M50 S/B mainline J10 to Edmondstown O/B	9500		live	10.5	99750
3	M50 Edmondstown O/B	26400	M50 S/B at offslip to J13	29600	Travel M50 S/B Edmondstown to J13 Offslip		3200	dead	0	
4	M50 S/B at offslip to J13	29600	M50 S/B J13 off slip @ Roundabout	30400	Treat J13 S/B offslip	800		live	7	
5	M50 S/B J13 off slip @ Roundabout	30400	M50 S/B J13 off slip @ Roundabout	30400	Treat 2x roundabouts and link rd at J13 Dundrum	600		live	7	
6	M50 S/B J13 off slip @ Roundabout	30400	M50 N/B J13 on slip @ Roundabout	30400	travel from off to on slip		400	dead	0	
7	M50 N/B J13 on slip @ Roundabout	30400	M50 Mainline onslip from J13	29400	Treat M50 N/B onslip J13	1000		live	7	
8	M50 Mainline N/B onslip from J13	29400	M50 Edmondstown O/B	26400	Travel Mainline from J13 to Edmondstown O/B		3000	dead	0	
9	M50 Edmondstown O/B	26400	M50 N/B at on slip from J10	19500	Treat M50 N/B mainline Edmondstown O/B to J9 offslip	6900		live	10.5	72450
10	M50 N/B at on slip from J10	19500	M50 N/B J7 diverge of slips to N7	19200	Travel J9 N/B offslip to diverge of slip for N7		300	dead	0	
11	M50 N/B J7 diverge of slips to N7	19200	N7 J9 E/B merge with mainline N7	N7 E 0.2	Treat J9 N/B freeflow slip to N7 E/B	500		live	3.5	
12	N7 J9 E/B merge with mainline N7	N7 E 0.2	Longmile road		Tranel N7 E/B to Longmile Road and Turn		1300	dead	0	
13	Longmile road		N7 J9 W/B off slip to M50 S/B N7	N7 E 0.0	Turn and Travel N7 from Longmile Road to J9		1000	dead	0	
14	N7 J9 W/B off slip to M50 S/B N7	N7 E 0.0	M50 Mainline S/B onslip from J9 Auxlane start	19300	Treat N7 W/B onslip to M50 S/B freeflow	600		live	3.5	
15	M50 Mainline S/B onslip from J9 Auxlane start	19300	M50 S/B Aux lane at off slip J10	19800	Treat M50 S/B Aux lane J9 - J10	500		live	3.5	1750
16	M50 S/B Aux lane at off slip J10	19800	M50 S/B off slip J10 diverge of freeflow	20200	Travel M50 S/B off slip J10 to diverge of freeflow	400		Live	7	
17	M50 S/B off slip J10 diverge of freeflow	20200	J10 Ballymount R838 road		Treat J10 S/B off slip freeflow to R838	200		live	3.5	
18	J10 Ballymount R838 road		R838 Ballymount Roundabout J10		Travel R 838 to Ballymout Ind Est R/B and Turnturn		300	dead	0	
19	R838 Ballymount Roundabout J10		R838 W/B J10 Overbridge TL's		Travel R838 from Bally mount Ind Est R/B to J10 S/B onslip		300	dead	0	
20	R838 W/B J10 at freeflow to S/B onslip		R838 W/B J10 freeflow on slip to M50 S/B		Treat J10 S/B freeflow slip from R838 to merge with onslip	200		live	3.5	
21	R838 W/B J10 freeflow on slip to M50 S/B	20300	M50 S/B mainline on slip from J10	20900	Treat J10 S/B onslip to M50 S/B Aux lane	500		live	3.5	
22	M50 S/B mainline on slip from J10	20900	M50 S/B aux lane at off slip to J11	22500	Treat M50 S/B Aux Lane J10-J11	1600		live	3.5	5600
23	M50 S/B aux lane at off slip to J11	22500	J11 Rotary M50 offslip	22900	Treat M50 S/B J11 offslip to Rotary	400		live	3.5	
24	J11 Rotary M50 S/B offslip	22900	J11 Rotary M50 onslip S/B	22900	Treat J11 Rotary	600		live	10.5	
25	J11 Rotary M50 offslip S/B	22900	J11 Rotary M50 onslip S/B	23000	travel part of J11 Rotary		200	dead	0	
26	J11 Rotary M50 onslip S/B	23000	M50 S/B Mainline/aux onslip from J11	23400	Treat J11 M50 S/B on slip	400		live	3.5	
27	M50 S/B Mainline/aux onslip from J11	23400	M50 S/B Mainline/aux offslip to J12	24100	Treat M50 S/B Aux lane J11 - J12	700		live	3.5	2450
28	M50 S/B Mainline/aux offslip to J12	24100	J12 off slip from M50 S/B R133	24500	Treat M50 S/B off slip to J12	400		live	7	
29	J12 R133 off slip from M50 S/B	24500	J12 R133 on slip to M50 N/B	24500	Treat J12 overbridge W/B	150		live	10.5	
30	J12 R133 on slip to M50 N/B	24500	M50 N/B mainline/Aux from J12	24200	Treat M50 N/B on slip J12	300		live	7	
31	M50 N/B mainline/Aux from J12	24200	M50 N/B mainline/aux slip off to J11	23400	Treat M50 N/B Aux Lane J12 - J11	800		live	3.5	
32	M50 N/B mainline/aux slip off to J11	23400	J11 Rotary at M50 S/B off slip	23000	Treat M50 N/B J11 offslip	400		live	7	
33	J11 Rotary at M50 S/B off slip	2300	N81 W/B to Roundabout		Travel N81 W/B to Roundabout and turn		550	dead	0	
34	N81 W/B to Roundabout		J11 Rotary N81 freeflow N/B onslip	22900	Turn at Roundabout on R81 and travel E/B to J11 Rotary		450	dead	0	
35	J11 Rotary N81 freeflow N/B onslip	22900	M50 N/B onslip J11	22700	Treat N81 E/B free flow slip to J11 N/B onslip	200		live	3.5	
36	M50 N/B onslip J11	22700	M50 N/B mainline/Aux from on slip J11	22300	Treat M50 N/B J11 onslip to M50 N/B Aux lane	600		live	7	
37	M50 N/B mainline/Aux from on slip J11	22300	M50 N/B mainline/aux slip off to J10	20900	Treat M50 N/B Aux Lane J11- J10	1300		live	3.5	4550
38	M50 N/B mainline/aux slip off to J10	20900	J10 Ballymount R838 road at TL,s	20300	Treat M50 N/B off slip J10 to TL's	600		live	7	
39	J10 Ballymount R838 road at TL,s	20300	M50 N/B mainline/aux at onslip from J10	19800	Travel M50 N/B J10 Onslip to M50 mainline		500	dead	0	
40	M50 N/B mainline/aux at onslip from J10	19800	M50 N/B mainline off slip to J9 N7	19400	Treat M50 N/B Aux lane J10 -J9	300		live	3.5	1050
41	M50 N/B mainline off slip to J9 N7	19400	M50 J9 N/B off slip at diverge of slips to N7	19100	Treat M50 N/B off slip to diverge for N7 E&W	300		live	7	
42	M50 J9 N/B off slip at diverge of slips to N7	19100	N7 Mainline W/B under bow string bridge	N7 W 0.7	Treat M50 N/B freeflow J9 to N7 W/B	500		live	3.5	
43	N7 Mainline W/B under bow string bridge	N7 W 0.7	N7 W/B mainline at J2 off slip	N7 W 3.5	Treat N7 W/B Mainline to J2 Kingswood	2800		live	10.5	
44	N7 W/B mainline at J2 off slip	N7 W 3.5	N7 J2 W/B off slip Kingswood rotary R136	N7 W 4.0	Treat N7 W/B off slip to J2 Kinswood	500		live	3.5	
45	N7 J2 W/B off slip rotary R136	N7 W 4.0	N7 J2 E/B on slip rotary R136	N7 W 4.0	Treat J2 Kingswood O/B N/B	400		live	10.5	
46	N7 J2 E/B on slip rotary R136	N7 W 4.0	N7 E/B mainline at onslip from J2 Kingswood	N7 E 3.6	Treat N7 E/B onslip J2 Loop from Kingswood	800		live	3.5	
47	N7 E/B mainline at onslip from J2 Kingswood	N7 E 3.6	N7 E/B mainline at slip diverges on J1/J7	N7 E 0.7	Treat N7 E/B Mainline J2 to J9 M50 at slip diverges	2900		live	10.5	
48	N7 E/B mainline at slip diverges on J1/J7	N7 E 0.7	N7 Mainline E/B at slip from Monastry Rd	N7 E 0.3	Treat N7 E/B mainline at diverges in N7 to City	300		live	7	
49	N7 Mainline E/B at slip from Monastry Rd	N7 E 0.3	N7 Mainline E/B at Nass Rd into City	N7 E 0.0	Treat N7 E/B Mainline @ merge with M50 N/B slip to city	300		live	10.5	
50	N7 Mainline E/B at Nass Rd into City	N7 E 0.0	Longmile Rd -Turn		Travel N7 E/B to Longmile Road and Turn		1000	dead	0	
51	Longmile Rd -Turn		N7 J9 W/B mainline Nass Rd	N7 W 0.0	Travel N7 W/B from Longmile Road to J9 Interchange		1000	dead	0	
52	N7 J9 W/B mainline Nass Rd	N7 W 0.0	N7 Mainline W/B under bow string bridge	N7 W 0.8	Treat N7 W/B Mainline to entrance to past Luas entrance	800		live	7	

	M50 Route 4: Page 2									
No.	Start	Chainage	End	Chainage		Dist Live	Dist Dead	Dead/Live	width spread	
53	N7 Mainline W/B under bow string bridge	N7 W 0.8	N7 Mainline at off slip to Newlandscross	N7 W 1.2	Treat N7 W/B Aux Lane Aux lane from Luas to J1 Newland X	400		live	3.5	
54	N7 Mainline at off slip to Newlandscross	N7 W 1.2	Newlandscross off slip at R113 TL's	N7 W 1.9	Treat N7 W/W offslip to Newlands X J1	700		live	7	
55	Newlandscross off slip at R113 TL's	N7 W 1.9	N7 W/B mainline at Newlandscross on slip	N7 W 2.5	Treat N7 W/B J1 Newlands X On slip	600		live	3.5	
56	N7 W/B mainline at Newlandscross on slip	N7 W 2.5	N7 W/B mainline at J2 offslip	N7 W 3.6	Travel N7 W/B and turn at J2 Kinswood		1100	dead	0	
57	N7 W/B mainline at J2 offslip	N7 W 3.6	N7 J2 W/B off slip Kingswood rotary R136	N7 W 4.0	Travel N7 W/B off slip to J2		400	dead	0	
58	N7 J2 W/B off slip Kingswood rotary R136	N7 W 4.0	N7 J2 E/B on slip Kingswood rotary R136	N7 E 4.0	Travel N/B R136 J2 Overbridge		400	dead	0	
59	N7 J2 E/B on slip Kingswood rotary R136	N7 E 4.0	N7 E/B Mainline at onslip from J2	N7 E 3.6	Travel N7 E/B J2 On slip		800	dead	0	
60	N7 E/B mainline at onslip from J2 Kingswood	N7 E 3.6	N7 E/B mainline/bus lane to Newlandscross offslip	N7 E 2.5	Treat N7 E/B Aux/Bus Lane J2 - J1	1100		live	3.5	
61	N7 E/B mainline/bus lane to Newlandscross offslip	N7 E 2.5	N7 E/B offslip to Newlandscross R113	N7 E 1.9	Treat N7 E/B J1 Off Slip to Newlands X	700		live	7	
62	N7 E/B offslip to Newlandscross R113	N7 E 1.9	N7 E/B onslip to N7 mainline/Aux	N7 E 1.4	Treat N7 E/B J1 On Slip (stay left and treat aux/bus lane)	500		live	7	
63	N7 E/B onslip to N7 mainline/Aux	N7 E 1.4	N7 aux lane to Monastry rd	N7 E 0.5	Treat N7 E/B Aux/Bus lane J1 to Monastery Rd (stay left)	900		live	3.5	
64	N7 aux lane to Monastry rd	N7 E 0.5	Turn at Monastry Rd R/B		Travel W/B Monastery Rd to R/B and tun		200	dead	0	
65	Turn at Monastry Rd R/B		N7 E/B onslip at Monastry Rd	N7 E 0.5	Travel E/B Monastery Rd R/B to Onslip N7 E/B		200	dead	0	
66	N7 E/B onslip at Monastry Rd	N7 E 0.5	N7 Slip Road to M50 S/B Loop	N7 E 0.3	Treat N7 E/B Freeflow from Monastery Rd to M50 S/B on slip loop	250		live	7	
67	N7 Slip Road to M50 S/B Loop	N7 E 0.3	M50 Mainline merge S/B onslip	18900	Treat N7 E/B slip to M50 S/B mainline	550		live	7	
68	M50 Mainline merge S/B loop onslip	18900	M50 S/B mainline merge with on slip from N7	19300	Treat M50 S/B Aux Lane from N7 E/B onslip and N7 W/B onslip	400		live	3.5	
69	M50 S/B mainline merge with on slip from N7 W/B	19300	M50 S/B J10 Off slip at Diverge freeflow to R838	20200	Travel M50 S/B J9 to J10 off slip diverge for R838		800	dead	0	
70	M50 S/B J10 Off slip at Diverge freeflow to R838	20200	M50 S/B off slip J10 Junct with Traffic Lights	20300	Treat M50 S/B J10 offslip freeflow to R838 E/B	150		live	7	
71	M50 S/B off slip J10 Junct with Traffic Lights	20300	R838 E/B to merge with freeflow from J10 S/B offslip		Treat R838 E/B for 100m to merge with freeflow	100		live	7	
72	R838 E/B to merge with freeflow from J10 S/B offslip		R838 E/B at R/B Ballymount Ind Est		Travel R838 E/B to Ballymount Ind est R/B and turn		300	dead	0	
73	R838 E/B at R/B Ballymount Ind Est		R838 W/B R/B to freeflow onslip J10 S/B (East Side of J10)		Travel R838 W/B to J12 at where freeflow to M5 S/B starts		300	dead	0	
74	R838 W/B R/B to freeflow onslip J10 S/B(East Side of J10)		R838 W/B at merge with freeflow from M50 N/B (West Side of J10)		Treat R838 W/B across J10 Overbridge	350		live	10.5	
75	R838 W/B at merge with freeflow from M50 N/B (West Side of J10)		R838 W/B Junt at Belgard Road		Travel R838 W/b and turn an Belgard Road		1100	dead	0	
76	R838 W/B Junt at Belgard Road		R 838 E/B C/W (West side of J10)		Travel R838 E/B from Belgard Rd to J10		1100	dead	0	
77	R 838 E/B C/W (West side of J10)		R 838 E/B C/W (East side of J10) @ TL,s	20300	Treat R838 E/B across j10 Overbridge	300		live	10.5	
78	R 838 E/B C/W (East side of J10) @ TL,s	20300	J10 S/B Onslip at merge with freeflow from R838	20500	Treat M50 S/B onslip J10 from TL's to merge with freeflow from R838	200		live	3.5	
79	J10 S/B Onslip at merge with freeflow from R838	20500	J11 Offslip at diverge with freeflow to N81	22600	Travel M50 S/B J10 to J11		2100	dead	0	
80	J11 Offslip at diverge with freeflow to N81	22600	N81 E/B merge with freeflow from M50 off slip	N81	Treat M50 S/B ofslip J11 freeflow to N81 E/B	400		live	3.5	
81	N81 E/B merge with freeflow from M50 off slip	N81	R/B on N81 Spawell	N81	Travel N81 E/B to Spawell R/B and turn		600	dead	0	
82	R/B on N81 Spawell	N81	J11 Rotary	N81	Travel N81 W/B from Spawell R/B to J11 Rotary		700	dead	0	
83	J11 Rotary		J11 N/B onslip to M50		Travel part of J11 rotary to M50 N/B on slip		350	dead	0	
84	J11 N/B onslip to M50	22900	M50 onslip N/B merge with freeflow from N81	22800	Treat M50 N/B onslip J11 to merge with freeflow from N81 E/B	100		live	7	
85	M50 onslip N/B merge with freeflow from N81	22800	J12 Offslip N/B at diverge with freeflow to R838 W/B	20500	Travel M50 N/B J11 to J10		2300	dead	0	
86	J10 Offslip N/B at diverge with freeflow to R838 W/B	20500	R838 W/B J10	20400	Treat M50 N/B freeflow from J10 N/B offslip to R838 W/B	150		live	3.5	
87	R838 W/B J10		Turn at Belgard Rd R838		Travel R838 W/b and turn an Belgard Road		1200	dead	0	
88	Turn at Belgard Rd R838		R838 E/B J10 Freeflow to M50 N/B		Travel R838 E/B from Belgard Rd to J10		1300	dead	0	
89	R838 E/B J10 Freeflow to M50 N/B	20300	J10 onslip N/B merge	20000	Treat R838 E/B freeflow slip to M50 N/B onslip from J10	400		live	3.5	
90	J10 onslip N/B merge	20000	J9 offslip N/B to N7 diverge	19200	Travel M50 N/B J10 to J9 offslip		800	dead	0	
91	J9 offslip N/B to N7 diverge	19200	Longmile road N7		Travel M50 N/B J9 off slip to N7 E/B and turn at longmile road		1900	dead	0	
92	Longmile road N7 turn		N7 J9 onslip to M50 S/B	N7 W 0.1	Travel N7 W/B from Longmile Road to J9 Interchange		1100	dead	0	
93	N7 J9 onslip to M50 S/B	N7 W 0.1	M50 off slip N/B to N7 inbound	N7 E 0.4	Treat N7 W/B freeflow to merge with M50 N/B offslip to N7 E/B	300		live	3.5	
94	M50 off slip N/B to N7 inbound	N7 E 0.4	Longmile road N7		Travel M50 N/B J9 off slip to N7 E/B and turn at longmile road		1400	dead	0	
95	Longmile road N7 turn		J1 Newlands X W/B Offslip	N7 W 1.8	Travel N7 W/B from Longmile Road to N7 W/B off slip J1 Newlands X		2900	dead	0	
96	J1 Newlands X W/B Offslip	N7 W 1.8	Belgard Road R113 S/B merge		Treat N7 J1 off slip spur to Belgard Road R113 S/B	150		live	3.5	
97	Belgard Road R113 S/B merge		Belgard Rd R113 Turn		Travel Belgard Road R113 and turn at TL's		250	dead	0	
98	Belgard Rd R113 Turn		Belgard Road R113 N/B merge to N7 onslip W/B	N7 W 1.9	Travel Belgard Road R113 N/B TL's to N7 J1 W/B onslip		250	dead	0	
99	Belgard Road R113 N/B merge to N7 onslip W/B	N7 W 1.9	N7 J1 Onslip W/B	N7 W 1.9	Treat R113 freeflow slip to N7 W/B onslip at J1 Newlands X	100		live	3.5	
100	N7 J1 Onslip W/B	N7 W 1.9	N7 J2 Kingswood Interchange	N7 W 4.1	Travel N7 W/B J1 to J2 and turn		2200	dead	0	
101	N7 J2 Kingswood Interchange	N7 W 4.1	N7 E/B off slip to J1	N7 E 2.7	Travel N7 E/B J2 to J1 Newlands X offslip		1400	dead	0	
102	N7 E/B off slip to J1	N7 E 2.7	N7 E/B onslip from J1	N7 E 1.9	Travel N7 E/B J1 Offslip		800	dead	0	
103	N7 E/B onslip from J1	N7 E 1.9	N7 J1 onslip at diverge of lanes	N7 E 1.5	Travel N7 E/B Newlands X onslip TLs to diverge of on slip		400	dead	0	
104	N7 J1 onslip at diverge of lanes	N7 E 1.5	N7 E/B mainline merge with on slip	N7 E 1.2	Treat N7 E/B J1 Onslip to N7 mainline	350		live	3.5	
105	N7 E/B mainline merge with on slip	N7 E 1.2	N7 mainline diverge for M50 S/B onslip	N7 E0.7	Travel N7 E/B Mainline to diverge of N7 slip roads		400	dead	0	
106	N7 mainline diverge for M50 S/B onslip	N7 E 0.7	N7 On slip to M50 N/B at merge with Monastery Rd slip	18600	Treat N7 E/B freeflow slip to M50 N/B mainline J9	600		live	7	
107	N7 On slip to M50 N/B at merge with Monastery Rd slip	18600	depot Castleknock	13300	Travel M50 Mainline J9 to Castleknock Depot		5300	dead	0	
						49,800	51,450			187,600
			N7 E/B to M50 S/B Loop onslip at diverge (N7 E 0.5) to slip on from Monastry Rd (N7 E 0.3)=200m x 2 lanes TBC by Globalvia Jons on return to Sandyford Depot					Adjusted Area		**207,988**

M50 Route 5

M50 Route 5				
Primary Station	**Sandyford**			
Secondary Station	**Leopardstown**		Average Non Salting Speed (km/hr)	70
Salting Depot	Castleknock		Average Salting Speed (km/hr)	50
Route No:	5 (M50/CMA)		Route time to end salting (hr)	1hr 49 mins
Rate of Spread	10 - 25g/m2		Dry 10g Treatment Tonnes	1.11
Depot to Route (km)	13.1		Route tonnage Pre-Wet (10g, 15g, 20g& 25g) Rock Salt(70% ratio)	**0.87T/1.3T/1.73T/2.16T**
			Route Tonnage Pre-Wet (10g, 15g, 20g, & 25g) Marine Salt in Brine (10% ratio)	**0.09T/0.13T/0.18T/0.22T**
Time to Route (min)	12 min		Brine Volume (10g, 15g & 20g) x 4 salt weight	**371l/556l/741l/926l**
Treated Length (m)	50150	1 Hour 01 min	Route to depot (km)	17.1
Dead Length (m)	76600	1 Hour 05 min	Square Meter of surface Treated m2	123,396
Total Route Time		2 Hour 06 min	Average Spread width (m)	11.64

M50 Route 5: Page 1

No.	Start	Chainage	End	Chainage	Project Road	Dist Live	Distance Dead	Dead/ Live	width spread m	Area m2
1	Castle knock depot	13300	M50 Mainline Edmondstown Bridge	26400	Travel M50 S/B Mainline Depot to Edmondstown O/B		13100	dead	0	
2	M50 Mainline Edmondstown Bridge	26400	M50 S/B J14 Offslip	31900	Treat M50 S/B Edmondstown O/B to J14 Offslip	5500		Live	10.5	57750
3	M50 S/B J14 Offslip	31900	M50/N11 Merge	M11 S 9.5	Treat M50 S/B J14 Offslip to M11 S/B Merge	7900		Live	7	
4	M50/N11 Merge	M11 S 9.5	N11 Off slip to J5	M11 S 11	Treat M11 S/B from M50 to J5 Bray Offslip	1500		Live	10.5	
5	N11 Off slip to J5	M11 N 11	J5 Rotary end of off slip		Treat M11 J5 S/B off slip to Bray	750		Live	3.5	
6	J5 Rotary end of off slip		Rotary J5		Treat J5 Bray North Rotary	150		Live	7	
7	Rotary J5		N11 On slip merge with Mainline	M11 N 11	Treat M11 N/B onslip from Bray J5 to M11 Mailine	900		Live	3.5	
8	N11 On slip merge with Mainline	M11 N 11	M11 N/B at diverge for N11/M50	M11 N 9.7	Treat M11 N/B Mainline to start of M50 N/B	1300		Live	10.5	
9	M11 N/B at diverge for N11/M50	M11 N 9.7	M50 N/B J14 at onslip merge	31500	Treat M50 N/B M11 diverge to J14 On slip	8300		Live	7	
10	M50 N/B J14 at onslip merge	31500	M50 Mainline Edmondstown Bridge	26400	Treat M50 N/B J14 Onslip merge to Edmondstown O/B	5100		Live	10.5	53550
11	M50 Mainline Edmondstown Bridge	26400	M50 Mainline Offslip to J12	25000	Travel M50 N/B Edmondstown O/B to J12 offslip		1400	Dead	0	
12	M50 Mainline Offslip to J12	25000	J12 Offslip N/B TL @ R133	24500	Treat M50 N/B Offslip to J12	500		Live	7	
13	J12 Offslip N/B TL @ R133	24500	M50 N/B onslip @Tls J12	24500	treat R133 E/BOverbridge J12	150		Live	7	
14	M50 N/B onslip @Tls J12	24500	M50 Mainline Onslip from J12	25200	Treat M50 S/B onslip from J12	700		Live	7	
15	M50 Mainline Onslip from J12	25200	M50 S/B at offslip to J13	29600	Travel M50 S/BMainline J12 to J12		4400	dead	0	
16	M50 S/B offslip to J13	29600	Rotary J13 Off slip	30400	Treat M50 S/B off Slip J13	800		Live	7	
17	Rotary J13 Off slip	30400	Rotary J13 Off slip	30400	Treat J13(N) 2 x rotarys and link Road betwwen them	600		Live	7	
18	Rotary J13 Off slip		Rotary J13 Off slip		Travel rotary at J13 (N)		100	dead	0	
19	Rotary J13 Off slip	30400	J13 Rotary	31900	Treat M50 S/B Aux/Green route J13(N) to J13(S)	1500		Live	7	
20	J13 Rotary	31900	J13 Rotary	31900	Treat J13(S) Rotary	600		Live	10.5	
21	J13 Rotary		J13 Rotary		Travel J13(S) Rotary		150	dead	0	
22	J13 Rotary	32000	M50 S/B J14 on slip merge	33300	Treat M50 S/B J13(S) onslip	1200		Live	3.5	
23	M50 S/B off slip merge	33300	M50 S/B J15 Offslip	34900	Travel M50 S/B J13 to J15		1600	dead	0	
24	M50 S/B J15 Offslip	34900	J15 Rotary Off slip	35500	Treat M50 S/B offslip to J15	550		Live	3.5	
25	J15 Rotary Off slip		J15 Rotary Off slip		Treat 2 x rotarys and link roads at J15(N)	600		Live	7	
26	J15 Rotary Off slip		J15 Rotary Off slip to Ballyogan rd		Travel rotary at J15		100	dead	0	
27	J15 Rotary Off slip to Ballyogan rd		J15 Rotary On slip	35700	Treat Ballyogan Link Rd S/B between Roundabouts J15	200		Live	7	
28	J15 Rotary On slip		J15 Rotary On slip from link Rd Ballyogan		Treat at J15(S) Rotary	250		Live	7	
29	J15 Rotary On slip from link Rd Ballyogan		J15 Rotary On slip to M50 S/B		Travel Rotary J15		100	dead	0	
30	J15 Rotary On slip to M50 S/B	35800	J15 on slip merge with M50	36300	Treat M50 S/B Onslip J15	500		Live	3.5	

	M50 Route 5: Page 2									
No.	Start	Chainage	End	Chainage		Distance Live	Distance Dead	Dead/ Live	width spread m	
31	J15 on slip merge with M50	36300	M50 S/B J16 off slip diverge	37200	Travel M50 S/B J15 to J16		900	dead	0	
32	M50 S/B J16 off slip diverge	37200	J16 offslip junct R118	37800	Treat M50 S/B offslip to J16	600		Live	7	
33	J16 offslip junct R118	37800	R118 Interchange		Treat R118 E/B link road J15 to TL's Cherry Wood	700		Live	10.5	
34	R118 Interchange		R118 Interchange		Travel and turn on R118 Cherrywood TL's		200	dead	0	
35	R118 Interchange		J16 Onslip S/B	37800	Treat R118 W/B Cherrywood TL's to J15 M50 Onslip S/B	600		Live	10.5	
36	J16 Onslip S/B	37800	M50 S/B merge with mainline	38400	Treat M50 S/B On slip at J16	600		Live	3.5	
37	M50 S/B merge with mainline	38400	N11 J5 Bray Int Rotary		Travel M50 S/B J16 to J5 M11 Bray North		3500	dead	0	
38	N11 J5 Bray Int Rotary		M50 N/B offslip to J16	38300	Travel M11 N/B from J5 to M50 N/B J16		3700	dead	0	
39	M50 N/B offslip to J16	38300	J16 R118 Interchange N/B	37600	Treat M50 N/B J16 Off Slip	700		Live	7	
40	J16 R118 Interchange N/B	37600	R118 junst with S/B off slip		Treat R118 E/B over bridge to the merge with M50 N/B off slip	200		Live	10.5	
41	J16 offslip junct R118		R118 Interchange		Travel R118 E/B to TL's Cherrywood and turn		700	dead	0	
42	R118 Interchange		J16 Onslip S/B	37700	Travel R118 W/B from TL's Cherrywood to M50 On slip S/B		600	dead	0	
43	J16 Onslip S/B R118		J16 R118 to N/B on slip		Treat R118 W/B from M50 S/B on slip over bridge to M50 N/B Onslip	300		Live	7	
44	J16 R118 to N/B on slip	37700	M50 N/B mainline onslip merge	37000	Treat M50 N/B on slip J16	700		Live	7	
45	M50 N/B mainline onslip merge	37000	M50 N/B offslip to J15	36200	Travel M50 N/B J16 to J15		800	dead	0	
46	M50 N/B offslip to J15	36200	J15 Rotary N/B off slip	35500	Treat M50 N/B Off Slip to J15	650		Live	3.5	
47	J15 Rotary N/B off slip	35500	J15 Rotary N/B off slip	35400	Travel Rotary J15		150	dead	0	
48	J15 Rotary N/B off slip	35400	M50 J15 N/B mainline onslip merge	34800	Treat M50 N/B On Slip J15	600		Live	3.5	
49	M50 J15 N/B mainline onslip merge	34800	M50 J13 N/B offslip to rotary	32900	Travel M50 N/B J15- J13		1900	dead	0	
50	M50 J15 N/B offslip	32900	J13 Rotary South offslip	32000	Treat M50 N/B Off Slip to J13	900		Live	7	
51	J15 Rotary	32000	J13 South Rotary	31900	Travel Rotary J13		100	dead	0	
52	J13 Rotary South at Green Route	31900	J13 North Rotary @ Green route N/B	30500	Treat M50 N/B Aux/Green route to J13(S) t oJ13(N)	1400		Live	7	
53	J13 North Rotary Green route N/B		J13 South Rotary Green route		Travel M50 S/B Aux/Green Route J13(N) to J13(S)		1800	dead	0	
54	J13 Rotary South at Green Route	32000	J15 Interchange	35500	Travel M50 S/B J13 (S) Rotary to J15		3500	dead	0	
55	J15 Interchange	35500	J13 N/B offslip at freeflow to Bearnaway	32100	Travel M50 N/B J15 to J13 offslip		3400	dead	0	
56	J13 N/B offslip at freeflow to Bearnaway	32100	Bearnaway Rd freeflow slip		Treat M50 N/B J13 freeflow slip to Bearnaway S/B	200		Live	3.5	
57	Bearnaway Rd freeflow slip		Bearnaway TL's		Travel S/B Bearnaway to TL's with R113		300	dead	0	
58	Bearnaway TL's		J14 Rotary On slip N/B		Travel R113 to J14 Rotary		800	dead	0	
59	J14 Rotary On slip N/B	32500	J14 M50 N/B mainline	31100	Treat M50 N/B Onslip J14	1400		Live	7	
60	J14 M50 N/B mainline	31100	J12 Interchange	24500	Travel M50 N/B J14 to J12		6600	dead	0	
61	J12 Interchange	24500	M50 S/B J14 off slip	31600	Travel M50 S/B J12 to J14		7100	dead	0	
62	M50 S/B J14 off slip	31600	J14 Rotary	32500	Treat M50 S/B Offslip J14	900		Live	7	
63	J14 Rotary	32500	Bearnaway TL's		Travel Rotary J14 and R113 to TL's with Bernaway.		800	dead	0	
64	Bearnaway TL's		Freeflow slip to Green route N/B		Travel N/B Bernaway to J13 Freeflow slip N/B Green route		300	dead	0	
65	Freeflow slip to Green route N/B		Green route N/B @ J13 South	31800	Treat Freeflow Bernaway N/B to Green Route N/B at J13(S)	150		Live	3.5	
66	Green route N/B @ J13 South	31800	Green route N/B @ J13 North	30400	Travel M50 N/B Aux/Green Route J13(N) to J13(S)		1400	dead	0	
67	Green route N/B @ J13 North	30400	Castleknock Depot	13300	Travel M50 N/B J13 to Castleknock Depot		17100	dead	0	
						50,150	76,600			111,300
								Adjusted Area		**123,396**

APPENDIX 4 - WINTER MAINTENANCE DUTY ENGINEERS' ROSTER FOR THE PERIOD 1ST OCTOBER 2023 TO 15TH MAY 2024

Please see below for details for M50CL Duty Engineers for Winter 2023/24. Duty Engineers hand over each Tuesday at 08:30hrs.

Date	Duty Engineer	Date	Duty Engineer	Date	Duty Engineer
01/10 – 03/10	Technical Engineer	12/12 – 19/12	Project Manager	27/02 – 05/03	TM & Network Inspector
03/10 – 10/10	TM & Network Inspector	19/12 – 26/12	O&M Network Manager / Winter Manager	05/03 – 12/03	Works Manager
10/10 – 17/10	Works Manager	26/12 – 02/01	Night Shift Supervisor	12/03 – 19/03	Works Supervisor
17/10 – 24/10	Works Supervisor	02/01 – 09/01	Technical Engineer	19/03 – 26/03	Project Manager
24/10 – 31/10	Project Manager	09/01 – 16/01	TM & Network Inspector	26/03 – 02/04	O&M Network Manager / Winter Manager
31/10 – 07/11	O&M Network Manager / Winter Manager	16/01 – 23/01	Works Manager	02/04 – 09/04	Night Shift Supervisor
07/11 – 14/11	Night Shift Supervisor	23/01 – 30/02	Works Supervisor	09/04 – 16/04	Technical Engineer
14/11 – 21/11	Technical Engineer	30/01 – 06/02	Project Manager	16/04 – 23/04	TM & Network Inspector
21/11 – 28/11	TM & Network Inspector	06/02 – 13/02	O&M Network Manager / Winter Manager	23/04 – 30/04	Works Manager
28/11 – 05/12	Works Manager	13/02 – 22/02	Night Shift Supervisor	30/04 – 07/05	Works Supervisor
05/12 – 12/12	Works Supervisor	20/02 – 27/02	Technical Engineer	07/05 – 14/05	Project Manager

APPENDIX 5 - LIST OF CONTACT NUMBERS

M50CL Supervisory and Management Contacts:

Position	Location	Contact Numbers	
		Office	Email
O&M Manager	Castleknock Depot	01 823 5888	info@m50concession.com
O&M Network Manager/Winter Manager	Castleknock Depot	01 823 5888	info@m50concession.com
Works Manager	Castleknock Depot	01 823 5888	info@m50concession.com
Project Manager	Castleknock Depot	01 823 5888	info@m50concession.com
Technical Engineer	Castleknock Depot	01 823 5888	info@m50concession.com
Works Supervisor	Castleknock Depot	01 823 5888	info@m50concession.com
TM & Network Inspector	Castleknock Depot	01 823 5888	info@m50concession.com
Night Shift Supervisor	Castleknock Depot	01 823 5888	info@m50concession.com

M50CL Operatives Contacts:

Position	Route	Contact Numbers
Works Supervisor	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Electrician	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888
M50 Concession Operative	All Routes	01 8235888

Authority's Site Representative

Authority	Location	Telephone Nos.
		Office
TII (Atkins)	Swords	01 890 5811
	Swords	01 690 5188

Across Boundary Contacts:

Authority	Location	Telephone Nos.
		Office
Fingal County Council	Blanchardstown	01 890 5811
South Dublin County Council	Tallaght	01 414 9000
Dun Laoghaire Rathdown County Council	Dun Laoghaire	01 205 4700
Dublin Port Tunnel (Egis Road & Tunnel Operation)	Dublin Port Tunnel	01 884 8438
MMaRC Area A (Globalvia Jons Maintenance)	Castleknock	01 891 3302

Gardai Contacts:

Name / Position	Location	Contact Numbers
		Office
Traffic Inspector	Dublin Castle	01 666 9800
Traffic Inspector	Santry	01 666 4000
Traffic Inspector	Blanchardstown	01 666 7000
Traffic Inspector	Terenure	01 666 6400
Traffic Inspector	Blackrock	01 666 5200

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