# SKID RESISTANCE POLICY AND OPERATIONAL PROCEDURES DOCUMENTS

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| **Author** | Roads Asset Manager |
| **Owner** | Head of Roads & Amenity Services |
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PART A: SKID RESISTANCE POLICY

## 1. INTRODUCTION

1.1 This Policy sets out Argyll and Bute Council`s approach to the monitoring of skid resistance on carriageways and interpreting data arising from any measurements made. Responsibility for the provision and maintenance of the Policy lies with the Head of Roads and Amenity Services. Responsibility for the implementation of the Policy lies jointly with the Network and Environment Manager and the Roads Operations Manager through their respective technical teams.

1.2 The policy and standards are applicable to Argyll and Bute Council`s surfaced public road network as defined in Appendix A of this Policy and in accordance with the Council's List of Public Roads. This policy deals with vehicular running surfaces only and is not applicable to the footway or cycleway network. It makes reference to the Design Manual for Roads and Bridges Part 1, HD 28 and HD 36. This Policy does not cover the All Purpose Trunk Roads within Argyll (A85 Oban – Tyndrum, A828 Connel – Ballachulish, A82 Fort William – Glasgow, A83 Tarbet – Kennacraig) as these roads are the responsibility of Transport Scotland.

1.3 In this document, the term "skid resistance" refers to the frictional properties of the road surface measured using a specified device under standardised conditions. The term always refers to measurements made on wet roads, unless specifically stated otherwise. These measurements are used to characterise the road surface and assess the need for maintenance; they cannot be related directly to the friction available to a road user making a particular manoeuvre at a particular time.

1.4 The procedures adopted to monitor skid resistance on the network are risk based and rely on an integrated approach involving Network Management and Roads Maintenance Engineers. The risk is associated with the relevant traffic volume of a particular section of route, as defined by its category within the Roads Hierarchy.

1.5 All data related to the measurement and ongoing monitoring of skid resistance is to be treated as confidential and must not be communicated to Third Parties (including the Police or applications under Freedom of Information) without the written consent of the Head of Roads and Amenity Services. Where information is required by the Police, the Head of Roads and Amenity Services must be informed immediately.

## 2. OUTLINE PRINCIPLES

2.1 The extent of the network subject to monitoring of skid resistance is detailed in Appendix A.

2.2 The monitoring of skid resistance and the management of the risk of incidents where wet tyre adhesion may be a contributory factor is a principle factor of road safety engineering.

2.3 The volume of traffic and geometry of any section of a route will have an effect on the risk of incidents. Factors such as bend radii, gradient, approaches to junctions, roundabouts and pedestrian crossings require consideration.

2.4 Routine monitoring of skid resistance is carried out using a Sideway Force Coefficient Routine Investigation Machine (SCRIM) operated in accordance with BS 7941-1 and HD28. The Single Annual survey method is used to determine the Characteristic SCRIM Coefficient (CSC) for 10m sub-sections of the network.

2.5 Vehicle incident data where wet skidding has been identified as a possible contributory factor shall be considered in conjunction with the CSC obtained from the annual skidding resistance survey to determine areas where there is evidence of a heightened incidence of occurrences requiring further investigation.

2.6 The identification of an area within the network with a CSC value which requires investigation does not necessarily dictate that the road surface requires treatment as other methods of mitigating the risk may be deemed more appropriate. For example, enhancement of road markings, providing advance warning signs and the improvement of sightline distances on the approach to a site of concern, may be sufficient to address the risk.

2.7 The procedure detailed in Appendix D shall be followed whereby site investigation shall determine the requirement for mitigation measures including whether the erection of temporary warning signs is required to alert drivers to the risk of skidding incidents. The level of treatment required shall be assessed using all available information to produce the most cost effective solution to improve the safety of the road user. On completion of a treatment, all temporary signing shall be removed.

PART B : OPERATIONAL PROCEDURES

## 3 PROCEDURE FOR SELECTION OF ROAD NETWORK FOR MONITORING

### Road Network

3.1 For the purposes of this procedure, the extent of the network subject to monitoring of skid resistance is detailed in Appendix A.

3.2 Traffic count statistics shall be assessed and the status of individual sections of the public network may be promoted to or downgraded from the network identified in Appendix A.

### Method of Survey

3.3 Routine monitoring of skid resistance is carried out using a Sideway Force Coefficient Routine Investigation Machine (SCRIM) operated in accordance with BS 7941-1 and HD28. The Single Annual survey method is used to determine the Characteristic SCRIM Coefficient (CSC) for 10m sub-sections of the network. Under this procedure the network will be surveyed once each year and in successive years the surveys will be carried out in rotation during early season, mid-season and late season.

3.4 Routine monitoring of Sensor Measured Texture Depth is undertaken annually as part of the data collection for the Scottish Roads Maintenance Condition Survey (SRMCS) SCANNER survey to determine Best Value Performance Indicators. Presently all A Class and 50% of B and C class routes are surveyed annually.

### Data Storage

3.5 The Council's Pavement Management System (PMS) is used to store and process the survey data. The system is provided and maintained by WDM Ltd.

### Investigatory Levels

3.6 Investigatory Levels are defined and reviewed as described in section 4.

### Site Investigation

3.7 Site Investigations are carried out in accordance with section 5. They may also be instigated as part of accident investigation procedures.

### Complaints about skid resistance

3.8 If complaints are received or other concerns are raised about skid resistance on the network detailed in Appendix A, then the data obtained from routine testing shall be used to respond initially and a surface condition report relevant to the site will be prepared through consultation between network and locally based maintenance staff and where appropriate, by procuring suitably qualified technical staff from the Council's Consultancy Service – Term Commission framework. Site specific testing will not normally take place unless deemed appropriate and agreed by the Network and Environment Manager.

## Other Roads

### Network

3.9 These are all other adopted, surfaced roads which are not detailed in Appendix A and which appear on the Council's List of Roads.

### Method of Survey

3.10 No routine monitoring of skid resistance is undertaken by virtue of their lower traffic volumes and hence reduced probability of incidents.

3.11 Testing may be deemed to be necessary on a site specific basis following complaints, repeated incidents of damage involving vehicles in wet conditions, regular damage to street furniture or as part of accident investigation procedures. Testing shall only be undertaken after an initial assessment of the data required for a site investigation (except test results) and where appropriate with specialist support from Materials Testing Engineers procured through the Council's Consultancy Service - Term Commission. The approval of the Network and Environment Manager is also required.

3.12 Site specific testing may be undertaken either as part of the first available routine SCRIM survey or if considered practicable, a separate exercise using a Griptester. The Pendulum Skid Tester shall not be used.

3.13 The CSC shall be derived in the normal manner for results from SCRIM surveys. The results from Griptester surveys shall be converted to equivalent CSC values using correlations developed by the County Surveyors' Society Griptester User Group.

### Data Storage

3.14 The Council's Pavement Management System (PMS) is used to store and process the survey data from SCRIM surveys. Equivalent CSC values derived from Griptester surveys shall also be stored on the PMS.

### Investigatory Levels

3.15 Investigatory Levels are defined as described in section 4 and are recorded on the PMS.

### Site Investigation

3.16 Site Investigations are carried out in accordance with section 5.

## 4. **PROCEDURE FOR DETERMINING INVESTIGATORY LEVELS**

### Assignment

4.1 The network detailed in Appendix A is divided up on the basis of the definitions in HD28 and each sub-section is assigned a Site Category and Investigatory Level (IL). The assigned IL is based on the values in Table 4.1 of HD 28, adjusted to suit the configuration of the Argyll and Bute network (for example no motorways). The Investigatory Levels table, as amended, is contained in Appendix B.

4.2 Where road improvements are made which mean a redefinition of site category is required (e.g. the installation of a pedestrian crossing or a new section of road is opened), then the lowest value of IL for the appropriate site category will be adopted, unless a site specific risk assessment undertaken by a qualified Safety Auditor indicates that a higher value is appropriate. This risk assessment shall address the factors detailed in paragraph 4.12 of HD 28.

4.3 For sites not on the network detailed in Appendix A, the Site Categories and ILs shall be determined initially by pavement engineering staff as part of the site investigation process and shall generally be within the bands in Table 4.1 of HD28. These shall be reviewed as part of the investigation process and the values assigned shall be recorded on the PMS.

### Review

4.4 Reviews of ILs shall be undertaken in the following circumstances:-

- when SCRIM results indicate that a section lies below the current IL and the site investigation procedure is invoked,
- when site-specific accident investigations are being undertaken,
- when changes are made to the network.

4.5 The review shall be lead by pavement engineering staff and involve accident investigation and maintenance staff and the following information shall be obtained as a minimum: -

- The latest CSC and IL data from the PMS.
- Details from locally based staff of:-
- changes that have taken place in the site use or road layout e.g. the installation of traffic signals, pedestrian crossings or roundabouts,
- relevant local factors such as non-injury accidents, complaints or repeated reports of damage.
- Details of accidents extracted from Strathclyde Police road accident statistical returns, contained within the PMS system. Only wet road accidents occurring in the previous 36 months shall be considered in conjunction with SCRIM survey results. An accident specialist shall review this data to establish, if possible, the extent to which the road surface is a factor in the recorded accidents.

4.6 The principles outlined in HD28 shall be followed in the review process and any adjustments deemed necessary to Investigatory Levels shall be made in steps of 0.05 units of CSC.

4.7 There are two sets of circumstances where the inter-relationship between wet road accidents and SCRIM results shall have the potential to affect the SCRIM Investigatory Level. These are:

- Where CSC is below Investigatory Level and there are no recorded wet road accidents within the last 36 months, there is potential to reduce the Investigatory Level,
- Where analysis of accident records show there are wet road accidents but the CSC is above Investigatory Level, there is scope to raise the Investigatory Level.

4.8 Recommendations to adjust the Investigatory Levels shall be submitted to the Network and Environment Manager for approval prior to implementation.

4.9 The basis of decisions to amend Investigatory Levels shall be recorded together with confirmation that the Pavement Management System has been updated accordingly.

**Texture Depth**

4.10 The Investigatory Level for texture depth (Sensor Measured Texture Depth) on all sites will be 0.7mm.

## 5 PROCEDURE FOR SITE INVESTIGATION

### Purpose

5.1 Sites where the analysis of accident details suggests a concentration of wet surface accidents or sites where the CSC is at or below the IL require a site investigation. The objective is to:-

- Determine whether a surface treatment is justified to reduce the risk of accidents, particularly accidents in wet conditions,
- Determine whether some other form of action may be required,
- Determine whether the current IL is appropriate,
- Determine whether to keep the site under review and not carry out any works.

### Procedure

5.2 The investigation shall be undertaken by pavement engineering staff in consultation with accident investigation staff and maintenance staff. The site investigation and associated procedures detailed in Chapter 5 and Annexes 4 & 5 of HD28 shall be followed.

5.3 Sites requiring investigation shall be identified and prioritised as soon as practicable after the CSC values have been received from the routine SCRIM survey. This may take the form of an A*nnual Road Safety Statement* as part of the budget programme process.

5.4 For those sites identified by the routine SCRIM survey, prioritisation will be on the basis of the amount by which the skid resistance is below the IL. If a substantial number of sites are identified by this procedure then further prioritisation on the basis of other factors such as traffic type and volume will be necessary. For those sites identified by the Annual Road Safety Statement, prioritisation shall be on the basis of the number of casualties.

5.5 A programme of remedial treatments shall be developed from the conclusions of the site investigations and priority shall be given to treating the following sites:-

- Where the accident history shows there to be a clearly increased risk of wet or skidding accidents,
- Where the skid resistance is at least 0.05 CSC units below the Investigatory Level,
- Where low skid resistance is combined with low texture depth (less than 0.8mm).

5.6 At all sites where surface treatment is recommended, slippery road warning signs shall be erected and maintained until the treatment is carried out. This shall be done as soon as practicable after the identification of such sites.

### Records

5.7 Appendix C details the content of a site investigation report, a copy of which shall be held on the Pavement Management System

## 6. PROPERTIES OF SURFACING MATERIALS

6.1 Specifications for all surfacing laid in maintenance works (including patching) and new construction shall include requirements for Polished Stone Value (PSV) and Aggregate Abrasion Value (AAV) of the aggregate and texture depth of the surface.

6.2 The PSV and AAV shall be selected from the tables in the current edition of HD36. The designer shall record the commercial vehicle flow used and the source of that data.

6.3 For sites on the network detailed in Appendix A and other locations where Investigatory Levels have been assigned, then the PSV specified shall be derived from the IL held on the pavement management system for that location and the commercial vehicle flow.

6.4 For all other sites, the site definition and the commercial vehicle flow shall be used to determine the PSV required (this is because a non-standard value of IL may apply on sites subject to IL reviews or accident investigations).

6.5 Texture Depth values for new surfacing, measured by the volumetric patch method (BS EN 13036-1), shall be as follows: -

| Site description | Average Texture depth |
|---|---|
| Roads subject to a speed limit of 40mph or above | 1.5mm |
| All other roads | 1.0mm |

6.6 For Thin Surface Course Systems, texture depths measured by the volumetric patch method (BS EN 13036-1) shall be as shown below:-

| Site description | Untrafficked | After 2 years |
|---|---|---|
| Roads subject to a speed limit of 40mph or above | 1.5mm | 1.0mm |
| All other roads | 1.2mm | 0.8mm |

6.7 The full procedural Process Map for Skid Resistance Monitoring, Investigation and Treatment Selection is contained in Appendix D.

## 7 EARLY LIFE SKID RESISTANCE OF ROAD SURFACING

7.1 Newly laid asphalt surfaces can exhibit lower skid resistance than the same surface after a period of trafficking, which could be because of the binder film that initially coats the aggregate particles. Measurements on a limited number of surfaces have shown that the skid resistance can be affected in both wet and dry conditions and this potentially gives rise to additional accident risk to road users. However, this characteristic of new surfaces is not fully understood, particularly in relation to the duration of the effect and the influence of different types of asphalt surfacing materials and is the subject of ongoing research.

7.2 Current research shows that for newly laid asphalt surfaces in wet conditions, the low-speed skid resistance measured by SCRIM can occasionally be below 0.45. For sites that have been assigned an Investigatory Level (IL) of 0.45 or above as a result of applying section 4 of this instruction, the skid resistance during the early life period could be below the IL. Therefore, a site specific risk assessment shall be undertaken by the designer to identify which of the following actions is required:

(i) Sites with IL set at 0.40 or lower - no other action is required.

(ii) Sites with IL set at 0.45 – the skid resistance shall normally be above 0.45 but may reduce below this level for a short period. In practice, a short-term drop of skid resistance below the IL is not unusual for sites where the average skid resistance over the summer period is above the IL. On its own, this does not warrant the use of warning signs. However, where the skid resistance prior to maintenance was substantially above the IL, the new surface could result in a significant reduction in skid resistance.

Drivers who are familiar with the road layout and whose driving style relies on a high level of friction to complete some manoeuvres successfully could be at greater risk following the surfacing treatment. Therefore, warning signs shall be used, as described below, if either:

(a) The treatment was triggered to increase the skid resistance, (i.e. the specific need to improve the skid resistance to a value above 0.45 has been demonstrated), or
(b) The treatment was triggered for other reasons, e.g. improvement works, and the skid resistance before treatment is above 0.50 or is not known.

(iii) Sites with IL set at 0.50 or above – these sites are most likely to exhibit skid resistance below the IL during the early life period. Warning signs must always be used, as described below.

## 8 PROCEDURE FOR USE OF WARNING SIGNS

8.1 Where warning signs are required, they shall be erected for one of two reasons:-

- As a result of an investigation, where a surface treatment is required to improve the CSC value to an acceptable level and such treatment has still to be done,

- In accordance with Section 7 on a section of new bituminous road surfacing, as part of structural improvement works, before the road is opened to unrestricted traffic.

8.2 On surface treatments which are purely required for the purposes of increasing the friction resistance and texture characteristics, signs can be removed on satisfactory completion of the works, within the appropriate quality assurance and site verification procedures. This shall be applicable to High Friction Surfacing and other such treatments.

8.3 On sites where structural strengthening works have been carried out including the provision of a new bituminous surface course, signs shall normally be removed after six months. Although reduced skid resistance may be observed for a longer period than 6 months, the duration of the effect for different materials or under different traffic conditions is not fully understood at present. The period of six months has been chosen as a compromise between providing warning during the period when the greatest reduction in skid resistance is likely to occur and the risk of undermining the credibility of signs to drivers by leaving them in place for a longer period.

8.4 The sign used shall be the slippery road warning sign (Diagram 557, Traffic Signs Manual, chapter 4) in conjunction with an appropriate supplementary plate (Diagram 570) to cover the extent of the new surfacing.

8.5 Where slippery road warning signs are present before maintenance, they may be left in place providing their location meets or exceeds the requirements described.

## 9 REFERENCES

Design Manual for Roads and Bridges, TSO, London

- HD28/04, Skid Resistance (Volume 7, Section 3, Part 1)
- HD36/06, Surfacing Materials for New and Maintenance Construction (Volume 7, Section 5, Part 1)

PART C : APPENDICES

## APPENDIX A

### Details of Roads subject to routine SCRIM surveys

| Road no. | Description | Comment |
|---|---|---|
| A83 | Campbeltown - Kennacraig | Principal Kintyre route |
| A814 | Cats Castle - Faslane Roundabout | Principal Lomond route |
| A814 | Garelochhead Bypass - Glen Mallon | MoD ; HMNB(C) Faslane - protocol |
| A815 | Cairndow - Dunoon (via Hunter's Quay) | Principal Cowal route |
| A816 | Oban - Lochgilphead | W Lorn / Mid-Argyll Principal. Route. |
| A817 | Garelochead - A82 (Luss) | Haul Rd – Faslane / Coulport |
| A818 | Helensburgh - A82 (Arden) | Lomond TR Link |
| A819 | Inveraray – A85 (Dalmally) | E Lorn / Mid-Argyll TR Link |
| A885 | Sandbank - Dunoon | Direct Dunoon route |
| A886 | Strachur - Colintraive | W Cowal – Bute access |

Surveys will be carried out annually on the whole of the above network on a rotational basis, as indicated by the typical cycles below:-

| | |
|---|---|
| 2011 | Late Season |
| 2012 | Mid Season |
| 2013 | Early Season |
| 2014 | Late Season |
| 2015 | Mid Season |
| 2016 | Early Season |

# APPENDIX B
## Investigatory Levels

| Site Category and definition | | Investigatoty Level at 50km/h | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 |
| A | Motorway | Not Applicable within Argyll and Bute | | | | | | | |
| B | Dual carriageway non-event | | | | | | | | |
| C | Single carriageway non-event | | | | | | | | |
| Q | Approaches to and across minor and major junctions, approaches to roundabouts | | | | | | | | |
| K | Appraoches to pedestrian crossings and other high risk situations | | | | | | | | |
| R | Roundabout | | | | | | | | |
| G1 | Gradient 5-10% longer than 50m | | | | | | | | |
| G2 | Gradient > 10% longer than 50m | | | | | | | | |
| S1 | Bend radius < 500m - dual carriageway | | | | | | | | |
| S2 | Bend radius < 500m - single carriageway | | | | | | | | |

KEY

Indicates the range of Investigatory Levels that will generally be used for roads carrying significant traffic levels

Indicates a lower Investigatory Level that will be appropriate in low risk situations, such as low traffic levels or where the risk present are well mitigated and low incidence of accidents has been observed

Indicates maximum Investigatory Level unless there is significant evidence of high risk

Notes

1. Investigatory Levels are for the mean skidding resistance within the appropriate averaging length.
2. Investigatory Levels for site categories A,B and C are based on 100m averaging lengths (50m lengths for some Overseeing Organisations) or the length of feature if it is shorter.
3. Investigatory Levels and averaging lengths for site categories Q,K,G and S are based on 50m approach to the feature but this shall be extended when justified by local site characteristics.
4. Investigatory Levels for site category R are based on 10m lengths.
5. Residual lengths less than 50% of a complete averaging length maybe attached to the penultimate full averaging length, providing the site category is the same.
6. As part of site investigation, individual values within each averaging length should be examined and the significance of any values which are substantially lower than the mean value assessed.

Based on Table 4.1 of HD 28/04 as related to Argyll and Bute network

# APPENDIX C

## Content of a Site Investigation

The Site Investigation shall consider the following list of headings and associated items for consideration. A written assessment is required under each heading taking account of the relevant items listed. References to other supporting documents shall be made where necessary.

**1 Site location and use:**

- What is the location and nature of the site?
- Are there any features that could be expected to require road users to be able to stop or manoeuvre to avoid an accident? For example, junctions, lay-bys, other accesses, crossings, bends or steep gradients.
- What are the site category and the current Investigatory Level? Has there been any substantial change in the amount or type of traffic using the road that would influence the requirement for skid resistance and could require the Investigatory Level to be changed?

**1 Pavement condition data:**

- What is the CSC, by how much is it below the Investigatory Level and over what length? Is the skid resistance uniform along the site or are there areas of lower skid resistance or large changes in skid resistance? Is the lowest skid resistance in locations where road users have a specific need to stop or manoeuvre? (The risk of accidents generally increases as the skid resistance falls, but the increase in risk will be greater for sites where the road user is likely to need to stop quickly or manoeuvre.)
- Are there any individual 10m lengths that fall significantly below the mean for an averaging length, and is the location of such lengths significant, e.g. a short length of low skid resistance within a sharp curve.
- Does the site contain a sharp bend to the left in combination with traffic braking or accelerating, e.g. a sharply curved roundabout approach or exit? In these circumstances the offside wheel path can become more polished than the nearside wheel path and the skid resistance in the offside wheel path can be up to 0.05 units CSC lower than that measured in the nearside wheel path. However, this does not mean the skid resistance is more than 0.05 units CSC below the Investigatory Level, because the Investigatory Level will have been raised in the vicinity of the curve to compensate for this effect (Chapter 4).
- What is the texture depth and do areas of low texture depth (below 0.8mm SMTD) coincide with areas of low skid resistance?
- Are there any extreme values of rut depth or longitudinal profile variance that could affect vehicle handling or drainage of water from the carriageway?

**2 Accident history:**

- A methodology for analysing the accident history is given in Annex 5 of HD 28.

**3 Site inspection:**

- Has a visit to the site been carried out? If so, then what range of weather and traffic conditions has been observed and over what period? If not, then what other information has been drawn upon?

**4 Visual assessment:**

- Is a visual inspection of surface condition consistent with the available survey data?
- Skid resistance and texture depth are generally measured in the nearside wheel track in lane one. Is the rest of the area of the maintained pavement surface visually consistent with the measured path, or are there any localised areas of polished surfacing, low texture depth, patching or areas otherwise likely to give rise to uneven skid resistance? If it is likely that the skid resistance of other lanes could be lower than the lane tested then additional surveys may need to be carried out to investigate this. This could occur, e.g. If the surface in other lanes (including the hard shoulder) is different to the lane tested, and these lanes carry a similar volume of heavy traffic to the lane tested.
- If so, is the location such that the lack of uniformity is likely to increase the risk of accidents occurring?
- Is the area of the maintained pavement surface free from debris and other sources of contamination? Is water known to drain adequately from the carriageway during heavy rain? Is the pavement free of other defects such as potholes?

**5 Road users:**

- What is the volume and type of traffic, including vulnerable road users? Are observed traffic speeds appropriate to the nature of the site? If there is significant variation in the speed, type or volume of traffic during the day, have observations been made in an appropriate range of traffic conditions? What types of manoeuvres are made and what are the consequences if not completed successfully, e.g. head-on or side impact at speed are likely to have severe consequences? Is there any evidence that road users consistently fail to negotiate the site successfully, such as tyre tracks into the verge?

**6 Road layout:**

- Is the road design still appropriate for the speed and volume of traffic? Is the layout unusual or likely to be confusing to road users?
- Is the carriageway particularly narrow and is a hard shoulder or 1 metre strip provided? Is the road layout appropriate for the number and type of vulnerable road users (pedestrians, cyclists, motorcyclists, equestrians, bus and tram users)?
- Are junction sizes appropriate for all vehicle movements? Are right turning vehicles adequately catered for? Are priorities at junctions clearly defined? Are traffic signals operating correctly and are they clearly visible to approaching motorists?

**7 Markings, signs and visibility:**

- Are all pavement markings, warning and direction signs appropriate and effective in all conditions (e.g. day, night, fog, rain, on coloured pavement surface)? Have old pavement markings been removed properly? Are there any redundant signs that could cause confusion? Are signs or other roadside objects on high-speed roads adequately protected from vehicle impact?
- Is visibility adequate for drivers to perceive the correct path? Do sight lines appear to be adequate at and through junctions and from minor roads or other accesses? Is the end of likely vehicle queues visible to motorists? Does

landscaping, taking into account future growth of vegetation and the effects of wind and rain, reduce the visibility, including visibility of signs?

## 8 Additional information:

- Are any other sources of information available, such as reports or visual evidence of damage only accidents, incidental damage to street furniture or reports from the Police? Such reports are likely to be subjective but are relevant if the reliability of the information is borne out by observations of the site.

## 10 Recommendations:

Following the investigation a clear recommendation must be given of the actions to be taken. Normally it will be one or more of the following:-

- Surface treatment - if it appears that improving the skid resistance or other surface condition will reduce the risk of skidding accidents. When this option is recommended it shall require the erection of Slippery road warning signs at the beginning of the affected section, as soon as practicable after the completion of the site investigation.
- Road Safety Engineering measures – if the investigation identified some characteristic of the site or user behaviour that could be improved by engineering measures. An outline of the measures considered appropriate shall be given which should form the brief for Network Management to commission development of a scheme.
- Requirements for additional maintenance – such as additional sweeping, cleaning road signs or renewal of road markings
- There is no justification at present for treatment – continue to monitor and review again in 1 year's time.

The completed report shall be signed by the pavement engineer, the accident specialist and the member of maintenance staff responsible for its preparation.

The completed report shall be forwarded to the Network and Environment Manager.

# APPENDIX D

Network selection, Surveying, Analysis and Treatment Flow Chart