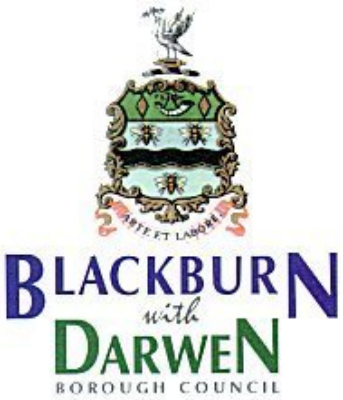


Highways Resilience Strategy

DOCUMENT CONTROL

Policy Title: Resilience Strategy

Version No: V 2.0

Status: DRAFT / TO BE APPROVED

Version	Date	Amendment	Prepared by	Checked by	Date Approved By BwDBC
1.0	27/01/17	-	George Bell	Matthew Joyce	Approved 12th May 2017
1.1	08/11/17	Update following October severe event	George Bell	Matthew Joyce	
2.0	21/02/19	Major Review	George Bell	Matthew Joyce	

Next major review due 27/01/21

Resilience Strategy

Resilience Standard

It is vital that sufficient resources are available throughout the winter period and other severe weather events to ensure that it is possible to provide an effective, efficient service. These requirements vary throughout the season particularly in periods of severe weather, but as a minimum the service should endeavour to keep the resilient network clear at all times.

The resilient network and strategy should be reviewed and updated every two years as a minimum but with any major changes to the network triggering an earlier review. It should also be reviewed and updated following any relevant event.

Resilient Network

This is the minimum network required in order that the businesses and services across the borough can continue to operate. The A road network forms the majority of the resilient network but not exclusively so.

The resilient network consists of the following roads:

- All 'A' roads
- B6130, B6231(from Haslingden Road to Branch Road), B6232, B6236, B6391 and B6447
- C613, C614(from Broadhead Road to Chapeltown Road), C615(from Bolton Road to Pole Lane), C616 and C618
- Davy Field Road
- Hardman Way, Sudell Road, Sudellside Street, Olive Lane, Winterton Road, Chapels, Goosehouse Lane, Lower Eccleshill Road, Paul Rink Way (only required as relief for A666 should flooding occur)

This network is mapped on the Council's corporate GIS system.

Resilience Preparation

Prior to being in a position whereby the council is invoking the full resilience strategy, there are many actions that the council can take in preparation for its implementation:

- Effective maintenance of the resilient network is a priority, i.e. the resilient network receives a higher priority in any maintenance programme
- Ensure salt stock is at a maximum going into any winter period
- Accurate and frequent monitoring of salt stock during the season with early ordering of salt to top-up stock will take place.
- Ensure that the fleet of gritters are ready and well maintained
- Ensure constant revision of flooding areas following any severe weather event.
- Ensure wide dissemination of self-help information to the public, e.g. flooding leaflets, winter driving tip leaflets, etc.

Risk Management

Risks and their mitigation associated with the resilient network are documented within the network risk register and are incorporated into the departmental risk register.

Winter Service

Introduction

This strategy is not intended to cover normal winter maintenance which may in itself result in some road closures and major disruptions. This strategy should therefore be looked at as a supplement to the existing policy to deal with a very severe prolonged winter weather event.

During such an event, particularly if it is nationwide, there can be, as was the case in February 2009, rock salt supply difficulties resulting in serious rock salt shortages.

Under normal winter conditions the council's gritting routes seek to ensure that, so far as is reasonably practicable:

- the strategic and principal routes are available
- emergency Services are not unduly delayed
- principal public transport routes are maintained

In times of shortage or difficulty it will not always be possible to maintain all of these routes to an ideal standard and when this point is reached the provisions contained within this strategy should be implemented. As a guideline the trigger point for implementing this strategy would be when salt stocks drop below the level whereby given the daily salt usage in place at the point where there was less than 5 days capacity in reserve.

Reduction in service

The measures detailed below need to be implemented as a controlled degradation of service as opposed to a knee jerk reaction to intermittent supply problems.

The implementation of these measures will most probably give rise to an increase in road traffic accidents on untreated roads and as such the decision to implement this strategy should be taken by the Head of Service or an appropriate Chief Officer.

There are six distinct types of action which can be taken to reduce the overall tonnage of rock salt used by the Borough.

- Reduce spreading rates (e.g. from 40 grams per square metre to 20 gsm)
- Bulk out the normal rock salt using inert fillers, such as sharp sand (normally only used when hard packed snow is an issue).
- Source alternate products such as pad salt.
- Reduce the length of road gritted.
- Reduce or stop hand gritting.
- Reduce or stop re-filling salt bins.

These actions can be used individually or in any combination.

It should be borne in mind that reducing spread rates and bulking out rock salt vastly reduces the actual amount of rock salt spread on the road and this could quickly lead to a dangerously low and unacceptable level of service.

It is not possible to give specific instructions on reducing spread rates and bulking out percentages in advance as the extent of actual shortages and availability of alternatives is unknown.

Hand gritting and re-filling salt bins do not consume large tonnages of rock salt, nevertheless significant savings can be made if these routine actions are discontinued in times of shortages.

Normal gritting routes comprises

- Four primary routes treating 84.5 miles (136 km) of carriageway and
- Four secondary routes treating 81.9 miles (131.8 km) of carriageway,
    - Total: 166.4 miles (267.8 km).

Network Reduction

Prior to reducing the network coverage to the resilient network, salt stocks should be conserved through reducing spread rates if possible, however a careful balance is required in order to ensure driver safety on the network along with maintaining vital infrastructure.

Therefore, if current stock levels are sufficient a spread rate reduction may be sufficient to maintain stocks above the critical level whilst still covering the majority of the primary and secondary network.

However, if consequences are outside the local authorities control and the weather is having an impact on national supplies and shortages are occurring then it may be prudent to gradually reduce network coverage until sufficient deliveries and re-stock takes place and weather conditions improve. Should however the guideline trigger value of 5 days salt stock capacity in reserve be reached, network coverage should be reduced to the resilient network.

A priority list below in order not to reduce the network alone:

- 1st In instances of prolonged hard packed snow, mix salt with grit[1]
- 2nd Reduce spread rate
- 3rd Gradually reduce network coverage
- 4th Treat resilient network only – see Appendix A for resilient network gritting routes.

These decisions must only be made by a Chief Officer or Head of Service.

[1] Grit, which is in fact a coarse natural sand, is only usually used on hard-packed snow and ice. In conditions where snow has already settled, grit can be mixed with salt up to a ratio of 50/50 to provide traction and help break up frozen surfaces.

Combination of salt spread reduction and network reduction

Various scenarios are given below for different reductions in salt availability

Percent reduction in supply	Possible action	Percent reduction in consumption
10	Reduce spread rates on secondary routes from 40 gsm to 30 gsm	12.3 %
20	Reduce spread rates on secondary routes from 40 gsm to 20 gsm OR Reduce spread rates on primary and secondary routes from 40 gsm to 30 gsm	24.6 % 25%
30	Reduce spread rates on primary routes from 40 gsm to 30 gsm and reduce secondary routes from 40gsm to 25 gsm	31%
40	Reduce spread rates on primary routes from 40 grams to 30 grams and secondary routes from 40grams to 20 grams	37%
50	Bulk out rock salt using sharp sand in equal parts, effectively cuts rock salt spread rates in half	50%
60	Reduce spread rates on all routes from 40 gsm to 20 gsm and Reduce gritting mileage on secondary routes from 81.9 miles to 50 miles	59.6%
70	Reduce spread rates on all routes from 40 gsm to 20 gsm and Reduce gritting mileage on secondary routes from 81.9 miles to 10 miles	71.6%

Severe Weather

Rain

The council's response to periods of prolonged wet weather are generally covered within the Council's Multi-Agency Flood Plan Parts 1 & 2.

The location of gullies and watercourse trash screens in areas known to flood have been identified and mapped on the council's corporate GIS system. As per the council's Gully Cleaning Policy, all critical gullies will be attended twice per year as a minimum. They will also be inspected on receipt of either an amber or red flood warning event and cleaned as necessary prior to the event.

The main area of the resilient network that is at risk from flooding is the A666 in Darwen between the circus and Hollins Grove. On receipt of either an amber or red flood warning event, the resilient network route Sudell Road, Sudellside Street, Olive Lane, Winterton Road, Chapels, Goosehouse Lane, Lower Eccleshill Road and Paul Rink Way will be checked to ensure that there are no obstructions on the route by Utility Company's or other works.

For critical flood risk areas see Appendix B.

Wind

There are no known areas of the network which are adversely affected by wind. Historically, however, there have been occasions of highways being blocked by uprooted trees. When high winds are forecast, the council's tactical officer will consider whether or not the forecast is severe enough to warrant having a tree specialist gang on stand-by.

In addition street lighting columns on the resilient routes are subject to more frequent structural checks and are programmed for replacement before their condition becomes critical.

Heat

Periods of exceptional heat during the summer months may result in some roads surfaced with older materials requiring the application of sealing grit to maintain their skid resistance and prevent their deterioration. During prolonged periods of daytime air temperatures in excess of 25^{o}c, additional inspections of the resilient network will be undertaken and sealing grit applied as necessary.

Other Risks

Major Incidents

In the event of a major incident affecting the resilient network, critical network diversion routes have been identified and documented in the Network Risk Register - Highway Asset Management Structures (Network Impact). Any incident will be dealt with under the Council's Major Incident Contingency Plan – MERLIN.

No high risk industrial plants, e.g. chemical or oil plants, have been identified as risks to the network.

Major incidents include local risks such as a breach of the Leeds / Liverpool canal banks where it runs through the borough or a rail incident at one of the many rail bridges over the highway network.

Communications

Information and Publicity

A key aspect of any resilience strategy is keeping the public informed of the developing condition of the network. This needs to be done through a variety of media outlets in order that information reaches the widest public audience.

Current Information

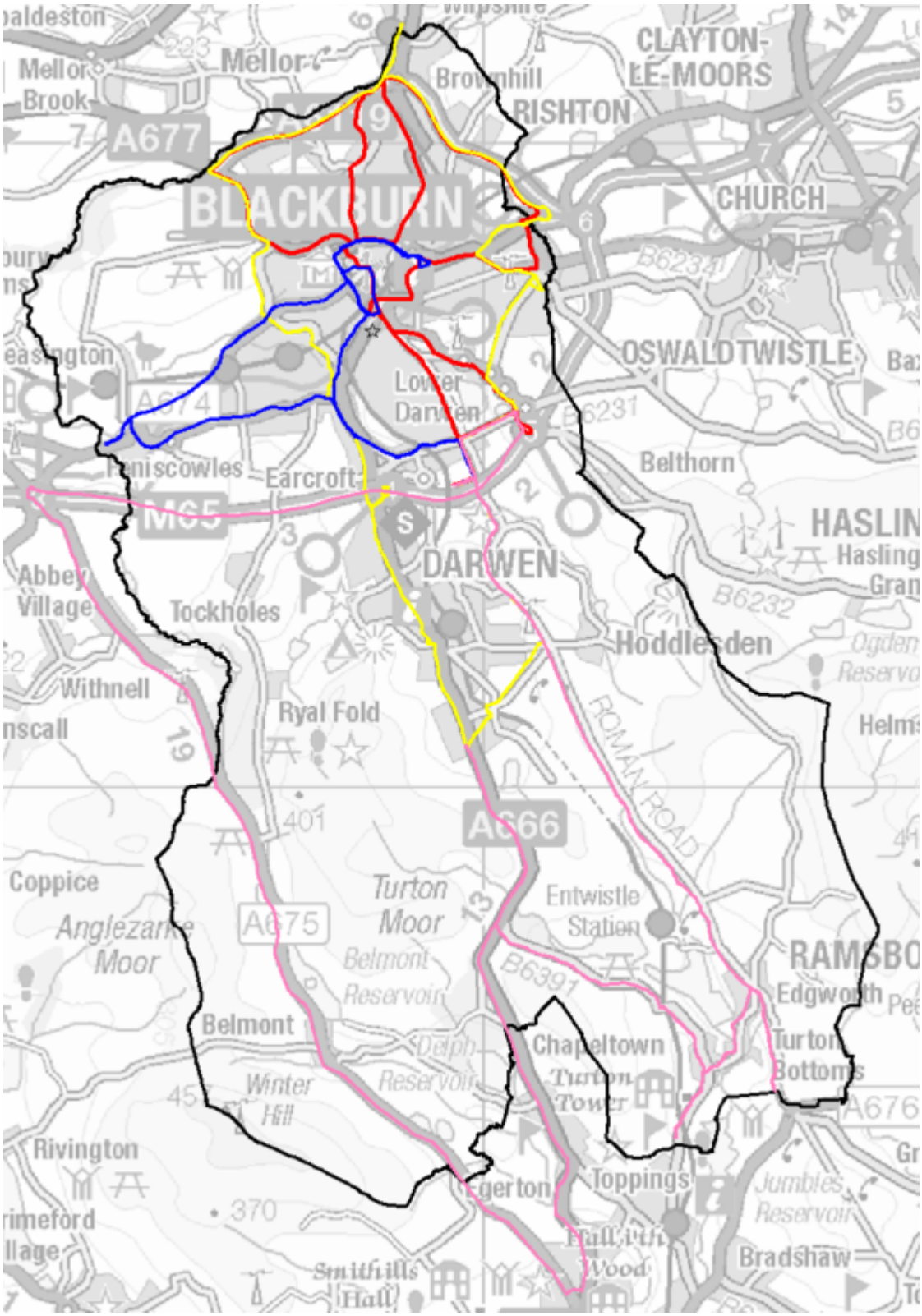
For day-to-day updates on the unfolding network condition during severe weather events, the quickest way to keep the public informed is through social media networks and local radio stations.

Should the resilient strategy be invoked, the council's Policy and Communication's team will be on standby to disseminate information through the Council's Facebook and Twitter accounts as well as briefing the local radio stations, BBC Radio Lancashire, The Bee Radio and Rock FM.

Press releases will be regularly supplied to the local newspaper, the Lancashire Telegraph.

Appendix A

Resilient Network Gritting Routes


Mellor
Brookhill
CLAYTON-LE-MOORS
RISHTON
A677
BLACKBURN
CHURCH
B6234
OSWALDTWISTLE
Lower Darwen
B6231
Belthorn
Earcroft
M65
DARWEN
HASLIN
Hasling
Abbey Village
Tockholes
Hoddlesden
B6232
Withnell
Ryal Fold
ROMAN ROAD
A666
Coppice
Turton Moor
Entwistle Station
A675
Belmont Reservoir
B6391
Belmont
Chapeltown
Turton Tower
Edgworth
Turton Bottoms
Winter Hill
Rivington
Toppings
Bradshaw
Smithills Hall

S = Salting, NS = Non-Salting, SA = Straight Ahead, TR = Turn Right, TL = Turn Left, TA = Turn Around

BLUE ROUTE - Resilient Network				
Salt / Not Salt	**Direction**	**Route Detail**	**S Miles**	**NS Miles**
Route starts at Davyfield Road, BB1 2LX				
S	TR	Davy Field Road	0.2	
S	TL	Roman Road	0.4	
S	TL	Stopes Brow / Rakes Bridge / Fore Street	0.6	
S	SA	Branch Road	0.5	
NS	TR	Bolton Road		0.4
S	TL	Livesey Branch Road	2.2	
S	TL	Preston Old Road to Tintagel Close	0.4	
NS	TA	Preston Old Road to Livesey Branch Road		0.4
S	TR	Preston Old Road	1.7	
S	SA	Redlam / Bank Top / Whalley Banks	0.9	
S	TL	Montague Street	0.1	
S	TR	Barbara Castle Way	0.8	
S	SA	Eanam / Higher Eanam	0.3	
S	TR	Unamed Link Road	0.0	
S	TR	Higher Audley Street	0.1	
NS	TR	Higher Barn Street		0.1
S	TL	Eanam	0.1	
S	SA	Barbara Castle Way	0.8	
S	TR	Feilden Street / Cardwell Place	0.2	
NS	SA	Higher Church St / Darwen St / Park Rd / Russell St		0.6
S	SA	Wainwright Way	0.4	
S	SA	Montague Street	0.3	
S	TL	Montague Street	0.3	
S	SA	Wainwright Way	0.4	
S	TR	Bolton Road	0.8	
S	TL	Bolton Road	0.2	
NS	TL	Return to Depot - Bolton Rd / Branch Rd / Stopes Brow/ Roman Rd		2.1
ROUTE COMPLETE				

Route Totals	Salting	Non Salting
	11.5	3.6

S = Salting, NS = Non-Salting, SA = Straight Ahead, TR = Turn Right, TL = Turn Left, TA = Turn Around

YELLOW ROUTE - Resilient Network				
Salt / Not Salt	**Direction**	**Route Detail**	**S Miles**	**NS Miles**
Route starts at Roman Road, Junction of Davy Field Road				
NS	TR	Davy Field Road		0.2
S	TR	Roman Road	1.9	
S	TR	Marsh House Lane	0.1	
S	TL	Pole Lane	0.8	
S	TL	Sough Road	0.1	
S	TR	Watery Lane	0.4	
S	TR	Bolton Road	1.0	
S	SA	Borough Road / Green Street	0.3	
S	SA	Bury Street	0.1	
S	SA	Duckworth Street	0.4	
S	SA	Blackburn Road	0.9	
S	TR/TA	Earcroft Way / M65 Roundabout	0.6	
S	TR	Blackburn Road	0.3	
S	SA	Bolton Road	0.9	
S	TR	Alan Shearer Way	0.2	
S	TL	Aqueduct Rd, Hamilton St, Hollin Bridge St, Stancliffe St, S	1.1	
S	TL	Buncer Lane / Billinge Avenue	0.8	
NS	TL	Preston New Road		1.0
S	TR	Yew Tree Drive / Ramsgreave Drive	2.0	
S	TL	Whalley New Road	0.6	
NS	TA	Whalley New Road		0.6
S	TL	Brownhill Drive / Whitebirk Drive	2.1	
S	TR	M65 Roundabout /A678 slip road to Red Lion Roundabout	0.4	
S	SA	Carl Fogarty Way	0.6	
NS	TL	Accrington Road		0.5
S	TR	Bank Lane	0.1	
NS	TR	Shadsworth Road		0.1
NS	TL	Fecitt Brow		0.2
S	TL	Bank Lane	0.2	
S	TL	Shadsworth Road	1.1	
NS	TL	Return to Depot - Haslingden Rd / Blackamoor Rd / Roman Rd		1.7
ROUTE COMPLETE				

Route Totals	Salting	Non Salting
	16.74	4.09

S = Salting, NS = Non-Salting, SA = Straight Ahead, TR = Turn Right, TL = Turn Left, TA = Turn Around

PINK ROUTE - Resilient Network				
Salt / Not Salt	**Direction**	**Route Detail**	**S Miles**	**NS Miles**
Route starts at Blacksnape Road, Junction of Marsh House Lane				
NS	TR	Davy Field Road		0.2
NS	TR	Roman Road		1.9
S	SA	Blacksnape Road / Roman Road / Blackburn Road	4.0	
S	SA	Bury Road	1.1	
NS	TA	Bury Road		1.1
S	TL	Bolton Road / Wellington Road / Chapeltown Road	1.8	
NS	TA	Chapeltown Road		0.7
S	TL	High Street / Green Arms Road	2.7	
S	TR	Bolton Road / Cemetery Road	2.0	
NS	TA	Cemetery Road / Bolton Road to Green Arms Road		2.0
S	SA	Bolton Road / Blackburn Road	1.1	
NS	SA	A666 to Bar Lane		2.8
NS	TR	Bar Lane		0.2
NS	TR	Belmont Road to Borough Boundary		1.5
S	SA	A675 Belmont Road / High Street	4.9	
NS	SA	Return to Depot - A675 through Abbey Vilage to Jct 3 M65		3.5
NS	TR	M65 Jct 3 to Jct 5		5.1
NS	TL	Blackamoor Rd / Roman Rd / Davy Field Rd		1.5
ROUTE COMPLETE				

Route Totals	**Salting**	**Non Salting**
	17.5	**20.3**

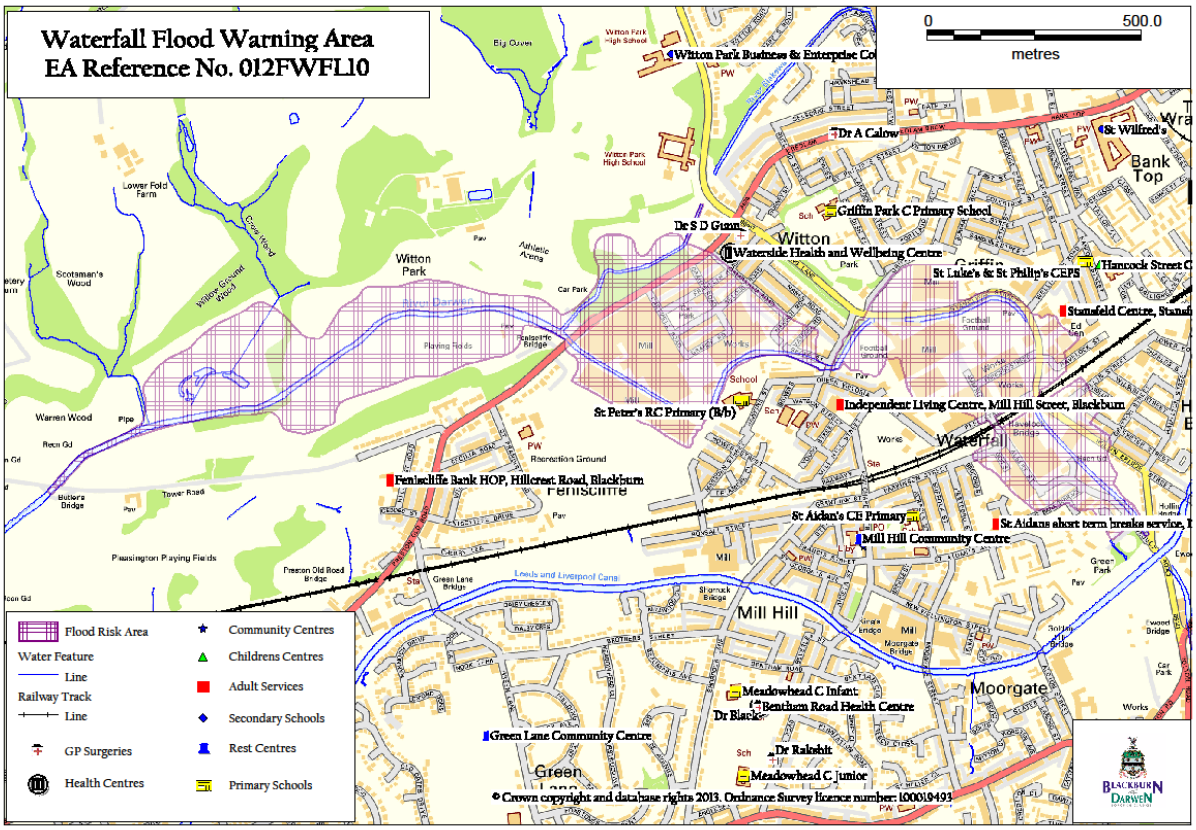
S = Salting, NS = Non-Salting, SA = Straight Ahead, TR = Turn Right, TL = Turn Left, TA = Turn Around

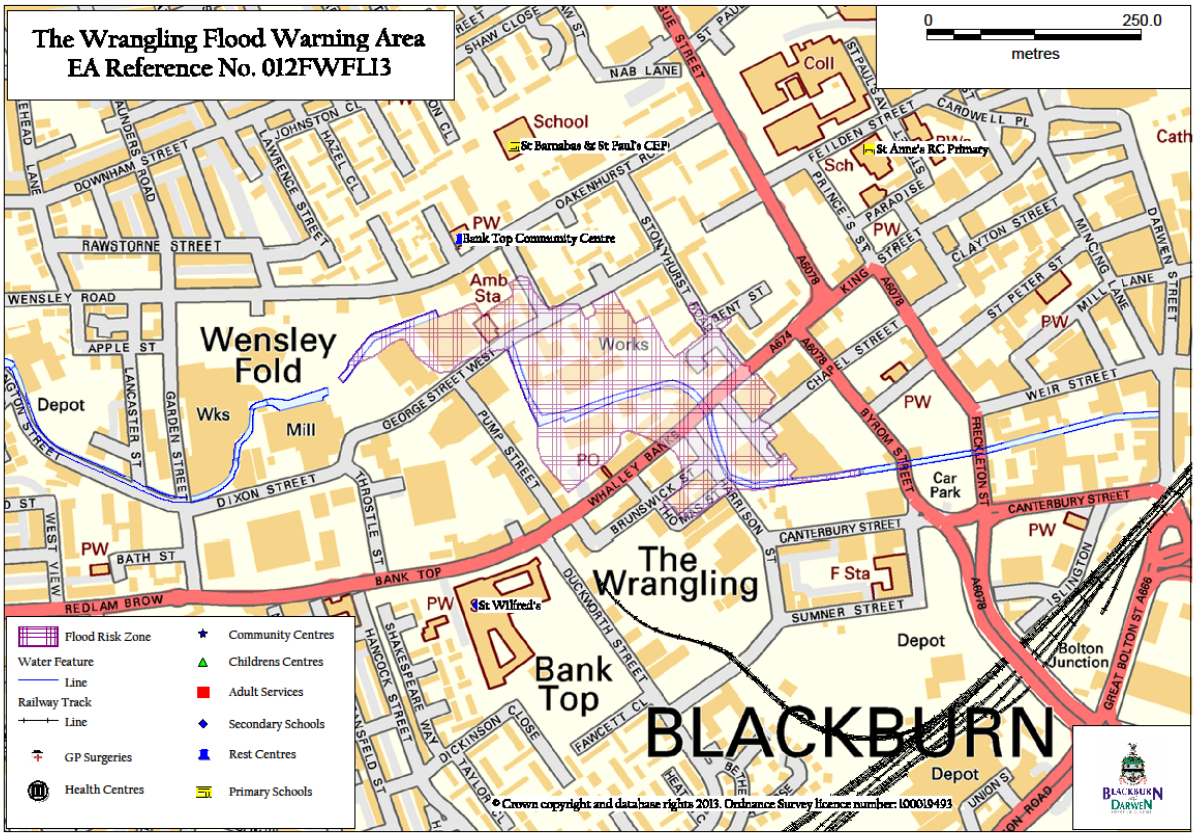
RED ROUTE - Resilient Network				
Salt / Not Salt	**Direction**	**Route Detail**	**S Miles**	**NS Miles**
Route starts at Blackamoor Road, Juncion of Roman Road				
NS	SA	Davy Field Road / Roman Road to Blackamoor Lights		0.6
S	TR	Blackamoor Road to Guide Crossroads	0.6	
S	TR/TA	M65 Roundabout	0.6	
S	SA	Haslingden Road	1.7	
S	TR	Grimshaw Park	0.2	
S	TL	Russell Street	0.1	
S	TR	Great Bolton Street	0.1	
S	TR	Lower Audley Street	0.4	
S	TL	Higher Audley Street	0.4	
S	TL	Higher Barn Street	0.1	
S	TR	Higher Eanam/Copy Nook/Bottomgate/Furthergate/Accrington Ro	1.2	
S	TL	Whitebirk Road	0.4	
S	TR	Red Lion Roundabout/A678 Slip Road to Whitebirk Roundabout	0.2	
S	TL	Whitebirk Drive/Brownhill Drive/Ramsgreave Drive	2.3	
S	TL	Pleckgate Road	0.8	
S	TL	Shear Brow	0.7	
NS	TL	Barbara Castle Way		0.4
S	TL	A666/Larkhill Whalley New Road	1.7	
S	TL	Ramsgreave Drive/Yew Tree Drive	1.9	
S	TR	A677/Preston New Road	1.9	
NS	TR	Barbara Castle Way		0.1
S	TL	Alma St/Blakey Moor/Cardwell Pl/Higher Church St/Darwen St	0.6	
S	SA	Park Road	0.2	
NS	SA	Grimshaw Park		0.2
S	SA	Brandy House Brow/Roman Road to Blackamoor lights	1.2	
NS	SA	Return to Depot - Roman Road/Davy Field Road		0.6
ROUTE COMPLETE				

Route Totals	**Salting**	**Non Salting**
	17.6	**1.9**

Appendix B

Critical Flood Risk Areas


Waterfall Flood Warning Area
EA Reference No. 012FWFL10
0
500.0
metres
Witton Park Business & Enterprise Co
Witton Park High School
Big Owen
Lower Fold Farm
Scotsman's Wood
Witton Park
Athletic Arena
Car Park
Dr A Calow
St Wilfred's
Bank Top
Griffin Park C Primary School
Dr S D Gunn
Witton
Waterside Health and Wellbeing Centre
St Luke's & St Philip's CEPS
Hancock Street C
Stansfeld Centre, Stansfi
Warren Wood
Pipe
Recn Gd
Butlers Bridge
Tower Road
Pleasington Playing Fields
Preston Old Road Bridge
Leeds and Liverpool Canal
Green Lane Bridge
St Peter's RC Primary (b/b)
Independent Living Centre, Mill Hill Street, Blackburn
Waterfall
Recreation Ground
Pennine
Penlaschiffe Bank HOP, Hillcrest Road, Blackburn
St Aidan's CE Primary
St Aidans short term breaks service, I
Mill Hill Community Centre
Mill Hill
Meadowhead C Infant
Bentham Road Health Centre
Dr Black
Moorgate
Green Lane Community Centre
Dr Rakshit
Meadowhead C Junior
Green
Flood Risk Area
Water Feature
Line
Railway Track
Line
GP Surgeries
Health Centres
Community Centres
Childrens Centres
Adult Services
Secondary Schools
Rest Centres
Primary Schools
© Crown copyright and database rights 2013. Ordnance Survey licence number: 100019493


The Wrangling Flood Warning Area
EA Reference No. 012FWFL13
0
250.0
metres
NAB LANE
Coll
School
St Barnabas & St Paul's CEP
St Anne's RC Primary
Sch
FEILDEN STREET
CARDWELL PL
Cath
SHAW CLOSE
EHEAD LANE
SAUNDERS STREET
DOWNHAM ROAD
JOHNSTON CL
LAWRENCE STREET
HAZEL CL
OAKENHURST RD
PRINCE'S ST
PARADISE STREET
CLAYTON STREET
MINCING LANE
DARWEN STREET
RAWSTORNE STREET
Bank Top Community Centre
STONYHURST ROAD
KING STREET
A6078
A674
ST PETER ST
MILL LANE
WENSLEY ROAD
Amb Sta
Wensley Fold
Works
APPLE ST
Depot
Wks
Mill
LANCASTER ST
GARDEN STREET
GEORGE STREET WEST
PUMP STREET
CHAPEL STREET
WEIR STREET
BYROM STREET
FRECKLETON ST
WHALLEY BANK
BRUNSWICK ST
THOMAS ST
HARRISON ST
CANTERBURY STREET
Car Park
DIXON STREET
THROSTLE ST
WEST VIEW
BATH ST
BANK TOP
REDLAM BROW
St Wilfred's
The Wrangling
F Sta
SUMMER STREET
Depot
Bank Top
DUCKWORTH STREET
SHAKESPEARE WAY
HANCOCK STREET
DICKINSON CLOSE
TAYLOR ST
FAWCETT CL
BLACKBURN
Depot
Bolton Junction
SLINGTON
GREAT BOLTON ST A666
UNION S
Flood Risk Zone
Water Feature
Line
Railway Track
Line
GP Surgeries
Health Centres
Community Centres
Childrens Centres
Adult Services
Secondary Schools
Rest Centres
Primary Schools
© Crown copyright and database rights 2013. Ordnance Survey licence number: 100019493