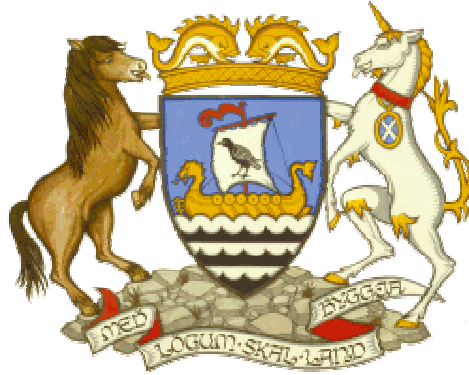


Shetland Islands Council



Sixth Biennial Flood Report November 2007

To
The Scottish Government

1. Introduction

- 1.1 This report specifies the measures Shetland Islands Council considers necessary to prevent or mitigate flooding of land within Shetland and is published to meet the requirements of the Flood Prevention (Scotland) Act 1961 as amended by the Flood Prevention and Land Drainage (Scotland) Act 1997 (“the Act”).
- 1.2 This report details:
- (i) All measures that Shetland Islands Council considers it requires to take to prevent or mitigate flooding of land in its area.
 - (ii) All measures which Shetland Islands Council have taken to prevent or mitigate such flooding since publication of the last Biennial Report;
 - (iii) Floods that have occurred since the publication of the last Biennial Report.

2. Background

- 2.1 The Act places duties on Shetland Islands Council, which can be summarised as follows;
- To assess watercourses from time to time to ascertain whether or not any such watercourse is likely to cause flooding of non-agricultural land; where it appears that any watercourse is in a condition which is likely to cause flooding of land, not being agricultural land and that the exercise of any power mentioned in section 2 (1)(a) of the Act would substantially reduce the likelihood of such flooding, the Council shall exercise that power accordingly.
 - To prepare and publish biennial reports specifying (a) the measures the Council considers it requires to take to prevent or mitigate the flooding of land in their area, (b) the measures which the Council has taken since the publication of their previous Biennial Report to prevent or mitigate the flooding of such land; and (c) all occurrences of flooding of such land since that date.

3. Flood Risk Management and Coastal Protection

- 3.1 This 6th Biennial Report addresses the statutory requirements of the Act and provides an update on the work that has been undertaken since the last report. That work included the audit of selected watercourses and existing coastal protection works and a review of the Coastal Protection and Flooding Policy and the work of the Shetland Flood Appraisal Group.

3.2 Prevention and Mitigation Measures: -

- 3.2.1 The Roads Service has undertaken several improvements to roads culverts around the road network over the past 2 years. This involved the redesign and construction of several large and medium sized drainage culverts and cross drains. Road drainage improvements have been carried out where required, having been prioritised against other demands. Basic maintenance work and improvements to watercourses have been carried out to reduce the likelihood of flooding to properties and land.
- 3.2.2 All channels for the conveyance of water, whether naturally occurring or engineered, require continual maintenance to ensure their efficiency and integrity. Some watercourses are often no more than old field-ditches that have not been cleared for many years. Blockages formed by water borne debris are often cleared by natural processes, however, at times of heavy rainfall a blockage of a watercourse could result in localised flooding events. In many instances the flooded area is agricultural land and out with the remit placed on Shetland Islands Council by the Act. Shetland Islands Council continue to monitor the ditches that are likely to affect protected buildings.
- 3.2.3 **Appendix 1** is a list of the reported incidents of flooding as reported to both the Planning Service and the Roads Service since the last report. Analysis of these reported incidents illustrates that much flooding occurs due to the temporary blockage of roadside ditches or piped watercourses and uncontrolled runoff from fields. The majority of flooding affects roads rather than “protected buildings”. As such, the appropriate action to resolve an incident is undertaken by the Council’s Roads Service under the powers of the Roads (Scotland) Act 1984.
- 3.2.4 All culverts, road cross drains and roadside ditches are inspected as part of the roads inspectors’ routine safety inspections and more frequently after unduly severe weather/storm conditions. When a new cross drain, culvert or bridge is installed, the watercourse in which it is to be placed is assessed to ensure that the infrastructure is designed to be fit for purpose.
- 3.2.5 Extensive reconstruction works have been carried out on the section of rock armour in the Burn of Weisdale. The section of armour specifically provides protection for the Weisdale Mill, which is a Listed Building. The existing rock armour was of insufficient height and was showing severe incidents of undermining and scour in various areas. SEPA have a gauging station positioned on the burn which consists of a number of

electronic sensors used to measure the water levels with readings logged electronically every 15 minutes. **Appendix 2** shows sample river level data for the previous two years. The flood watch threshold of 1.200m is shown in blue and it can be seen from this that water levels in the burn exceed this limit quite regularly. **Appendix 3** gives a graphical representation of this information over the previous 5-year period. The highest peak recorded over the previous 2-year period was 1.868m on 20th August 2007. This was the second highest water level since records began on this stretch of water.

- 3.2.6 Culverting of streams and burns is a long standing practice commonly associated with urban expansion and often regarded by those undertaking a development as an acceptable means of gaining land by removing landscape features. The use of culverts is a well-established approach to deal with watercourses during development and their justification is rarely questioned. Culverts, however, pose maintenance challenges and blockages may result in flooding.
- 3.2.7 The Development Plans service is continuing with its survey of watercourses that are likely to be affected by pressures for future development. This work will ensure that a coordinated and planned approach is undertaken when considering the disposal of surface water run off. This should result in less likelihood of flooding of new settlements, as there will be adequate infrastructure, designed to an adequate capacity, to dispose of surface water. A 1 in 200 year event is considered when designing new infrastructure. The survey work undertaken so far has targeted areas under the greatest development pressure to enable Shetland Islands Council to determine the likelihood of a flood threat or risk. This involves site assessments to assess general condition, faults that may lead to flooding and measures that would reduce flood risk. Once complete, this study will ascertain the capacity of watercourses to carry surface water discharge from proposed developments.
- 3.2.8 Policies within the Shetland Structure Plan and Local Plan require that proposed developments should not be subject to flooding or cause flooding of adjacent property. In the assessment of planning applications our increased knowledge of watercourses and their characteristics, development “hot spots” and historical flooding have encouraged Shetland Islands Council to require developers to demonstrate that their development will not be a flood risk. Developers are being encouraged to apply the principles of Sustainable Drainage as these techniques attenuate the surface water discharge to a more natural flow rate that can be managed by the existing infrastructure. This focus on Sustainable Drainage has been pursued as a result of the production of the “Sustainable Urban

Drainage Manual". SUDs are encouraged in all new developments as they ensure that the existing capacity of watercourses is not overloaded unnecessarily. The SIC Planning Service has produced an advice note which outlines the basic principles of SUDs and gives some examples of types of SUDs which are appropriate to contain surface water run off from domestic property. The Planning Service is currently working closely with the Roads Service to produce more detailed guidance on SUDs and Flood Risk Assessments for developers.

- 3.2.9 It is now widely accepted that climate change will result in wetter winters and drier summers and the frequency and impact of storms is predicted to be greater. Advice suggests that infrastructure that would once have been designed to withstand a 1 in 100 year event should henceforth be designed to withstand a 1 in 200 year event (i.e. an event with a 0.5% chance of being equalled or exceeded in any year). This will result in infrastructure better suited to future requirements and increase its "design life" or functionality.
- 3.2.10 The implementation of Structure Plan and Local Plan policies by the Council, as part of the assessment of a planning application, ensures that the best approach is taken to safeguard existing and new development against flooding.

3.3 Coastal Flooding

- 3.3.1 Analysis of the historical reported incidents of flooding illustrate that the most common source of flooding was inundation by the sea. Analysis of the reported incidents in the current period illustrates that coastal inundation is still an issue however the majority of incidents are the result of a combination of heavy rainfall and insufficient or poorly maintained drainage infrastructure. Coastal flooding events occur when an unusually high tide affects low lying property, the worst effects resulting when the high tide coincides with a severe weather incident. Again, climate change predictions indicate the severity and frequency of storms will increase resulting in some of the present infrastructure failing to cope with adverse storm surges. The study undertaken in 2003 (see previous report) which predicts the scenario for Shetland in the future still forms important background research on which Development Plan policies relating to flooding and climate changes are based.
- 3.3.2 Practical application of these findings vindicates the Structure Plan requirement for the submission of a Flood Risk Assessment in support of any planning application for proposed development below the 5m contour.

- 3.3.3 Both The Coast Protection and Flooding Grant Schemes have not been administered over the previous two years. It is increasingly apparent that the works required to mitigate coastal flooding are much larger and more technically demanding engineering operations than initially assumed and for that reason a suitable engineering member of staff has recently been appointed to the post.
- 3.3.4 The Shetland Flood Liaison Appraisal Group (FLAG) has been convened in line with the recommendation of SPPG7 "Planning and Flooding". The Shetland FLAG consists of representatives of SEPA, SNH, Scottish Water, Lerwick Port Authority, various council services, private consultants and a representative of the insurance industry. Whilst the group has not met recently the members of the group maintain contact via e-mail when specific issues arise. The group will reconvene in the future.
- 3.3.5 In the near future it is hoped that a full review of the SIC Coast Protection and Flooding Policy (and the associated Grant Scheme) will be complete and a report highlighting the proposed changes will be put before Councillors for approval.
- 3.3.6 There continues to be a significant body of work required to be undertaken. Perhaps the most important development in the topic area has been the securing of personnel to undertake this work. The dedicated time of an engineer in the lead role will allow the work to be done in a coordinated manner.

Appendix 1 - Reported incidents of flooding Nov 2005 – Nov 2007

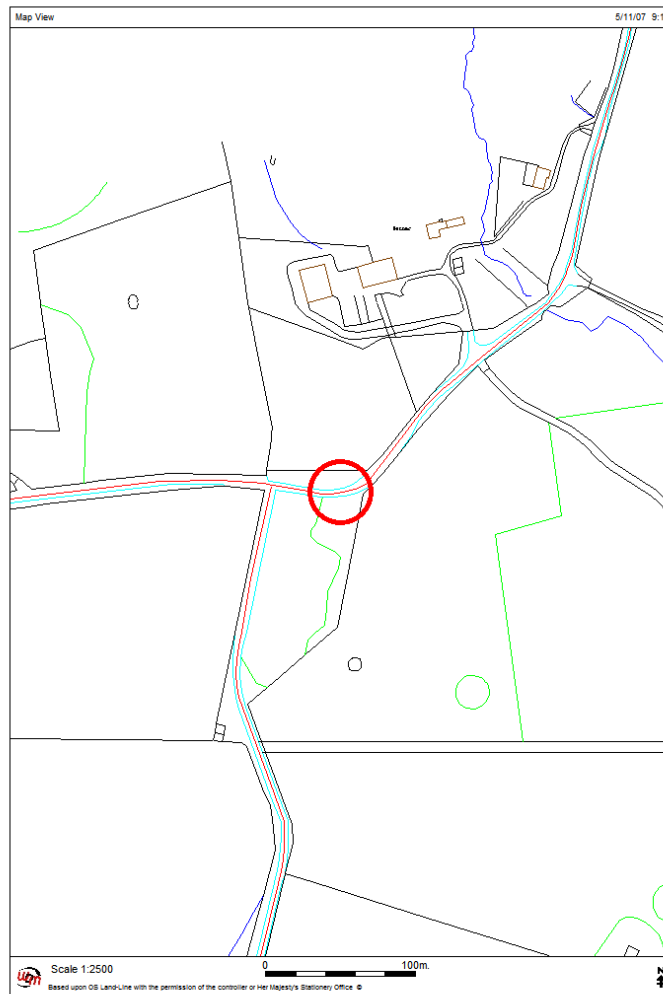
LOCATION: Selivoe, Bridge of Walls

Associated Watercourse: Sandwater

CC Area: Aithsting & Sandsting

Grid Ref: 429147, 1147873

Map Extract:



INCIDENT: Localised flooding event around road channel

Date: March 2007

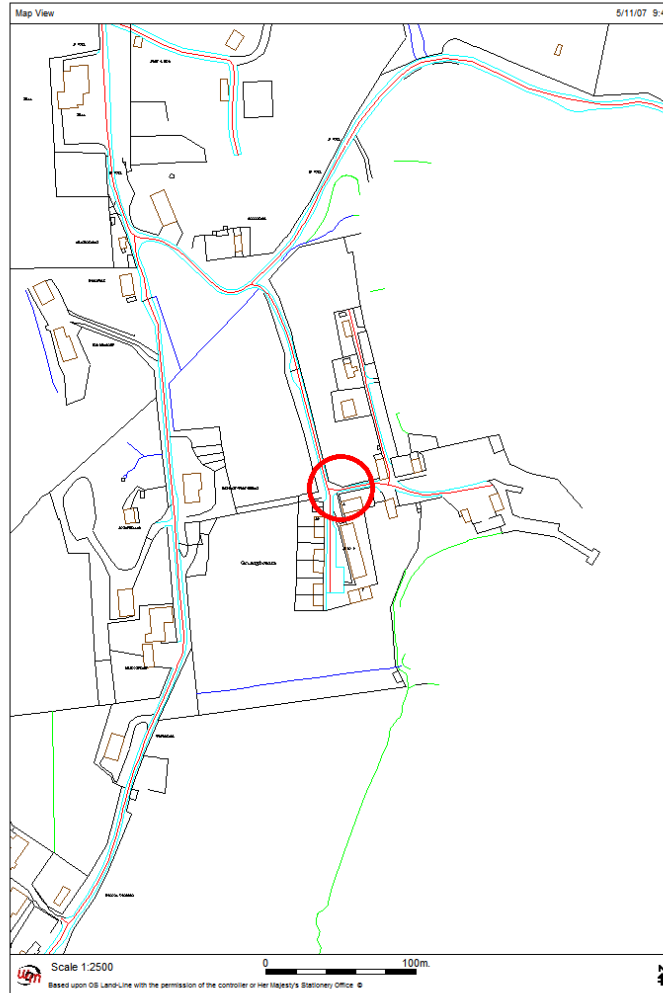
Action Taken: Access re-graded to allow water to flow to side drain

LOCATION: Grindibrek, Skeld

CC Area: Aithsting & Sandsting

Grid Ref: 431189, 1144779

Map Extract:



INCIDENT: Excessive water running down carriageway into garden

Date: October 2006

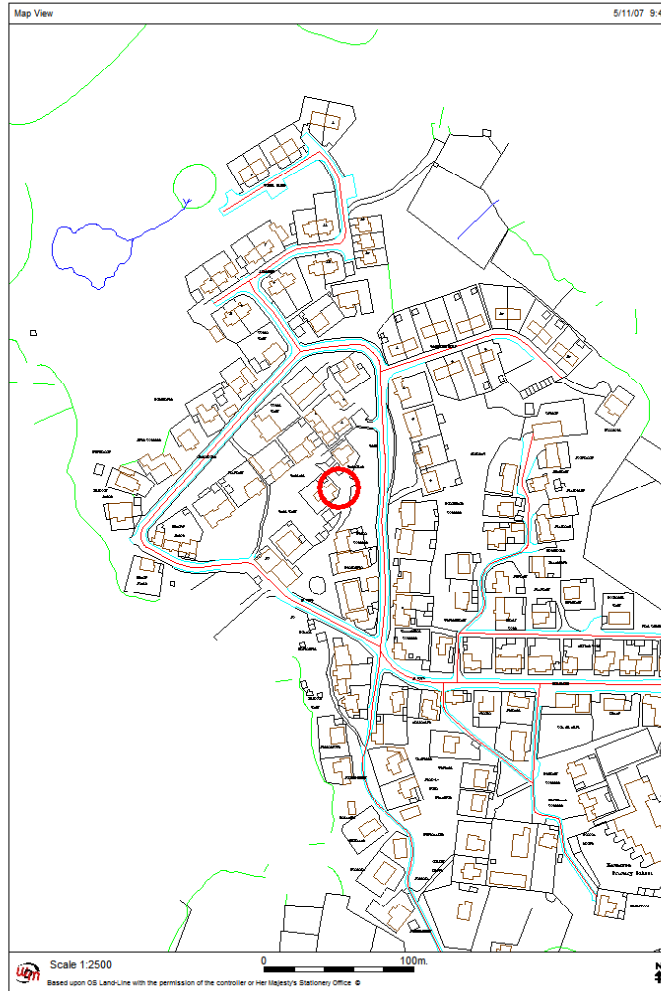
Action Taken: Existing French drains including pipes and headwalls renewed with existing ditches cleared

LOCATION: Glenlea, Hamnavoe

CC Area: Burra & Trondra

Grid Ref: 436970, 1135925

Map Extract:



INCIDENT: Water entering garage

Date: August 2006

Action Taken: Existing ditch cleared

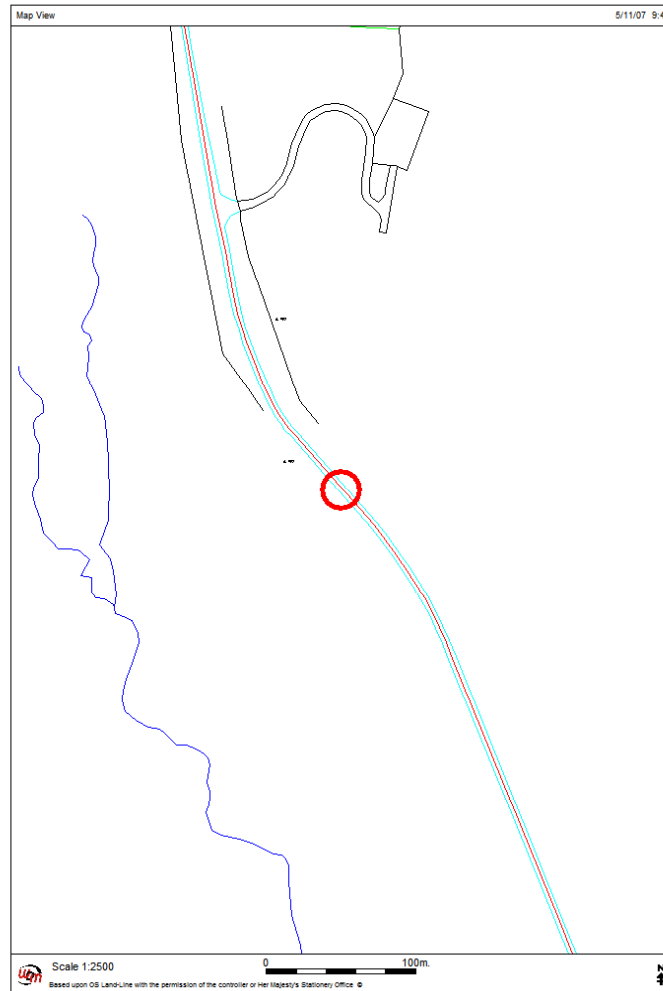
LOCATION: Petta Water, Voe

Associated Watercourse: Corgill Burn

CC Area: Delting

Grid Ref: 441508, 1159928

Map Extract:



INCIDENT: Localised flooding

Date: May 2006

Action Taken: Hard shoulder re-graded with offlets constructed

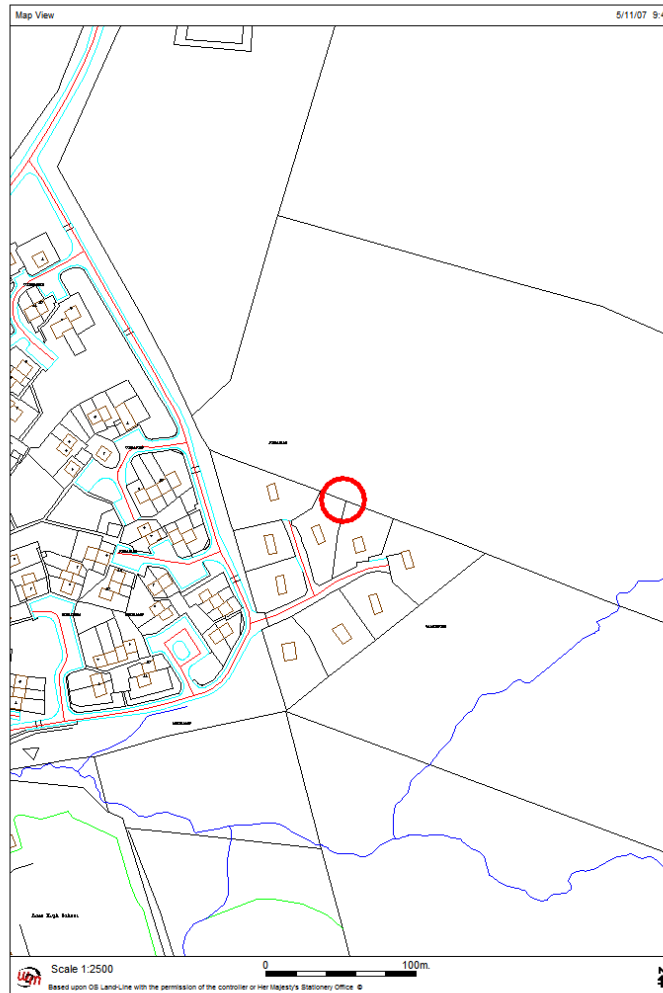
LOCATION: Moorfield, Brae

Associated Watercourse: Gallow Burn

CC Area: Delting

Grid Ref: 436117, 1168497

Map Extract:



INCIDENT: Severe flooding through housing scheme

Date: February 2006

Action Taken: New interceptor ditch dug around north end of housing scheme

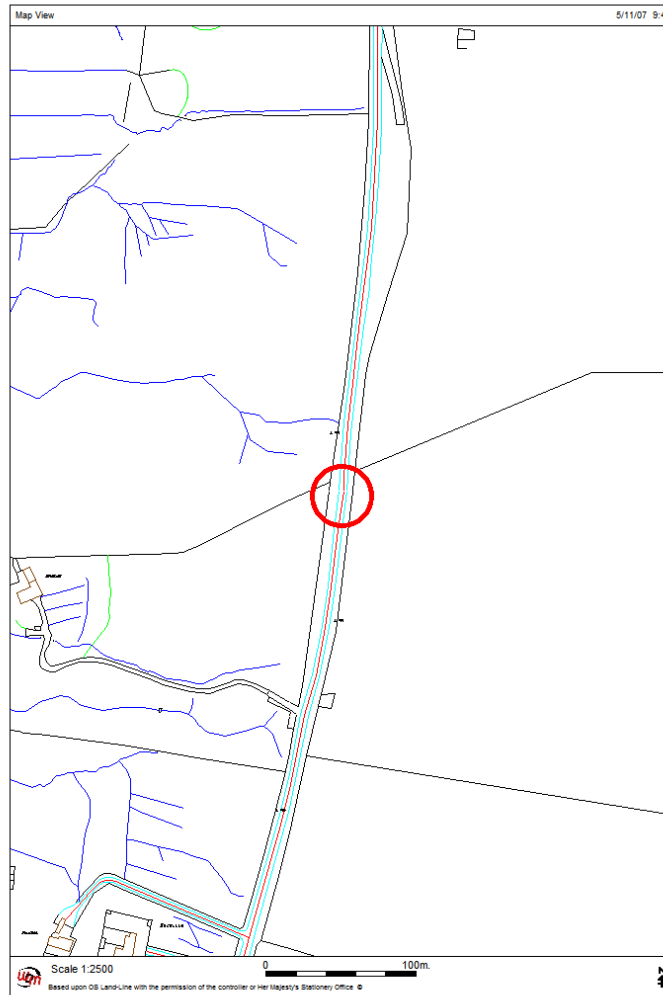
LOCATION: Collafirth, Delting

Associated Watercourse: Queina Waters

CC Area: Delting

Grid Ref: 441035, 1165000

Map Extract:



INCIDENT: Localised flooding event

Date: December 2005

Action Taken: Field drains and headwalls constructed

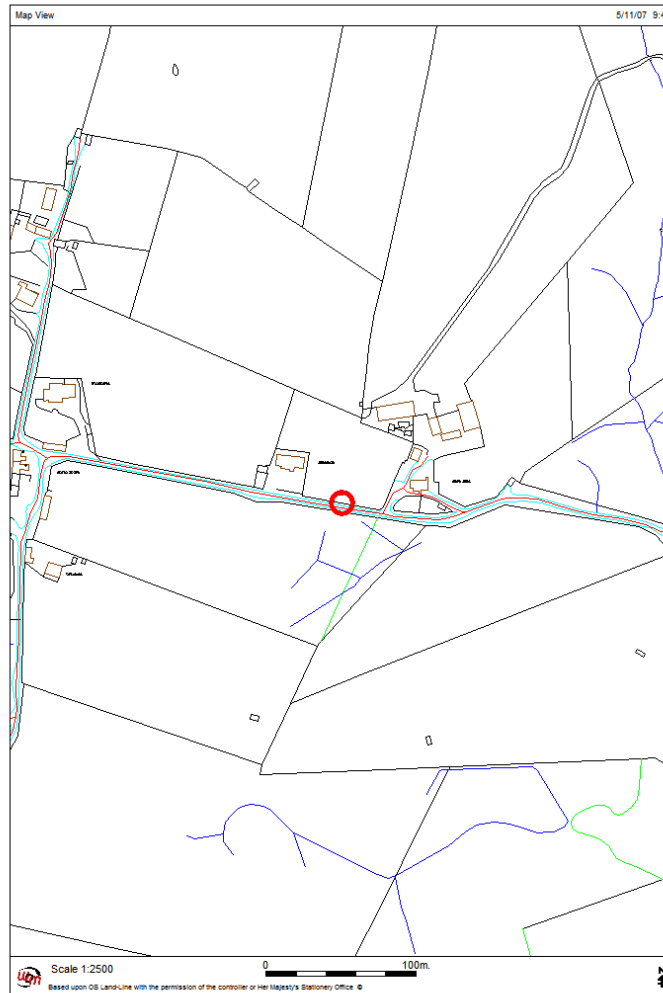
LOCATION: Lynnside, Wethersta, Brae

Associated Watercourse: Mill Loch

CC Area: Delting

Grid Ref: 436292, 1165637

Map Extract:



INCIDENT: Road verge flooding

Date: December 2005

Action Taken: Section ditched with new field drain constructed

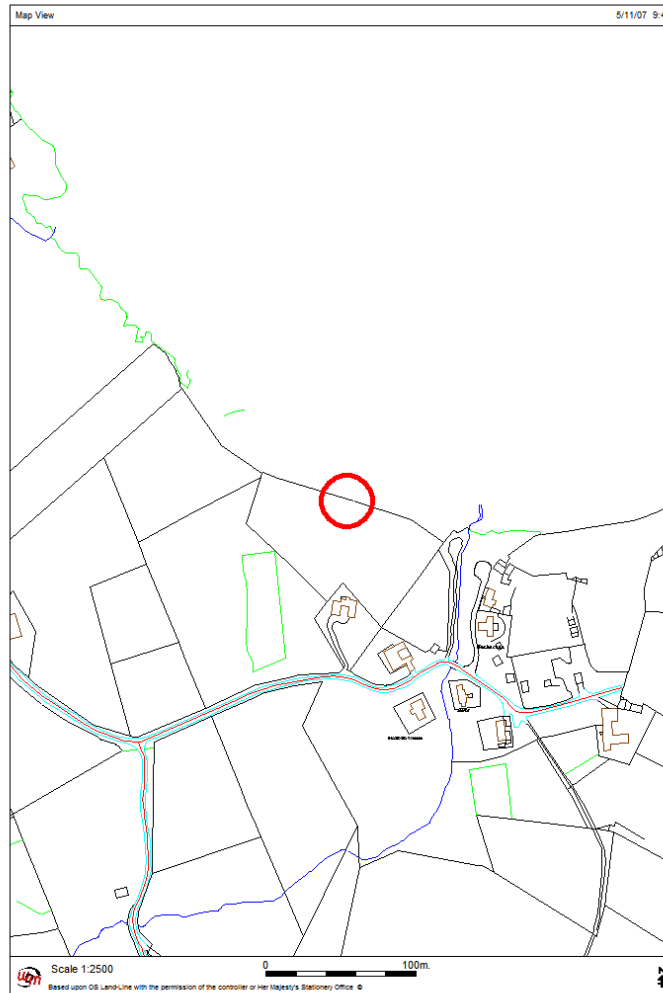
LOCATION: Levenwick, Dunrossness

Associated Watercourse: Burn of Netherton

CC Area: Dunrossness

Grid Ref: 441201, 1121345

Map Extract:



INCIDENT: Floodwaters collecting on land at high tide and periods of heavy rain

Date: December 2006

Action Taken: Existing ditches cleared

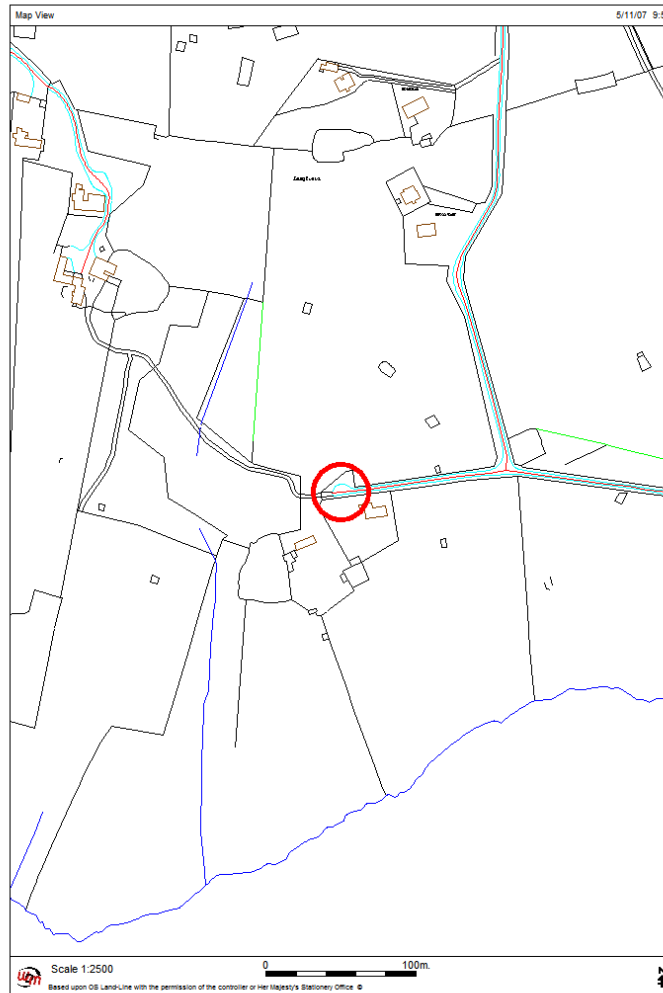
LOCATION: Longfield, Dunrossness

Associated Watercourse: Burn of Hogarth

CC Area: Dunrossness

Grid Ref: 438342, 1116081

Map Extract:



INCIDENT: Water running off hill into back door of property

Date: April 2006

Action Taken: Filter drain constructed around north end of property

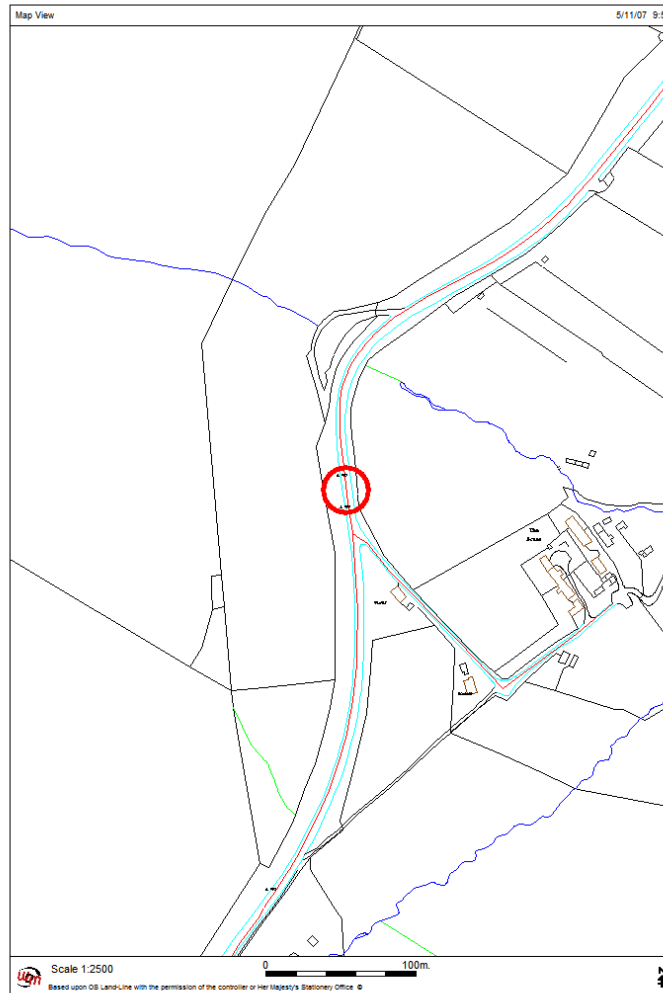
LOCATION: The Brune, Channerwick

Associated Watercourse: Burn of Claver

CC Area: Sandwick

Grid Ref: 440052, 1123002

Map Extract:



INCIDENT: Inlet flow impeded

Date: December 2005

Action Taken: New pipe fitted at entrance to bus shelter

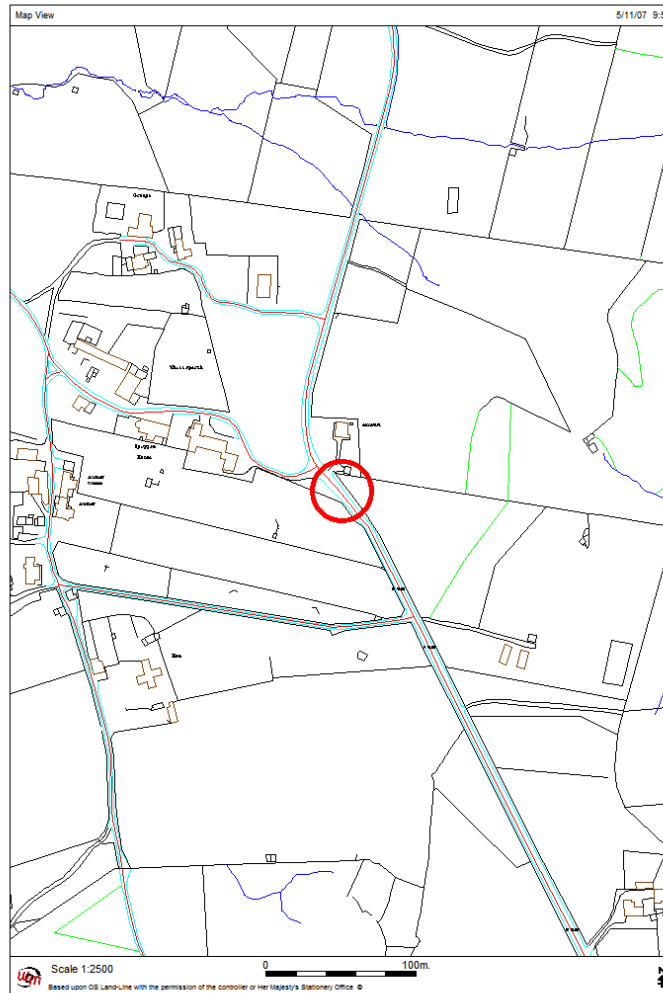
LOCATION: Longfield, Dunrossness

Associated Watercourse: Burn of Scousburgh

CC Area: Dunrossness

Grid Ref: 437947, 1117327

Map Extract:



INCIDENT: Water gathering at road edge and existing ditch flooding

Date: May 2006

Action Taken: Existing ditches cleared and a cross drain constructed

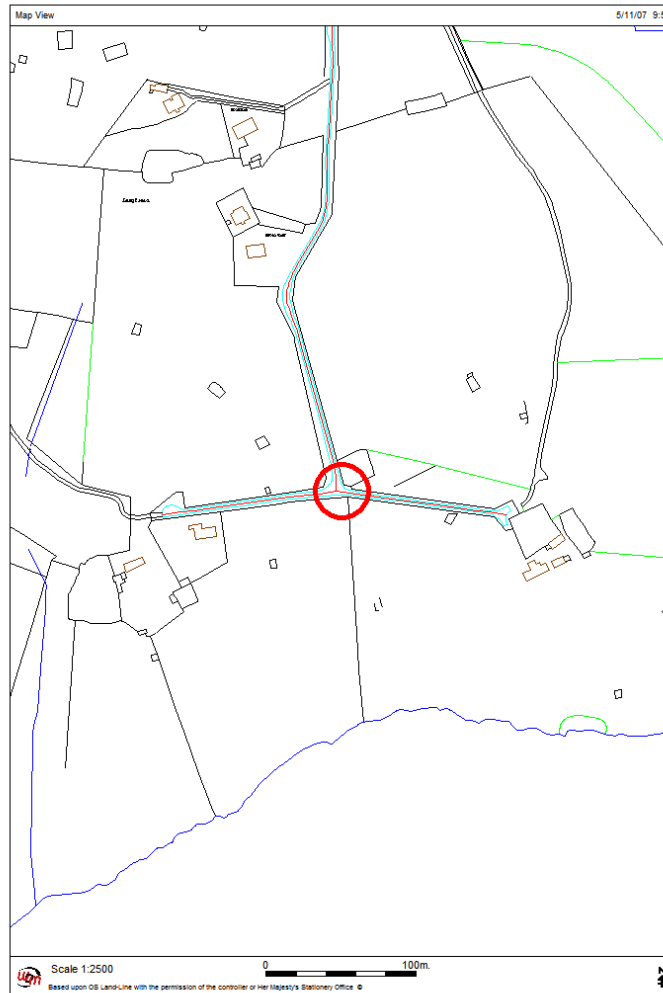
LOCATION: East Longfield, Dunrossness

Associated Watercourse: Burn of Hogarth

CC Area: Dunrossness

Grid Ref: 438456, 1116095

Map Extract:



INCIDENT: Water entering back garden and close to rear of property

Date: November 2005

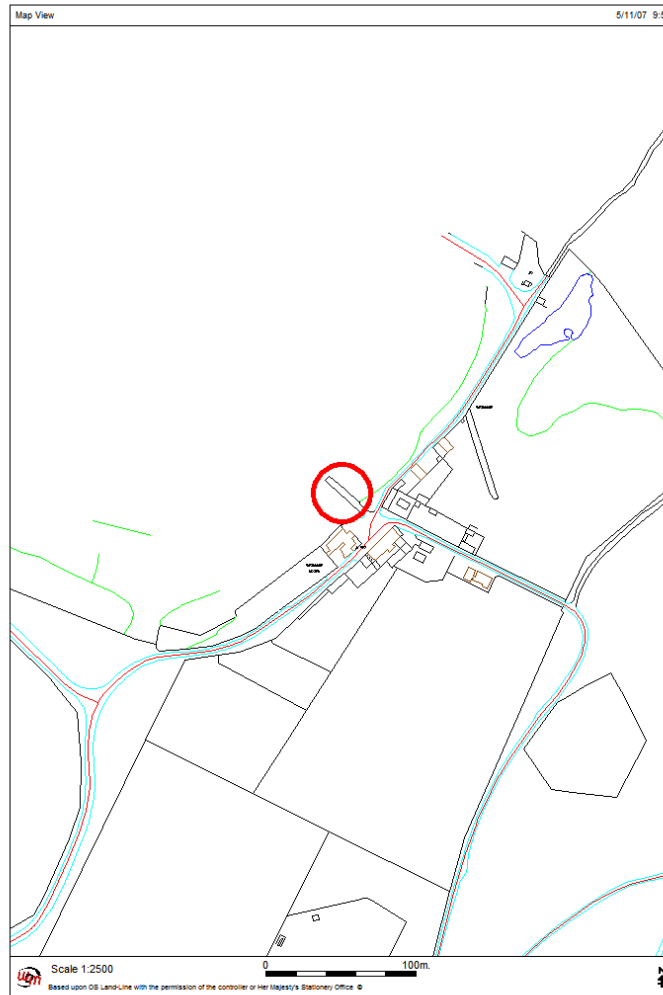
Action Taken: New turning head constructed altering existing drainage flows

LOCATION: Grutness, Sumburgh

CC Area: Dunrossness

Grid Ref: 440431,1109965

Map Extract:



INCIDENT: Erosion of Grutness Pier

Date: December 2006

Action Taken: Continual monitoring of pier erosion

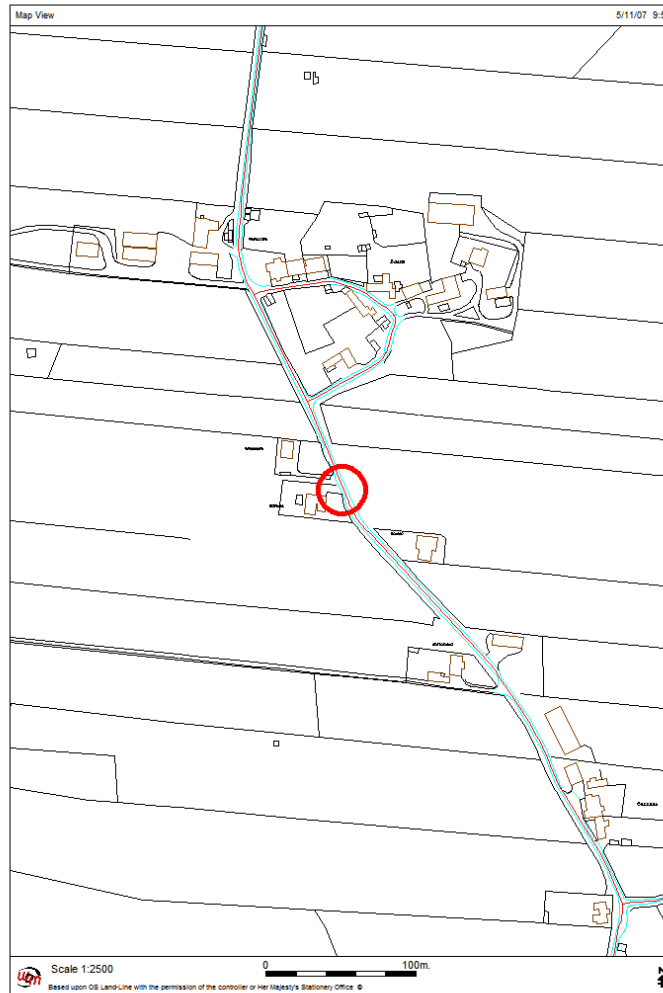
LOCATION: Brake Road, Dunrossness

Associated Watercourse: Burn of Hillwell

CC Area: Dunrossness

Grid Ref: 437109, 1114456

Map Extract:



INCIDENT: Regular flooding of area in front of Roselea

Date: September 2006

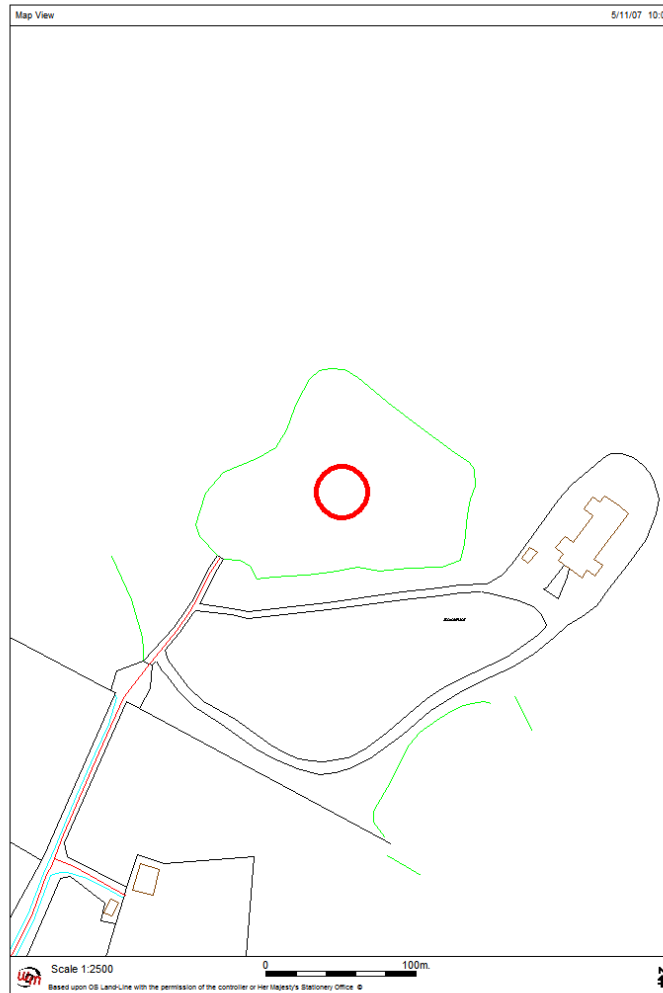
Action Taken: Type 8 drainage chamber constructed

LOCATION: Gremista, Lerwick

CC Area: Lerwick

Grid Ref: 447211, 1145375

Map Extract:



INCIDENT: Flooding at landfill site

Date: August 2005

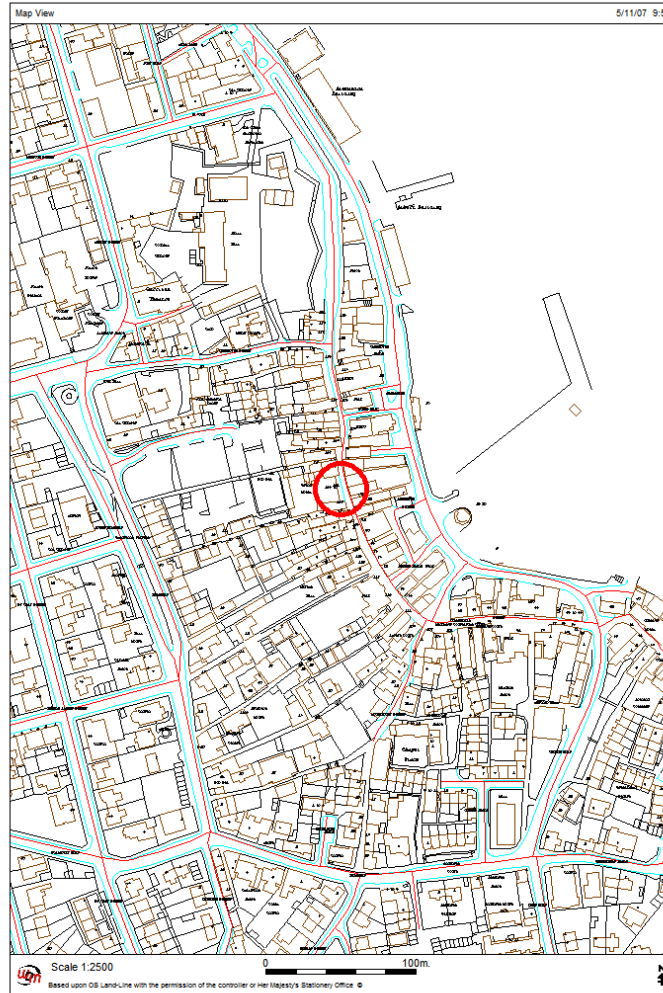
Action Taken: Monitoring events

LOCATION: Pottinger's Shoe Shop, Lerwick

CC Area: Lerwick

Grid Ref: 447637, 1141355

Map Extract:



INCIDENT: Flooding

Date: August 2005

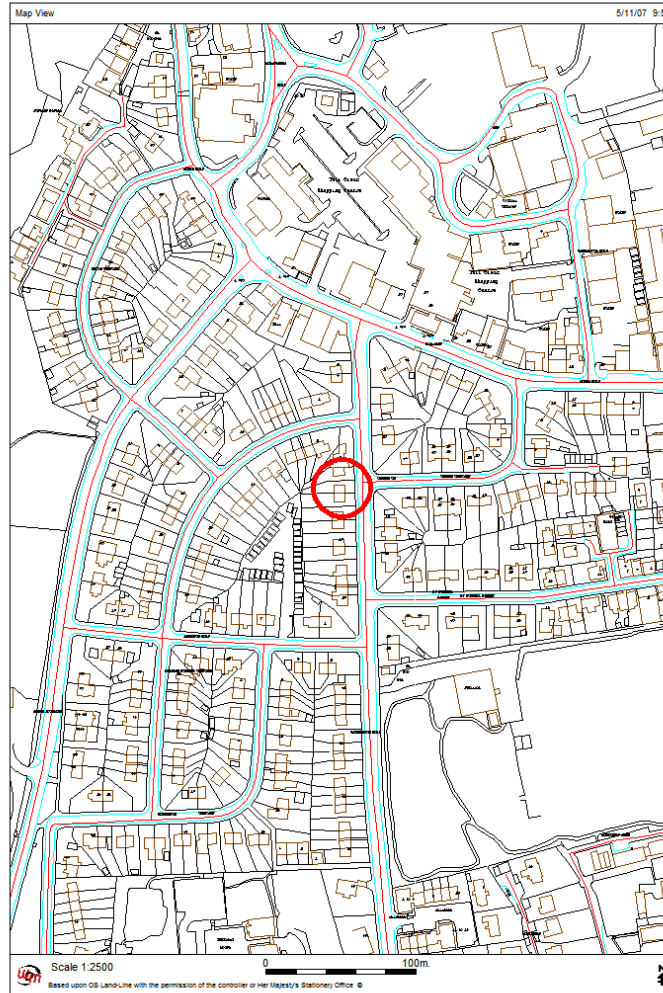
Action Taken: Drains cleared

LOCATION: 10 Gilbertson Road, Lerwick

CC Area: Lerwick

Grid Ref: 446951, 1141624

Map Extract:



INCIDENT: Flood in garden

Date: August 2005

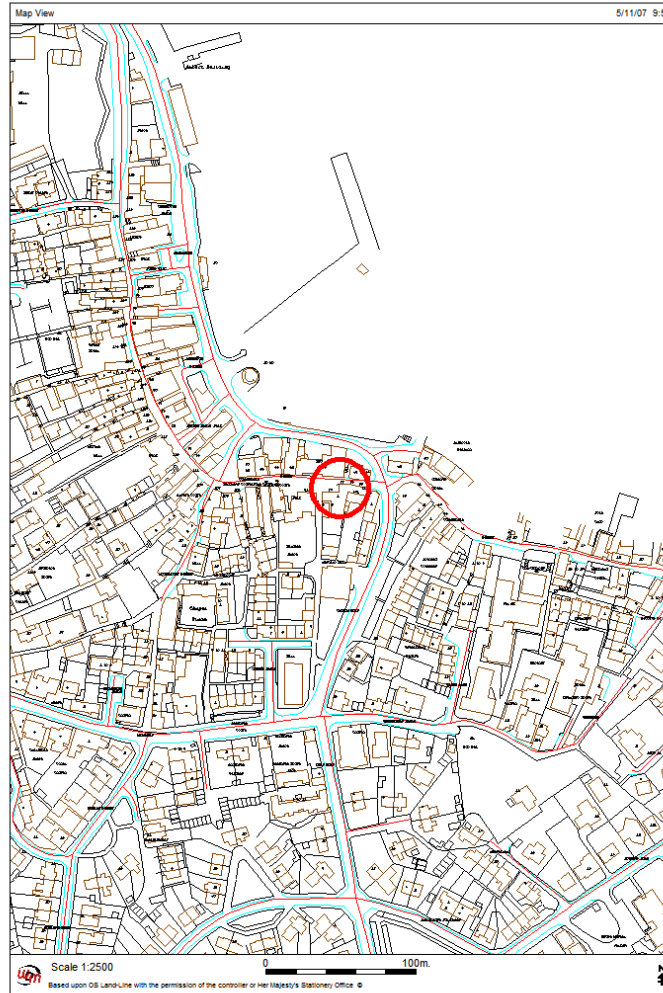
Action Taken: Drain cleared

LOCATION: Shetland Times Shop, Lerwick

CC Area: Lerwick

Grid Ref: 447779, 1141261

Map Extract:



INCIDENT: Flooding

Date: August 2005

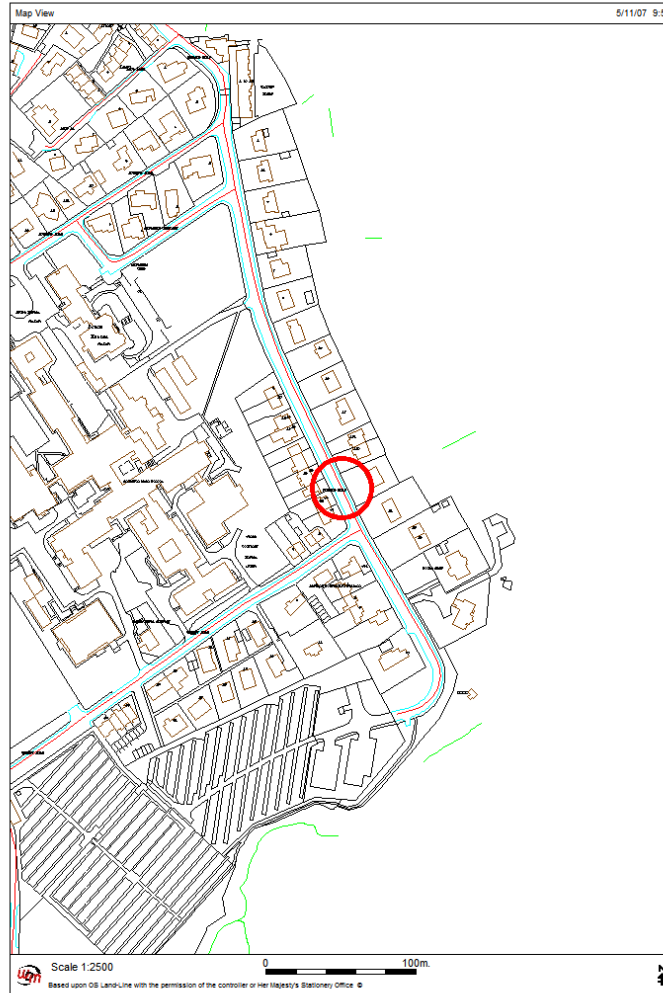
Action Taken: Drains cleared

LOCATION: Twageos Road, Lerwick

CC Area: Lerwick

Grid Ref: 448171, 1140843

Map Extract:



INCIDENT: Localised flooding on carriageway

Date: August 2007

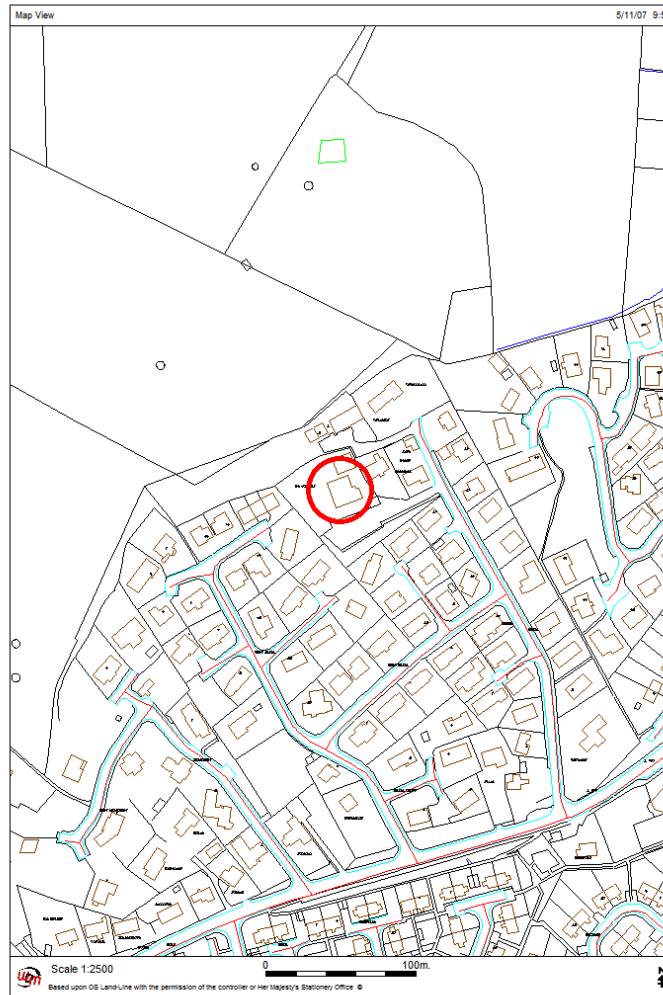
Action Taken: Wearing Course re-graded to allow flow to gully

LOCATION: Upper Baila, Lerwick

CC Area: Lerwick

Grid Ref: 445818, 1140494

Map Extract:



INCIDENT: Flooding of property

Date: December 2006

Action Taken: Drainage channels required on owners land

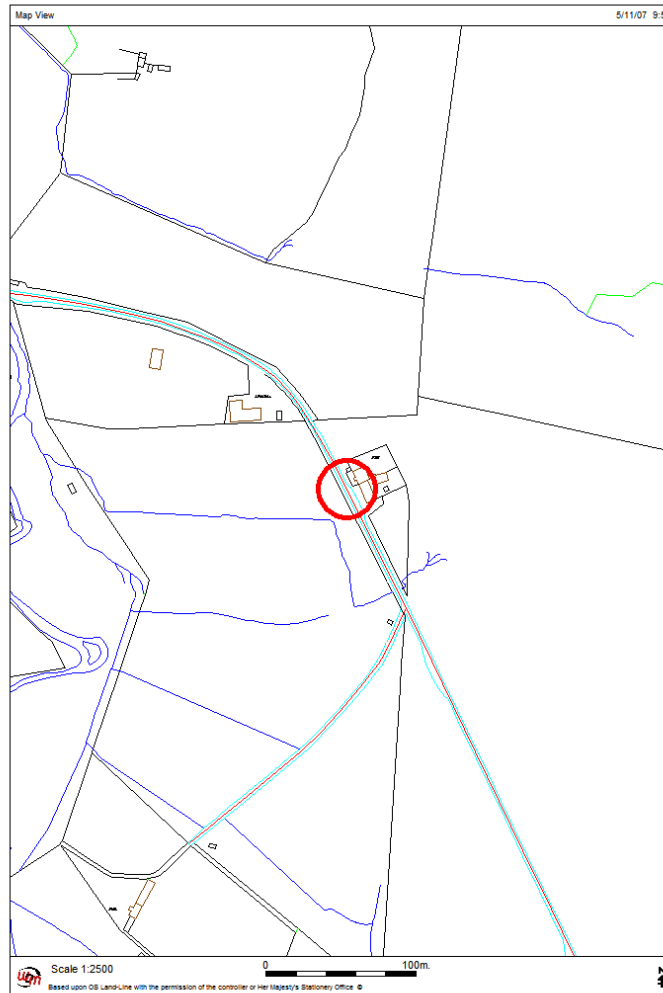
LOCATION: Dury, North Nesting

Associated Watercourse: Grunnafirth

CC Area: Nesting & Lunnasting

Grid Ref: 446297, 1159626

Map Extract:



INCIDENT: Runoff from hill causing flooding at back door

Date: January 2007

Action Taken: Drain under house located, cleared and connected to roadside ditch.

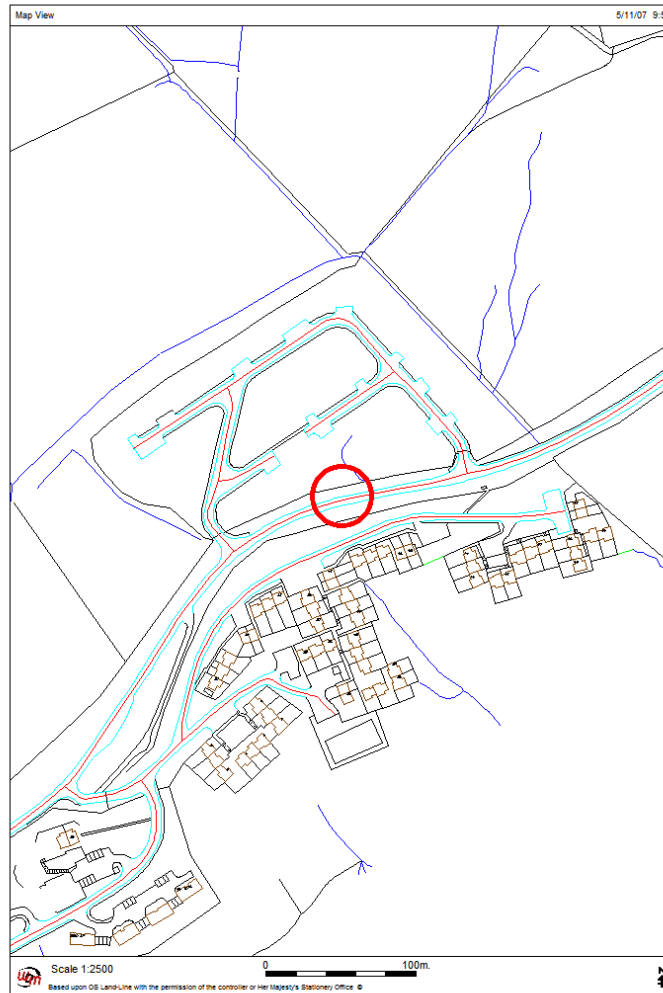
LOCATION: Upper Lea, Mossbank

Associated Watercourse: Hill of Lee

CC Area: Delting

Grid Ref: 444529, 1174357

Map Extract:



INCIDENT: Water from hill catchments causing severe flooding of housing area

Date: February 2007

Action Taken: Blocked ditches and pipes cleared and redesigned as required

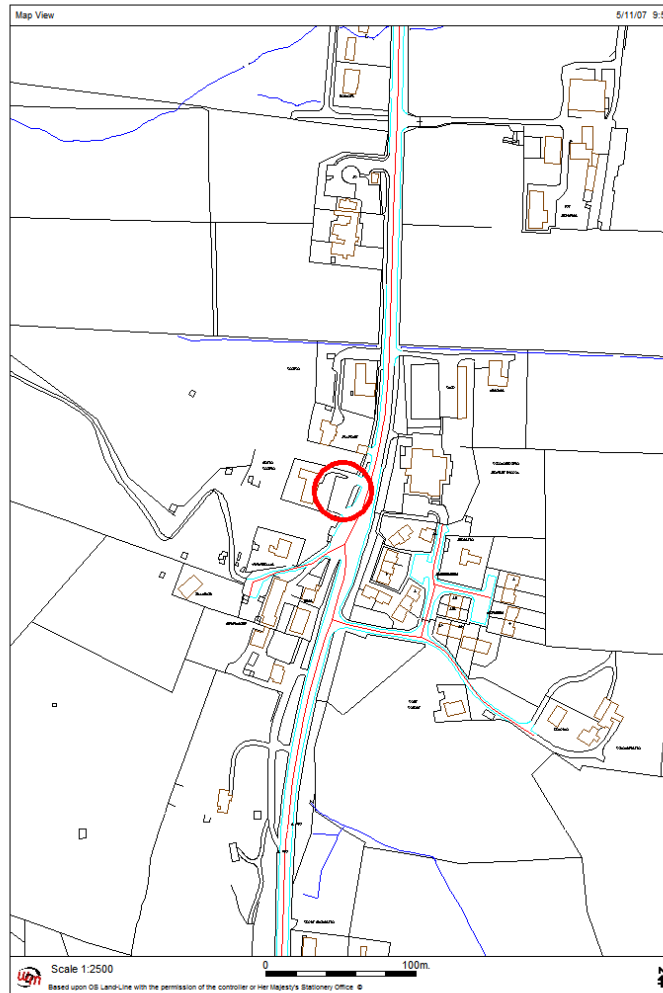
LOCATION: Cunningsburgh Kirk, Cunningsburgh

Associated Watercourse: Burn of Mail

CC Area: Gulberwick, Quarff & Cunningsburgh

Grid Ref: 443082, 1129227

Map Extract:



INCIDENT: Car park flooding

Date: February 2007

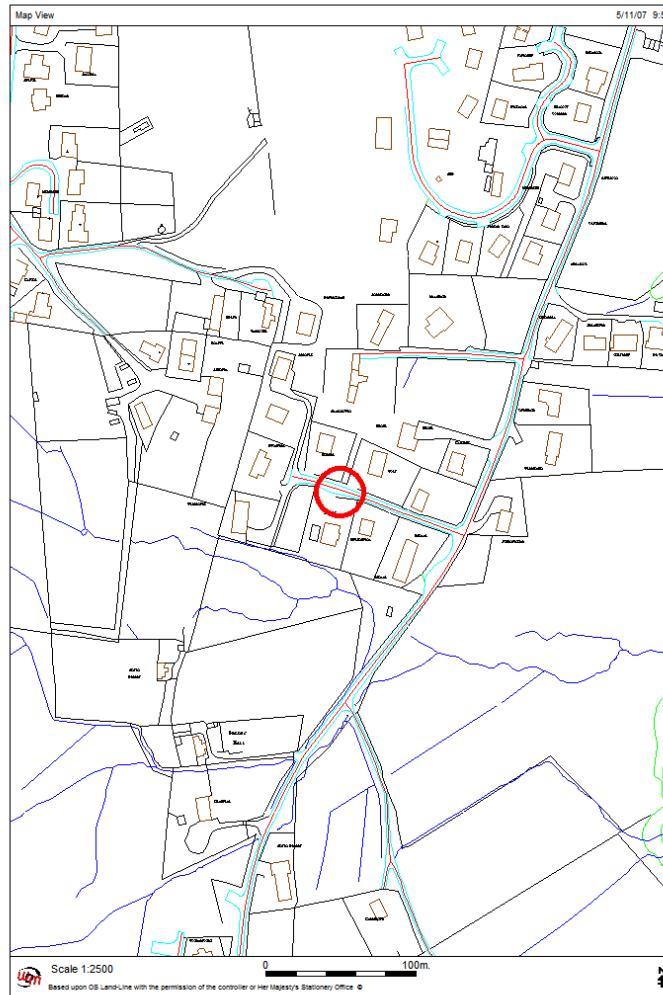
Action Taken: Blockage in burn causing flooding, cleared with Kirk digger.

LOCATION: Ellangowan, Gulberwick

CC Area: Gulberwick, Quarff & Cunningsburgh

Grid Ref: 443956, 1138215

Map Extract:



INCIDENT: Water pooling outside property

Date: April 2006

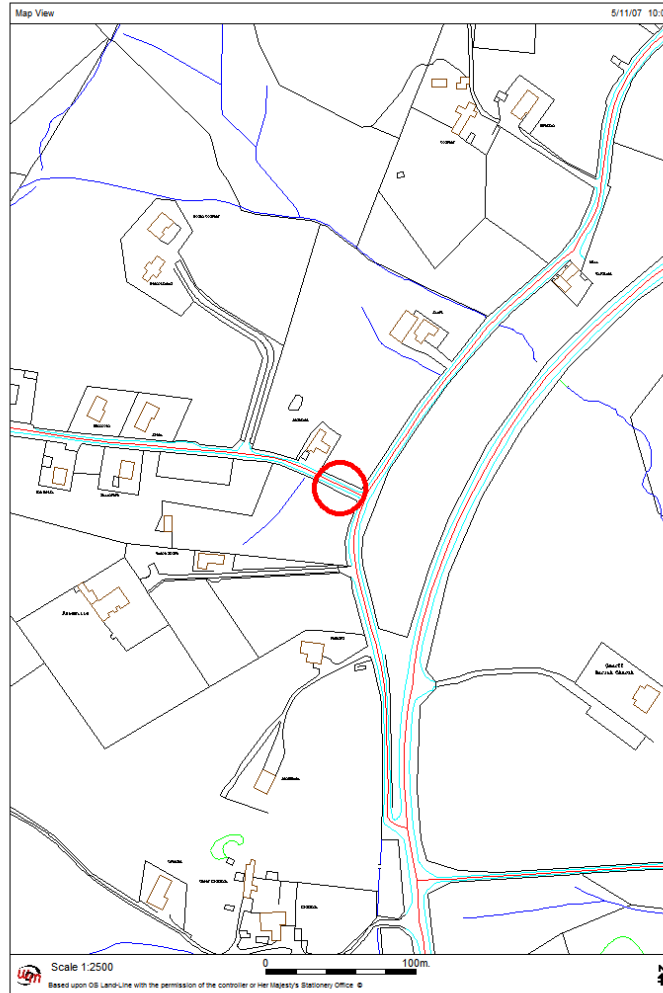
Action Taken: Filter drain and new cross drain constructed

LOCATION: Westerquarff, Quarff

CC Area: Gulberwick, Quarff & Cunningsburgh

Grid Ref: 442645, 1135587

Map Extract:



INCIDENT: Spring in carriageway

Date: December 2006

Action Taken: Source of spring located and piped to watercourse

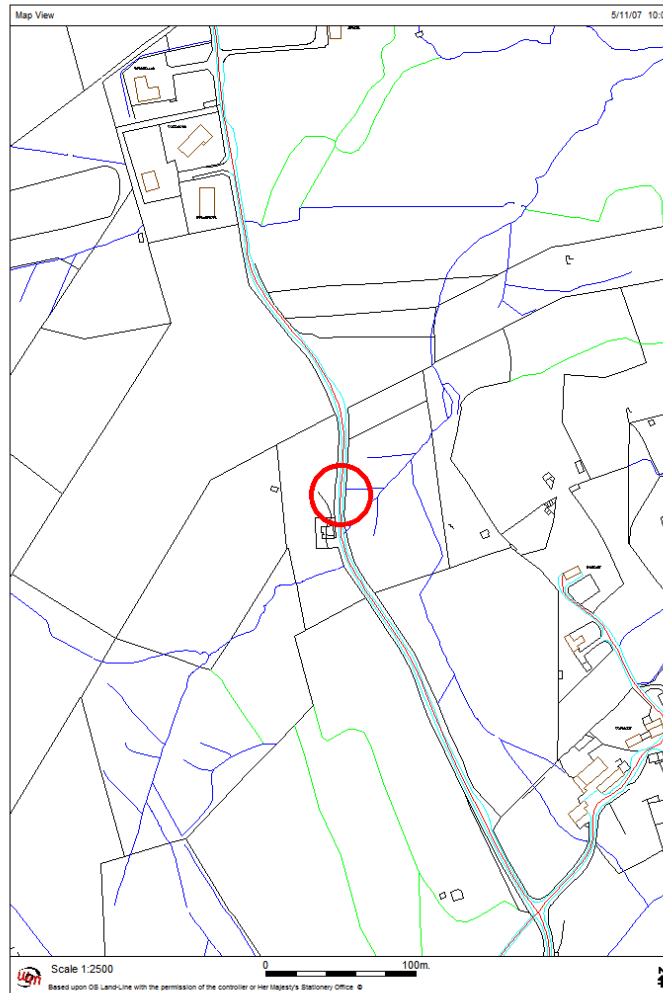
LOCATION: Fladdabister Loop

Associated Watercourse: Burn of Nugarth

CC Area: Gulberwick, Quarff & Cunningsburgh

Grid Ref: 443586, 1131835

Map Extract:



INCIDENT: Spring in carriageway

Date: December 2006

Action Taken: Source of spring located and piped to watercourse

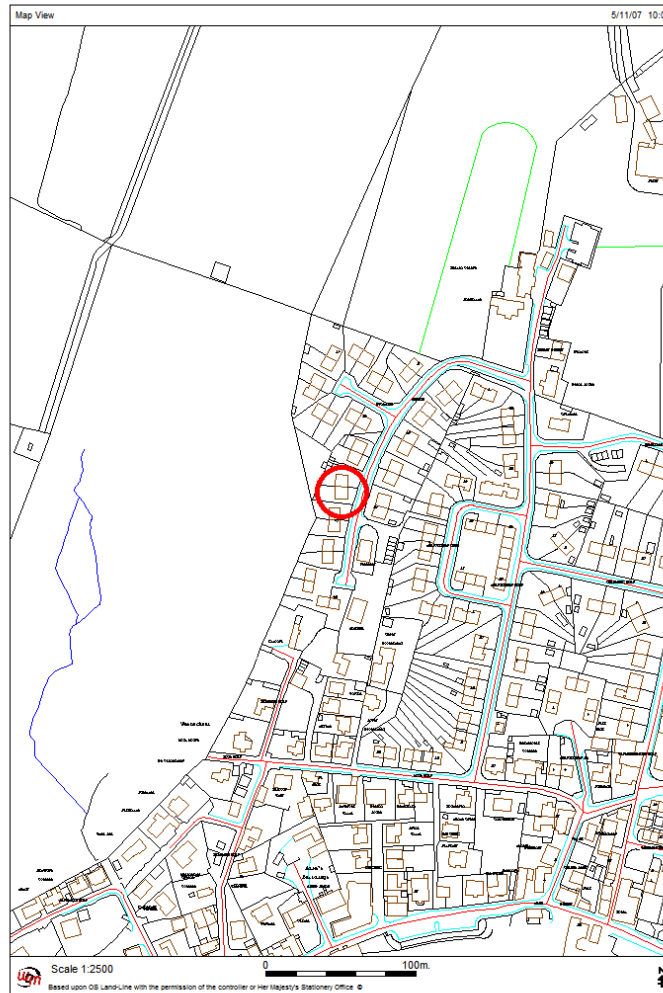
LOCATION: 38 Sycamore Avenue, Scalloway

Associated Watercourse: Burn of Shalders-ayre

CC Area: Scalloway

Grid Ref: 440057, 1139725

Map Extract:



INCIDENT: Garden & path flooding

Date: February 2006

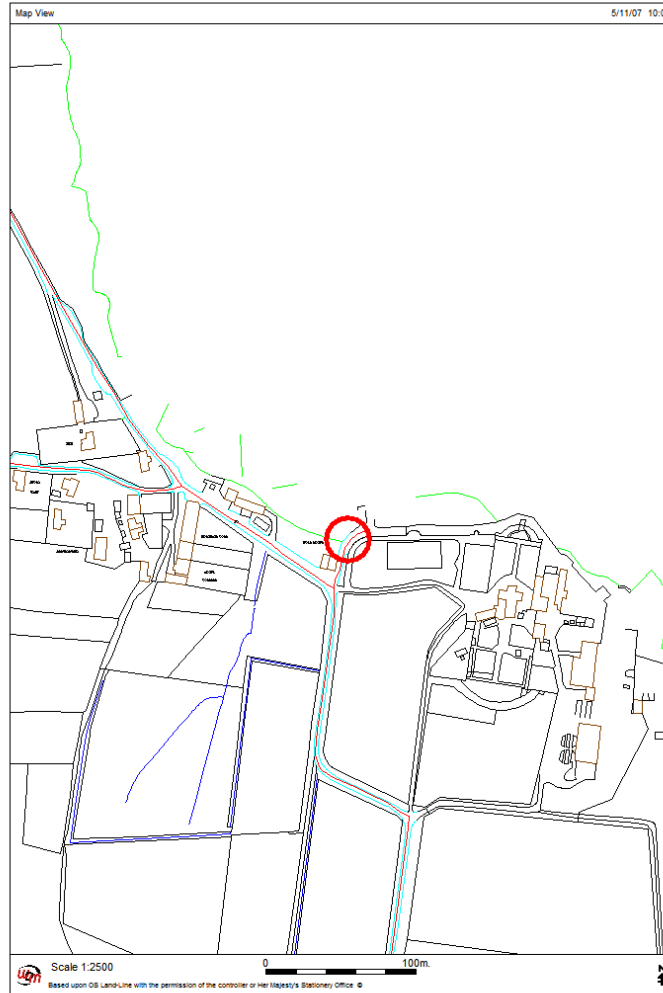
Action Taken: Housing Dept. cut interceptor ditch at rear of property

LOCATION: Sandsayre, Sandwick

CC Area: Sandwick

Grid Ref: 443555, 1124919

Map Extract:



INCIDENT: Road flooded

Date: January 2006

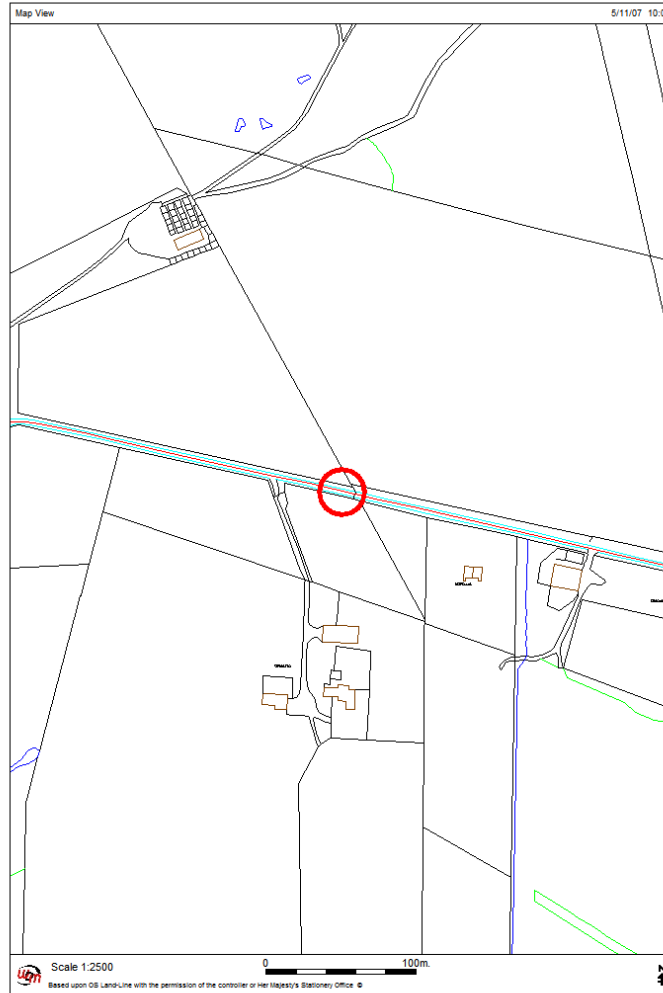
Action Taken: Road cleared and warning signs erected

LOCATION: Baltasound, Unst

CC Area: Unst

Grid Ref: 463873, 1209683

Map Extract:



INCIDENT: Localised flooding on road

Date: November 2005

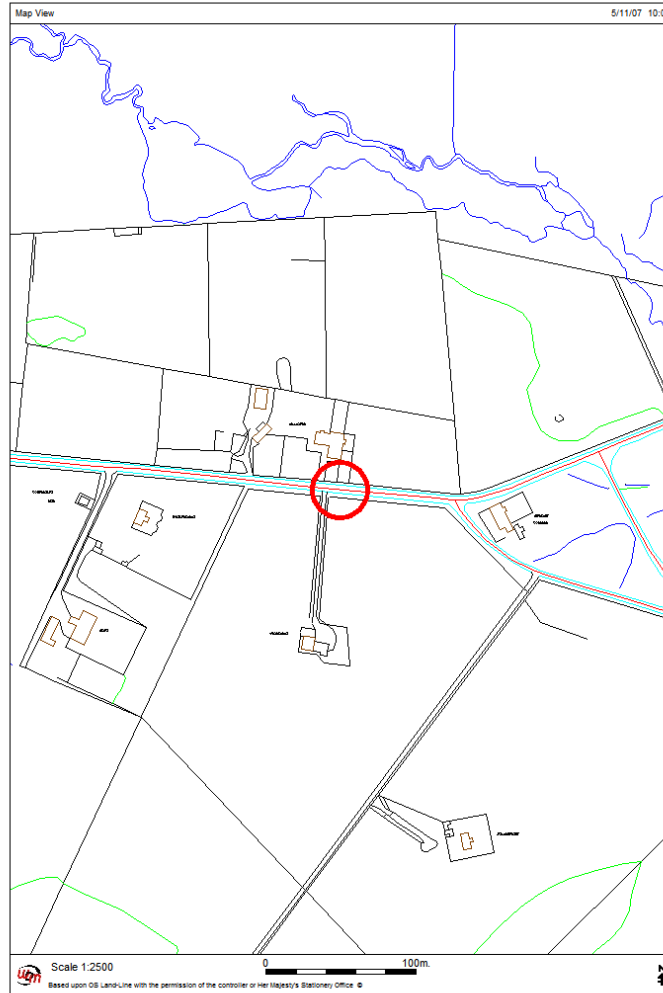
Action Taken: Section of ditch cleared

LOCATION: Millbrae, Unst

CC Area: Unst

Grid Ref: 461717, 1208792

Map Extract:



INCIDENT: Localised flooding on road

Date: November 2005

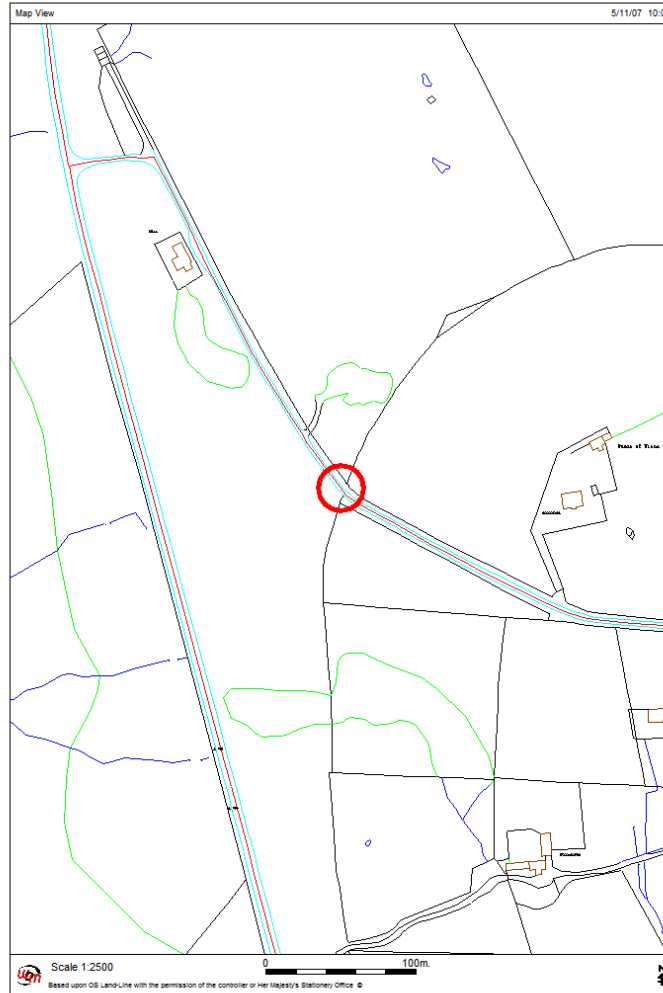
Action Taken: Section of ditch cleared

LOCATION: Ulsta, Yell

CC Area: Yell

Grid Ref: 446074, 1180622

Map Extract:



INCIDENT: Localised flooding on road

Date: November 2005

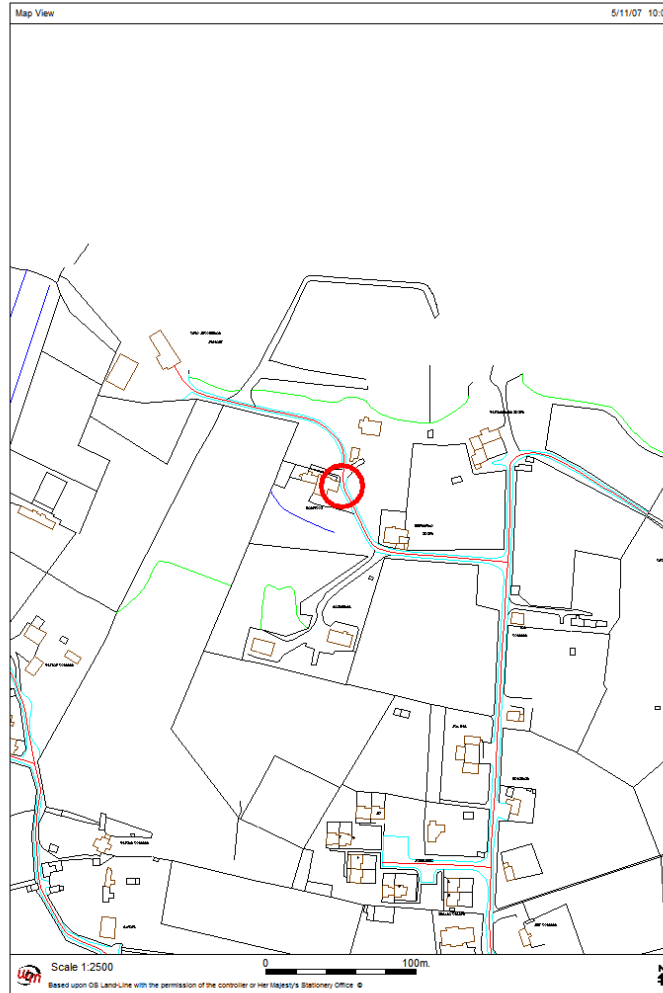
Action Taken: Section of ditch cleared

LOCATION: Sherwood, Yell

CC Area: Yell

Grid Ref: 451056, 1191473

Map Extract:



INCIDENT: Water from road affecting house

Date: August 2006

Action Taken: Road channel grading corrected to divert water flow

Appendix 2: Weisdale Burn sample river level data

