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Clean, Safe Drinking Water from Small Community Supplies – the UK Approach

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Regulation Team Leader
Drinking Water Quality

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The views expressed in this presentation are those of the author and do not necessarily reflect the policies of the Scottish Government

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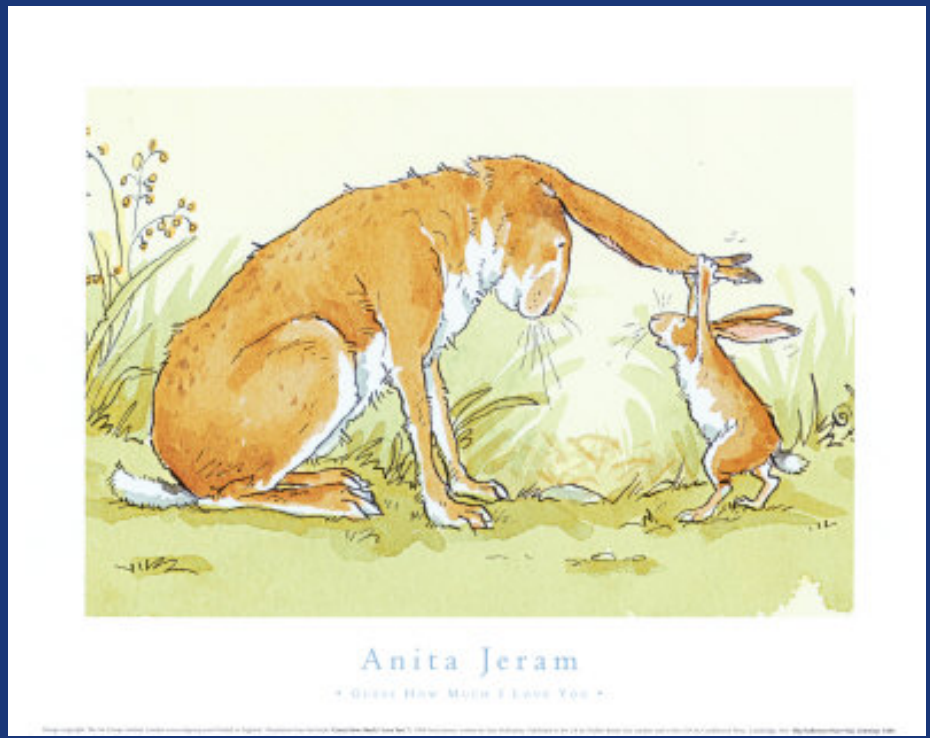
What will you hear?



- Scene setting
- A new approach to legislation
- Risk Assessment in the UK
- Some conclusions

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Some Terminology

In Scotland drinking water is supplied by either

- statutory water undertakers – Scottish Water

or

- from “private water supplies” which equate to small community supplies

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History is on our side!

"Cooking pot" filled from running water dating from over 5000 years ago!

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Do we have a problem?

In Scotland private water supplies caused 21 out of 57 waterborne disease outbreaks between 1945 and 1978 (37%). These outbreaks gave rise to at least 9362 cases.

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Some more numbers

In Aberdeenshire (Scotland) 1750 samples analysed between 1992 and 1998. 41% failed for Total coliforms; 30% failed for *E. coli*; 15% failed for nitrate. Combined failure rate was 48%

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Characteristics of private water supply-related outbreaks – the UK experience

- Transient populations
- Inadequate/ineffective treatment
- Animal presence
- Significant rainfall preceding consumption

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How bad are small community supplies in Scotland?

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I wouldn't drink from that after what we've just done behind this wall!

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Integrated Drinking Water Management

- Compliance monitoring
- Small samples, limited testing
- Major limitations

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Water Safety Plans

"The most effective means of consistently ensuring the safety of a drinking water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer."

WHO 2004

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Components of a Water Safety Plan

- System assessment
- Identify control measures
- Management plan

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Focus on small supplies

- Inform public
- Assess water supply to see if it can meet targets
- Monitor control measures and training to maintain risks at tolerable level
- Operational monitoring
- Systematic management procedures
- Appropriate incident responses
- Programmes to upgrade/improve existing water systems

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What will you hear?

- Scene setting
- Legislative approach
- Risk Assessment in the UK
- Some conclusions

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UK Risk assessment protocol

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Private water supply, Aberdeenshire, Scotland

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Figure 1 – Hazard assessment matrix

	Severity of consequences				
Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	16	32	64	128	256
Likely	8	16	32	64	128
Moderately likely	4	8	16	32	64
Unlikely	2	4	8	16	32
Rare	1	2	4	8	16

www.privatewatersupplies.gov.uk

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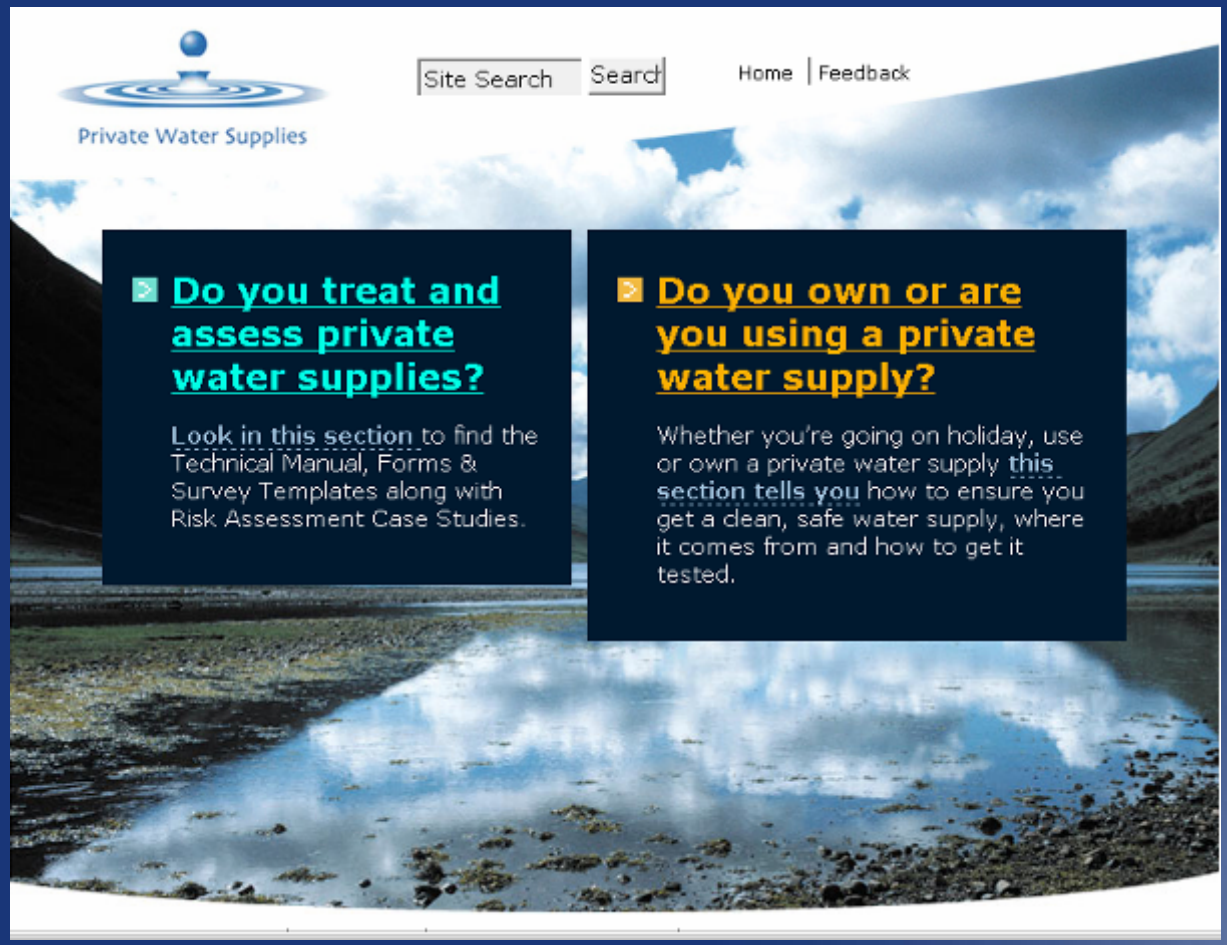

www.privatewatersupplies.gov.uk

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How's it done then?

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(1) Identify the private water supply on which to undertake the risk assessment investigation.

(2) Confirm with the relevant person or persons who will be an appropriate contact person.

(3) Arrange with contact person identified from (2) a mutually agreeable date/time/location to meet and undertake the investigation. **Note that the risk assessment is principally based around the <u>source</u> of the supply.**

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(4) Ensure that an appropriate premise will also be available for sampling and make necessary arrangements to take a sample of the drinking water.

(5) Prepare risk assessment forms prior to site investigation completing all sections that require historic or archived data

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(6) Ensure that appropriate maps (in the UK this will be the soil leaching potential and Ordnance Survey 1:50,000) for the likely area of the source are available and take to site investigation meeting.

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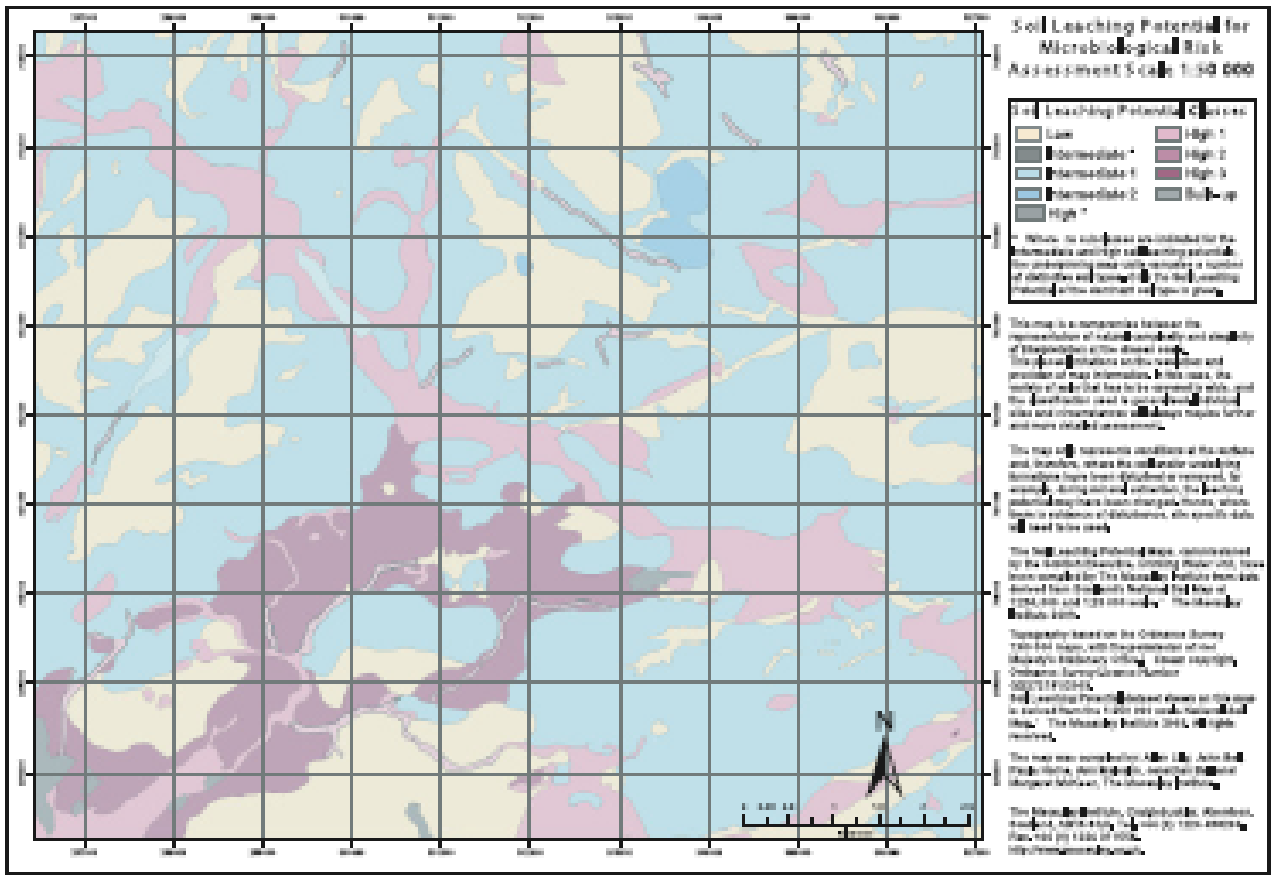
Figure A4.1 Soil Leaching Potential Map for area around Knuttmound Estate



Extract of a soil leaching potential map taken from Technical Manual

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(7) Ensure that appropriate sampling equipment and containers are available and take to site investigation meeting.

(8) Undertake site risk assessment investigation.

(9) Undertake appropriate sampling activities at location(s) identified in (4).

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(10) Collate results of sampling activity into risk assessment form

(11) Complete risk assessment form including any additional information requested at time of site investigation.

(12) Record and file complete risk assessment form.

(13) Send a copy of the completed risk assessment to the relevant person(s) for their records.

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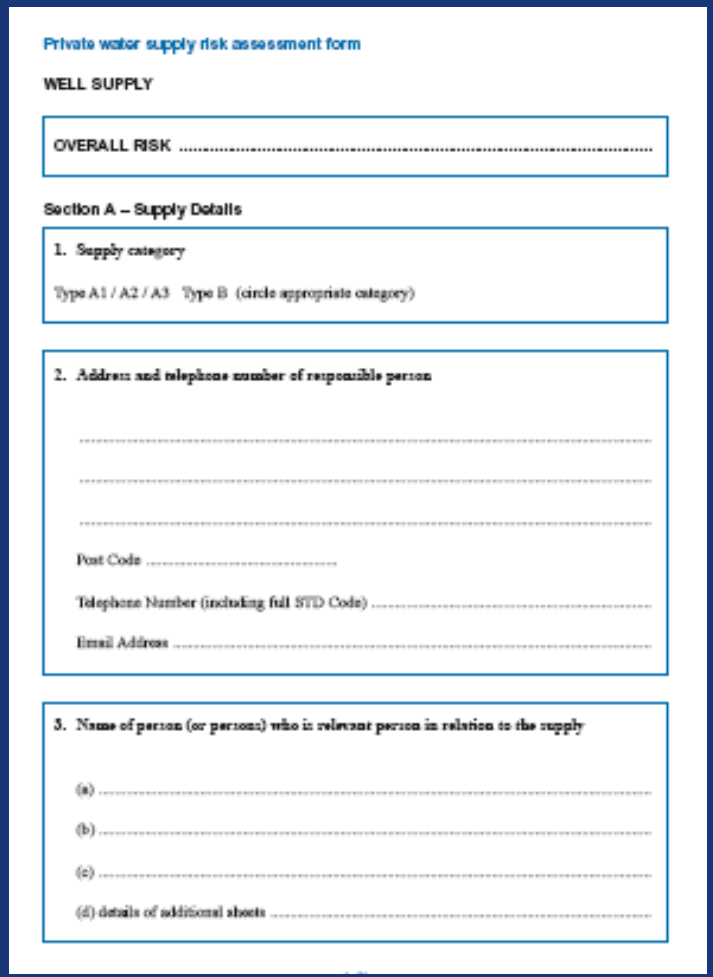


Private water supply risk assessment form

WELL SUPPLY

OVERALL RISK .....

Section A – Supply Details

1. Supply category

Type A1 / A2 / A3 Type B (circle appropriate category)

2. Address and telephone number of responsible person

.....

.....

.....

Post Code .....

Telephone Number (including full STD Code) .....

Email Address .....

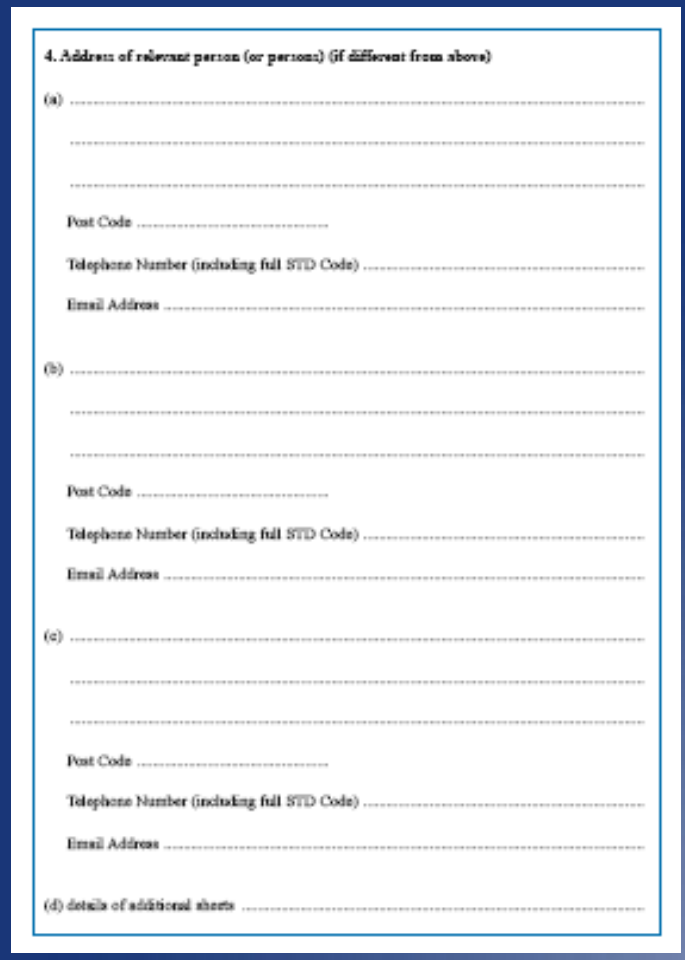
3. Name of person (or persons) who is relevant person in relation to the supply

(a) .....

(b) .....

(c) .....

(d) details of additional sheets .....



4. Address of relevant person (or persons) (if different from above)

(a) .....

.....

.....

Post Code .....

Telephone Number (including full STD Code) .....

Email Address .....

(b) .....

.....

.....

Post Code .....

Telephone Number (including full STD Code) .....

Email Address .....

(c) .....

.....

.....

Post Code .....

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(d) details of additional sheets .....

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Case study – surface-derived water supply from the Scottish Borders

- Site - Dawyck Botanical Gardens
- 28 miles south of Edinburgh
- Between 165 and 250m elevation
- Continental climate (temp range -19 to 28.5^{o}C; annual rainfall is low between 1070 and 875mm)
- History of planting back to 1680

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- Water drawn from Scrape Burn
- Supplies visitor centre and 3 cottages
- 10 people in cottages with a further 7 staff at centre
- Site has around 24,000 visitors annually

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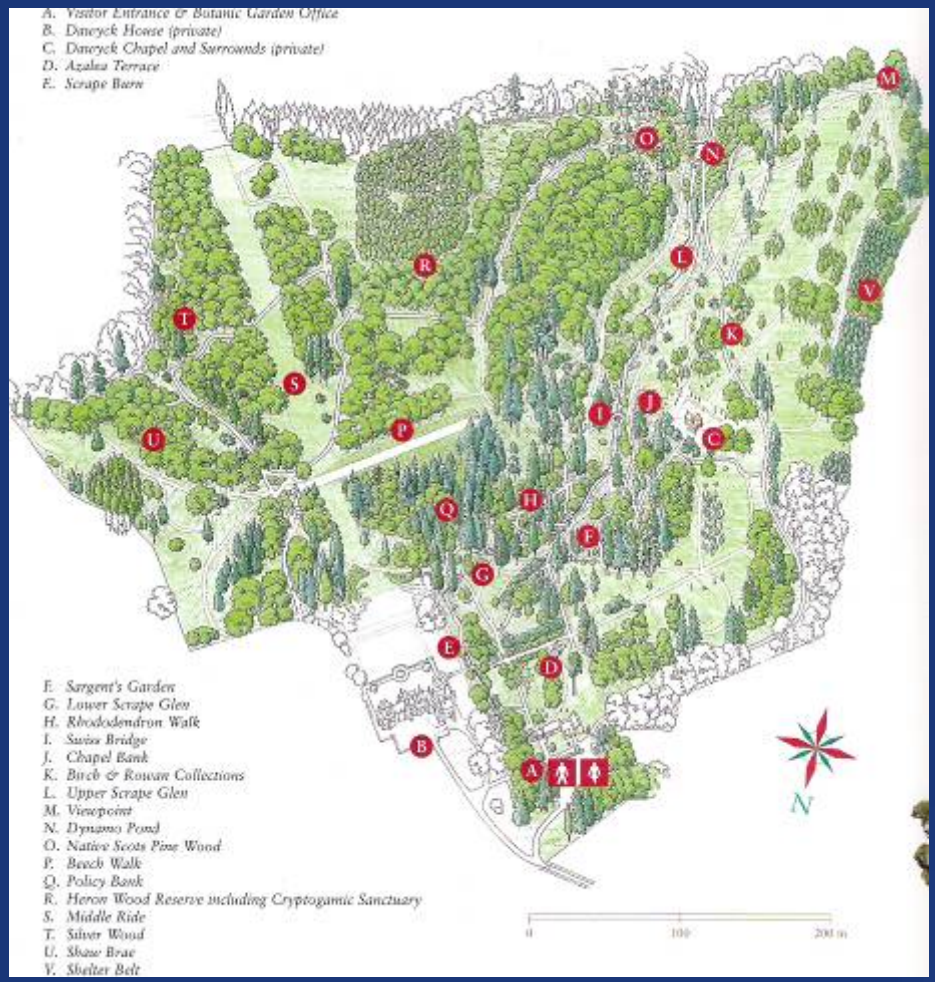
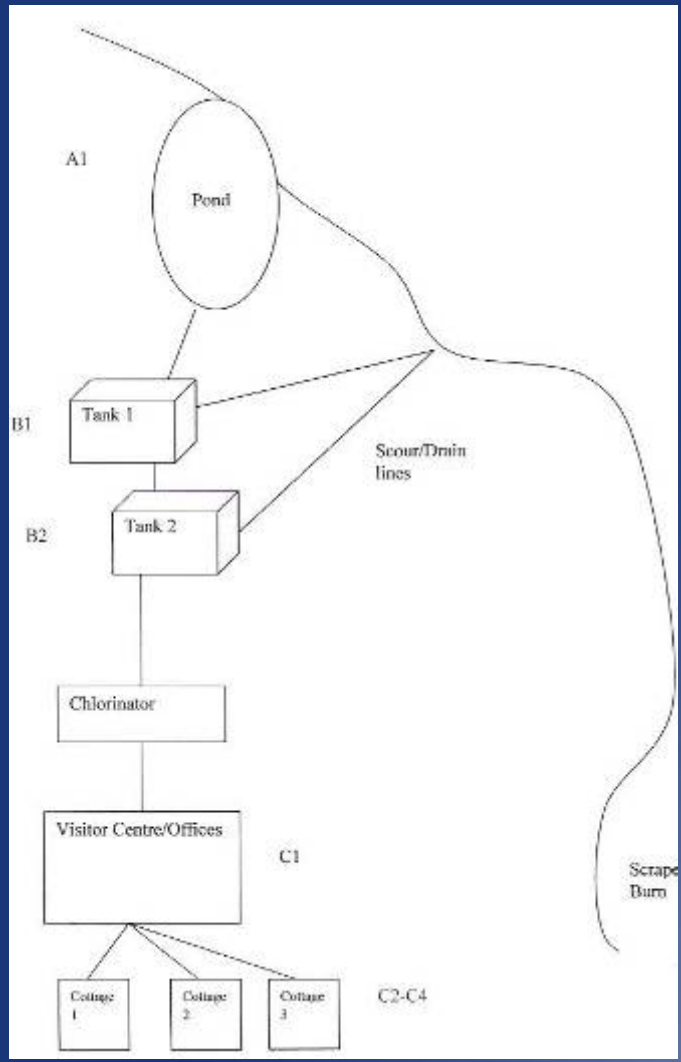


Dawyck
Botanic Garden

The Scottish Government

Dawyck Botanic Garden Supply



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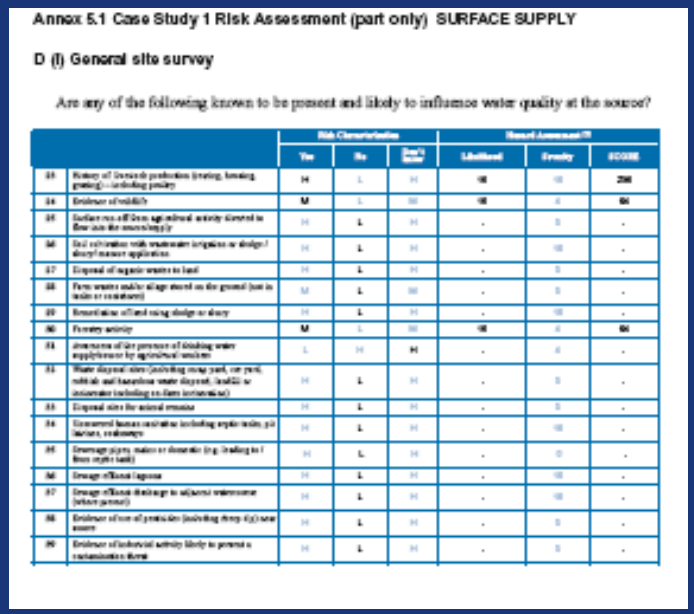

Annex 5.1 Case Study 1 Risk Assessment (part only) SURFACE SUPPLY

D (i) General site survey

Are any of the following known to be present and likely to influence water quality at the source?

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		Yes	No	Don't Know	Likelihood	Severity	SCORE
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34	Evidence of wildlife	M	L	M	16	4	64
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D (iv) Overall risk assessment

(a) Risk characterisation

The overall risk assessment for the source is taken as the highest individual risk category identified from each of the two surveys.

The overall risk characterisation category will be recorded as the risk assessment score for the source.

Survey Entries	Risk Characterisation Category
General Site Survey	HIGH
Source Survey	HIGH
Overall Risk	HIGH

(b) Hazard assessment

Individual components in each of the surveys with a hazard assessment score of 32 or greater should be considered as priority candidates for remedial works capable of reducing the overall risk characterisation category.

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Q23 History of livestock production (rearing, housing, grazing) - including poultry

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The Scottish Government

Q 24 – Evidence of wildlife

Scrape Burn catchment showing signs of erosion on heather grouse moor at source of the burn

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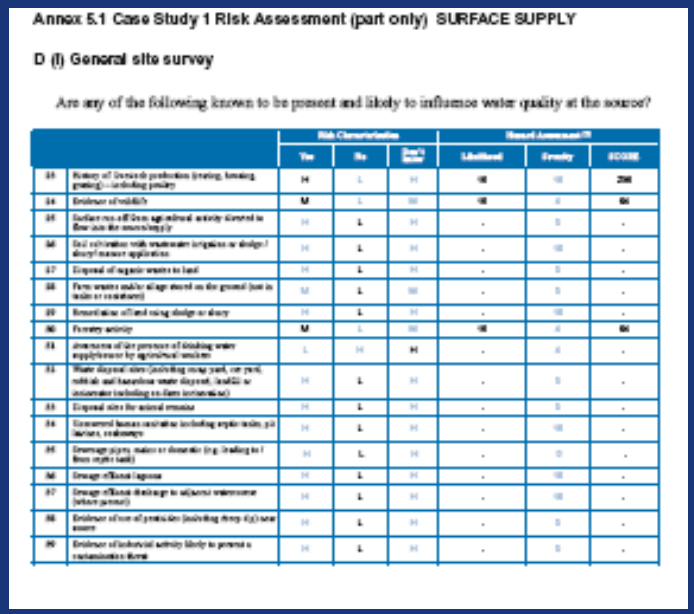

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(b) Hazard assessment

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Q30 – Forestry activity

Sump oil on trackway

Found after forestry operations

Scrape Burn is down slope on the right of the picture just out of shot.

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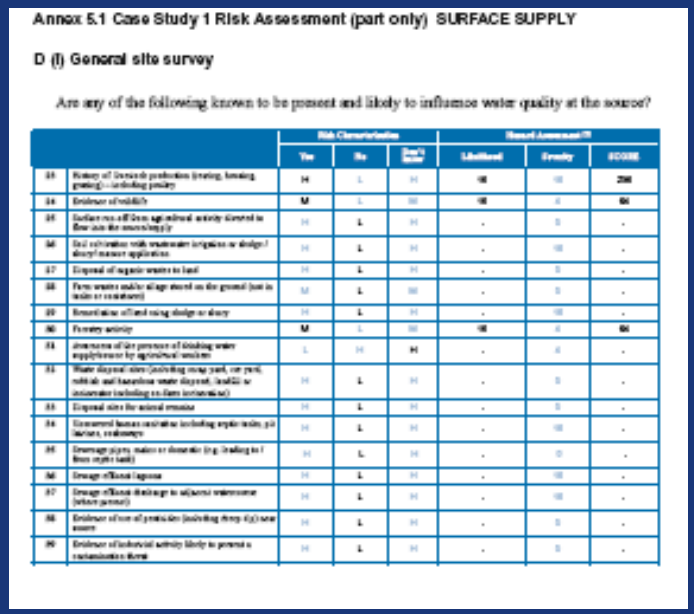

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Q40 – Supply network constructed from material liable to fracture

Air vent and tanks at Dawyck Botanic Garden

The Scottish Government

Overflow pipe

Scour (drain) pipe from tanks

Q41 – Intermediate tanks are not adequately protected

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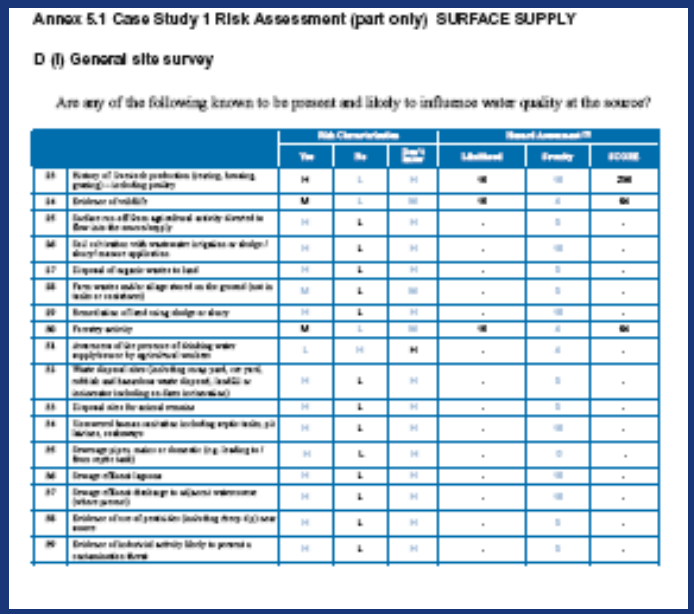

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Scrape Burn showing wind fallen logs carried by the burn when in spate

Pond formed from Scrape Burn used as source of drinking water supply at Dawyck Garden

(Note gravel deposits washed into the pond during spate flows)

The Scottish Government

Case Study - conclusions

- Overall risk HIGH
- Interventions/action plan to include
  - Reduce access of animals to burn
  - Control forestry activity
  - Protect drain and scour lines
  - Identify pipe materials
  - Be aware that heavy rainfall can have detrimental effects on water quality in this system

The Scottish Government

Risk assessment - not just for humans!

The Scottish Government

Case Study - Acknowledgements

Forbes Shepard, Scottish Borders Council
Susan Napier, Scottish Borders Council
David Knott, Curator, Dawyck Botanic Garden, Stobo

The Scottish Government

What have you heard?

- Scene setting
- A new approach to legislation
- Risk Assessment in the UK
- Some conclusions

The Scottish Government

Small Community Supply Management Network (WHO)

Objectives:

To promote the achievement of substantive and sustainable improvements to the safety of community water supplies around the world, particularly in rural areas, in order to meet the MDGs related to water and sanitation.

The Network is a **platform** for:

- Advocacy
- Innovative research
- Good practice/lesson learning
- Widespread information sharing

The Scottish Government

Partnerships for Achieving Millennium Development Goals in Armenia?

then how about

Small Community Supply Management Network

Contact the Network via
Donald.reid@scotland.gsi.gov.uk or
mercerj@who.int

The Scottish Government

“The moment you’re born you’re done for”

Arnold Bennett
27 May 1867 – 27 March 1931

The Scottish Government

And remember about the Small Community Supply Management Network