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IN(FO)W(OR)DS



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USER GUIDE FOR ASSESSING THE IMPACT OF COMBINED SEWER OVERFLOWS

FR 0466

April 1994

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USER GUIDE FOR ASSESSING THE IMPACT OF COMBINED SEWER OVERFLOWS

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April 1994

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SUMMARY

I BENEFITS

A standardised, robust and cost-effective method for assessing and reporting the environmental impact of combined sewer overflow (CSO) discharges is essential for good practice in urban pollution control. Such a methodology is needed for identifying CSOs that perform unsatisfactorily and for prioritising these for improvement schemes intended to limit pollution, as required by the Urban Waste Water Treatment Directive.

II OBJECTIVES

To develop a standardised, objective assessment procedure to enable the impact of combined sewer overflows (CSOs) to be reported within a regulatory framework.

III REASONS

CSO discharges have long been recognised as having a major contribution to the poor quality of urban rivers. Whilst assessment procedures have been developed independently by NRA Regions for short-term reporting needs, there is a need for a standardised national approach for long-term use.

IV CONCLUSIONS

This user guide provides details on how to objectively assess and report the impact of combined sewer overflows on receiving waters.

Certain factors have been identified and agreed as useful measures of impact. These are dry-weather operation, public complaint, sewage fungus and sewage-derived litter.

Biological information does not generally add to the final assessment of impact based on the above factors, and is not included as an assessment methodology in this guide.

V RECOMMENDATIONS

The procedures proposed in this report should be used in future broad-brush assessments of CSO impact undertaken at a catchment or regional scale by the NRA and/or Water Utilities.

A broad-brush impact assessment approach should be used as one of the first stages in any programme of investment to upgrade sewer systems.

NRA Regions and Water Utilities should cooperate fully in the process of CSO assessment to arrive at an agreed prioritisation list.

The NRA should consider the resourcing needed to undertake CSO assessments and plan to have them available for future investment programmes.

Biological information is not included in the recommended methodology but it could be used to gain additional information in cases of uncertainty, and is appropriate for detailed scheme design. Interpretation should be based on either percentage difference of upstream and downstream BMWP score or RIVPACS EQI bandings.

Groups of CSOs discharging in close proximity should be assessed as a single unit.

Once an impact classification list has been developed, prioritisation should be achieved by considering each CSO on a case by case basis taking into account other information on receiving water use and sewer hydraulics (dry-weather flow, population served, sewer capacity and modelling data as available).

During the prioritisation process due consideration should be given to all type(s) of impact identified e.g. aesthetic, water quality.

Once CSOs have been prioritised in terms of impact, planned improvements should be integrated within overall investment programs.

VI RESUME OF CONTENTS

A recommended procedure for classifying and prioritising CSOs in terms of impact is presented.

CONTENTS	Page
SUMMARY	(i)
SECTION 1 - INTRODUCTION	1
SECTION 2 - RECOMMENDED CSO ASSESSMENT PROCEDURE	3
2.1 INTRODUCTION	3
2.2 FIELD METHODOLOGY	3
2.2.1 General	3
2.2.2 Assessment of dry-weather operation	3
2.2.3 Assessment of sewage-derived litter	4
2.2.4 Assessment of sewage fungus	6
2.2.5 Assessment of public access/amenity value	9
2.3 SCORING OF IMPACT ASSESSMENT COMPONENTS	9
2.3.1 General	9
2.3.2 Dry-weather operation	9
2.3.3 Sewage-derived litter	10
2.3.4 Sewage fungus	11
2.3.5 Public complaints and/or pollution incidents	12
2.3.6 Receiving water class change/long-term river quality objective (LTRQO) failure	12
2.4 SCORING OF RECEIVING WATER USE-RELATED FACTORS	13
2.4.1 General	13
2.4.2 Fishery status	13
2.4.3 Conservation status	13
2.4.4 Potable abstraction	14
2.4.5 Public access/amenity value	14
2.5 SUMMARY OF DATA REQUIREMENTS	15
SECTION 3 - CLASSIFICATION OF CSO IMPACT	17
3.1 INTRODUCTION	17
3.2 CLASSIFICATION OF CSOs BASED ON ASSESSED IMPACT	17
3.3 CLASSIFICATION OF CSOs BASED ON RECEIVING WATER USE	18
SECTION 4 - PRIORITISATION OF CSOs FOR IMPROVEMENT	19
APPENDICES	
APPENDIX A - SUGGESTED PROFORMA FOR FIELD DATA COLLECTION	21
APPENDIX B - WORKED EXAMPLES OF CSO ASSESSMENT PROCEDURE	25

CONTENTS (Continued)**Page****LIST OF TABLES**

Table 2.1 - Categories of CSO dry-weather operational status	4
Table 2.2 - Sewage-derived litter scores	4
Table 2.3 - Criteria relating to public access/amenity value of the receiving water	9
Table 2.4 - Scores for dry-weather operation	10
Table 2.5 - Numerical and equivalent letter scores for sewage-derived litter	10
Table 2.6 - Scores for presence/absence of sewage fungus on CSO structure	11
Table 2.7 - Scores for sewage fungus present in immediate mixing zone	11
Table 2.8 - Scores for public complaints and/or pollution incidents	12
Table 2.9 - Scores for receiving water class change/LTRQO failure	12
Table 2.10 - Scores for fishery status of receiving waters	13
Table 2.11 - Scores for conservation status of receiving waters	14
Table 2.12 - Scores for potable abstraction	14
Table 2.13 - Scores for public access/amenity value	14
Table 3.1 - Criteria for classification of CSO impact	17
Table 3.2 - Criteria for classification of receiving water use	18
Table B1 - Example scores from information collected for impact assessment from three site visits (June/Sept/Nov-Jan)	27
Table B2 - Use-related information (scores in parenthesis)	28

LIST OF FIGURES

Figure 2.1 - Location of sampling points for sewage derived litter	5
Figure 2.2 - Example showing the selection of upstream and downstream sewage litter sampling stretches to avoid non-uniform river sections	7
Figure 2.3 - Location of sewage fungus sampling points	8
Figure 4.1 - Flow diagram illustrating stages in CSO assessment procedure	20

SECTION 1 - INTRODUCTION

This report is a supplement to report FR 0465 (Development of a procedure for assessing the impact of combined sewer overflows) and contains guidance on procedures which can be used for assessing the impact of combined sewer overflows (CSOs) on rivers and canals. The procedure is intended for broad-brush assessment of a large number of CSOs (on a catchment, regional, or similar scale) to enable identification of those CSOs that are unsatisfactory. The methodology presented here has drawn on procedures used by different NRA Regions and on comments from representatives of the NRA and Water Utilities. Details of data requirements are given and, where this involves field assessments, methodologies are clearly set out. The procedure for recording data in the field is explained in Section 2.2 (a sample proforma is presented in Appendix A and completed proformas from actual field visits are presented in Appendix B). The procedure for scoring this data and other impact assessment data collected from office records is given in Section 2.3. The procedure used for scoring additional information relating to receiving water use is given in Section 2.4. The methods used for classifying CSOs in terms of their impact on receiving waters and for classifying receiving water use, is presented in Section 3. Guidelines for subsequent prioritisation for improvement are given in Section 4.

Full details of the development of this methodology can be found in report FR 0465. The work was jointly funded by FWR and the NRA.

Note that the assessment procedure does not include macroinvertebrate sampling, however, it could be used to gain additional information in cases of uncertainty.

SECTION 2 - RECOMMENDED CSO ASSESSMENT PROCEDURE

2.1 INTRODUCTION

This section provides details on a) the methodology which can be employed at field sites for the assessment of CSO impact (Section 2.2), b) a scoring system for impact components (Section 2.3), and c) a scoring system for receiving water use (Section 2.4).

2.2 FIELD METHODOLOGY

2.2.1 General

At field sites, data should be collected on a range of different aspects of overall impact (public access/amenity value, dry-weather operation, sewage-derived litter and sewage fungus) each of which is described below (an example of the proforma which should be used for recording field collected data is presented in Appendix A). Where data relating to a particular impact category are collected at different locations within a site (i.e. sewage-derived litter and sewage fungus), the same assessor should collect the information to avoid operator bias. Data from the field sites should be collected during periods of normal flow and during dry weather. The assessment of dry and wet weather will inevitably contain an element of subjective judgement but dry weather should be defined by very little or no rainfall in the area in the previous 24 hours. If there is some uncertainty (particularly if CSOs are discharging) rainfall data and river flow data (from the nearest gauging station) should be examined if available.

Due to the transient nature of CSO impact, more than one site visit is recommended. Visits to each site should be separated by a reasonable time span, ideally by three months. In the examples given in Appendix B, site visits were made on three occasions.

Where there is more than one CSO at a site these should be treated as a unit, with sampling carried out upstream and downstream of the group. In some cases, depending on their proximity, it may be desirable to sample between CSOs as well for better resolution.

2.2.2 Assessment of dry-weather operation

The dry-weather operational status of each CSO should be recorded as one of the categories shown in Table 2.1.

Table 2.1 - Categories of CSO dry-weather operational status

Category	Description
Sewage discharging	Discharge definitely identifiable as sewage e.g. sewage solids present, turbid discharge, possibly some foaming, sewage smell.
Clear discharge	When viewed from a position close to the CSO, the discharge appears clear.
Unidentifiable discharge*	When discharge cannot be positively identified as sewage or a clear discharge e.g. when the CSO cannot be viewed at close proximity.
No discharge	No discharge
Assessment not possible	Assessment not possible e.g. CSO is submerged or is situated in a culverted section of river.

* An unidentified discharge should be investigated further

The operational status should also be recorded if the weather is wet (see Section 2.2.1) at the time of the site visit since this information may be useful, for example in determining whether a particular CSO is operating according to consent.

2.2.3 Assessment of sewage-derived litter

At each CSO, estimates should be made of the number of identifiable items of sewage-derived litter (i.e. feminine hygiene products, contraceptives, toilet paper, faeces) at three locations (see Figure 2.1):

- In the immediate vicinity of each CSO.
- Along a stretch of river extending 50 m upstream of each CSO or group of CSOs.
- Along a stretch of river extending 50 m downstream of each CSO or group of CSOs.

For each of these three counts, allocate a score according to the logarithmic scale shown in Table 2.2:

Table 2.2 - Sewage-derived litter scores

Number of items	Score
0	0
1-10	1
11-100	2
101-1000	3
>1000	4

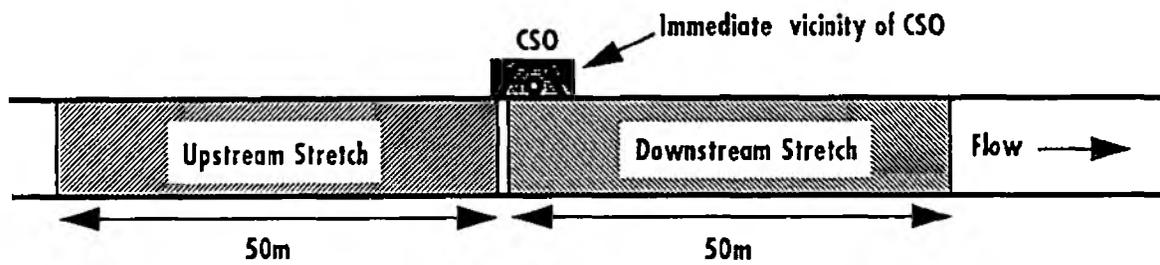


Figure 2.1 Location of sampling points for sewage derived litter

When estimating items in the immediate vicinity of the CSO, include any on the external structure (screen, flap valve, apron etc.) and, for CSOs set back from the water's edge, on the bank immediately in front of the CSO. Do not include items in the river immediately in front of the CSO as these will be counted in the downstream assessment.

For the upstream and downstream stretches select, where possible, a 50 m stretch starting at the CSO. These should be as similar as possible. If, for example, there is a bridge adjacent to the CSO, choose a stretch starting beyond the bridge. If the nature of the banks or watercourse changes such that a relatively uniform 50 m stretch cannot be found, then shorter but equal length stretches should be selected. For example, if the river enters a canalised section 30 m downstream, then stretches extending 0-30 m downstream and 0-30 m upstream of the CSO should be selected. Figure 2.2 gives an example of how to select uniform stretches in this kind of situation. If it is not possible to identify similar upstream and downstream stretches then this part of the assessment should be abandoned.

To assess the number of sewage-derived litter items, walk the length of each stretch once, counting visible items. Wherever possible, assess the stretch by wading in the water (ensuring that safety regulations/guidelines are met).

Include items in the river, on the bank and on overhanging vegetation. When a large amount of sewage litter is present, the number of items can be estimated to save time.

Where multiple CSOs discharge into a stretch of river, sewage litter should be assessed upstream and downstream of the group of CSOs and in the immediate vicinity of each individual CSO.

An additional subjective assessment can be made of the general aesthetic appearance of the CSO and surrounding area and classified as good, fair or poor.

2.2.4 Assessment of sewage fungus

The presence/absence of sewage fungus should be assessed on each CSO structure and, where possible, at three sites within the river (see Figure 2.3):

- At a suitable site (see below) within about 50 m upstream of the CSO;
- Within the mixing zone, immediately downstream of the CSO and adjacent to the bank on which the CSO is situated;
- At the first suitable site situated at a distance of greater than seven river widths downstream of the CSO (seven river widths is used to arbitrarily define the extent of the mixing zone).

At each site, pick up ten cobble-sized stones (usually defined as >64 mm - <256 mm) and estimate the percentage cover of sewage fungus over the whole stone (i.e. top and bottom) to the nearest 10%. Record the percentage cover on each stone separately. Ensure that stones are taken from locations at each site that are as similar as possible for conditions such as flow, depth, and river bed composition.

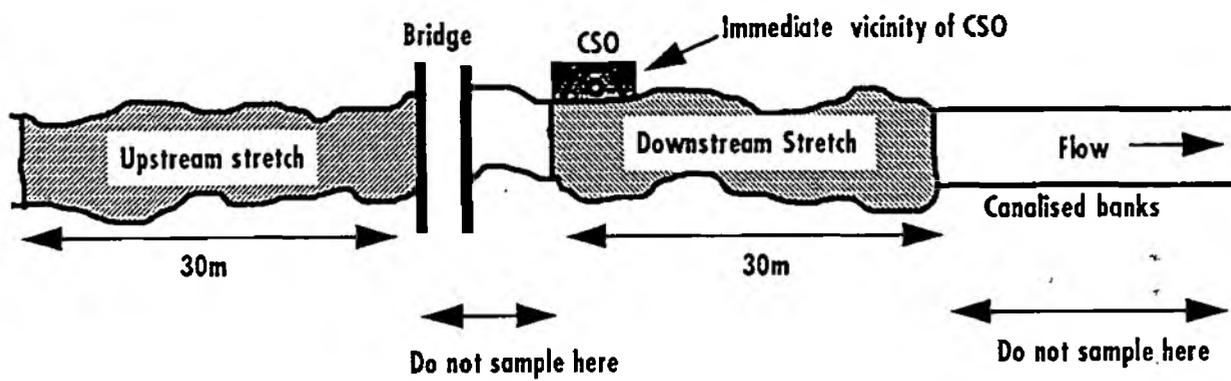


Figure 2.2 Example showing the selection of upstream and downstream sewage litter sampling stretches to avoid non-uniform river sections.

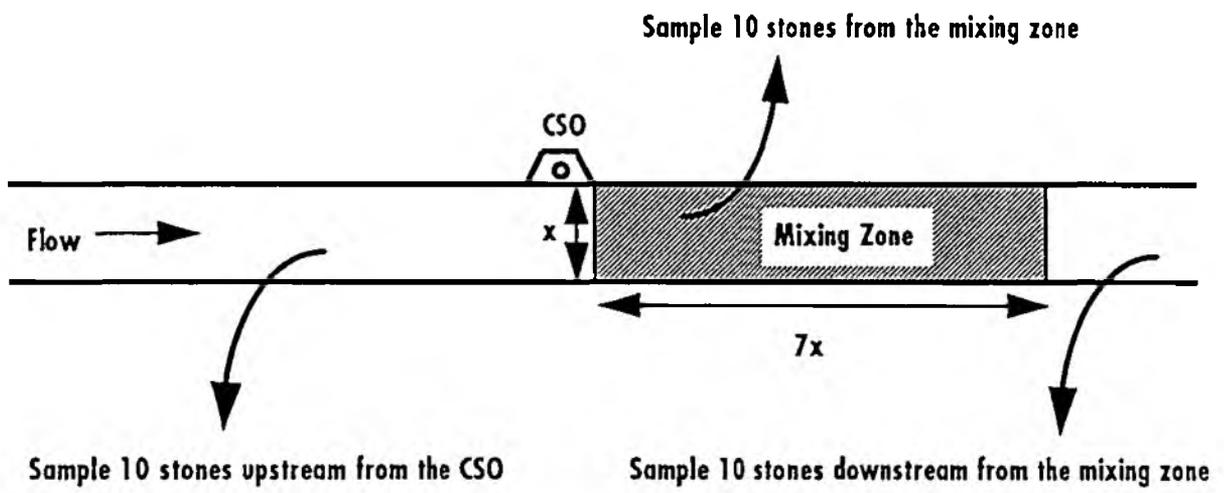


Figure 2.3 Location of sewage fungus sampling points

2.2.5 Assessment of public access/amenity value

This information will be used to classify the value of receiving waters in terms of their use (see Section 2.4). The public access/amenity value of the receiving water should be assessed and allocated to one of the categories in Table 2.3 (these categories are recommended in the AMP2 guidelines).

Table 2.3 - Criteria relating to public access/amenity value of the receiving water

Category	Criterion
Non-amenity	Seldom or never used for amenity purposes, remote or inaccessible area.
Low amenity	Casual riverside access on a limited or infrequent basis, such as a road bridge in a rural area, footpath adjacent to watercourse.
Moderate amenity	Boating on receiving water, popular footpath adjacent to watercourse, watercourse passes through housing development or frequently used town centre area (e.g. bridge, pedestrian area, shopping area).
High amenity	Influences an area where bathing and water contact sport (immersion) is regularly practised, receiving watercourse passes through a formal public park or formal picnic site.

2.3 SCORING OF IMPACT ASSESSMENT COMPONENTS

2.3.1 General

This section outlines a scoring system for the data described in Section 2.2 from which CSOs requiring improvement can be prioritised. The impact of each CSO, or group of CSOs, is represented by a string of letters showing the perceived level of impact for each category. "A" represents the highest level of impact and "E" the lowest for each of the categories in Section 2.2.

2.3.2 Dry-weather operation

Information should be sought from records on whether a CSO has any history of dry-weather operation. This, together with the field observation on dry-weather operation, should be scored as in Table 2.4.

Table 2.4 - Scores for dry-weather operation

Category	Score
Assessment not possible (e.g. CSO submerged)	-
No dry-weather sewage discharge/no history of dry-weather sewage discharge	E
*Non-validated history of dry-weather sewage discharge	D
Dry-weather sewage discharge/*validated history of dry-weather discharge	A
Sewage discharged during wet weather	?

* Note that for history of dry weather discharge to be validated a recorded observation of dry-weather discharge must have been made at some time by NRA staff. History of dry-weather discharge should be described as non-validated if evidence is anecdotal.

When the assessment is carried out during wet weather (see Section 2.2.1), if there is no discharge this should be scored as such. However, if sewage is discharging during wet weather then a question mark should be used as a flag for possible further investigation.

2.3.3 Sewage-derived litter

Where an upstream-downstream assessment (Section 2.2.3) of sewage-derived litter has been made, the upstream score (derived from Table 2.2) should be subtracted from the downstream score and the result converted to the appropriate letter score given in Table 2.5. The score for the immediate vicinity of the CSO should similarly be converted and the higher of the two used for the purpose of prioritisation. For example, if an upstream score of 2 and a downstream score of 4 was observed the difference (2) would be scored as "C", but if the immediate vicinity score was 3 (= "B") then this score would determine priority. Where multiple CSOs discharge into a stretch of river, sewage litter should be assessed upstream and downstream of the group of CSOs and in the immediate vicinity of each individual CSO. The highest 'immediate vicinity' score should then be compared with the difference between the upstream and downstream scores and the highest of these scores used for classification.

Table 2.5 - Numerical and equivalent letter scores for sewage-derived litter

Numerical score for sewage litter	Letter score
0	E
1	D
2	C
3	B
4	A

2.3.4 Sewage fungus

The presence of sewage fungus on the CSO structure and that present within the receiving water are scored separately:

Sewage fungus present on CSO structure

The presence/absence of sewage fungus on the CSO should be scored as shown in Table 2.6.

Table 2.6 - Scores for presence/absence of sewage fungus on CSO structure

Sewage fungus on CSO structure	Score
Absent	E
Present	B

Sewage fungus in receiving waters

To score the presence of sewage fungus, first calculate the mean percentage cover for the ten stones taken from the immediate mixing zone (Section 2.2.4) and assign an alphabetic score from Table 2.7.

Table 2.7 - Scores for sewage fungus present in immediate mixing zone

Mean % cover (immediate mixing zone)	Score
<2%	E
2% - 20%	D
21% - 50%	B
>50% or if present outside immediate mixing zone	A

If sewage fungus is present in the river downstream of the mixing zone (defined by seven river-widths) assign a score of A, if it is not present downstream then use the score defined by the mean percentage cover for the ten stones collected in the immediate mixing zone. Two percent has been chosen as the cut-off point for the minimum score because this would require either 20% cover on one stone or 10% cover on two stones (since cover is estimated to the nearest 10% for ten stones). This reduces the possibility of incorrect scoring through the mis-identification of a small amount of material on a single stone.

The percentage cover of sewage fungus upstream of the CSO is not used for scoring purposes, but if present, the site should be investigated further to ascertain the cause.

2.3.5 Public complaints and/or pollution incidents

Information on public complaints and/or pollution incidents should be obtained from NRA pollution records and local councils. Use the scoring system in Table 2.8 for the number of (validated) public complaints and/or pollution incidents over a period of one year. Public complaints and pollution incidents should, where possible, be scored separately and the highest score should be used to classify the CSO.

Table 2.8 - Scores for public complaints and/or pollution incidents

Complaints/incidents No. yr ⁻¹	Score
0	E
1-2	D
3-10	C
>10	B

2.3.6 Receiving water class change/long-term river quality objective (LTRQO) failure

Where a CSO (or group of CSOs) is known, or suspected, to be causing a change in the water quality class (either NWC or GQA, whichever is applicable) of the receiving water, or a failure of the long-term river quality objective (LTRQO), a score should be applied using Table 2.9. Note that this relates to changes/failures directly attributable to the CSO(s) and not to a general urban impact. Note that "suspected" implies that careful consideration has been given to all available information on the CSO, receiving water and other discharges.

Table 2.9 - Scores for receiving water class change/LTRQO failure

Category	Score
No class change or LTRQO failure	E
One of a group of CSOs suspected of causing/contributing to LTRQO failure	D
One of a group of CSOs causing/contributing to a LTRQO failure or suspected of causing/contributing to a class change OR a single CSO suspected of causing/contributing to LTRQO failure	C
One of a group of CSOs causing/contributing to a class change or a single CSO suspected of causing a class change OR a single CSO causing/contributing to LTRQO failure	B
Single CSO causing/contributing to a class change	A

2.4 SCORING OF RECEIVING WATER USE-RELATED FACTORS

2.4.1 General

This section outlines the scoring system used for ranking receiving waters in relation to their uses. This system is separated from the assessment of impact given in Section 2.3 and used to further categorise impact once the impact assessment has been carried out; numerical scores are used to avoid any confusion with the impact scores derived in Section 2.3. Individual scores for fishery status, conservation status, downstream potable abstraction and public access/amenity value are presented. The scores are weighted to reflect the perceived degree of importance of the different uses. Information on fisheries status and conservation status should be available from NRA fisheries and conservation officers.

2.4.2 Fishery status

The scoring system given in Table 2.10 is based on the draft classification scheme for the fisheries ecosystem proposed by the NRA (and presented in a recent DoE consultation paper) for the purpose of setting Statutory Water Quality Objectives (SWQOs).

Table 2.10 - Scores for fishery status of receiving waters

Fishery description	Score
Some fish species may be present but no sustainable fishery exists	0
Sustainable cyprinid fishery present	1
High class cyprinid fishery present	2
Sustainable salmonid and high class cyprinid fishery present	3
High class salmonid and cyprinid fisheries present	4

2.4.3 Conservation status

Table 2.11 shows the scoring system for the conservation status of the receiving waters.

Table 2.11 - Scores for conservation status of receiving waters

Conservation status	Score
Discharge does not impinge on a site with special conservation status	0
Discharge impinges on a non-designated conservation site or a site of local importance	2
Discharge impinges on a designated conservation site or site of National importance	4

2.4.4 Potable abstraction

The presence of abstraction points for potable supply should be scored using Table 2.12.

Table 2.12 - Scores for potable abstraction

Category	Score
No potable abstraction <10 km downstream	0
Potable abstraction <10 km downstream	2
CSO known to affect abstraction	4

Ten kilometres is taken as an arbitrary cut-off for downstream distance of potable water abstraction.

2.4.5 Public access/amenity value

Scores for access/amenity (Section 2.2.5) should be allocated using Table 2.13.

Table 2.13 - Scores for public access/amenity value

Category	Score
Non-amenity	0
Low amenity	1
Moderate amenity	2
High amenity	3

2.5 SUMMARY OF DATA REQUIREMENTS

The list below gives a summary of all the data required for the CSO assessment procedure:

Field data

- Dry-weather operation
- Sewage litter
- Sewage fungus
- Public access/amenity*

Data from records

- History of dry-weather operation
- Public complaints
- Pollution incidents
- Receiving water class change/LTRQO failure
- Fishery status*
- Conservation status*
- Potable abstraction points*

* denotes information on receiving water use

SECTION 3 - CLASSIFICATION OF CSO IMPACT

3.1 INTRODUCTION

Ultimately, the aim of a "CSO assessment" exercise is to identify which CSOs are unsatisfactory and, possibly, to prioritise the worst of these for improvement. This section describes the method used for classification and prioritisation of CSOs using the scores derived in Section 2. Worked examples using data collected during trials of the CSO assessment methodology are presented in Appendix B.

3.2 CLASSIFICATION OF CSOs BASED ON ASSESSED IMPACT

CSOs, or groups of CSOs, can be classified by allocating a string of six letters (e.g. BEBACD) corresponding to the scores for each of the measured impact types. Where data are missing use a dash. The criteria given in Table 3.1 should be used to class CSOs as satisfactory, unsatisfactory or very unsatisfactory.

Table 3.1 - Criteria for classification of CSO impact

Class	Criterion
Satisfactory	All Es with only one D permitted
Unsatisfactory	At least two Ds or one C present
Very unsatisfactory	At least two Bs or one A present

This approach has been taken so that the final assessment is in a form that conveys information on the nature of impact that is immediately accessible. Thus CSOs that are unsatisfactory due only to aesthetic impact can be distinguished from those that are causing water quality problems and those having both types of impact.

Depending on the number of site visits made to each CSO, it is recommended that the highest score for each scoring category is used (differences in score may occur when sites are visited on more than one occasion due to the transient nature of CSO impact). Ultimately, assessment will probably be made from a maximum of two visits, and the degree of impact assessed will partly depend on previous weather conditions and other factors. Taking the higher score will give an indication of the worst case impact for a particular CSO, while further investigation will pin-point any one-off problems such as discharge caused by sewer blockage.

3.3 CLASSIFICATION OF CSOs BASED ON RECEIVING WATER USE

The criteria given in Table 3.2 can be used for a use-related classification of the receiving water.

Table 3.2 - Criteria for classification of receiving water use

Receiving water Use-related class	Criterion
Low value	A single score of 1 or less
Medium value	Any score of 2 or two scores of 1
High value	Any score above 2 or two or more scores of 2

SECTION 4 - PRIORITISATION OF CSOs FOR IMPROVEMENT

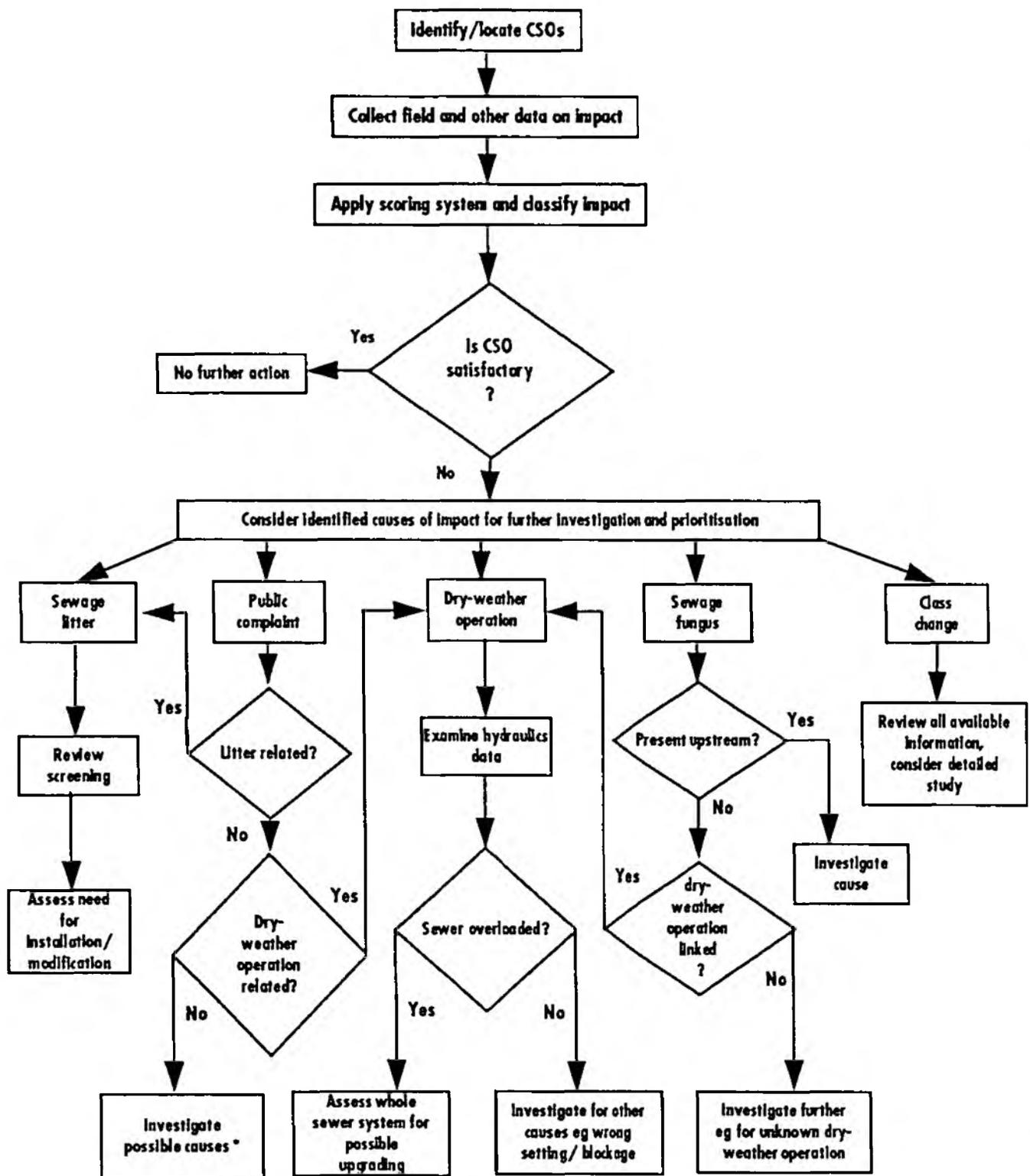
Once the assessment of impact of CSOs has been completed, the use-related classification and information on the sewer system (see below) should be taken into account when developing a prioritisation for sewer/CSO upgrading.

Clearly attention will focus on those CSOs classified as very unsatisfactory but all those deemed either unsatisfactory or very unsatisfactory should be considered on a case by case basis. The identified nature of the impact will play an important part in decision making. Where the only recorded impact is aesthetic, the existing screening, if any, will need to be considered. Where dry-weather or premature operation is the primary problem, an assessment should be made of sewer hydraulics data to assess whether the cause is hydraulic overloading, incorrect overflow setting or sewer blockage. This will include (depending on availability) population equivalent and measured dry-weather flow, maximum flow capacity, any modelling data and predicted spill frequency.

If there is an impact on receiving water class/LTRQO (especially if this is the only type of impact) supplementary information will be required relating to the presence of trade effluents in the sewerage system and any sewer monitoring/sampling data. Figure 4.1 gives an overview of the whole CSO impact assessment and classification procedure, together with follow-up actions required.

The use-related class should be used to assist in the prioritisation for upgrading; CSOs impinging on high amenity receiving water sites may be considered to be of higher priority than those having equivalent impact on low amenity sites.

Biological information is not included in the recommended methodology because the resource requirements are too high for a wide-scale assessment programme, and it was found not to give much extra information (see report FR 0465). However, it could be used to gain additional information in cases of uncertainty. Interpretation could be based on upstream-downstream differences in biotic scores or RIVPACS EQI bandings.



* Complaints could be due to factors such as pooling of sewage, coloured discharges, foaming or fish kills.

Figure 4.1 Flow diagram illustrating stages in CSO assessment procedure

**APPENDIX A - SUGGESTED PROFORMA FOR FIELD DATA
COLLECTION**

CSO ASSESSMENT FIELD PROFORMA

Assessor's name Date
 Time

1. GENERAL INFORMATION

Site/CSO name
 Receiving water End of pipe NGR*
 CSO reference no. Structure NGR*
 Consent number Consent NGR
 * use ≥8 digit NGR eg SJ 1234 5678 Weather (dry or wet over previous 24 hours)

2. PUBLIC ACCESS/AMENITY VALUE

Non-amenity	- seldom or never used for amenity purposes; remote or inaccessible	Tick
Low	- basic amenity use only; casual riverside access on limited or infrequent basis such as a roadbridge in a rural area, footpath adjacent to watercourse	<input type="checkbox"/>
Medium	- boating on receiving water, popular footpath adjacent to watercourse; watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area)	<input type="checkbox"/>
High	- influences area where bathing and water-contact sport (immersion) is regularly practised (eg wind-surfing, sports canoeing); receiving water passes through formal public park; formal picnic site	<input type="checkbox"/>

3. DRY-WEATHER OPERATION

Sewage discharging	Tick		
Clear discharge	<input type="checkbox"/>		
Unidentified discharge	<input type="checkbox"/>		
No discharge	<input type="checkbox"/>		
Other (eg submerged)	<input type="checkbox"/>		

Wet weather?

No	Tick		
Yes	<input type="checkbox"/>	→	If CSO is discharging in dry weather has this been reported?
	<input type="checkbox"/>		No
	<input type="checkbox"/>		Yes

Make a sketch map of the field site on the reverse of this form, showing the position of the CSO and the location of all sampling points. Take photograph(s) to show the CSO and its location

4. SEWAGE-DERIVED LITTER

Scores: 0 = 0; 1 = 1-10; 2 = 11-100; 3 = 101-1000; 4 = >1000 items

Immediate vicinity	Score	Stretch starts how many metres from CSO?
	<input type="checkbox"/>	
50 m upstream stretch	<input type="checkbox"/>	→ <input type="checkbox"/>
50 m downstream stretch	<input type="checkbox"/>	→ <input type="checkbox"/>

5. SEWAGE FUNGUS

(a) Present on CSO structure?

No Yes

(b) In-river assessment

Assess the percentage cover (to nearest 10%) of sewage fungus on ten cobble-sized stones at three sites: (1) upstream, (2) immediately downstream; (3) >7 river-widths downstream.

Site	Distance from CSO (m)	Percentage cover of sewage fungus on stones									
		1	2	3	4	5	6	7	8	9	10
Upstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Immediately downstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>7 river-widths downstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. SUBJECTIVE IMPRESSION OF CSO AND SURROUNDS

Tick one:

Good Fair Poor

**APPENDIX B - WORKED EXAMPLES OF CSO ASSESSMENT
PROCEDURE**

APPENDIX B - WORKED EXAMPLES OF CSO ASSESSMENT PROCEDURE

Examples of the information collected from two field study sites used during the development of the assessment methodology are presented. These sites (one in Anglian region and one in Welsh region, see proformas for further site details) were visited on three separate occasions (June 1993, September 1993 and November 1993/January 1994). Completed proformas are given for each visit.

The information collected from the field site visits and the additional information required for impact assessment is summarised in Table B1 below.

Table B1 - Example scores from information collected for impact assessment from three site visits (June/Sept/Nov-Jan)

	Scores	
	Example 1 Site A5, R Ivel June/Sept/Nov-Jan	Example 2 Site W10, Rhymney June/Sept/Nov-Jan
Dry-weather operation	E/E/E	E/E/E
Sewage litter	E/E/E	E/C/D
Sewage fungus (in river)	-/-	E/E/E
Sewage fungus (on structure)	-/E/E	B/B/B
Public complaints/pollution incidents	E	E
Receiving water Class change/LTRQO failure	E	E
Classification	SATISFACTORY	UNSATISFACTORY

The use-related information is presented in Table B2 below.

Table B2 - Use-related information (scores in parenthesis)

	Scores	
	Site A5, R Ivel	Site W10, Rhymney
Potable abstraction	None < 10 km downstream (0)	None < 10 km downstream (0)
Fishery status	Sustainable (3) salmonid	'Salmonids (3) present'
Conservation status	None (0)	None (0)
Public access/amenity value	Medium (2)	Inaccessible (0)
Use-related class	HIGH	HIGH

CSO ASSESSMENT FIELD PROFORMA

Assessor's name / Milne

Date 24/6/93

Time 08:15

4. SEWAGE-DERIVED LITTER

Scores: 0 = 0; 1 = 1-10; 2 = 11-100; 3 = 101-1000; 4 = >1000 items

	Score	Stretch starts how many metres from CSO?
Immediate vicinity	<input style="width: 20px;" type="text" value="0"/>	
50 m upstream stretch	<input style="width: 20px;" type="text" value="0"/>	→ <input style="width: 20px;" type="text" value="0"/>
50 m downstream stretch	<input style="width: 20px;" type="text" value="0"/>	→ <input style="width: 20px;" type="text" value="0"/>

5. SEWAGE FUNGUS

(a) Present on CSO structure?

No Yes

(b) In-river assessment

Assessment not possible

Assess the percentage cover (to nearest 10%) of sewage fungus on ten cobble-sized stones at three sites: (1) upstream, (2) immediately downstream; (3) >7 river-widths downstream.

Site	Distance from CSO (m)	Percentage cover of sewage fungus on stones									
		1	2	3	4	5	6	7	8	9	10
Upstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Immediately downstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>7 river-widths downstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. SUBJECTIVE IMPRESSION OF CSO AND SURROUNDS

Tick one:

Good Fair Poor

1. GENERAL INFORMATION

Site/CSO name The Boot

Receiving water River Ivel End of pipe NGR* TL 18454058

CSO reference no. - Structure NGR* -

Consent number - Consent NGR -

* use ≥8 digit NGR
eg SJ 1234 5678

Weather (dry or wet over previous 24 hours) Dry

2. PUBLIC ACCESS/AMENITY VALUE

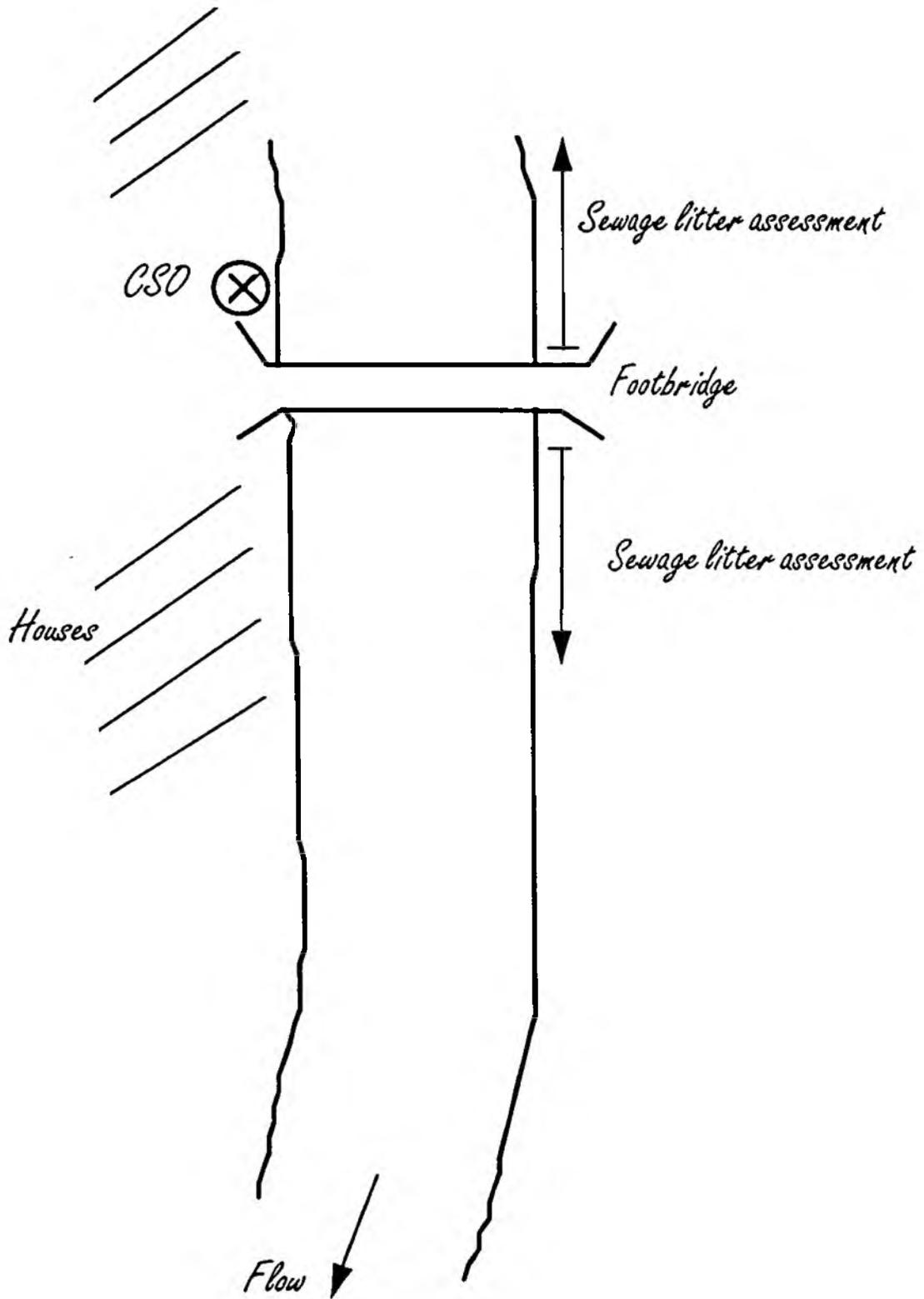
Non-amenity	- seldom or never used for amenity purposes; remote or inaccessible	Tick <input type="checkbox"/>
Low	- basic amenity use only; casual riverside access on limited or infrequent basis such as a roadbridge in a rural area, footpath adjacent to watercourse	<input type="checkbox"/>
Medium	- boating on receiving water, popular footpath adjacent to watercourse; watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area)	<input checked="" type="checkbox"/>
High	- influences area where bathing and water-contact sport (immersion) is regularly practised (eg wind-surfing, sports canoeing); receiving water passes through formal public park; formal picnic site	<input type="checkbox"/>

3. DRY-WEATHER OPERATION

Sewage discharging	Tick <input type="checkbox"/>	Wei weather?		
Clear discharge	<input type="checkbox"/>	No	Tick <input checked="" type="checkbox"/>	If CSO is discharging in dry weather has this been reported?
Unidentified discharge	<input type="checkbox"/>	Yes	<input type="checkbox"/>	
No discharge	<input checked="" type="checkbox"/>			No <input type="checkbox"/>
Other (eg submerged)	<input type="checkbox"/>			Yes <input type="checkbox"/>

Make a sketch map of the field site on the reverse of this form, showing the position of the CSO and the location of all sampling points. Take photograph(s) to show the CSO and its location

SITE A5 - THE BOOT, RIVER IVEL



CSO ASSESSMENT FIELD PROFORMA

Assessor's name 1 Milne Date 16/9/93
 Time 15:40

1. GENERAL INFORMATION

Site/CSO name The Boot
 Receiving water River Ivel End of pipe NGR* TL 18454058
 CSO reference no. - Structure NGR* -
 Consent number - Consent NGR -
 * use ≥8 digit NGR eg SJ 1234 5678 Weather (dry or wet over previous 24 hours) Wet

2. PUBLIC ACCESS/AMENITY VALUE

Non-amenity - seldom or never used for amenity purposes; remote or inaccessible Tick
 Low - basic amenity use only; casual riverside access on limited or infrequent basis such as a road/bridge in a rural area, footpath adjacent to watercourse
 Medium - boating on receiving water, popular footpath adjacent to watercourse; watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area)
 High - influences area where bathing and water-contact sport (immersion) is regularly practised (eg wind-surfing, sports canoeing); receiving water passes through formal public park; formal picnic site

3. DRY-WEATHER OPERATION

Wet weather? Tick
 Sewage discharging No If CSO is discharging in dry weather has this been reported? No Yes
 Clear discharge Yes
 Unidentified discharge
 No discharge
 Other (eg submerged)

Make a sketch map of the field site on the reverse of this form, showing the position of the CSO and the location of all sampling points. Take photograph(s) to show the CSO and its location

4. SEWAGE-DERIVED LITTER

Scores: 0 = 0; 1 = 1-10; 2 = 11-100; 3 = 101-1000; 4 = >1000 items

Immediate vicinity	Score <input type="text" value="0"/>	Stretch starts how many metres from CSO?
50 m upstream stretch	<input type="text" value="0"/> → <input type="text" value="0"/>	
50 m downstream stretch	<input type="text" value="0"/> → <input type="text" value="0"/>	

5. SEWAGE FUNGUS

(a) Present on CSO structure?
 No Yes

(b) In-river assessment *Assessment not possible*

Assess the percentage cover (to nearest 10%) of sewage fungus on ten cobble-sized stones at three sites: (1) upstream, (2) immediately downstream; (3) >7 river-widths downstream.

Site	Distance from CSO (m)	Percentage cover of sewage fungus on stones									
		1	2	3	4	5	6	7	8	9	10
Upstream	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Immediately downstream	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
>7 river-widths downstream	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

6. SUBJECTIVE IMPRESSION OF CSO AND SURROUNDS

Tick one:
 Good Fair Poor

CSO ASSESSMENT FIELD PROFORMA

Assessor's name / Milne Date 29/11/93
 Time 10:40

1. GENERAL INFORMATION

Site/CSO name The Boot
 Receiving water River loel End of pipe NGR* TL 18454058
 CSO reference no. - Structure NGR* -
 Consent number - Consent NGR -
 * use ≥8 digit NGR eg SJ 1234 5678 Weather (dry or wet over previous 24 hours) Dry

2. PUBLIC ACCESS/AMENITY VALUE

	Non-amenity - seldom or never used for amenity purposes; remote or inaccessible	Tick <input type="checkbox"/>
Low	- basic amenity use only; casual riverside access on limited or infrequent basis such as a roadbridge in a rural area, footpath adjacent to watercourse	<input type="checkbox"/>
Medium	- boating on receiving water, popular footpath adjacent to watercourse; watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area)	<input checked="" type="checkbox"/>
High	- influences area where bathing and water-contact sport (immersion) is regularly practised (eg wind-surfing, sports canoeing); receiving water passes through formal public park; formal picnic site	<input type="checkbox"/>

3. DRY-WEATHER OPERATION

	Sewage discharging	Tick <input type="checkbox"/>	Wet weather?			
	Clear discharge	<input type="checkbox"/>	No	<input type="checkbox"/>	→ If CSO is discharging in dry weather has this been reported?	No
	Unidentified discharge	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>		Yes
	No discharge	<input checked="" type="checkbox"/>				
	Other (eg submerged)	<input type="checkbox"/>				

Make a sketch map of the field site on the reverse of this form, showing the position of the CSO and the location of all sampling points. Take photograph(s) to show the CSO and its location

4. SEWAGE-DERIVED LITTER

Scores: 0 = 0; 1 = 1-10; 2 = 11-100; 3 = 101-1000; 4 = >1000 items

	Score	Stretch starts how many metres from CSO?
Immediate vicinity	<input style="width: 30px; text-align: center;" type="text" value="0"/>	
50 m upstream stretch	<input style="width: 30px; text-align: center;" type="text" value="0"/>	→ <input style="width: 30px; text-align: center;" type="text" value="0"/>
50 m downstream stretch	<input style="width: 30px; text-align: center;" type="text" value="0"/>	→ <input style="width: 30px; text-align: center;" type="text" value="0"/>

5. SEWAGE FUNGUS

(a) Present on CSO structure?

No Yes

(b) In-river assessment

Assessment not possible

Assess the percentage cover (to nearest 10%) of sewage fungus on ten cobble-sized stones at three sites: (1) upstream, (2) immediately downstream; (3) >7 river-widths downstream.

Site	Distance from CSO (m)	Percentage cover of sewage fungus on stones									
		1	2	3	4	5	6	7	8	9	10
Upstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Immediately downstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>7 river-widths downstream	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. SUBJECTIVE IMPRESSION OF CSO AND SURROUNDS

Tick one:

Good Fair Poor

CSO ASSESSMENT FIELD PROFORMA

Assessor's name S Clarke Date 17/6/93
 Time 12:05

1. GENERAL INFORMATION

Site/CSO name Pontlottyn
 Receiving water Rhymney End of pipe NGR* SD 11800631
 CSO reference no. W10 Structure NGR* SD 12050620
 Consent number AF 3001303 Consent NGR SD 1185006300
 * use ≥8 digit NGR eg SJ 1234 5678 Weather (dry or wet over previous 24 hours) Dry

2. PUBLIC ACCESS/AMENITY VALUE

Non-amenity - seldom or never used for amenity purposes; remote or inaccessible Tick
 Low - basic amenity use only; casual riverside access on limited or infrequent basis such as a roadbridge in a rural area, footpath adjacent to watercourse
 Medium - boating on receiving water, popular footpath adjacent to watercourse; watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area)
 High - influences area where bathing and water-contact sport (immersion) is regularly practised (eg wind-surfing, sports canoeing); receiving water passes through formal public park; formal picnic site

3. DRY-WEATHER OPERATION

Sewage discharging Tick Wet weather? Tick
 Clear discharge No If CSO is discharging in dry weather has this been reported? No
 Unidentified discharge Yes Yes
 No discharge

Make a sketch map of the field site on the reverse of this form, showing the position of the CSO and the location of all sampling points. Take photograph(s) to show the CSO and its location

4. SEWAGE-DERIVED LITTER

Scores: 0 = 0; 1 = 1-10; 2 = 11-100; 3 = 101-1000; 4 = >1000 items

	Score	Stretch starts how many metres from CSO?
Immediate vicinity	0	
50 m upstream stretch	2	100
50 m downstream stretch	2	0

5. SEWAGE FUNGUS

(a) Present on CSO structure?

No Yes

(b) In-river assessment

Assess the percentage cover (to nearest 10%) of sewage fungus on ten cobble-sized stones at three sites: (1) upstream, (2) immediately downstream; (3) >7 river-widths downstream.

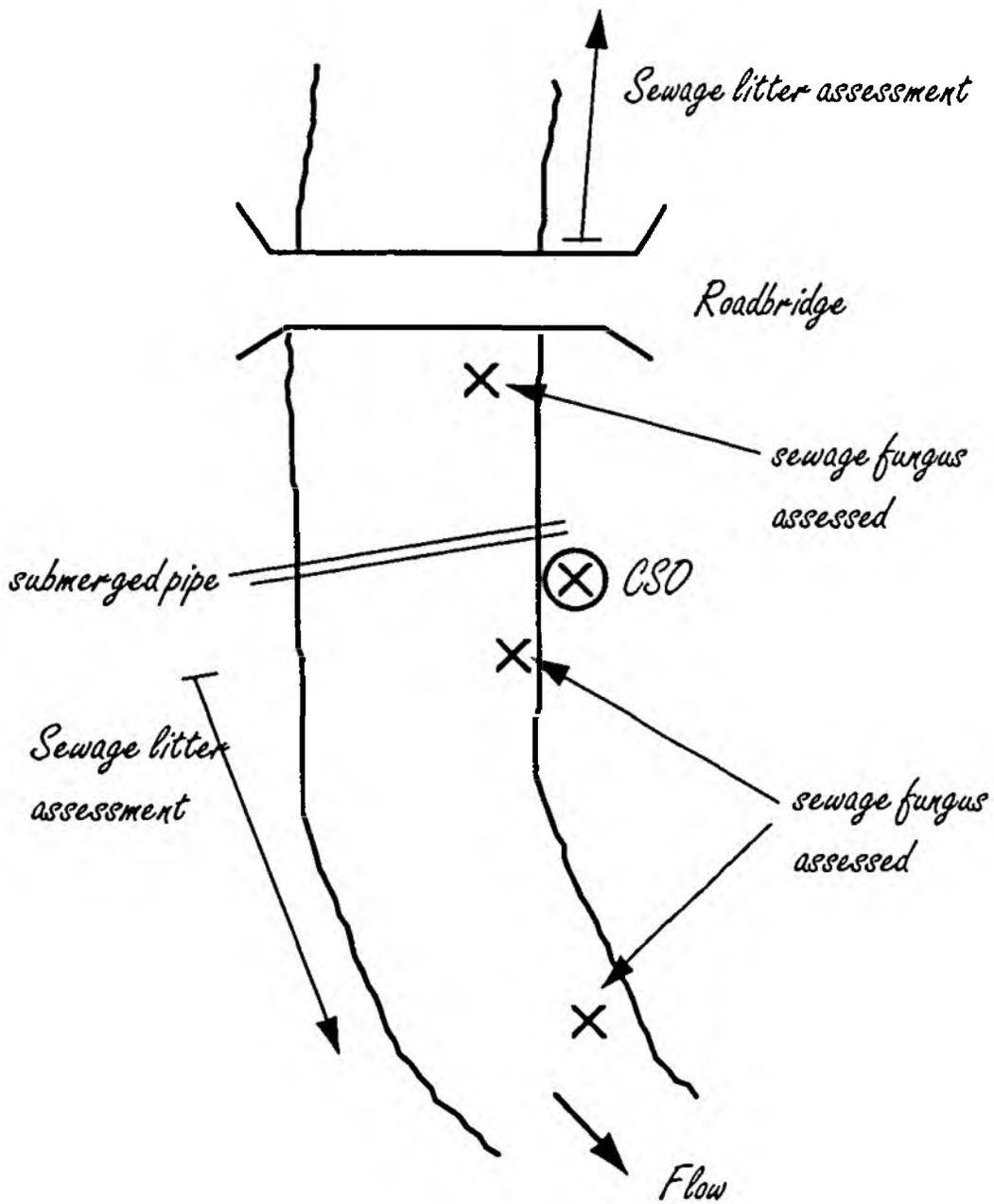
Site	Distance from CSO (m)	Percentage cover of sewage fungus on stones									
		1	2	3	4	5	6	7	8	9	10
Upstream	80	0	0	0	0	0	0	0	0	0	0
Immediately downstream	2	0	0	0	0	0	0	0	0	0	0
>7 river-widths downstream	100	0	0	0	0	0	0	0	0	0	0

6. SUBJECTIVE IMPRESSION OF CSO AND SURROUNDS

Tick one:

Good Fair Poor

SITE W10 - PONTLOTTYN, RHYMNEY



CSO ASSESSMENT FIELD PROFORMA

Assessor's name S Clarke Date 21/9/93
 Time 13:25

1. GENERAL INFORMATION

Site/CSO name Pontlloftyn
 Receiving water Rhymney End of pipe NGR* SD 11800631
 CSO reference no. W10 Structure NGR* SD 12050620
 Consent number AF 3001303 Consent NGR SD 1185006300
 * use ≥8 digit NGR eg SJ 1234 5678
 Weather (dry or wet over previous 24 hours) Wet

2. PUBLIC ACCESS/AMENITY VALUE

Non-amenity - seldom or never used for amenity purposes; remote or inaccessible Tick

Low - basic amenity use only; casual riverside access on limited or infrequent basis such as a roadbridge in a rural area, footpath adjacent to watercourse

Medium - boating on receiving water, popular footpath adjacent to watercourse; watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area)

High - influences area where bathing and water-contact sport (immersion) is regularly practised (eg wind-surfing, sports canoeing); receiving water passes through formal public park; formal picnic site

3. DRY-WEATHER OPERATION

Sewage discharging Tick

Clear discharge Wet weather? No Yes

Unidentified discharge If CSO is discharging in dry weather has this been reported? No Yes

No discharge

Other (eg submerged)

Make a sketch map of the field site on the reverse of this form, showing the position of the CSO and the location of all sampling points. Take photograph(s) to show the CSO and its location

4. SEWAGE-DERIVED LITTER

Scores: 0 = 0; 1 = 1-10; 2 = 11-100; 3 = 101-1000; 4 = >1000 items

	Score	Stretch starts how many metres from CSO?
Immediate vicinity	<u>2</u>	
50 m upstream stretch	<u>1</u> →	<u>700</u>
50 m downstream stretch	<u>2</u> →	<u>0</u>

5. SEWAGE FUNGUS

(a) Present on CSO structure? No Yes

(b) In-river assessment

Assess the percentage cover (to nearest 10%) of sewage fungus on ten cobble-sized stones at three sites: (1) upstream, (2) immediately downstream; (3) >7 river-widths downstream.

Site	Distance from CSO (m)	Percentage cover of sewage fungus on stones									
		1	2	3	4	5	6	7	8	9	10
Upstream	<u>80</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Immediately downstream	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
>7 river-widths downstream	<u>700</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

6. SUBJECTIVE IMPRESSION OF CSO AND SURROUNDS

Tick one: Good Fair Poor

35

CSO ASSESSMENT FIELD PROFORMA

Assessor's name S Clarke Date 19/1/94

Time 12:05

1. GENERAL INFORMATION

Site/CSO name Pontlottyn

Receiving water Rhydney End of pipe NGR* SD 11800631

CSO reference no. W10 Structure NGR* SD 12050620

Consent number AF 3001303 Consent NGR SD 1185006300

* use ≥8 digit NGR
eg SJ 1234 5678

Weather (dry or wet over previous 24 hours) Dry

2. PUBLIC ACCESS/AMENITY VALUE

Non-amenity - seldom or never used for amenity purposes; remote or inaccessible

Tick

Low - basic amenity use only; casual riverside access on limited or infrequent basis such as a roadbridge in a rural area, footpath adjacent to watercourse

Medium - boating on receiving water, popular footpath adjacent to watercourse; watercourse passes through housing development or frequently used town centre area (eg bridge, pedestrian area, shopping area)

High - influences area where bathing and water-contact sport (immersion) is regularly practised (eg windsurfing, sports canoeing); receiving water passes through formal public park; formal picnic site

3. DRY-WEATHER OPERATION

Sewage discharging

Tick

Wet weather?

Clear discharge

Tick

No

→ If CSO is discharging in dry weather has this been reported?

No

Unidentified discharge

Yes

Yes

No discharge

Other (eg submerged)

Make a sketch map of the field site on the reverse of this form, showing the position of the CSO and the location of all sampling points. Take photograph(s) to show the CSO and its location

4. SEWAGE-DERIVED LITTER

Scores: 0 = 0; 1 = 1-10; 2 = 11-100; 3 = 101-1000; 4 = >1000 items

	Score	Stretch starts how many metres from CSO?
Immediate vicinity	1	
50 m upstream stretch	2	100
50 m downstream stretch	2	0

5. SEWAGE FUNGUS

(a) Present on CSO structure?

No Yes

(b) In-river assessment

Assess the percentage cover (to nearest 10%) of sewage fungus on ten cobble-sized stones at three sites: (1) upstream, (2) immediately downstream; (3) >7 river-widths downstream.

Site	Distance from CSO (m)	Percentage cover of sewage fungus on stones									
		1	2	3	4	5	6	7	8	9	10
Upstream	80	0	0	0	0	0	0	0	0	0	0
Immediately downstream	2	0	0	0	0	0	0	0	0	0	0
>7 river-widths downstream	100	0	0	0	0	0	0	0	0	0	0

6. SUBJECTIVE IMPRESSION OF CSO AND SURROUNDS

Tick one:

Good Fair Poor



FOUNDATION
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