Chapter 3a
Key outputs
Sewerage service

Covering:
DG5 Annual external flooding summary
DG5 Areas on the external "At risk" register

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This table has 25 lines (2 of which are calculated). It covers:

- **DG5 - Annual external flooding summary**

These lines include areas externally flooded as a result of overloaded sewers and other causes.

- **DG5 – Areas on the external "At risk" register**

These lines cover areas at risk of external flooding more frequently than once in twenty years (including more frequently than once in twenty years, once in ten years and twice in ten years), problem status of the external areas on the register and annual changes to the register.

Lines 1 to 11: DG5 Annual external flooding summary

Aim

To measure the frequency of actual flooding of external areas from the **public sewerage system** by foul water, surface water or combined sewage.

Common definitions

External flooding: For the purposes of DG5, **external flooding** is defined as flooding which is not classed as internal. For reporting purposes, external areas will be split into curtilages, highways and other external areas. All incidents should be recorded irrespective of size.

Flooding incidents: For the purpose of the return, a **flooding incident** is defined as an event of external flooding (as defined above) from a public sewer (whether foul, combined or surface water).

Overloaded sewers: A sewer is overloaded when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded. No account should be taken of the severity of the storm causing the incident.

External areas at risk: These are defined as **external areas** that have suffered or are likely to suffer flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant period (once in twenty years or once or twice in ten years).

Severe weather: All flooding incidents should be reported irrespective of the severity of the storm. The company may indicate in the commentaries when flooding incidents have been due to severe rainfall and this information will be taken into account if the information is used in the Levels of Service report. Severe weather incidents should only include rainfall events having a return period that is greater than once in twenty years.

Lines 12 – 25: DG5 External areas on the "At risk" register

Aim

To measure the risk of flooding to external areas from the **public sewerage system** by foul water, surface water or combined sewage.

This measure already exists for internal flooding and is being extended as internal problems are alleviated and the focus turns to external flooding.

Risk assessment

The definition of external areas at risk means that it is unlikely that external areas can be removed from risk by operational improvements.

Information on external areas at risk is to be reported in the form of a balance sheet, which identifies performance against the three DG5 reference levels at the end of the report year as well as the reasons for changes in the reported DG5 figures during the report year. It distinguishes between those problems that have been solved as a result of action by the company and those which come from better information. (External areas should be reported under one of the 1 in 20, 1 in 10 or the 2 in 10 categories.)

Guidance for Annual flooding summary

The table requires that the company report flooding by the number of external areas and the number of incidents.

Flooded areas (line 1):

For the purposes of the annual flooding summary all areas that have experienced external flooding should be reported. If a property suffers external flooding then it should be reported in this line even if on a separate occasion the property has also experienced internal flooding in the report year.

Flooding incidents (lines 2 to 11):

All incidents of external flooding should be reported in the table under the appropriate category. A property that is flooded both internally and externally during the same event should only be recorded on the internal incident flooding summary.

For the purpose of the return, all external flooding incidents caused by the overloading of sewers (which cannot be positively attributed to other causes, such as blockage, collapse or equipment failure) must be reported under the heading of overloaded sewers. This includes flooding incidents caused by severe storms which may be outside the company's design standard for a particular sewer. The commentary should state the number of 'unknown cause' external areas affected by flooding incidents which have been placed in the overloaded sewer category.

There are three categories for the reporting of external flooding: curtilages, highways, other. Examples of floodings within the allocations are:

- ‘curtilage’ - any flooding (except internal flooding) within the curtilage of a residential building – this includes detached garages, linked detached garages as these are not included in the definition of internal flooding;
- ‘highways’ – including footpaths; and
- ‘other’ - external flooding to non-residential buildings and areas e.g. schools, offices, commercial premises and public buildings; public open space; agricultural land; car parks.

Whilst we expect the company to use their best judgement to assess the number of flooded areas some further guidance has been asked for therefore for the purposes of the reporting requirements, highway and ‘other’ flooding should be counted as follows:

Highway flooding:

- If a road floods in two places and the contour of the road is the only reason for two patches of water, then this should be counted as one highway area flooding;
- If a road floods in two places and the flooding is sufficiently far apart to be deemed as coming from two different hydraulic inadequacies in the network, then this should be counted as two highway area floodings; or
- If a road floods at a cross roads or T junction, this should be counted as one highway area flooding.

'Other' flooding

- Flooding to the external area of, offices, commercial premises, public buildings, car parks and agricultural land should be counted as one area irrespective of how many patches of flood water there are, and whether the areas are split into different uses; or
- Flooding to public open spaces should be judged on the use of the area. For example external flooding of a cafe outdoor eating area in a park and the surrounding parkland may be classed as two areas. The company should use the commentary to justify the differentiation of the areas of use.

Areas experiencing repeat flooding due to other causes

We are now collecting data on areas which have experienced repeat flooding due to other causes. This is to enable us to gauge the extent of the problem and may help inform investment decisions for PC10. We expect the company to keep a record of areas which have flooded more than once due to other causes. Initially we will use a ten year period for repeat flooding. This may be revised depending on the data received.

Guidance for at risk register

It should be noted that DG5 measures the frequency of flooding incidents at external areas and not the return period of the storm that causes the flooding.

External areas at risk of flooding will be identified by a number of methods:

- historical information on actual flooding incidents; or
- a **verified** hydraulic model. (**Verified** means that external areas indicated as at risk are known to have flooded, or there is good reason to believe that unreported flooding has occurred, or changes in the network or properties draining to the system clearly put the external area in the at risk category although insufficient time has elapsed for actual flooding to have arisen).

When a previously unreported external area is flooded, it should normally be considered to be at risk and added to the 1 in 20 category unless**:**

- investigation clearly shows that it is at risk of flooding more frequently than once in ten years, when it should be included in the once in ten year category;
- investigation clearly shows that it is at risk of flooding more frequently than twice in ten years, when it should be included in the twice in ten year category;
- the storm was exceptionally severe **and** investigation shows that it is clearly not at risk of flooding as frequently as once in twenty years and the severity of the storm can be verified (e.g. by the Meteorological Office); or
- the cause was a blockage, etc.

In all cases, the decision as to whether a property is to be reported as being at risk should be taken in the context of the aim of the indicator, as set out above.

If a problem is identified and resolved during the report year, it should be entered in the balance sheet as a new problem and as a problem resolved during the same year. (This ensures that NIAUR can identify the number of problems resolved by the company).

Flooding is not always reported. Therefore, when an incident is reported, the company is expected to investigate the extent of the problem and the number of surrounding areas that were affected. These should then be reported in the relevant categories (at risk and incidents). Where the cause of flooding at an external area is still unknown at the time of compilation of the return, then that external area must be categorised as affected by external flooding due to overloaded sewers, and placed in the appropriate risk category.

All external areas which have flooded must be entered in the DG5 register, although those meeting the defined exclusion criteria are not reported as being at risk for the DG5 indicator.

A property should appear on either the internal risk register **or** the external risk register but not both. For example:

- A property that has flooded internally and subsequently floods externally should not be added to the external register but kept on the internal register. However this property should be recorded in lines 1 (‘areas flooded externally in the year’) and line 2 (‘Curtilage flooding incidents in the year’) of this table; or
- A property that has only flooded externally and then floods internally should be removed from the external risk register and placed on the internal risk register and reported in line 25 ‘moved from external to internal register’.

There must be clear and auditable links between the company's register and the DG5 balance sheet.

Mitigation: Mitigation is a temporary solution which lowers but does not eliminate the risk of a property flooding due to hydraulic overload. The company should only install mitigation measures if the flooding is not moved to cause further problems elsewhere. If mitigation measures have to be installed to neighbouring properties to prevent them flooding as part of the overall mitigation solution and the neighbouring properties have never flooded then only the properties that have flooded should be counted in the total number of properties mitigated. A property that is on the 1 in 10 risk register should **not** be moved off the 1 in 10 register or to the lower risk category of 1 in 20 as a result of not flooding due to mitigation measures.

Where such a property is flooded as a result of failure of the mitigation, it should be reported as an overloaded sewer incident.

Properties protected by mitigation measures, reported in lines 18, 19, 26 and 27, should include those where mitigation was installed in earlier years and still reduces the risk of flooding at that property.

Movements between registers

Some companies move properties between the risk registers if they have not flooded for a certain period. We do not expect to see properties that have ‘timed out’ being added back on to the register due to reflooding. The company should use its commentary to inform us if ‘timed out’ properties are being added back on to the register.

Cost calculations

We will require cost information for sewer flooding schemes to be submitted in the company’s business plan for the next review. The company should therefore ensure that they keep a record of their outturn costs for SBP schemes.

Methodology statements

The company is expected to include their methodology statements with each Annual information return. The statement should include:

- How an area is added to the at risk register from the initial flooding incident, for example what investigation is carried out immediately after the incident, which register it goes on to;
- How properties are moved between the 1 in 10, 2 in 10 and 1 in 20 risk registers;
- Mitigation – how a company approaches mitigation, how a mitigated property is treated on the at risk register;
- Definition of severe weather – how the company determines whether an area was flooded due to severe weather; and
- If the methodology for external flooding is the same as internal flooding the company should state this. However a definition of what is counted in the 'curtilage', 'highway' and 'other' categories should be included.
- How cost benefit analysis is applied to areas on the registers.

Records

The company must maintain verifiable records for DG5. The aim of the records is to provide an auditable method for identifying the specific external areas which are affected by flooding or are at risk of experiencing flooding.

The DG5 Register: As part of these records the company must maintain a DG5 register which should form a database of all properties and external areas which experience sewer flooding. It will enable the identification by address of individual properties and external areas which are below the reference level. It should also contain information on (for example) complaints and the results of their investigation, problems which are attributable to customers' apparatus, and properties and external areas which experience sewer flooding but are covered by one of the allowable exclusions. The register must clearly identify those properties and external areas below the reference level, distinguish them from those which have flooded but are not below the reference level and provide a verifiable reason for the exclusion (e.g. flooding was a result of a blockage).

The records should include:

- date of incident;
- properties or external areas affected identified by address;
- cause of flooding (including source and reason, where known);
- action taken;
- name of the persons completing the records;
- the "at risk" category for reporting under DG5;
- if a property on the register is not reported as being at risk under DG5, the reason should be stated; and
- if the internal and external registers are held in the same database then the problem needs to be identified as an internal or external flooding problem.

Company commentary

The company should:

- comment on significant year on year changes in reported figures;
- comment on the number of external areas reported under external flooding due to overloaded sewers because no other cause has been positively identified for flooding incidents at those external areas;
- state whether any allowance has been made for problems as yet undiscovered;

- state any assumptions made in reporting the figures in the balance sheets;
- comment on the reason why, and number of, external areas, which are added and then removed from the at-risk register during the report year. For example, this might include: external areas added to but subsequently removed from the at risk register in the report year due to the rainfall event associated with the flooding incident being assessed as 'severe weather'; or external areas which are added to but subsequently removed due to company action during the report year;
- include the return periods of severe weather incidents reported in line 6 and the number of external areas flooded in each incident;
- include a table in the commentary showing the number of external areas that have experienced repeat hydraulic flooding in the report year and the number of times they have flooded;
- comment on progress of the programme relative to the profile of external problems solved shown in the determination. State any reasons behind any significant changes in outputs in the report year;
- comment on its policy on determining which schemes are cost beneficial; and
- justify the differentiation of the areas of use of parkland.

Guidance to Reporter

The Reporter should comment on:

- whether data collection methods used are appropriate to meet NIAUR's reporting requirements and clearly set out in the methodology statement;
- whether all assumptions have been disclosed and their materiality;
- the appropriateness of the confidence grades assigned;
- the efficacy of the methodologies used and the quality of data employed by the company to identify severe weather events;
- the quality of the data supplied for external flooding and the methodologies used to collect it;
- how a company is counting highway and 'other' areas; and
- the numbers reported in the additions/removals lines in the balance including minimum design storm return periods for areas removed by company action;
- whether the approach to cost benefit analysis is appropriate.

Table 3a line definitions

A ANNUAL FLOODING SUMMARY
(i) OVERLOADED SEWERS

1	Areas flooded externally in the year (overloaded sewers)	nr	0dp
Definition	Total number of areas affected by external flooding incidents in the year due to overloaded sewers.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

2	Curtilage flooding incidents in the year (overloaded sewers)	nr	0dp
Definition	The number of incidents of curtilages affected by external flooding in the year due to overloaded sewers.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

3	Highway flooding incidents (overloaded sewers)	nr	0dp
Definition	Total number of incidents of highways flooded in the year due to overloaded sewers. This includes footpaths.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

4	Other flooding incidents (overloaded sewers)	nr	0dp
Definition	Total number of incidents of other areas affected by external flooding in the year due to overloaded sewers. Examples of other areas includes external flooding to non-residential buildings e.g. schools, offices, commercial premises and public buildings; public open space; agricultural land; car parks.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

5	Total flooding incidents (overloaded sewers)	nr	0dp
Definition	Total number of incidents of areas affected by external flooding in the year due to overloaded sewers.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Calculated: sum of lines 2, 3 and 4.		
Responsibility	Comparative Efficiency & Performance Team		

6	External flooding incidents (overloaded sewers attributed to severe weather)	nr	0dp
Definition	The number of incidents of external flooding caused by overloaded sewers at areas which are known to be **not** at risk of flooding more frequently than once in twenty years. Accordingly, this line's enumeration includes flooding incidents caused by severe storms which affect areas that are not at risk of flooding more frequently than once in twenty years. The company should use the commentary to report the number of flooding incidents caused by severe weather at areas that are already known to be at risk of flooding from sewers more frequently than once in twenty years. Incidents of flooding via the sewers caused by overflowing watercourses should be excluded. The company should include the rainfall return periods for the incidents reported in the commentary.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

(ii) OTHER CAUSES

7	Areas flooded externally in the year (other causes)	nr	0dp
Definition	The number of external areas affected by flooding incidents from equipment failures, blockages or collapses (collectively grouped as other causes). An area affected by more than one incident under this definition is reported as one area in this line.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

8	Areas which have flooded more than once in the last 10 years (other causes)	nr	0dp
Definition	The number of areas which have experienced multiple incidents of external flooding in the last 10 years caused by blockages, collapses and equipment failure.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

9	Flooding incidents (other causes - equipment failure)	nr	0dp
Definition	The number of incidents of external flooding caused by the failure or incorrect operation of company apparatus (e.g. pumping stations, penstocks, maintenance equipment, combined sewer overflows, or real time control systems).		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

10	Flooding incidents (other causes - blockages)	nr	0dp
Definition	The number of incidents of external flooding caused by a complete or partial blockage of the sewer (including siltation) where the sewer itself is still intact. If the blockage is the result of a fracture or deformation of the pipe, it should be included in the 'other causes – collapses' category.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

11	Flooding incidents (other causes - collapses)	nr	0dp
Definition	The number of incidents of external flooding caused by the collapse of a sewer. This line's enumerator should also include incidents due to fracture or deformation. (This does not affect the definition of collapse for reporting in table 16).		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

B AREAS ON THE 1:10, 2:10, 1:20 AT RISK
(i) AT RISK SUMMARY

12	2 in 10 risk at end of year	nr	0dp
Definition	The number of external areas at risk of flooding twice or more in ten years at the end of the year.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

13	1 in 10 risk at end of year	nr	0dp
Definition	The number of external areas at risk of flooding more than once in ten years (but less than 2 in 10) at the end of the year.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

14	1 in 20 risk at end of year	nr	0dp
Definition	The number of external areas at risk of flooding more than once in twenty years (but less than 1 in 10) at the end of the year.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

15	Total at risk on the 1:10, 2:10, 1:20 register at end of year	nr	0dp
Definition	DG5: Total number of external areas at risk of flooding more than once in twenty years – at end of year. Validation check: line 15 previous year – (current year line 20 + line 21+ line 22+ line 25) + (current year line 23 + line 24) = line 15 current year.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Calculated: the sum of lines 12, 13 and 14.		
Responsibility	Comparative Efficiency & Performance Team		

(ii) PROBLEM STATUS OF EXTERNAL AREAS ON THE 1:10, 2:10, 1:20 REGISTER

16	Cost beneficial problems where risk is reduced temporary measures (mitigation)	nr	0dp
Definition	The number of external areas registered as being at risk in lines 12, 13 and 14 which have received temporary protection to reduce risk of flooding, and where the company has assessed that a permanent solution would be cost beneficial.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

17	Non cost beneficial problems where risk is reduced by temporary measures (mitigation)	nr	0dp
Definition	The number of problems registered as being at risk in lines 12, 13 and 14 where the company has assessed that it is not cost beneficial at the present time to provide a permanent solution but which have received a temporary solution (mitigation) to reduce the risk of flooding.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

18	Cost beneficial problems awaiting solution and problems which have not been appraised	nr	0dp
Definition	The number of problems registered as being at risk in lines 12, 13 and 14 which the company has assessed are cost beneficial but have not yet received a permanent solution and do not have mitigation plus those problems which have not yet been appraised and therefore it is not known whether they are cost beneficial or if mitigation is suitable. Note this line includes areas where mitigation is not appropriate or where a customer had refused mitigation but in both cases a full capital solution is cost beneficial.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

19	Non cost beneficial problems which have not been solved by mitigation	nr	0dp
Definition	The number of properties registered as being at risk in lines 12, 13 and 14 which the company has assessed are not cost beneficial and have received neither a temporary protection to reduce risk nor a permanent solution. Note: these may be areas where mitigation measures are not appropriate or where a customer has refused mitigation.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

(iii) ANNUAL CHANGES TO 1:10, 2:10, 1:20 REGISTER

20	Removed by company action (external only)	nr	0dp
Definition	The number of external areas removed from the 1:10, 2:10, 1:20 "at risk" registers by company action. These are external areas removed from being at risk of flooding due to company action such as sewer enhancement which is linked to capital investment (for CM, ESL or SDB purposes) in the sewerage system. The outputs should be from schemes which only solve external flooding The company should use the commentary to explain the reasons why and the number of individual external areas added to and subsequently removed from the "at risk" register during the report year (please see commentaries section within the guidance) There must be clear and auditable links between the company's registers and the DG5 external area balance sheet.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

21	Removed by company action (external linked)	nr	0dp
Definition	The number of external areas removed from the 1:10, 2:10, 1:20 "at risk" registers by company action. These are external areas removed from being at risk of flooding due to company action such as sewer enhancement which is linked to capital investment (for CM, ESL or SDB purposes) in the sewerage system. The outputs should be from schemes which solved both internal and external flooding. The company should use the commentary to explain the reasons why and the number of individual external areas added to and subsequently removed from the "at risk" register during the report year (please see commentaries section within the guidance).		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

22	Removed because of better information	nr	0dp
Definition	The number of external areas removed from the 1:10, 2:10, 1:20 "at risk" register because of better information. This category is defined as changes resulting from better quality information such as improved knowledge of the sewerage system (e.g. extended modelling, better estimates of figures). This number will include external areas previously thought to have been at risk but where investigation has subsequently shown the problem to have been, caused by reasons other than overloading (e.g. a blockage or collapse). The line should also include external areas, which were incorrectly identified as being at risk in previous years. Properties which are removed from the external and added to the internal register due to subsequently experiencing internal flooding should not be included in these lines but in line 25 'remove from external to internal register'. The company should use the commentary to explain the reasons why and the number of individual external areas added to and subsequently removed from the "at risk" register during the report year (please see commentaries section within the guidance). There must be clear and auditable links between the company's registers and the DG5 external area balance sheet.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

23	Added because of better information	nr	0dp
Definition	The number of external areas added to the 1:10, 2:10, 1:20 "at risk" register as a result of better quality information such as improved knowledge of the sewerage system (extended modelling, better estimates of figures, etc). External areas identified in this category will have been below the reference level in the previous year but not identified**.** There must be a clear and auditable links between the company's registers and the DG5 balance sheet.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

24	Added because of increase demand	nr	0dp
Definition	The number of external areas added to the 1:10, 2:10, 1:20 "at risk" register as a result of increased demand for waste water disposal. For additions to this line it must be possible to demonstrate that in the past the relevant assets were adequate and the affected properties were not at risk of flooding more frequently than the reference level. Thus the additions will have arisen as a result of new connections to the network or where the operation of the system has changed since the last technical assessment (i.e. the load on the system has been increased by new development or a change in the aggregation of flows has resulted in inadequate capacity). There must be a clear and auditable links between the company's registers and the DG5 external area balance sheet.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

25	Removed from external to internal register	nr	0dp
Definition	The number of properties on the 1:10 2:10, 1:20 "at risk" registers which have subsequently flooded internally. These properties are removed from the external register and entered onto the relevant 1:10, 2:10, 1:20 internal register. If the property is entered onto the 1:10 or 2:10 internal register then it should be entered into the appropriate line in table 3. It should also be included in table 3, line 24 'added because of better information'. If the property is entered onto the 1:20 internal register then it should appear in table 3, line 15 '1:20 risk at end of year' and should also be included in table 3 line 32 'added because of better information'.		
Primary Purpose	Confirming delivery of key outputs and service.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

CHANGE CONTROL SHEET
CHAPTER 3a

2008/1.0	First issue of chapter for the SBP period