

EA-NORTH EAST BOX 7

THE ENVIRONMENT AGENCY
RIDINGS AREA, NORTH EAST REGION
HYDROMETRIC ASSET CONDITION SURVEY
ACTION PLAN 1998 – 2001

ANNEX 1

COPIES OF INFORMATION RECEIVED FROM OTHER REGIONS

Flynn & Rothwell Ltd
Consulting Engineers
Genesis Centre
Science Park House
Birchwood
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ANNEX 1

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Environment Agency Anglian Region

Asset Database Information



**ENVIRONMENT
AGENCY**

Your ref.

Our ref. SJW/671/2

Date: 8 September 1998

Mr J Mitchinson
Flynn and Rothwell Ltd
Genesis Centre
Science Park South
Birchwood
Warrington
WA3 7BH



Dear Jeremy

ASSET DATABASE INFORMATION

As discussed, please find enclosed a copy of:

- Regional Asset Database - Consultant Terms of Reference. (Unfortunately the file I found this in only contained a second draft version)
- Proposed Methods for Assessing Hydrometric Structures
- Data Required from Area Offices

I hope this will be useful in allowing you to complete your work for the Ridings Area of North East Region. If you have any questions please contact me and I shall try to help.

Yours sincerely

**SIMON WOOD
SENIOR HYDROLOGIST**

Encs

cc Ian Hampson (EMAIL - Letter Only)

The Environment Agency
Kingfisher House, Goldhay Way, Orton Goldhay, Peterborough, PE2 5ZR.
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NF

2nd Draft (as circulated to Areas, 29/11/93)

NATIONAL RIVERS AUTHORITY

Anglian Region

REGIONAL HYDROMETRIC ASSET SURVEY

Consultants Terms of Reference

B.M.J. Barton
Projects Engineer
NRA (Anglian Region)

29th November 1993



NRA

1.0 Introduction

The Anglian Region of the National Rivers Authority (NRA) proposes to engage Consultants by competitive tender to carry out a comprehensive survey of the condition and effectiveness of all fluvial hydrometric installations currently operated by the NRA within the Anglian region.

2.0 Background

2.1 The Anglian Region of the NRA operates a large number of river and streamflow gauging stations and water level monitoring stations ("gauging stations") throughout the region. Some of these gauging stations have been installed by the NRA since 1989 but most were installed by its predecessor bodies, namely:

- a) the Lincolnshire, Welland & Nene, Great Ouse, Norfolk & East Suffolk and Essex River Authorities prior to 1974 (River Boards prior to 1964)
- b) the five eponymous River Divisions of the Anglian Water Authority between 1974 and 1983.
- c) the five multi-functional Divisions of the AWA between 1983 and 1989.

The layout, design, construction, condition and performance of the NRA's gauging stations therefore varies widely across the region.

2.2 It is intended to carry out a Regional Hydrometric Asset Survey of all the NRA's existing gauging stations within the Anglian Region and to appoint Consultants for this purpose. This survey will include hydrometric gauging structures and all associated buildings, plant, services and equipment at each location, but exclude hydrometric instrumentation and telemetry. The area covered by the NRA's Anglian Region and hence this asset survey is shown on Figure 1.

2.3 The survey will assess and record the structural condition and state of maintenance of all structures and buildings, and the hydrometric range and hydraulic efficiency of the gauging structure or structures, at each location. Some locations may have multiple gauging station installations.

2.4 To ensure consistency across the Region, the survey will be carried out as a single contract and the Consultant employed will be expected to ensure that such consistency is maintained at all times.

3.0 Scope of the Survey

3.1 All 212 gauging stations to be included in this survey are listed by Operational and Hydrometric Area on the attached schedule (Appendix "A"). Compound or multiple gauging stations at a single location are indicated as such. The geographical locations of all these gauging stations are shown on the series of 1/50,000 scale plans included as Appendix "B". For the purposes of this contract, Appendix "A" should be taken as definitive and Appendix "B" as indicative only.

- 3.2 At each location the survey will deal separately with (a) the buildings and NRA compound and (b) (except at water level monitoring stations) the hydrometric structure and any associated weirs and sluices which form part of the operation of the gauging station. The detailed requirements for each part of the survey are listed in detail below.

3.3 Buildings and Grounds

In this context "buildings" include all huts, kiosks, instrument cabinets or other enclosures used to house the hydrometric instrumentation at each gauging station, together with the stilling well and associated inlet pipework. At each location the building & grounds survey will include:

- a) The preparation of a 1/100 scale sketch plan of the whole site, including the gauging structure and watercourses, and a list of all other known plans and drawings of the site, buildings and hydrometric structures (see 3.4 below), and their location.
- b) At least two (more where appropriate) clear 150mm x 100mm colour print photographs of each building, taken from different angles, and one photograph showing a general view of the site.
- c) Details of the NRA's ownership or occupation of the site and NRA access rights thereto. The Regional terrier may be used for this purpose - see section 5.2 below.
- d) Details of type (vehicular or pedestrian) length and condition of the NRA's access to the site from the nearest public highway or right of way.
- e) Details of all services (mains electricity, telephone etc) laid on to the site.
- f) A general description of each building, with leading dimensions, together with a detailed survey of the structural condition and state of maintenance of the building, both internal and external, made from a detailed visual inspection by a suitably qualified building surveyor. Details of the type and condition of any site boundary fencing should also be included.
- g) A determination from NRA records (see Sect.5.2) or evidence on site the date of construction of the buildings, and an estimate of the asset value of the buildings expressed as replacement cost at 9/94 price levels.
- h) The identification of any specific hazards to the health and safety of NRA hydrometric personnel working at that site and visitors to the site, and advise on action necessary to eliminate or minimise that hazard and to comply with all relevant Health & Safety Act regulations, including (where applicable) those relating to confined spaces.

- j) Recommendations (with budget cost estimates) for appropriate works involving capital expenditure necessary to avoid or minimise recurring future revenue expenditure, including items identified in (h) above.
- k) Recommendations for a priority-ranked maintenance programme for the period 1994 - 1998 inclusive. A common, logical and consistent ranking procedure shall be prepared and agreed beforehand with the Project Manager for this purpose.

3.4 The Hydrometric Structure

In this context "hydrometric structure" includes all gauging weirs at that location, structures calibrated for primary or secondary gauging purposes, associated bypass weirs and sluices etc. and the channel or channels of the gauged watercourse upstream and downstream of the gauging station. At each location the hydrometric structure survey will include:

- a) Two clear photographs (more if appropriate) as 3.3(b) above of each distinct component of the hydrometric structure, showing different views of each component.
- b) A general description, with leading dimensions, of the hydrometric structure, and a detailed survey of the structural condition and state of maintenance of the structure, taking particular note of the crest of the weir (or, where applicable, sluice gate or spillway).
- c) Age and asset value - as 3.3(g) above.
- d) Health & Safety - as 3.3(h) above, with special consideration to safety at high flows.
- e) Capital expenditure recommendations - as 3.3(j) above.
- f) Priority-ranked maintenance recommendations - as 3.3(k) above.
- g) An assessment of the compliance of the hydrometric structure with the relevant provisions of British Standard 3680.
- h) A detailed re-evaluation of the current stage-discharge rating relationship used at each gauging station (except for simple level monitoring stations) and an assessment of (i) the low flow sensitivity of the relationship and (ii) the modular flow limit of the rating relationship and its susceptibility to the influence of external factors (weed growth, variable hydraulic control etc) on tailwater levels. Where applicable, the use of secondary gauging points (eg crest tappings) for flow estimation under non-modular conditions should be identified and taken into account.

This re-evaluation should note and review the existing Institute of Hydrology

Flood Studies Report and Low Flow Study Report assessments, and utilise the NRA (North West Region) gauging station classification system - Appendix "C".

All work carried out under sections 3.4(g) and (h) above should be undertaken by a fully qualified and experienced hydraulic engineer in full accordance with the relevant provisions of British Standard 3680.

4.0 The Survey Report

- 4.1 The Survey Report will be presented to the NRA as three separate bound volumes, one for each Area, with the results and recommendations of the Building and Grounds Survey (sec.3.3) and Hydrometric Structure Survey (sec.3.4) presented consecutively for each gauging station. Gauging stations will appear in each volume in Water Data Unit reference number order. Appendices shall only be used with the agreement of the Project Manager.
- 4.2 Two draft copies of each volume of the Survey Report shall be delivered to the Contract Administrator at least four weeks before the end of the engagement. A progress meeting to discuss the draft volumes and agree amendments etc to the drafts will take place at least two weeks before the end of the engagement.
- 4.3 Six bound copies of each volume of the final, agreed Survey Report will be delivered to the Contract Administrator by the end of the period of the engagement.

5.0 Consultation and Data Acquisition

- 5.1 The consultant will not be required to consult with any external body, but will be expected to consult with the Regional Estates Surveyor, the Engineering Manager and the Area Water Resources Managers, or their nominated representatives.
- 5.2 Much of the data, records and information required by the consultant under sections 3.3. and 3.4 above is available within the following NRA offices:
Estates Section, Kingfisher House, Peterborough
Engineering Services Dept., Aqua House, Peterborough
Northern Area Office, Aqua House, Harvey Street, Lincoln
Central Area Office, Bromholme Lane, Brampton, Huntingdon
Eastern Area Office, Cobham Road, Ipswich
Additional information may be available at various District Offices but arrangements to visit these offices should be made through the appropriate Area Office.
All relevant information will be made freely available to the Consultant though prior notification to the office concerned is essential, but any document which is removed from an NRA office must be recorded and signed for.

6.0 Ownership of Documents, Data, etc. and Copyright

In addition to the NRA's amendments to the provisions of the Association of Consulting Engineers' General Conditions of Engagement the consultant shall on completion of the engagement hand over to the NRA all documents, papers, plans, photographs (including photographic negatives) and data collected as part of the survey. Copyright of the Survey Report will be vested in the NRA.

7.0 Programme of Work

It may be assumed that the successful tenderer will be appointed and this engagement will commence before the end of December 1993. The definitive survey report will be presented to the NRA within nine calendar months of the appointment being made.

8.0 Administration of the Contract

- 8.1 This consultancy will be undertaken on a fixed fee basis in accordance with the ACE Conditions of Contract as amended by the NRA within which these Terms of Reference are incorporated. The fixed fee will include all fees, charges, staff salaries and multipliers, and all expenses incurred by the consultant in carrying out the work.
- 8.2 Progress meetings will be held at Kingfisher House, Peterborough, at approximately monthly intervals throughout the duration of the engagement. The consultant should allow for six such meetings (including preliminary and draft report stage meetings) within their budget costs. Summary progress reports detailing work completed and projected, fees/expenses incurred, contractual matters etc will be submitted to the NRA Contract Administrator at least one week before each progress meeting.
- 8.3 The Area Water Resource Managers will provide the Consultant with sufficient keys for the Consultant's staff to gain access to all sites and buildings, though some sites (indicated in Appendix "A") should only be visited accompanied by an NRA hydrometric technician unless specifically exempted from this requirement by the appropriate Area Water Resource Manager.
- 8.4 For the purposes of this engagement, the consultant's NRA contacts will be:

Project Manager:	Nigel Fawthrop
Contract Administrator:	Barry Barton
Estates Surveyor:	Doug Dent

Hydrometric Data and Information

Regional Office, Peterboro':	Angela Wallis
N.Area Wat.Res.Manager:	Ian Gray (pp Andy Baxendale)
C.Area Wat.Res.Manager:	Mark Whiteman (pp Pat Sones)
E.Area Wat.Res.Manager:	Mark Huband (pp Steve Dines)

NRA (Anglian Region)

PROPOSED METHODS FOR ASSESSING HYDROMETRIC STRUCTURES

A. Measurements and information to be obtained on site visits

1. Photographs

1. Structure from upstream
2. Structure from downstream
3. Upstream channel
4. Downstream channel
- 5+ Specific features such as weed growth, structure damage, bed/bank erosion, sedimentation etc

2. Structure Data

1. Type(s) single or compound
2. Construction material
3. Leading dimensions and levels entered on type sketch, including wing walls, divide walls (compound), tapping locations, gauge boards, stilling well and recorder datums
4. Any conditions preventing full survey

3. Data to assess modular limit

1. Current upstream water level. Hence flow from structure rating
2. Current downstream water level and centre-line surface velocity by timing floats
3. Approximate downstream channel width
4. Current estimate of Manning's n

5. Note any structures, confluences or bends likely to modify downstream rating curve

B. Analysis of NRA and site data

1. Assessment of modular limit

1. From NRA rating table, read flow (Q) at time of site visit
2. Calc downstream flow depth (D) from $D = Q/\bar{V}B$, where $\bar{V} = 0.83 V_{surf}$.
 V_{surf} and B (channel width) obtained on site visit
3. With current value of Manning's n , derive a downstream channel rating curve, which passes through the downstream water level (measured on site visit) and with origin at downstream bed level
4. Plot structure rating curve and downstream channel rating on same graph
5. Assess flow (Q_m) at which structure becomes non-modular, based on BS recommendation of modular limit. Determine frequency of flows, exceeding this modular limit from IH data.
6. At sites prone to weed growth in channel, re-assess Manning's n and repeat Step 5. Note possible change in frequency of flows exceeding modular limit.

2. Conformity of BS structures

1. Determine a preferred ^(hydraulic) rating from appropriate BS equation based on all available structure data (NRA and site measurements), including non-modular range (if applicable).

BS3680

2. Check preferred rating against current rating used by NRA. Note if rating includes non-modular range.
3. Check a few points on NRA rating table to see if equation has been evaluated correctly.
4. If appropriate, check constants (a, b, c) in best-fit equations, used for telemetry, against rating curve. Plot as a scatter diagram.

3. Rating of non-standard structures

1. Assess possible effect on rating of non-conformity to BS in either constructional detail or site condition (erosion, sedimentation, damage, etc) and, if necessary, modify rating accordingly.
2. Check preferred rating against current rating used by NRA, noting if the latter has been modified by model testing or site calibration or includes non-modular range.
3. Check telemetry best-fit equations as for BS standard structures.
4. Identify structures whose current NRA rating should be further investigated.

4. Low Flow Sensitivity

1. From IH flow frequency tables, assess 95 per centile flow (Q95).
2. At Q95 determine change in Q for a 10mm rise in water level from recommended rating curve and express as Low Flow Sensitivity value.

5. Hydrometric classification of structure

1. Based on the total structure assessment, each structure will be placed into one of four classes for performance at High Flow (MAF), Medium Flow (ADF) and Low Flow (Q95) following the guidelines given in the NRA-AR document "Gauging Station Classification".
2. This information, together with summary data for the structure and the recommended flow rating will be given in the bound volumes of the Report and included in the computer database in a format to be agreed with NRA-AR.

ANGLIA ASSET SURVEY - APRIL 1994

DATA REQUIRED FROM AREA OFFICES - by HR Wallingford

General:

1. Indication of which sites will probably be too deep to wade.
2. Identification of complex sites which include compound structures, bypass channels, sluices etc.
3. Identification of which structures are standard, non-standard or Essex.
4. Which sites require member of NRA to accompany site surveyors?
5. If it can be arranged, it would be of great benefit to talk to the hydrometric assistants who have local knowledge of the sites.

At each site:

1. Current stage discharge rating curves for the full range of flows.
2. Leading dimensions of the gauging structures preferably shown in plan or sketch form.
3. Levels, to local datum, of all crests, sills and main wing walls.
4. Levels of gauge board and stilling well datum values.
5. The location and level of local bench mark.
6. Location of tapping points.
7. Is there a downstream or crest tapping? Is it regularly recorded?
8. How and when was the latest calibration of the structure carried out?
9. Is the downstream channel influenced by weed growth, sedimentation or erosion or from backwater effects of, say, a downstream structure.
10. Is the upstream channel affected by sedimentation or erosion?
11. Has there been any changes to the structure or river since the latest calibration, e.g. subsidence, downstream channel modifications.
12. Is there a tailwater rating for the site?
13. Are flow frequency curves available?
14. How is low flow measured?

15. How is head measured?
16. How are the gauges zeroed?
17. At sluices, are the changes in gate opening recorded systematically?

DATA REQUIRED FROM AREA OFFICES - by Hannah Reed

General:

1. Construction drawings for any standardised elements (eg flumes, stilling wells, rain gauge installations).
2. Cost data on any standardised elements (eg grp housings, rain gauges).

At each site:

1. Construction drawings including site plan/layout, general arrangement drawings, construction details. Preferably "as-built" drawings but, failing that, any contract or other construction drawings.
2. Construction drawings of any alterations carried out at each site.
3. Discussion with hydrometric assistants to identify any particular operational, access, maintenance or security difficulties at each site and any recent alterations/maintenance/expenditure.

Environment Agency Midlands Region

Specification for Asset Survey of Hydrometric Stations

**SPECIFICATION FOR ASSET SURVEY OF
HYDROMETRIC STATIONS
ON BEHALF OF: ^{Environment Agency} NATIONAL RIVERS AUTHORITY
~~SEVERN-TRENT REGION~~**

^{August 1996}
DATE : ~~DECEMBER 1992~~

SCOPE OF THE WORKS

The Works essentially comprise the production of Condition Surveys, ~~the identification of~~ services, and the production of an essential repairs and planned maintenance report for hydrometric measurement stations, situated in the Upper Severn, Lower Severn, Upper Trent, Lower Trent catchment areas of the ~~National River Authority's~~ ^{Environment Agency's} Severn-Trent region.

As stated within the Quotation document; the ~~National Rivers Authority~~ ^{Environment Agency} has divided the Works into individual catchment areas, and has offered the option to quote for more than one catchment area, up to, and including all four areas within the ~~Severn-Trent Region~~ ^{Midlands}.

PARTIES AND CONSULTANTS

Employer :
Project Manager

~~National Rivers Authority~~
~~Severn-Trent Region~~

*Environment Agency
Midlands Region*

Sapphire East

550 Streetsbrook Road

Solihull

West Midlands B91 1QT

Contact: Mr J S Waters

Senior Hydrologist

Telephone : 021 711 2324

Telefax : 021 711 5824

Project Manager : Hepzibah T Hunt
Chartered Quantity Surveyor
26 Simmonds Way
Atherstone
Warwickshire CV9 3AX
Contact: Mrs H T Hunt
Telephone: 0827 711522
Facsimile : 0827 711522

The Surveyor : The term surveyor shall mean the Company(s) who have been successful in submission of their quotation for undertaking the Works (or parts thereof) as described within this, and associated project documentation.

The Surveyor's Company name and registered office shall be as indicated on page 1 of the Quotation Document.

INTRODUCTORY POINTS

~~NRA's Severn-Trent Hydrology Department~~

Water Resources *Churnham Agency, Midlands Region*
The ~~Hydrology~~ department of the ~~National Rivers Authority~~, ~~Severn-Trent Region~~, is responsible for the measurement and analysis of hydrometric data for the region.

This data is obtained through the use of its network of hydrometric river flow and level, raingauge and groundwater stations, which are located across the length and breadth of the catchment areas of the rivers Severn and Trent.

Environment Agency Midlands Region Hydrometric Stations
~~National River Authority's Severn-Trent (Hydrometric) Stations~~

There are a total of 217 Nr stations included within this asset survey which the *Environment Agency* ~~National Rivers Authority~~ use for the purposes of obtaining hydrometric data.

These stations are categorised into four geographical areas, as detailed below:

- 1 Upper Severn Area - 88 Nr hydrometric stations
- 2 Lower Severn Area - 36 Nr " "
- 3 Upper Trent Area - 46 Nr " "
- 4 Lower Trent Area - 47 Nr " "

Survey's in the above stated individual areas assessing conditions of the hydrometric stations and external works are required in order for repair works to be incorporated into the NRA's proposed planned maintenance programme.

Agency's

The information contained within this and associated project documentation is specifically for the proposed Asset Survey of the individual catchment areas of the ~~NRA Severn-Trent~~ *Agency's Midlands* Region.

ASSET SURVEY PROJECT DETAILS

Location of Hydrometric Stations

Identification and location of the stations are to be through the use of Ordnance Survey National grid references and, where provided, photocopied A3 or A4 size location plans of stations, the latter supplied by the ~~National Rivers Authority~~.

Environment Agency

The Surveyor is required to provide his own Ordnance Survey maps and other associated items necessary to undertake the condition survey work defined within this document.

The aim of this information is to provide the surveyor with the necessary basic knowledge of each individual station type to be visited. This information has been provided to aid the surveyor.

For example, (1) all Cable Ways (CW) have been identified in order to ensure that the associated cableway stanchions, located on both sides of the river, are included within the condition survey.

(2) Ultrasonic and electromagnetic stations (US and EM) have been identified in order to ensure that ^{all bankside fittings are included in} ~~the above/below ground cabling or ducting, is included and identified within~~ the condition survey.

[Requirements of the Asset Survey' section of this Specification Page 7, define Works to be included and carried out by the Surveyor].

Appendix V of this document provides photocopied A4 size sketch diagrams of the main types of hydrometric measurement stations to be encountered during the condition survey.

If the Surveyor requires further information, he/she is to contact the Project Manager.

Access to Hydrometric Stations

Access will be provided via a 'Master' set of keys which will allow access to all the stations.

An access schedule, identifying particular stations which have specific access instructions, is to be found within Appendix IV of this document.

Include Section on lost keys.

If difficulty is encountered with access to any stations, the Surveyor is to immediately contact the Project Manager, who will ascertain the reasons for any entry problem and resolve it without delay.

Commencement and Completion Dates

2 September 1996
The Asset Survey will commence on the 8 February 1993, for a period of *few* ~~three~~ weeks, with a completion date of ~~26~~ February 1993.

27 September 1996

If weekend or out of normal working hours work is envisaged, the Surveyor is to contact the appropriate Area Hydrometric Officer and Project Manager to confirm that this will be allowed.

Quotation Option

In accordance with the Quotation Document, the Surveyor's attention is drawn to the option of quoting for more than one catchment area.

The Surveyor is required to quote in a lump sum form, Catchment area by Catchment area, and not by grouping the cost of individual Catchment Area's together.

If the Surveyor feels that he can offer a benefit in terms of cost (or otherwise) either due to the ability to tender for more than one catchment area, or for some other reason, this benefit is to be included and identified by way of a discount.

The quotation is to include for time, travelling, subsistence and all other costs, as in accordance with the Quotation Document.

REQUIREMENTS OF THE ASSET SURVEY

Asset Condition Survey

The purpose of the Survey is to identify the repair liability for each station.

Thurman Agency

The condition survey is to be performed with the use of standard ~~NRA~~ Condition Survey Property Sheets, a copy of which can be found within Appendix VI of this document. These are to be used for all stations and are to be fully completed.

Agency

The Surveyor is to use the ~~NRA~~ Condition Survey Property Sheet as a Master Copy, to produce as many copies as necessary to undertake the project based upon this format. If there is inadequate space for survey information, the surveyor is to incorporate additional pages into the survey sheets based upon the same format.

Information required to be collated, assessed and included within the condition survey has been classified into the following elements:-

Category	Elements
1	External
	Building
	Elements
	1.1 Substructures at or above ground level
	1.2 Floors (excluding screeds etc)
	1.3 External walls and other supporting structures
	1.4 Roofs and coverings
	1.5 Dpc and ventilation (including internal assessment)
	1.6 Rainwater goods
	1.7 Doors
	1.8 Windows
	1.9 Stairs
	1.10 External decorative finishes
	1.11 Other non standard elements

2 Internal
Building
Elements

- 2.1 Internal walls/partitions
- 2.2 Internal wall openings
 - windows
 - doors
 - other
- 2.3 Floor coverings (including screeds etc)/finishes
- 2.4 Internal wall finishes
- 2.5 Internal ceiling finishes
- 2.6 Fixtures and fittings (excluding hydrometric equipment)
- 2.7 Cableway stanchions
- 2.8 Insulation
- 2.9 Other non standard elements

3 Services

- ~~3.1 The location of all above and below ground services, including cabling and ducting in connection with Ultrasonic and Electromagnetic gauging stations, cabling to rainwater gauging stations etc. (including where cabling is taken across the river via bridges etc)~~

4 3 External Works

- 3
4.1 All areas outside the building footprint, upto and including, the boundary line, including hard and soft landscaping, fencing, hedges, railings, gates, steps, staircases, handrailing and balustrading etc.
- 3
4.2 General description of external main signage, and repairs required.

5 4 Dangerous/
Non
Environmentally
Friendly
Materials

- 4
5.1 Identification of all materials which do not conform with current statutory requirements (ie. Public Health Act, Fire Prevention Act, British Standards etc).

Identification of materials such as asbestos, are to be included, with an indication of items of work required to bring the stations within current legislative parameters.

Exclusions

Certain building elements are excluded from the Asset Survey and hence no reference to the following is required:-

- 1 ^{Environment Agency} All ~~National Rivers Authority's~~ technical hydrometric measuring equipment (except electromagnetic and ultrasonic measurement stations ^{fittings} ~~cabling~~), including stilling wells and weirs etc.
- 2 All cable way equipment, excluding cableway stations which are included in the Asset survey.
- 3 All electrical wiring, fixtures and fittings.
- 4 All mechanical pipework, fixtures and fittings.

Priority/Time Codes

The survey sheet includes a time code requirement which requires the Surveyor to place time parameters against items requiring repair/cyclical maintenance.

The time parameters are as follows:-

Time

Code	Time Parameter	Reason
1	Immediate Repairs Required	Relates to work of an urgent and essential nature to remedy an existing serious defect.
2	Urgent statutory work not to be deferred beyond the first 12 months	Any items of disrepair of a statutory nature, which would render the ^{Environment Agency} NRA liable to statutory prosecution. To meet statutory obligations. To comply with Health and Safety requirements. ^{where} Whose delay is likely to have significant cost consequences.

- | | | |
|---|------------------|---|
| 3 | Within 12 months | Immediately identifiable defects which should be dealt with within 12 months of Asset Survey. |
| 4 | Within 2-3 years | Repairs becoming evident, but which will not be immediately detrimental to the Property. |
| 5 | Within 5 years | As for 4; desirable but not essential. |

Cyclical Repairs

Even though an element may be in sound condition at present, provision should be made within the time scales for future repair(s) eg. external redecorations (which should appear at least once within the time scales) and later repairs to renew/repair any particular elements.

Repair Costs

All costs throughout the time code scales are to be at this years prices and are to reflect the current economic climate and market conditions.

It should be assumed that all items of repair are to be carried out on an individual element basis - ie. not as part of a major redevelopment scheme.

The costs will be treated as indicative only and therefore should be totally realistic and exclude all contingencies.

Condition ('Cond' on survey sheet)

The survey sheet includes a condition column, which requires the Surveyor to place the stations into appropriate condition bands.

- | | | | | |
|---|---|-------|---|--|
| 1 | - | Good | - | Completely capable for its purpose. No visible defects of any serious consequence. |
| 2 | - | Fair | - | Less capable for its purpose, with signs of deterioration |
| 3 | - | Poor | - | Requiring attention. |
| 4 | - | Bad | - | Repair/replacement recommended without delay. |
| 5 | - | Other | - | Requiring further investigation. |

Station Sketches

identified in the schedule showing

Scaled sketches of ~~the~~ stations ~~and~~ overall boundaries are to be produced, indicating overhead and below ground routes of all services associated with the measurement station. Further information to be included is as follows:-

- 1 A Northing sign
- 2 An indication of the proximity of the station to the river (if present)
- 3 An indication of the access route to the station.
- 4 An indication of the location of external ^{Agency} ~~NPA~~ technical hydrometric equipment (ie. cableway stanchions, electromagnetic and ultrasonic equipment etc) as appropriate.
- 5 A scale, drawing date, title, name of company who produced the drawing and the initials of the draughtsman.

Sketches are to be 1:50, the overall site plan may be up to a scale of 1:250. If it is considered that particular sites require a scale not identified within this section, the Surveyor is to contact the Project Manager to confirm the suggested and desired scale. If possible, sketches are to be produced on A3 size drawing sheets, similarly, if the Surveyor considers this standard to be unsuitable for particular stations, he/she is to contact the Project Manager to confirm the suggested and desired size.

Photographs

The Surveyor is to provide 35mm good, coloured, clear quality, dated photographs of all the stations surveyed.

The photographs are to provide visual details of access, the front elevation of the station and other views if considered to be of importance or benefit to the Employer. Photographs are to be numbered and clearly indexed for identification purposes. The negatives of the photographs are also to be provided, suitably numbered and indexed.

Additionally, the Surveyor is to provide photographs to illustrate major items of disrepair.

Life Cycle Costing Report

In addition to the planned maintenance survey the surveyor is to assess the life cycle costing aspect of the main materials found present within the stations and to recommend alternative low cost long life replacement materials.

All works which are considered to require further assessment from a structural engineer or other specialised consultant, are to be individually identified within this report.

Final Reports

Two copies of the condition survey report containing all the above requirements should be suitably bound and returned to the ~~National Rivers Authority~~ by the agreed date in the appointment letter.

Environment Agency

QUALITY CONTROL

During progress of the condition survey, a quality control audit will be carried out by the Project Manager. The Surveyor is to comply with requests made by the Project Manager to enable the Quality Control audit to be carried out to the satisfaction of the National Rivers Authority. *Enslant*

Agree

The quality audit will essentially require the appointed Surveyor to supply condition survey information to the Project Manager as and when requested during the progress of the survey.

If the results of the audit express an area of concern the Surveyor must be available to attend a meeting with the Project Manager and Client if requested, to resolve any points of issue at an early stage.

If the situation dictates, site visits to previously inspected premises shall be made by the Surveyor at the total expense of the said Surveyor.

PROGRAMME CONTROL OF THE SURVEY

The Surveyor shall submit to the Project Manager, on a weekly basis, information in a programme format detailing the number of stations to be visited in the coming week, the number of stations visited in the last week (as appropriate), and the number of stations remaining to be visited together with any other relevant information. A comparison against the number of visits estimated to the number of actual visits accomplished will provide the Project Manager with sufficient information to enable the programming of the survey to be closely controlled.

Each weekly programme is to be approved by the Project Manager.

Consent Agency

National Rivers Authority Technical Equipment

All ~~NRA~~ equipment is excluded from the Asset Survey.

Agency

Should ANY of the equipment be damaged by the Surveyor during the survey works, the Project Manager is to be immediately informed.

The Surveyor will be financially responsible for all costs associated with any equipment damaged by the said Surveyor during the condition survey of the stations.

~~NATIONAL RIVERS AUTHORITY~~ STATIONS

Consent Agency

Should the Surveyor damage any part of the premises in any way during the execution of the survey, the Surveyor is to immediately notify the Project Manager. The Surveyor is to take immediate precautions to protect persons and property as necessary and to indemnify the ~~National Rivers Authority~~ *Consent Agency* against all claims whatsoever to persons and property arising from damage to these.

EXISTING CABLING AND SERVICES

Should the Surveyor damage any underground or overhead services or cabling in any way whatsoever during the execution of the survey, the Surveyor is to immediately notify the Project Manager. The Surveyor is to take immediate precautions to protect persons and property as necessary and to indemnify the ~~National Rivers Authority~~ *Consent Agency* against all claims whatsoever to persons and property arising from damage to these.

OBLIGATIONS AND RESTRICTIONS IMPOSED BY THE ~~NRA~~ *Consent Agency*

Generally

It must be clearly understood by the Surveyor that the said Surveyor is entirely responsible for carrying out the survey, for any damage, accident, annoyance, nuisance or disturbance that may be occasioned to adjoining neighbouring buildings and damage to persons, property or equipment by the operations arising from the execution of the survey.

Furthermore, the Surveyor is to undertake to properly, substantially and effectively reinstate and make good all damage if caused by themselves during the carrying out of the survey.

Use of Site

The sites of the survey are not to be used for any other purpose than that of carrying out of the condition survey works. The Surveyor is to avoid interruption to Hydrometric Officers who work at these stations or to the surrounding properties. It is expected that the Survey work can be executed without such interruption.

Payment conditions of the NRA *Environment Agency*

The successful company shall be authorised to proceed with the survey on receipt of an Official Order. Invoices will only be accepted in accordance with the conditions of the official order and will be paid within 28 days of receipt. No part payment conditions are offered.

Surveyor's Representative

The same representative shall remain in charge throughout the entire period of the condition survey except by agreement in writing with the Project Manager.

Compliance with Specification Document

Alterations or qualifications to this specification document or to the quotation document must not be made without the consent of both Project Manager and Client. Documents containing such alterations or qualifications may be rejected.

Implicit in the Survey and at the discretion and risk of the Surveyor

The Surveyor is to comply with all enactments, regulations and working rules relating to:

- safety, health and welfare of work people
- control of noise, pollution and all other statutory obligations
- police regulations
- traffic regulations

Professional Indemnity Insurance and Public Liability Insurance

Quotations must be accompanied by details of the Surveyors professional indemnity insurance and public liability cover. The information provided is to include the following details:

- 1 Name of Insurer
- 2 Policy Number
- 3 Extent of Cover
- 4 Expiry date
- 5 Excess

Environment Agency
NATIONAL RIVERS
AUTHORITY
Midlands Region
~~SEVERN-TRENT REGION~~

SAMPLE OF MEASUREMENT STATIONS WITHIN THE
UPPER SEVERN AREA

Area Hydrometric Officer: J. Payne Esq.

Area Hydrometric Office: Hafren House
Welshpool Road, Shelton
Shrewsbury, SY3 8BB

Area Office Tel Nr: 0743 272828 ext 3439
Area Office Fax Nr: 0743 272138

NR	STATION NAME	RIVER NAME	O.S. GRID REF	STATION TYPE & COMMENT
1	Montford Gauging Station	Severn	SJ412144	Open channel station with cable way, and winch; two buildings on one site to survey; visit to be accompanied with an NRA employee. Contact Area Hydrometric Officer to arrange suitable date.
2	Bewdley Gauging Station	Severn	S0782762	Ultrasonic measurement station.
3	Yeaton Gauging Station	Perry	SJ434192	Weir measurement station.
4	Crudging- ton Gauging Station	Strine	SJ640175	Electromagnetic measurement station.
5	Nib Heath Ground Water Station	N/A	SJ420182	Ground water measurement station.

*ultrasonic
measurement*

Environment Agency Welsh Region

Hydrometric Asset Survey Terms of Reference & Specification of Works

* NOT FOR CIRCULATION *
OUTSIDE THE AGENCY



ASiantaeth yr
Amgylchedd Cymru
ENVIRONMENT
AGENCY WALES

HYDROMETRIC ASSET SURVEY

(River Level & Flow Measurement Stations)

Terms of Reference & Specification of Works

Version Draft 1.4
Editor Regional Hydrometric Officer
Date 11th August 1998

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Authors : T.P.Spierling

Planned Date : August 1998

Printed : 11th August 1998

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Environment Agency Wales

HYDROMETRIC ASSET SURVEY
River Level & Flow Measurement Stations

CHANGE CONTROL

Version	Date Effective	Changes (Summary)
Draft 1.0	15/05/98	Initial Draft based upon Anglian & Midlands Specifications
Draft 1.1	01/06/98	Version for Internal Discussion
Draft 1.2	13/06/98	Includes comments from Dai Thomas & John Arrowsmith
Draft 1.3	30/07/98	Includes comments from Steve Mayall
Draft 1.4	11/08/98	As issued to Term Consultant

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

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HYDROMETRIC ASSET SURVEY
River Level & Flow Measurement Stations

PART I
TERMS of REFERENCE

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

1.0 Introduction

The Environment Agency Wales proposes to engage one or more Surveyors, to carry out a comprehensive asset condition survey for its primary river flow and level measurement stations.

Note : In this context, "The Environment Agency Wales" comprises the Hydrometric Catchment Areas, 055 to 067 and 102, and hence, includes sites in England (Rivers Wye and Dee) but excludes sites in Area 054 (Midlands Region). This differs from the administrative boundary defined as that of the Principality of Wales.

No previous planned sequence of surveys have been undertaken in Wales, except where problems were already apparent.

This survey does not address specifically the hydraulic performance of each in-river flow control measurement structure or open watercourse section used as a measuring device, or the inspection of cableway wiring, pulleys etc, but is restricted to their physical and structural condition, particularly in the case of the flow measurement structures. In addition, the condition of any on-site related buildings are to be surveyed and reported upon. The condition of any linking structures (ie intake pipes) are also to be surveyed and reported. The general condition of the encompassing site is also to be reported upon, including security of boundary enclosure and access to the site.

2.0 Background

The Environment Agency Wales currently operates [150] river level monitoring stations. Of these flows are either measured directly or derived from direct level measurements at [XXX] locations: [XXX] have "control" ¹ structures and [XXX] are calibrated open channel sites. The remaining [XXX] are purely water level monitoring stations.

Detailed measurement surveys are required to accurately record all key dimensions of structures and watercourse sections. The sites are to be described in words, as-built drawings and by photographic records; including general views and specific coverage of structural deficiencies or anomalies. Data is to be returned to the Agency in the form of an electronic media, wherever possible (ie survey details, digitised maps and photographs) and hard copy formats.

2.1 Hydrometric River Stations

There are [150] specifically selected stations included within the asset survey.

These stations are categorised into 14 hydrometric catchments, as detailed below

¹ In this context, "control" means the existence of an in-river structure whereby, in normal conditions, the water surface is drawn down through its critical depth.

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River Level & Flow Measurement Stations

Area	Major Rivers	In-River Structures	Open Channel / Bed Control	Total
055	Wye	13	17	30
056	Usk, Ebbw	10	5	15
057	Rhymney, Taff, Ely	12	6	18
058	Cadoxton, Thaw, Ogmore, Kenfig, Afan, Neath	11	1	12
059	Loughor, Tawe, Gower	1	2	3
060	Tywi, Gwendraeth	5	7	12
061	Eastern & Western Cleddau	1	2	3
062	Teifi	-	1	1
063	Ystwyth, Rheidol, Aeron	2	2	4
064	Dyfi			8
065	Glaslyn			15
066	Conway, Clwyd			10
067	Dee			18
102	Cefni, Angelsey			1
Totals		107	43	150

2.2 Station Types

All stations have been coded into group "types", depending on whether they have in-river structures or not. This grouping is a useful method of giving the Surveyor a reasonable indication of the station complexity. For the purposes of the Asset Condition Survey, there are six (6) main station "types". This code is for identification purposes only.

These are as follows

- 1 Open channel / bed control station (ie no in-river structure)
- 2 British Standard (BS 3680) control structure (ie in-river structure)
- 3 Non-Standard structure (ie in-river structure)
- 4 Electromagnetic gauging station (ie in-river / under river structure)
- 5 Ultrasonic gauging station (ie in-river structure)
- 6 Flume (ie in-river structure)

Each of the above types may have an associated cableway: this is shown as a separate item in the Schedules in Appendix C.

The aim of this information is to provide the Surveyor with a basic knowledge of each

HYDROMETRIC ASSET SURVEY River Level & Flow Measurement Stations

individual station to be visited. This information has been provided, in good faith, to aid the Surveyor.

3.0 Scope of the Works

The Works essentially comprise the production of Asset Condition Surveys and the production of an essential prioritised repairs and planned maintenance report for the named hydrometric monitoring stations, situated within designated catchment areas of the Environment Agency Wales.

4.0 Requirements of the Survey

The sites to be included in the survey are listed in Appendix C, which is an extract from the current Service Level Agreement. They are listed by their hydrometric catchment (area), asset number, station number, station name and river name (watercourse), grid reference, whether a flow or level monitoring station, station type, whether a building is on site, whether a cableway is associated with the site and if so, whether that cableway have its own building.

This survey will include all associated buildings, plant, services and equipment at each site, including a survey of the enclosed station site, but excluding hydrometric instrumentation, telemetry and electrical utilities equipment. Each station report will be reported individually and be based upon the complete enclosed site, with any related building or structure identified under the station reference.

This survey will specifically include

- the structural integrity of all civil works at a site
- Health & Safety Implications (as detailed in the specification)
- Environmental Assessment

But will specifically exclude

- condition of any instrumentation on the site (electrical & mechanical)
- condition of any lifting equipment (eg winches, cableway wire ropes and fittings)
- suitability of any structure to meet expected monitoring criteria

5.0 Data Acquisition

The Surveyor will not be required to consult with any external body, other than the Land Registry, but within the Agency will be expected to consult with the Regional Hydrometric Officer, Area Team Leaders Hydrometry or their nominated deputy (henceforth called the Area Representative). Contact with the Agency will be by prior appointment.

The Region's Areas and office locations are shown on the map in Appendix B. The

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

contact office telephone numbers and Area Representatives are

South East - Cardiff (01222-770088 Ext 2243) - Martin Richards / John Arrowsmith
Catchment areas 055, 056, 057 and 058 (part)

South West - Swansea (01792-645300 Ext 3536) - Dai Thomas / Hywell Perrott
Catchment Areas 058 (part), 059, 060, 061, 062 and 063)

North - Bangor (01248-670770 Ext 4041) - Helen Ferguson / John Williams /
Catchment Areas 064, 065, 066, 067 and 102)

6.0 Report of Survey

The Agency will provide the Surveyor with a Work Programme in the format shown in Appendix D. This shall comprise a list of stations to be surveyed under an individual contract within an agreed timetable. On completion of the programme, the Surveyor shall provide the Area Representative with a collated set of report forms, grouped by individual station, together with any photographic records and drawings as expressed in Appendix A to this specification. All documentation, including digital images shall also be provided to the Area Representative on magnetic media, preferably CDROM.

The Agency is keen to explore the use of industry standard database software to hold the survey data, including sketch plans, drawings, photographs, and structural condition information. The Agency is currently advocates Microsoft Access 97.

Copyright of the final report, including all plans, drawings, photograph images, database (if provided by the Surveyor), and data collected or obtained as part of, or in connection with the survey, is to be vested in the Agency.

6.1 Drawings & Sketches

Scaled sketches of each station identified in the schedule showing overall boundaries are to be produced, indicating overhead and below ground routes of all services associated with the station. The style of these sketches will replicate those produced previously, examples of which are included in Appendix A.

Further information to be included is as follows:-

- 1 an Ordnance Survey "Northing" sign
- 2 an indication of the proximity of the site to any river(s)
- 3 an indication of the access route to the site
- 4 location of any public rights of way, whose proximity of the site may endanger the general public
- 5 an indication of the location of external Agency technical hydrometric equipment (ie cableway stanchions, electromagnetic and ultrasonic equipment etc) as appropriate.

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River Level & Flow Measurement Stations

- 6 a scale, drawing date, title, name of company who produced the drawing and the initials of the draughtsman.

Sketches are to be 1:50, the overall site plan may be up to a scale of 1:200. If it is considered that particular sites require a scale not identified within this section, the Surveyor is to contact the Area Representative to confirm the suggested and desired scale. If possible, sketches are to be produced on A3 size format, similarly, if the Surveyor considers this standard to be unsuitable for particular stations, he/she is to contact the Area Representative to confirm the suggested and desired size.

The Agency requires that any sketches, drawing, plans or maps shall be supplied in both paper and electronic formats. Acceptable electronic formats at bitmaps and AutoCad compatible drawings.

6.2 Digital Photographs

The Surveyor is to provide high resolution digital and print, coloured, clear quality, dated and annotated photographic images of all the stations surveyed. Format to be high resolution JPG, at least 1024 x 768 pixels per frame. The Surveyor will also provide equivalent colour slides.

The photographs and slides are to provide visual details of access, the front elevation of the station and other views if considered to be of importance or benefit to the Agency. Photographs are to be numbered and clearly indexed for identification purposes.

Additionally, the Surveyor is to provide photographic images to illustrate major items of disrepair or violation of the Agency's Health & Safety guidelines

7.0 Programme of Works

The Agency in Wales, intends to conduct its Asset Survey as a series of 'grouped' sites contracts. The initial contract will comprise three stations from at least one Operational Area.

These initial surveys will be used to quality assure the requirements of the Agency's survey and to clarify any misunderstandings as to the data being collected. These results, together with any recommendations the Surveyor may wish to table, will be used to amend the specification prior to completing the remainder of the stations listed in Appendix C.

8.0 Contract Arrangements

The initial limited engagement will be made on a fixed fee basis in accordance with the Agency's General Conditions of Contract for Supply of Services from Term Consultants. The Surveyor is regarded as the Contractor. The fixed fee will include all fees, charges, staff salaries and multipliers, and all expenses incurred by the Surveyor in carrying out

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

the work.. The Contractor is to submit details on the Agency's 'Target Fees' proforma and return it to the appropriate Area Representative.

In support of the submission the Surveyor is required to provide detail CV's of all staff to be employed on the survey together with details and appropriate CV's of any sub-consultants or sub-contractors to be employed.

Progress meetings, if required by the Area Representative, will be held at the appropriate Area Office, or at alternatively agreed venue, at intervals, agreed with the Area Representative, throughout the duration of the engagement. Summary progress reports each detailing work completed and projected, fees / expenses incurred, contractual matters etc., are to be submitted to the Area Representative at least one week before each progress meeting.

The Area Representative will provide the Surveyor with appropriate keys for the Surveyor's staff to gain access to all sites. A small number of sites may only be visited accompanied by the Area Representative.

9.0 Parties and Consultants

Project Manager : Area Representatives (see Section 5.0)

The Surveyor : The term Surveyor shall mean the Contractor undertaking the Works (or parts thereof) as described within this, and associated project documentation.

Project Coordinator : Terry Spierling (Cardiff 01222-770088 Ext 2159)

10.0 Survey Station Locations

10.1 Location of Hydrometric Stations

Identification and location of the stations are to be through the use of Ordnance Survey national grid references (to a minimum of 10 metres resolution, but preferable to 1 metre, where close proximity of structures require it).

The Surveyor is required to provide his own Ordnance Survey maps and other associated items necessary to undertake the condition survey work defined within this document.

Use of the Ordnance Survey's 1:10,000 maps is recommended by the Agency for identification of the stations as this is also widely available in digital format.

A Schedule, identifying each station included in this contract, together with comments for particular stations, are to be found within Appendix D of this document.

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

10.2 Access to Hydrometric Stations

Access will be provided via "Master" sets of keys which will allow access to a specific set of stations.

Keys - and particularly Master Keys - which are lost or mislaid introduce a potential weakness in the security afforded by a Master Key Suite.

A Financial Surety, in the sum of £ 500 per key issued to the Surveyor, will be required of the Surveyor. Such sums may - by agreement with the Project Manager - be deducted from final invoices.

The Surveyor is expressly forbidden from copying Agency keys; similarly the keys are not to be loaned to any other person or agent other than the appointed Surveyor and his/her staff.

If difficulty is encountered with access to any stations, the Surveyor is to immediately contact the Area Representative

11.0 Commencement and Completion Dates

The Asset Survey will commence and be completed within dates agreed between the Surveyor and the Area Representative.

12.0 Quality Control

During progress of the condition survey, a quality control audit will be carried out by the Project Coordinator. The Surveyor is to comply with requests made by the Area Representative to enable the Quality Control audit to be carried out to the satisfaction of the Agency.

The quality audit will essentially require the appointed Surveyor to supply condition survey information to the Area Representative or project Coordinator as and when requested during the progress of the survey.

If the results of the audit express an area of concern the Surveyor must be available to attend a meeting with the Area Representative if requested, to resolve any points of issue at an early stage.

12.1 Programme Control of the Survey

The Surveyor shall submit to the Area Representative, on a pre-arranged basis, information in a programme form detailing the number of stations to be visited in the coming period, the number of stations visited in the last period (as appropriate), and the number of stations remaining to be visited together with any other relevant information. A comparison against the number of visits estimated to the number of actual visits

HYDROMETRIC ASSET SURVEY

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accomplished will provide the Area Representative with sufficient information to enable the programming of the survey to be closely controlled.

12.2 Environment Agency Technical Equipment

All Agency equipment is excluded from the Asset Survey.

Should ANY of the Agency's equipment be damaged by the Surveyor during the survey works, the Area Representative is to be immediately informed.

The Surveyor is not to interfere with any instrumentation or electrical installations on the site. If access to parts of a building or structure (eg stilling wells) is needed which requires instrumentation to be moved or removed, the Surveyor is to notify the Area Representative in advance. The Area Representative will be solely responsible for the moving, removing, reinstallation and setting up of any Agency instrumentation.

The Surveyor will be financially responsible for all costs associated with any equipment damaged by the said Surveyor during the condition survey of the stations.

12.3 Surveyor's Representative

The same representative should remain in charge throughout the entire period of the condition survey except by agreement in writing with the Area Representative.

12.4 Compliance with Specification Document

Alterations or qualifications to this specification document must not be made without the consent of the Area Representative. Documents containing such alterations or qualifications may be rejected.

12.5 At the Discretion and Risk of the Surveyor

It is Implicit in the survey, that the Surveyor is to comply with all enactments, regulations and working rules relating to:

- any relevant Environment Agency working instructions
- safety, health and welfare of work people
- control of noise, pollution and all other statutory obligations
- police regulations
- traffic regulations

HYDROMETRIC ASSET SURVEY
River Level & Flow Measurement Stations

HYDROMETRIC ASSET SURVEY
River Level & Flow Measurement Stations

PART II
SPECIFICATION of WORKS

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

13.0 Requirements of the Asset Survey

Asset Condition Survey

The condition survey is to be reported using the format detailed in the standard Agency report sheets, a copy of which can be found within this document (Appendix A). If the Surveyor has agreed with the Area Representative to use a database, then the form of the questions and answers must correspond to those shown on the report sheet.

These sheets are to be used for all stations and are to be fully completed (ie items not applicable to any particular station must be annotated as such).


The survey will comprise six elements

- Station Survey
- Detailed Survey
- Detailed Condition Survey
- Detailed Asset Assessment
- Life Cycle Costings

14.0 Station Survey

A general audit of the site to identify the presence (or absence) of a pre-defined list of items; their general condition and any comments that the Surveyor would wish to draw the Agency's attention to (Appendix A - Forms 1-15).

15.0 Detailed Survey

 A detailed survey of the site, to include sketch maps and plans of the main constitutional parts (ie site, building and structures), and a levelling survey, presented as a series of cross-sections (Appendix A - Forms 16-24). Forms 17-19 are included as examples to illustrate the format expected of the station sketch and cross sections - The Surveyor may, as an alternative, produce the same degree of detail using an electronic draughting package, compatible with AutoCad drawing format.

The detailed survey requirements are set out below.

15.1 Sites

At each site, the survey will include details of the nature and condition of the boundary enclosure, security of both vehicular and pedestrian access including cattle grids, and effectiveness of any hazard warning signs (if present) or recommendations for their provision, if absent. Access into the watercourse is to be reported upon; and if by ramp, steps, irons or similar structure, its condition and compliance with Health & Safety standards reported upon. Guard rails and footbridge access across watercourse are also included in the survey. The Environmental questions concerning materials stored within

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

the site enclosure are also to be detailed.

At each location the site survey will include:

- a) A 1:200 scale sketch plan (in paper and electronic formats (eg bitmaps, AutoCad compatible)) of the whole site, showing the relative locations of any buildings, hydrometric and related structures and watercourses.
- b) At least two (more where appropriate) clear (150mm x 100mm hard copy format) high resolution digitised colour photographs showing a general view of the site; separate photographs will be required in recommendations for improved access or potential hazardous situations where they have been identified in the report.
- c) Details of the Agency's ownership or occupation of the site and Agency's access rights thereto. Where possible consult the existing regional terrier held by the Legal & Estates Department at the Agency's "Rivers House" Office. If no record is available, the Surveyor must consult the Land Registry.
- d) Details of type (vehicular and/or pedestrian), length and condition of the Agency's access to the site from the nearest public highway or right of way (identifying potential access hazards, eg blind spots) and rights of access; and provide a suitably annotated sketch map.
- e) Details of all services (mains electricity, telephone etc) laid on to the site; or in the close vicinity of the site and provide a suitably annotated sketch map, showing locations of any stop valves or isolation switches.
- f) Comment on the suitability, security and stability of the existing site benchmark (SBM) studs, where installed. Location plans of any Ordnance Survey bench (OBM) mark used to check site SBMs are to be provided by the Surveyor; including grid reference of the Ordnance Datum bench mark, elevation and date of last survey. The Agency will provide purpose made studs.
- g) Proximity of any public right of way that crosses the site or is sufficiently close to suggest possible danger to the general public from the Agency's main purpose on that site.

15.2 Buildings

In this context "buildings" includes all huts, kiosks, instrument cabinets or other enclosures used to house hydrometric apparatus, whether permanent or temporary.

At each location the buildings survey will include:

- a) A 1:50 scale sketch drawing of each building, with sufficient details to cross-reference any areas requiring remedial works and photographs mentioned in the

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

report.

- b) A general description of each building, with leading dimensions, together with a detailed survey of the structural condition and state of maintenance of the building, both internal and external, made from a detailed visual inspection by a suitably qualified building surveyor.
- c) At least two (more where appropriate) clear (150mm x 100mm hard copy format) high resolution colour slides and matching digitised colour photographs of the exterior and interior of each building, taken from different angles. Close-up views are required of any particular problem or defect areas.
- d) Produce an estimate of the current asset value of the site, expressed as replacement cost at First Quarter of the current year's price base. The Surveyor is to provide supporting documentation.
- e) The identification of any obvious hazards to the health and safety at that site and advise on action necessary to eliminate or minimise that hazard and to comply with all relevant Health & Safety Act regulations, including (where applicable) those relating to confined spaces. A copy of the current Agency's Health & Safety guidelines will be provided to the Surveyor.
- f) Recommendations (with budget cost estimates) for appropriate remedial works involving capital expenditure necessary to avoid or minimise recurring future revenue expenditure.
- g) Recommendations for a priority-ranked maintenance programme for the next five year period 1999 - 2004 and beyond (refer to 'Urgency' codes detailed in 17.1).
- h) The Surveyor is to report the presence or suspected signs of hazardous materials employed in the fabric of the structure. The Surveyor is to employ non-intrusive inspection methodologies whenever possible and report any rupture of the containment of any hazardous material to the Area Representative immediately.

15.3 Hydrometric Structures

In this context "hydrometric structure" includes all gauging weirs and structures, associated bypass weirs and sluices etc. at all locations and the channel or channels of the gauged watercourse upstream and downstream of the control section. At each location the hydrometric structure survey will include:

- a) a 1:50 scale sketch plan (in paper and electronic formats (eg bitmaps, AutoCad compatible)) of each component, with sufficient details to cross-reference any recommended remedial works, photographs etc mentioned in the report. This plan will represent the 'as-found' status.

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

- b) A general arrangement drawing with description, cross-section and elevations, with all key dimensions, of each control structure, together with a detailed survey of its structural condition and state of maintenance, paying particular attention to the 'crest' of any weirs (and other prime control features). The elevations are to show the position and level of all tapping points, where installed. Describe the upstream and downstream approaches to the structure. Document the condition and extent of the bank and bed materials and level survey significant change points.
- c) A general description and detailed cross-section of each open channel site, together with a survey of its condition and state of maintenance. Describe the upstream and downstream approaches to the gauge. Document bank and bed materials, condition and extent and level survey significant change points. The cross-section is to cover the full range of flow or level measurement ².
- d) A description and survey of the stilling-well. Best visual techniques, avoiding man-entry are to be employed. To include details of the connecting pipework, level and diameter of any intake invert, any deformations and siltation, signs of leakage into the stilling well through defective seals.
- e) A description and detail survey of any river features, artificial or natural, forming the low flow hydraulic control for the open channel sites, together with, for all sites, surveys of relevant right and left bank-full levels. Comment on the likely effect of river vegetation and sediment movements.
- f) A description of the site staff gauges and survey of their condition. Comment on their range, accessibility and ease of reading.
- g) Appropriate colour slides and matching digitised photographs of the site to include views, across the structure or open channel section, and upstream and downstream from, and upstream and downstream towards, the structure or open channel section. Close-up views are required of any particular problem or defect areas.
- h) Produce an estimate of the current asset value of the site, expressed as replacement cost at First Quarter 1998 of the current year's price base. The Surveyor is to provide supporting documentation.
- i) The identification of any obvious hazards to health and safety relating to the site, but excluding any related to buildings or recorder housings or general site access.
- j) An assessment of the compliance of the hydrometric structure, if applicable, with the relevant provisions of British Standard 3680.

²

Where-ever possible, the Area Representative will provide the Surveyor with details the highest recorded water level for each individual site (see Appendix D).

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

- k) The identification of any specific hazards to the health and safety of the Agency's hydrometric personnel working at that site and visitors to the site, and advise on action necessary to eliminate or minimise that hazard and to comply with all relevant Health & Safety Act regulations, including (where applicable) those relating to confined spaces.
- l) Recommendations (with budget cost estimates) for appropriate remedial works involving capital expenditure necessary to avoid or minimise recurring future revenue expenditure.
- m) Recommendations for a priority-ranked maintenance programme for the next five year period 1999 - 2004 and beyond (refer to 'Urgency' codes detailed in 17.1).
- n) Inspection and report on the structural condition of the cableway (if installed) anchorage arrangement and conditions of stanchions and foundations; but will exclude the condition of any ropes and cables themselves and associated pulleys and connections, which are subject to annual inspections by Agency staff. Notwithstanding, any visible defects should be recorded and brought to the Agency's attention.
- o) Where it might affect the normal approach velocity profile at the station, measure silt accumulation upstream of the structure by surveying both concrete structure level and silt level at 5 locations across the channel half way between the toe of the structure and the wingwalls. Results should be available as natural bed profile and current siltation profile.

It is a requirement that the survey methodology, and data gathering methods and systems are agreed with the Area Representative prior to commencement of the survey.

15.4 Checking Levels on Site

The survey will require the establishment of a permanent site bench mark (SBM), where one does not exist, (m AOD) and the verification of any local site datum of the structure (in most instances this will be the zero of the control structure).

- All station datums shall be levelled in to Ordnance Datum Newlyn (OD).
- All stations containing water level recording equipment shall have two station benchmarks (SBM) located at least 30 metres from the station, located in a convenient and stable position where practicable.
- Where possible the SBM's shall be levelled in to two arbitrary OBM's.
- All datums shall be levelled in to the SBM's, eg Controls, Weir Crests, Station Instrument Zero, Staff Gauge zero, Outside Datum Plate and Inside Datum Plate.

An accurate (± 1 mm) survey by theodolite or surveyor's level should be made to check the weir crest level (or levels) and stilling well / instrumentation bench mark level (or levels, at those stations where dual water level gaugings are made) relative to the gauging

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

station's SBM. Any discrepancies found between the SBM and equivalent staff gauge level should be highlighted in the report.

Where water level gauge boards exist, either upstream or downstream of the gauging structure(s), these should also be included in the survey and their accuracy relative to the local datum checked.

The survey will include reports on

- The internal Diplate/Diptone plate (where this exists).
- All staff gauges (Ramp gauges to levelled at 1 metre intervals and their slope angle recorded).
- Minimum level recordable (may not be zero) and gauge board range

Any cross channel levels, including across any weir crest, must contain a minimum of 12 appropriately spaced points (which must include left bank, channel centre and right bank), but not separated by more than 10% of the channel width at that point. Points must include left and right bank water levels and to conclude at top of river banks or as directed by the Agency's representative.

For the survey of gauging weir crests (and other structures with a hydrometric function) levels should be taken at each end and at the centre. Where the width and condition of the crest requires, intermediate levels must be taken at a minimum of 12 appropriately spaced points, but not separated by more than 10% of the channel width at that point

On sloping crests (eg flat vee) levels should be taken at each end and centre (with appropriate precautions to ensure the precise level of the base of the vee is obtained) and the intermediate slope assessed by intermediate levels. The Surveyor's attention is drawn to the potential hazards of undertaking this action in periods of high flows.

Levels should also be taken as appropriate, on the tops of wing walls and intermediate piers / dividing walls where these are of hydrometric relevance.

The Surveyor will be expected to establish separate bench marks for each structure and building (located internally if a building).

15.5 Longitudinal & Cross Sectional Surveys

These will include

Longitudinal Section from 3 x width U/S of control to 2 x width D/S
Cross Section at Control Point (eg Weir Crest)
Section at Start of U/S apron
Cross Section at U/S of Start of U/S apron
Cross Section at End of D/S apron (hydraulic jump step)
Cross Section at D/S of End of D/S apron (hydraulic jump step)

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

Cross Section at any significant change in bed formation within limits of wing walls
Cross Section at Intake Pipes ³
Cross Section at Cableway (if installed)
Other locations identified by the Surveyor as having a likely affect on the flow regime of the river through the measurement section.

The Surveyor is to note that any in-river survey is to take place when the river levels are at their optimum for the required accuracy required of the survey.

16.0 Detailed Condition Survey

A structural assessment of the site, detailing any items for which remedial action is required (refer to Section 17.1 of Urgency codes); the report is to include a estimate assessment of the cost of any remedial works (Appendix A - Forms 25-26)

The Surveyor is to use the Agency Station Survey Sheet and Detailed Condition Survey Report Sheets as a Master Copy, unless othwerwise agreed with the Area Representative, to produce as many copies as necessary to undertake the project based upon this format. If there is inadequate space for survey information, the Surveyor is to incorporate additional pages into the survey sheets based upon the same format.

The details on the survey sheet can be used as the basis of a computer database, provided any deviation from the item descriptions are agreed with the Area Representative.

Information required to be collated, assessed and included within the condition survey has been classified into elements.

The Surveyor's attention is draw to the following elements

External and Internal Building Elements

The Surveyor is to provide a detailed report against each of the main building elements identified within the Agency Station Survey sheets (see Appendix A).

For example, under the element of "Station Survey Sheet - Buildings (External)", under the field "Roof", the Surveyor is to detail the type of roof contruction present (eg pitched, flat etc), other associated construction elements such as parapet walls, together with all first and second joinery fittings, and building items composite to the main building element identified ie battens, felting, vapour checks etc and the identification and specification of all building materials used.

3

Any cross channel levels, including across any weir crest, must contain a minimum of 12 appropriately spaced points (which must include left bank, channel centre and right bank), but not separated by more than 10% of the channel width at that point. Points must include left and right bank water levels and to conclude at top of river banks or as directed by the Agency's representative.

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

Damp and Ventilation

The Surveyor is to provide all necessary damp detection equipment and to include in the condition survey report, the results of the damp testing undertaken.

External Decorative Finishes and Internal Decorative Finishes

The Surveyor is to provide projected decorative requirements over a five year period. The projected decorative requirements for doors and windows (including frames, cills etc), over a five year period is to be included under separate category headings.

Composite Building Elements

The building elements identified are deemed to include all items necessary for a complete operational / functional building element. For example the door element is deemed to include all first and second joinery fixing, including the door, cill door opening, frame and lining set, architraves, ironmongery, glazing (if present) and total decoration etc.

Special Category (Dangerous / Non Environmentally Friendly Materials)

The Surveyor is to bring to the attention of the Area Representative any item or material that he / she believes does not conform with current statutory requirements (ie Public Health Act, Fire Prevention Act, British Standards etc).

Identification of materials such as asbestos, are to be included, with an indication of items of work required to bring the stations within current legislative parameters.

Exclusions

Certain building elements are excluded from the Asset Survey and hence no reference to the following is required:-

- All Agency technical measuring instrumentation
- All cable way equipment, excluding cableway stanchions which are included in the Asset survey.
- All electrical wiring, fixtures and fittings within buildings.

16.1 Condition Codes

The survey sheet includes a condition column, which requires the Surveyor to place the stations into appropriate condition bands.

Ref	Code	Meaning
1	Good	Completely capable for its purpose. No visible defects of any serious consequence.

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

Ref	Code	Meaning
2	Fair	Less capable for its purpose, with signs of deterioration.
3	Poor	Requiring attention.
4	Bad	Repair/replacement recommended without delay.
5	Other	Requiring further investigation (with appropriate explanation in the comments section)

17.0 Detailed Asset Assessment

Based upon the physical and condition surveys, the Surveyor will prepare a schedule of recommended works to be carried out on a station by station basis. This schedule will be prioritised in accordance with the coding methodology shown in 17.1 below and presented to the Agency on appropriate forms (Report Forms 25 & 26).

17.1 Priority Codes

The survey sheet includes a time code requirement which requires the Surveyor to place time parameters against items requiring repair/cyclical maintenance.

The time parameters are as follows

Urgency	Code	Description
Immediate	I1	Emergency, Legal Obligation, Health & Safety
	I2	Residual Asset Life < 2 Years
	I3	Operational Requirement within 1 Year
Soon	S1	Medium Term Legal Obligation
	S2	Residual Asset Life between 2 and 5 Years
	S3	Operational Requirement within next 2 to 5 Years
Later	L1	Residual Asset Life > 5 Years
	L2	Operational Requirement beyond 5 Years

17.2 Cyclical Repairs

Even though an element may be in sound condition at present, provision should be made within the time scales for future repair(s) eg external redecorations (which should appear at least once within the time scales) and later repairs to renew / repair any particular elements.

17.3 Repair Costs

All costs throughout the time code scales are to be at First Quarter of the current year's

HYDROMETRIC ASSET SURVEY

River Level & Flow Measurement Stations

process.

It should be assumed that all items of repair are to be carried out on an individual element basis - ie not as part of a major redevelopment scheme.

The costs will be treated as indicative only and therefore should be totally realistic and exclude all contingencies. Where practicable, the Surveyor is to provide source documentation to support any estimates provided.

18.0 Life Cycle Costing

In addition, the surveyor is to assess the life cycle costing aspect of the main materials found present within the stations and to recommend alternative low cost long life replacement materials.

All works which are considered to require further assessment from a structural engineer or other specialised consultant, are to be individually identified within this report.

The Surveyor is to use the 'urgency' categories, referred to in Section 17.1 to present the recommendations.

HYDROMETRIC ASSET SURVEY
River Level & Flow Measurement Stations

APPENDIX A

HYDROMETRIC ASSET SURVEY
River Level & Flow Measurement Stations

ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

Site Environment

Ref	Description	Check	Condition	Comments on Condition and Construction
SI01	Grounds			(eg litter free & tidy)
SI02	On-Site Storage *			(eg maintenance material, containment, security)
SI03	Gates			
SI04	Fences			
SI05	Pedestrian Access			
SI06	Vehicular Access			
SI07	On-Site Parking			
SI08	Off-Site Parking			
SI09	Vegetation			

Refer to Section 16.1 on Condition Codes

* these cover Environmentally hazardous materials eg oil, bulk liquids, fertilizers, creosote etc. Please list each type, its means of storage, condition of the storage facility, security, breaches in security, susceptibility of vehicular damage.

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

BUILDING : Description :
(Repeat this form for each Building on Site)

External

Ref	Description	Check	Condition	Comments on Condition and Construction
BE01	Foundations			
BE02	Damp Proof Membrane			
BE03	External Walls			
BE04	Station Signage (Name etc)			
BE05	Roof			
BE06	Guttering & Downpipes			
BE07	Gulleys			
BE08	Inspection Chamber Markings			(ie blue for surface, red for foul)
BE09	Drainage of Watercourse / Soakaway / Other			
BE10	Oil Interceptors			
BE11	Watercourse Outfall			(eg odour, colour)
BE12	Door Security (Lock Type)			
BE13	Perimeter Pathing			
BE14	Path from Building to Channel			

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature-not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

BUILDING : Description :
(Repeat this form for each Building on Site)

Internal

Ref	Description	Check	Condition	Comments on Condition and Construction
BI01	Internal Walls			
BI02	Flooring			
BI03	Anti-Skid Finish			
BI04	Internal Finish to Walls			
BI05	Ceiling			
BI06	Internal Finish to Ceiling			
BI07	Ventilation			
BI08	Internal Condition (eg Clean)			
BI09	Internal SBM			
BI10	Door Decoration			
BI11	Windows			
BI12	Anti-Vandal Screens			
BI13	Window Decoration			
BI14	Wall Insulation			
BI15	Ceiling Insulation			

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

BUILDING : Description :
(Repeat this form for each Building on Site)

Stilling Wells(s)

Ref	Description	Check	Condition	Comments on Condition and Construction
SW01	Well Construction			
SW02	Well Intake Pipes			
SW03	Siltation			
SW04	Leakage / Seals			
SW05	Well Cover			
SW06	Well Lights			
SW07	Valve Gear			

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

BUILDING : Description :
(Repeat this form for each Building on Site)

Health & Safety (Internal)

Ref	Description	Check	Condition	Comments on Condition and Construction
HS01	Well Safety Gate			
HS02	Well Ladders / Foot Irons			
HS03	Safety Harness Attachments			
HS04	Signs of Asbestos			(non invasive inspection)
HS05	Water Supply			
HS06	Water Meter			
HS07	Toilet Facilities			
HS08	Hand Cleansing Material			
HS09	Hand Washing Facilities			
HS10	Showering Facilities			

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

BUILDING : Description :

Health & Safety (External)

Ref	Description	Check	Condition	Comments on Condition and Construction
HS11	Pedestrian Access to Channel			
HS12	Vehicular Access to Channel			
HS13	Steps to Channel			
HS14	Footbridge over Channel			
HS15	Safety Rails			
HS16	Ladders to Channel			
HS17	Safety Attachment Attachments			

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

BUILDING : Description :
(Repeat this form for each Building on Site)

Utilities - Electricity / Gas / Heating Oil (Non Intrusive Examination)

Ref	Description	Check	Condition	Comments on Condition and Construction
UE01	Electricity Supply			
UE02	External Lights / Sockets			
UE03	External Floodlights			
UE04	Meter Box			
UE05	Mains Cable			
UE06	Isolation Switch			
UE07	Internal Power Sockets			
UE08	Internal Lights			(on at time of visit ?)
UE09	Light Timers/Sensors/Auto			
UE10	High Efficiency Fluorescent Type			
UE11	Heaters			(on at time of visit ?)
UE12	Heater Type (Elec/Gas/Oil)			
UE13	Heater Thermostat			
UE14	Oil Storage Facility			(ie Bunded)
UE15	(PEA) Portable Test Tag			
UE16	Earth Cabling			
UE17	RAR Modem			
UE18	Battery Charger			
UE19	Batteries (Heavy Duty)			
UE20	Lightning Arrester			
UE21	Alternative Power Supply			

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

BUILDING : Description :
(Repeat this form for each Building on Site)

Utilities - Telephone

Ref	Description	Check	Condition	Comments on Condition and Construction
UT01	Internal Socket			
UT02	Check Line to Building			

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

Cableway (If housed in separate Bulding - complete check separate sheet for that Building)

Ref	Description	Check	Condition	Comments on Condition and Construction
CW01	Stanchion (Winch End)			
CW02	Foundation (Winch End)			
CW03	Stanchion (Passive End) *			
CW04	Foundation (Passive End)			
CW05	Cableway Weight			(size, weight etc)
CW06	Portable Winch			

General Comment (Condition, State of Repair)

* Where access to the opposite bank cannot be achieved by wading, footbridge of local public highway or footpath, this item should be so annotated.

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES
HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

River Channel (U/S & D/S Control Structure or Rated Section)

Ref	Description	Check	Condition	Comments on Condition and Construction
RC01	Upstream Channel			
RC02	Downstream Channel			
RC03	Right Hand Bank			
RC04	Left Hand Bank			
RC05	Upstream Siltation			
RC06	Downstream Siltation			

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

In-River Hydrometric Structure (If Present)

Ref	Description	Check	Condition	Comments on Condition and Construction
HS01	General Description			
HS02	Compliant with BS 3680			(general configuration)
HS03	Crest or Control			
HS04	Crest Tapping			
HS05	Crest Capping			
HS06	Bypass (Diversion) Channel			
HS07	Bypass Sluices			
HS08	Intake Pipes			
HS09	Curtain Walling			
HS10	Dividing Walls			

see Also Form 10 - River Channel (U/S & D/S Control Structure or Rated Section)

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

Open Channel /Bed Control (*conveyance*)

Ref	Description	Check	Condition	Comments on Condition and Construction
OC01	Approach Channel Alignment			eg straight for X times channel width
OC02	Asymetric Approach Flow			general comments
OC03	Exit Channel			
OC04	Channel Bed			
OC05	Siltation			
OC06	Wing Wall (Left)			
OC07	Wing Wall (Right)			

see Also Form 10 - River Channel (U/S & D/S Control Structure or Rated Section)

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

Electromagnetic Measurement Structure (if present) - excludes testing and calibration checks

Ref	Description	Check	Condition	Comments on Condition and Construction
EM01	Engineered Section			
EM02	Duct Pits (Coil)			
EM03	Duct Pits (Voltage Sensors)			
EM04				

see Also Form 10 - River Channel (U/S & D/S Control Structure or Rated Section)

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

Ultrasonic Measurement Structure (if present) - excludes testing and calibration checks

Ref	Description	Check	Condition	Comments on Condition and Construction
US01	Pole Box			
US02	Transducer Rack Supports			
US03	Duct Pits			
US04	Transducer Support Foundations			

see Also Form 10 - River Channel (U/S & D/S Control Structure or Rated Section)

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

STATION SURVEY SHEET

Station Asset No.: Station Name :
Date : Surveyor :

Staff Gauge Boards

Ref	Description	Check	Condition	Comments on Condition and Construction
SG01	Upstream Board			
SG02	Upstream Board Extension			(if separate)
SG03	Downstream Board			
SG04	Downstream Board Extension			(if separate)

General Comment (Condition, State of Repair)

✓	Feature Checked	✗	Feature Absent	\	Feature not Checked
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ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

DETAILED SURVEY SHEET

SITE REF : STATION NAME :
DATE : SURVEYOR :

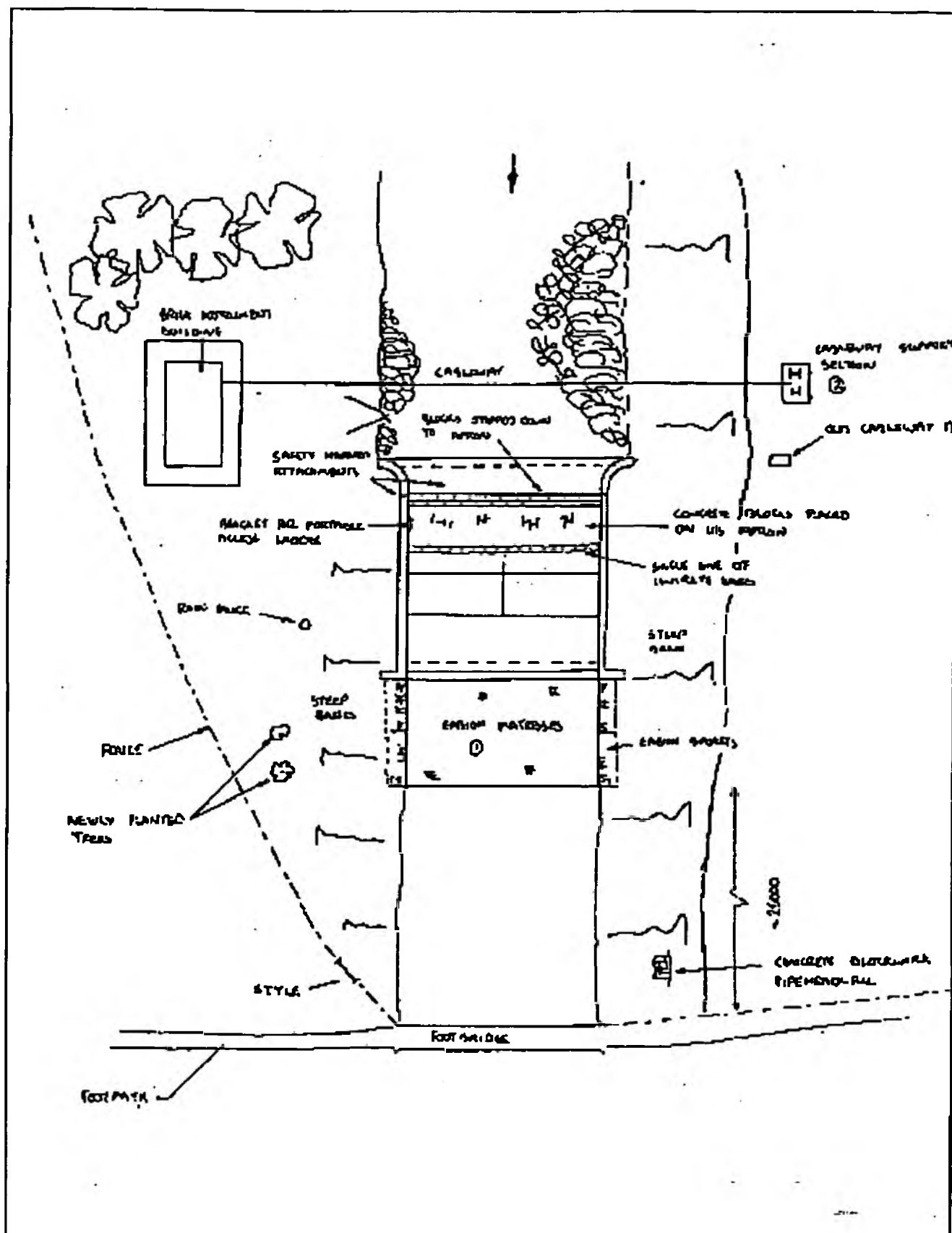
General Description

U/S Channel Width (m) :
D/S Channel Width (m) :
Width of Channel @ Structure (m) :
Description and approximate length
of U/S approach channel (m) :
Description and approximate length
of D/S exit channel (m) :
Structures U/S :
Structures D/S :
Description of erosion / siltation :
Description and affect of sedimentation :
Description and affect of vegetation :
Description of inflows / confluences :
Description of staff gauges / accessibility :
Conformity with BS 3680 :
Range of U/S Staff Gauge (m) :
Range of D/S Staff Gauge (m) :
Ease of reading staff :
Description and levels of stilling well :
Internal diplate level (m AOD) :
SBM (structure / site) (m AOD) :
SBM (building) (m AOD) :

ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

DETAILED SURVEY SHEET

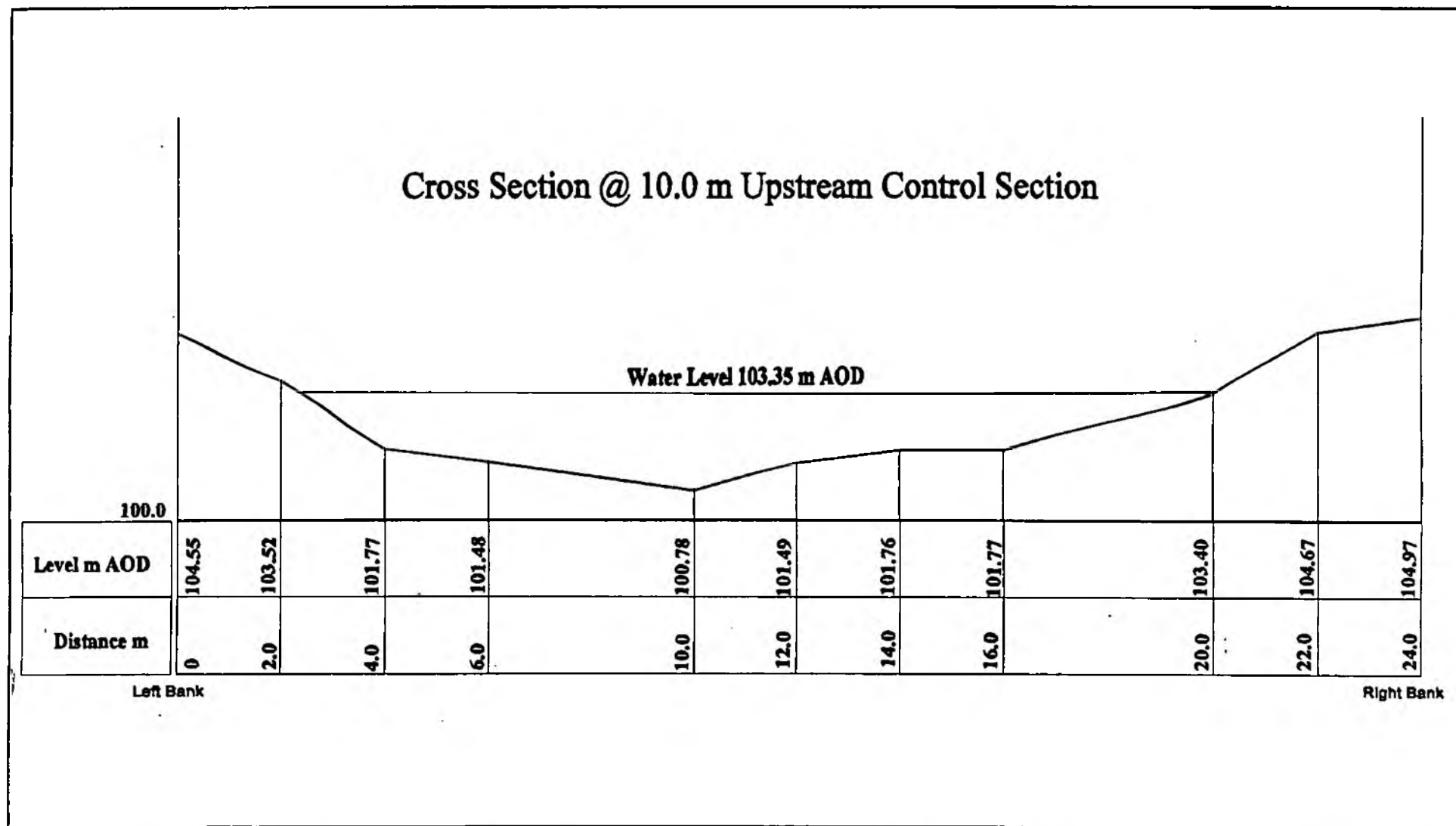
SITE REF : STATION NAME :
 DATE : SURVEYOR :



ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

CROSS SECTION DETAIL SHEET

SITE REF : STATION NAME :
 DATE : SURVEYOR :



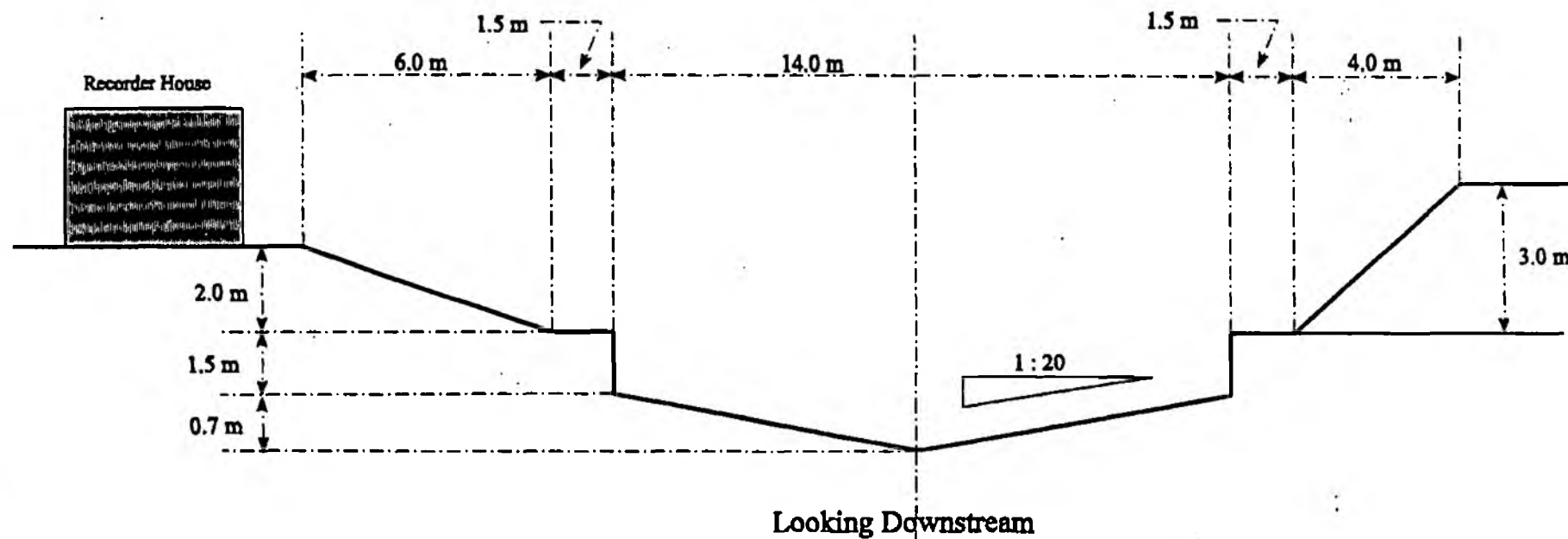


ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

CROSS SECTION DETAIL SHEET

SITE REF : STATION NAME :
DATE : SURVEYOR :

Cross Section @ Control Section



ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

CONDITION SURVEY SHEET

SITE REF : STATION NAME :
DATE : SURVEYOR :

1. GENERAL DESCRIPTION

Type of Structure and General Description

2. STRUCTURAL CONDITION

Main Structure

Description	Y/N	Sketch Ref	Image Ref	Comment Reference
Is concrete spalled or cracked ?				
Is reinforcement exposed ?				
Is reinforcement corroded or frayed ?				
Are joint sealers in sound condition ?				
Is there any settlement or distortion of wing walls ?				
Is there evidence of tree root damage ?				
Is there potential future damage from tree roots ?				
Is erosion protection provided ? ⁵				
Is erosion protection adequate ?				

If any faults are noted, they should be photographed and described below with sufficient information to enable the cost of repairs to be estimated.

Reference

ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

CONDITION SURVEY SHEET

SITE REF : STATION NAME :
DATE : SURVEYOR :

Hydrometric Structure (Weir Crest Flume)

Item	Y/N	Sketch Ref	Image Ref	Comment Reference
Is concrete spalled or cracked ?				
Is GRP damaged ?				
Is crest plate eroded ?				
Is crest plate secure ?				
Is crest even and level ?				
Are Gauge boards present ?				

If any faults are noted, they should be photographed and described below with sufficient information to enable the cost of repairs to be estimated.

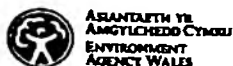
Reference

Hydrometric Structure (Tapping Points)

Item	Y/N	Sketch Ref	Image Ref	Comment Reference
Is siltation present ?				
Are ther strainers ?				
Are the strainers adequate ?				
Are isolation valves operable ?				

If any faults are noted, they should be photographed and described below with sufficient information to enable the cost of repairs to be estimated.

Reference



ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

CONDITION SURVEY SHEET

SITE REF : STATION NAME :
DATE : SURVEYOR :

Hydrometric Structure (Stilling Well & Buildings)

Item	Y/N	Sketch Ref	Image Ref	Comment Reference
Are stilling wells robust ?				
Are stilling wells damaged or corroded ?				
Are buildings is good condition ?				
Are buildings weatherproof ?				
Are buildings secure ?				
Graffiti ?				

If any faults are noted, they should be photographed and described below with sufficient information to enable the cost of repairs to be estimated.

Reference



ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

CONDITION SURVEY SHEET

SITE REF : STATION NAME :

DATE : SURVEYOR :

Health & Safety Checks

If any faults are noted, they should be photographed and described below with sufficient information to enable the cost of repairs to be estimated.

HANDRAILS	Y/N	Sketch Ref	Image Ref	Comment Reference
Are handrails necessary ?				
Are handrails present ?				
Are handrails secure ?				
Are handrails corroded ?				
Is handrail paint / galvanising in good condition ?				

Reference

LADDERS	Y/N	Sketch Ref	Image Ref	Comment Reference
Are ladders necessary for access into the hydrometric structure ?				
Are ladders present ?				
Are ladders secure ?				
Are ladders corroded ?				
Are ladders paint / galvanising in good condition ?				

Reference

ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

CONDITION SURVEY SHEET

SITE REF : STATION NAME :
DATE : SURVEYOR :

Health & Safety Checks (continued)

SAFETY HARNESS ATTACHMENTS	Y/N	Sketch Ref	Image Ref	Comment Reference
Are safety harness attachments present ?				
Are safety harness attachments in good condition ?				

Reference

STILLING WELLS	Y/N	Sketch Ref	Image Ref	Comment Reference
Are stilling wells big enough for man entry ?				
Are stilling wells signed as 'confined spaces' ?				
Are there means to prevent falling into stilling well ?				
Are these means adequate and in good condition ?				
Is there a means of access down into the well ?				
Is the means of access in good condition ?				

Reference

ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

DETAILED ASSET ASSESSMENT

SITE REF : STATION NAME :
DATE : SURVEYOR :

CURRENT DETAILS

Date of Construction	
Source of Information	
Replacement Cost @ April 1998 Prices	£

RECOMMENDED WORKS

Immediate : I1 Emergency, Legal Obligation, Health & Safety

Description	Estimated Cost £

Immediate : I2 Residual Asset Life < 2 Years

Description	Estimated Cost £

Immediate : I3 Operational Requirement within 1 Year

Description	Estimated Cost £

Soon : S1 Medium Term Legal Obligation

Description	Estimated Cost £

ENVIRONMENT AGENCY WALES HYDROMETRIC ASSET SURVEY

DETAILED ASSET ASSESSMENT

SITE REF : STATION NAME :
DATE : SURVEYOR :

Soon : S2 Residual Asset Life between 2 and 5 Years

Description	Estimated Cost £

Soon : S3 Operational Requirement within next 2 to 5 Years

Description	Estimated Cost £

Later : L1 Residual Asset Life > 5 Years

Description	Estimated Cost £

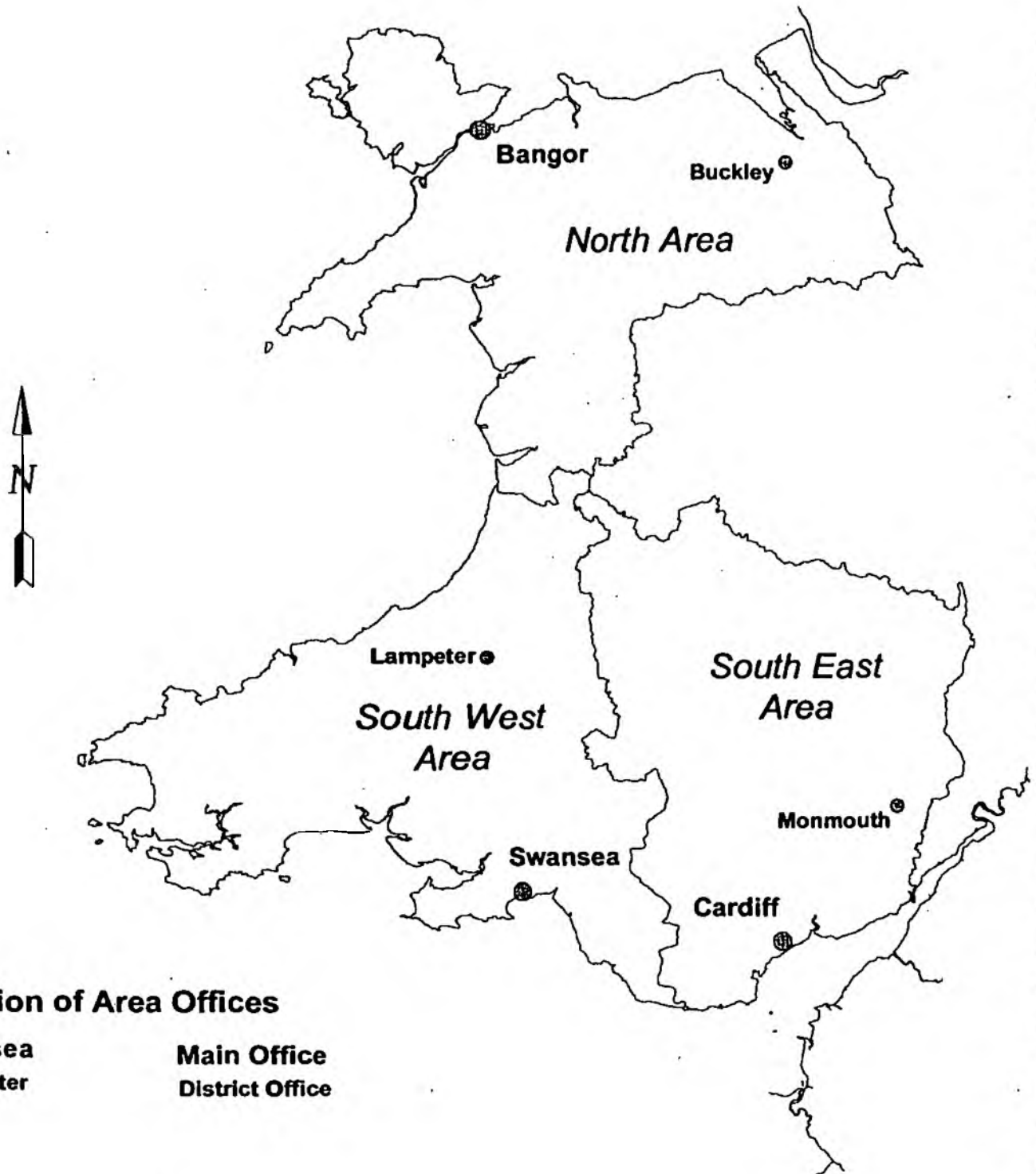
Later : L2 Operational Requirement beyond 5 Years

Description	Estimated Cost £

APPENDIX B

**Location of Main Offices of
Environment Agency Wales**

Environment Agency - Wales



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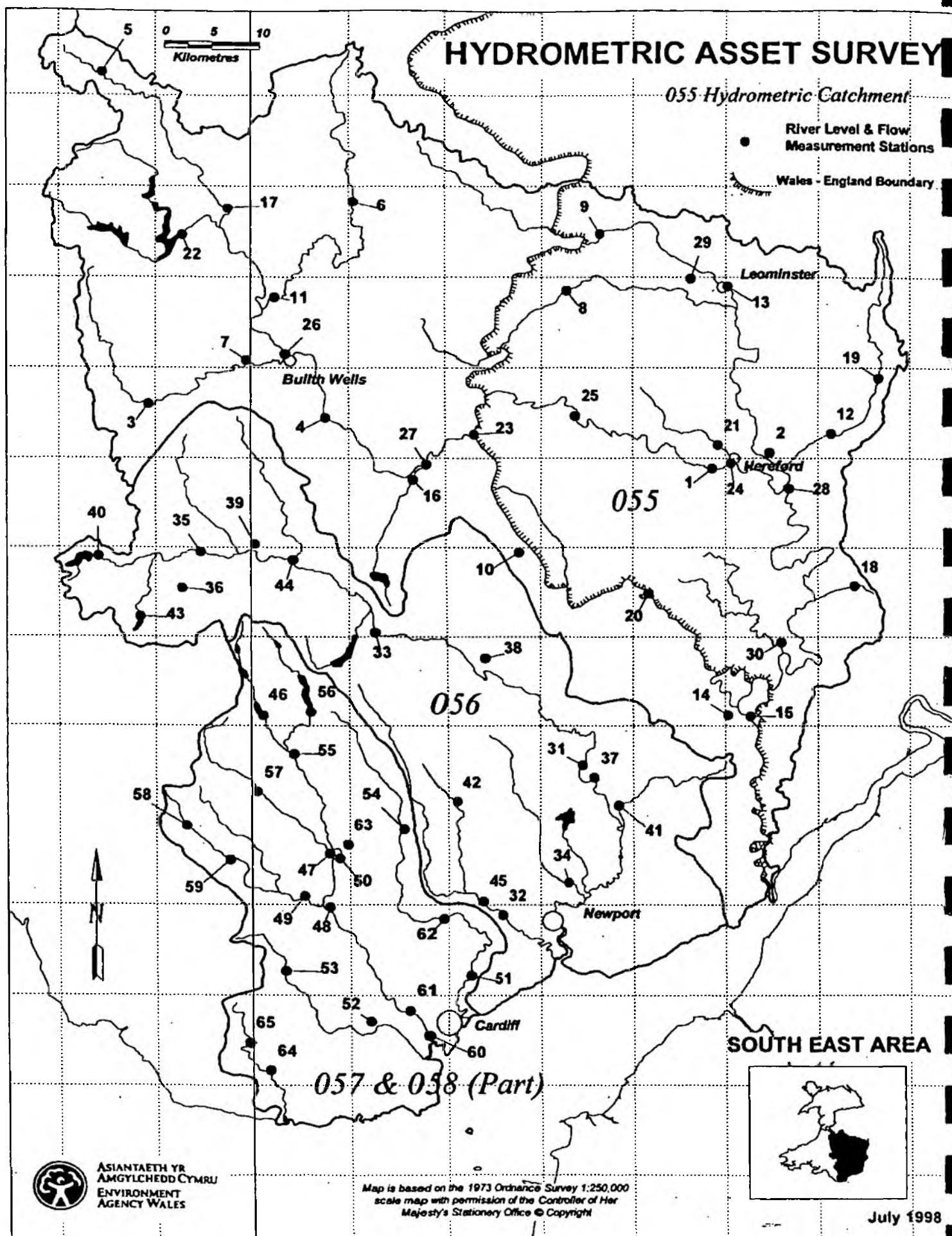
July 1998

APPENDIX C

SCHEDULES of HYDROMETRIC ASSETS included in the SURVEY

This survey will be undertaken as a series of 'grouped' stations, decided by each the Area Representative.

From this listing, the Area Representative will identify those stations to be included in a 'survey package' for which the Surveyor will be expected to return a quotation. The successful Surveyor will then be required to complete the survey to a timetable agreed between the Surveyor and the Area Representative. The Area Representative may request that addition survey work be carried out at nminated sites, which the Area Representative will indicate to the Surveyor to include in the quotation.



Hydrometric Asset Survey - Master List of Sites

SOUTH EAST AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
1	055	100001	055002	BELMONT	WYE	SO 4851 -3881	FLOW	1	Y	Y	-	
2	055	100002	055003	LUGWARDINE	LUGG	SO 5485 -4060	FLOW	1	Y	Y	-	
3	055	100003	055004	ABERNANT	IRFON	SN 8927 -4598	LEVEL	1	Y	Y	-	
4	055	100005	055007	ERWOOD	WYE	SO 0758 -4449	FLOW	1	Y	Y	-	
5	055	100007	055010	PANT MAWR	WYE	SN 8442 -8251	LEVEL	1	Y	Y	-	
6	055	100008	055011	LLANDEWI	ITHON	SO 1046 -6829	LEVEL	1	Y	Y	-	
7	055	100009	055012	CILMERY	IRFON	SN 9954 -5082	FLOW	2	Y	Y	-	
8	055	100010	055013	TITLEY MILL	ARROW	SO 3283 -5849	FLOW	1	Y	Y	-	
9	055	100011	055014	BYTON	LUGG	SO 3646 -6471	FLOW	2	Y	Y	-	
10	055	100012	055015	TAFOLOG	HONDDU	SO 2767 -2944	LEVEL	1	Y	-	-	
11	055	100013	055016	DISSERTH	ITHON	SO 0246 -5779	FLOW	2	Y	Y	-	
12	055	100015	055018	YARKHILL	FROME	SO 6146 -4270	FLOW	1	Y	Y	-	
13	055	100017	055021	BUTTS BRIDGE	LUGG	SO 5021 -5896	FLOW	3	Y	Y	-	
14	055	100018	055022	MITCHEL TROY	TROTHY	SO 5025 -1122	LEVEL	2	Y	-	-	
15	055	100019	055023	REDBROOK	WYE	SO 5276 -1108	FLOW	1	Y	Y	-	
16	055	100020	055025	THREE COCKS	LLYNFI	SO 1661 -3760	FLOW	3	Y	Y	Y	
17	055	100021	055026	DDOL FARM	WYE	SN 9758 -6758	FLOW	3	Y	Y	-	
18	055	100022	055027	SANDFORD BRIDGE	RUDHALL BROOK	SO 6400 -2571	FLOW	6	Y	-	-	
19	055	100023	055028	BISHOPS FROME	FROME	SO 6666 -4886	FLOW	3	Y	Y	-	
20	055	100024	055029	GROSMONT	MONNOW	SO 4165 -2489	FLOW	1	Y	Y	Y	
21	055	100025	055031	THREE ELMS	YAZOR BROOK	SO 4913 -4146	FLOW	2	Y	-	-	

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Master List of Sites

SOUTH EAST AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
22	055	100026	055032	CABAN (ELAN VILLAGE)	ELAN	SN 9283 -6461	FLOW	2	Y	Y	-	
23	055	100035	055804	HAY-ON-WYE	WYE	SO 2288 -4262	LEVEL	1	Y	-	-	
24	055	100038	055807	HEREFORD, OLD WYE BRIDGE	WYE	SO 5060 -3945	LEVEL	1	Y	-	-	
25	055	100041	055811	BREDWARDINE	WYE	SO 3370 -4467	LEVEL	1	Y	-	-	
26	055	100043	055813	BUILTH WELLS	WYE	SO 0351 -5153	LEVEL	1	Y	-	-	
27	055	100044	055814	GLASBURY	WYE	SO 1804 -3930	LEVEL	1	Y	-	-	
28	055	100046	055816	MORDIFORD	WYE	SO 5688 -3663	LEVEL	1	Y	-	-	
29	055	100056	055020	CHOLSTREY MILL	PINSLEY BROOK	SO 4620 -5980	FLOW	6	Y	-	-	
30	055	100730	055036	MARSTOW MILL	GARREN	SO 5605 -1935	FLOW	4	Y	-	-	
31	056	100058	056001	CHAINBRIDGE	USK	SO 3461 -0559	FLOW	1	Y	Y	-	
32	056	100059	056002	RHIWDERIN	EBBW	ST 2588 -8887	FLOW	2	Y	Y	-	
33	056	100061	056004	LLANDETTY	USK	SO 1268 -2046	LEVEL	1	Y	Y	-	
34	056	100062	056005	PONTHIR WEIR	AFON LWYD	ST 3297 -9244	FLOW	3	Y	-	-	
35	056	100063	056006	TRALLONG	USK	SN 9474 -2951	LEVEL	1	Y	Y	-	
36	056	100064	056007	PONT-HEN-HAFOD	SENNI	SN 9281 -2544	FLOW	2	Y	-	-	
37	056	100066	056010	TROSTREY	USK	SO 3585 -0420	FLOW	2	Y	-	-	
38	056	100068	056012	MILLBROOK	GRWYNE	SO 24050-17570	FLOW	2	Y	-	-	
39	056	100069	056013	PONT-AR-YSCIR	YSCIR	SO 0035 -3040	FLOW	2	Y	-	-	
40	056	100070	056014	USK RESERVOIR	USK	SN 8399 -2905	FLOW	2	Y	-	-	
41	056	100071	056015	OLWAY INN	OLWAY BROOK	SO 3849 -0109	FLOW	2	Y	-	-	

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Master List of Sites

SOUTH EAST AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
42	056	100075	056019	ABERBEEG	EBBW	SO 2100 -0149	FLOW	3	Y	-	-	
43	056	100078	056803	CRAY RESERVOIR	AFON CRAI	SN 8839 -2226	FLOW	3	Y	-	-	
44	056	100079	056804	BRECON	USK	SO 0426 -2860	LEVEL	1	Y	-	-	
45	056	100090	056815	RISCA	EBBW	ST 2372 -9038	LEVEL	1	Y	-	-	
46	057	100093	057817	LLWYNON RESERVOIR	TAFF FAWR	SO 0119 -1117	FLOW	6	Y	-	-	
47	057	100095	057004	ABERCYNON	CYNON	ST 0792 -9564	FLOW	2	Y	-	-	
48	057	100096	057005	PONTYPRIDD	TAFF	ST 0793 -8973	FLOW	2	Y	Y	-	
49	057	100097	057006	TREHAFOD	RHONDDA	ST 0531 -9094	FLOW	3	Y	Y	-	
50	057	100098	057007	FIDDLERS ELBOW	TAFF	ST 0894 -9515	FLOW	2	Y	Y	-	
51	057	100099	057008	LLANEDEYRN	RHYMNEY	ST 2243 -8213	FLOW	2	Y	Y	-	
52	057	100100	057009	ST.FAGANS	ELY	ST 1212 -7705	FLOW	2	Y	Y	-	
53	057	100101	057010	LANELAY	ELY	ST 0336 -8268	FLOW	3	Y	-	-	
54	057	100102	057014	GILFACH BARGOED	RHYMNEY	ST 1560 -9837	LEVEL	3	Y	-	-	
55	057	100103	057015	MERTHYR TYDFIL	TAFF	SO 0431 -0681	FLOW	2	Y	Y	-	
56	057	100104	057016	PONTSTICILL	TAF FECHAN	SO 0598 -1153	FLOW	2	Y	-	-	
57	057	100108	057805	ABERDARE	CYNON	SO 0055 -0261	LEVEL	1	Y	-	-	
58	057	100112	057809	TYNEWYDD	RHONDDA FAWR	SS 9321 -9873	LEVEL	3	Y	Y	-	
59	057	100113	057810	GELLI	RHONDDA FAWR	SS 9771 -9496	LEVEL	1	Y	-	-	
60	057	100114	057811	CARDIFF TIDAL (PENARTH ROAD BRIDGE)	TAFF	ST 1801 -7548	LEVEL	1	Y	-	-	

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Master List of Sites

SOUTH EAST AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
61	057	100115	057812	WESTERN AVENUE BRIDGE	TAFF	ST 1611 -7829	LEVEL	1	Y	-	-	
62	057	100117	057814	WATERLOO BRIDGE	RHYMNEY	ST 1950 -8841	LEVEL	1	Y	-	-	
63	057	100743	057899	QUAKERS YARD	BARGOED TAF	ST 0983 -9665	LEVEL	1	Y	-	-	
64	058	100120	058011	GIGMAN BRIDGE	THAW	ST 0174 -7165	FLOW	2	Y	-	-	
65	058	100481	058803	COWBRIDGE FWS	THAW	SS 9962 -7466	LEVEL	1	Y	-	-	

Note : Refer to Section 10.2 for Information on Station Types

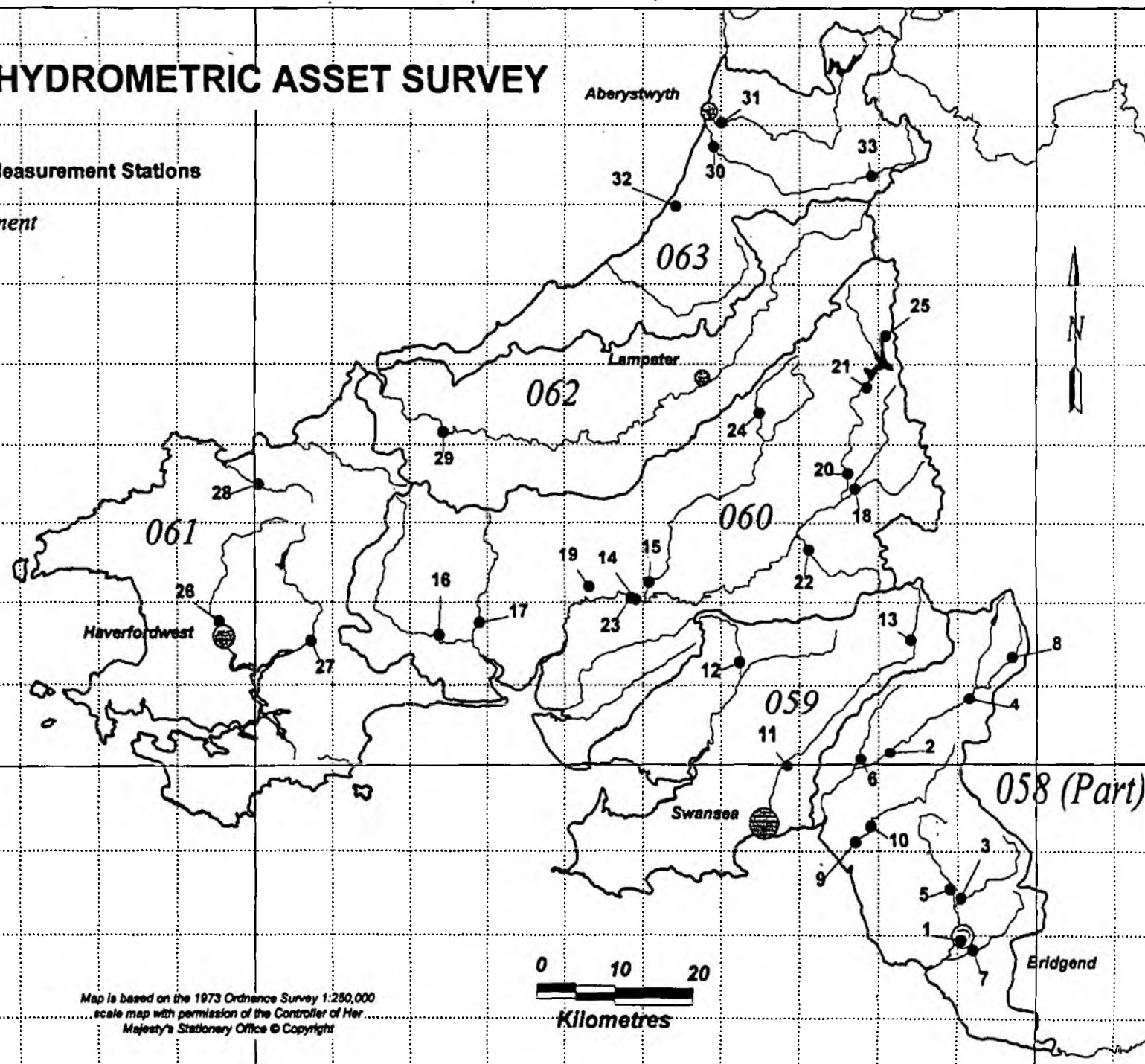


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HYDROMETRIC ASSET SURVEY

- River Level & Flow Measurement Stations

062 Hydrometric Catchment



SOUTH WEST AREA



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July 1998

Hydrometric Asset Survey - Master List of Sites

SOUTH WEST AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
1	058	200001	058001	BRIDGEND	OGMORE	SS 90400-79400	FLOW	2	Y	-	-	
2	058	200002	058002	RESOLVEN	NEATH	SN 81500-01700	FLOW	2	Y	Y	-	
3	058	200003	058005	BRYNMENYN	OGMORE	SS 90400-84400	FLOW	2	Y	Y	-	
4	058	200004	058006	PONT-NEATH-VAUGHAN	AFON MELLTE	SN 91500-08200	FLOW	2	Y	Y	-	
5	058	200005	058007	COYTRAHEN	LLYNFI	SS 89100-85500	FLOW	2	Y	Y	-	
6	058	200006	058008	CILFREW	DULAIS	SN 77800-00800	FLOW	2	Y	Y	-	
7	058	200007	058009	KEEPERS LODGE	EWENNY	SS 92000-78200	FLOW	2	Y	Y	-	
8	058	200008	058010	ESGAIR CARNAU	HEPSTE	SN 96900-13400	FLOW	2	Y	-	-	
9	058	200009	058012	MARCROFT WEIR	AFAN	SS 77100-91000	FLOW	3	Y	Y	-	
10	058	200014	05804T	CWMAFAN	AFAN	SS 79100-92900	LEVEL	3	Y	-	Y	
11	059	200019	059001	YNYSTANGLWS	TAWF	SS 68500-99800	FLOW	1	Y	Y	-	
12	059	200020	059002	TIR-Y-DAIL	LOUGHOR	SN 62400-12700	FLOW	3	Y	Y	-	
13	059	200525	05904T	CRAIG Y NOS	TAWF (UPPER)	SN 841-155-	LEVEL	1	Y	-	-	
14	060	200023	060001	TY-CASTELL	TYWI	SN 49100-20400	LEVEL	1	Y	Y	-	
15	060	200024	060002	FELIN MYNACHDY	COTHI	SN 50800-22500	FLOW	1	Y	Y	-	
16	060	200025	060003	CLOG Y FRAN	TAF	SN 23800-16000	FLOW	1	Y	Y	-	
17	060	200026	060004	GLASFRYN FORD	DEWI FAWR	SN 29000-17500	FLOW	1	Y	-	-	
18	060	200027	060005	LLANDOVERY	BRAN	SN 77100-34300	FLOW	5	Y	Y	-	
19	060	200028	060006	GLANGWILI	GWILI	SN 43100-22000	FLOW	1	Y	Y	-	
20	060	200029	060007	DOLAU HIRION	TYWI	SN 76200-36200	LEVEL	1	Y	Y	-	
21	060	200030	060008	YSTRADFFIN	TYWI	SN 78600-47200	FLOW	2	Y	-	-	Not Agency Building

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Master List of Sites

SOUTH WEST AREA

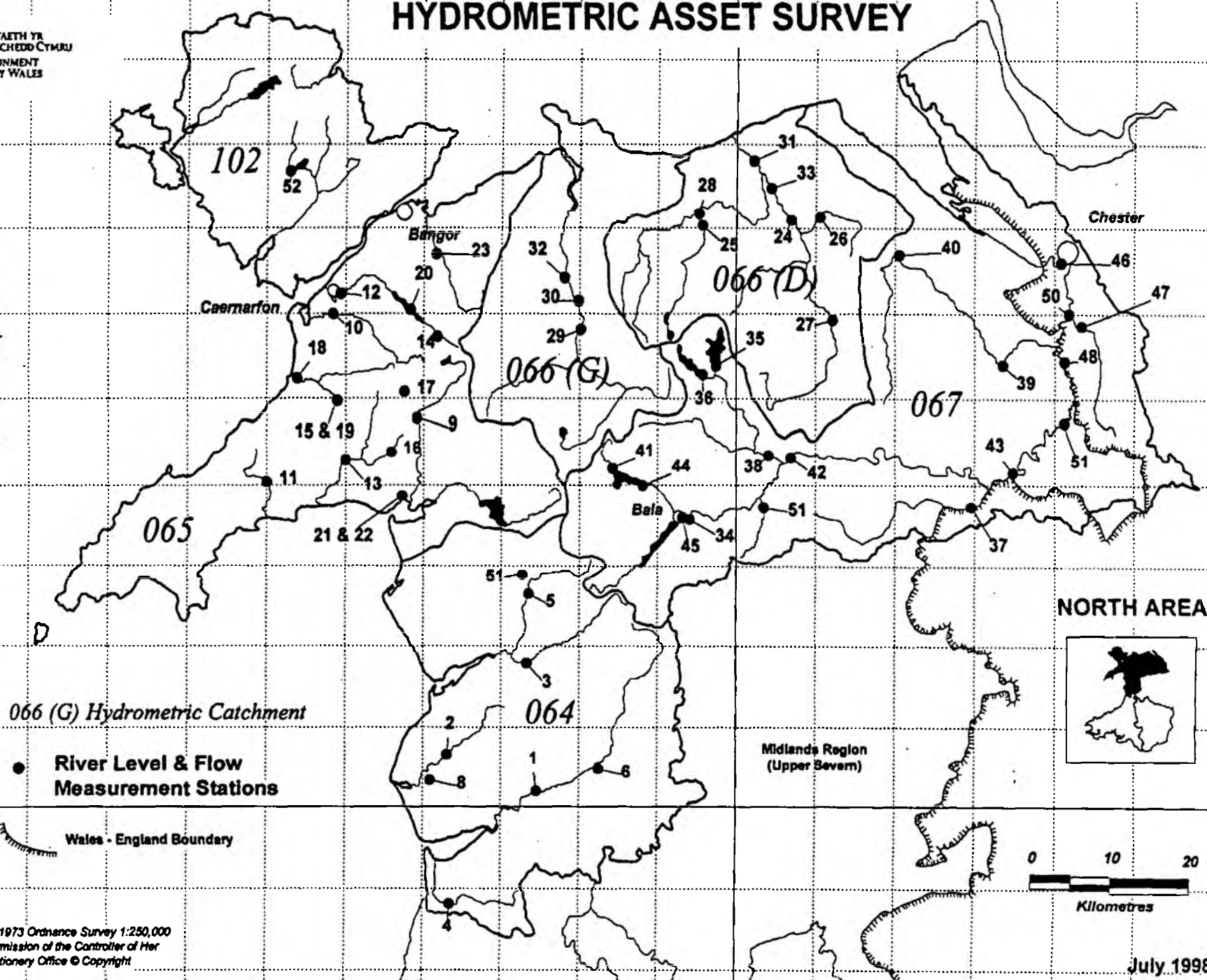
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
22	060	200031	060009	FELIN-Y-CWM	SAWDDE	SN 71200-26600	FLOW	2	Y	Y	-	
23	060	200032	060010	NANTGAREDIG (CAPEL DEWI)	TYWI	SN 48500-20600	FLOW	2	Y	Y	-	
24	060	200033	0660012	DDOL LAS	TWRCH	SN 65000-44000	FLOW	1	Y	-	-	
25	060	200589	060627	BRIANNE FLUME - BUSTACH	NANT Y BUSTACH	SN 810-536-	FLOW	6	Y	-	-	
26	061	200039	061001	PRENDERGAST MILL	WESTERN CLEDDAU	SM 95400-17700	FLOW	1	Y	Y	-	
27	061	200040	061002	CANASTON BRIDGE	EASTERN CLEDDAU	SN 07200-15300	FLOW	3	Y	Y	-	
28	061	200041	061003	CILRHEDYN BRIDGE	AFON GWAUN	SN 00500-34900	FLOW	1	Y	Y	-	
29	062	200043	062001	GLAN TEIFI	TEIFI	SN 24400-41600	FLOW	1	Y	Y	-	
30	063	200045	063001	PONT LLOLWYN	YSTWYTH	SN 59100-77400	FLOW	3	Y	Y	-	
31	063	200046	063002	LLANBADARN	RHEIDOL	SN 60100-80400	FLOW	1	Y	Y	-	
32	063	200047	063003	LLANRHYSTYD	WYRE	SN 54200-69800	LEVEL	1	Y	-	-	
33	063	200048	063004	CWM YSTWYTH	YSTWYTH	SN 79100-73700	FLOW	2	Y	Y	-	

Note : Refer to Section 10.2 for Information on Station Types



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HYDROMETRIC ASSET SURVEY



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Hydrometric Asset Survey - Master List of Sites

NORTH AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
1	064	300001	064001	DYFI BRIDGE, MACHYNLLETH	DYFI	SH 7459 -0196	FLOW	1	Y	Y	-	
2	064	300002	064002	PONT Y GARTH, TYWYN	DYSYNNI	SH 6311 -0660	FLOW	3	Y	Y	-	
3	064	300004	064005	BOWLING GREEN, DOLGELLAU	WNION	SH 7330 -1783	LEVEL	1	Y	-	-	
4	064	300005	064006	DOLYBONT, LLANDRE	LERI	SN 6348 -8805	FLOW	2	Y	-	-	
5	064	300417	064010	TYDDYN GWLADYS, GANLLWYD	AFON MAWDDACH	SH 7354 -2637	FLOW	1	Y	Y	-	
6	064	300418	064009	CEMMAES ROAD, MACHYNLLETH	AFON TWYMYN	SH 8252 -0474	FLOW	1	Y	Y	-	
7	064	300420	064025	EDEN, GELLI GOCH (LEVEL)	AFON EDEN	SH 7141 -2842	LEVEL	3	Y	-	-	
8	064	300421	064035	BRYN CRUG, TYWYN (LEVEL)	AFON FATHEW	SH 6094 -0332	LEVEL	1	-	-	-	
9	065	300007	065001	BEDDGELERT	GLASLYN	SH 5916 -4779	FLOW	1	Y	Y	Y	
10	065	300008	065004	BONTNEWYDD	GWYRFAI	SH 4841 -5991	FLOW	2	Y	-	-	
11	065	300009	065005	PENCAENEWYDD	ERCH	SH 4000 -4037	FLOW	2	Y	-	-	
12	065	300010	065006	PEBLIG MILLS, CAERNARFON	SEIONT	SH 4941 -6228	FLOW	1	Y			
13	065	300011	065007	GARN DOLBENMAEN	DWYFOR	SH 5002 -4293	FLOW	2	Y	-	-	
14	065	300012	065008	NANT PERIS	NANT PERIS	SH 6176 -5727	FLOW					
15	065	300013	065009	CWM DULYN, NEBO	CWM DULYN	SH 4892 -4977	FLOW	6	Y	-	-	
16	065	300018	065071	CWMYSTRADLLYN	AFON CWMYSTRADLLYN	SH 5585 -4394	LEVEL	6	Y	-	-	Building not owned by Agency
17	065	300423	065014	HAFOD WYDR, BEDDGELERT	AFON COLWYN	SH 5753 -5083	FLOW	2	Y	-	-	Gauging Bridge

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Master List of Sites

NORTH AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
18	065	300424	065015	PONT Y CIM, PONTLLYFNI	AFON LLYFNI	SH 4381 -5238	FLOW	2	Y	-	-	
19	065	300425	065022	CWM DULYN, NEBO	LLYN CWM DULYN	SH 4897 -4975	LEVEL	-		-	-	Lake level
20	065	300428	065990	LLANBERIS	LLYN PADARN	SH 5836 -6044	LEVEL	-	Y	-	-	Lake Level
21	065	300429	065550	PORTHMADOG UPSTREAM SLUICE GATES	AFON GLASLYN	SH 5728 -3857	LEVEL	-		-	-	
22	065	300430	065550	PORTHMADOG DOWNSTREAM SLUICE GATES	AFON GLASLYN	SH 5726 -3858	LEVEL	-		-	-	
23	065	300552	065017	TANYSGAFELL, BETHESDA	AFON OGWEN	SH 6161 -6687	LEVEL	-		-	-	
24	066	300020	066001	PONT-Y-CAMBWLL	CLWYD	SJ 0694 -7096	FLOW	1	Y	Y	-	
25	066	300022	066003	BRYN ALED	ALED	SH 9570 -7034	LEVEL	3	Y	-	-	Exclude Building
26	066	300023	066004	BODFARI	WHEELER	SJ 1051 -7132	FLOW	2	Y	-	-	Gauging Bridge
27	066	300024	066005	RUTHIN WEIR	CLWYD	SJ 12190-59230	FLOW	3	Y	-	-	
28	066	300025	066006	PONT-Y-GWYDDEL	ELWY	SH 9524 -7176	FLOW	1	Y	Y	-	
29	066	300027	066011	CWM LLANNERCH, BETWS Y COED	AFON CONWY	SH 8016 -5810	FLOW	1	Y	Y	-	
30	066	300030	066014	PONT FAWR, LLANRWST	AFON CONWY	SH 7988 -6150	LEVEL	-	-	-	-	
31	066	300039	066007	RHUDDLAN	CLWYD	SJ 02140-78050	LEVEL	-	Y	-	-	
32	066	300040	066998	TREFRIW	AFON CONWY (TIDAL)	SH 7809 -6415	LEVEL	-	-	-	-	
33	066	300407	066025	PONT DAFYDD	CLWYD	SJ 0438 -7488	FLOW	4	Y	Y	-	
34	067	300041	067001	BALA	DEE	SH 9408 -3573	FLOW	3	Y	Y	-	

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Master List of Sites

NORTH AREA												
Map Ref	Catch	Asset Number	Station Number	Station Name	River Name	Grid Reference	Level / Flow	Station Type	Recorder Building	Cableway Present	Cableway Building	Comments
35	067	300043	067003	LLYN BRENIG OUTFLOW	AFON BRENIG	SH 9745 -5388	LEVEL	3	Y	-	-	Exclude Building
36	067	300044	067004	ALWEN RESERVOIR OUTFLOW	ALWEN	SH 9573 -5282	LEVEL	3	Y	-	-	Exclude Building
37	067	300045	067005	BRYNKINALT	CEIRIOO	SJ 2955 -3728	FLOW	3	Y	Y	-	
38	067	300046	067006	DRUID	ALWEN	SJ 0408 -4359	FLOW	1	Y	Y	-	
39	067	300048	067008	PONT-Y-CAPEL	ALYN	SJ 33520-54000	FLOW	3	Y	Y	Y	
40	067	300049	067009	RHYDYMWYN	ALYN	SJ 20520-66750	FLOW	6	Y	-	-	Exclude Building
41	067	300050	067010	CYNEFAIL	AFON GELYN	SH 8428 -4200	FLOW	2	Y	-	-	
42	067	300054	067014	CORWEN	DEE	SJ 0694 -4330	LEVEL	-	Y	-	-	
43	067	300055	067015	MANLEY HALL	DEE	SJ 34820-41460	FLOW	3	Y	Y	Y	
44	067	300057	067017	LLYN CELYN OUTFLOW	AFON TRYWERYN	SH 8810 -3993	LEVEL	3	Y	-	-	Exclude Building
45	067	300059	067019	WEIR X	AFON TRYWERYN	SH 93180-35980	LEVEL	3	Y	Y	Y	
46	067	300060	067020	CHESTER WEIR	DEE	SJ 4081 -6585	LEVEL	-	Y	-	-	Fish Trap
47	067	300061	067021	LEA HALL FARM	ALDFORD BROOK	SJ 4342 -5855	LEVEL	2	Y	-	-	
48	067	300064	067024	FARNDON	DEE	SJ 41220-54370	LEVEL	-	Y	-	-	
49	067	300065	067025	BOWLING BANK	CLYWEDOG	SJ 3956 -4827	FLOW	2	Y	Y	-	
50	067	300066	067027	IRONBRIDGE	DEE	SJ 41800-60020	FLOW	5	Y	-	-	
51	067	300067	067028	LLANDRILLO	AFON CEIDIOG	SJ 0348 -3716	FLOW	3	Y	-	-	
52	102	300077	102001	BODFFORDD	AFON CEFNI	SH 42930-76880	FLOW	6	Y	-	-	

Note : Refer to Section 10.2 for Information on Station Types

APPENDIX D

List of Station to be Surveyed

**The following Schedule will be completed by the Area Representative
to define the number of stations to be included in the survey batch**

Hydrometric Asset Survey - Surveyor's Work Programme

[illegible]

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Surveyor's Work Programme

[illegible]

Note : Refer to Section 10.2 for Information on Station Types

Hydrometric Asset Survey - Surveyor's Work Programme

[illegible]

Note : Refer to Section 10.2 for Information on Station Types

Environment Agency North West Region

Hydrometric Asset Survey Pre-Qualification Letter