

ENVIRONMENT AGENCY
THAMES REGION SURVEY GROUP

MAPS, PLANS
SURVEYS & DATA

1996 Edition



For Internal Circulation Only



ENVIRONMENT AGENCY

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INFORMATION SERVICE

THAMES REGION

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Front Cover: Aerial Photography of the Thames Regional Headquarters, Reading
Ref: 2808 Flown 1992, Scale 1:3000

ENVIRONMENT AGENCY



003381

Contacts

The Survey Group is located on the 8th Floor Reading Bridge House:-

**c/o Kings Meadow House
Kings Meadow Road
Reading
Berkshire
RG1 8DQ**

Survey Manager	Dick Greenaway	01734 535740
Surveyor Archivist	Keith Nursey	01734 535767
Archivist & Map Librarian	Belinda Mitchell	01734 535748
Circular 30/92 (Section 105)	Derek Noble	01734 535647
FAX		01734 535107

Or Email us.

The Survey Group

The Environment Agency (EA), Thames Region Survey Group is based in Reading - and comprises of four members, the Survey Manager, Surveyor Archivist, the Archivist and Map Librarian and a Circular 30/92 Survey Consultant.

The Survey Group is able to offer a number of survey related functions to the EA and this booklet is intended to help you obtain these services.

The Survey Archive

This contains a variety of historical information dating from the 1930's as well as current survey data, which incorporates the following:-

Channel surveys -	Cross sections, long sections, reports, photographs, digital data.
Topographic surveys -	Plans of sites, reports, photographs, digital data.
Hydrographic surveys -	River charts, reports, photographs, digital data.
Aerial photographs -	Vertical stereo/mono and oblique photography, colour and black/ white.
Control information -	Benchmark lists and coordinate data

Survey Specification Advice

A function of the Survey Group is to ensure that specifications for new surveys meet both the customers requirements and the quality requirements of the EA. We will provide advice and assistance to colleagues with the drafting of survey specifications and on the validation of surveys.

The Survey Group also maintains a list of recommended survey companies. This is a list of survey companies who have demonstrated that they can attain the EA standards of survey quality. They are audited to ensure that these standards are maintained and only companies from this list should be invited to tender for survey contracts.

The Survey Group will also advise and assist with the location and acquisition of geographic and topographic information from other sources and should be consulted before purchases are made to ensure that the best possible sources are used.

The Large Scale Map Library

The Survey Group also maintains a collection of large scale Ordnance Survey maps and plans, and an increasing number of digital maps. The Survey Group holds the regional budget for the provision of Ordnance Survey Maps and all map requirements should be sent to the Group to avoid expensive duplication.

Levels of Service

Map Library and Survey Archive

Copies of maps already held in the library

- Orders placed before mid-day should be available for collection or posting the same day.
- Orders placed after mid-day should be available the following morning.
- Very large orders will take longer to recover and print. An estimated delivery time will be given when the order is received.

New Maps

- These are obtained from the local Ordnance Survey Agent and paid for from the Survey Group budget.

Copies of Plans and Drawings

- These are covered by the same conditions as copies of maps.

Benchmark Lists and Control Information

- If these are held in the Archive they will be faxed or posted the same day. If they are not held in the Archive they will be ordered from the Ordnance Survey the same day. In urgent cases the Ordnance Survey will fax data and in non urgent situations the data will be posted.

Copies of 'Reports of Survey'

- Except in urgent cases these will be available for collection or posting within three working days of the placing of your order.

Aerial Photographs

- The order for the provision of new contact prints will be sent to the supplier within two working days of the placing of your order. Delivery times from the supplier vary with the company, and an estimate will be obtained when the order is placed.
- Laser copies of slightly inferior quality, can be made from prints held in Archive. If these are acceptable they can be ready for collection or posting within two working days of the order being placed.
- Large orders for loans or copies will take longer and an estimate of delivery times will be given.

Please see Appendix for an Archive Request Form

Mapping

The Map Library consists of hard copy maps and plans. Coverage of the whole region is available at:

1:50,000	B/W outline, flat.
1:25,000	B/W outline, flat.
1:10,000	Film.

All are updated when the Ordnance Survey publish new editions.

Extensive coverage of the Thames Region is held at 1:1250 and 1:2500.

Old maps are not discarded when replaced and the Archive provides an historical record of various locations before new developments eg, M25.

A selection of First Edition 1:2500 OS Plans (1881) and 1930's County Series Maps (Captain Ferrier Maps) are also available to view and historical maps can be obtained.

Please note a budget is held by this department to purchase new mapping and therefore only the cost of copying the maps/plans is charged to the customer's budgets.

Should any department consider updating their map archive or needs to discuss any further mapping requirements, please contact Belinda Mitchell.

Ordnance Survey 1:10,000 Scale

Coverage of the whole Region is available at this scale and is updated when the Ordnance Survey publish a new edition.

Maps are named for the 10km block within which they lie with a prefix which identifies the 100km block.

The block is published as 4 maps, and each is named for its quadrant.

Therefore:-

100km block	SU	TL	or	TQ	etc
-------------	----	----	----	----	-----

10km Block	0	Easting
------------	---	---------

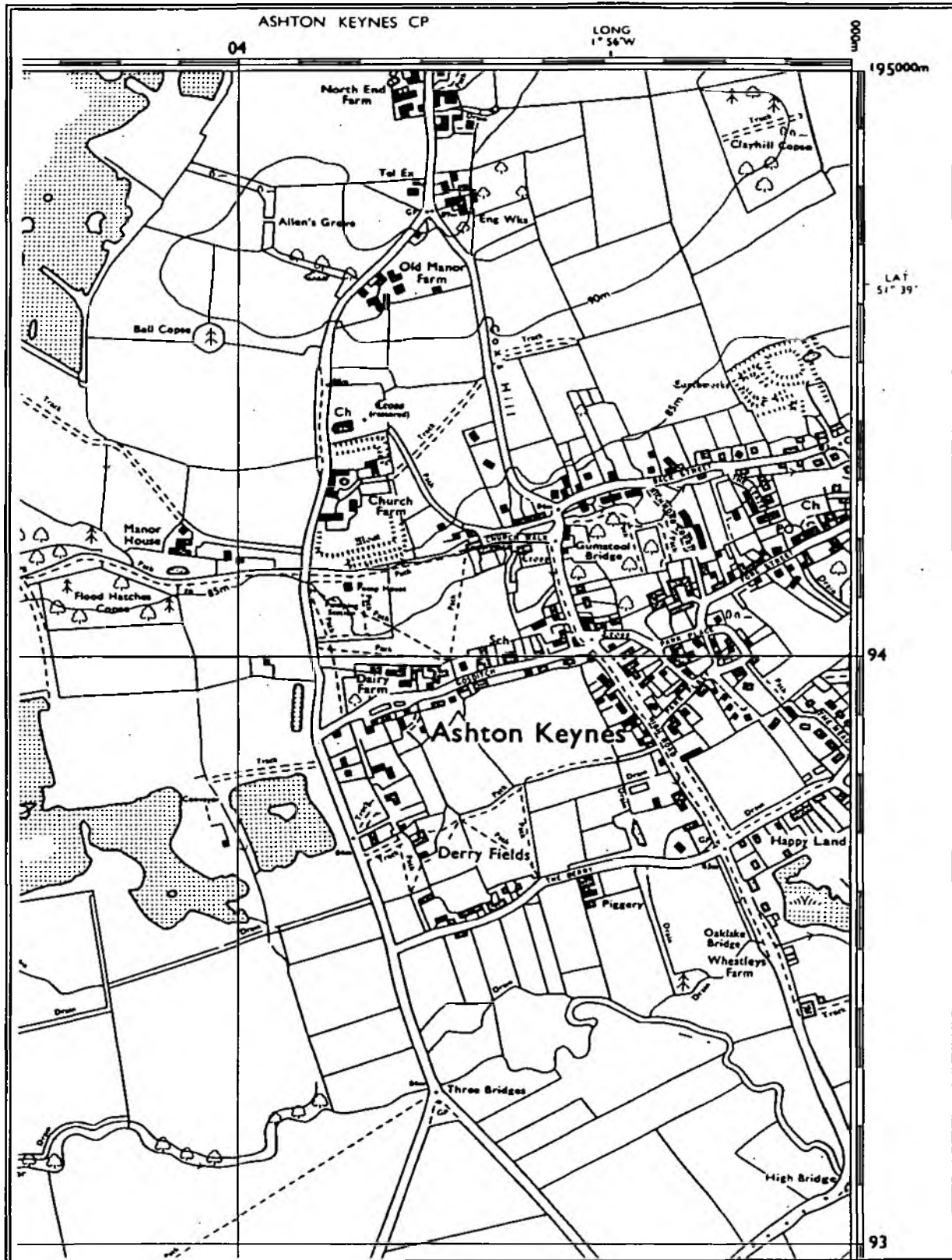
	9	Northing
--	---	----------

Quadrant	SW
----------	----

Map Reference:- SU 09 SW

1:10,000 SCALE PLAN

Extract From SU 09 SW



Ordnance Survey 1:2500 and 1:1250

The coverage is very extensive but full coverage of the Region is not held within the Archive.

Superplans are now available for most of the region. These are digitally plotted plans and orders for new maps will be placed the same day.

1:2500

All rural and some small built up areas, are mapped at this scale and each plan covers 1 km x 1 km

Maps are named for the 100km block (TQ SU etc.) and the co-ordinates of the bottom left hand corner.

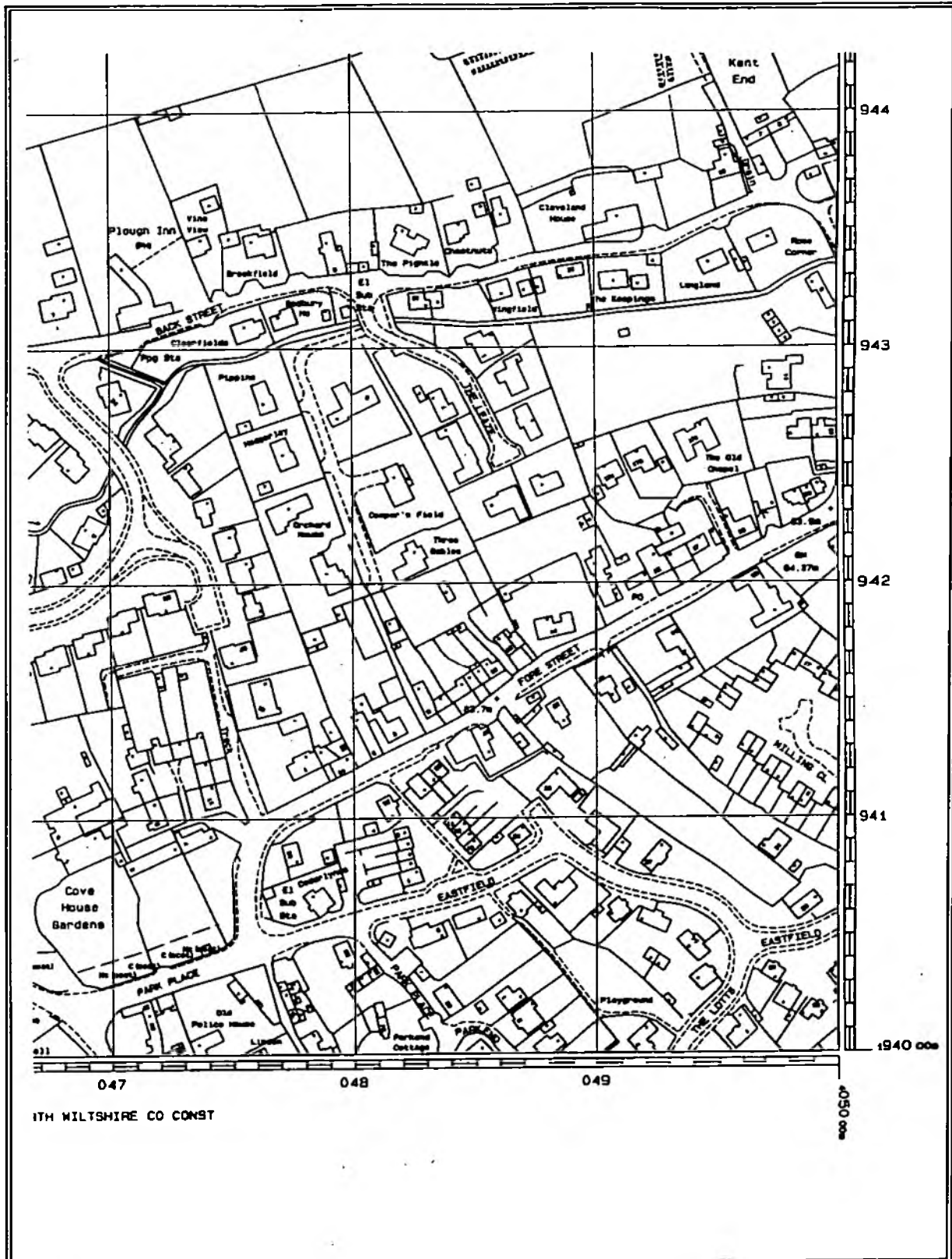
1:1250

Urban areas are mapped at this scale and are NOT available at 1:2500. Each map covers 500m x 500m.

Maps are named for the 100km block (TQ SU etc.) and the co-ordinates of the bottom left hand corner plus the quadrant.

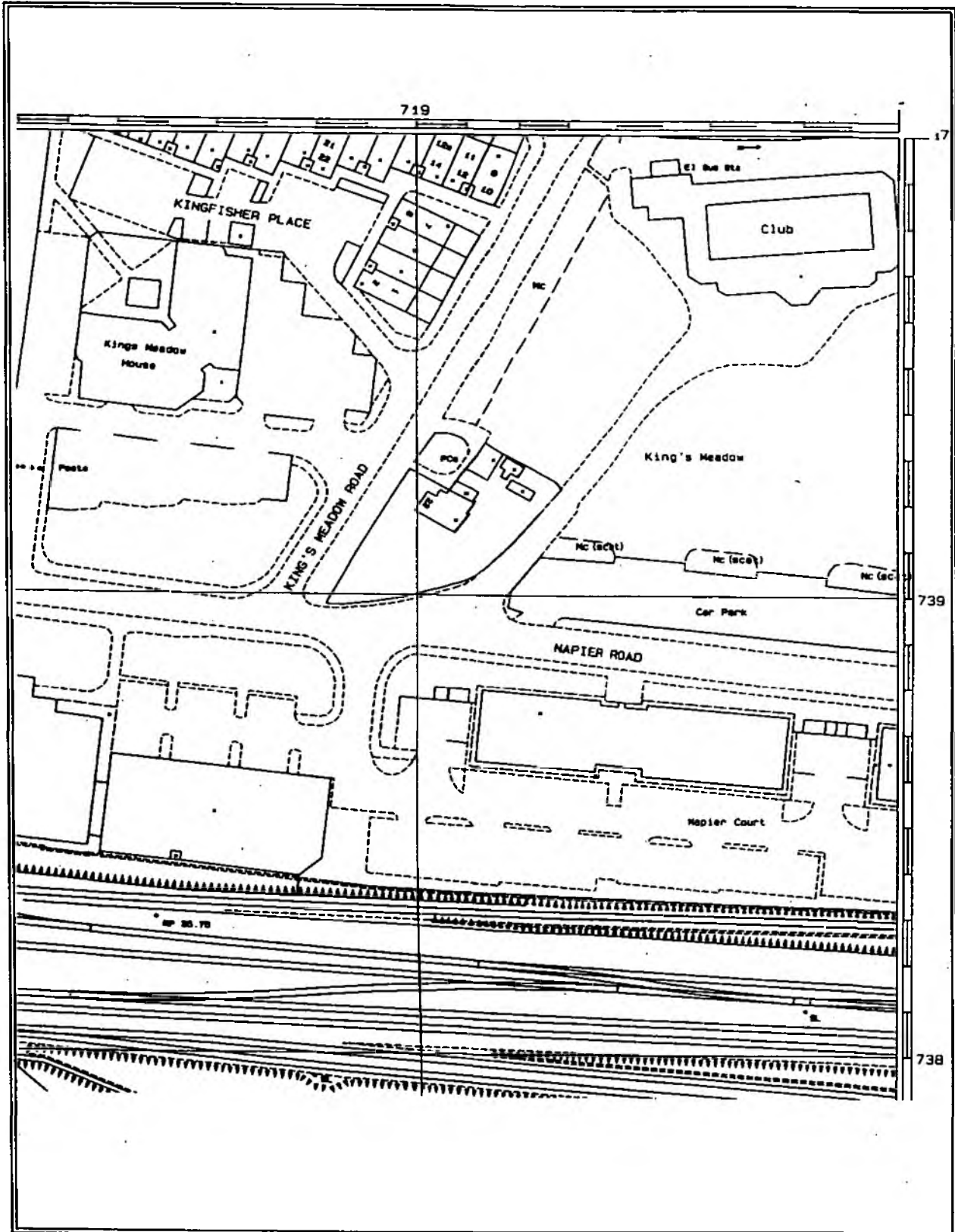
1:2500 SCALE PLAN

Extract From SU 0494



1:1250 SCALE PLAN

Extract From SU 7173 NE



Digital Mapping

Ordnance Survey Digital Maps at 1:10,000 scale (in raster format), for the whole of the Thames Region are held by the GIS Group.

Larger scales (1:2500, 1:1250) can be supplied by the Survey Group on disc or data cartridge as **dwg** files for Autocad or in **dxf** format for other systems. When digital files are not available in the archive, these can be ordered from the Ordnance Survey.

Contact: Belinda Mitchell or Keith Nursey

Survey Data

The Survey Group offers specialist advice on the following types of surveys. Specialist advice can also be obtained for other types of surveying and terrain data gathering.

Channel Surveys:	to provide cross sections and longitudinal sections of watercourses
Topographic Surveys:	to produce plans of areas
Hydrographic Surveys:	to produce 'charts' of areas covered by deep water
Photogrammetry:	to provide mapping and digital terrain models of large areas from aerial photographs.
Deformation Monitoring Surveys:	to produce high accuracy information on structures to allow detection of movement within the structure.
Aerial Photography:	to provide both high quality vertical photography for photogrammetric mapping and oblique photography for site recording.

Each project generates a Report of Survey which includes additional information such as photographs of the site, structures and details of landownership and land use where appropriate. Data will be presented both as hard copy negatives, from which prints may be made, and as digital data, primarily for use in Cad systems and modelling systems.

Please see Appendix for :-

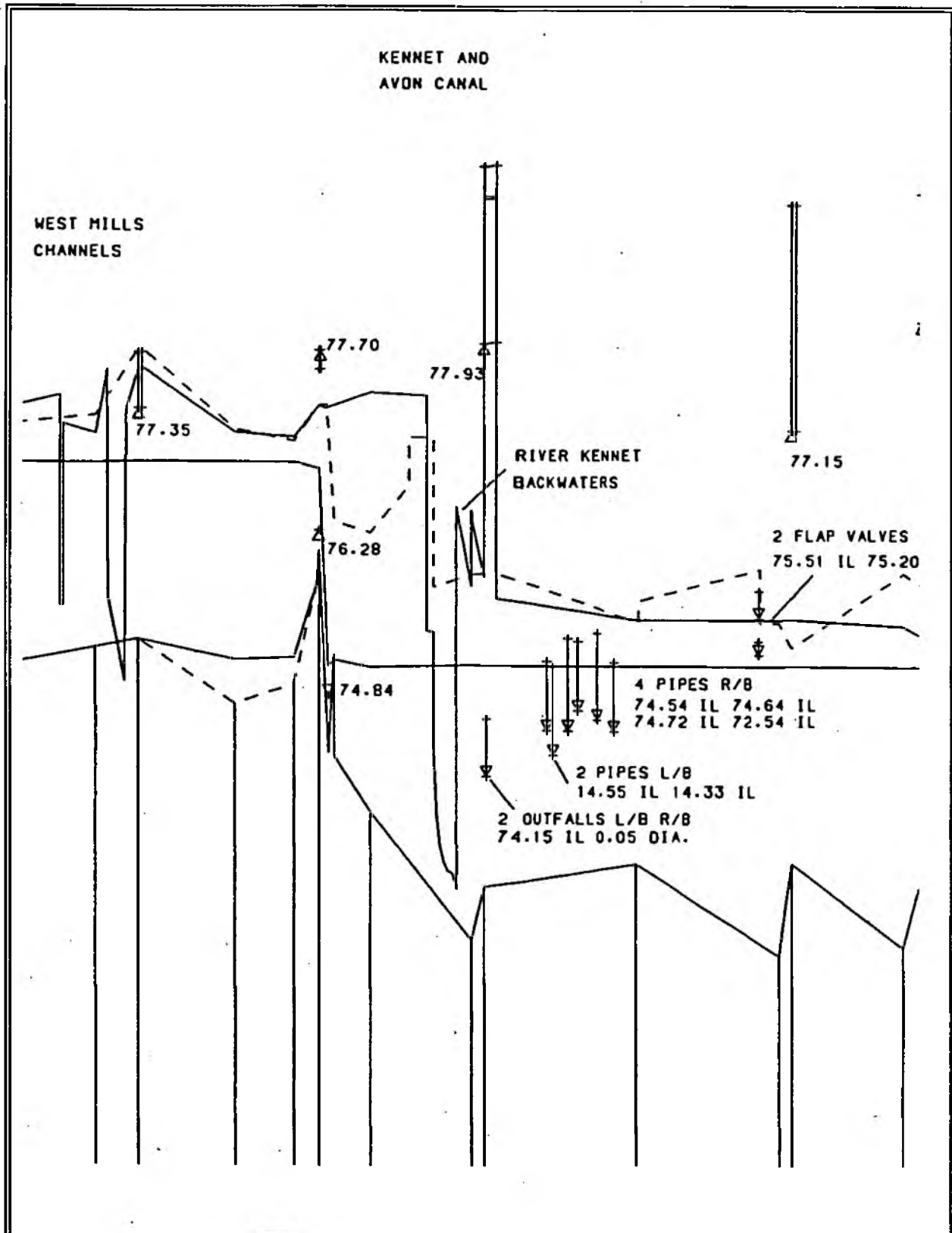
A summary sheet of the specifications and requirements for channel, topographic, photogrammetry, deformation and hydrographic surveys.

A Survey request form

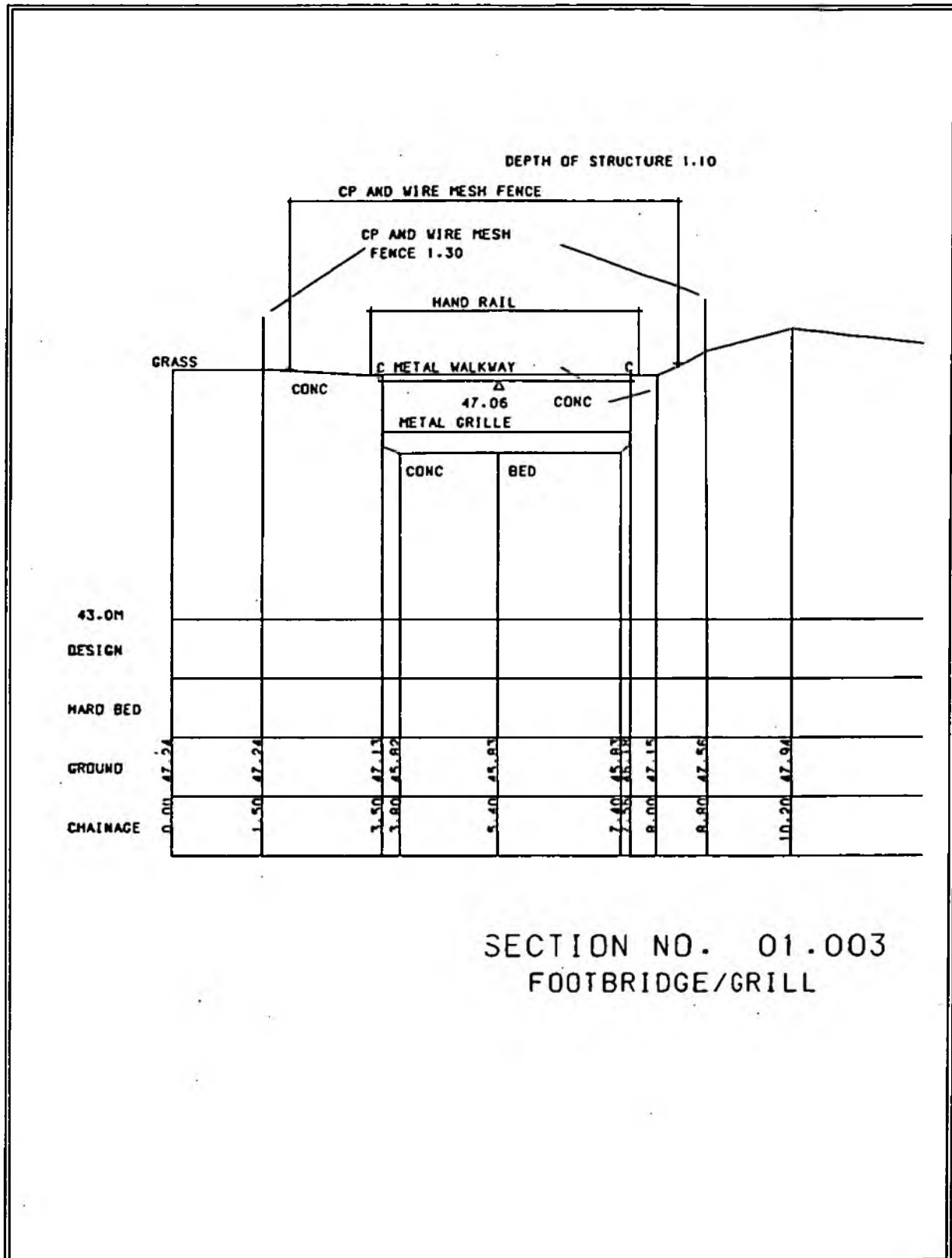
Contact Dick Greenaway or Keith Nursey for all work relating to new surveys.

Examples of the types of survey appear on the following pages:-

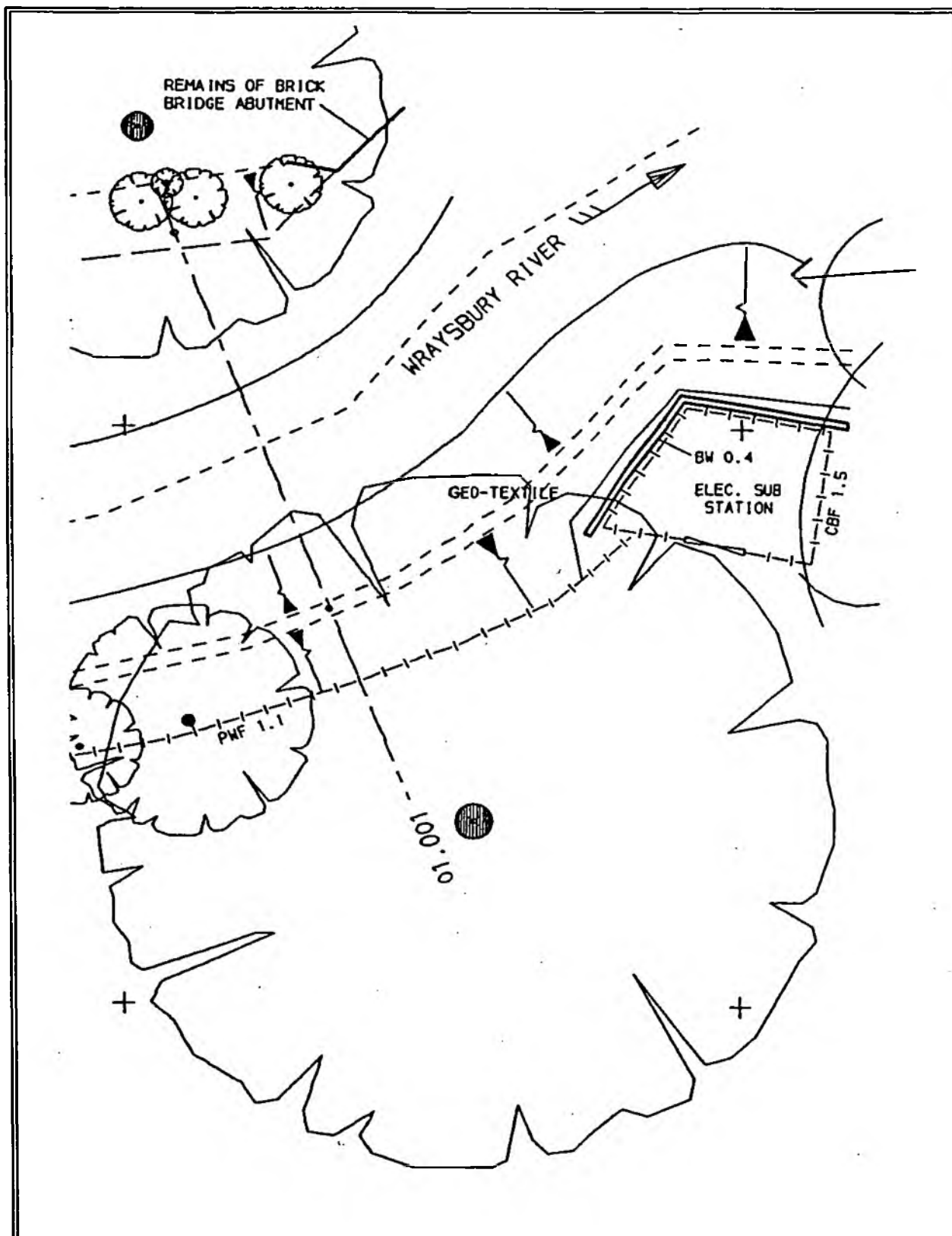
Channel Survey - Long Section Extract

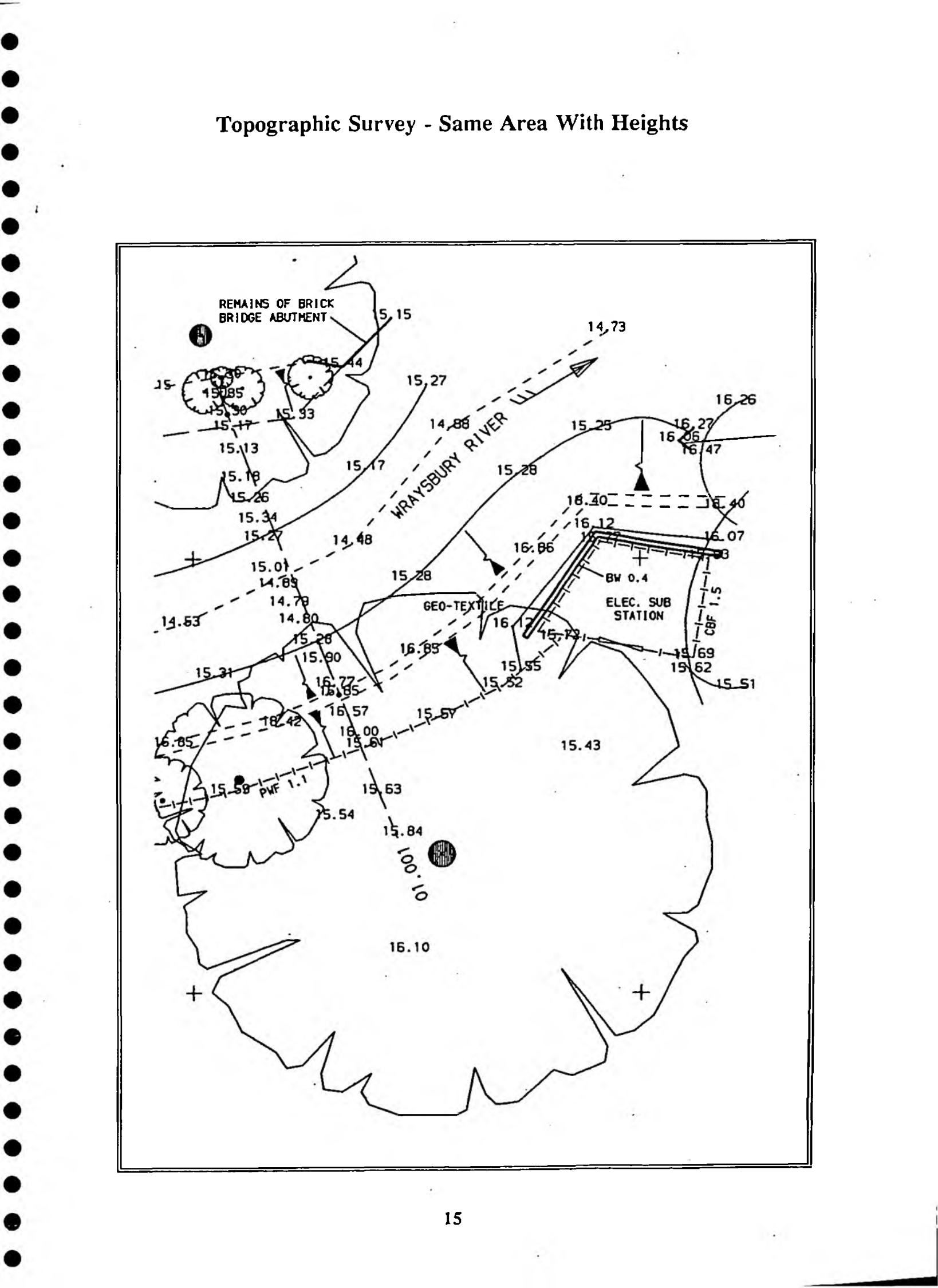


Channel Survey - Cross Section Extract



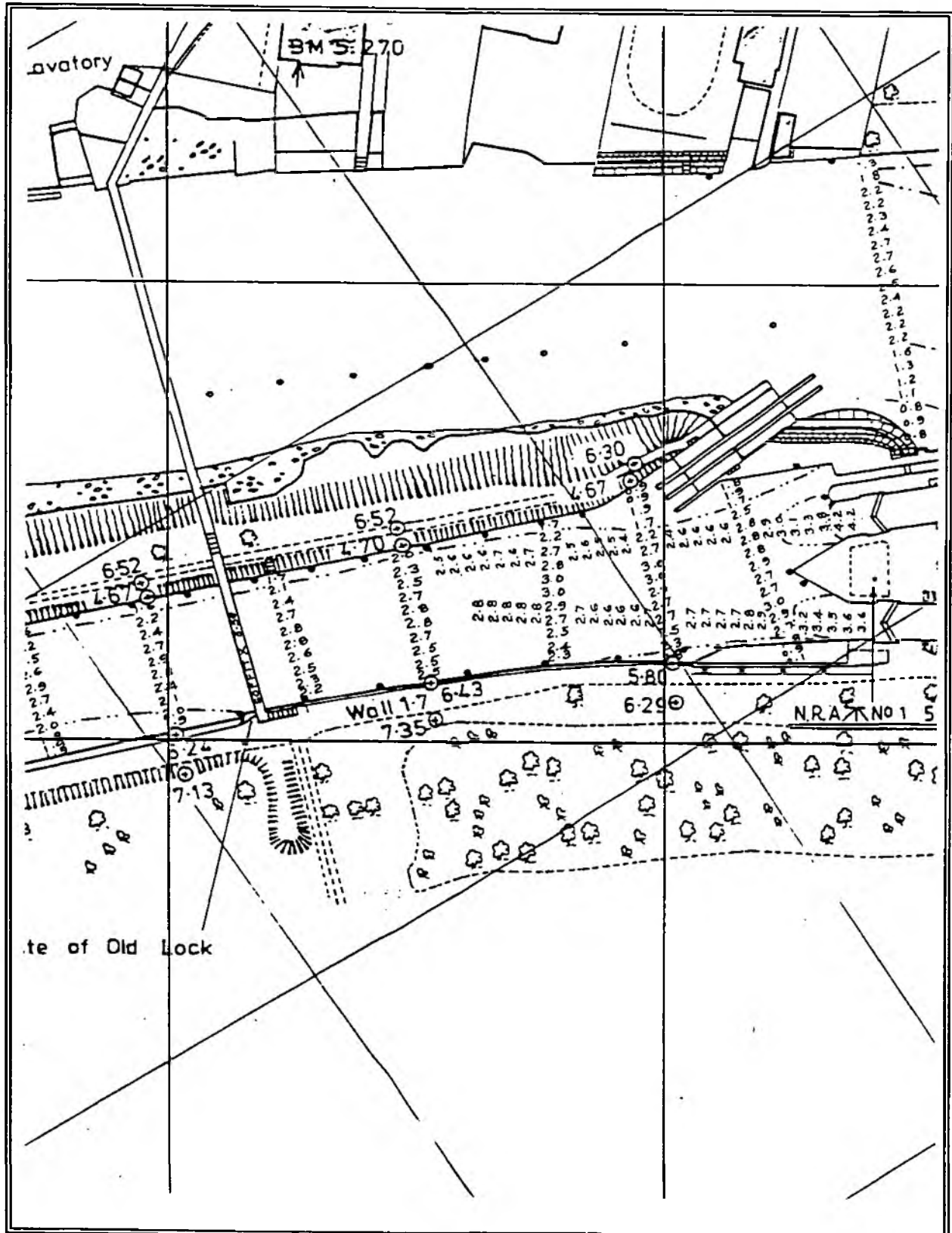
Topographic Survey - Without Heights



[illegible]

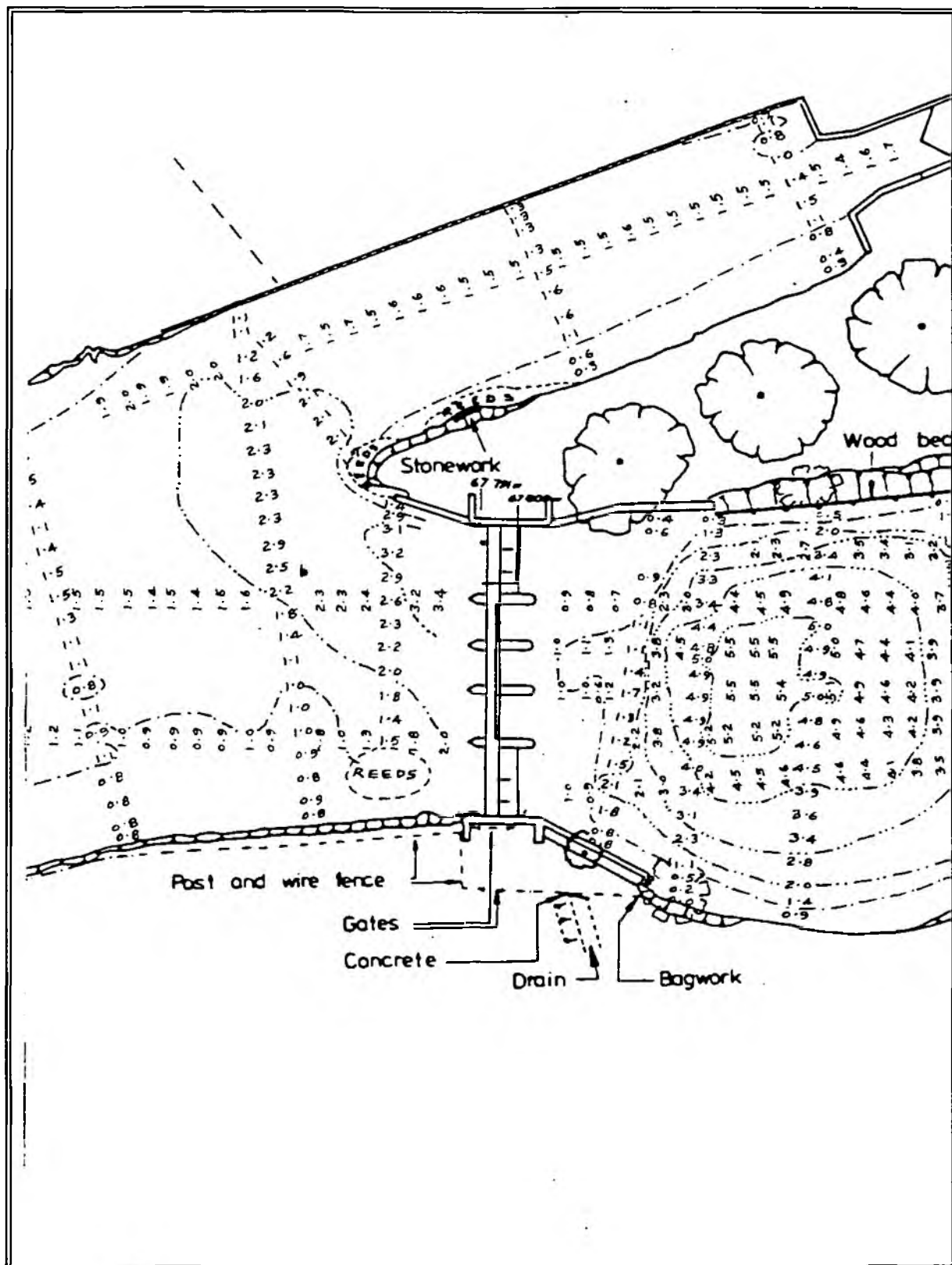
Hydrographic Survey - Reach Survey Extract

Extract From Teddington Reach Survey



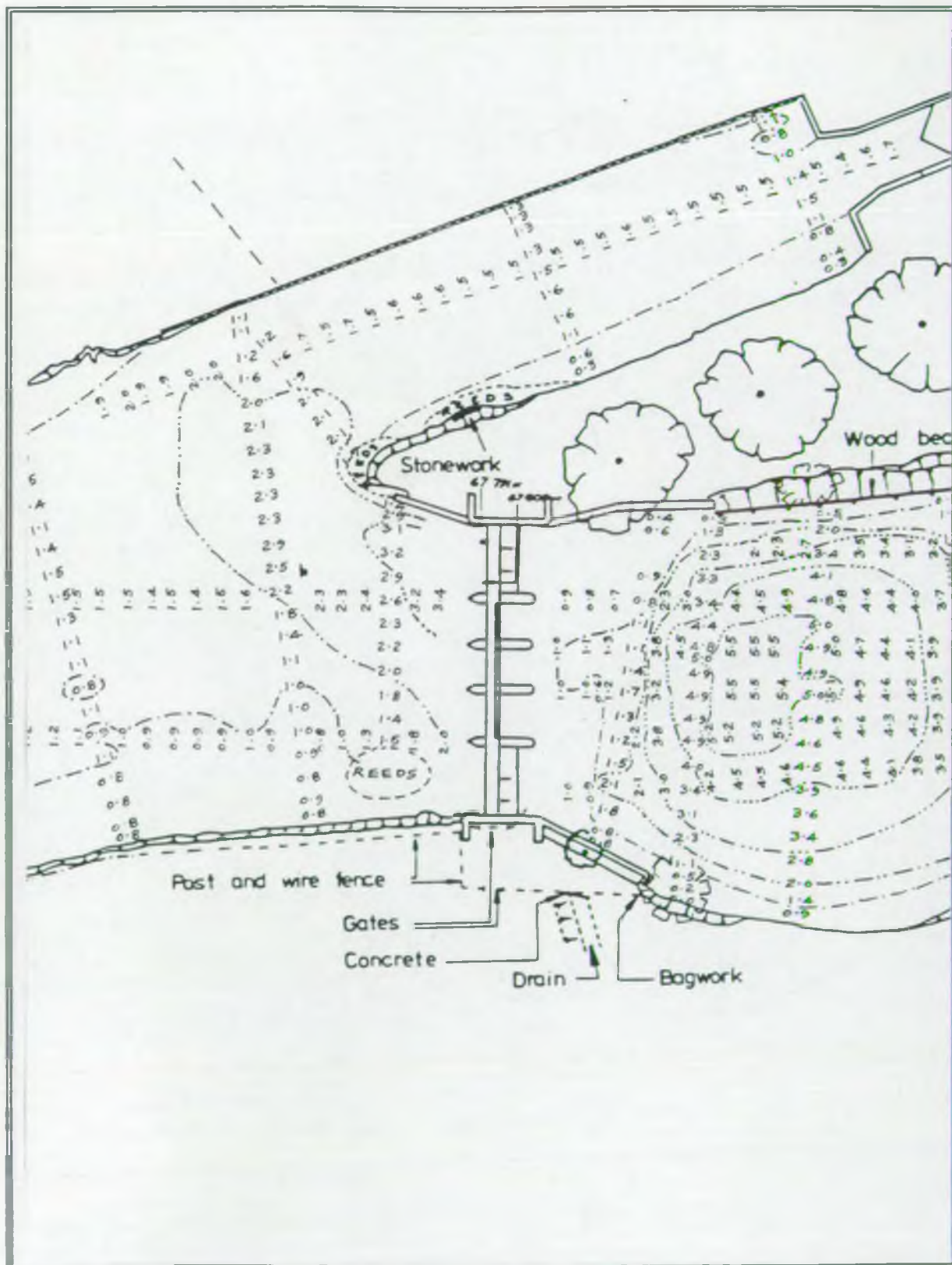
Hydrographic Survey - Weir Survey Extract

Extract From Grafton Weir Pool Survey



Hydrographic Survey - Weir Survey Extract

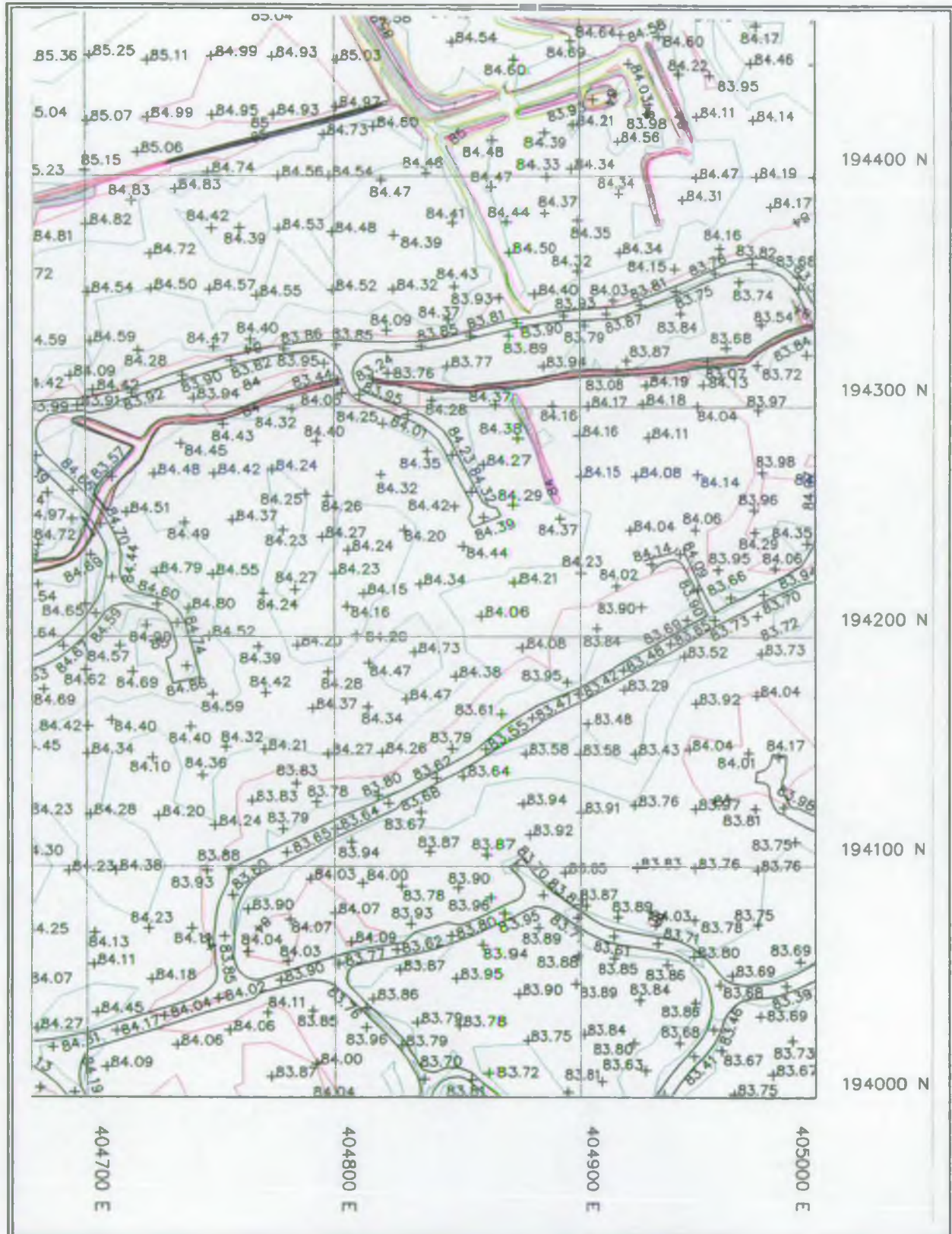
Extract From Grafton Weir Pool Survey



Photogrammetry Survey

Extract From Drg W03S 2974/20 Ashton Keynes

Please see OS Plan SU0494 (extract seen earlier in Mapping section)



Deformation Survey - Deformation Table Extract

Extract From Washlands FSA, Dagenham

<p style="text-align: center;">WASHLANDS F.S.A. DAGENHAM DEFORMATION SURVEY</p>									
<p>Tape Distances Page 3 of 3</p>					<p>HALCROW Survey</p>				
DATE	02/12/94	02/12/94		06/03/95		20/11/95			
CHAINAGE (M)	FIRST VALUES	Diff from A mm		Diff from A mm		Diff from A mm		Diff from A mm	
265	0.913	.913	0	.910	-3	.923	+10		
280	0.898	.898	0	.895	-3	.900	+2		
300	0.864	.864	0	.863	-1	.867	+3		
320	0.924	.924	0	.926	+2	.932	+8		
334	0.867	.868	+1	.869	+2	.876	+9		
336	0.879	.879	0	.879	0	.890	+11		
338	0.882	.882	0	.879	-3	.895	+13		
340	0.890	.890	0	.889	-1	.905	+15		
342	0.890	.890	0	.888	-2	.902	+12		
344	0.889	.889	0	.888	-1	.896	+7		
346	0.887	.887	0	.885	-2	.893	+6		
348	0.889	.889	0	.889	0	.898	+9		
350	0.879	.879	0	.879	0	.888	+9		
352	0.887	.887	0	.889	+2	.896	+9		
354	0.891	.891	0	.892	+1	.902	+11		
TAPE.	TA. 28	TA. 28		TA. 28		TA. 27			

Aerial Photography

The Survey Group commissions and archives high quality stereo aerial photography to provide a detailed photographic record of the Thames Region and to produce heightened plans and computer models by photogrammetry.

The Standard Specification for photography commissioned by the Survey Group is:-

1:3000 Contact scale

Colour

Stereo pairs

Forward Motion Compensated cameras.

Flown during the winter at times of minimum vegetation cover.

Oblique photography can also be commissioned for special purposes and a number of oblique photographs are available.

Vertical Aerial Photography can also be commissioned throughout the year for specific projects.

Aerial photographs can also be enlarged, and/or compiled into mosaics at different scales. For further details of these services or any similar requirements please contact any member of the survey group.

Please note that loans of sets of photographs covering specific areas have been arranged with the different EA - Thames Region offices in the Areas to ensure maximum use is made of this valuable resource. Any aerial photograph held by the survey group can be loaned or colour copied to individuals or departments.

Requests for aerial photographic coverage of any nature should be addressed to Belinda Mitchell to reduce unnecessary repetition of data.

Aerial Photography

Extract From NRA Aerial Photography Ref 2808 Run 71 4419, (scale 1:3000), height control points are circled on photo. Please see OS Plan SU 09SW, SU0494 (extract seen earlier in Mapping section and same area is depicted in the Photogrammetry section).



Benchmarks and Control Information

OS Bench Marks and NRA / EA Bench Marks

An extensive library of Ordnance Survey Bench Mark Lists and NRA / EA Benchmark Lists are held in the Survey Group.

The Ordnance Survey ceased to maintain the OS benchmark network in 1972 and it has degraded to a considerable degree. The NRA / EA Benchmark was developed to compensate for the lack of OS coverage. NRA / EA BMs are routinely established as part of most surveys and are installed at approximately 1km intervals along the watercourse and on many NRA / EA structures such as locks and weirs. OS and NRA / EA Benchmarks (where available) will be supplied on request. Lists are referenced by KM square, in the same way as a 1:2500 plan.

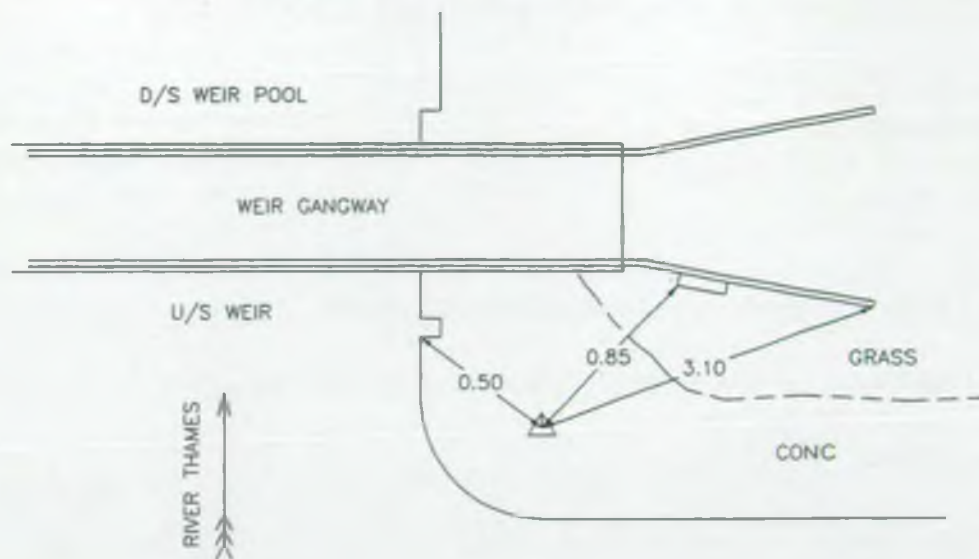
Other Control Information

We hold a limited amount of Ordnance Survey Triangulation Information Sheets (TRIG), Triangulation Availability Diagrams (TADs) and detail on co-ordinated points obtained as part of survey tasks.

We also hold a growing library of Global Positioning System (GPS) station data. Stations are established at 5km intervals along the Thames and other major watercourses, usually on NRA EA structures. These are also indexed by kilometre square.

All requests should be routed via the Survey Group which holds a central budget for purchase of control information.

Please contact Belinda Mitchell for the above information.



WITNESS DIAGRAM



BASED ON ORDNANCE SURVEY BENCH MARKS:

- | | | | | |
|------------|---|------|---|------------------------------|
| 1. SU 5060 | E | 9438 | N | ALTITUDE: _____ metres O.D.N |
| 2. SU 5047 | E | 9419 | N | ALTITUDE: _____ metres O.D.N |

DESCRIPTION: HORIZONTAL NRABM
IN CONCRETE EDGE OF WEIR 'D'
SUTTON POOLS.

SURVEYED BY: HALCROW THAMES
DATE: JUL 1995 JOB NO: 3295

O.S. NATIONAL GRID REF: 5046 E

N.R.A BENCH MARK
ALTITUDE: 50.30 metres O.D.N

EVERY CARE HAS BEEN TAKEN IN OBTAINING
THIS INFORMATION, BUT NO RESPONSIBILITY
FOR LOSS OCCASIONED TO ANY PERSON ACTING
ON THIS INFORMATION CAN BE ACCEPTED BY
THE NATIONAL RIVERS AUTHORITY.

9442 N

K.M.Square: SU 5094

Digital Terrain Modelling

The Survey Group has been employing computer techniques for surveying since the 1970's and has built up a large archive of digital data on the watercourses and landscapes of the Thames Region.

Copies of this data can be provided and merging and modelling can also be arranged and carried out to meet individual customer requirements.

The MOSS Ground Modelling System is available to manipulate data to produce:-

Contour plots

Sections through the modelled area

Areas

Volumes

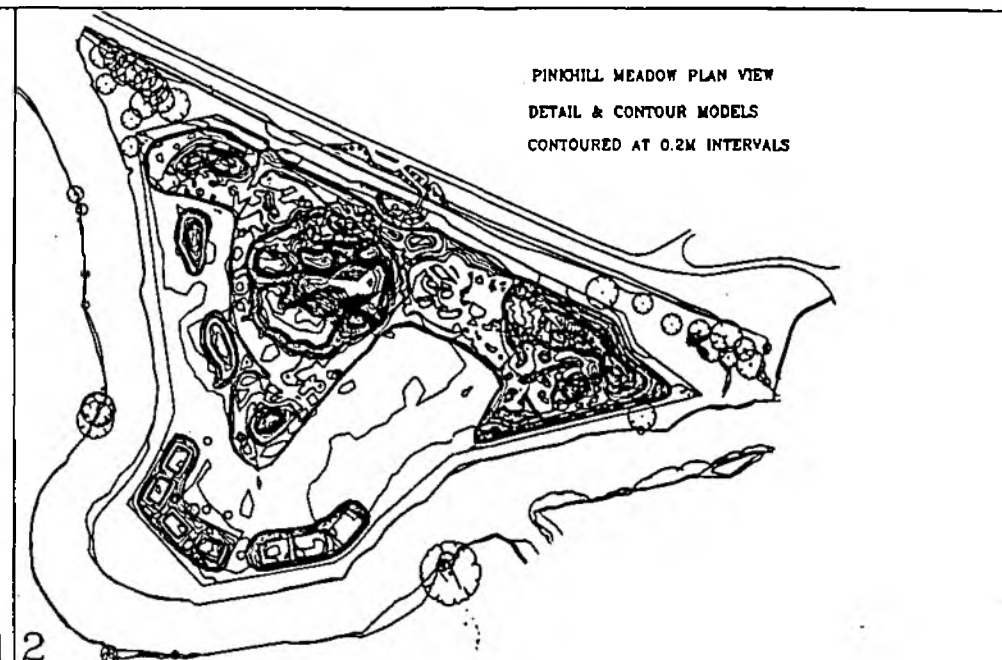
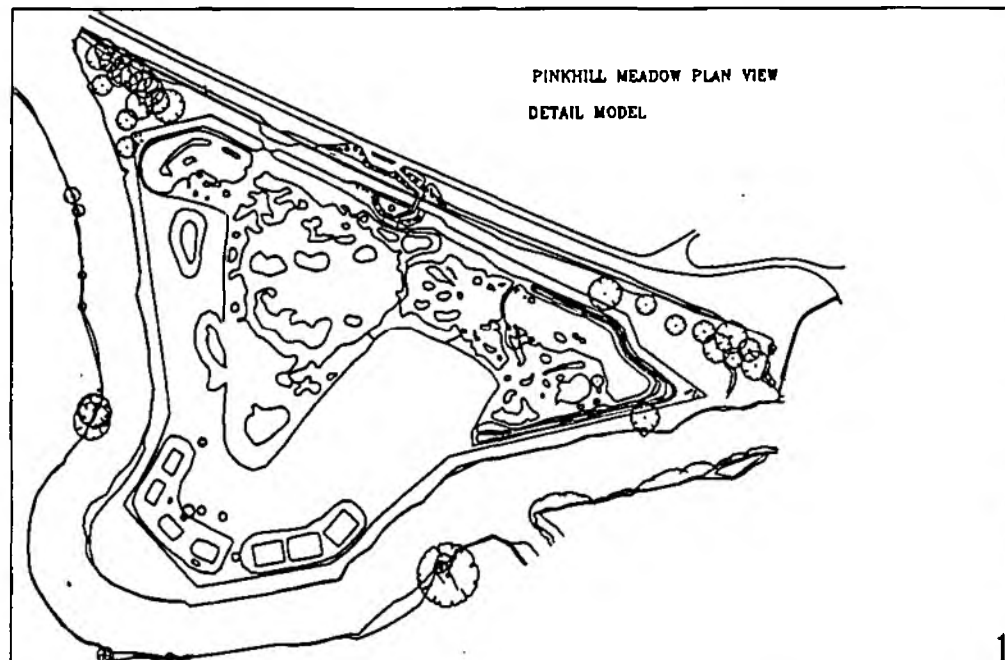
Perspective Views

Model Comparisons

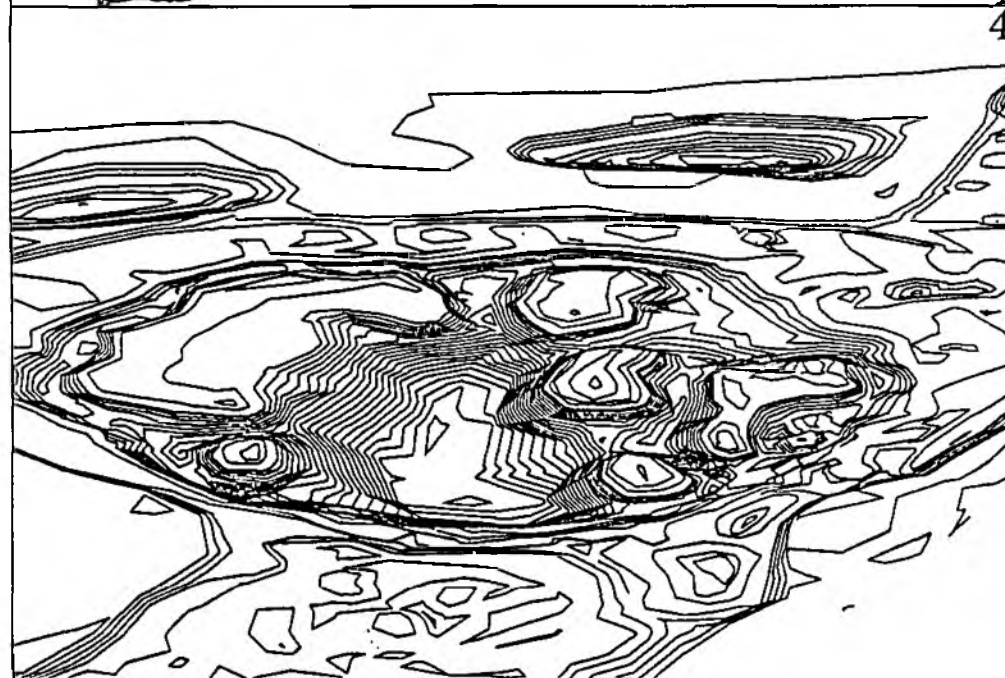
The quality of the modelled output depends on the density of the survey data and this should be borne in mind when commissioning surveys and modelling.

The digital data can be interfaced to other computer systems such as ONDA, AUTOCAD, MEDUSA etc for further analysis.

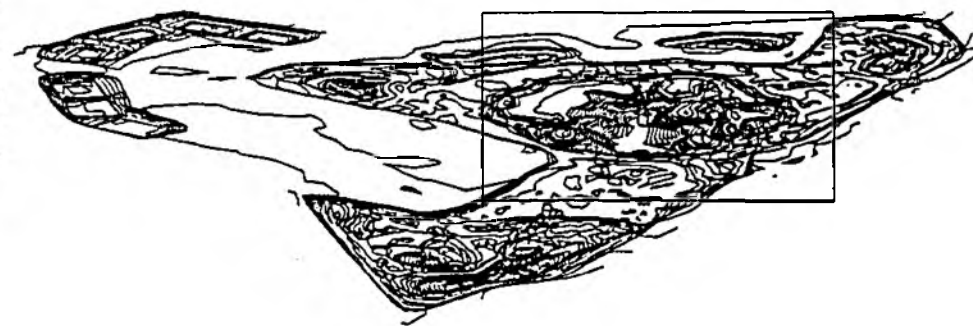
Digitally produced surveys can be replotted at any scale required, but the scale of the original should be remembered when using the results.



1 2
4 3



PINKHILL MEADOW PERSPECTIVE VIEW WITH ROTATION
CONTOUR MODEL ZOOMED TO FIT WINDOW
THE RECTANGLE SHOWS THE AREA COVERED
BY WINDOW NUMBER 4.



Circular 30/92 Surveys

As a result of the Circular 30/92 Memorandum of Understanding, the NRA / EA has been charged with providing flood envelopes and related information to Local Authorities and others, to ensure planning decisions take account of any risk of flooding. This requires a large data collection initiative.

As part of this initiative, the Survey Group is responsible for the commissioning of aerial photography, flood plain mapping and channel surveys, as well as the assessment of suitability and coverage of existing surveys to provide data for in bank and out of bank modelling.

The Survey Group has been involved from the earliest stages of the Project, providing advice to other Regions as well as contributing to data collection methods adopted within Thames Region. The Survey Group has also advised on and contributed to a specification for the output format of the Circular 30/92 data.

Quality Assurance Consultancy

The Survey Group was the first NRA unit to obtain registration to ISO9002 (BS5750 part 2). This was achieved in 1992 and has been successfully maintained ever since.

Dick Greenaway has qualified as a lead auditor and has built up considerable experience of implementing, operating and auditing a formal Quality System.

This expertise is freely available to any group considering implementing a quality system.

Contact: Dick Greenaway

APPENDIX

EA Thames Region Survey Group

Summary of Channel Survey Specification

(Standard Contract and Specification for Surveying Services, Version 2 June 1994)

Scope

Cross sections of the watercourse are surveyed at 100m intervals (or as specified), at all significant changes in width or shape, and at all structures. Sections extend to approximately 10m (unless specified otherwise) beyond the bank tops, and include details of bed material, water level, boundaries (fences, walls etc), surfaces, buildings and vegetation. Sections at structures show the upstream face only unless specified otherwise or if there is a significant difference between the upstream and downstream face.

The long section shows the bank crest, water and deepest bed levels and structures. It is generated from information selected from the cross sections, together with any significant information between sections, such as changes in bank height, pipe outlets, tributaries, cattle drains etc.

Output

Hard Copy:

- Long Section (vertical scale 1:50 and horizontal scale of 1:10,000 and 1:2,500 or 1:1,250 in urban areas), with key plan showing location of cross sections on OS 1:10,000 scale or larger plans.
- Cross Sections at horizontal and vertical scale of 1:100, at 100m intervals.

Digital Format:

- Channel Survey data in EEBY format for loading into the ONDA hydraulic modelling software.
- Long Section and Cross Sections in DXF format (for ACAD Version 11).

A report of survey is also produced. This includes details of any NRA / EA Bench Marks established, land ownership and land use details obtained during field survey, key plan, levelling control details, photographs of structures and general views along the watercourse, as well as quality control and assurance data as required by the specification.

Accuracies

Vertical:

Bench Marks & levelling circuits:

Level traverse misclosures are to be assessed by using Clark's Formula of:

$$E = 0.005 \sqrt{N} \quad \text{where } N = \text{No. of set ups, or,}$$

$$E = 0.012 \sqrt{D} \quad \text{where } D = \text{traverse length in kilometres}$$

Misclosure between OSBM's shall not be greater than 20mm.

Elevations on long section and cross sections: to plotting scale (1:100 equivalent to 0.01m on hard detail)

Horizontal:

Based on OS 1:2,500 and/or 1:1,250 scale plans. Positions of cross sections are deduced by scaling from the OS plans and/or measuring from local detail.

NRA Thames Region Survey Group
Summary of Photogrammetry Specification
(Version 2 September 1995)

Basis of Photogrammetry

Photogrammetry is based on 1:3,000 scale colour stereoscopic vertical aerial photography, commissioned by the NRA Thames Region. The photography is flown during the winter months when vegetation coverage is at a minimum.

Plan control to rectify the photography is obtained from OS digital plans at 1:1,250 and/or 1:2,500 scale. Vertical control requires field survey - spirit levelling or GPS (Global Positioning System) to establish elevations for selected points identified on the photography.

Once the photography has been corrected for tilt etc and scaled, accurate height and plan data can be measured.

Output

Data is presented in digital format, based on the OS plans at 1:1,250 and/or 1:2,500 scale. Information consists of :-

- 25m grid of spot heights (positions varied to avoid structures and other obstructions, with additional points where required to define the topography)
- Digital Terrain Model - in 3D DXF format (for ACAD version 11) and MOSS Genio version 8 format
- Three Dimensional 3D strings - to supplement the grid of spot heights in the following locations:- break lines in terrain, all water lines (as on photography), tops of banks of lakes, ponds and watercourses (including ditches wider than 1.0m at the water or bed line), the centre line of any visible dry watercourse, tops and bottoms of any bank greater than 0.5m in height, centre line of roads and tracks less than 2mm in width at the relevant OS plan scale, edges of roads and tracks if more than 2mm in width at the relevant OS plan scale, top and bottom of retaining walls more than 1.0m in height, and as required to supplement spot heights to generate 0.25m contours without ambiguity.
- 0.25m contours (generated from DTM)

No revision of OS plan details is required - any new development which does not appear on the OS plans is defined by a null height string line and annotated according to land use.

A report of survey is also produced. This includes details of any NRA Bench Marks established, any land ownership details obtained during field survey, key plan, levelling control and photo control details, as well as quality control and assurance data as required by the specification.

Accuracies

Vertical:	On hard surfaces and water lines	± 0.05 metres
	On soft surfaces where grass, crops and other vegetation is less than 0.25m high at time of photography	± 0.10 metres

Horizontal: based on OS plans. When fitting 3D string lines to local detail, any discrepancies between OS plan and photography in excess of 2mm (eg 5m at 1:2,500 scale or 2.5m at 1:1,250 scale) shall be noted.

NRA Thames Region Survey Group

Summary of Hydrographic Survey Specification

(Standard Contract and Specification for Surveying Services, Version 2 June 1994)

Scope

River Channels

Cross sections are measured at 50 metre intervals along the channel, at bridges and at particularly deep or shallow areas. Soundings are taken by echosounder at approximately 3metre intervals along the cross section. The ranges are measured with a laser rangefinder. The section is carried across each bank by conventional levelling techniques.

In addition, any changes to the bank line are sketch surveyed and added to the plot. Samples of the river bed surface are taken at intervals and shown on the plans. Bridge arch soffits are measured and shown as a label. Reputed landownership is added as a note block.

Weir Pools

Lines of soundings are run using the same echosounder and laser ranger techniques as above. The pattern of lines is designed to show the underwater topography of the weirpool in detail and to reveal any scouring which may be threatening either the weir structure or any protective works. Changes to the bankline are surveyed and added to the plan. Both the tail and the head of the weir are surveyed.

Output

River Channels

Hard Copy:

- Plots of the soundings, bank levels, bridge soffit heights, landownership, bed composition on OS derived base plans at 1:1250. Bathymetric contours at 1m intervals.
- Longitudinal Section showing the deepest bed level on each section and the right and left bank crests and bridge soffits. Scales 1:10,000 horizontal and 1:50 vertical.
- Cross sections are not normally plotted unless specifically requested.
- A Report of Survey is also produced as for Channel Surveys.

Digital Format

- Cross section data in EEBYDATA format for loading into the ONDA modelling software.
- Long Section and Cross Sections in DXF format (for ACAD Version 11)

Weirpools

Hard Copy:

- Plots of the soundings only at 1:500 on a specifically surveyed base plan. Batymetric contours at 1 metre intervals.
- A Report of Survey is also produced which contains photographs of the site.

Digital Format:

- The data is gathered digitally but is not normally available in digital format unless specifically requested. It can be converted to MOSS format to allow modelling of the underwater topography for model comparison etc..

Accuracies

- Vertical:** Water levels are based on TBMs installed by conventional levelling traverses. The same tolerances apply as for Channel Surveys. Soundings are taken with a digitised echosounder. Accuracy of soundings is $\pm 0.1\text{m}$.
- Horizontal:** Ranges are taken with a hand held laser rangefinder with an accuracy of $\pm 0.1\text{m}$. Line zero positions are measured from mapped features and the lines are orientated using a hand bearing compass to an accuracy of ± 1 degree.

Summary of Deformation Monitoring Specification.

(Standard Contract and Specification for Surveying Services, Version 2 June 1994)

Scope

An individual scheme is devised for each structure designed to detect any likely movement in all three directions. A network of permanent marks is installed to allow accurate repeat observations. These will be stainless steel sockets or pins in solid structures and Permanent Ground Markers in earthworks. Each of these is photographed and witnessed to allow definite retrieval. Datum stations are established off site against which the structure can be monitored. The vectors are measured using high precision theodolites and laser rangefinders and the resulting data is analysed by a computer package using 'Least Squares' techniques. Two sets of measurements are carried out at the start of a monitoring project followed by repeat measures at requested intervals. The results are tabulated and shown as differences from the original set of readings.

Output

Hard Copy:

- A Report of Survey containing details of the network, station descriptions and result tables is produced at the first measure, followed by updated tables at subsequent measures.

Digital Format

- The tables and text of the report are available in Word Perfect. 'SNAP' analysis package output is available if requested.

Accuracies

- Angles:** Read to $0.1''$ of arc. A minimum of four pointings on each face will be observed. On rays of over 30 metres the Standard Deviation of these readings will not exceed $1''$ of arc.
- Distances:** Will be measured at least four times and the Standard Deviation recorded. The instrument will be capable of a precision of $1\text{mm} \pm 1\text{ppm}$.
- Levelling:** Will be carried out using Precise Levels and Invar Staves.

EA Thames Region Survey Group

Summary of Topographic Survey Specification

Standard Contract and Specification for Surveying Services, Version 2 June 1994

Scope

Topographic detail on plans of various scales. This includes ground levels, breaks of slopes, channels and ditches, boundaries, structures, vegetation, buildings, and services. Detail is obtained using ground survey techniques utilising modern electronic equipment. Sites can range from small overfall structures to sites covering many hectares of floodplain, although in the latter case photogrammetry may be a more viable method of obtaining detail.

Output

Hard Copy:

- Plan (typically 1:100, 1:200 or 1:500 scale), with a key plan showing the location of the site on an OS 1:10000 extract.

Digital Format:

- Data in DXF format (for use in Autocad and other software packages).
- Data in Moss genio (for use in Digital Terrain Models).

A Report of Survey is produced. This includes details of any NRA/EA benchmarks established, details of any permanent survey stations established (these being available for future works such as setting out), land ownership and land use details obtained during fieldwork, and photographs of the site.

Where appropriate, detail such as levels and services can be superimposed on OS 1:1250 or 1:2500 base plans.

Accuracies

Vertical Control:

Benchmarks and levelling circuits:

Level traverse misclosures are assessed using Clark's Formula of:

$E = 0.005m\sqrt{N}$ where N = No. of setups, or

$E = 0.012m\sqrt{D}$ where D = traverse length in kilometres

Misclosure between OSBMs shall not be greater than 20mm.

Horizontal Control:

For topographic surveys with scales of 1:500 and

larger a minimum accuracy of 1:20000 shall be acceptable after initial bearing adjustment of the traverse.

Detail:

The precision of heights on hard surfaces may be taken to be within +/- 14mm relative to the control station height. For soft detail double the tolerance for hard detail applies.

The precision of position may be taken to be +/- 50mm (for 1:500 scale surveys) relative to the control station position.

The scale of the survey can be changed but the original scale at which the survey was undertaken sets the accuracy.

Name:	
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Dept/Address:	Date:
Telephone Number:	

Charge Code:

No of Copies

No of Copies

[illegible]

Dyeline Paper	Xerox Paper	Dyeline Film	Xerox Film	Other(specify)

Please continue overleaf..

Data Requirements:

Drg no/Job No	Data Format (Medusa or Acad)	Version	Type of Media, eg 1/4" Tape/Plots or File Transfer Location

Other Data Details:**Other information requirements (eg. Aerial Photographs, Copies of Survey Reports etc.)
Give Details:**

For Survey Use Only**Actioned by:****Date in:****Respond date:****Delivery date:****Total copies****Maps:** _____**Drgs:** _____**BMs:** _____**APs:** _____**Reports:** _____

QAF Gen 13 SURVEY REQUEST FORM

Client use: Title	Survey use only
	Job No
Survey use only Drg No	Charge Code
Title	

DATE REQUESTED:	DATE REQUIRED:
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FROM:	RISK ASSESSMENT: PLEASE ASSESS RISK TO PROJECT OF INCORRECT/INCOMPLETE SURVEY DATA
ADDRESS:	
	HIGH MEDIUM LOW
TELEPHONE:	LIQUIDATED DAMAGES: £ per day
FAX:	Reason:-

PURPOSE OF SURVEY

SPECIFICATION: Please attach marked up copy of O.S. Plan including grid references
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Please continue overleaf.....

LANDOWNERS / SITE CONTACT:

(Continue on separate sheet if necessary)

Delete as applicable

IS THE SITE AFFECTED BY LEGISLATION?	YES/NO
IS ACCESS AGREED?	YES/NO
IS THE AREA AN SSSI?	YES/NO
ANY LISTED BUILDINGS?	YES/NO
SITE OF ARCHAEOLOGICAL INTEREST?	YES/NO
IS THE SITE SENSITIVE eg. Public enquiries/Pressure Groups? ARE THERE ANY KNOWN HAZARDS If YES enclose details	YES/NO

IS THE SURVEY TO PRODUCE A DIGITAL TERRAIN MODEL?	YES/NO
IS THE DATA TO BE ADDED TO AN EXISTING SURVEY/MODEL?	YES/NO
IS MEDUSA FORMAT REQUIRED?	YES/NO
OTHER FORMATS. (If YES give details)	YES/NO

FINAL HARD COPY: Plots will not normally be provided when Medusa format is required.	
SCALE(S) (ie. 1:500 / 1:100 etc)	
PAPER PLOTS (Size ie. A0 / A2 / B1) (state number required)	
COPY NEGATIVES (state number required)	
FILE LISTINGS	
PHOTOGRAPHIC RECORD?	
VIDEO RECORD?	
ANY OTHER REQUIREMENTS?	

Signed:

Receipt of form acknowledged by:

Date: