7 Management information systems

The information strategy

History

7.1. The development of BWB's management systems took place in parallel with a number of organizational and management changes. In the spring of 1987, BWB commissioned Consultants A to undertake a study, at a cost of some £60,000, to develop the prime information needs of the organization and compare them with the then current systems which had been designed and installed up to 20 years earlier. The consultants reported in January 1988. Their findings were that the information systems as they then existed suffered from a number of faults: information was not held on an integrated basis, it could not be readily accessed by management, and excessive manual effort was needed to store and retrieve it. Consultants A concluded that BWB needed an `Information Strategy', and proposed one.

7.2. Other consultants, B, were then appointed in May 1988 to assist management implement the systems required by the strategy. Consultants B reviewed the work of A and reported to the Executive Group in June 1988. They found A's report to be largely valid `taking due account of the changes which have occurred … mainly the move to Area Business Units'. Both consultancy organizations recommended the use of application packages where possible rather than bespoke programs and the use of mini-computers in each Area then existing rather than a central computer.

7.3. Board approval to proceed with the issue of contracts to hardware and software suppliers was given in July 1988, subject to a full report on costs and benefits being provided in September. This decision was based on Consultant A's report and estimated one-off costs of £1.1 million.

7.4. BWB told us that within seven months of approval-that is, by April 1989-the strategy had been implemented. By that time:

(a) mini-computers had been installed in each of the six regions and at headquarters;

(b) software packages had been loaded and tested;

(c) data had been loaded or converted;

(d) a telecommunications network had been installed linking waterway, region and headquarters;

(e) about 300 personal computers (PCs) and terminals had been delivered;

(f) staff had been trained; and

(g) user manuals had been produced.

Costs

7.5. Consultant A's report of January 1988 estimated the total cost of implementing the information strategy to be of the order of £1.1 million once-off plus £0.5 million a year.

7.6. By the time the Director of Finance reported to the Board nine months later, in September 1988, the cost of the systems was said to be £4.7 million over five years. Supporting information implied that this cost was at September 1988 prices. This information appeared in a cost benefit analysis which is reproduced in Table 7.1.

TABLE 7.1 **Cost/benefit analysis of systems development, September 1988**

£'000

	Year 0 (1988/89)	*Year 1 (1989/90)*	*Year 2 (1990/91)*	*Year 3 (1992/93)*	*Year 4 (1993/94)*	*Year 5 (1994/95)*	*Total*
Costs							
New computer hardware:							
Minis	-339	-219	-36	-36	-36	-36	-702
Micros	-554	-413	-28	-35	-35	-35	-1,100
Other	-349	-83	-56	-59	-75	-75	-697
	-1,242	-715	-120	-130	-146	-146	-2,499
Application software:							
Financial management	-144	-18	-18	-18	-18	-18	-234
Treasury accounting	-35	-4	-4	-4	-4	-4	-55
Personnel/payroll	-13	-16	-16	-16	-16	-16	-93
Engineering/purchasing	-78	-10	-10	-10	-10	-10	-128
Property management	-200	-6	-6	-6	-6	-6	-230
Software extension and enhancement	-100	-	-	-	-85	-85	-270
	-570	-54	-54	-54	-139	-139	-1,010
Implementation costs:							
Financial management	-35	-20	-	-	-	-	-55
Treasury accounting	-20	-5	-	-	-	-	-25
Personnel/payroll	-44	-27	-8	-3	-	-	-82
Engineering/purchasing	-132	-235	-63	-43	-43	-43	-559
Property management	-80	-126	-128	-82	-31	-31	-478
	-311	-413	-199	-128	-74	-74	-1,199
Total costs	-2,123	-1,182	-373	-312	-359	-359	-4,708
Benefits (savings)							
UNISYS equipment replacement	-	78	158	200	283	532	1,251
MIS operations cost savings	-	15	106	173	173	173	640
Financial management	-	14	40	40	40	40	174
Treasury accounting	-	28	47	52	52	52	231
Personnel/payroll		18	69	79	79	79	324
Engineering/purchasing		500	1,252	1,602	1,702	1,802	6,858
Property management	0	124	246	328	328	328	1,354
Total benefits	0	777	1,918	2,474	2,657	3,006	10,832
Net benefits	-2,123	-405	1,545	2,162	2,298	2,647	6,124

Source: BWB.

7.7. It will be seen that the justification for the scheme was based mostly on projected savings in engineering, purchasing and property management operations and on rental and operating cost savings on the UNISYS system. At the time the Engineering Department dealt with most waterway operational matters, and the savings would now be called operational savings. BWB informed us that at the time its view was that rationalization of operations under the then proposed reorganization plans would not succeed without the management and planning information which the new computer systems were expected to yield.

7.8. BWB informed us that the estimates of January and September 1988 were on different bases. The former assumed continued use of the current UNISYS computers with custom-programmed software. The latter assumed IBM computers with package software. BWB now states that the £1.1 million was a severe underestimate.

7.9. We asked BWB to let us have the actual costs of bringing the new system into operation, and it appeared to have difficulty in supplying the information. We later learned that there had been a project controller for the introduction of the new system and that costs were recorded and progressed at the time. It informed us that virtually all the expenditure, a total of £5.3 million, was incurred in the financial years 1988/89 and 1989/90. The analysis of costs at out-turn prices within that period is shown in Table 7.2.

TABLE 7.2 **Expenditure in the financial years 1988/89 and 1989/90**

	£'000
Software	
Mini-computer operating software	108
Applications software	673
Software modification and testing	579
Other costs	
Cabling, telecommunications network	565
Implementation and training	540
Outside project management advice	212
Other costs	226
Depreciation	516
Total special revenue charges	3,419
Hardware	
Mini-computers	892
PCs and terminals	879
Other costs, eg modems, room fitting	135
Total capital expenditure	1,906

Source: BWB.

7.10. Actual running costs of the management information systems (MIS) unit at Watford for 1989/90 to 1992/93 and its budget costs for 1993/94 are shown in Table 7.3. The corresponding years' figures for regional and other headquarters information technology (IT) costs are in Table 7.4.

TABLE 7.3 **BWB: MIS department costs, 1989/90 to 1993/94**

£'000

	1989/90 actual	*1990/91 actual*	*1991/92 actual*	*1992/93 actual*	*1993/94 budget*
Salaries					
Permanent	498	634	728	645	680
Consultancy	0	40	148	97	150
Transfer to special revenue*	-139	0	0	0	0
Total staff costs	359	674	876	742	830
Training	34	31	18	36	30
Operating costs					
Software purchases	20	10	33	41	36
Hardware purchases	5	20	10	18	5
Maintenance: software	24	6	11	12	12
Maintenance: hardware	97	62	28	54	38
Consumables	59	25	13	14	14
Insurance	10	36	12	9	12
Rental hardware	221	54	0	0	0
Rental software	27	9	0	0	0
Other	-24	0	0	0	0
	439	222	107	148	117
Computer-aided software engineering	0	0	0	168	26
Telecoms network	5	35	31	27	34
Depreciation	12	110	108	130	169
Total MIS costs	849	1,072	1,140	1,251	1,206
Staff numbers					
Permanent staff	25	29	22	19	20
Regional co-ordinators	6	6	5	5	4
Contractors	9	4	6	4	4

Source: BWB.

*The sum of £139,000 in MIS departmental costs was charged to the centre as part of the cost of bringing the new system into operation, and is contained within the total in Table 7.1.

TABLE 7.4 **Regional and other headquarters IT costs***

£'000

	1989/90 actual	*1990/91 actual*	*1991/92 actual*	*1992/93 actual*	*1993/94 budget*
Cost of IT staff	96	108	100	105	88
Depreciation	270	270	270	270	270
Maintenance	79	135	127	118	88
Rental of hardware	180	130	0	0	0
Software maintenance	12	12	12	12	12
Telecoms	75	75	75	75	75
	712	730	584	580	533

Source: BWB.

*All costs, which are additional to MIS departmental costs in Table 7.3, are approximate.

Current arrangements

7.11. The MIS that BWB now possesses, following the application of its management information strategy and the associated effort and expenditure, is discussed in the following sections under the headings hardware, software, system modules and use of resources.

7.12. User access is controlled through the usual arrangement: each user is identified by name and has a secret password allowing access only to those applications which the user is authorized to enter. There are lockout arrangements to prevent the access of information by one person whilst it is being updated by another.

The hardware

7.13. Equipment used for the systems developed according to the information strategy consists of eight IBM AS/400 computers with associated peripheral devices. These computers are linked by dedicated 9,600 Baud telecommunications lines to form a computer network. In addition to the IBM AS/400s, BWB now owns more than 370 PCs, mainly IBM 286, 386 or 486 models.

7.14. Five of the AS/400 machines are used within regions (at what were in the past five of the six regional offices) and the other three at headquarters. One of the headquarters machines was originally at a former sixth regional office. Within each region there is a local network for communication between waterway computers or terminals and the regional machine. Figure 7.1 illustrates the network arrangement.

7.15. Disk capacities range from 2.6 gigabytes in Scotland to 7 gigabytes for the central computer. Immediate access memory ranges from 16 megabytes to 48 megabytes. Table 7.5 shows individual characteristics of the machines and also the estimated number of users.

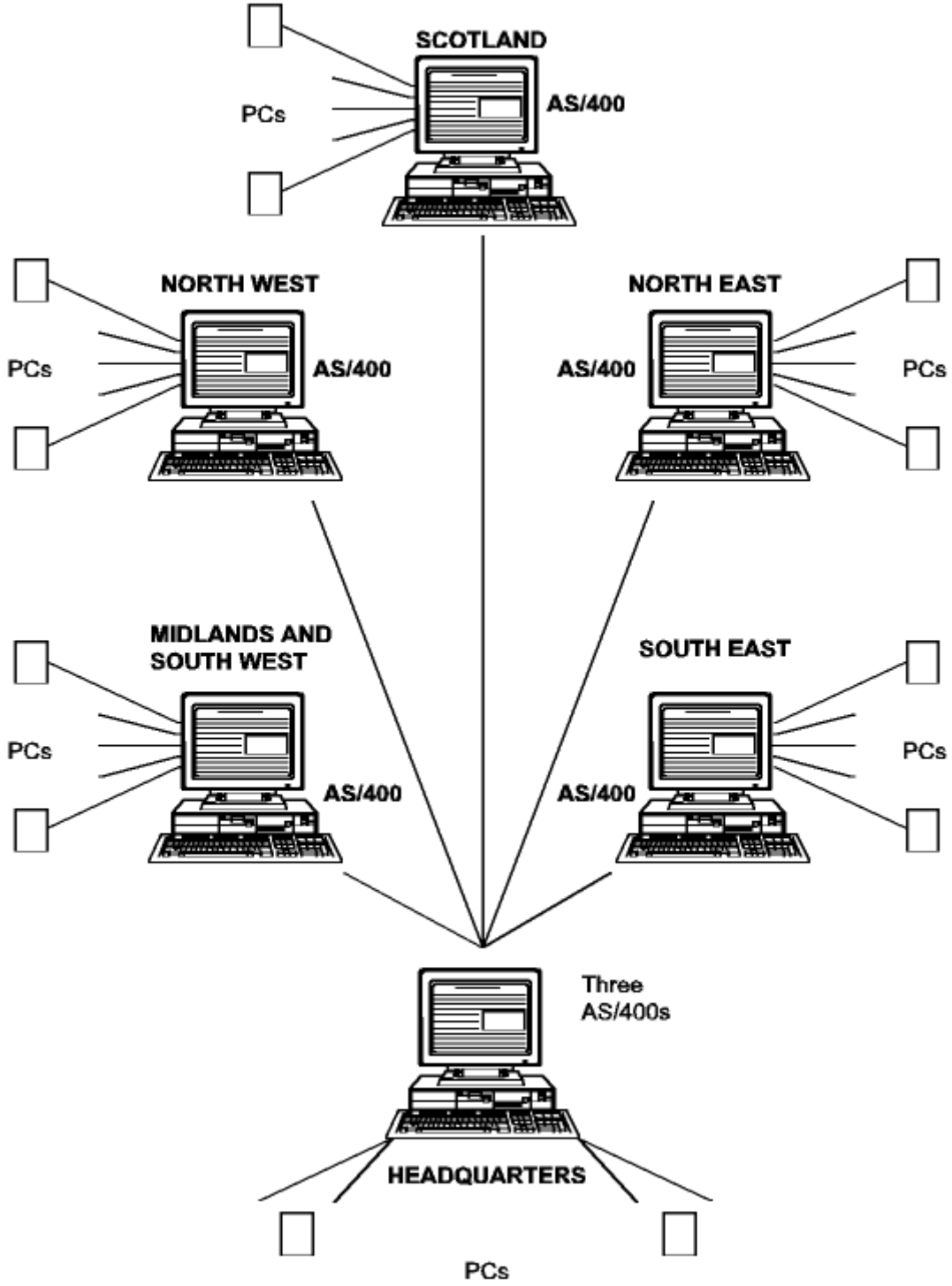
TABLE 7.5 **Analysis of AS/400s in BWB at 16 June 1993**

AS400 location	*Model*	*Disk Gb*	*Memory Mb*	*Headquarters users*	*Regional users*	*Waterway users*
Headquarters						
Development	B35	5	24	12	8	-
Central	B50	7	48	90	30	40
Payroll/personnel	B35	4.2	24	22	25	45
Southern	B35	4.2	24	10	30	39
Midlands/South West	B35	4.2	24	10	39	40
North East	B35	4.2	24	10	30	40
North West	B30	3.0	16	10	21	35
Scotland	B30	2.6	16	10	13	9

Source: BWB.

FIGURE 7.1

BWB computer network



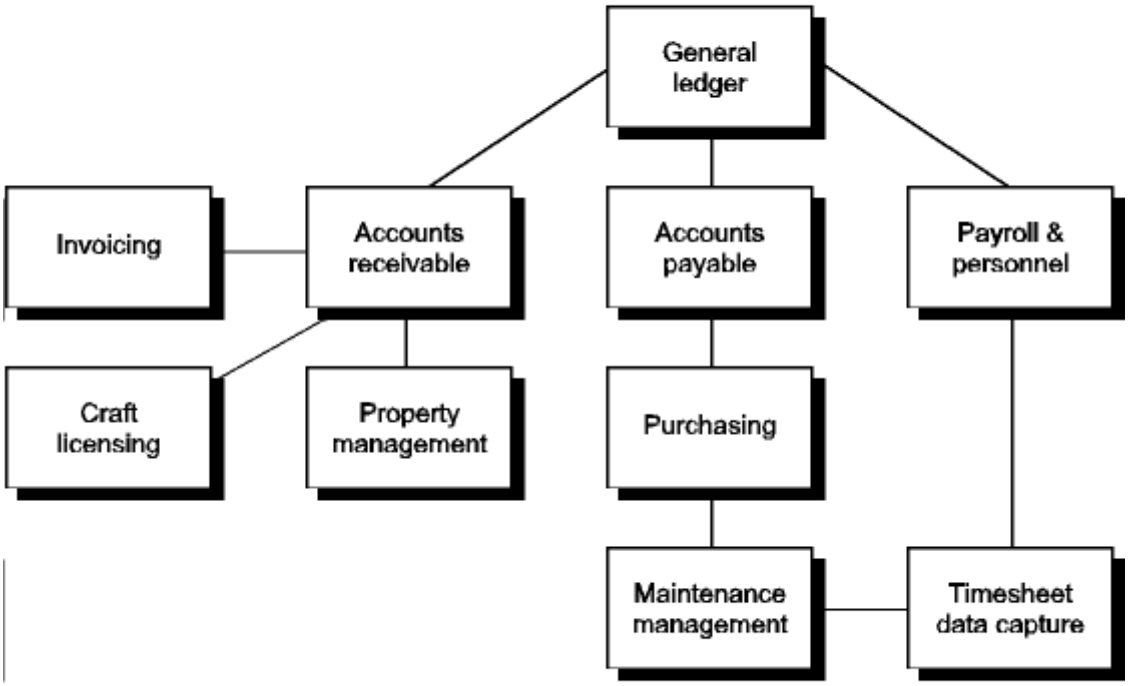
Source: BWB.

The software

7.16. BWB call the major user software elements `systems'. There are ten of them, and each has been developed under a project leader who is or was the principal user of the particular system. The systems are intended to intercommunicate where necessary. Figure 7.2 illustrates what the systems are and how they interconnect. BWB told us that each one of these systems went live on 7 April 1989, although the Property Management System (PMS) was used for the first time in late June.

FIGURE 7.2

Simplified hierarchy of BWB's systems



Source: BWB.

System modules

7.17. Our terms of reference mention the scope for improving the Board's financial and management systems. Of the ten `systems' available, four are purely financial: General Ledger; Invoicing; Accounts Receivable; and Accounts Payable. Two systems may be considered partly managerial and partly financial: Payroll & Personnel; and Purchasing. The remaining four systems are primarily managerial: Craft Licensing; Maintenance Management; Timesheet Data Capture; and Property Management.

7.18. The Board's financial systems are considered in Chapter 4. In the present chapter we deal with those systems which are primarily managerial but also refer to others.

The Payroll & Personnel System

7.19. The Payroll & Personnel System consists of two distinct packages, one for payroll and the other for personnel information, both rented from Company D. These packages have not been modified in any way in order to adapt them for BWB use. Tailoring to BWB applications is through appropriate choice of parameters within the standard pair of systems. In those cases where it has been impossible to achieve the desired effect through choice of parameters, BWB's own procedures have been adapted to suit what can be achieved by the packages.

7.20. We have not undertaken a detailed investigation of the payroll package.

7.21. The master file for payroll is quite separate from the master personnel file, but a `common data feature' allows about 14 fields to be held in common within the payroll master file. Within files there are standard parameter-determined fields, but in addition the user can specify his or her own fields. In this area it appears that the packages are not particularly sophisticated; as there is no chaining of data, the space allocated for user fields is taken up even when no user fields are specified.

7.22. Despite the powerful computer in which it resides, the Payroll & Personnel System cannot itself be used by managers for `what if' calculations through the computer screen. Management information is either presented in printed report form through a report writer or downloaded to a PC for subsequent manipulation through a spreadsheet package.

7.23. Some reports for managerial purposes can present problems. Difficulties can arise because each package was designed to be free-standing and therefore contains its own report writer. Each report writer can only access its own master file plus, in the case of the personnel package, the common data. To deal with data from more than one masterfile, the user must either download it to a PC for manipulation by a spreadsheet package using Datalens, a program which facilitates the downloading, or the user has the facility to use Query, an AS/400 facility for merging files. Consequently a lay user of the system could encounter difficulty in preparing a report which involves a mix of personnel and pay information: precisely the kind of report likely to be required for pay negotiation purposes.

7.24. In 1989 and 1990 BWB did indeed have difficulty in providing the unions with information needed for pay negotiation purposes. As a result of these and similar problems in the use of the Payroll & Personnel System for policy purposes (although not for personnel case purposes), specialist staff running the system were reorganized. Originally there were separate specialist groups within the Finance Department and the Human Resources Department. The two groups were merged within the command of the Finance Department to form a Payroll and Personnel Administration Unit.

7.25. The functions of this unit are not simply to deal with the input and verification of information and the production of payroll. It also acts as the interface between management and the system. A manager wishing to undertake an analysis or `what if' scan of options (for example, the costs to BWB of various merges or splits of current grades with corresponding scale adjustments and `mark time' arrangements) would turn to the unit to obtain the necessary computer-generated reports.

The Purchasing System

7.26. The Purchasing System is a menu-led package with reasonably comprehensive facilities. It appears to work adequately within BWB.

7.27. A purchase begins with the final user of the goods completing a simple hand-filled requisition form. From that point onward the system is computerized and operated by specialist staff: either small purchasing units at headquarters and regional offices or the Waterway Clerk in a waterway office. Where, say, a waterway clerk wishes to use an as-yet unapproved vendor then he or she will contact the regional finance staff or headquarters purchasing staff. The only point at which the final user is again required to take action is on partial or complete delivery of goods against an order.

7.28. The system also has facilities for stores but, whilst useful, these facilities are not of great importance in the general run of BWB operations where goods are frequently ordered against specific job requirements.

7.29. There are reasonably comprehensive reporting facilities within the system. Sixteen end-of-day reports are available as well as four end-of-period reports. These are listed in Appendix 7.1 along with some optional reports which are available.

7.30. The Purchasing System communicates with the Accounts Payable module and with the Maintenance Management System.

The Craft Licensing System

7.31. The current Craft Licensing System (CLS) has been operating since May 1992. Licences and mooring permits are produced as computer printout on preprinted and preperforated paper. Their appearance is very similar to the road vehicle licensing disc, and they reach the customer on a similarly perforated sheet.

7.32. The principle of the system is that the issue of licences and permits is controlled by waterways whilst the mechanics are dealt with at headquarters. A brief description of the processes used has been produced by BWB and incorporated in its Stage 1 Training Pack. It takes the form of three simple diagrams shown here as Figures 7.3, 7.4 and 7.5.

7.33. These figures demonstrate how the craft licensing staff undertake virtually all of the operations in conjunction with the system apart from authorization or refusal of a licence or permit, authorization to renew and authorization or refusal of a refund. In this way local contact with the customer is maintained and local knowledge of the customer and craft can be applied. The craft licensing staff of seven people are located at headquarters in the Commercial Department. Within the computer systems the CLS communicates with Accounts Receivable.

7.34. The number of users of the CLS is as follows:

TABLE 7.6 **Number of CLS users**

	Enquiry only	*Maintenance (data input)*
Waterway	46	68
Region	23	5
Headquarters	9	21

Source: BWB.

7.35. Documentation is largely on preprinted stationery and is clear and well produced. In 1991/92 about 30,000 licences or permits were issued. Of these, about 63 per cent originated as the result of applications to, or reminders from, headquarters, about 17 per cent originated from waterway offices and the remaining 20 per cent came through agents. When applications appear at waterway offices they are sent daily, together with cheques for payment, to headquarters. Cash in payment is banked locally. The image of a local waterway service is enhanced by computer issue of standard letters in a form which shows them as originating from the appropriate Waterway Manager. Enquiry routines within the system allow local and other staff to examine information specific to craft, owners or moorings.

The Maintenance Management System

7.36. The Maintenance Management System is based on an externally-supplied computer package. It is intended for the use of all staff involved in waterway maintenance: engineers, foremen, waterway office staff, and regional technical staff and managers. The package contains a number of modules, some of which are not relevant to BWB. There are five modules which are used: Infrastructure and Plant, Inspections, Work Orders, Repetitive Work Orders and Documentation.

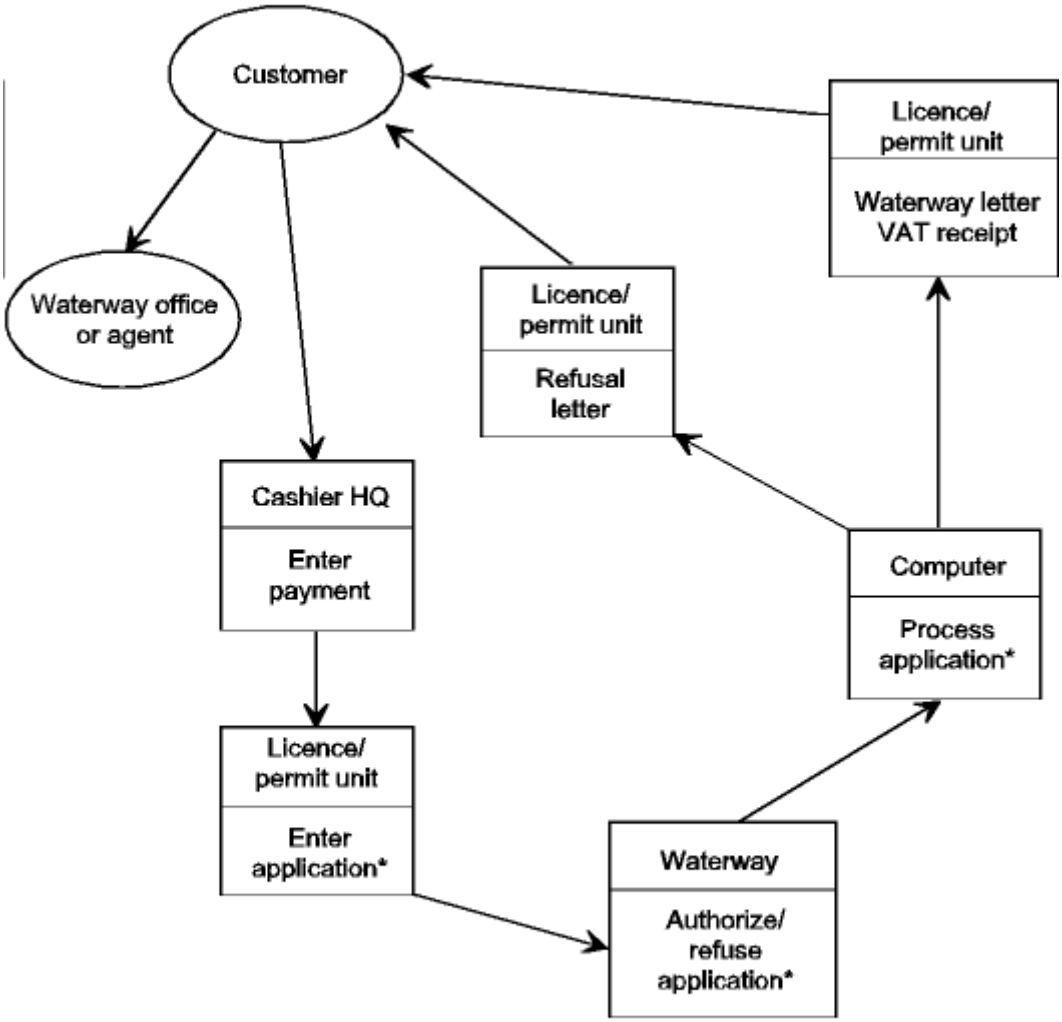
7.37. The Infrastructure and Plant Module is used to establish a record of each item of infrastructure or plant along each length of a waterway. Items include bridges, locks, weirs, leisure facilities and marinas.

7.38. The Inspection Module records inspection information, and can list it according to various criteria, for example location or type of structure.

7.39. The Work Orders Module allows the recording of job progress and estimated and actual costs of each job. The Repetitive Work Orders Module is a simple variant that allows pre-recording of details which can then be called up to create a particular work order or which can be used to programme a schedule of work orders.

FIGURE 7.3

Issue of craft licences and mooring permits

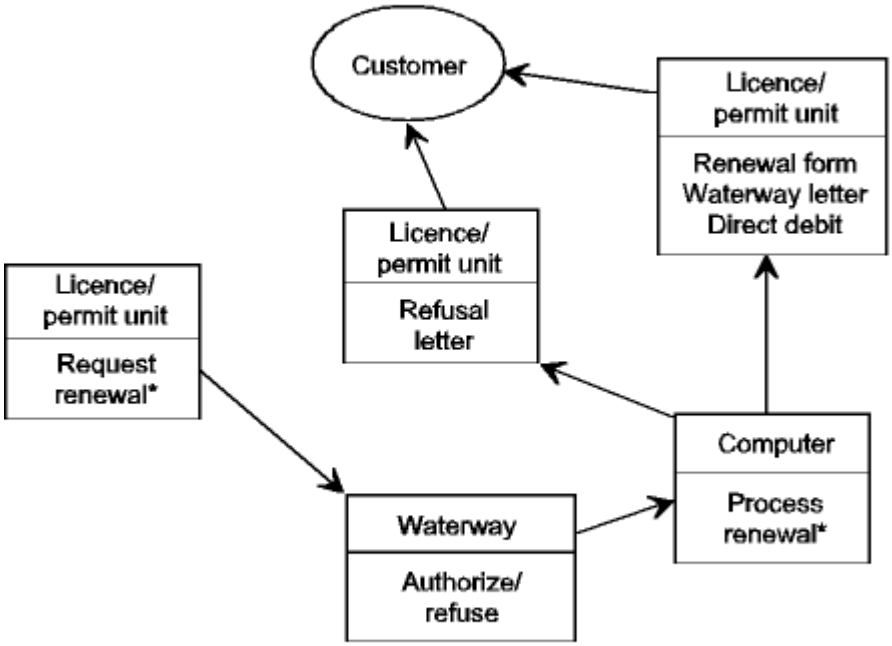


Source: BWB.

*Status check.

FIGURE 7.4

Renewals of craft licences and permits

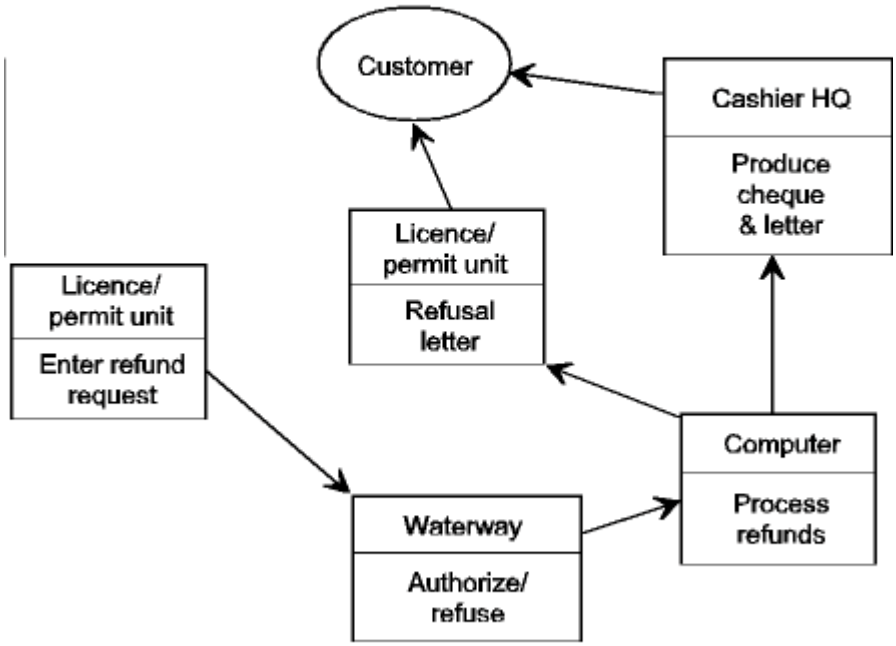


Source: BWB.

*Status check.

FIGURE 7.5

Refunds



Source: BWB.

7.40. The Documentation Module is used to cross-reference infrastructure items with corresponding documentation outside the computer system. The documentation might include maps and plans, maintenance or parts manuals, technical specification, survey reports and so on.

7.41. Costing information is received from the Timesheet Data Capture System, which is described briefly below, and from the Purchasing System.

7.42. We have examined a typical application of the system at waterway level: the initial keying of a work order by a foreman with accompanying production of a job card for use by the gang doing the work, and the later recording of job completion with details of actual material costs, actual hours worked and a description of the job as actually done. For this kind of application the system itself appears to work well.

7.43. BWB recognizes that there is a need to develop the system further. It has set up a group within the North East Region to look at possible developments. BWB agrees that there is a need to make the system more `user friendly' and to make information on productivity and unit costs easier to produce. A separate development of stand-alone software is also under way in the same region with the aim of applying the system more to planning and resource allocation.

The Timesheet Data Capture System

7.44. The function of this system, as implied by its title, is to record information from wages grade timesheets at waterway offices and workshops. The timesheet itself is a well-designed and straightforward document. Figure 7.6 shows the sheet and the codes presented on its reverse side. Input of information using the Timesheet Data Capture System is correspondingly straightforward. The system has, of course, facilities for entry of new staff and deletion of leavers. It also has facilities, for use at regional headquarters, for recording salaried staff absences and salaried staff expenses.

The Property Management System

7.45. The PMS deals with an important element of BWB's activities and must be viewed against the background of the property information it needs to handle. There are considerable complexities in that information which arise for two reasons.

7.46. First, there are wayleave problems inherited from the BTC in 1968. For example, British Rail was then paid under certain wayleave agreements and the Inland Waterways Division had to seek its share. Even now there are still problems about whose approval is needed (railways or canals) for, say, leave for British Telecommunications plc to erect telephone poles.

7.47. Second, prior to 1989 the information was based on Estates Agreements, and its prime use was in the collection of rents and fees. In 1989 the land classification was reorganized to include all land recognized as a manageable asset as opposed to the rent roll which included only land yielding a rent.

7.48. A revised PMS is currently under development. The existing system was specified in late 1988 by Consultants C who were engaged to develop and programme the system. The priority was to ensure continued production of the rent roll whilst constructing a database founded on property records rather than letting agreements.

FIGURE 7.6

Time sheet

Name _____ Waterway/Dept _____

Payroll No | | Week Number _____

Designation _____ Week ending _____

WORK ORDER/ SUB-ORDER	PARTICULARS OF WORK	ACTUAL HOURS WORKED								TOTAL TIME	
		F	SAT	SUN	M	T	W	Th		HRS	MINS
									ORD		
									1.5		
									2		
									ORD		
									1.5		
									2		
									ORD		
									1.5		
									2		
									ORD		
									1.5		
									2		
									ORD		
									1.5		
									2		
										TOTAL WORKING TIME	

ALLOWANCES, PAYMENTS & EXPENSES				
DETAILS	CODE	*	£	p
TOTAL				

*IF ANY AMOUNT IS TO BE DEDUCTED ASTERISK SHOULD BE INSERTED IN THIS COLUMN

PARTICULARS OF TRAVEL	ACTUAL TRAVELLING TIME									
								ORD		
								1.5		
								2		
									TOTAL TRAVELLING TIME	

PARTICULARS OF ABSENCE	ABSENCE CODE						
WHOLE DAYS ABSENT							
HALF DAYS ABSENT							

I CERTIFY THAT THE DETAILS ENTERED HEREON ARE CORRECT.

Signed . . . . . Employee

Certified by . . . . . .

STARTING TIME							
FINISHING TIME							
MEAL BREAK							
HOURS WORKED							

The more common Allowance/Expense Codes are given below. A complete list is held by Local Offices.

CODE	ALLOWANCE/EXPENSE
912	LONDON ALLOWANCE
913	FRINGE LONDON ALLOWANCE
915	BONUS ALL TYPES
916	TAXABLE GENERAL
921	HIGHER GRADE DUTY PAY
922	REPAIR YARD FLEXIBILITY
931	CONTRACTED OVERTIME
932	SHIFT ALLOWANCE
935	TOOL ALLOWANCE
936	ON CALL ALLOWANCE
960	TRAINING
961	OTHER AUTHORISED ABSENCE
968	HOLIDAY PAY
980	NON TAXABLE GENERAL
981	FARES

The complete list of Absence Codes is given below:

CODE	ABSENCE TYPE
A	ANNUAL HOLIDAY
L	SPECIAL LEAVE WITH PAY OR IN LIEU
N	SPECIAL LEAVE WITHOUT PAY
R	INDUSTRIAL INJURY
T	STATUTORY HOLIDAY
K	OTHER AUTHORISED ABSENCE
E	TRAINING
O	UNAUTHORISED ABSENCE
U	UNCERTIFIED ABSENCE (FIRST 3 DAYS)
S	SELF CERTIFIED (DAYS 4 TO 7)
M	MEDICAL CERTIFICATE (DAY 8 ON)
F	SICK NOT ON NORMAL WORKING DAY
P	MATERNITY LEAVE

NOTE
When the following codes are entered an entry is **always** required in the allowances, payments and expenses box.

ABSENCE CODE			EXPENSE ALLOWANCE CODE		
A	-	ANNUAL HOLIDAY	968	-	HOLIDAY PAY
T	-	STATUTORY HOLIDAY	968	-	HOLIDAY PAY
K	-	OTHER AUTHORISED ABSENCE	961	-	OTHER AUTHORISED ABSENCE
E	-	TRAINING	960	-	TRAINING
L	-	SPECIAL LEAVE WITH PAY	961	-	OTHER AUTHORISED ABSENCE
or	-	SPECIAL LEAVE IN LIEU	968	-	HOLIDAY PAY

The Rate of Pay for Other Authorised Absence and Training can be obtained from The Payroll Supervisor, Watford.

In all other cases **ONLY** the absence box should be completed.

7.49. Consultants C failed to deliver the system on time. Many different program releases were issued over the period of a year, the documentation was not supplied and BWB found many errors in the programs. Consultants C were required to pay compensation. This took the form of both cash and credit, the latter being spent mainly on education and training with a quite separate division of the company. To date BWB has received some £35,000 in compensation.

7.50. The work is now in the hands of Consultants D using their own computer-aided software engineering package. The package is being used to create a new system which corrects previous faults and incorporates additional facilities. A particular facility being added will allow *ad hoc* reporting under user control and the downloading of certain information items to PCs so that further manipulation or report generation can be undertaken by the user. BWB staff will be trained in the use of the computer-aided software engineering package so that the system may be maintained in-house.

7.51. BWB was unable to estimate the cost to its business of its problems with Consultants C. The new system is due to be installed in April 1994. Payment to the external supplier is to be £90,000.

7.52. As it now stands, the PMS incorporates all data on properties: land and buildings and structures both above ground and below (for example, pipes).

7.53. Agreements can be attached to properties and units within a property, eg a floor. All agreements relate to income of some kind, whether rent or wayleave payments. The system is concerned with the management of the agreement, compliance with the agreement and income.

7.54. Originally the system was placed on the IBM AS/400 computer for each region so there was no need for a region identifier. Since the amalgamation of some regions a regional identifier has been introduced. The coding hierarchy is Region-Waterway-Property- Unit (sites do not enter into the scheme as they are looked upon as a grouping of properties).

7.55. In 1989 there was a massive computer-based data conversion exercise. About 30,000 packages of information including plans and agreements were scanned and the appropriate information entered into the machine. Apart from these packages, others were constructed and entered using Ordnance Survey sheets to locate and code the property sites.

7.56. Additional input methods vary from region to region. Some regions have more surveyor staff (some of whom may key in directly) and some have more administrative staff. Users will include lands assistants, surveyors and estates managers. Commercial Managers and Regional Managers are likely to ask their surveyors/estate managers for report summaries rather than use the system themselves. Application of the system is essentially regional. Regional users have access to the Plan Book and so can identify the property number. Information is sent to headquarters in aggregated form. The split of users between waterways, regions and headquarters is shown in Table 7.7.

TABLE 7.7 **Number of users of PMS**

	Enquiry only	*Maintenance (data input)*
Waterway	46	0
Region	62	40
Headquarters	13	0

Source: BWB.

7.57. Routine changes can be made to the basic information including:

(a) accounting changes, eg taxation codes;

(b) administrative changes, eg BWB classification of regions; and

(c) survey changes, eg physical alterations, agreement changes.

7.58. If property is disposed of it is given a `disposal' classification after exchange of contract. Once completion has taken place the property record is archived.

Use of resources

7.59. A measure of how the AS/400 computer resources are consumed by various application and other systems is provided by the amount of hard disk space each system occupies. An analysis of the position at August 1992 is provided in Table 7.8. We noted that the IBM system and the documents/profiles/security etc occupy about half the total storage capacity.

TABLE 7.8 **Summary analysis of DASD,* August 1992**

	Region†						Total (mb)
	SE	*SW*	*MI*	*NE*	*NW*	*SC*	*HQ*
Core applications							
Purchase Orders	48	49	49	52	50	36	54
Accounts Payable	152	155	160	194	188	107	283
Accounts Receivable	148	105	159	146	170	118	254
Invoicing	11	9	10	11	10	13	8
General Ledger	82	78	93	100	94	70	90
General Ledger Spread Sheet	74	66	74	80	81	65	161
General Ledger interfaces	1	1	1	1	1	0	6
Maintenance Management System	122	146	178	212	203	102	61
Timesheet Data Capture System	10	9	10	11	11	9	24
Property Management System	114	90	127	100	111	96	0
Property Management System invoicing	44	37	50	36	43	16	0
Pay/Personnel	-	-	-	-	-	-	1,637
Craft/direct debit	-	-	-	-	-	-	210
	806	745	911	943	962	632	2,788
Other applications							
Audit	13	17	13	28	28	1	39
Query	11	1	34	2	1	1	0
Ops/utilities	63	65	63	61	68	62	175
Other	3	3	3	3	4	2	140
Training	4	4	5	4	4	4	3
	94	90	118	98	105	70	357
IBM system/data							
Operating system	485	485	485	485	485	485	507
User/general library	28	63	52	86	185	72	87
History files	16	23	39	26	21	0	43
Spool files	67	11	32	44	42	0	542
Performance data	190	117	127	105	100	57	1
	786	699	735	746	833	614	1,180
Documents/profiles/ security etc	117	57	68	187	85	132	336
DASD used (mb)	1,803	1,591	1,832	1,974	1,985	1,448	4,661
% DASD used‡	75%	66%	76%	82%	83%	72%	78%

Source: BWB.

*Direct Access Storage Device, ie hard disk.

†The SW & MI regions merged in October 1992, and one computer was transferred to headquarters.

‡The general level at which performance degrades is said to be 75 per cent usage. However, BWB states that this figure can be increased to 90 per cent if data are reasonably static.

7.60. BWB's system is on line and has reasonable reaction times. We suggested to BWB that the reaction time actually needed is no greater than that required for weekly input of pay information for the production of the payroll one week later. BWB pointed to the need for a fast turnround on the issue of licences and permits and up-to-the-minute information on licences for evasion control purposes.

7.61. BWB informed us that it has begun a review of its information systems which is due to be completed by October 1993.

Use of information by management

7.62. Each of the systems contains a report package and standard reports are made regularly available. Waterway and regional management staff receive regular monthly financial summaries. The Executive team receive monthly information from a variety of systems, for example:

- actual, budget and forecast expenditure for each department;
- staff head counts; and
- quantities viewed by BWB as performance measures, including direct costs per km of waterway, overhead cost ratios, overtime and absence rates.

7.63. In addition, BWB points to the facilities we have already mentioned-the Query facility, Datalens and so on-as examples of the machinery available to support management decision-making. This machinery is claimed to be flexible in use, and BWB has provided us with examples of what it can produce:

- a bad debts analysis derived from the Accounts Receivable system;
- market trends in craft licensing; and
- histograms of overtime hours.

Other improvements

7.64. Management systems go wider than solely computer-based systems. Many organizations, including government organizations, employ internal management support staff whose role is to seek out areas for improvement and/or to devise systems. The staff might be of various disciplines: operational research, audit or O&M, for example.

7.65. Management support staff of this kind do not exist within BWB. Particular operational or management changes are studied by various working groups. Some 24 groups have been established over the past two years to deal with issues like automatic weed-cutting, dredging, the Maintenance Management System, the CLS, the PMS and career planning (see paragraph 5.3).

Conclusions and recommendations

7.66. BWB used consultants to develop an Information Systems Strategy prior to the establishment of the new management structure. Decisions were taken on the purchase of IT systems in some haste and before users within the new structure could consider what would be appropriate. In some cases BWB was badly advised. As a result parts of the overall system are not yet meeting user needs. Other parts of the system may well have cost more to bring into operation than they need have done or are believed to have done. Many of the figures shown in Table 7.1 were estimates and forecasts. BWB has stated that a review of its systems was started in 1992 and is due to be completed in October 1993, although no progress had yet been made on this review at the time of our report.

7.67. BWB should undertake a full review of its management strategy and its management systems to ensure that they meet user needs at least cost. The views of users should figure prominently in the review, and adequate time should be allowed for its completion. We suggest a reporting date of 1 July 1994.

7.68. In 1995 BWB should review the costs and benefits to date of its systems and compare them with the forecasts made in 1988 (Table 7.1).

7.69. From one point of view the system of working groups is commendable, since it is important to take on board the views and needs of the users or operators of a system, process or piece of equipment. However, working groups can be expensive in staff time, particularly in an organization as geographically dispersed as BWB. It may be that some staff time could be saved by providing support from a small group of specialist investigators. This group might also save some of the expenditure on external consultants.

7.70. BWB should investigate whether staff time and external consultant expenditure might be saved by the establishment of a management support group.