

Lead of TPTLM
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TECHNICAL PLANNING

Development Control/Environmental Assessment

Situation Report 1991

ENVIRONMENT AGENCY



102335

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Introduction

This report documents activities in development control, quantifying mitigation and enhancement measures obtained by the NRA as a result of negotiations with developers following pre-planning enquiries and planning or land drainage consent applications. These discussions have usually taken place with the agreement and support of the relevant local authorities.

Negotiations have resulted in increasing numbers of baseline surveys, both hydraulic and environmental, being carried out by the developer, in accordance with the NRA's statutory duties including those identified under section 8 of the 1989 Water Act, to assess the likely impacts of projects.

NRA (TR) has a presumption against the culverting of watercourses unless absolutely necessary. In addition the Authority generally objects to river realignment and straightening which can have geomorphological impacts, inducing instability and also destroying the natural channel with associated implications for flora and fauna. For many smaller day-to-day projects, Technical Planning staff advise using guidance notes (eg. golf courses, culverts and bank protection).

More recently NRA (TR) has succeeded in negotiating wider river corridors, initially for access (a minimum of 8m), and increasingly wider corridors (up to 100m +) are being requested from the wildlife and conservation point of view. NRA (TR) is keen to encourage developers to view rivers as key features of a development rather than engineering problems to be overcome.

Contents

The input made by Technical Planning staff in negotiating environmentally acceptable solutions to developments over the past 4 months, either still in progress or completed after 31st December 1990, is recorded.

Only those projects of sufficient significance to record in this way have been included, although a similar approach is taken with a larger number of less significant cases. This summary allows the quality of work to be recorded as well as the basic number of planning applications/land drainage consents processed, which is the sole 'achievement' currently noted by the authority.

Consideration of the various criteria adopted in this report, which may be capable of further development, may lead to improved reporting of the value of the Section's work in T.S. Quarterly Achievement Reports, as well as an enhanced measures of NRA influence at regional/national level. A series of draft Development Control Guidance Notes will increasingly ensure consistency in the content and quality of the approach to development proposals.

Summary Of Results

Returns from the opening programme of the monitored proactive approach, ie. the first 3 months of 1991, show the following:

Total length of river enhancement	- 38 Kms
Environmental Damage Avoided:	
Very high : Category A	- 5 schemes
High level, local : Category B	- 8 schemes
Medium to high level, local : Category C	- 5 schemes
Low level, local : Category D	- 2 schemes
Total Technical Planning Staff input	- 123½+ days.
Total value of engineering assets	- £146,000.
" " " environmental (data) assets	- £90,000.
Minimum estimate of enhancements	- £9 million.

It should be noted that staff time input to these major projects is not complete in all cases; if 200 days were allowed for completion, and an estimated 100 days allowed for support from other staff, together with 30% unproductive time (ie. a total of 2 m.y. approx), an output of £4.5 million per person per quarter is calculable. To the annual figure achieved should be added the cost (note, these costs probably understate the true value substantially) of flood defence asset creation, estimated in 1989/90 to be £40 million.

Conclusions

The NRA TR has found a significant way of achieving its goals through proactive intervention into development control, building on the Forward Planning/Catchment Planning Initiative. Valuable mitigation and enhancement measures are now being negotiated with developers, and will increasingly be based on the series of Development Control Guidance Notes.

Baseline studies, both hydraulic and environmental (including river corridor surveys) are now carried out by developers to assess the likely impacts of a project, and mitigation and enhancement measures are increasingly being considered as an integral part of a development package. Some basic measures of this influence on how the vast investment in land use change are practicable and helpful in determining the cost-effectiveness of the planning function.

READING OFFICE

Title of application: Caversham Lakes Development.

Location: Reading

Nature of application: Development of gravel pit (Pre-planning)

Proposed by: Redland Properties Ltd.

Negotiations

The proposed site for development lies within the floodplain of the Thames in 30 year-old gravel extraction area, and covers an area of approximately 350 acres.

Peter Bretts Associates are constructing a mathematic model of the river floodplain at present.

The N.R.A. has stressed that the hydraulic solution must not merely be local to the site. and should facilitate improvement of flood defence levels of service of Reading.

NRA Departments consulted:

Recreation & Conservation, Aquatic Biology, Fisheries, Landscape Architecture, Pollution Control.

Proposed treatment:

Still being discussed.

Solution

Still being discussed.

Area of river/floodplain treatment: 1 km of River Thames and tributary.

Environmental damage averted: High local, with significant systemic implications: Cat. B.

<u>Time input by Technical Planning staff:</u>	Engineering	5 days
	Environmental	<u>2 days</u>
		7 days

Total Capital Value (of enhancements and mitigation): Potentially very high/High: > fl million.

READING OFFICE

Title of application: River Mole at Gatwick.

Location: Gatwick, Surrey

Nature of application: River Diversion, development.
(planning/land drainage application)

Proposed by: BAA Consultancy.

Negotiations

The expansion of Gatwick airport would result in river channel diversion. The NRA insisted that mitigation and enhancement measures be included as part of the works.

NRA Departments consulted:

Fisheries, Aquatic Biology, Pollution Control, Conservation.

Proposed treatment

A three-stage channel, substrate, pools, deflectors, and suitable planting are to be incorporated into either the main works or a subsequent contract.

Environmental specialists are expected to monitor the mitigation and enhancement works during construction.

Solution (hydraulic)

(As above)

Solution (Environmental)

(As above)

Length of channel treatment: 1.7 km.

Environmental damage averted: High locally, with significant systemic implications: Cat. B.

Time input by Technical Planning staff:

Environmental	- 2 days
Engineering	- 2 days
	4 days

Total Capital Value (of enhancements & mitigation): High: £250,000

READING OFFICE

Title of application: The Reading Oracle Development.

Location: Reading town centre.

Nature of application: Land drainage consent.

Proposed by: Reading Borough Council.

Negotiations

The proposal is to straighten a short section of the River Kennet for development recreational reasons. The NRA wishes to minimise any channel realignment to avoid creating instability and as far as possible enhance the river environment.

The Authority requested a desk study be carried out, to investigate the morphological impacts of the realignment. Another of the Authority's requirements is to ensure that a landscape architect carries out the final enhancement work to a specification dictated by the NRA.

NRA Departments consulted:

Aquatic Biology, Fisheries, Conservation, Landscape Architecture.

Proposed treatment

No details yet agreed.

Solution (Hydraulic)

None as yet. Approx £20,000 for studies etc.

Solution (Environmental)

None as yet.

Length of channel treatment: 100m

Environmental damage averted: Medium-High locally (some systemic implications: Cat. C.

Time input by Technical Planning staff: Environmental) only study
Engineering) negotiations have
taken place so far.

Total Capital Value (of solutions, enhancements & mitigation): Medium:
> £100,000.

READING OFFICE

Title of application: Blackwater Valley Road. (Hampshire Section).

Location: Farnborough, Hampshire.

Nature of application: Land drainage consent.

Proposed by: Hampshire County Council.

Negotiations

There are to be five realignments to the river.

Negotiations with engineering and environmental staff resulted in Hampshire County Council financing an Environmental Co-ordinator who will monitor the works during construction.

NRA Departments consulted:

Conservation, Fisheries, Aquatic Biology, Pollution Control.

Proposed treatment

Mitigation measures include:

- a two stage flood channel
- reinstated gravels
- the construction of pools
- bank treatment (eg. riprap and willow spiling).
- other sensitive works.

Solution (Hydraulic)

Standard designs include reed storage and size distributions for the reinstated substrate.

Solution (Environmental)

mitigation measures as mentioned above.

Length of channel treatment: 3 - 5 km.

Environmental damage averted: High over long length of river, with high significant systemic applications: Cat. A.

<u>Time input by Technical Planning staff:</u>	Environmental	7 days
	Engineering	<u>10 days</u>
		17 days

Total Capital Value (of enhancements & mitigation): Very High
> £1 million.

READING OFFICE

Title of application: Kennet Valley Park.

Location: Kennet Valley.

Nature of application: Pre-planning.

Proposed by: A Consortium of gravel companies; including
ARC properties, Tarmac, Hall Aggregates.

Negotiations:

Environmental coordination discussions are taking place.

The developer's consultants are to carry out 8 to 10 baseline surveys including archaeology, wildlife, fisheries/angling, aquatic biology, recreation, minerals and waste, landscape and ornithology to NRA specification.

NRA Departments consulted:

Conservation, Fisheries, Aquatic Biology, Pollution Control, Water Quality, Water Resources.

Proposed treatment

The N.R.A. is giving advice on studies at this stage in the scheme.

Solutions

Options under preparation.

Length of river treatment

Environmental damage averted: Potentially very high over large local area, with significant systemic implications for all NRA interests except navigation: Cat. A.

Time input by Technical Planning staff:

Environmental	3 days
Engineering	<u>4 days</u>
	7 days

Total Capital Value (of solutions, enhancements and mitigation): Verh High, so far, about £50,000 of data collection. Estimated value of potential enhancements > £1 million.

READING OFFICE

Title of application: Redhill Brook realignment

Location: Redhill, Surrey.

Nature of application: Land drainage consent.

Proposed by: Crest Homes

Negotiations

The Proposals of urban development involve a channel diversion. The brook involved is of sinuous nature in erodible sediments and therefore any planned straightening of the channel would need to be resisted.

Negotiations with Surrey County Council, McDowells and Crest were held, regarding the brook diversion.

NRA Departments consulted:

Fisheries, Maintenance Operations, Conservation.

Proposed treatment

Appropriate mitigation and enhancement measures.

Channel cross sections have been revised to emulate natural asymmetry of the diverted brook section, which is to be made sinuous. Gravel substrate will also be instated.

Solution (Hydraulic)

The size of flood storage and the ecological pond would be decreased in order to accommodate the course of the brook. Also, instability would be avoided as a result.

Solution (Environmental)

Revised channel sections.

Length of river treatment: 30m max.

Environmental damage averted: High locally with significant systemic implications: Cat. B.

<u>Time input by Technical Planning staff:</u>	Environmental	1 day
	Engineering	<u>2 days</u>
		3 days

Total Capital Value (of enhancements & mitigation): Medium £150,000

READING OFFICE

Title of application: Eastworth Road, Chertsey.

Location: Chertsey.

Nature of application: Residential development (pre-planning stage)

Proposed by: Mount York Estates.

Negotiations

The original plans encroached onto the river corridor.

Also, the proposals lie in the flood plain, and the Authority advised against development.

NRA Departments consulted:

Conservation, Pollution Control, Operations.

Proposed treatment

Environment mitigation/enhancement alongside the development.

Solution (Hydraulic)

N/A

Solution (Environmental)

NRA has negotiated the enhancements of tree and shrub planting.

Length of river treatment: about ½ km

Manpower Time input: (Environmental) ½ day.
(Engineering) 1 day.

Environmental damage averted: Low, local: Cat. D.

Time input by Technical Planning Staff: Environmental ½ day
Engineering 1 day
7½ days

Total Capital Value (of solution, enhancements & mitigation): Low: £50,000

READING OFFICE

Title of application: Park and Ride scheme at Loddon Bridge.

Location: Reading.

Nature of application: Development of river floodplain.

Proposed by: Pitnile Ltd.

Negotiations

Initial proposals were to build a car park, bus shelter and associated facilities on the river floodplain.

No Environmental Assessment of the site was done.

The NRA refused the proposals on the grounds that the scheme would be detrimental to the environment, (loss of river corridor), and considerably affect the flood capacity of the reach.

Compensatory flood storage would need to be found.

NRA Departments consulted:

Conservation, Pollution Control, Operations.

Proposed treatment

None as yet.

Solution (Hydraulic)

No solutions found yet.

Solution (Environmental)

N/A

Length of river treatment: 350m

Environmental damage averted: High locally, with some systemic implications:
Cat. C.

<u>Time input by Technical Planning staff:</u>	Environmental	2 days
	Engineering	<u>2 days</u>
		4 days

<u>Total Capital Value (of solutions. enhancements & mitigation):</u>	Medium:
	Environmental Studies £20,000
	Enhancements >£80,000

READING OFFICE

Title of application: Coldharbour Farm, Aylesbury

Location: Large scale commercial and residential development
pre-application consultation

Nature of application: Planning land consent

Proposed by: Ernest Cook Trust

Negotiations

Major works to Bear Brook floodplain, and development of green field sites crossed by Bear Brook, Southcourt Brook, Stoke Brook and Hartwell Ditch. Potential exacerbation of flood risk and related hydraulic issues, loss of natural watercourse and floodplain environment.

NRA Departments consulted:

Fisheries, Conservation, Landscape, Aquatic Biology, Water Quality - Surface/Ground, Pollution Control.

Proposed treatment:

Rehabilitation of a 6 km length of the Bear Brook. A two-stage channel is to be created, with appropriate landscape and wildlife measures. In addition Stoke Brook and Southcourt Brook, currently artificially straight are to be made sinuous. The maintenance of 50 and 100 m river corridors are included in the proposals. All the work is to be undertaken at the developer's expense including an extension of a 120 m wide river corridor from Haydon Mill to the River Thames to compensate for a narrower corridor within the built area.

Solution (Hydraulic)

Meanders and realignments etc
Hydraulic modelling of floodplain.
Watercourse changes. Provision of
flood compensation area. Landscaped
flood transfer/alleviation pond
between Hartwell Ditch and Stoke
Brook.

Solution (Environmental)

Planting, landscaping to NRA
requirements.

Length of channel treatment: About 4500 m

Environmental Damage Averted: High; large local area with significant
systemic implications: Cat. B

Time input by Technical Planning staff:

Environmental	3 days
Engineering	8 days
	11 days

Total Capital Value Added (of solutions, enhancements and mitigation): Very
high > £1 million

READING OFFICE

Title of application: Local Planning Authority - General Policy

Location: River Cherwell, Banbury, Oxfordshire.

Nature of application: Pre-planning application.

Proposed by: The Local Authority and Bovis Homes.

Negotiations

NRA have identified a number of environmental concerns regarding low flows, flash floods, water quality through Banbury. NRA have notified the LPA of the need for LPA help to studies (technical and environmental) underway to identify solutions and implement them through the planning process.

NRA Departments consulted:

Fisheries, Amenities and Recreation, Water Resources, Pollution Control, Flood Defence Operations:

Proposed treatment

Not applicable.

Solution (Hydraulic)

Solution (Environmental)

Currently under study. Many comprise river rehabilitation; flood alleviation; low flow augmentation; strategic drainage scheme, all over approx 2 km of the Cherwell. Plus fisheries improvements.

Length of channel treatment: 2 km approx.

Environmental damage averted: Very High, large local area with significant systemic implications: Cat. A

<u>Time input by Technical Planning staff</u>	Environmental	7 days
	Engineering	<u>10 days</u> *
		17 days

Total Capital Value (of solutions, enhancements and mitigation): Very High:
Estimated potential > £1 million.

* Including Term Consultants' work.
Estimated final time: 30 days.

READING OFFICE

Title of application: Cogges Link Road, Witney

Location: Witney, Oxfordshire

Nature of application: Pre-planning application

Proposed by: Oxfordshire County Council

Negotiations

- Flood defence concerns, increased flood risk to Witney.
- Environmental - diversions of watercourse and major structures over E & W arms of Windrush floodplain.
- Fisheries - EEC designated salmonid fishery.

NRA Departments consulted:

Aquatic Biology, Conservation, Fisheries, Pollution Control.

Proposed treatment:

(Under negotiation) All this yet to be agreed by Technical Planning (EA Section).

Geotextile seeded and planted to diverted watercourses outside main structures. Oversized culverts for secondary watercourses. Proposed 'Armoflex' revetment of sections beneath main structures, could be coloured concrete and will leave the bed of channels undisturbed. Downstream, river grading works to west channel normally not supported by NRA but may form part of fisheries improvement scheme.

Solution (Hydraulic)

To be agreed.

Oxfordshire County Council are paying 50% of hydraulic/hydrological modelling studies to look at these and wider NRA interests, ie. £20,000.

Solution (Environmental)

River corridor survey requested.

Length of channel treatment: Minimum 500 m.

Environmental damage averted: Medium to High, locally: Cat. C

<u>Time input by Technical Planning staff:</u>	Environmental	2 days
	Engineering	5 days
		7 days

Total Capital Value (of solutions, enhancements and mitigation): High
Contribution Estimated following negotiation - > £500,000

READING OFFICE

Title of application: Carterton NE Development

Location: Carterton

Nature of application: Combined Residential and Employment

Proposed by: Trenchwood (Lead Developer)

Negotiations:

The main conflict is the restriction on flows from a development site via the Highmoor Brook through Brize Norton Airfield. PSA/MOD concerns have to be addressed by a flood storage and flow attenuation scheme on the golf course proposed as part of the development. NRA have built a hydrological model to assess the situation and review developer's proposals.

NRA Departments consulted:

Projects, Modelling, Survey.

Proposed treatment:

Large balancing ponds on golf course plus very restricted outflow.

Solution (Hydraulic)

Developer contribution of £6,000 to NRA model.

Solution (Environmental)

Not discussed yet

Length of channel treatment: N/A

Environmental damage averted: Medium locally with systemic implication:
Cat. C.

<u>Time input by Technical Planning staff:</u>	Environmental	2 days
	Engineering	<u>8 days</u>
		10 days

Total Capital Value (of solutions, enhancements and mitigation): Medium:
Estimated following negotiation; say £150,000.

READING OFFICE

Title of application: A418 Aylesbury Bypass

Location: Wing to Aylesbury, Bucks.

Nature of application: Pre-planning.

Proposed by: DTp/Bucks County Council

Negotiations

Crossing of Thame floodplain and approximately another thirty main/non main river watercourses by a major new road. Cuttings proposed through Bedgrave and Stoke Brooks at Aylesbury, requiring inverted syphons for continuation of the watercourses beneath the cuttings. Pumped road drainage requiring balancing ponds and pollution control measures outside cuttings.

NRA Departments consulted:

None as yet.

Proposed treatment:

To be discussed in detail. NRA have stated that environmental enhancement, particularly with regard to mitigating the effects of the cuttings south of Aylesbury will be required. This is a most intractable problem, all the more so because the DTp resisted earlier invitations to a partnership approach.

Solution (Hydraulic)

To be agreed.

Outlines contained in
Peter Brett Associates
report for the cuttings.

Solution (Environmental)

To be agreed.

To start, river corridor survey of
1.5 km for each watercourse crossing.

Length of channel treatment: > 30 road crossings of main/non main rivers.

Environmental damage averted: Very high with many significant systemic implications: Cat. A.

<u>Time input of Technical Planning staff:</u>	Environmental	1 day
	Engineering	15 days *
		16 days

Total Capital Value (of solutions, enhancements and mitigation): Very High
>£1 million.

* Including Term Consultants' time.

READING OFFICE

Title of application: Poyle Manor Hotel.

Location: Poyle, Near Slough.

Nature of application: Planning Application

Proposed by: Douglas Norwood Architects (on behalf of Gulf Air)

Negotiations

The NRA objected on two grounds:

- Breach of NRA Byelaw: The development plans did not include an 8 m wide maintenance strip, adjacent to the Poyle Channel, for use as access by the NRA.
- The proposed development would have a detrimental effect on the water environment, and would conflict with the Authority's wildlife corridor policy.

These objections were in addition to restrictions on the architect's solution (of accommodating the hotel), by other bodies.

Proposed treatment

Environmental enhancement of the river corridor.

NRA Departments consulted:

Land Drainage, Surfacewater Pollution, Groundwater Pollution, Amenities and Recreation, Fisheries, Operations, Projects.

Solution:

After further discussions, the developer produced revised plans which included a corridor of minimum width 8 m. In addition to this revised corridor width, further discussions produced enhancement measures which included landscaping of the environment in the vicinity of the river corridor, planting and improved public access to the river.

Discussions with Spelthorne Borough Council have been an essential element in this case and are continuing.

Length of channel treatment: 300 m

Environmental damage averted: Medium-high locally: Cat. C.

<u>Time input by Technical Planning staff:</u>	Environmental	1 day
	Engineering	<u>1 day</u>
		2 days

Total Capital Value (of solutions, enhancements and mitigation): Medium
£100,000.

READING OFFICE

Title of application: Brooklands farm
Location: Lightwater
Nature of application: (Unlawful action)
Proposed by: N/A

Negotiation

Unlawful tipping by an individual occurred next to a river channel. This had the effect of raising ground levels. Surrey County Council recommended enforcement action.

NRA Departments consulted:

Aquatic Biology, River Operations, Land Drainage, Pollution Control, Water Resources, Groundwater Protection

Proposed treatment:

The NRA has suggested mitigation and enhancement measures which include planting. An 8 m corridor is intended to be created along the length of the river.

Solution (Hydraulic)

N/A

Solution (Environmental)

N/A

Length of river treatment: 100 m

Environmental damage averted: Low locally (over small length of river)

Time input by Technical Planning staff: (Environmental) 5 hours maximum.
(Engineering)

Total Capital Value (of solutions, enhancements & mitigation): Low: £5,000

READING OFFICE

Title of application: Whitmoor Wood, Woking.

Location: Woking.

Nature of application: Filling of land for agricultural purposes.

Proposed by: Chambers Homefield Sandpit Ltd.

Negotiations

Objection was made to a planning application to fill a wetland in order to convert it to agricultural land. The reasons for the objections were; loss of habitat and concern about flood water levels.

The channel a affected is a non-main river.

NRA Departments consulted:

Water Resources, Amenity and Conservation, Fisheries, River Operations, Pollution Control, Land Drainage, Groundwater Protection.

Proposed treatment

See below.

Solution (Hydraulic)

The developers are constructing a flood storage pond as a minimum requirement from the NRA.

Solution (Environmental)

Minor enhancements are to be agreed.

Length of river treatment: 2 km of minor channel.

Environmental damage averted: High locally, significant systemic implications: Cat. B.

<u>Time input by Technical Planning staff:</u>	Environmental	1 day
	Engineering	<u>3 days</u>
		4 days

Total Capital Value (of solutions, enhancements & mitigation): £50,000

LONDON OFFICE

Title of application: Thamesmead Erith, Spine road extension.

Location: Marsh-dykes catchment.

Nature of application: Planning, (land drainage application to follow).

Proposed by: The London Borough of Bexley.

Negotiations

The proposed road crosses five main dikes. It is proposed to culvert 350 m of dike in order to accommodate the road. The N.R.A. is negotiating to control the road runoff and reduce the amount of culverting.

NRA Departments Consulted:

Land Drainage, Pollution Control, Groundwater Protection, Water Resources, Fisheries, Aquatic Biology, Amenity and Conservation.

Proposed treatment:

After much insistence from the Technical Planning Environmental Co-ordinator (London), it was agreed to install storage ponds incorporating positive water quality design.

In addition, the amount of culverting from road crossings was reduced and an open channel was maintained by negotiating a diversion in the dyke.

Solution:

To be finalised.

Length of river treatment: 350m of watercourse.

Environmental damage averted: High locally with significant systemic implications: Cat C.

Time input by Technical Planning staff: Environmental and Engineering 30 days

Total Capital Value (of solutions, enhancements and mitigation): Medium-High
£500 K

! high

LONDON OFFICE

Title of application: Docklands Light Railway extension.

Location: Greenwich and Lewisham.

Nature of application: Parliamentary Bill (ie. passed to Parliament and may override the Authority's powers).

Proposed by: London Transport.

Negotiations

The railway runs along the river Ravensbourne. This has an impact on the corridor. The river channel at this location is concrete lined; negotiations between the N.R.A. and London Transport are taking place to establish mitigation for loss of opportunity for future river restoration, as well as diversion of the river through a public park because of the line of the proposed railway.

NRA Departments consulted:

Legal, Recreation and Conservation, Fisheries, Landscape, Aquatic Biology, Groundwater Protection.

Proposed treatment:

Being negotiated.

Length of river affected: about 2km

Environmental damage averted: Very high over significant length, very significant systemic implications: Cat. A.

Time input by Technical Planning staff:

Environmental	5 days.
Engineering	<u>10 days.</u>
	15 days.

! low

Total Capital Value: Very High, potentially >£1 million.

WALTHAM CROSS OFFICE

Title of application: Barking Reach

Location: Tidal Thames.

Nature of application: Pre planning stage

Proposed by: Mott MacDonald

Negotiations

River corridor studies for Gores Brook and other watercourses affected by the development are being discussed.

NRA Departments consulted:

Property and Estates, Surface water Protection, Groundwater Protection, Pollution Control, Fisheries, Conservation.

Proposed treatment

No solution or treatment has been agreed yet, as the scheme is at the pre-environmental discussion stage.

Solution (Hydraulic)

N/A

Solution (Environmental)

N/A

Length of river treatment: 10 km of watercourse

Environmental damage averted: Medium High locally, some systemic implications: Cat.C.

Time input by Technical Planning staff:

Environmental	1 day
Engineering	<u>2 days</u>
	3 days

Total Capital Value (of solution, enhancements & mitigation): £50,000
Hydraulic studies. £20,000 Environmental studies.

WALTHAM CROSS OFFICE

Title of application: Royal Ordnance Site, Enfield

Location: Enfield, Middlesex.

Nature of application: Pre-planning stage.

Proposed by: Trafalgar House Business Parks.

Negotiations

Proposals to create water features on Quinton Hall Brook, NRA negotiated the installation of off-line features as opposed to on-line features.

Improvements in the river capacity were also established.

NRS Departments consulted:

Water Resources, Navigation, Fisheries.

Proposed treatment

The NRA accepted proposals, in principle, for off-line features of a more natural course of river.

Solution (Hydraulic)

N/A

Solution (Environmental)

N/A

Length of river treatment: 1 to 2 km.

Environmental damage averted: High locally, significant systemic implications: Cat. B.

Time input by Technical Planning staff: Environmental: 1 day
Engineering: 6 days
7 days

Total Capital Value (of solution, enhancements & mitigation): Medium:
> £250,000

Culverting Issues

Developers' arguments. and suggested answers

- (1) channels in urban areas are often regarded as rubbish tips. Regular clearance of this rubbish (to prevent flooding) is at the taxpayers expense (ref: Slough).
 - A. enhancement/creation of channel reduces mistreatment and encourages interest in maintaining community asset.
- (2) safety issue where the river is apparently at risk of undercutting the embankment of a dam (ref: London Borough of Croydon).
 - A. safety aspects can be resolved without recourse to culverting-and more cheaply.
- (3) safety issue: open channels are dangerous for children.
 - A. natural channels with variably-sloping banks are not dangerous, and are recreational assets.
- (4) money available to spend on capital projects (such as culverting). No money for maintenance of an open channel.
 - A. spend capital on enhancement/provision of community asset, take advice on minimising maintenance.
- (5) open channels encourage rats. Can be a hazard where development includes food outlets (ref: River Cole).
 - A. rats also inhabit sewers.
- (6) aesthetic issues. A culvert replaces an unsightly ditch.
 - A. see 4 - why is it unsightly?
- (7) odours in open watercourses.
 - A. see 4 - odours are not inescapable, but can be minimised by good design.
- (8) open watercourses more likely to flood (ref: East Herts)
 - A. if upstream development increases flood risk, is a culvert the best starting point for improvement?
- (9) need to maximise area of development (eg. for car parking).
 - A. in urban area, both human and wildlife communities need a good environment - river corridors represent a small, precious fraction of the total land available for car parking in the catchment.

Problems associated with culverting

- (1) Geomorphology. Loss of pool-riffle sequence and natural substrate. Increased velocities may cause downstream erosion.
- (2) Wildlife. Loss of marginal and aquatic vegetation. Loss of natural substrate and diversity.
- (3) Fisheries. Potential loss of natural habitat, unknown effects on natural migrations of fish. Precise impact depends on type/length of culvert.
- (4) Hydraulics. Potential upstream and downstream flooding. Loss of floodplain storage.
- (5) Maintenance. Potential for blockage. Difficult/danger in clearing blockage under storm conditions.

- (6) Water Quality. Loss of beneficial action from aquatic vegetation; unable to trace a polluting source.
- (7) Loss of recreation/amenity facility/potential.
- (8) Loss of landscape.
- (9) Health and Safety. Problems for children and with maintenance. Gases/petroleum vapour. Rescue access difficult.

Circumstances where culverts might be acceptable

Road crossings with suitable replacement of substrate. However clear, single-span structure with natural inverts may be more appropriate.

Mitigation/enhancement criteria

If culverting is necessary then minimise length. Minimise slope increase along culverted section and choose satisfactory alignment with channel upstream and downstream. Preserve natural bed. Maximise cross-section of culvert and use box in preference to pipe. Preserve floodplain flow routes and characteristics.

Size culvert to permit future regrading of channel if necessary and allow replacement of natural bed material.

Minimise tree removal. Reinstate land above and alongside culvert with appropriate native trees and shrub planting and wildflower seed mixes.

If culverting is absolutely necessary then there should be extensive provision of access openings for entry/exit/ ventilation and for monitoring sewer outfalls.

Any culverting should be regarded as causing adverse environmental impact which should be fully mitigated and offset by suitable environmental enhancements.

Guide to circulation.

Applications for culverting should be circulated to:

Fisheries,
Conservation,
Environmental Coordinator
River Operations (for main river),
Land Drainage,
Biology.

Andrew Brookes 12/1/91
Revised 24/5/91

Development Control Guidance Note 2 (Second draft)

Golf Courses

Developers arguments, and suggested answers

- (1) The need for recreation facilities and benefits to the community etc.
A. A 'natural' river corridor adds interest and habitat diversity without inhibiting facilities.
- (2) Promises to preserve some areas of wildlife value.
A. What wildlife need is conservation of the vital continuum provided by a river corridor, linking areas planned for 'preservation'.
- (3) The turning of farm land and industrial land into golf courses may well improve the environmental value of the land.
A. Our advice can optimise this welcome improvement.
- (4) Creation of areas of rough - sowing of wild seeds etc to replace the natural habitat that has been removed.
A. The river corridor is a specialist's area - rough-sowing may be entirely unsuitable.

Problems Associated with Golf Courses

- (1) Damage to river banks resulting from heavy machinery working too close (see photographs in archive). This leads to instability, slumping and erosion.
- (2) Destruction of marginal and bankside vegetation associated with (1) above. Trees and shrubs are often cut down and removed to facilitate clear sighting of tees etc. This leads to further bank instability and a decrease in shade and cover affecting fisheries and wildlife interests in the channel (eg. increased temperature, decrease dissolved oxygen).
- (3) Increased surface water run-off due to removal of trees, improved drainage under greens, irrigation etc. This could affect the hydrograph and as well as causing localised erosion could lead to flooding problems downstream. (This depends on the location of the golf course in the Catchment e.g. headwaters or in floodplain downstream). Re-landscaping can affect the catchment boundaries which may also increase run-off etc.
- (4) Loss of floodplain storage and flood flow routes due to landscaping etc. This can cause upstream and downstream flooding.
- (5) Culverting of minor ditches and streams. See guidance note (1) for implications.
- (6) Construction causes temporary problems such as siltation, local ponding and flooding. Dewatering may have pollution control implications.
- (7) Water features such as on-stream lakes lead to widening and excavation of the river bed. These have adverse consequences such as habitat destruction, the deterioration of water quality during construction, due to suspended solids, or after the works due to algal blooms.

- (8) If structures are installed the free movement of fish is likely to be obstructed. Siltation occurs upstream of the structure and erosion downstream.
- (9) Abstraction from water bodies could have water resource implications.
- (10) Golf courses are often made 'sterile' land. The soil is altered when sand is added. Moles and worms etc are destroyed. Fertilisers are added which lead to eutrophication problems. Various herbicides/insecticides are employed leading to further water quality problems. Blue dye is often used in lakes - this could have water quality implications.

Mitigation/Enhancement Criteria

- (1) An 8 - 10 metre strip should be left adjacent to any watercourse as a natural undisturbed corridor, where herbicides etc are not used. Larger areas may require designation if the natural land drainage situation requires it.
- (2) Where the floodplain is affected, flood compensation measures should be incorporated.
- (3) Balancing ponds could be used where necessary to delay surface water discharge.
- (4) All water features should be off-line.
- (5) The use of fertilisers and herbicides in water bodies on golf courses should be discouraged. The use of herbicides in watercourses should be prohibited.

Note

It is important that guidelines are given to the developer at an early planning stage to enable successful enhancement/mitigation measures to be incorporated.

Reference: KP/DR
Revised: 25/5/91 AB

Development Control Guidance Note 4 (Draft)

BANK PROTECTION WORKS

Developers' arguments, and suggested answers

- (1) Perceived erosion problem.
 - A. Explain why this is a perceived problem only.
- (2) Safety issue - where a river is apparently at risk of undercutting a building/structure.
 - A. Ditto
- (3) Development pressure - bank protection may permit a greater area of land to be developed.
 - A. River corridor is a small but very special/valuable fraction of total land mass, and should be protected as such.

Problems with bank protection

1. Geomorphology
 - loss of natural bank profiles.
 - impact on bed of channel where bank protection works require footings/protective apron into the channel.
2. Wildlife
 - loss of marginal habitat and bankside trees and shrubs.
 - long stretches of bank protection works mean a considerable disruption to the river corridor.
 - artificial vertical banks curtail free access of wildlife from the bank to the water.
3. Fisheries
 - loss of hiding places in and under the bank for fish and other organisms.
 - loss of marginal and bankside vegetation leading to impoverishment of the habitat eg loss of shade from tree cover.
4. Hydraulics
 - possible loss of channel capacity.
5. Water Quality
 - loss of marginal reed beds may have detrimental effect on water quality.
6. Landscape
 - unsympathetic bank protection works may be visually intrusive.
7. Health and Safety
 - long sections of vertical banks resulting from hard bank protection works create safety problems.

Circumstances where bank protection might be acceptable

1. Where a building or other structure is threatened by erosion.

Mitigation/enhancement criteria

1. Minimise length of bank protection.
2. Retain existing tree and shrub growth.
3. Use natural (willow spiling, willow stakes, hurdles, faggoting, wattle etc) or environmental acceptable artificial materials (eg. nicospan, enkamat and other geotextiles).
4. Retain marginal shelves and create new low-level shelves behind the protection material.
5. Protect river cliffs only at base and retain original profile.
6. If sheet piling is unavoidable (where structures threatened), set as far back as possible, regrade the bank in front of the piles and plant up.
7. Reinstate any land disturbed by protection works and enhance with appropriate planting of native trees and shrubs.

Guide to Circulation

Bank protection applications should be circulated to:

Fisheries
Conservation
Environmental Coordinator
River Operations
Navigation (for the R. Thames)
Recreation & Amenity
Land Drainage

Note

A national NRA Research and Development Project has recently been completed investigating methods of bank protection on navigable rivers.

Revised: draft 24/5/91 AB

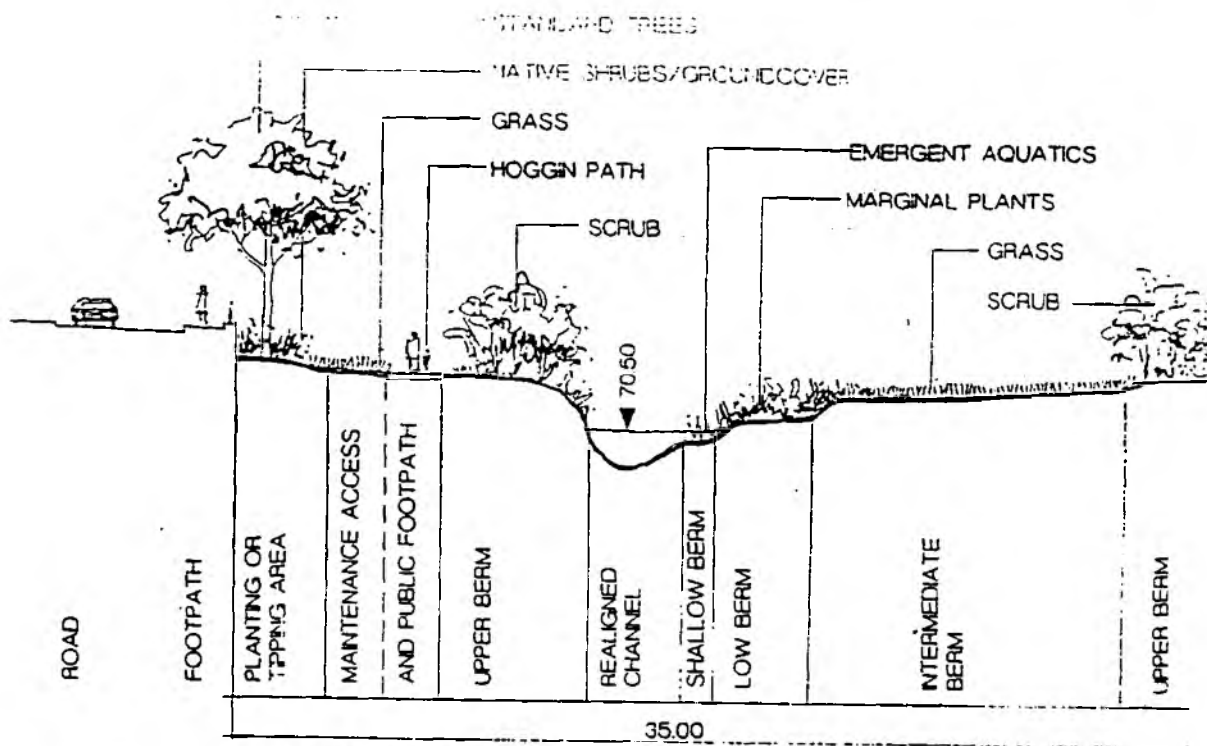
Guide to Circulation

Golf course remote from watercourses should be circulated to:-

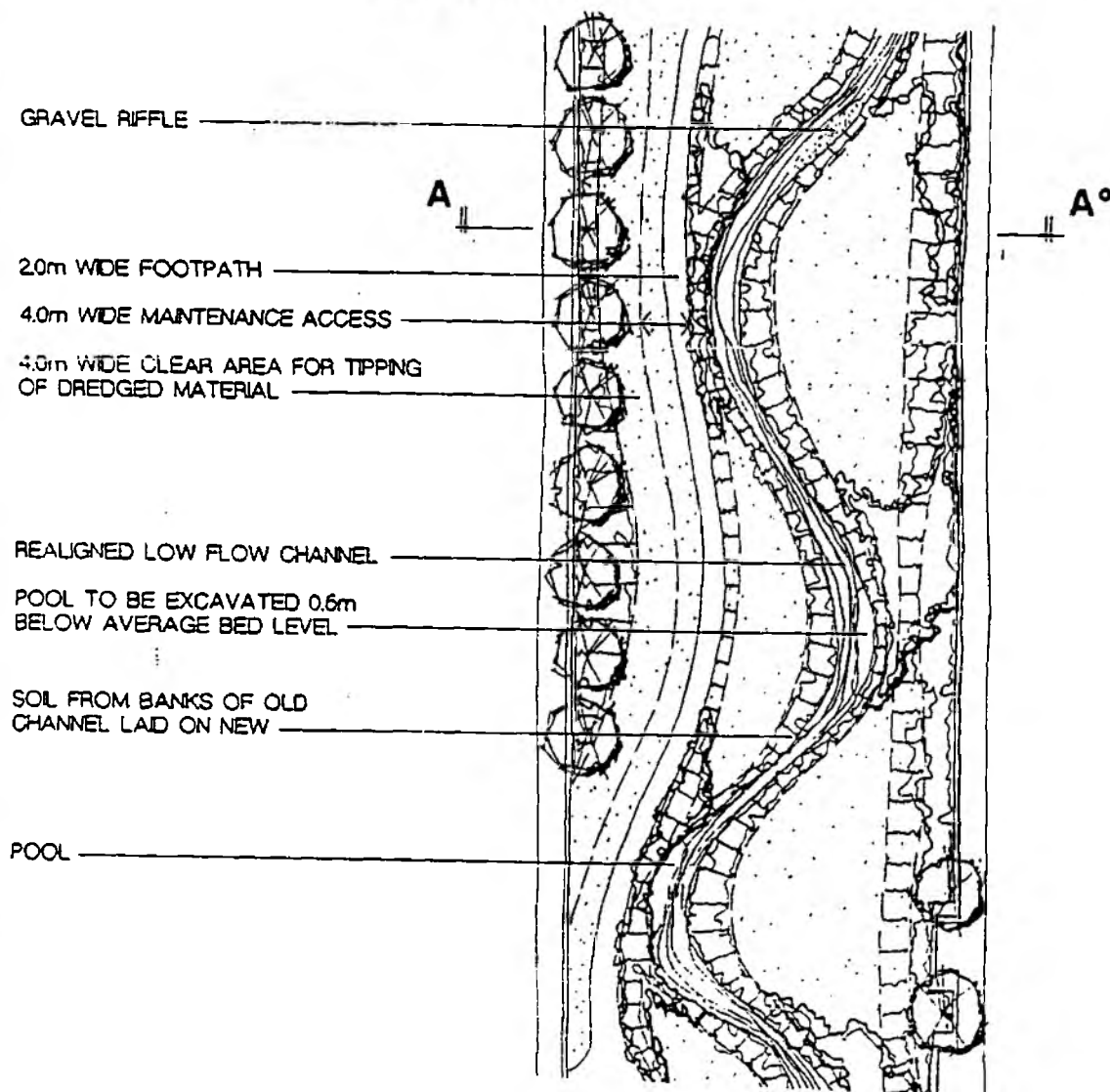
- Land Drainage
- Pollution Control
- Water Resources
- Geochemist

Golf courses adjacent to main or non-main rivers should be circulated to the above and the following:-

- Fisheries
- Conservation
- Biologist
- Environmental Coordinator
- River Operations (main river only)



SECTION A-A°



"Example of design of river environment from the Thames Region - (within a Corridor)"

**NEXT TIME THERE IS A
RESIDENTIAL DEVELOPMENT
ADJACENT TO A CREEK
LET'S PUT—
STREETS & OPEN SPACE
NOT—BACKYARDS
NEXT TO THE WATERWAY.**

THIS WILL:

- **Provide more homeowner privacy and security**
- **Generally equal or better the development's lot yield**
- **Provide more usable open space**
- **Often make homes more valuable**
- **Enhance creekside and neighborhood environments.**

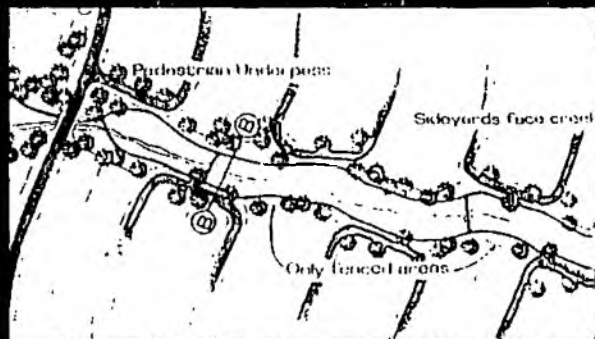
Try this . . .

Parallel Streets



Or this . . .

Loop Streets



Or this . . .

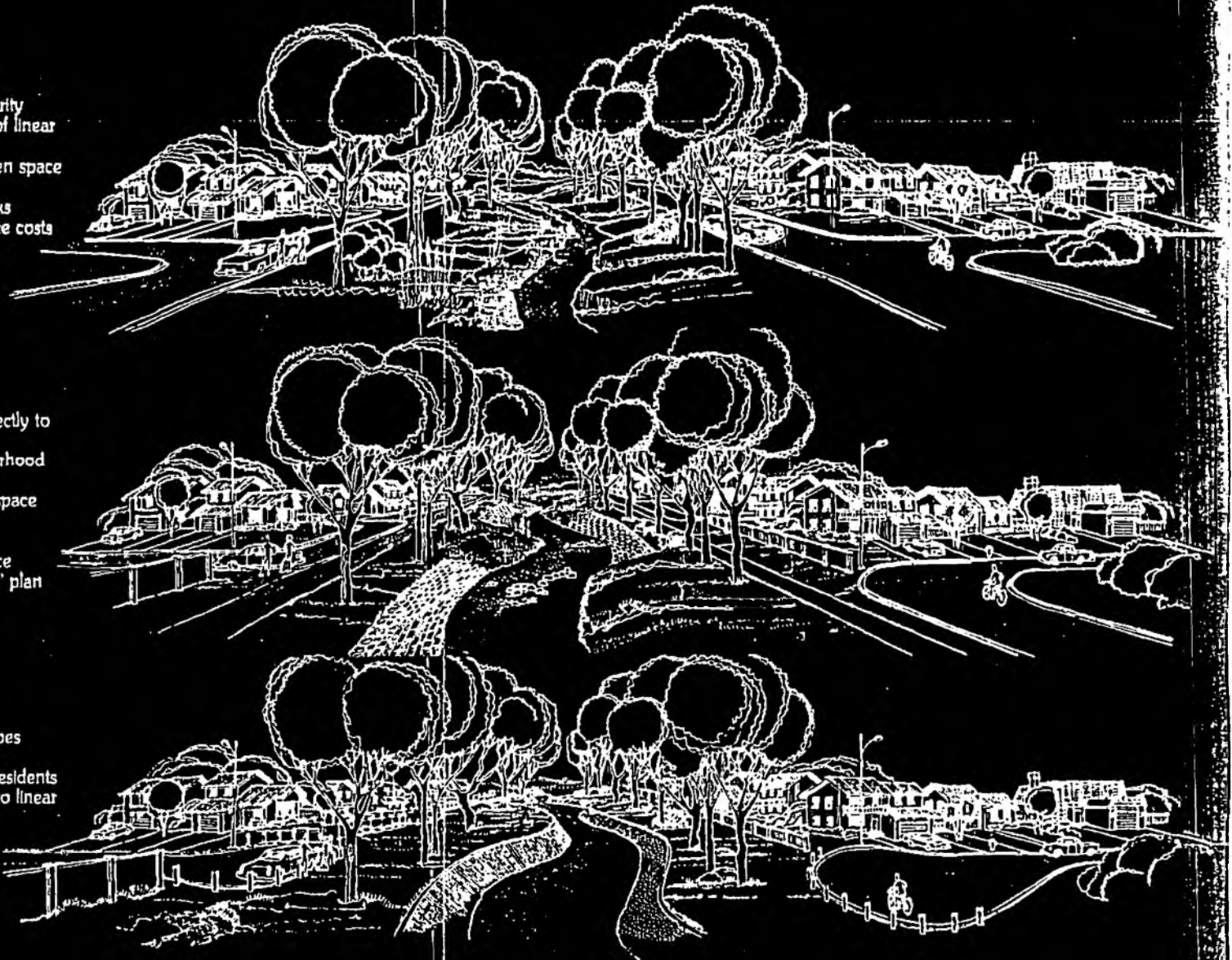
Cul-de-sac Streets



Maximum homeowner privacy and security
 Passing motorists can enjoy the beauty of linear
 open space
 Motorists have more access to linear open space
 when it is a public park
 No backyards or sidewalks fronting creeks
 May reduce flood protection maintenance costs

Minimize number of homes exposed directly to
 creeks
 Liberal access to open space by neighborhood
 residents and motorists
 Staggered loops give more visual open space
 than cul-de-sacs
 Pedestrian oriented
 Minimum fencing along linear open space
 compared to old "backyard facing creek" plan
 Maximum lot yield with curving loops

Homeowners prefer over other street types
 Pedestrian oriented
 Maximum use of linear open space by residents
 Allows good physical and visual access to linear
 open space



"Example of river Corridor concepts taken from the Santa Clara Valley Water District, California, USA (published 1979/85)"