Greenwich Peninsula
Land Management Plan
on behalf of English Partnerships

Section A
Peninsula-Wide

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Land Management Plan
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Section A
Peninsula-Wide

April 2001

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EXECUTIVE SUMMARY

This document is the first 20-year Management Plan for the recently created Green Space on the redeveloped Greenwich Peninsula in London. Section A of the Management Plan covers the whole peninsula. Section B covers component management sub-areas of Green Space on the peninsula. The component areas are shown on Figure 1.3.

The areas of Greenwich Peninsula covered by this plan, as of January 2000, are in the ownership of English Partnerships. It is the intention expressed in the draft 'Exit Strategy' (see Bibliography Section 1.0) for the peninsula that all Green Space recently created / enhanced be managed together. This is to ensure that standards of management are consistent, high and in keeping with the carefully developed design intentions for landscape, ecology, transport, and other aspects of human amenity.

The Peninsula Management Plan explains the proposed management structure for the peninsula's open space, identifies sources of funding, registers the interest and intentions of groups and individuals interested in green space management in the area, and provides objectives, and outline prescriptions for management activities, including monitoring.

It is the policy of the land-owners that the Green Space be managed so as to:

- achieve and maintain a high standard of repair, functionality, safety and aesthetic appeal;
- maximise the ecological value and cohesion of all the Green Space, subject to other important constraints;
- ensure that no significant avian hazards to air traffic develop;
- maximise efficient use of non-renewable resources required for land management purposes and encourage recycling; and
- maintain in perpetuity the overall design aesthetic and intention as developed over the long and detailed redevelopment period.

The general landscape character of the local area is of a river floodplain that has been heavily influenced by built development. The predominant topographic influence is the River Thames, which forms a tight meander around the Greenwich Peninsula.

PART 1 – DESCRIPTION

1.1 GENERAL INFORMATION

Table 1.1 - Plan Details

Client	ENGLISH PARTNERSHIPS						
Site	GREENWICH PENINSULA ESTATE GREEN LAND						
Location	LONDON BOROUGH OF GREENWICH						
Prepared By	Alison Braham/Gavin Fancote - WS Atkins Consultants Dr Mike Wells / Nicholas Pearson Associates						
Draft	1	2					
Date	12/05/00	18/04/01					
Address of Management Company	*Address to be added when known*						
Approved by Freeholder	*Chairman's Name and Date here*						
Date of next reviews	June 2001	September 2001	December 2001	March 2002	March 2003		
Undertaken by	-						

Location

The Greenwich Peninsula Estate Green Land is located on the Greenwich peninsula in the London Borough of Greenwich (East London). The peninsula is located within 1 kilometre of historic Greenwich. The peninsula is crossed by the Greenwich meridian. The following table gives six-figure grid references for the geographical centre of each component management sub-area or part of sub-area included within the peninsula-wide Management Plan for the site, see Table 1.2 and Figure 1.1 and Figure 1.2.

Table 1.2 - Location of Main Green Space Features on the Site

Component	Grid Reference
Millennium Village Marsh (incorporating the Greenwich Peninsula Ecology Park)	TQ399793
Inter-tidal Terraces – Blackwall Point Ecology Sculpture	TQ390803
Inter-tidal Terraces – Eastern River Wall	TQ398796
Millennium Village Green	TQ398791
Central Park	TQ394795
Riverside Walkway	TQ396797
Meridian Gardens	TQ389801
Fearon Street Pocket Park	TQ402785
Bugsby's Way Pocket Park	TQ402788
A102 (M) Road Bund	TQ397787

Figure 1.1 - Site Location in London Context

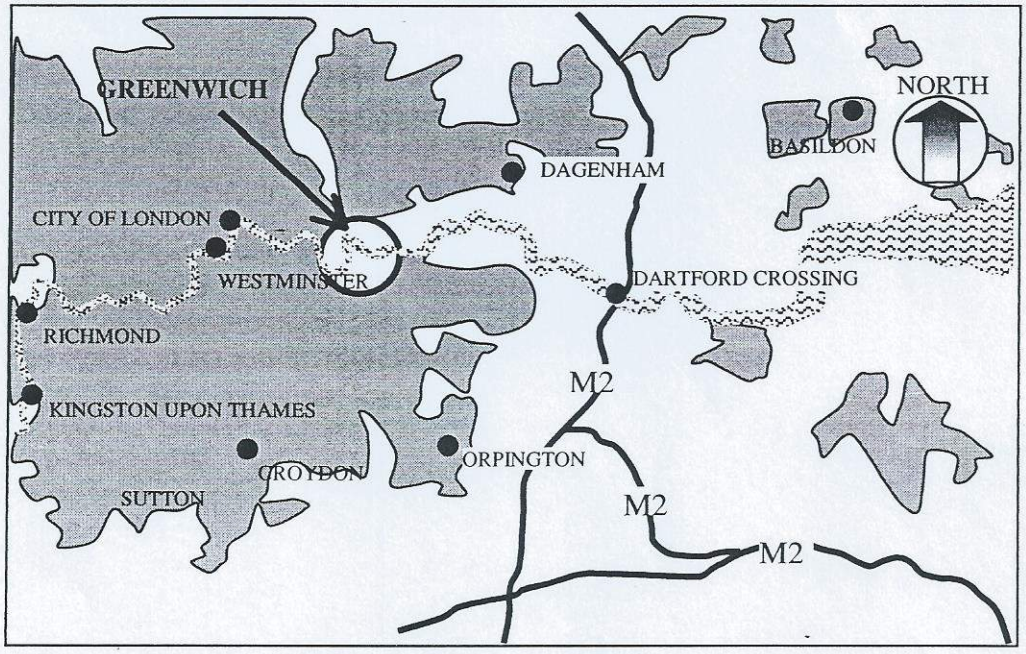
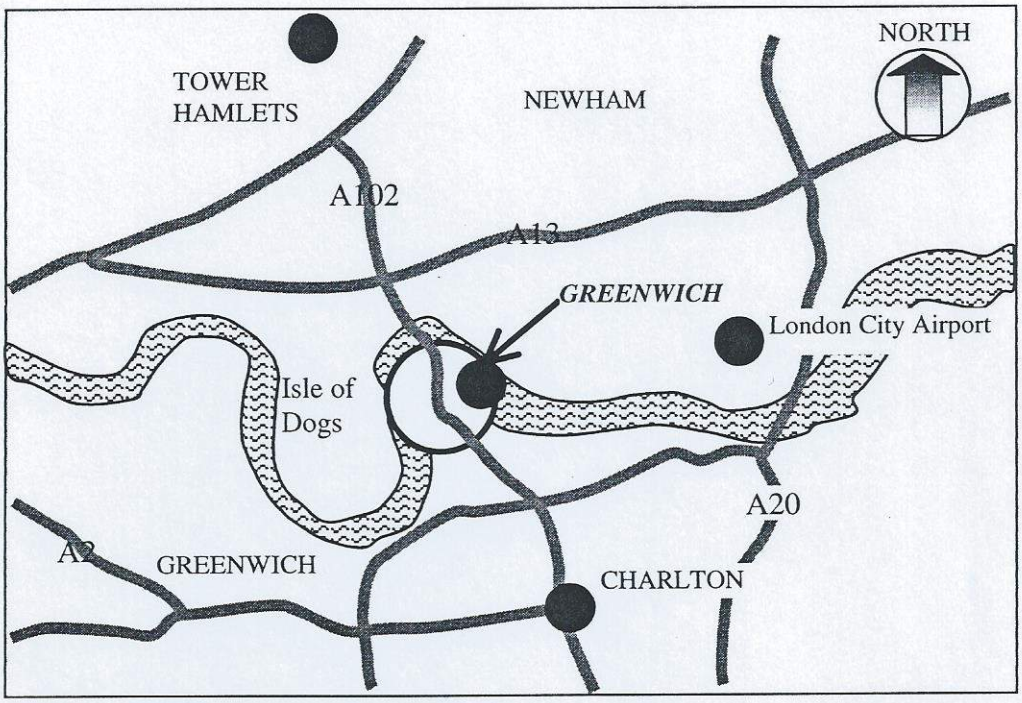


Figure 1.2 - Site Location in Local Context



Land Tenure

This is not a legal document. Please refer to the original tenure documents before taking any decision or any actions which may have legal implications.

Owner and Type of Holding

The land management areas covered by this plan at the time of first draft are owned freehold as of January 2000 by English Partnerships. The intention is for a gradual hand-over of the freehold of all management areas to a charitable trust, referred to at the time of writing of this plan (January 2000) as the Greenwich Peninsula Trust (GPT). The trust will also be a company limited by guarantee. Details of the proposed structure of the GPT and of the transfer procedures may be obtained from English Partnerships (1999; see Bibliography Section 1.0).

English Partnerships Address:

Greenwich Peninsula Development Office:
110 Buckingham Palace Road,
London, SW1W 5SB
Tel: 0171 730 9399
Key contact: Duncan Innes

Greenwich Peninsula Site Office: *current at time of writing management plan*
203 Blackwall Lane,
East Greenwich,
London
SE10 0A
Tel: 0181 2935115
Fax: 0181 2935099
Key Contact: Kay Murch

Greenwich Peninsula Trust Address:

Address to be added when trust created and known

Date of Acquisition
Refer to Appendix 1 for details.

Length of Lease Agreements
The lease agreements for the different component management areas run for 999 years from date of transfer.

Total Area
The total area of the Greenwich Peninsula Estate Green Land, as of the first main hand-over of lands to the GPT, is 119.6 hectares. There is scope for increase in the size of this area as other areas of landscape redevelopment on the peninsula reach reasonable completion.

Legal Rights of Access & Bylaws
At the time of writing, details are unknown. Reference should be made to the Section 38 and 278 Planning Adoption Agreements with London Borough Greenwich Council. The status of the open space is also unknown at present.

Reservations
Refer to Appendix 2 for conditions of lease(s).

Common Rights

To be checked and confirmed

Management Infrastructure

During the period when the freeholds of any Component Management Areas within the Greenwich Peninsula Estate Green Land are held by English Partnerships, management and maintenance of those component areas is undertaken by an Estate/ Facilities Management Consultancy appointed by English Partnerships.

As such areas become 'substantially complete' in terms of infrastructure and landscape creation, the head-leaseholds of these Component areas are transferred to a trading company, TradCo owned wholly by the Greenwich Peninsula Trust. TradCo is an Ordinary Limited company that is responsible for the day to day management of the Estate. Immediately after the leasehold transfers, the freeholds pass to Greenwich Peninsula Trust.

The structure of TradCo is described in the *Greenwich Peninsula Exit Strategy* (see Bibliography Section 1.0).

TradCo is specifically responsible for:

- maintenance of all green land according to prescriptions set out in the peninsula-wide and component area management plans, including all necessary monitoring, record-keeping, publicity, and the raising of additional funds from appropriate sources (e.g. via guided tours, park appeals, visitor events etc.);
- maintenance of the river wall;
- infrastructure and Public Liability Insurance;
- encouraging the participation and co-ordination of the activities of the voluntary sector;
- security; and
- accounting and service charge collection.

TradCo will also recommend service charge levels, and any alterations to the estate management strategy as set out in the Management Plans. Written approval of the full GMT board before implementing such changes is required.

TradCo contracts the hands-on management activities to an Estate/ Facilities Management Consultancy. At present this consultancy is:

Name, address and contact details to be added when known

A suggested Management Policy and incomplete provisional list of specialist consultants and interest groups able to advise the Peninsula Trading Company are provided in Appendix 3.

It is recommended that a change of tenure should prompt a review of the management plan and an agreement by the new tenant to adopt the plan.

Map Coverage

There is no accurate OS coverage of the redeveloped peninsula at the time of writing.

Document and Photographic Library

The document and photographic library is held at:

Address To Be Provided

Further copies of the same documents are available in the following locations:

- East Greenwich Public Library and
- Woodland Local History Centre (East Greenwich Council), Mycenae Road, London, SE3.

Copies of selected key documents (including this plan) are available in the control point office of the Ecology Park.

All of these documents may be viewed by the general public, though only for reference at the site where held.

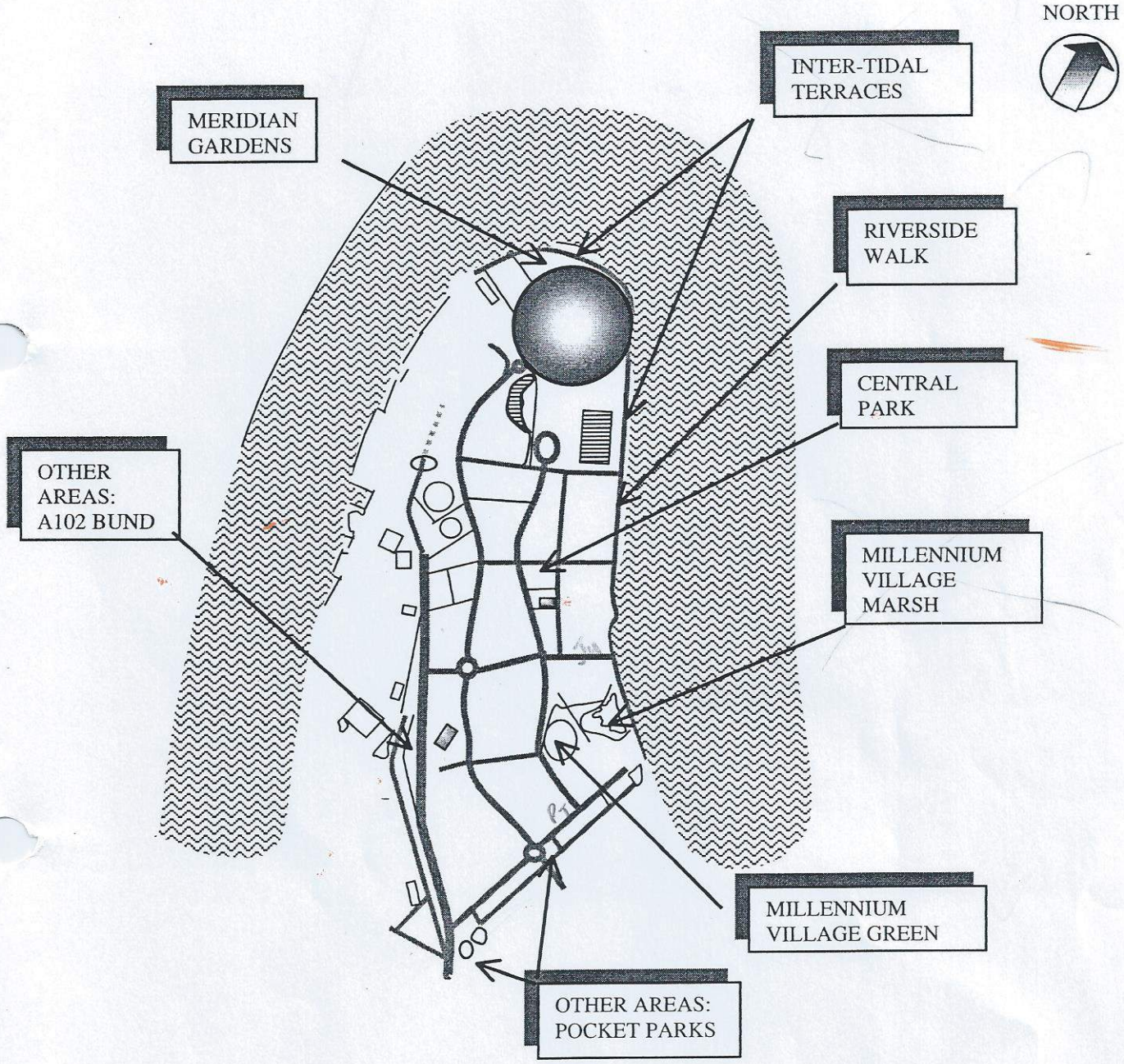
A list of all documents to be held in the library is detailed in the Bibliography and various Appendices to this Management Plan.

Areas Covered by Component Management Plans

The overall co-ordination of the management of the Peninsula is addressed in this document, but it can not cover the provision of management prescriptions for such widely different types of landscape and features to be found on the Peninsula. These features can be covered in the following Part B Component Area Land Management Plans:

1. Greenwich Millennium Village Marsh;
2. Inter-tidal Terraces;
3. Central Park and Millennium Village Green;
4. Meridian Gardens, Ordnance Wharf and Riverside Walk; and
5. Other Areas.

Figure 1.3 - Location of Component Land Management Plans



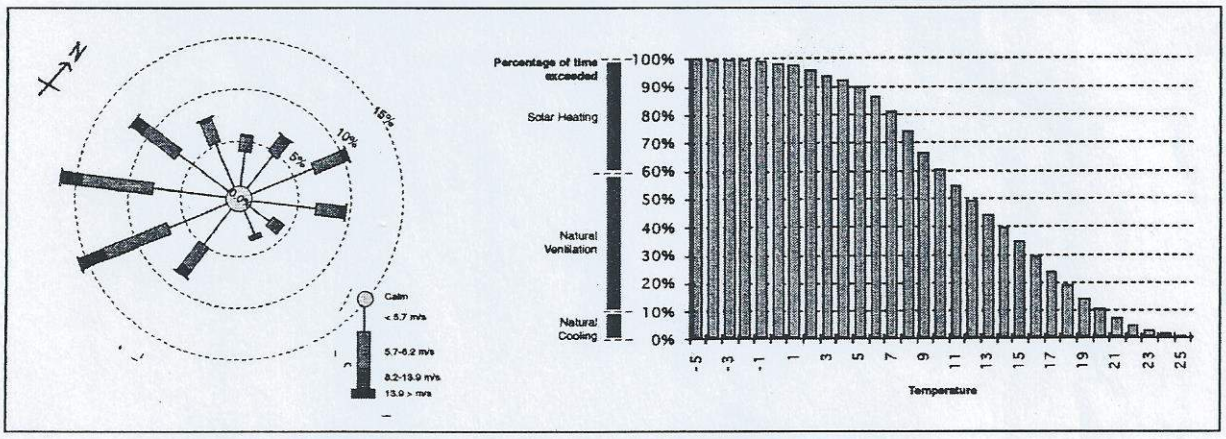
1.2 ENVIRONMENTAL INFORMATION

Physical

Climate

A full climatic summary for the area is available in Rogers *et al.* 1998 Landscape Design Report. Excerpts are reproduced below. Prevailing winds are from the southwest and seasonal cold winds (in spring) are from the northeast. There are also occasional storm winds from the northwest. Temperature on the peninsula typically falls below 0°C for around 7% of the year at present. The developing built form and trends in global warming may reduce this percentage. Rainfall varies typically from 35 mm in March to 65 mm in November (February to June are the driest months). Summers are likely to become drier in the area with global warming over the next 50 years (perhaps as much as 70% drier by 2050).

Figure 1.4 - Wind Distribution & Temperature during a Typical Year



Geology, Geomorphology and Hydrology

Before the remedial works, which were carried out between 1996 and 1999 by British Gas (now BG plc) and English Partnerships, parts of the site were heavily contaminated due to its former use as a gas works. The contamination principally occurred within the made ground, described below in the section on Historical Nature of Contamination. The site currently contains residual contamination principally within the made ground, at levels acceptable to the Environment Agency (EA) and Environmental Health Authority (EHA) contained below a series of barrier systems. These were designed to isolate the contamination from final site users, described below in the section on Remedial Measures. This section therefore describes the underlying geology, with the overlying made ground described in later sections.

Greenwich lies within the Greater Thames Estuary Natural Area boundary, whose underlying geology mainly comprises clays and sands.

Alluvial Clay and Peat

The made ground overlies the alluvial clay and peat, which ranges in depth from between 0.5 and 5m. The alluvial clay comprises a soft to firm, greenish grey and black, silty organic clay. The peat is generally a firm, very friable, dark brown or black fibrous, occasionally amorphous, peat, which is a discontinuous stratum across the site.

Alluvial Terrace Gravels

The clay and peat sequence is underlain by a 2 to 8m thickness of Terrace Gravels, which is classified as a minor aquifer. The gravels consist of fine to coarse, brown sands and fine to coarse, rounded, black and angular to sub-rounded brown flint gravels.

London Clay and Woolwich and Reading Beds

The London Clay and Woolwich and Reading Beds underlie the gravels over much of the site. The sequences are considered to form an aquitard. The thickness of the London Clay is between 2m and 20m and the Woolwich and Reading Beds is between 1m and 20m. However, these beds were not encountered in the southern corner of the site. Where the London Clay is present, it comprises a brown stiff to very stiff closely fissured silty clay. The Woolwich and Reading Beds comprise black-speckled dark green-grey fine sand with many white shelly fragments.

Thanet Sands

The Thanet Sands underlie the Woolwich and Reading Beds over the majority of the site and the alluvial deposits in the southern corner of the site, north of the chalk outcrop. The sands comprise a 1m to 20m thick, grey-green very dense silty fine to medium sand becoming more silty with depth, containing occasional coarse sub-angular to sub-rounded gravel.

Upper Chalk

The Upper Chalk is present below the entire site and outcrops beneath the alluvial deposits in the extreme southern corner of the site. The thickness is believed to be up to 60m, with areas of putty chalk at the surface. The chalk is stiff to weak angular chalk with fissuring, close fracturing and jointing.

Hydrogeology and Hydrology

Shallow groundwater was encountered across the site at a depth of between 0.5m and 4.0m below ground level. The groundwater was generally found to be perched within the made ground, immediately above the alluvial clays.

Across the peninsula, the alluvial clay generally separates the perched shallow groundwater from the groundwater present within Terrace Gravels, which is considered to be a minor aquifer. However, the two groundwater systems are likely to be linked in areas where either the clay is not present, or where it has been thinned, or punctured by disturbances and structures such as disposal pits, tank excavations and piled foundations.

The groundwater within the Thanet Sands and Upper Chalk, the main aquifer, is protected from the upper contaminated groundwater by the presence of the London Clay and Woolwich and Reading Beds for the majority of the site. The groundwater within the gravels will be in hydraulic continuity with the Thanet Sands and Upper Chalk in the southern corner of the site.

The River Thames dominates the upper hydrology, which is adjacent to the north and eastern boundaries of the site. The river is in hydraulic continuity with the groundwater within both the made ground and gravels.

Historical Nature of Contamination

Before the British Gas and English Partnership remediation, of 1996 to 1999, the made ground across the majority of the site was contaminated by the historic gas works activities. The depths of made ground ranged between 0m and 5m, with greater depths of made ground generally in the northern half of the site and the areas adjacent to the river wall. The made ground typically comprised gasworks wastes including coal, coke, ash, clinker, foul lime and, to a lesser extent, spent oxide.

The principal areas of gasworks contamination were associated with the northern part of the site, which previously housed a main tarworks and the central part which housed a chemical works. The south-eastern corner of site historically contained a landfill, comprising sandy clayey soil containing bricks and concrete with very occasional plastic, bottles, fabric and pottery. The average thickness of the waste in this area was 5m, with a maximum recorded thickness of 8m.

The nature of the contamination varied over the site according to the previous operations present on the site. The gasworks related contamination principally consisted of:

- Coal tars, polyaromatic hydrocarbons, phenols, benzene and other volatile organic compounds;
- Cyanides and heavy metals; and
- Sulphur compounds and ammonia.

Deeper contamination was present in the areas around major tanks and, in places, where foundations penetrated the underlying clay.

The area to the west of the site, currently occupied by the hotel development, contained marginal hydrocarbon contamination associated with former fuel depots and car breaking activities.

Historically the groundwater contamination across site was mainly confined to the shallow groundwater, within the made ground, which across the site varied in contamination status from relatively clean to moderately contaminated. In some areas, contamination of the underlying Terrace Gravel aquifer had occurred. However there was no evidence of significant contamination within the major aquifer, the Thanet Sands/ Upper Chalk.

Remediation

The extent of the remediation works were determined using the BATNEEC concept (Best Available Technique Not Entailing Excessive Costs) and the Government's policy of rendering sites 'suitable for use'. The overall remediation strategy was therefore designed in the context of two requirements, for statutory purposes and for development purposes. The summary of this approach is as follows:

- **Statutory Remediation,** the scope of works interpreted as being appropriate to minimise statutory liabilities arising from ground contamination assuming a vacant and secure site; and

- **Development Remediation,** any remaining scope of works necessary to make the site suitable for its future use.

The statutory remediation involved removal or treatment of the principal contamination sources, which were considered to represent a risk of pollution, particularly to controlled waters. The work involved the removal of tanks, the main tar well, the effluent pond, excavation of selective material for off site disposal or reuse after treatment, in situ remediation of volatile organic hydrocarbons and on site treatment of contaminated groundwater.

The development remediation involved a flexible approach depending on the nature and extent of the contamination remaining after the statutory remediation works, in order to make the areas suitable for end purpose. This included removing contaminated areas of made ground, to levels acceptable to the EA and EHA, and isolating residual contamination by the construction of barrier systems. The barrier systems were constructed using suitable quality materials derived either from site, or from Julibee Line Extension arisings and other imported materials. Along the river wall a low permeability, bentonite slurry wall was installed, tied into the underlying clay to minimise migration of residual contaminants in perched groundwater into the Thames. Bentonite slurry walls were also placed along pipeline routes that penetrated through the made ground into the alluvium, to prevent corrosion damage caused by contaminated groundwater to the pipes and the creation of preferential flow pathways for contaminated groundwater.

Across the majority of the site the underlying residual contamination was contained by the construction of a capping system. In park areas this comprised of a visual marker layer, 200mm of capillary break, to prevent the migration of contamination, a geotextile (brightly coloured plastic mesh), and 900mm of good quality clay, compacted to a permeability of 1×10^{-9} m/s. Under the southern park area, where contamination levels were low, the thickness of clay was reduced to 500mm. The southern lake capping system comprised a minimum of 300mm of clay over which was laid an impermeable geomembrane to prevent downward migration of water from the lake. The capping under residential areas consisted of a marker layer over lain by 900mm of compacted good quality clay. Service trenches were constructed along utility corridors, consisting of marker layer, 200mm of capillary, separator geotextile, and up to 1.3m of cohesive fill. The areas under roads and car parks were capped by hard standing, either road construction of 200mm or cement bound material overlaid by fiberdeck.

The ground under the area of the exhibition site and the dome was subject to extensive statutory remediation works. The end use of the majority of the area required it to be covered with hard standing. Based on the above, the capping system comprised a marker layer placed on the existing ground, overlain with approximately 500mm depth of clean hardcore. This provided a clean working surface for the construction of the dome and associated structures. In landscaped areas around the dome the capping system comprised a 200mm granular capillary break overlain by a geotextile separator and a 500mm to 900mm layer of well compacted clay, with a permeability of 1×10^{-9} m/s.

Additionally a low permeability gas membrane was installed under the whole of the Dome.

Soils

The growth media on the peninsula were all either imported ready-made, or fabricated on site from imported constituents. In areas where high diversity in herbaceous vegetation was intended, relatively low-nutrient substrates were put in place. Similarly much of the substrates of the lake beds within the Village Marsh was of low nutrient status at installation. Imported topsoils and turf were, however, also used extensively to promote strong growth of trees and shrubs and provide a hard wearing sward where required in the shortest possible timescale.

A special prescription for growth substrate was developed for the experimental inter-tidal terraces. Further details of substrates put in place for specific landscape elements and habitats are provided in the Component Area Management Plans.

Topography

The predominant topographic influence is the River Thames which forms a tight meander around the Greenwich Peninsula to the north and west. Ground levels in the peninsula vary little and are generally in the region of 5m above ordnance datum (AOD). To the south and south east of the site, ground levels rise to a broad area of higher ground running east west at approximately 40-50m AOD.

Human/Cultural

Archaeology and Past Land Use

See Bibliography: Section 1.0; Section 2.0 (Nicholas Pearson Associates 1998; Battle McCarthy 1998) and Section 4.0 (Ede / Battle McCarthy 1996).

The Greenwich Peninsula is a low lying area within the flood plain of the River Thames. The superficial geology of the peninsula contains peat layers which are thought to be of prehistoric date and may contain well preserved palaeoenvironmental information. They may also contain waterlogged prehistoric archaeological remains or seal buried land surfaces.

Table 1.3 - Historical Development

1695	Agricultural fields and marshes with simple farm track / access roads.
1834	Agricultural fields, with large Mill Pond where Village Marsh is now. Fields referred to as Greenwich Marshes.
1885	Tip of peninsula referred to as Bugsby's Marshes. Blackwall Ordnance Works now built close to tip. Other works and boat yards to the south west. More road development.
1894	Major development. Nearly all riverside of peninsula utilised by South Metropolitan Gas Works and Chemical Works along the eastern half; and gas holders, major shipbuilding yard and other work yards along the western half. Highest astronomical tides extend 100m inward from the tip where the meridian gardens are now. Centre of peninsula still undeveloped. Dolphin jetty half built and ordnance jetty present.
1919-1935	Similar picture but Dolphin Jetty doubled in size and inland flooding no longer permitted at Blackwall Point. Football ground shown in the heart of the peninsula.
1952-1968	Major expansion of south-east gas boards, now the largest in Europe. No green space left on the peninsula.
1970s-1985	Progressive dereliction of gas works, with advent of north-sea gas.
1985-1995	Site clearance (leaving gas holders).

There is little evidence for Roman or Saxo-Norman occupation of the Greenwich Peninsula. Few structures were built on the peninsula before the 19th century. Industrialisation of the peninsula started in the early 19th century and by the mid-20th century almost the whole of the peninsula had been developed. The industrial activities have left a legacy of contaminated ground and ground water that may affect the opportunities for archaeological work in some parts of the peninsula.

In addition to the alluvium and peat deposits, the buried and invisible nature of archaeological remains means that there is a potential for the occurrence of previously unknown remains in areas which have not been previously affected by development.

Little archaeological investigation has occurred on the Greenwich Peninsula itself because of problems of historic land contamination (now remediated). *It is recommended that any future obtrusive work would require a watching Archaeology brief and contact with the Museum of London Archaeology Service (MoLAS).*

References

See Bibliography Section 2.0 (Museum of London Archaeological Service, 1993.)

See Appendix 4 for more historic information on the Peninsula – (Extract from English Partnerships web site).

Present and Predicted Land Use Categories

Present uses:

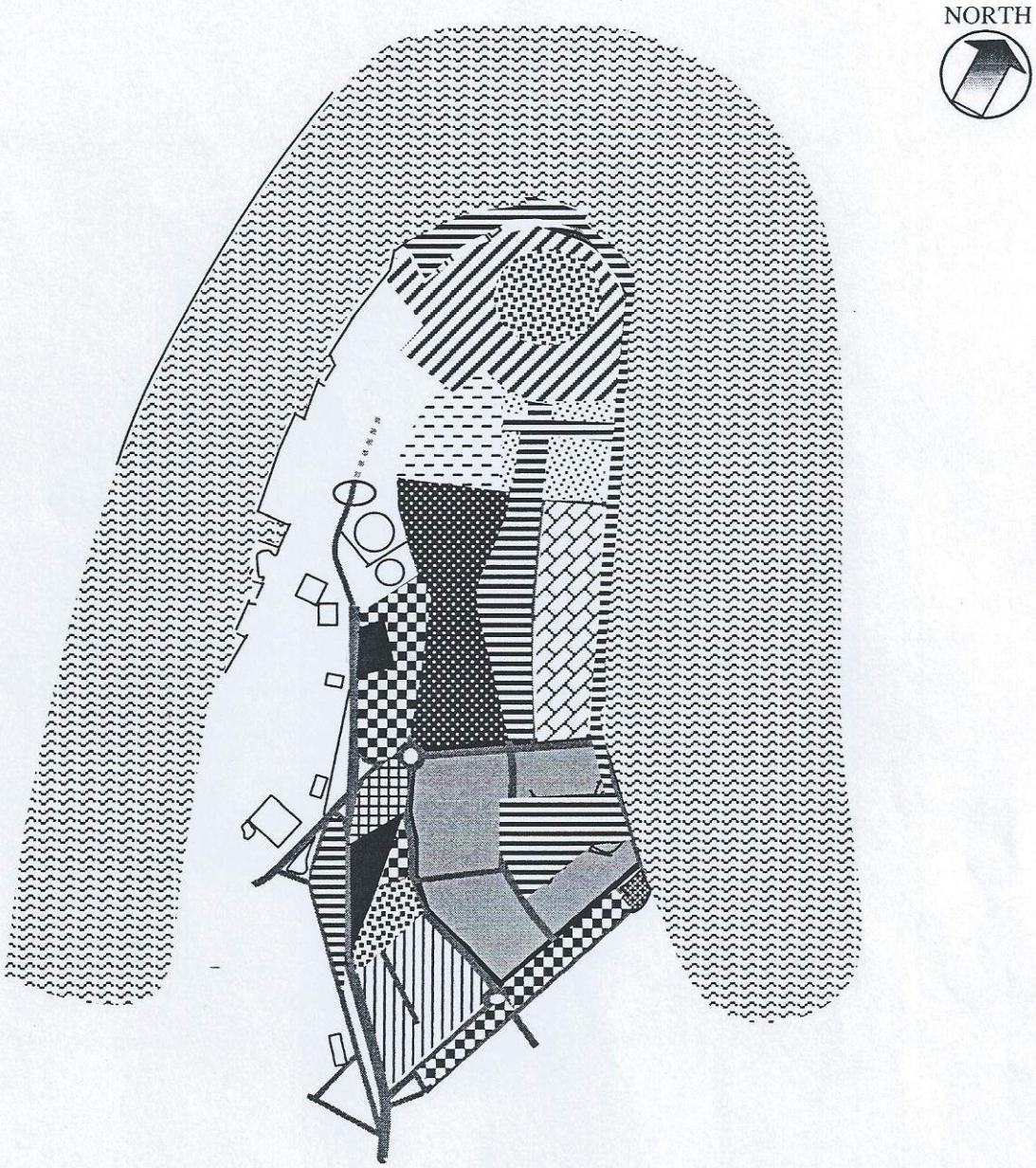
- Millennium Dome; temporary (one year – ends 2001) exhibition space-internal and external, including support areas with covered storage and coach parks;
- Transport; Jubilee line tube-North Greenwich Station;
- Industrial; Gas holders Ware housing; distribution depot-Ellis & Everade and Storage – Hornimans Museum;
- Commercial; Hotel, retail;
- Public open space; and
- Leisure; Yacht clubs.

Proposed/predicted uses:

Taken from English Partnerships, 'Greenwich Peninsula – Investing in the 21st Century'. Please note that at time of writing it is not guaranteed that development will follow this master plan.

- Residential; high and low density;
- Leisure; Millennium Dome-future use (including surrounding incidental open space), Cinema; Yacht clubs, other leisure uses;
- Transport; Jubilee line tube-North Greenwich Station;
- Industrial; Gas holders; Ware housing; distribution depot-Ellis & Everade and Storage – Hornimans Museum;
- Commercial; Hotel, retail, business and employment use; and
- Public open space, including a controlled access wetland area where development of a nature conservation resource for public use is the highest priority. This has been called the 'Greenwich Peninsula Ecology Park', but it should be noted that <u>all</u> green space on the peninsula has been designed to be ecologically functional and valuable to varying extents and as permitted by other constraints.

Figure 1.5 - Predicted Land-use



KEY

- Mixed use (C.B.D., Residential, Retail, Leisure)
- Residential (High Density)
- Residential (Low Density)
- Leisure
- Hotel
- Employment
- Public Open Spaces
- Incidental Open Spaces
- Retail (Food)
- Extended Jubilee Line
- Existing Use
- Millennium Village
- Greenwich Yacht Club

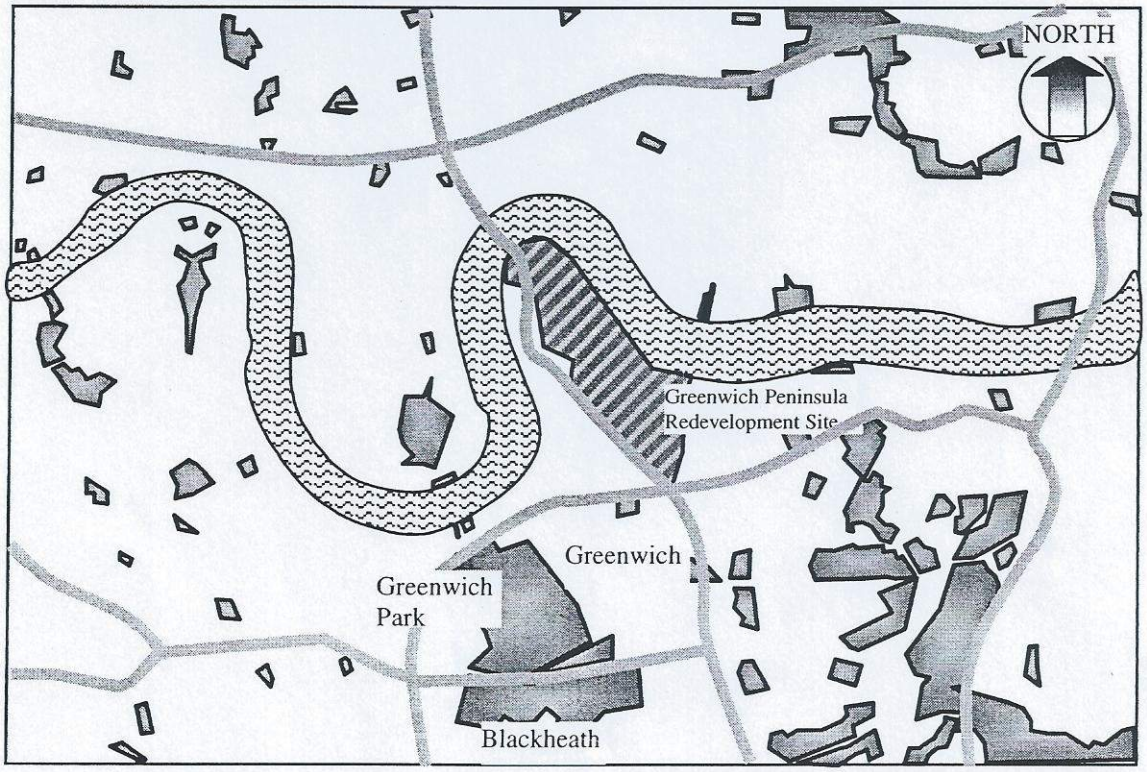
Landscape Context

The urban development of the Greenwich area has been strongly influenced by the River Thames and associated human exploitation of the river. Notable landmarks in the area include the Naval College, Queens House, Royal Observatory and Greenwich Park all dating from the 17th and 18th centuries. However, development resulting from the expansion of London in the Industrial Revolution predominates with extensive area of Greenwich having been developed for industrial and commercial uses and associated housing.

In the locality the largest area of open space and vegetation is comprised of Greenwich Park and Blackheath. Greenwich Park is an extensively planted enclosed parkland whilst Blackheath is a grassed open hill-top. Other areas of semi-natural vegetation or open space in the area are relatively small and scattered amongst the intensive built development.

The infrastructure of the area is strongly influenced by the Thames with the river historically forming a barrier to north/south movement. The main routes to the centre of London from the east pass through Greenwich either on the high ground to the south (the A2) or on the edge of the floodplain (the A206). The construction of the original Blackwall Tunnel at the end of the 19th Century linked the area to the north of the river and boosted the development of the peninsula. The comparatively recent construction of the A102(M) in 1967 enhanced the cross river link to the south east of London and beyond. The London Waterloo to Woolwich railway follows a similar line to the A206 along the edge of the Thames floodplain.

Figure 1.6 - Green Space Context



The local landscape character is subject to many of the urban influences referred to above, in particular:

- the A102(M) Trunk Road;
- the continued use of the western riverside of the Greenwich peninsula for large scale industrial processing;
- extensive areas of vacant land where former gas and oil storage depots have been removed; and
- areas of terrace housing dating predominantly from the 19th Century.

The main elements of the landscape character in the local area can be summarised as follows:

Residential Areas: lying mostly to the south west of the A102(M) between Tunnel Avenue and Woolwich Road. Generally based around a simple Victorian Street layout the housing stock includes low rise development from the 19th century, inter-war housing along Tunnel Avenue and a post-war housing estate. A new housing development is currently under construction to the south west of Tunnel Avenue on the site of the former B.O.C. factory.

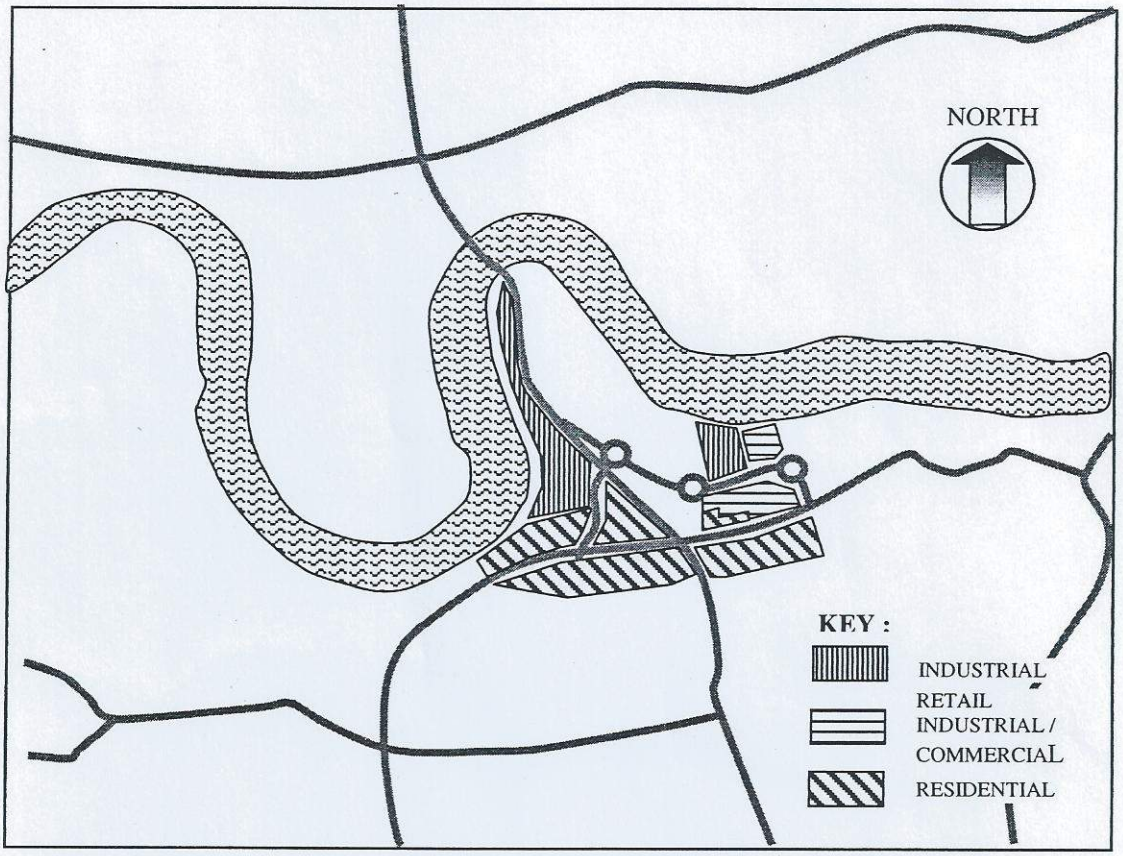
Industrial/Commercial Areas: a number of factors including access to the river front, even terrain, the historical development of London industry to the east and the recent improved road links have led to extensive areas of the peninsula being developed for industrial/commercial uses. Large processing plant, factories, warehousing, goods vehicle storage and oil and gas plant dominate the north west of the local area. Whilst visually dominating and, for the most part unattractive, the landscape created by these built forms could be described as dynamic and gives the feeling of industry at work. The landscape created by this development is also for the most part inaccessible, being fenced off from the general public.

Greenwich Peninsula: the now cleared and remediated area of the former British Gas works, to the north east of the A102(M), is the site of the Millennium Dome, formerly housing the Millennium Experience. Elements of completed landscape, at the time of writing give the area a predominantly 'parkland atmosphere', though this is also the setting of a major house construction programme.

The completed riverside walkway already makes strong reference to the past wetland nature of the peninsula via careful ecology design. Further details of this and other features are provided in the Component Area Land Management Plans.

The A102(M) Trunk Road: cuts across the site and forms the dominant element in the landscape from some viewpoints, particularly where elevated to the northwest and southeast. Its complex junction and structures to the southeast dominate the built form and sit uncomfortably with the housing along Tunnel Avenue. At the north-eastern end the motorway is more in character with the scale and nature of the adjacent industrial premises. The mass concrete structures associated with the elevated sections have considerable bulk but are generally unattractive whilst the regularly spaced lighting columns draw attention to the line of the route.

Figure 1.7 - Landscape Character Areas Surrounding the Greenwich Peninsula Redevelopment



Details of Recreational Uses

The current major recreational attraction on the site is the Millennium Dome festival 'celebrating British ideas and Technology in the form of multimedia attractions and exhibits', drawing national and international visitors to the site. This festival has been organised by the new Millennium Experience Company (NMEC). It is currently assumed for this Management Plan that after the exhibition stages over the year 2000, the future use of the Dome will continue to provide the main source of public recreation and become the main attraction for visitors to the Peninsula. As part of the Section 106, Agreement (the legal agreement between the Council and the New Millennium Experience Company), the Council negotiated that the NMEC would produce Cultural, Educational and Environmental Plans. These plans will help to secure the long-term benefits to Greenwich residents of hosting the Experience.

On the 4th March 1999, Lord Falconer launched a major international competition to determine the long term legacy and ownership of the Millennium Dome. The Government invited more than 1,000 companies world wide to bid for the Dome. Assets on offer including the Dome itself, its services and the 48 acres of land where the Dome is situated. An additional 20 acres of surrounding land are also available.

The requirements of the competition are that proposals will:

- make a significant contribution to establishing the Greenwich Peninsula as a the new thriving mixed use urban quarter for London;
- maximise the use of integrated public transport systems;
- provide value for money;
- complement other regeneration activities within the Thames Gateway area; and
- create a commercially viable future for the Dome which preserves the design integrity of the Dome's structure and makes use of the innovative and create techniques in terms of future design, use and occupation.

Meridian Gardens, which surrounds the north side of the Dome, is currently part of the festival and contains outdoor sculptures and activities. These would be subject to change on the completion of the festival. Central Park and Riverside Walk are also part of the festival for the year although no additional recreational features have been provided here during the festival. Central Park contains two water features for visual amenity.

The current green landscape infrastructure will provide opportunities for walking, cycling and open space for informal recreational activities. The Thames footpath continues through the site allowing walkers and cyclists access from neighbouring boroughs. An eventual link through to Greenwich by London Borough of Greenwich will improve this recreational facility.

The Greenwich Peninsula Ecology Park although not currently open to the public and with its future operational capacity subject to further decisions is assumed to realise its potential as a resource for local residents, school groups and interested local parties. Strong recommendations for its operation are made further on in this document. The use of the word 'Local' may extend to include the whole of London depending on the success of the park.

The recreational potential of the other ecological areas of the site such as the riverside terraces is primarily for passive amenity.

A public slipway is available at the yacht club for access to the Thames.

Fearon Street pocket park has a small amount of play equipment for the use of local children.

Any further facilities would be provided as part of future developments e.g. a cinema complex is currently under construction. It is assumed that use will not be restricted to simple passive use but a wide range of leisure activities.

Access to certain areas covered by this Green Space Management Plan will be controlled e.g. The Ecology Park 'Core' of the Millennium Village Marsh and no public access is provided or intended onto the Riverside Terraces.

Limited vehicular access in terms of places to park on the Peninsula is also assumed to have been maintained in the future.

Public/Organisational Interest and Involvement - Present and Predicted

The present interest in the site is given in Appendix 5. This is from the initial list of consultees and is not exhaustive.

Educational / Research / Interpretational Uses and Facilities

Most of the designed landscape on the peninsula is innovative and of potential interest to a variety of organisations and members of the public. The key facilities specifically designed to promote public educational use and research are as follows:

- The Dome; at least in the short-term information on the area is included in the NMEC exhibition;
- Environmental Information Points; these have been installed as a product of collaboration between English Partnerships and the Environment Agency at Blackwall Point (a display relating to the tidal Thames), the Eastern River Wall (a display relating to the history of London, the river and the site) and within the Greenwich Millennium Village (a display relating to the ecological interest in the park);
- The Ecology Park; which includes a Control Point/ Wardens Office - where educational literature on the ecology of the park, the peninsula and the tidal Thames may be obtained. Particular educational features include a computerised water quality control system including water circulation, aeration and treatment reedbeds. This system also incorporates a lit display board which indicates constant flow rates and aerator function. There are also many features specifically designed to attract and permit the close inspection of key species of wildlife;
- a Visitor Centre within the Greenwich Millennium Village itself. This will provide facilities for use by e.g. school parties, and other groups visiting the peninsula. Facilities will include a lecture room, display areas and toilets. At the time of writing, it is intended that the Visitor Centre remain for some three years, until replaced by a centre incorporated within the proposed long-term infrastructure of the urban village.

Key innovative features of the landscape, the development of which could prove of particular interest to researchers of landscape design and development, land remediation and ecology are:

- The Ecology Park and wider Village Marsh;
- The Inter-tidal Terraces along the Eastern River Wall and at Blackwall Point, and associated riverside walkway planting;
- The Meridian Jetty 'wildlife island' near the Dome;

- The Village Green in Southern Park especially the associated wild floral habitats;
- Central Park and the Village Green especially in terms of tree choice, establishment and wildlife value;
- The marshland developed around the Dome within the Meridian Gardens; and
- The adjacent foreshore in relation to use by waterfowl given the designed change in land use on the peninsula.

Biological (Historic, Present and Future)

Flora and Plant Communities

Evidence extrapolated from core sampling in the close proximity of the peninsula suggests that some 12,000 years ago towards the end of the last Ice Age, the vegetative cover of the area of the peninsula was dominated by Dwarf birch and Juniper. As the climate warmed, succession progressed. Some 10,000 years ago, pine woodland communities dominated. By around 6500 years ago, there was a mixed cover of woodland including Oak, Hazel, Ash, Alder and Holly, felling had begun, and the edge of the peninsula was almost certainly an Alder carr. In the Bronze Age, some 4000 years ago, extensive felling occurred, and the peninsula most probably then became marshy pastureland. Some 500 years ago it is known that the peninsula was divided up into an agricultural field system.

Limited information on the plant communities and floral species present on the peninsula (terrestrial) in the late 1980s prior to clearance for redevelopment is provided in library documents. Bibliography Section 2.0 (WS Atkins 1990; Town Planning Consultancy Ltd. 1996; Nicholas Pearson Associates 1998) and Section 6.0 (Swales *et al.* 1989). Further information on botanical interest on the peninsula prior to clearance may be available through the London Wildlife Trust and their contacts.

Essentially, in 1996, the peninsula supported some 6 hectares of dense shrubs, 41 hectares of ruderals, rank grass and sparse scrub, with some trees, 1.2 hectares of abandoned allotments, and 11.25 hectares of amenity grassland (including willows, Elder and Butterfly-bush). There was also a 0.65 ha of reedbed, in the south-western corner of the peninsula. This reedbed was part of a 4 ha site of Borough Importance Grade 1 - see Bibliography Section 6.0; (Swales *et al.* 1989).

The inter-tidal plant communities before redevelopment of the peninsula were sparse, because over 90% of the river wall was of sheet-piled construction. Details of the species present may be found in Bibliography Section 6.0 (Ecoscope Applied Ecologists 1995). Some notes on the inter-tidal flora around the peninsula during redevelopment may be found in: Section 4.0 of the Bibliography.

At the time of writing, the plants and plant communities in each management compartment are recently planted or seeded, and hence at an early stage of development. To avoid repetition these species and communities are described in detail only within the Component Area Management Plans.

In general the habitats designed and present in January 2001 were as indicated in the following table.

Table 1.4 - General Habitat Types

Component	Main Landscape/Habitat Type
Millennium Village Marsh	Open water, reedbed and other emergent habitats, duck marsh, wet grassland, willow belts, wet woodland, deadwood habitats.
Inter-tidal Terraces	Diverse saltmarsh, with abundant Common Reed.
Millennium Village Green	Wildflower and amenity grassland, park woodland, some with shrub understorey.
Central Park	Amenity Grassland. Hornbeam-dominated park, woodland under-planted with Ivy. Amenity boulevard with grass and shrub beds.
Riverside Walkway	Gravel beds, some sown with native halophytes. Willow belt with interspersed sedge and coarse grass beds.
Meridian Gardens	Dry & wet meadows, small open ponds with associated reeds and marginal plants.
Pocket Parks	Amenity grassland, native/non-native herbaceous and tree/shrub planting.
A102 (M) Road Bund	Native/non-native tree and shrub planting.

An extract from the English Partnership's Greenwich Peninsula website, summary of the history of the Peninsula is presented in Appendix 4.

Photographs of the peninsula at this time are available in the Management Library.

Aerial video coverage of the peninsula prior to redevelopment is held by Environment Agency Thames Region.

Data on the terrestrial invertebrates of the area prior to clearance of the site were not compiled. Some data may be held by the London Wildlife Trust and their contacts.

Data on the fish and invertebrate populations of the adjacent tideway may be found in Bibliography Sections 4.0 and 6.0. More up-to-date information is held by the Environment Agency (see list of useful addresses). Key features of fish populations are:

1. The use of the gravels around the peninsula as a spawning ground for the Sand Smelt, a species which often contributes to what is known in fishing terminology as Whitebait. The first commercial catch of this species since Victorian times was made in 1998 in the Thames.

2. The use of the terraces by large numbers of estuarine fish, and fish fry on the ebbing tide.

No data on herpetofauna prior to site clearance were collected.

Data on bird use of the peninsula and the adjacent tideway before clearance for redevelopment are available in the Bibliography Section 2.0 (McKenzie 1997; Nicholas Pearson Associates 1998) and Section 7.0 (Ecoscope Applied Ecologists 1995). In brief summary, prior to clearance, the peninsula was home to important numbers of passerine birds, especially summer visitors and migrants, uncommon in the east of London. Black Redstart *Phoenicurus ochruros* - a species of major conservation concern favouring large derelict sites in the UK - was also present as a breeding species. At Blackwall Point an important roost of 15 to 20 Grey Herons on the undisturbed sheet piling occurred, adjacent to valuable feeding grounds in the inter-tidal gravels and shingles extending out from the point.

At the south-eastern edge of the peninsula, Teal (up to c.30) regularly roosted at the top of the sheet piling close to where is now the Village Marsh. Occasionally half as many were noted roosting inland on open areas of the derelict peninsula.

Data on bird use of the peninsula since redevelopment have not been collated but the London Bird Recorder has noted over 60 Canada Geese which have caused damage to wetland planting and protection netting. Many wagtails *Motacilla* sp. are using the new lake at the time of writing.

Data relating to use of the peninsula by mammals were not collated.

1.3 LANDSCAPE DESIGN STRATEGY

Purpose

The landscape design strategy for the Peninsula was developed to address the short, medium and long term uses of the area. Within this framework, the landscape design strategy proposed to:

- **mitigate as far as possible given other constraints for the loss of habitats present on the site prior to the commencement of the site enabling works;**
- **create a long term green landscape infrastructure for urban development capable of adapting to suit progressive phasing of development;**
- **provide movement corridors within the landscape to encourage walking and cycling;**
- **provide for usable public open space and recreation areas;**
- **design the parkland in a continuous sequence of space with complementary but different activities and qualities providing:**
  1. **out door living space for future residents; and**
  2. **a flexible framework to respond to the needs and character of its neighbouring uses.**
- **create instant impact and shelter within the site - addressing the conditions of scale and exposure with the requirements for instant impact and shelter; and**
- **provide an immediate landscape setting for the Millennium exhibition and the Greenwich Millennium Village development.**

As well as addressing the above, the landscape design strategy also adopted elements from the ecology strategy that proposed to:

- **establish a peninsula-wide habitat resource within a progressively created infrastructure of trees;**
- **establish a high level of appropriate biodiversity within a rich variety of ecosystems;**
- **create a broad diversity of habitats with special reference to the Thames Tideway;**
- **mitigate as far as possible given other constraints for loss of habitats in the peninsula before remediation; and**

- **provide for a diversity of species.**

The implementation of the landscape design strategy therefore proposed to:

- illustrate the concept of natural colonisation which reflects how under natural conditions the landscape of the peninsula would have been progressively colonised by vegetation - salt marsh and mud flats, grazing marshes and alluvial forest maintaining intermediate successidual stages by management;

- evolve a landscape in which woodland is planted and managed through to maturity; and

- create a landscape where the future built form appears to be defined by natural topography and site conditions (rather than the usual where buildings are the primary definers of urban space).

Urban forestry techniques were employed using a grid with (2 layers), an initial mixture of smaller sized stock and semi mature 'noble' species; the former creating an immediate impact. As this forest establishes, progressive thinning and removal is intended to progressively diminish the impression of a grid and encourage the emergence of - a maturing forested landscape as illustrated in Figure 1.8.

The design of planting and layout of built form is intended to provide protection for people and suitable conditions for wildlife to establish and flourish. The winds dictated the alignment of recently constructed and still proposed built form. The main axis of the Central Park is at right angles to the prevailing winds with minor streets proposed at 45 degrees to this access. Woody planting at either end will break the air flow – see Figure 1.9.

Foci

The strategy recognised the need to create a series of foci, where public usage would be focused, creating the sequence of green spaces along the central axis of the Peninsula.

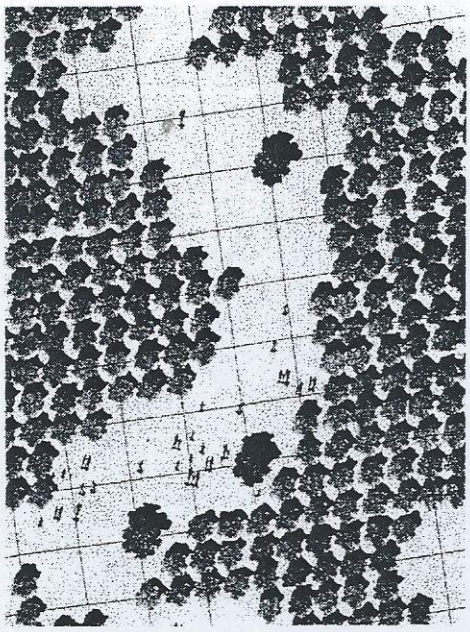
These being:

- Meridian Gardens – festive gardens as well as longer term wetland areas;
- Central Park – urban gardens; and
- Southern Park – activity and wetland park.

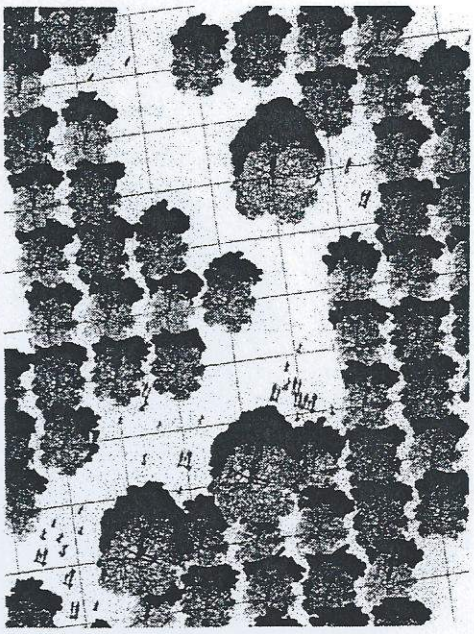
Public and Private Landscape

Outside the series of public spaces, the masterplan also highlights other potential open spaces which would be developed along side future built form. These would increase the useable open space with the introduction of semi-private courtyards. This offers the opportunity to extend the concept of afforestation and naturalisation and visually link to the armature – to give a sense of extensive parkland.

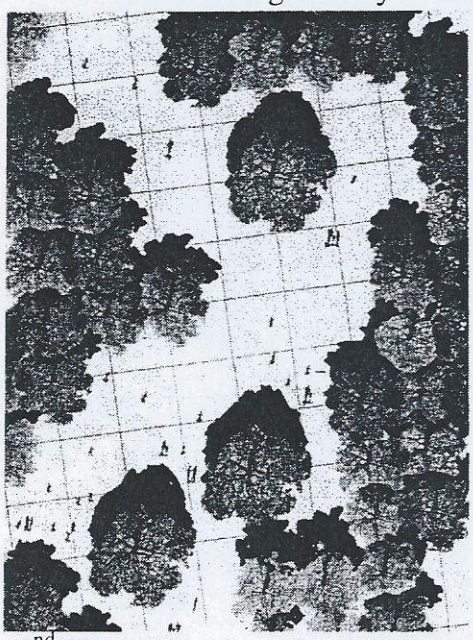
Figure 1.8 - Afforestation of the Peninsula



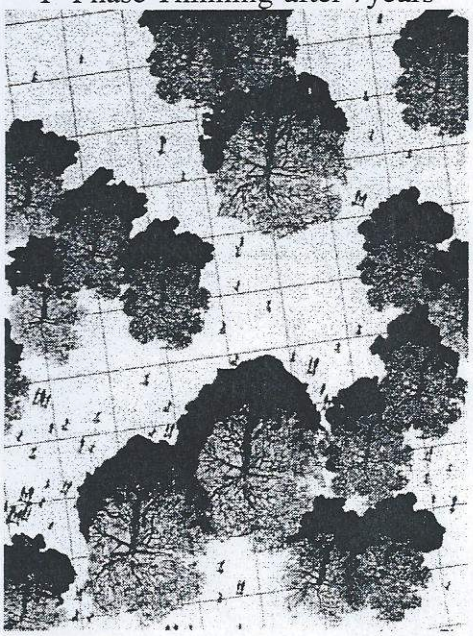
Initial Planting Density



Ist Phase Thinning-after 7years

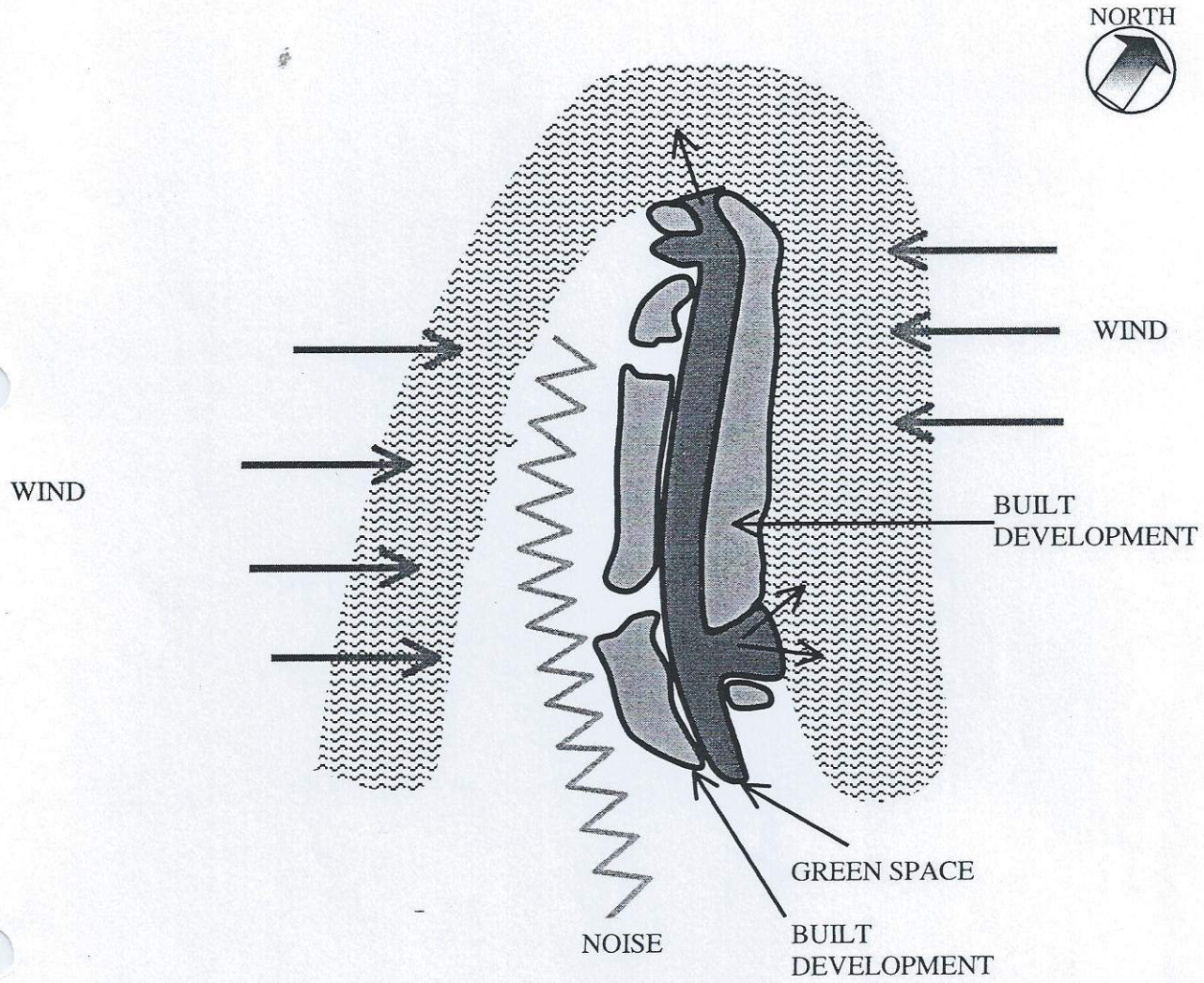


2nd Phase Thinning-after 15 Years



Final Phase Thinning

Figure 1.9 - Climatic Conditions and Urban Response



PART 2 – EVALUATION & OBJECTIVES

2.1 SITE EVALUATION

It should be noted that the current site is dynamic and will be subject to change that will have to be accounted for, but for which the precise details cannot necessarily be determined now. Provision for these changes can be made in future reviews of the management plan. The density of housing, the potential for the way in which the sites could be used and the impact of increasing numbers of people could be subject to a number of changes from the scenario currently envisaged.

In writing this plan the following have been assumed:

- **a trust will be formed to manage the Peninsula;**
- **the development will be as shown in the current plan (Figure 1.5), which will be reflected in the London Borough of Greenwich Unitary Development Plan;**
- **the Riverside walk will extend around the whole of the Peninsula;**
- **development will be realised on the western half of the Peninsula; and**
- **all construction/development works complete by (say) 2010 this has been assumed so that, the impact of people (residential and influx) on the site could be addressed).**

In future reviews of the management plan, it may be possible to state more about the ecological qualities such as rarity and diversity on the Greenwich Peninsula if the current ecological aspirations come to fruition. This would be dealt with at component area plan level and undertaken with eaeh review. At present this cannot be undertaken as the site is too new but the site can currently be described as fragile due to its newness and susceptibility to change.

Summary of Key Landscape Features and Elements.

The following key features and elements within the Greenwich Peninsula are shown in Figure 2.1 and are listed below. These include elements both within and outside the responsibility of this management plan:

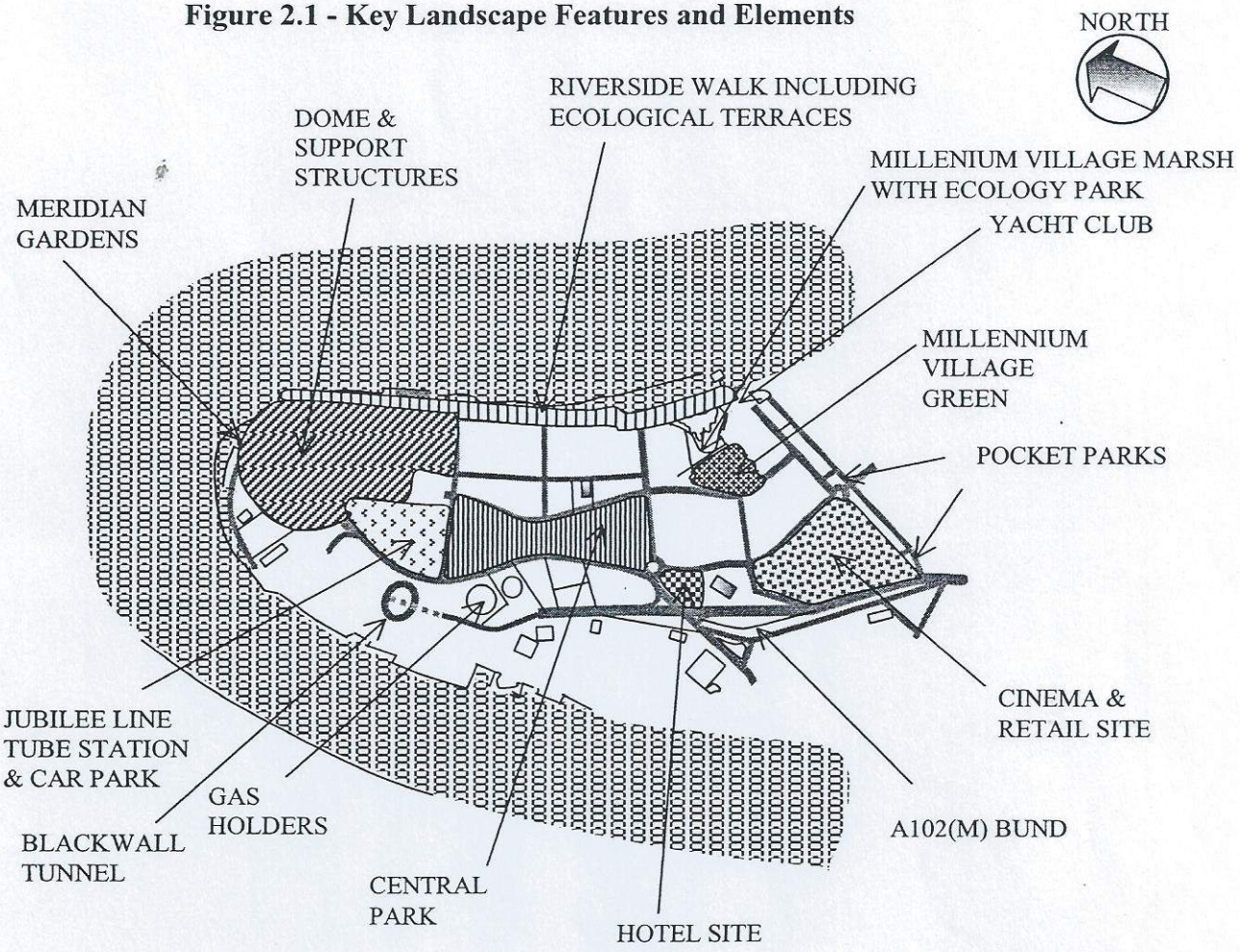
- The Dome and support structures;
- Meridian Gardens;
- Riverside walk – including intertidal terraces;
- Central Park;

- Millennium Village Green;
- Millennium Village Marsh incorporating Ecology Park;
- A102 Bund;
- Pocket Parks;
- Internal Transport structure; roads, bus link, riverside walk;
- Yacht Club;
- Jubilee line tube station and carpark;
- Hotel and retail park sites;
- Proposed/future development – Greenwich Millennium Village and school/health centre site; and
- Gas holders.

The Peninsula was conceived as a parkland and has the following unifying elements:

- *Surface materials.* Peninsula appears as a natural park – surface to evoke paths of large parks. Different surface treatment linked to various ground uses. Simple materials of low cost and without scale – poured/natural materials.
- *Contours.* Scale of the meander – a vast alluvial deposit. Site remains visible and transparent. Natural quality.
- *Urban furniture.* Unified concept for whole peninsula, however organisation of the furniture is not homogenous but responds to its location.
- *Highway markings and signage.* Rationalisation and integration, attempt to anticipate needs, reducing clutter.
- *Tree selection.* Includes a range of pioneer and climax native species, with a limited number of non native species, divided into six categories with banding of species across the Greenwich Peninsula. The design responds not only to physical aspect and constraint but also supports its current uses e.g. A102(M) – tolerant of traffic pollution. Central Park – bands poplars/ birch for rapid growth with oaks and ash. Riverside Walk – exposure tolerant.

Figure 2.1 - Key Landscape Features and Elements



Nature Conservation and Biodiversity Evaluation of Site

The nature conservation evaluation of features is considered at the component area plan level. It is nonetheless true that habitat features created across the whole peninsula have a cumulative nature conservation value (and potential value) which is greater than the sums of the parts.

In assessing nature conservation value, account has been taken both of the Ratcliffe Criteria (see Countryside Council for Wales Management Planning Book in Bibliography Section 7.0) and the criteria for selection of sites of conservation importance in London set out in Greater London Authority 2001 (see Bibliography Section 6.0). The grade of 'Local' site (GLA 2001) has been split into High, Medium and Low in the present plan.

Much weight is given to the criteria relating to human access to wildlife and resultant educational opportunities on a former area designated as deficient in such access. 'Naturalness' criteria can not strictly be applied, as the conservation value of the habitats created may be considered to be elevated by the fact that reference has been made to the pre-historic vegetation cover of the peninsula in the design. Aesthetic appeal is also an important criterion on which the varied assemblage of habitats and styles should be considered to be highly rated. Species richness and diversity should improve over time, especially if allowed to do so by management. Emphasis is placed on the nature conservation value being strongly increased by the close proximity of the peninsula to the Thames tideway.

Beyond traditional nature conservation evaluation, the diversity of life on site may be considered to have wider values e.g. fisheries. These wider values are also considered (see Byron 2000, Bibliography Section 6.0). Specific reference has also been made to the recently published London Biodiversity Action Plan (London Biodiversity Partnership 2000, 2001; Bibliography Section 6.0).

Site Value in the Wider Perspective and Implications for Management

The redeveloped/ developing landscape of the Greenwich Peninsula possesses an importance that extends well beyond its boundaries and the size of the natural resource it supports.

The Greenwich Peninsula redevelopment is a UK Government flagship project, showing the way forward for the possible regeneration of thousands of hectares of derelict land nationwide.

It is vital that the landscapes and habitats created at great public expense and to the highest standards of design (in relation to e.g. remediation, aesthetic appeal, historical reference and ecological engineering) thrive and develop in perpetuity as a vital signpost of national commitment to sustainable urban renaissance.

This in turn means that adequate funds, skills and controls be placed in an accountable system of management covering the landscape of the peninsula as an holistic unit.

Table 2.1 - Summary of Key Ecological Features and estimated Nature Conservation Value

Feature	Value Year 2000	Predicted Future Value 2020 (given appropriate management)
Freshwater wetland habitat	Borough Grade II Value	Metropolitan Value
Park woodland	Medium Local value	Metropolitan Value
Inter-tidal saltmarsh habitats and communities	Borough Grade II Value	Metropolitan Value
Willow scrub with rough grassland	Low Local Value	High Local or Higher Value

Key Environmental Relationships with Implications for Management

The environmental relationships between elements of the existing landscape, which must be understood in order for appropriate management to be carried out, are discussed in the Component Area Management Plans. It should be noted that key successional and natural processes are essential components of the design and should not be disrupted unduly for reasons of e.g. 'tidiness' or 'safety' without careful reference to the objectives of the plan.

2.2 MANAGEMENT POLICY

Aims

To contribute to the sustainable regeneration of the Greenwich Peninsula by effective management of the overall landscape design strategy and efficient maintenance of each landscape component, to create a long term landscaped environment for a predominantly residential area.

Key components aims:

- **establishing a peninsula-wide habitat resource within a progressively created tree infrastructure;**
- **establishing a high level of biodiversity within a rich variety of eco systems;**
- **creating a broad diversity of habitats with special reference to the Thames tideway;**
- **mitigating as far as possible given other constraints for the loss of habitats present on the peninsula before regeneration commenced;**
- **making provision for a diversity of species favouring those of local origin;**
- **ensure proposals would not lead to an increase in bird strike risk;**
- **recreate concept of natural colonisation – salt marsh, mud flats, marshes and alluvial forests;**
- **create a landscape where the future built form appears to be defined by natural topography and site conditions; and**
- **urban forestry plantation techniques are central to concept – dense grid planting and progressive thinning to create parkland landscapes.**

At some point in the future, it may be deemed necessary to review and update this design strategy in light of changing land uses.

Ideal Management Objectives

Ideal management objectives to achieve the above aims are given in Table 2.2 followed by further details for the prescriptions to each objective in Table 2.3. Table 2.2 identifies a review period for each of the Objectives; on a yearly or three yearly basis.

The programme of responsibilities outlined in Part 1 (Description) of this Plan describes English Partnership's proposals for the management infrastructure of the Peninsula. A framework programme for overall review of the Land Management Plan is as follows:

- Review management plans after completion of Millennium Exhibition/conformation of proposals for the Dome and surrounding site i.e. after first year.

- Full review of management plan at completion of 3 year aftercare period/ defects. *The question of what happens if the trust is not successful following EP shadow trust period, 3-5yr period needs to be addressed.*

Footnote to review period

Difficulties that must be addressed are the phasing of responsibilities including the:

- defects liability period;

- the initial period of full English Partnerships ownership;

- the EP handover period, medium and long term use of the Dome/ site, and thereafter;

- an approved Management Plan is also required to meet Greenwich Council's planning condition informatives and as a basis for ongoing monitoring of Civil Aviation Authority (CAA) Bird Strike risk; and

- Review timescale to refine the management and maintenance procedures as the site develops and adjacent development takes place and changing use patterns emerge.

Table 2.2 - Ideal and Operational Management Objectives

	Ideal Objective	Operational Objective	Review Period
1.0	To provide Amenity and Recreation areas around the site, to fully integrate with the supporting infrastructure.	1.1 *Refer to all Component Area Management Plans.*	3 yr
2.0	To provide an educational use.	2.1 *Refer to all Component Area Management Plans.*	3yr
3.0	To mitigate human disturbance to wildlife.	3.1 *Refer to Component Area Management Plans:- Ecology Park, Intertidal Terraces, Meridian Gardens.*	3yr
4.0	To reintroduce or create a range of natural and semi natural habitats to encourage the return of wildlife to the site.	4.1 *Refer to all Component Area Management Plans.*	3yr
5.0	To manage green space so as to achieve and maintain a high standard of repair, functionality (including aesthetic and ecological), safety and to maximise ecological value.	5.1 Implementation of relevant maintenance regimes/contractual agreements to ensure establishment of newly created habitats. 5.2 Maintain in perpetuity the overall design aesthetic and intention as developed over the long and detailed redevelopment period. 5.3 Ensure that adequate funds and logistical support are obtained from all appropriate sources to provide the level of management effort and expertise required to meet other objectives and provide monies for purchase / repair of capital items, planting stock and other materials (sources to include service charges, charity fund raising, and community interest group involvement etc.).	1yr
6.0	To maximise efficient use of non-renewable resources required for land management purposes and encourage recycling.		1 yr
7.0	To monitor and record water quality in the chalk borehole supply and inform key parties of implications of any changes in quality.	7.1 Take samples and submit for full suite of tests for contaminants and nutrients every three months. 7.2 Analyse data and inform parties responsible or irrigation / lake top-up of any implications. 7.3 If borehole water quality is changeable, obtain verification tests and set in motion any necessary measures for provision of alternative water source. 7.4 If borehole water quality is unacceptable, obtain professional advice on remediation of borehole. 7.5 Keep detailed records of analysis results and conclusion in Appendix to Management Plan.	1 yr
8.0	To ensure that no significant avian hazards to air traffic develop.	8.1 Monitor avifauna on the whole terrestrial site and adjacent tideway and collate results in relation to wider geographical area. 8.2 Walkover transect survey of all compartments on a monthly basis, counting all species encountered.	1 yr

	Ideal Objective	Operational Objective	Review Period
		8.3 Record any notable concentrations of birds on an incidental basis. 8.4 Record and / or verify counts of birdlife supplied by third parties. 8.5 Determine whether birdlife observed could conflict with airplane safety; and commission specialist studies as required to fully assess any risks and suggest solutions. 8.6 Undertake monthly counts of the waterfowl using the adjacent tideway (from Blackwall Point to Southern Park) and compile results. 8.7 Produce Annual Bird Report.	
9.0	To monitor and review all future proposals for development to assess compatibility with the design strategy.	9.1 Set up and maintain links with London Borough of Greenwich planning department.	Annually
10.0	To collate information and images to publicise widely the redevelopment of the peninsula's landscape and habitats where these provide exemplars of urban brownfield regeneration.	10.1 Maintain indexed photographic library on disc using digital photography. 10.2 Analyse and summarise monitoring on an annual basis using appropriate statistical and graphical techniques. 10.3 Produce graphic output of data, advice leaflets etc. in a publicly presentable form. 10.4 Send out leaflets relating to the management areas to local government, libraries and others. 10.5 Create and maintain a web site for the peninsula landscape providing up-to-date information on features and opportunities for environmental education and participation. 10.6 Hold conferences in the Millennium Village Visitor Centre relating to the site and/or generic issues relating to urban green space, landscape and wildlife. 10.7 Maintain list of interested parties and the nature of their past and present involvement in management including monitoring.	3 yr
11.0	To ensure compliance with any legislation applicable to the whole management area and to report and act on any notable environmental incidents.	11.1 Obtain summaries of emergent legislation of potential relevance to management / safety etc. on at least a monthly basis. 11.2 Suggest modifications to plan prescriptions or objectives in light of legislative changes. 11.3 Report and act on environmental incidents. 11.4 Ensure that all relevant parties are informed of incidents, (including solicitors to TradCo as necessary). 11.5 Record full details of all environmental incidents including circumstances, parties, involved etc.	1 yr

Table 2.3 - Implication of Objectives

Ideal Objective 5.0 - To manage green space so as to achieve and maintain a high standard of repair, functionality (including aesthetic and ecological), safety and to maximise ecological value

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Implementation of relevant maintenance regimes/contractual agreements to ensure establishment of newly created habitats.	To ensure establishment so that the design strategy is achieved.	High use of resources.	Medium-High			
Maintain in perpetuity the overall design aesthetic and intention as developed over the long and detailed redevelopment period.	To ensure design strategy is achieved.	High use of resources.	High	WSA		
Ensure that adequate funds and logistical support are obtained from all appropriate sources to provide the level of management effort and expertise required to meet other objectives and provide monies for purchase / repair of capital items, planting stock and other materials, Including service charges charity fund raising, and community interest group involvement etc	Essential.	Fund raising can be time consuming.	Medium			

Ideal Objective 6.0 - To maximise efficient use of non-renewable resources required for land management purposes and encourage recycling

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Review maintenance specification	Effective contract management, use of resources/cost.	Time	Low			

Ideal Objective 7.0 - To monitor and record water quality in the chalk borehole supply and inform key parties of implications of any changes in quality

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Take samples and submit for full suite of tests for contaminants and nutrients every three months.	Permits early detection of problems to avoid major lake contamination.	Cost	High			
Analyse data and inform parties responsible or irrigation / lake top-up of any implications.	As above	Skill requirement	Low	NPA (Bath)		
If borehole water quality is changeable, obtain verification tests and set in motion any necessary measures for provision of alternative water source	As above	Cost	High			
If borehole water quality is unacceptable, obtain professional advice on remediation of borehole.	Prevention of problem less expensive than cure.	Cost	Medium High	NPA (Bath)		
Keep detailed records of analysis results and conclusion in Appendix to Management Plan.	Permits proactive adjustment of management.	Time and skill requirement.	Medium			

Ideal Objective 8.0 - To monitor and develop value of Peninsula to diverse avifauna whilst ensuring that no significant avian hazards to air traffic develop and to monitor avian nature conservation

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Monitor avifauna on the whole terestrial site and adjacent tideway and collate results in relation to wider geographical area.	Data required for CAA. Data useful for PR.	Time	Medium	Des McKenzie		
Walkover transect survey of all compartments on a monthly basis, counting all species encountered.	As above.	Time	Medium	Des McKenzie		

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Record any notable concentrations of birds on an incidental basis.	Data required for CAA. Data useful for PR.	Few	Low	Des McKenzie		
Record and / or verify counts of birdlife supplied by third parties.	Increased chance of detecting change.	Reliability	Low	Des McKenzie		
Determine whether birdlife observed could conflict with airplane safety; and commission specialist studies as required to fully assess any risks and suggest solutions.	Required by CAA.	Time and cost	Medium	NPA (Bath)		
Undertake monthly counts of the waterfowl using the adjacent tideway (from Blackwall Point to Southern Park) and compile results	As above	Time and Cost	Medium	Des McKenzie		
Produce Annual Bird Report	As above	Time and Cost	High	Des McKenzie		

Ideal Objective 9.0 - To monitor and review all future proposals for development to access compatibility with the design strategy

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Set up and maintain links with the London Borough of Greenwich planning department.	Working to achieve overall design strategy.	Time	Medium		Annually	

Ideal Objective 10.0 - To collate information and images to publicise widely the redevelopment of the peninsula's landscape and habitats where these provide exemplars of urban brownfield regeneration

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Maintain indexed photographic library on disc using digital photography.	Promotion. Management aid.	Time and cost	Medium			
Analyse and summarise monitoring on an annual basis using appropriate statistical and graphical techniques.	Promotion. Management aid.	Time and cost	Medium High			
Produce graphic output of data, advice leaflets etc. in a publicly presentable form.	Promotion. Management aid.	Time and cost	High			
Send out leaflets relating to the management areas to local government, libraries and others.	Funding can be attracted.	Time and cost	Medium			
Create and maintain a web site for the peninsula landscape providing up-to-date information on features and opportunities for environmental education and participation.	Fulfils key aim of peninsula landscape in educational terms. Also fund raising.	Time and cost	Initially High, then Medium.			
Hold conferences in the Millennium Village Visitor Centre relating to the site and/or generic issues relating to urban green space, landscape and wildlife.	As above.	Few	Medium			
Maintain list of interested parties and the nature of their past and present involvement in management including monitoring.	Resource base for future management.	None	Low			

Ideal Objective 11.0 - To ensure compliance with any legislation applicable to the whole management area and to report and act on any notable environmental incidents

Operational Objective	Advantages	Disadvantages	Cost Implication	Potential Consultancies	To be achieved	Data & Monitoring Required
Obtain summaries of emergent legislation of potential relevance to management / safety etc. on at least a monthly basis.	Legal compliance. Control of liability.	Cost, requirement for expertise.	Moderate to Low			
Suggest modifications to plan prescriptions or objectives in light of legislative changes.	As above.	Cost	Low			
Report and act on environmental incidents.	Legal compliance, control of liability and maintenance of habitats.	Cost and time.	Low to High			
Ensure that all relevant parties are informed of incidents, (including solicitors to TradCo as necessary).	Liability.	None	Low			
Record full details of all environmental incidents including circumstances, parties, involved etc	Liability.	None	Low			

Factors Influencing the Achievement of Ideal Management Objectives

Owners / Occupiers Objectives

At the time of writing there is an extremely high degree of commitment on the part of the landowner, English Partnerships to achieve full implementation of the Ideal Management Objectives.

As a head-leaseholder, the New Millennium Experience Company's commitment to the objectives of this plan are as yet untested.

Although efforts have been made with regard to certain landscape features to reduce maintenance requirements, the array of landscape and habitat types on the peninsula will require extensive management to retain form and attain maturity. The provision of adequate funding and adequately skilled personnel in the long-term make the difference between sustained success and notable failures in the peninsula's regeneration. Ultimately the land will be in the charge of the Greenwich Peninsula Trust and the ongoing success of the landscape redevelopment depends on what attitudes develop and vested interests emerge; and how these differ between members of the Trust. Without constant reference to the design criteria and sustainable ethos behind the whole site, there is a very significant chance that many aims set out in this plan could become diluted by lack of adequate funding or appropriate, sensitive management on the ground. Such an outcome would constitute a waste of the sums of public money hitherto interested in a cutting-edge regeneration project.

Internal Natural Factors

Wildlife themselves can militate against the successful implementation of prescriptions and the achieving of objectives. Most notably Canada Geese are already proving a threat to the integrity of the Village Marsh, and may damage planting elsewhere. It may be necessary to seek holistic solutions to the problem of Canada Geese, extending well beyond the peninsula. For latest advice see Bibliography Section 7.0 (London Lakes Project). Solutions to such problems can be found, but only if a long-term (> 10 years) effort is maintained.

Other waterfowl may also (over time) damage habitats that have been designed to attract and accommodate them. Repair by way of occasional capital works inevitably may be required.

The landscapes on the peninsula will require irrigation to differing degrees and at different times of the year. To a notable extent planting design and substrate enhancements are such that good retention of moisture from rainfall should occur. Supplementing irrigation, and lake top-up, however are from the borehole. The potential adverse effects resulting from spread of contaminants between gravel and chalk aquifers and subsequent appearance in borehole water should be noted. Monitoring is required to ensure that contaminants are not added to wetland or other habitats. It should also be noted that irrigation requirements may change as the global climate becomes increasingly warm.

Natural predators, which may prove detrimental to ideal objectives, include Fox, rat and Peregrine Falcon, being predators of (variously) waterfowl and/or their eggs.

Internal Man-induced Factors

By their very presence and activity the public will exert a variety of effects on wildlife and habitats. They may encourage undesirable species, perhaps in large numbers as a result of intentional and unintentional provision of food. Species of greatest concern would include those bird species which can form large flocks and roosts, including Starling and Woodpigeon. These species, in turn, depending on their patterns of behaviour and land use might pose a threat to civil aviation (airplanes approaching or leaving London City Airport). This issue is documented in Bibliography Section 2.0 (Nicholas Pearson Associates 1998). The management response required is to monitor avian activity on the peninsula closely and to take remedial action should any significant threats develop.

Human safety is often considered to be incompatible with dense vegetation cover at ground level. In parts of the peninsula, notably the Village Marsh and Village Green and the Eastern Riverside Walkway, landscapes have been created partly to mitigate for the loss of habitats previously found on the peninsula. Alteration of the prescription, for example, to cut willow belts to below head height, because of safety concerns would not be acceptable in terms of maintaining important functions for mitigation of habitat loss. Alternative solutions in terms of lighting, and increased surveillance and policing should be sought.

The amenity value provided by the presence of nature and wildlife is a key aim of the site design and ecological strategy. People will, however, directly and indirectly affect wildlife merely by being too close or physically affecting it (e.g. wildflowers by trampling). The need to maintain constant vigilance for problems as and when they arise, and to act swiftly to counteract these problems, is paramount. For example, fencing may be required to divert people away from vulnerable areas, either temporarily or in the longer term. Additional screens between the public and wildlife may need to be erected or existing screens modified to permit shier species to utilise habitats especially within the Village Marsh.

In such an urban area, a key force militating against the success of objectives will be vandalism. This may take the form of damage to specific features or more diffuse damage e.g. via oil being poured into a lake. Introduction of problem species by the public is also of potential concern. These would include for example alien aquatic plants e.g. New Zealand Pygmyweed, alien Marsh Pennywort, Nutall's Pondweed, and Parrot's Feather. Other problem introductions would also include any fish introduced by members of the public e.g. cleaning out aquaria into one of the waterbodies. Alien amphibians, as escaped pets can be damaging to aquatic ecosystems and wildlife. Pets, especially cats which are known to be major predators of birds and mammals in the UK, are likely to require specific mitigative measures.

Little can be done to prevent the new landscapes from receiving discrete exogenous pollution events at unspecified times. Pollution events in the tideway or as a result of vandalism on land are examples. Pollution could be in the form of nutrient loading from a concentration of sewage effluent in the tideway adversely affecting the ecosystems of the inter-tidal terraces. Pollution could equally be car oil poured carelessly or as an act of vandalism into one of the lakes in the Village Marsh. Good monitoring, rapid response time from trained management staff, and in-built resilience in the designed landscape and habitat features are the means of achieving management objectives despite such exogenous influences.

External Factors

Exogenous influences liable to affect landscape quality and nature conservation value include:

- aerial pollution, including nitrate deposition, sulphur dioxide, dust and ozone;
- increasing atmospheric levels of Carbon Dioxide;
- increasingly warmer, drier summers (see Bibliography Section 6.0: Climate Change Impact Review Group 1996); and
- river water quality.

PART 3 – ACTION PLAN

To be completed in consultation with appointed Estates / Facilities Management Company.

PART 4 – PROJECT RECORDS AND REVIEW

All results of or records of the following are to be entered in, this section on an ongoing basis:

- **management actions;**
- **changes to management prescriptions or objectives;**
- **management meetings;**
- **annual plan reviews;**
- **monitoring;**
- **environmental incidents; and**
- **relevant changes in local, national or international legislation or policy.**

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APPENDIX 1

Date of Leasehold Acquisition

1. DATE OF LEASEHOLD ACQUISITION

The dates on which TradCo acquired the leasehold and the Greenwich Peninsula Trust acquired the freehold of each given management area are tabulated below:

Component Area	**Date of Leasehold Acquisition by**	
	TradCo	**GPT**
Millennium Village Marsh		
Millennium Village Green		
Inter-tidal Terraces – Blackwall Point		
Inter-tidal Terraces – Eastern River Wall		
Central Park		
Riverside Walkway		
Meridian Gardens		
Pocket Parks		
A102 (M) Road Bund		

2. LEASE AGREEMENTS

The lease agreements for the different component management areas and conditions of leases (reservations and legal rights of access) are detailed as follows:

2.1 *To be added when known.*

APPENDIX 2

Lease Agreements

APPENDIX 3

Suggested Management Policy and Advisors

3. SUGGESTED MANAGEMENT POLICY AND ADVISORS

Suggested management policy and specialist consultants

THE AGREED MANAGEMENT POLICY

The following is a suggested policy that requires agreement by the board of the Greenwich Peninsula Trust.

It is the policy of the land owners that the Green Space be managed so as to:

- **achieve and maintain a high standard or repair, functionality, safety and aesthetic appeal;**
- **maximise the ecological value and cohesion of all the green space, subject to other important constraints;**
- **ensure that no significant avian hazards to air traffic develop;**
- **maximise efficient use of non-renewable resources required for land management purposes and encourage recycling; and**
- **maintain in perpetuity the overall design aesthetic and intention as developed over the long and detailed redevelopment period.**

The following table lists specialist consultants and interest groups able to able to advise the Peninsula Trading Co.

Body/Individual	Nature of Agreement	Nature of Involvement
To be decided. (Offer from Des McKenzie Inner London Bird Recorder) Contact and Address:	To be advised (Annually Renewable Contract?)	Monitoring of bird populations peninsula-wide in relation to habitat value and concerns of the CAA. Provision of management
To be advised (Wildlife Trust?) (Trust for Urban Ecology?)	To be advised (Service Level Agreement?)	Advising on botanical species and community compositions and ecological management. All component areas but especially Southern Park, inter-tidal terraces and riverside walkway.
To be decided (Colin Plant: Peter Harvey?) (Wildlife Trust?) (Trust for Urban Ecology?)	To be advised? (Annually Renewable Contract?)	Invertebrate monitoring and management

APPENDIX 4

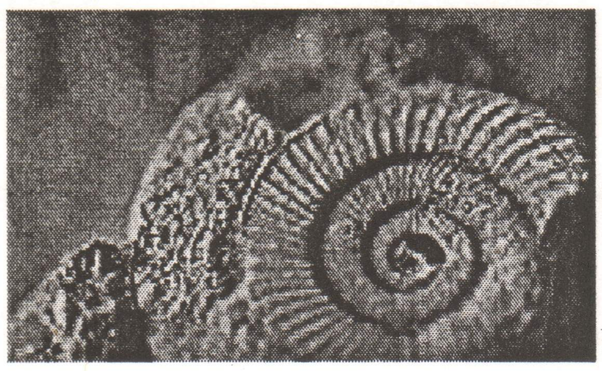
Peninsula History

WS/Atkins

4. PENINSULA HISTORY

4.1 History of the site – extract from English Partnerships Web Site.

History of Greenwich Peninsula



Greenwich Peninsula forms part of an area historically known as Greenwich Marsh.

Earliest recorded references to the area date back to 918 AD when the Marsh, and nearby Westcombe Park, were owned by Princess Aelfrida, daughter of Alfred the Great.

Over the next 900 years it remained relatively untouched as a rural community of farmers and fowlers although ownership of the land changed hands regularly, including the younger brother of Sir Robert Walpole.

By the beginning of the 19th Century - when the oldest building to be retained on site, the Pilot Inn was built - the population was still less than 500 and they were mostly working in market gardens. The site did, however, have harbour facilities and was near to the Kent rail system.

By 1860 only one market garden remained as the industrial revolution came to the Peninsula. Gas and coal tar production started at the turn of the century and was followed by cement, rope making, boiler and foundry making, chemical production, munitions works, ship building, soap, ice and even asbestos.

The biggest industrial impact came in 1889 when the South Metropolitan Gas works opened. It was the largest in Europe and at its peak employed 3,500 people. The introduction of natural gas led to the decline and closure of the works in 1985. The gasholder on the site, however, is still active and supplies gas to homes throughout the south east.

Sir George Livesey

The rural past of the Peninsula was further eroded with the construction of the Blackwall Tunnel in 1897, which has become one of the major river crossings in London and gateway to the city from the south east.

Not many people know that:

Explosions were unfortunately a common incident in the history of the Peninsula. Three people died when a steam water pump blew up in 1803, seventy years later an ammunition warehouse exploded and in 1915 a large quantity of explosives ignited and destroyed a gasholder opposite River Way, During the Second World War 150 bombs fell on the gas works and in 1989 one of the site gasholders was attacked by the IRA.

Pirates met a rather grisly end on the Peninsula during the last century. An area called "Execution Dock" was established just above the low tide mark and was used for hanging river pirates. The offending privateer would be hanged on a gallows surrounded by an iron cage and left until "three tides had passed over them".

Ghosts have been alleged to walk the Peninsula. The most spotted is said to be George Livesey, founder of the main gas works and local philanthropist. Various sightings have

been reported over the years from sources as impeccable as the station engineer of the gas works to construction workers building the Millennium Dome.

LOCATION | TRANSPORT | MAP | DOME | HOUSING

RETAIL | CINEMA | HOTEL | EMPLOYMENT | MILLENNIUM VILLAGE

APPENDIX 5

Public/Organisational Interest and Involvement Present and Predicted

5. PUBLIC/ORGANISATIONAL INTEREST AND INVOLVEMENT PRESENT AND PREDICTED

Public/organisational interest and involvement present and predicted.

The following table shows the current interest in the site following an organised site visit held on the 14 January 2000.

Person / Organisation	**Letter expressing interest in involvement with future management / monitoring included within Management Plan**	**Nature of logistical support that would be offered.**
English Nature (Rich Howorth)	Yes	EN does not intend to be involved in the management of Southern Park / terraces to a significant degree. EN suggested that Southern Park could make a good statutory Local Nature Reserve in the longer term.
London Ecology Unit (Mike Waite)	Comments passed directly onto English Partnerships	
London Wildlife Trust (Matthew Frith)	Yes	Would very much like to be involved in the establishment of an advisory panel to provide experienced opinion to feed into the development of management plans, and their implementation on the ground, and to advise on any problems that may arise. London Wildlife Trust are keen to assist in further development of such a plan, and would welcome the opportunity to further advise in the future.
Trust for Urban Ecology (Ben Dewhurst)	Yes	Trust for Urban Ecology support and express an interest in the long-term management and development of Southern Park and the Inter-tidal terraces. The trust has a long history of managing and developing urban nature parks and green spaces.

Person / Organisation	**Letter expressing interest in involvement with future management / monitoring included within Management Plan**	**Nature of logistical support that would be offered.**
Greenwich Environmental Forum (Anna Townend)	No response received as of yet.	
LA21 Representative for Greenwich also Green lands in Trust (Keith Townend)	No response received as of yet.	
London Bird Recorder (Des Mckenzie)	Yes	Bird Survey (on contract)
London Natural History Society (Colin Plant)	Endorses the comments made by Peter Harvey.	General advice
Essex Biological Recorder and Entomological Consultant (Peter Harvey)	Yes	Invertebrate monitoring (on contract)