Havant Thicket Winter Storage Reservoir

Environmental Impact Assessment Scoping Report

February 2009

ARUP

Portsmouth Water Ltd

Havant Thicket Winter Storage Reservoir

Environmental Impact Assessment
Scoping Report

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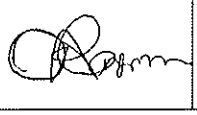
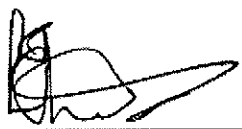
		Signature			
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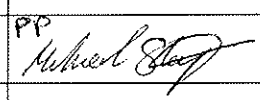
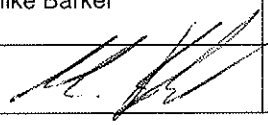
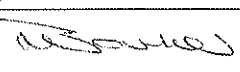
		Signature			
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Contents

Figures

Appendices

Appendix A

Transport Assessment Scoping Report

Appendix B

Scope Of On-Going Ecological Survey Work Since 2005

1 Introduction

Ove Arup & Partners Limited (Arup) has been commissioned by Portsmouth Water Ltd to undertake an environmental scoping study and environmental impact assessment (EIA) for the proposed development of the Havant Thicket Winter Storage Reservoir at Havant Thicket, Havant, in Hampshire. The location of the site is shown in Figure 1 at the end of this report.

The purpose of this report is to request a scoping opinion under Section 10 of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended) [1] with respect to the proposed development. The site occupies land located in Havant Borough Council (HBC) and East Hampshire District Council (EHDC), and the Scoping Opinion request is therefore submitted to both Local Authorities. Following a meeting held between Portsmouth Water, Arup and both Local Authorities on 18 August 2008, it was confirmed that Havant Borough Council would lead the planning application consultation given that a larger portion of the proposed development site falls within its administrative boundary.

This report provides information on the proposed development and an overview of the potential for significant environmental effects during construction and operation. The report sets out the proposed scope of the EIA, including surveys or data gathering to be carried out as part of the baseline assessment, the approach to be taken in conducting the assessment, and the basis for identifying the mitigation measures required to avoid, reduce or offset the identified potentially significant environmental effects of the development. The scoping report also identifies potential issues that are not considered likely to be significant and therefore have been scoped out.

In the following section, general information is given about the site and existing conditions. In section 3, a description is given of the proposed development. The overall methodology to the environmental impact assessment is explained in section 4 with the scope of individual topics set out in section 5.

1 The Town and Country Planning (Environmental Impact Assessment)(England and Wales) Regulations1999 (SI No. 293) as amended by the Town & Country Planning (Environmental Impact Assessment)(Amendment) Regulations 2006 (SI 2006 No. 3295) and the Town & Country (Environmental Impact Assessment)(Amendment)(England) Regulations 2008 (SI 2008 No. 2093).

2 The Site and Surrounding Area

2.1 The Site

The site of the proposed reservoir was purchased by Portsmouth Water in 1965. Most of the land was improved for agriculture and the pasture was then let to a tenant farmer but with public access retained via a bridleway across the middle of the site.

The reservoir site itself lies within a shallow valley and includes approximately 160 hectares of open grassland and woodland with hedgerows and ditches. The draft planning application red line includes the reservoir site, access road, pipeline and treatment works site, with a total area of approximately 232 hectares.

There are over 10 different types of dry to damp grassland present on site. The majority of types are wet grassland that support a variety of wildlife including birds, reptiles, insects and mammals. Further detail of the ecological resources present on site is provided in Section 5.8.

Three unnamed watercourses flow from the north to south across the site. These converge into one stream to the west of the Avenue before flowing off site (Riders Lane Stream). A small ditch traverses from the north-eastern portion of the site at Gypsies Plain off-site to the east.

There are no statutory international or national biodiversity designations within the boundary of the site. The site has several non-statutory designations, which are summarised in Figure 2. There are two designated areas of ancient woodland, and one designated area of ancient replanted woodland located within the site. The first area of ancient woodland is The Avenue, a band of trees which forms an extension of Staunton Country Park, itself located mainly off-site to the south. The second area of ancient woodland named Middle Clearing is an isolated strip of young oak plantation located approximately 250m to the west of The Avenue. The area of designated ancient replanted woodland is located 150m south of Middle Clearing. This is also a young oak plantation.

Other designations covering parts of the site are also shown in Figure 2:

- The Avenue and the land to the west of it are designated as part of the Sir George Staunton Conservation Area;
- The Avenue lies within the boundary of a Registered Park and Garden of Special Historic Interest;
- The Avenue, Middle Clearing, Staunton Country Park and the Forestry Commission land to the north are all classified as Sites of Importance for Nature Conservation (SINC).

2.2 Surrounding Area

The immediate surrounding area is characterised predominantly by woodland and grassland similar to that of the site itself (see Figure 3). The residential districts of Warren Park and Leigh Park lie to the west and south-west of the site respectively, the residential settlements of Stansted and Rowlands Castle are present predominantly 200m to the east of the site, although some properties lie adjacent to the existing B2149 road. The B2149 links Havant, located to the south of the site, to Horndean to the north and beyond.

The woodland directly to the north of the proposed development site is owned and managed by the Forestry Commission for timber production and is also classified as ancient / ancient replanted woodland, and is a designated SINC. The area is also occupied by land locally known as Havant Thicket, Long Wood and Furzy Plain (see Figure 3).

Directly to the west of the site are areas of open grassland and woodland known as Bells Copse and Cabbagefield Row. Some of the habitat here is classified as ancient woodland. South of these wooded areas lies the predominantly residential district of Leigh Park. Within

this area lies a dam structure known as Warren Dam, which was constructed in the mid-1960s with the intention of impounding water, for flood defence, from the Park Lane stream catchment at times of high flow. Park Lane Stream itself flows from north to south to the west of the site to a culvert system that discharges to the Hermitage Stream 1.2km further downstream. Since construction, the existence of the dam has had no known impact on flood risk in the upstream area. Further to the west the A3(M) road traverses in a north to south orientation and joins the B2149 at a roundabout in Horndean (Junction 2) approximately 2km to the north of the main site area.

Land to the south and south-west of the site comprises residential buildings associated with Warren Park and Leigh Park, the nearest of which are present on Swanmore Road approximately 20m from the proposed reservoir boundary. Numerous residential buildings are present adjacent either side of the proposed pipeline route. Staunton Country Park is present directly to the south of the site and of which the application site forms a part. The districts of Battins and Bondfields lie further to the south of Leigh Park, beyond which lies the central part of Havant.

The Solent European Maritime Site lies approximately 2.5 km south of the proposed main reservoir site. This site is a composite of the following designated Natura 2000 sites:

- Solent Maritime Special Area of Conservation (SAC);
- Chichester and Langstone Harbours Special Protection Area (SPA) / Ramsar;
- Solent and Southampton Water SPA / Ramsar; and
- Portsmouth Harbour SPA / Ramsar

As a whole, the Solent European Maritime Site provides internationally important examples of the transitional habitats found between terrestrial and marine environments, and the species communities associated with these areas. The site supports internationally important numbers of wintering wildfowl and wading bird species, as well as nationally important numbers of key wildfowl and wading breeding species. The potential effects of the proposed development on the Chichester and Langstone Harbour SPA are discussed in section 5.8.5.

3 Description of the Development

3.1 The Development Proposals

The development proposals are for the construction of a winter storage reservoir at Havant Thicket formed by embankments around the western, southern and eastern sides, together with associated operational structures and buildings, recreational facilities (D2, *sui generis*) and educational facilities (D1) comprising the following:

- construction of underground pipelines linking the reservoir with the existing pumping station and treatment works at Bedhampton (including the construction of the additional pumping facilities and the improvements to the treatment works) near to the route of the Riders Lane and Hermitage Streams and associated reinstatement works;
- construction of a valve house incorporated within landscaped earth mounding adjacent to the southern embankment;
- construction of an auxiliary discharge/spillway at the south-western side of the reservoir and associated works;
- enhancement of existing Forestry Commission fire road to provide vehicular access from the B2149 Manor Lodge Road to the reservoir perimeter incorporating a sustainable surface water drainage system;
- construction of a new junction on the B2149 Manor Lodge Road to provide the main site access;
- provision of 100 car parking spaces (current estimate) distributed at a number of locations around the site;
- construction of perimeter tracks to be used for operational and recreational purposes;
- creation of a network of bridleways, cyclepaths and footpaths, including a woodland adventure trail and information/nature trail (D2) and diversion of a bridleway, and permissive cyclepaths and footpaths;
- construction of a visitor/ education centre / café (sui generis and A3) with storage areas and welfare facilities to the northwest of the reservoir to be used for recreational and education purposes;
- provision of picnic area(s) and children's play area(s);
- creation of permanent wetland on the northern side of the reservoir and construction of bird watching hide/screen(s)(D2);
- provision of platforms for angling (D2);
- construction of a slipway (D2) on the western bank of the reservoir;
- construction of viewing feature on southern embankment of reservoir (D2); and
- construction of viewing area on the western edge of reservoir (D2).

Figure 3 shows the application boundary of the proposed development which has an approximate surface area of 232 hectares. It is proposed that a hybrid planning application will be submitted with certain elements of the scheme submitted in outline detail only. For example; the valve house, visitor centre, birds hides, viewing features, play areas and wetland area. The current 'outline plan' for the reservoir is shown on figure 4. This plan is provided for illustrative purposes only, all information shown is subject to further modification as the engineering design and environmental impact assessment are progressed.

A large portion of Havant Thicket located to the north of the proposed development site is classified as ancient replanted woodland, whilst smaller areas within it are classified as ancient woodland. The proposed main access route off Manor Lodge Road and associated car parking will pass through Havant Thicket. A small area of the southern extent of Havant

Thicket will be affected by the construction of the reservoir with some loss of both types of woodland.

The Avenue, which extends from Staunton Country Park, and Middle Clearing to the west of The Avenue, are both classified as ancient woodland and will be removed as part of the development proposals.

An area of woodland, located 150m south of Middle Clearing, is classified as ancient replanted and will also be removed.

Minor clearance caused by improvements to access and parking on a small area of designated ancient woodland to the north of Warren Park, known historically as Cabbagefield Row, may also be required.

The detailed alignment of the proposed pipeline route is still being finalised but will in general terms be laid to the east of the Hermitage Stream from Bedhampton to Corhampton Crescent and then follow the general alignment of the Riders Lane Stream from Corhampton Crescent, south and then east of Great Copse, crossing Middle Park Way between Bitterne Close and High Lawn Way. The route continues to the east of Winterslow Drive to the reservoir site boundary.

3.2 The Development in Operation

The proposed reservoir will store surplus water from the springs at Havant and Bedhampton that, during the winter and spring, would currently flow into Langstone Harbour. The harbour is an internationally designated Special Protection Area and conditions are being imposed by the Environment Agency (EA) upon Portsmouth Water's Abstraction licence at Havant and Bedhampton to ensure that sufficient flows to support the SPA habitat will be maintained. The surplus spring water will be pumped from Havant and Bedhampton to the reservoir by underground pipelines. The location of the pipeline route is shown on Figure 3. The reservoir will be predominantly filled by pumping but also intercepts natural streams with a small catchment. Compensation water will be released from the reservoir to Riders Lane stream.

It is envisaged that during years of average meteorological conditions the reservoir will remain full almost all year round, but in drier years when demand may be high, water may be drawn down to augment supplies. In extreme years or if demand increases significantly, the reservoir could be drawn down to very low levels. Water levels would be restored as quickly as practical during subsequent winters by pumping from the Havant and Bedhampton Springs, within the constraints of the EA abstraction licence.

When the reservoir is full there is the potential that rainfall could cause it to overflow. An overflow structure is therefore to be provided as part of the scheme to enable the embankment to be overtopped in a controlled way. Initial modelling indicates that the presence of the reservoir will reduce the risk of flooding downstream. In case of an emergency it is necessary to provide for the reservoir water to be drawn down as quickly as possible to protect the integrity of the embankment. An overflow will therefore be provided for extreme rainfall events and include culverts to assist with emergency drawdown operations. This discharge is proposed to enter Riders Lane Stream through an open channel. In emergency it will be possible to use the inlet pipeline as well as the outlet pipeline to ensure that critical drawdown is completed in the minimum time.

3.3 The Need for the Reservoir

A statement of need for the reservoir and the rationale behind the demand requirements of the catchment area will be provided within the ES. The needs assessment will draw from the 2009 WRMP, publication of which is anticipated in July 2009.

A study by the Water Resources in the South East (WRSE) Group, headed by the EA, indicated potential shortages over much of the South East by 2025. Both the 2004 and draft 2009 WRMPs identified a deficit in water resources within the next 10 -15 years.

A number of water management solutions have been identified in 2006 to assist with the demand management of water supply within the Portsmouth Water supply area. This includes leakage reduction; compulsory metering; Farlington washwater recovery; additional boreholes at Lavant & Brickkiln; a water efficiency programme; and a winter storage reservoir.

3.4 Site Alternatives

The EIA Regulations require consideration of the main alternatives to the scheme and also that the basis of the choice of preferred option made should take into account the environmental effects of these alternatives. The consideration of alternative sites and alternative forms of development on the chosen site will be addressed within the ES accordingly.

This will draw upon previous studies undertaken by Portsmouth Water which have since 1965 examined 19 alternative locations for a reservoir and also of the seven alternative layouts of development for the chosen site as part of a stakeholder consultation exercise that was undertaken by Entec in 2006. The assessment will describe options assessed in terms of reservoir layout, the pipeline route, and road access.

3.5 Construction Effects and Mitigation

The proposed development is expected to be initiated by preparatory works taking place in 2013-2015. At present site preparation works are envisaged to involve site investigations, a trial embankment test area, ecological habitat creation and species relocation in advance of clearance works associated with the development. Construction of the main embankment is estimated to take place between 2015 and 2018, followed by approximately 2 years to fill the completed reservoir during the winter months.

Assumptions will be made with respect to construction plant and vehicles in order to assess potential construction effects and their mitigation. Construction impacts to all potential sensitive receptors will be mitigated through the implementation of a Code of Construction Practice, which will be detailed within an Appendix to the ES. The Code of Construction Practice sets out a series of objectives and measures to be applied throughout the construction period for the works so as to maintain satisfactory levels of environmental protection and limit disturbance from construction activities as far as is reasonably practicable. The Code of Construction Practice will be agreed in advance with the Local Authorities. Measures typically include, for example, hours of work, noise control limits during working hours, dust control techniques, construction traffic access and routing, and site preparation works.

4 Methodology

4.1 General Approach to Environmental Assessment

The EIA is proposed to be carried out in four stages, as follows:

- Phase One: Scoping and consultation;
- Phase Two: Baseline data gathering;
- Phase Three: Impact assessment, identification of mitigation measures and consultation;
- Phase Four: Preparation of Environmental Statement and Non Technical Summary.

This scoping study falls within Phase One. Baseline data gathering (Phase 2) particularly with respect to ecology has been underway since 2005.

The scope of the environmental issues proposed for further assessment will be clarified through discussion with HBC and EHDC based on this report, which will be refined and finalised based upon comments received. Meetings have already taken place with a number of statutory consultees to clarify their requirements. The EIA process is already underway, and following receipt of the Scoping Opinion, an Environmental Statement (ES) will be compiled to support the hybrid planning application. The ES will be prepared in accordance with the *Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999(As Amended 2008)* (referred to as the 'EIA Regulations') and Circular 2/99 (Section 7) and from guidance received from the local planning authorities.

4.2 Requesting a Scoping Opinion

The proposed size of the development means that it is well above the applicable threshold of 1 hectare as set out in Schedule 2, Category 10 (i) of the EIA Regulations. In view of the scale, nature and location of the development it is considered likely to have significant environmental effects. A request for a screening opinion was therefore not considered necessary as it was assumed that an EIA will be required to be provided in accordance with the EIA Regulations.

A Scoping Opinion is sought to reach agreement on the topics and issues that should be addressed as part of the EIA and reported in the ES. As required in Section 10 of the EIA Regulations, this formal scoping opinion request includes the following information:

- *"A plan sufficient to identify the land;*
- *A brief description of the nature and purpose of the development and of its possible effects on the environment; and*
- *Such other information or representations as the person making the request may wish to provide or make".*

The environmental topics that have been considered within this scoping report are:

- air quality (including dust);
- archaeology and cultural heritage;
- ecology and nature conservation;
- soil conditions and ground contamination;
- landscape and visual effects;
- noise and vibration;
- socio-economic effects;
- telecommunications;

- transport;
- microclimate (wind effects and sunlight and daylight);
- waste; and
- water resources (including flows, quality and groundwater).

For each topic, the likelihood of significant effects arising will be considered in terms of:

- direct and indirect effects during construction;
- direct and indirect effects during operation; and
- cumulative effects arising from the proposed development with other development that has extant planning permission or is under construction. However, there are currently no known significant developments that have existing planning permission or resolution to grant planning permission that require consideration in the EIA, with one exception. Fuller Smith & Turner have been granted planning consent for a distribution warehouse at Dell Piece East, Horndean. The Transport Assessment supporting the application will be used to account for vehicular trips generated by this development in the background traffic flow.

4.3 Assessment Process

The Environmental Impact Assessment of the proposed development will be carried out in accordance with:

- European Council Directive 85/337/EEC; and
- Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended)

The scoping process and EIA will have regard to:

- Department for the Environment Transport and the Regions (DETR) Circular 02/99 Environmental Impact Assessment;
- DCLG Circular 01/2006: Guidance on Changes to the Development Control System;
- Environmental Impact Assessment: A guide to good practice and procedures (DCLG consultation paper, June 2006), with particular reference to Appendices E and F;
- Guidance on EIA Scoping (European Commission, June 2001); and
- policies and guidance relevant to the environmental topics being assessed.

For all topics to be assessed, relevant baseline data will be gathered to provide a reliable basis on which to predict effects likely to arise from the proposal (EIA Phase 2). Working closely with the Arup design team, through a process of iteration, mitigation measures will be incorporated into the design to reduce adverse effects. Other mitigation measures will also be recommended such as watching briefs during construction as well as the implementation of a Code of Construction Practice (EIA Phase 3). The assessment process will be documented in an Environmental Statement including technical appendices and a non-technical summary (EIA Phase 4).

As part of the EIA process, and in accordance with Part 1 of Schedule 4 “Information for Inclusion in Environmental Statements” of the EIA Regulations (also referred to above as Appendix F of the EIA good practice guide), difficulties encountered during assessment work, and the limitations and assumptions used for assessments will be set out.

Preliminary consultation with statutory and key non-statutory bodies has already taken place and is reflected in Section 5 (Review of Likely Significant Environmental Effects). Consultation will continue through the baseline data gathering and assessment phases.

The assessment would also consider potential for cumulative effects with other development that has extant planning permission or which is under construction. There are however no known significant consented development projects that should be included in the EIA.

While not included within the scope of the ES, sustainability and energy demand assessment of the proposals will be addressed within the overall planning submission documentation. The environmental affects of the energy supply options when finalised will be included as appropriate within the EIA process.

5 Review of Likely Significant Environmental Effects

5.1 Introduction

A review has been carried out on a topic by topic basis of the potential for significant environmental effects to arise as a result of the proposed reservoir. Where potential for significant effects has been identified, the proposed scope for the environmental assessment is described. Sections 5.2 to 5.4 describe three main areas in which potential effects have been scoped out of the assessment.

5.2 Telecommunications

New buildings and structures can have an effect on television reception in their vicinity, as a result of shadowing and reflection effects. However, given the relatively low height of the proposed buildings such as the visitor centre and valve house and the embankment forming the proposed development and the relatively high location of satellite and terrestrial television transmitters that serve this area, there are considered to be no shadowing and reflection effects resulting in significant impacts on radio and television reception. On this basis, it is considered that an assessment of television and radio interference is not necessary and should be scoped out.

5.3 Microclimate Effects

In general terms, the effects of a building on the pedestrian level wind environment become significant when there is a substantial height difference between the height of the proposed buildings and those of the surrounding area. Experience indicates that buildings of around 10 to 12 storeys above ground are likely to produce wind effects that might require full wind tunnel testing to assess the likely effects on the pedestrian level wind environment. The proposed development will comprise buildings of one to two storeys in height. Given the proposed building heights, it is considered that the likely effects on the pedestrian level wind environment would be insignificant, and no further study is required.

Preparation of the site will require the removal of three blocks of trees within the reservoir footprint. These trees are located within the valley some distance from the residential properties at the site boundary. Given the distance to the nearest residential properties, it is considered that the likely effects on the pedestrian level wind environment would be insignificant, and no further study is required.

New developments have the potential to affect the level of sunlight and daylight available to sensitive (residential) neighbouring properties. Factors affecting the likelihood of sunlight and daylight effects include the height of the proposed development, its location and proximity relative to the sensitive receptors, e.g. residential properties. The tallest structure of the proposed development would be the embankment itself at approximately 20m above ground in the south of the site, but here the nearest residential properties are no less than 70m away at Winterslow Drive. The nearest sensitive receptors to the site that could potentially be affected by overshadowing from the embankment are located to the west of the main reservoir site along Swanmore Road. However given the relatively low height of the embankment in the west (the height is no more than 7m above existing ground level at any point), the distance away from residential properties, and the presence of an existing tree screen along most of the western boundary, there are considered not to be any likely significant effects resulting from overshadowing of the proposed embankment.

5.4 Waste

5.4.1 Introduction

A scoping exercise has been undertaken to consider whether likely significant environmental effects may occur as a result of waste being generated by the construction and operational phases of the development of the proposed development. The effects are

considered in terms of the impact that may occur upon existing waste management practices and waste management infrastructure in the local and regional area, which are governed by policy at national, regional and local level as follows:

National Level:

- Planning Policy Statement 10: Planning for Sustainable Waste Management; [2]
- Waste Strategy for England 2007; and[3]
- Strategy for Sustainable Construction.[4]

Regional Level:

- Regional Spatial Strategy 9: The South East Plan;[5]
- Hampshire Minerals and Waste Development Framework: Core Strategy (Adopted June/July 2007);[6]
- Project Integra: Hampshire Joint Municipal Waste Management Strategy (Part 1: Core Strategy);[7]
- Project Integra: Hampshire Joint Municipal Waste Management Strategy (Part 2: Supporting Information);[8]
- Project Integra Action Plan 2008 – 2013; and[9]
- More From Less: How to Make Better Use of Hampshire's Material Resources (A Stakeholder Perspective).[10]

Local Level:

- East Hampshire District Local Plan: Second Review (2006);[11]
- East Hampshire District Core Strategy Issues and Options (Environment);[12]
- Havant Borough District-Wide Local Plan (Saved Policies);[13] and
- Havant Local Development Framework: Core Strategy Preferred Options.[14]

2 Office of the Deputy Prime Minister (2006) Planning Policy Statement 10: Planning for Sustainable Waste Management [online] Available at: http://www.communities.gov.uk/publications/planningandbuilding/planningpolicystatement10 (Accessed 03 July 2008).
3 Department for the Environment, Food and Rural Affairs (2007) Waste Strategy for England 2007 [online] Available at: http://www.defra.gov.uk (accessed 03 July 2008).
4 HM Government (2008) Strategy for Sustainable Construction [online] Available at: http://www.berr.gov.uk/files/file46535.pdf (accessed 23 September 2008).
5 South East Regional Development Agency (2006) The South East Plan Core Document [Online] Available at http://www.southeast-ra.gov.uk/southeastplan/plan/march_2006/core_document/cover_and_key_diagram.pdf.
6 Hampshire County Council (2007) Hampshire Minerals and Waste Core Strategy [Online] Available at http://consult.hants.gov.uk/portal/pdpp/hmwcs/hmwcs/hmwcs?pointId=project_12#document-project_12 (accessed 24 October 2008).
7 Project Integra (2006) Hampshire Joint Municipal Waste Management Strategy (Part 1: Core Strategy) [Online] Available at http://www.integra.org.uk/strategy.html (accessed 23 October 2008).
8 Project Integra (2006) Hampshire Joint Municipal Waste Management Strategy (Part 2: Supporting Information) [Online] Available at http://www.integra.org.uk/strategy.html (accessed 23 October 2008).
9 Project Integra Strategic Board (2008) Project Integra Action Plan 2008-2013 (Resource Management: Staying Ahead without Costing the Earth) [Online] Available at http://www.integra.org.uk/strategy.html (accessed 23 October 2008).
10 Hampshire County Council (2005) More From Less: How to Make Better Use of Hampshire's Material Resources (A Stakeholder Perspective [Online] Available at http://www.mrs-hampshire.org.uk/MRS.Documents/index.html (accessed 23 October 2008).
11 East Hampshire District Council (2006) The East Hampshire District Local Plan: Second Review [Online] Available at http://www.easthants.gov.uk/ehdc/localplanweb.nsf/webpages/Local+Plan (accessed 23 October 2008).
12 East Hampshire District Council (2008) Core Strategy Issues and Options (Environment) [Online] Available at http://www.easthants.gov.uk/ehdc/localplanweb.nsf/webpages/Core+Strategy (accessed 23 October 2008).
13 Havant Borough Council (2008) Havant Borough District-Wide Local Plan: Saved Policies [Online] Available at http://www.havant.gov.uk/havant-4889 (accessed 24 October 2008).
14 Havant Borough Council (2008) Havant Local Development Framework: Core Strategy Preferred Options [Online] Available at http://www.havant.gov.uk/havant-9345.

5.4.2 Baseline

The development site and immediate surrounding area is situated within a greenfield location, consisting of 160 hectares of open grassland and woodland. It has been determined that the site is unlikely to be contaminated based on previous geotechnical investigations and knowledge of the historic land use activities. Waste is likely to be generated by the construction of the borrow pit and embankments around the western, southern and eastern sides of the reservoir, together with associated operational structures and buildings, and recreational/educational facilities, as summarised below:

- **site preparation and excavation:** as a primarily greenfield site, waste will be generated through site preparatory works (including removal of trees, fences, and topsoil which will be reused on site as appropriate), and ground stabilisation and reinforcement. Materials will be excavated on site for the purpose of constructing the embankments and as a result of works required to install the rising main and lay foundations for operational buildings. Given the expected reuse of excavated materials on the site itself which will be dealt with in a separate Earthworks Strategy, waste arisings during the site preparation and main construction phase are expected to be minimal.
- **construction:** surplus material, in the form of recycled aggregates or locally sourced gravels, may arise from the laying down of erosion protection and waste will be generated through the construction of the following structures and buildings:
    - operational structures: installation of a rising main linking the reservoir to Bedhampton Springs, inlet and drawdown structures, a spillway and emergency overflow.
    - operational buildings: a valve control chamber, additional pumping and pre-treatment facilities at Bedhampton Springs;
    - recreational facilities: visitor and education centre, with a cafeteria, storage areas and welfare facilities.
- **operation:** operational waste will be generated from the treatment plant at Bedhampton Springs, by visiting staff employed at the treatment works and users of the recreational facilities (e.g. arising from the proposed visitor centre).

5.4.3 Scoping Assessment

It has been considered that the effects of waste that will be generated by the construction and operational phases of the development are not likely to be significant. As such, these effects are to be 'scoped out' of the EIA process and not taken forward for more detailed consideration at this stage. The rationale for 'scoping out' each of construction and operational waste is explained further below.

Assessment of Construction Phase

Information available to date suggests that, for the construction phase, measures have already been considered that will either reduce the amount of waste produced or appropriately mitigate the effects to a level at which the impacts would be considered to be negligible. These are detailed as follows:

The preferred site of the reservoir has been selected, in part, on the basis of its favourable, sloping topography, which reduces the need for excavation and for embankment construction around the full perimeter of the reservoir. The reservoir will be formed by flooding an area of land that will be constrained through the construction of embankments on three sides only.

The Reading Beds and London Clay Formation that underlay the site have been identified as a potentially suitable source of material for embankment construction from within the reservoir basin and will be obtained through the excavation of borrow pits on the site.[15] This

15 Entec UK Limited (2006) Havant Thicket Winter Storage Reservoir Engineering Study: Final Phase Two Report. Portsmouth water Limited.

will be incorporated into an earthworks strategy that will seek to achieve a cut and fill balance on the site.

As a result, most of the excavation waste generated as a consequence of the development (rather than for the purpose of supplying material) will be generated during construction of the associated infrastructure (including services) and recreational facilities, which are not extensive in themselves. It is likely that waste generated through construction of these facilities could potentially be incorporated back into construction/landscaping elsewhere on-site, particularly for ground re-instatement following installation of the rising main. Waste arising from the construction of the pipelines will be considered as part of the assessment.

The development is situated within an area which consists of previously undeveloped land, comprising designated country park, woodland and sites of historic interest. Therefore, any surplus excavation material (in the form of Reading Beds and London Clay Formation), or topsoil, is unlikely to be classified as hazardous, increasing its potential for use elsewhere.

Topsoil and potentially subsoil will be removed from across the site and stockpiled for re-use on the outer embankment slopes. This will be included as part of a landscaping strategy for the site.

Construction impacts will be minimised and mitigated through the implementation of a Code of Construction Practice (CoCP) as described in section 3.4. The CoCP will include measures to deal with the construction waste generated on-site, in accordance with the waste hierarchy and through the strategies proposed for the earthworks, landscaping and pipeline installation. Any issues identified associated with the need to remove water from the site are addressed in section 5.13.

A Site Waste Management Plan (SWMP) will need to be prepared by the Client and Principal Contractor prior to the commencement of construction in accordance with the requirements of the Site Waste Management Plan Regulations 2008. Preparation of the SWMP will require a forecast of the types and quantity of waste to be produced and the on and off-site opportunities for re-use and recycling of the waste generated.

Assessment of Operational Phase

Given the small scale of the operational and recreational facilities proposed, it is anticipated that the quantity of waste likely to be generated from the reservoir site on an annual basis would be small. Although numbers of staff and site visitors cannot be quantified at this stage, staffing is likely to be limited to small numbers of visiting technicians and maintenance crew and waste generated by visitors is likely to be seasonal given the outdoor nature of the development.

The waste generated will need to be removed off-site for treatment and/or disposal but the annual quantity generated is not likely to impact significantly upon waste management infrastructure in the local or regional area.

The use of the pre-treatment facility at the Bedhampton Springs site will generate a waste stream. This will be considered as a part of the assessment and an appropriate waste disposal route identified. The pre-treatment facility will only be utilised on days when water is being drawn from the reservoir. This will normally be during short periods of peak demand in a dry year, for maintenance, or to address an emergency supply problem.

5.4.4 Further Considerations

The exclusion of the effects of construction and operational waste from the scope of the EIA will be reconsidered if there is a significant change in the project proposals or current mitigation strategies, or if new information arises, such as from consultees, which may indicate that the effects that were previously ‘scoped out’ are likely to be significant.

5.5 Transport

A full Transport Assessment (TA) will be conducted for the proposed development. The scope of the TA has been discussed and agreed separately with officers of Hampshire County Council, and the Highways Agency and is attached as Appendix A.

5.6 Air Quality

5.6.1 Introduction and Methodology

This section reviews the potential for significant air quality issues resulting from the proposed development to establish how the air quality in the surrounding area may be affected.

The methodology that will be implemented includes:

- assembling and reviewing existing air quality data for the baseline conditions. Such data will be collated from HBC/ EHDC air quality review and assessment documents, local air quality monitoring data and the National Air Quality Archive;
- reviewing air quality guidance and relevant national, regional and local planning policy with regard to air quality;
- obtaining information regarding the operations of the proposed development to determine the potential for air emissions. It is anticipated that the primary source of operational emissions associated with the proposed development will be traffic travelling to and from the site;
- consulting with HBC/EHDC to agree the approach to the air quality assessment;
- assessing the impacts of the construction activities and the operation of the proposed development; and
- identifying appropriate mitigation for any identified significant adverse effects – mainly during the construction phase - and operational phase of the reservoir development.

5.6.2 Baseline Data

A site visit will be undertaken to identify sensitive receptors in and around the proposed development site. Relevant traffic data from the main roads around the site will be obtained from the transport consultants

Information regarding the proposed reservoir operations will be used to determine the potential for air emissions from plant and associated equipment.

The construction programme and construction methodology for the proposed development will be used to assess construction effects.

5.6.3 Consultation

Consultation with relevant Environmental Health Officers of HBC and EHDC has been undertaken and the areas of potential concern and assessment approach have been agreed verbally in principle with both Local Authorities.

5.6.4 Potential Issues

The proposed development will have potential impacts on air quality due to dust emissions from the excavation and transportation of materials during the construction process. Vehicular traffic emissions, in particular during construction and operation of the development, will have potential impacts upon local air quality.

5.6.5 Scope of Assessment

5.6.5.1 Assessment Methodology - Construction

The assessment of construction effects will involve a review of the proposed construction works during the various phases of the development to identify any potentially adverse effects, in relation to dust emissions, at nearby sensitive receptors. The significance of

effects will be assessed using the site evaluation guidelines contained within the GLA Best Practice Guidance[16].

Effects of construction traffic in the peak construction year will be assessed in terms of its effects on baseline air quality. Measures to reduce the effects of construction traffic will be addressed in the Code of Construction Practice (CoCP), as referred to in section 3.4.

5.6.5.2 Assessment Methodology - Operation

The approach to the assessment of effects during the operation of the development will consider the changes in traffic on local roads and will examine whether any declared Air Quality Management Areas are likely to be affected by the proposals. The extent of the assessment of the traffic-related air quality effects will be determined by the extent of the Transport Assessment as agreed with HBC/EHDC. It is anticipated that this will cover the local road network and any roads experiencing a change (as a result of the development) that meet the criteria detailed in the Design Manual for Roads and Bridges.[17]

The assessment of construction and operational effects will be undertaken for the pollutants nitrogen dioxide and fine particulate matter (key pollutants of concern with regard to road traffic) using an appropriate modelling methodology (to be agreed with the EHO at HBC/EHDC during consultation). The modelling will compare the 'Do Minimum' (i.e. without the proposed development) with the 'Do Something' (i.e. with the proposed development) situation. The model will be used to derive the appropriate parameters for comparison with relevant air quality objectives and limit values in the existing year and for the proposed year of opening of the development.

The significance of effects will be assessed using the approach outlined in National Society for Clean Air (NSCA) guidance[18]. The assessment would cover consideration of ecological sensitive receptors such as sites of special scientific interest, special protection areas or special areas of conservation within 200m of the site. However there are no such designated sites located within this distance from the main reservoir site and therefore assessment is not required.

The assessment of operational air quality effects will include plant specification for on-site boilers and any other relevant plant.

The air quality assessment will be in accordance with all relevant guidance from the Department for Environment, Food and Rural Affairs (DEFRA) and NSCA regarding air quality and development planning.

5.7 Archaeology and Cultural Heritage

The construction of the proposed development has significant potential to affect archaeological and cultural heritage aspects present on and around the site. These issues will be identified and quantified in full within the ES. Archaeology and cultural heritage comprises three elements:

- archaeology;
- built heritage, and
- historic landscape.

This scope will inform the assessment process by defining which aspects should be investigated to establish how the archaeology and cultural heritage of the site and the surrounding area would be affected by the proposals. This will ensure that the breadth and level of detail of the resulting assessment is adequate to meet the requirements of the EIA.

16 GLA (2006) Best Practice Guidance, The Control of Dust and Emissions from Construction and Demolition.
17 Highways Agency (2007) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1, HA207/07, Air Quality.
18 NSCA (2006), Development Control: Planning for Air Quality

5.7.1 Baseline Data

The proposed development site lies within agricultural land which is mostly pasture, but historically was part of the Forest of Bere. The historic environment information will be collected for an area approximately 500m beyond the development's boundary; additional data will be collected across a wider area for designated features (e.g. Scheduled Ancient Monuments (SAMs) and conservation areas) in conjunction with the visual envelope defined by the Landscape and Visual Chapter.

Staunton Country Park is Grade II* listed on The Register of Parks and Gardens with many of the building of historical interest and registered on the Sites and Monuments Record. Some of the buildings within the park are listed (e.g. The Bothy, Grade II and the Chinese Bridge Grade II). Part of the park, notably The Avenue is also designated as a conservation area, which stretches northwards from the core of the park; parts of The Avenue would be removed as a result of the development proposals.

In the local area, there are a number of designated monuments and sites including the Scheduled Ancient Monument (SAM) of the medieval motte and bailey castle at Rowlands Castle; a ring and bailey at Motley's Copse approximately 3km to the north of the site and the Roman villa of Littlepark Wood just to the north of a Roman road which ran between Chichester and Bitterne, these features lie to the south west of the study area.

Prehistoric remains have been found in the locality with a Mesolithic occupation site recorded approximately 1km to the north east and finds from the Palaeolithic, Neolithic and Bronze Age, have been found within the study area.

Existing sources which are being consulted include:

- Hampshire County Council Historic Environment Record;
- listed building data resourced from English Heritage, HBC and EHDC, with locally listed buildings also held at HBC and EHDC;
- local history archives, as appropriate, for background information about the history and development of the area; and
- historic cartographic sources which will be reviewed to understand the development of the landscape.

A range of information about the park may be available from the Hampshire Gardens Trust, Havant Museum and The Garden History Society; these organisations will be contacted as part of the data gathering process.

A review of available aerial photographs will be undertaken to consider the potential for below ground archaeological features and to assist in the understanding of past landuse and truncation.

In conjunction with the above sources, site visits will be undertaken to identify any areas of apparent archaeological truncation and/or disturbance and to understand the setting of monuments, structures and features of historic interest in the surrounding area and particularly Staunton Country Park. Consideration will be given to the need for further field evaluation. Close liaison will be maintained with the landscape and visual specialists in the determination of impacts on the setting of historic features, as referred to in section 5.7.3.

5.7.2 Consultation

Consultation is being undertaken with the following:

- English Heritage (EH) historic landscape advisor;
- Hampshire County Council (HCC) archaeological officer and historic landscape officer; and
- LPA conservation planning officer.

An onsite meeting was held on 23rd June 2008 with representation from EH, HCC, Portsmouth Water and Arup. Further meetings will be undertaken as part of the consultation process.

Guidance will be sought from HCC, HBC and EHDC regarding further specific measures as may be appropriate.

5.7.3 Potential Issues

The potential issues which would arise from the construction of the reservoir proposals include: the potential to directly affect below ground archaeological deposits, the direct impact on the registered garden and conservation area, and the indirect impact on the setting of historic structures within the garden e.g. The Beacon which stands on a rise. Construction of the pipeline may also have a direct impact on sub-surface archaeological deposits.

There is a degree of overlap between the cultural heritage and landscape disciplines and the work required to understand and assess the impact of the proposals on the historic park/garden. It is proposed that the Landscape and Visual Impact Assessment will also comprise an assessment of the historic landscape; close liaison will be maintained between the cultural heritage and landscape specialists to ensure a holistic approach is adopted throughout the assessment process.

5.7.4 Scope of Assessment

A qualitative assessment of archaeological remains, built heritage and historic landscape features will be undertaken based on a combination of:

- professional judgment;
- existing designations and local and county planning policies;
- the Institute for Archaeologists: Standards and Guidance;
- other relevant policy and guidance documents identified during initial baseline collection which will be consulted and reviewed;
- the level of information relating to historic feature(s), e.g. form, date, period, fragility;
- the nature/scale and severity of the construction/operational impact;
- the potential for the survival of deposits;
- the potential for effective and appropriate mitigation; and
- consideration of whether effects will be temporary or permanent, direct, indirect and cumulative.

The assessment will conform to the principles and objectives of PPGs 15 (Planning and the Historic Environment) and 16 (Archaeology and Planning).

5.7.4.1 Assessment Methodology - Construction

Cultural heritage is a finite and non-renewal resource. An overall qualitative assessment of cultural heritage assets will be undertaken based on a combination of:

- professional judgement;
- existing designations;
- consultation with relevant stakeholders;
- the level of information relating to the feature(s), e.g. form, date, period, fragility;
- the nature/scale and severity of the construction impact;
- the potential for the survival of archaeological deposits;
- appropriate effective mitigation measures; and

- consideration of whether effects will be temporary or permanent, direct, indirect and cumulative.

Further strategic recommendations will be made detailing opportunities arising from the cultural heritage assets on the site in terms of education and community identity.

A methodology based on the Highways Agency Design Manual for Roads and Bridges, other heritage industry guidance and best practice techniques will be used.

5.7.4.2 Assessment Methodology – Operation

It is not anticipated that there will be any operational effects on archaeological resources.

The effects of the operation of the development on the remaining built heritage structures within SCP will be assessed, including the setting of the development in relation to the park, and any associated listed structures.

The effects on the setting of listed buildings, locally listed buildings and conservation areas will be assessed based on the information gathered during the work in conjunction with the landscape/visual effects assessment.

5.8 Ecology and Nature Conservation

5.8.1 Introduction

The proposed development has the potential to significantly affect the condition and function of ecological resources present on and surrounding the site. These may occur through direct impacts, such as loss of habitats and species, or indirect impacts such as disturbance effects. These issues will be identified and quantified in full within the ES.

Key ecological issues have been identified through a process of consultation with a number of organisations, plus detailed ecological surveys within and around the site (see below).

5.8.2 Baseline Data

Baseline survey data has been gathered for the entire site since 2005, this is summarised in Appendix B. Following these initial surveys, more detailed surveys for certain species and habitats are currently on-going. Data has been gathered from the wider surrounding area (up to 3km from the site), to ensure that any relevant ecological features and/or resources are identified and to determine the local context within which the site is located.

Existing sources consulted for information include:

- HBC and EHDC;
- Natural England;
- Hampshire and Isle of Wight Wildlife Trust;
- local conservation groups (e.g. Hampshire Ornithological Society) ;
- appropriate OS map information and aerial photographs; and
- relevant planning documents (see below).

Information has also been obtained from available internet information resources or databases, including the Multi-Agency Geographic Information for the Countryside (MAGIC) and the National Biodiversity Network (NBN) websites.

Primary baseline data was obtained through an Extended Phase 1 Habitat Survey (Ecosa, 2006). As a result of this, more detailed studies are underway for the following key groups:

- bats (including Bechstein's bat);
- dormice;
- badgers;
- water voles;

- amphibians (including great crested newts);
- common reptiles;
- breeding and wintering bird communities;
- aquatic and terrestrial invertebrates; and
- river habitat surveys.

A full summary of the ecological surveys completed to date, and those that are currently on-going to obtain detailed information regarding specific key habitats and species is provided in Appendix B. Additional baseline surveys are being carried out around the proposed development area site in order to assess the suitability of these areas as ecological mitigation and biodiversity enhancement sites.

5.8.3 Consultation

Consultation is being undertaken with:

- Natural England;
- Hampshire and Isle of Wight Wildlife Trust;
- Environment Agency;
- local conservation groups;
- HBC and EHDC; and
- HCC

All of these organisations (except Natural England) are members of the key stakeholder group which has met regularly since 2004. There is an ecological sub-group which has, in part, guided the survey work required to inform the development.

5.8.4 Potential Issues

Using information gained for the project site to date, ecological issues of likely significance include:

- direct loss of ancient woodland, ancient replanted woodland, grassland, and scrub habitat types to the footprint of the development and its associated infrastructure;
- direct losses of species or individuals accidentally during site clearance or indirectly during site operation as they are displaced from the newly-developed area;
- damage to habitats during construction, as a result of, for example, accidental pollution, discharge of materials or intrusion into retained areas;
- disturbance of species during construction, through noise, and the presence of people and machinery;
- fragmentation of habitat links and loss of connectivity between existing areas of value;
- direct and indirect loss of aquatic habitat associated with tributaries to the Riders Lane Stream;
- direct loss of river bank habitat; and
- disturbance of species during operation, as a result of, for example, the presence of additional people and recreational activities.

5.8.5 Scope of Assessment

A qualitative ecological assessment will be undertaken in accordance with the Ecological Impact Assessment Guidance produced by the Institute of Ecology and Environmental Management (IEEM) 2006. Impacts will be assessed from empirical data and through experience of similar schemes locally and elsewhere. Where possible, context will be given to the significance of impacts by reference to UK, regional and local biodiversity targets.

The ecological assessment will consider all habitats and species that are relevant to the site and surrounding area. The assessment will establish the conservation objectives of current ecological guidance and policy at all levels, and will be in compliance with key nature conservation legislation i.e. the Wildlife and Countryside Act 1981 (as amended), the Conservation (Natural Habitats &c.) Regulations 1994 (as amended), and the Natural Environment and Rural Communities (NERC) Act 2006.

An assessment will be made of the potential for habitats to support species protected by law or otherwise of particular nature conservation value. The information collected should then be used to identify potential ecological constraints and will be used to inform any further work necessary in regards to the proposed development.

The assessment will apply qualitative scheme specific criteria taking into consideration the following:

- size, value and sensitivity of the ecological resource;
- magnitude, extent and direction of potential impacts (positive or negative);
- ability of the ecological resource to recover from temporary effects;
- consideration of duration and frequency– short, medium or long-term; consideration of reversibility; and
- the potential for effective mitigation.

The ecological assessment will inform the need for any mitigation or compensation whilst highlighting opportunities to incorporate ecological enhancements within and outside of the scheme. Mitigation measures will include reference to the Code of Construction Practice for the proposed construction programme.

Maintenance of new habitat associated with the operational phase of the proposed development via the implementation of an ecological management plan will also be discussed. The design of any ecological mitigation, compensation or enhancement will follow IEEM 2006 guidelines, as well as any other published best practice guidelines specific to the type of habitats to be provided. The design of these measures will be agreed with the consultees set out in Section 5.8.3.

Potential water quality and flow effects of the proposed development on the cited features for which the Solent European Sites, including the Chichester and Langstone Harbour SPA, were designated, including the likely affects of water abstraction from, and discharge to, these Sites, are being investigated through the Appropriate Assessment (AA) process. The early stages of the AA are currently being carried out by Arup. Potential impacts on the designated features of the Solent European Sites will not therefore be repeated within the EIA. However, the information will be provided as supporting information for the planning application. Additional impacts on other (non-cited) features of the Solent European Sites are not predicted.

5.9 Ground Contamination

5.9.1 Introduction and Methodology

This section describes the proposed assessment methodology for the assessment of impacts of potential contamination associated with past and current uses of the site, and key aspects of the development which may give rise to significant environmental effects arising from construction and operation of the proposed development.

The assessment will comprise a review of the available information on ground conditions and consideration of the effects of the ground works on the prevailing ground conditions. It will identify the requirements for mitigation in construction and for protection against ground contamination in the design of the development. The contamination assessment will be risk-based and consider sources, receptors and plausible pollutant linkages in accordance

with government guidance and the UK framework for the assessments of risks arsing from contaminated land.

The guidance set out by the Environment Agency in Model Procedures for the Management of Land Contamination, Technical Report CLR11 (2004) and the key UK policy document Planning and Policy Statement 23 (PPS 23), Planning and Pollution Control, Annex 2: Development on Land Affected by Contamination (2004) will be followed.

5.9.2 Baseline

The proposed development site area lies mainly within woodland and agricultural land which is mostly pasture, whilst the pipeline route is occupied by parts of Riders Lane Stream and urban areas associated with Leigh Park. There are currently no identified sources of significant contamination associated with the site. The baseline for the development will be taken as the current site condition.

5.9.3 Data Sources

The subsurface ground conditions and potential for ground contamination on and around the main site will be determined from the following data sources:

- non-intrusive site inspection;
- historic mapping of previous landuses;
- aerial photographs where available;
- Environmental Health Departments of HBC and EHDC;
- Environment Agency "What's in Your Backyard" data sources; and
- existing ground investigation data obtained from previous investigations.

Several phases of site investigation have taken place including, most recently, work by Soil Mechanics in January 2007, which provided information on the suitability of the 'borrow pit' material as construction material. This was reported on by the Entec Ltd in their "Embankment Material Investigations" report. Earlier investigations were undertaken by Edgar Morton & Partner, 1963 and Mander, Raikes & Marshall, 1978.

No ground contamination testing has been undertaken to date, and it is not proposed to specify ground contamination testing in order to complete the assessment.

5.9.4 Consultation

Consultation will be undertaken with officers of the Environmental Health Department of HBC and EHDC, as well as the Environment Agency's Contaminated Land officer.

5.9.5 Potential Issues

The potential for significant contamination at the majority of the site is considered to be very low, based on an initial review of historical maps and aerial photography. The potential for contamination in the area occupied by the proposed pipeline route is considered higher given that it passes through the urban district of Leigh Park, although it is still considered to be low. The proposed development in operation is not considered to represent a new contamination source.

5.9.6 Scope of Assessment

A qualitative assessment of the ground contamination issues and any proposed mitigation measures will be undertaken using a source-pathway-receptor risk assessment methodology and conceptual site model.

5.9.6.1 Assessment Methodology - Construction

This assessment will be based upon:

- professional judgment;
- a seven tier scale of Significance of Effects from Major Adverse to major Beneficial;

- factual information from the existing ground investigations; and
- outline scheme proposals for the development, and in particular re-profiling of excavated materials, and hard development.

Mitigation measures will include reference to the Code of Construction Practice for the proposed construction programme.

5.9.6.2 Assessment methodology – Operation

The assessment methodology will be similar to that described above, taking account of the final condition of the ground following development. Following the implementation of any mitigation measures found to be necessary during construction, and best practice procedures with respect to the provision of new plant and equipment, residual effects arising from operation of the development will be assessed.

5.10 Landscape and Visual

5.10.1 Introduction and Methodology

The landscape and visual assessment will examine the natural topography of the site and immediate area to establish its quality, character, and specific features. It will determine the degree to which the existing landscape will be affected both directly and indirectly by the proposed development. The assessment area will also be evaluated in terms of sensitivity to change i.e., the capacity of the landscape to accept change of the type and scale proposed.

The proximity of Staunton Country Park which appears as Grade II* on the Register of Historic Parks and Gardens, maintained by English Heritage, is a key consideration within the landscape assessment. It is intended to link directly with the archaeology and cultural heritage assessment to ensure coherency and to identify potential impacts and explore mitigation measures.

The visual assessment will examine key views of the proposed development from the neighbouring environment. A visual survey will record and identify sensitive receptors, principally residential areas such as Warren Park, Leigh Park and Rowlands Castle, public spaces, open spaces and designated historic views that would be affected by the proposals. In order to evaluate this effect, a Zone of Visual Influence will identify the potential extent to which the proposed development will be visible from the surrounding area. Views of the site will be assessed in relation to the landscape character areas and specific viewpoints will be identified and agreed with the local authorities, and for which photomontages will be prepared. The assessment will consider the visual impact from these specific viewpoints.

In order to ensure consistency the assessment is based upon advice contained in the following guidelines:

- Guidelines for Landscape and Visual Impact Assessment, published by the Landscape Institute and Institute of Environmental Assessment (LI and IEA) (2002);
- Landscape Assessment Methodology, Design Manual For Roads and Bridges (DMRB) Highways Agency; and
- Landscape Character Assessment Guidance for England and Scotland, The Countryside Agency and Scottish Natural Heritage, 2002.

The Guidelines for the Landscape and Visual Impact Assessment (LI and IEA) and the Landscape Assessment Methodology (DMRB) are both currently under review and the methodology that is used for this project will seek to accommodate recent developments in these methodologies.

5.10.2 Baseline

The following information is being reviewed in conjunction with the development proposals:

- Natural England's Landscape Character Assessment – Character Area 126, South Coast Plain;

- Havant Borough Townscape, Landscape and Seascape Character Assessment –LCA20 Staunton Country Park;
- East Hampshire Landscape Character Assessment – Area 10a Havant Thicket and Southleigh Forest;
- local plan policies with relevance to landscape considerations, including heritage landscapes;
- historic map evidence to identify designed historic viewpoints;
- OS mapping – topography and modern viewpoints;
- Leigh Park Gardens, Havant, Restoration Masterplan for the Historic Gardens Report; and
- the identified Zone of Theoretical Visual Influence.

5.10.3 Consultation

Consultation will be undertaken with the following bodies in order to identify visual receptors, viewpoints and potential mitigation measures:

- Landscape Officers from the two Local Authorities;
- Hampshire County Council;
- English Heritage and the Garden History Society;
- Havant Museum and Garden Society.

5.10.4 Potential Issues

The following issues will be addressed within the assessment of landscape and visual effects:

- the visual impact of construction operations;
- the impact on views from properties within Rowlands Castle and Warren Park;
- visual impact of the construction of the pipeline and subsequent restoration;
- the loss of designated ancient woodland and ancient replanted woodland;
- impacts on the rural landscape setting, character and appearance of the local area as a result of development in the countryside;
- the loss of publicly accessible open space;
- the appearance of engineering embankments, roads, hardstanding or structures from residential areas;
- the appearance of internal slopes of reservoir during drawdown;
- impacts on designed historic views and vistas;
- impacts on the character and setting of the Grade II* Staunton Country Park (including listed buildings or structures) and conservation area;
- the visibility from high points within the locality;
- views of the visitor centre and associated facilities including car parking; and
- views of the control house.

5.10.5 Scope of Assessment

The landscape assessment will determine the degree to which the existing landscape character, setting and quality will be affected both directly and indirectly by the proposed development. The visual assessment will examine changes to existing views and vistas due to the proposed development from the surrounding landscape. The assessment will consider the impact from specific key viewpoints for which photomontages will be prepared;

the location of photomontages will be agreed with HBC and EHDC. Both the landscape and visual assessment will follow the standard guidance identified in section 5.10.1.

Appropriate mitigation measures and design recommendations for the proposed development will be identified. The residual landscape and visual effects of the proposed development will also be assessed.

5.11 Noise and Vibration

5.11.1 Introduction and Methodology

This section of the scoping report reviews the potential for significant noise and vibration effects arising from the proposed development. The assessment process will define which aspects of construction and operation should be investigated to establish how the surrounding area may be affected by noise and vibration. This will ensure that the breadth and level of detail of the resulting assessment is adequate to support the planning application.

5.11.2 Baseline Data

A baseline noise survey will be conducted at selected locations around the proposed site representative of both isolated dwellings and communities.

Long-term measurements will be taken over a period of approximately a week at two locations at residential locations to the southwest and northeast (if practicable to gain access at representative positions). These results will indicate the variations in noise level over time due to differences in traffic and other noise sources over a typical week. Short-term monitoring at approximately eight positions will provide detail of the noise climate at other locations around the proposed development. These will be predominantly residential locations, but non-residential, noise sensitive leisure-use locations, such as footpaths, will also be included.

The attended site surveys will also identify existing noise sources and provide an impression of the overall noise climate in each area. Although potential noise monitoring locations will be identified from mapping information prior to the visit, the final selection will be made based on observations made on site.

Given the short-term nature of the linear pipeline works, which would be expected to pass any given receiver location within a period of days, it is not planned to take extensive baseline noise measurements along the pipeline corridor.

5.11.3 Consultation

Consultation will be carried out with the Environmental Health Departments of HBC and EHDC, and any other stakeholder groups proposed by the LPAs. The LPAs have already been consulted on the baseline data requirements, monitoring locations, approach and assessment criteria.

5.11.4 Potential Issues

The proposed scheme would potentially affect the noise climate of the area primarily as a result of the construction works which extend over a period of years. Construction activities which will be considered as part of the noise assessment would include:

- preliminary works such as road and drainage diversions and services diversions;
- bulk import of materials (if appropriate);
- excavation and earthworks;
- transfer / export of materials (if appropriate); and
- infrastructure / installations works (including the pipeline and pre-treatment facility away from main site).

Much of the construction works would take place well within the site boundary and the embankment itself would potentially provide a degree of screening once constructed.

Given the distance between the main works and the surrounding sensitive receivers it would not be expected that vibration from construction activities would result in any significant effects.

Operational noise will be considered as part of the assessment, although it is not envisaged that there will be any plant or machinery noise effects associated with the reservoir facility itself. As all plant would be housed inside a control room structure or the embankment, plant noise will be controlled at source by appropriate measures. Vehicle movements associated with maintenance and future leisure activities will be assessed. Operational noise associated with pre-treatment and pumping facilities at Bedhampton Springs will also be considered.

5.11.5 Scope of Assessment

5.11.5.1 Assessment of Construction

Noise levels from the construction of the proposed reservoir and associated infrastructure will be predicted at surrounding noise sensitive receivers. Noise levels will be estimated using British Standard 5228 – Noise and Vibration Control on Construction and Open Sites[19]. The prediction method contained in the Standard calculates noise levels at selected receivers based on source noise levels, propagation distance, details of the intervening ground cover, topography and screening. This information will be entered into a proprietary computer noise model which will allow noise mapping of construction noise emission in the study area around the proposed site. Detailed information on the proposed construction process, types and numbers of plant machinery, activity locations and duration of the various stages of the works will be obtained from the engineers developing the proposed scheme. This information will be based primarily on the Construction Method Statement (CMS). It is considered that this detailed modelling would provide a sufficient level of accuracy for this assessment.

Based on the proposed construction programme from the CMS, the various elements of the construction works will be grouped into phases for the purpose of the noise assessment. These phases would reflect the different noise exposures that would occur over time at representative noise sensitive receiver locations. Clearly, for construction noise which is a temporary, changing noise source, the duration of the different noise exposures is relevant to the assessment of potential effects as well as the absolute noise level.

The calculated noise levels will represent the noisiest periods when the maximum number of activities would be operating simultaneously during any given phase of the work. The predicted noise level will therefore represent the maximum noise level during each phase and may be lower at other times when not all of the processes are happening at the same time.

The baseline survey data will be used to evaluate whether the construction noise would be prominent over the existing daytime noise levels, which would enable the likely significance of potential effects to be assessed. It should be noted that construction works would generally be limited to conditioned working day hours as defined by local authority policy.

Noise levels arising from the pipeline works will be estimated from generic activities which would proceed along the route. The effects will be considered and reported although these would be expected to be limited, as the duration of the linear works in any one location would be relatively short.

The BS 5228 Standard also provides information on the prevention and control of construction noise and vibration, which would be taken into account.

19 BRITISH STANDARDS INSTITUTION (1997), BS 5228 *Noise and Vibration Control on Construction and Open Sites,* British Standards Institution

5.11.5.2 Assessment of Operation

The relevant potential noise sources (e.g. any plant machinery, traffic generation and any other miscellaneous activities) will be identified and assessed. Traffic noise changes will be predicted using the standard method: Calculation of Road Traffic Noise[20]. The magnitude of traffic noise changes arising from the northern approach road and existing roads will be calculated and any noise effects identified according to relevant significance criteria. Plant noise criteria will be applied following comparison with measured background noise data as appropriate.

5.12 Socio-Economics and Communities

5.12.1 Introduction and Methodology

An assessment will be undertaken of the potential for significant impacts arising from the development on socio-economic and community issues. This will consider both beneficial and adverse and direct and indirect effects when compared against existing baseline conditions. As there are no recognised methodology or assessment criteria for undertaking such an assessment, the assessment will rely on professional judgement, taking into account the results of consultation with stakeholders. In general, community aspects will be considered within the site area plus 5 km (approximately). A wider study area will be used when considering amenity issues.

5.12.2 Baseline Data

Baseline data will be collected from within the red line and the surrounding area based on census boundaries. Baseline data will be collected from primary and desk-based data sources and will include:

- undertaking a site visit to identify site activities and conditions within and around the red line;
- reviewing relevant local policies, legislation and guidance documents in relation to socio-economic issues in HBC and EHDC e.g. health provision, leisure and recreation, employment;
- reviewing web based Government Indices of Deprivation and NOMIS employment data;
- consulting with relevant service providers such as recreation and leisure; and
- identifying key local facilities and sources of employment in the vicinity of the proposed development.

5.12.3 Consultation

Consultation will be undertaken with HBC and EHDC to inform understanding about local regeneration initiatives that are planned and are being implemented. Consultation will also be carried out to establish current levels of leisure and recreational provision in the locality as a community resource.

5.12.4 Potential Issues

The following issues have been identified:

- the scheme may attract a large number of visitors from a wide catchment area, potentially leading to a negative effect on local facilities, including road networks and hence on local amenity;
- changes to existing access routes used by the local community; and
- there is likely to be a net increase in employment generated by the proposed development during construction and operation. The assessment will review the potential for this employment to be met locally in terms of skills and availability of resources.

20 DEPARTMENT OF TRANSPORT WELSH OFFICE (1988), *Calculation of Road Traffic Noise,* HMSO

5.12.5 Scope of Assessment

The assessment will consider effects arising during the construction and operation of the proposed development. This will primarily be in terms of changes in employment and changes in the provision of recreational and leisure facilities. Indirect effects, for example increases in employment for local services to meet the needs of construction workers and permanent staff, will also be considered.

5.12.5.1 Assessment of Construction

The construction assessment will estimate the likely number of construction jobs generated from the proposed development based on the cost of constructing the development.

Account will be taken of the need and opportunities for targeting construction employment to the local community.

5.12.5.2 Assessment of Operation

The operational assessment will compare existing socio-economic and community conditions within and around the site in terms of likely employment and amenity changes and provision of leisure and recreational facilities against the proposed development.

Any likely change in service provision resulting from the proposal will be considered in terms of the number of visitors proposed and existing levels of supply and demand.

The operational assessment will take into consideration the cumulative effects of other development for example in terms of additional visitor provision and the cumulative effects this may have on local service provision.

Mitigation measures will be suggested in response to any identified significant adverse effects. Consideration will also be given to opportunities for enhancement.

5.13 Water Resources

5.13.1 Introduction and Methodology

The water resources assessment will cover issues relating to surface water, groundwater, hydrology and flood risk and water quality. The assessment will examine the degree to which the existing quantity, character and quality of resources will be affected directly or indirectly by the proposed reservoir development, and will cover the potential impacts of the reservoir on groundwater and surface water resources during the construction phase and during the operation and lifetime of the reservoir.

The methods used to identify key issues will include:

- desk studies to review existing groundwater, surface water and hydrological data for the catchment and surrounding areas;
- consulting with the stakeholders such as the Environment Agency, HBC, HCC, EHDC Southern Water as appropriate to ascertain discharge constraints, ground and surface water quality, aquifer flows and abstraction potential;
- considering relevant local, national and European policies and guidance, particularly the Environment Agency's Groundwater Protection Policy;
- river surveys and geomorphological surveys to update data from previous surveys;
- hydrogeological and geological maps of Hampshire and Isle of Wight;
- British Geological Society (BGS) memoirs and reports on physical properties of aquifers in England and Wales;
- relevant technical and scientific papers;
- the Environment Agency Hampshire Groundwater Model;
- Environment Agency groundwater hydrograph data provided to Arup for the groundwater desk study and any other flow data which the Agency will provide;

- previous intrusive site investigation data and any new data obtained as part of the preliminary design works; and
- information held by Portsmouth Water.

5.13.2 Baseline Data

5.13.2.1 Surface Water Flows

Construction of the reservoir is expected to change the flow regime of surface water resources within the catchment of the reservoir. A small number of watercourses run from Havant Thicket in the north, southwards across the site. The streams converge into the Riders Lane Stream towards the south of the site, which then flows into the Hermitage Stream approximately 1.35km south of the main reservoir site boundary. Baseline data obtained from surveys over summer 2008 indicate that there is often little or no flow in these streams. Further assessments of winter flows will be necessary. The streams are currently un-gauged. Overflow from the reservoir will probably discharge to Riders Lane Stream.

Geomorphological surveys have been carried out on the Hermitage Stream, Riders Lane Stream and Park Lane Stream, all of which are being investigated for discharge of storm overflow and to meet emergency drawdown requirements. Preliminary field surveys carried out by Arup have shown the Hermitage Stream consists of alternate natural, channelised and culverted sections.

5.13.2.2 Surface Water Quality

In July 2008 Portsmouth Water began a schedule of monthly water quality sampling at three key sites on the small streams that will feed the reservoir and one critical site downstream (post confluence in the vicinity of the proposed reservoir discharge point) in order to provide basic water quality data. A further seven sites are to be sampled on three occasions (December 2008 to May 2009) at key confluence points downstream of the reservoir to help calibrate the water quality model. Gauging is also being carried out at the Environment Agency's New Road station. The period of water quality monitoring so far is considered too short to fully characterise the waters as not all streams were flowing at the beginning of the programme.

5.13.2.3 Groundwater

A preliminary desk study shows that approximately half of the reservoir site is covered by Quaternary Head (Undifferentiated) Deposits, comprising variable flinty clay and clayey silt with some very flinty loam.

Over the majority of the site this is underlain by the Eocene London Clay Formation. In the southern two-thirds of the site the London Clay Formation comprises stiff, grey brown-weathering silty clay; clayey silt and fine grained silty sand. The London Clay Formation in the northern third of the site comprises sand and silty loam with abundant flint pebbles and cobbles. This material is known as the Harwich Formation (formerly known as the London Clay Basement Beds). This is in turn underlain by the Palaeocene Reading Formation, which comprises mainly stiff red and grey mottled clay; fine-grained clayey sand and, locally, ferruginous sandstone at its base. Below these deposits lies the cretaceous Chalk.

Little information from previous site investigations exists regarding the Chalk beneath the site at depth. Only two of the previous site investigation boreholes reached the Chalk surface. Recorded Chalk depths are in excess of 30 metres below ground level. To the north east of the site, where Palaeogene deposits outcrop directly above Chalk, a number of solution features are present within the deposits. These features, a result of dissolution of the Chalk, are considered to be important in the local groundwater flow. The groundwater flow in the Chalk is in a southerly direction, towards the Havant and Bedhampton Springs.

The Chalk rock is classified as a major aquifer that is regionally important in potable groundwater supply. The chalk aquifer is considered to be a dual porosity aquifer with water contained in both the micropores of the Chalk rock and within the fractures and fissures. Volumetrically, most of the water is contained within the pores of the rock, however due to

their small size groundwater cannot flow easily through them. Instead, most groundwater flow within the chalk takes place through fractures and fissures which are present within the bulk rock structure. Limited information is available on the groundwater levels in the chalk beneath the site; however regional modelling suggests that they are likely to range from approximately 0 to +20 mOD. Groundwater in the Chalk beneath the site is confined by the overlying Palaeogene deposits.

Groundwater is also likely to be present within the overlying Palaeogene deposits however the volumes of water contained within them will be significantly less than in the Chalk. Groundwater is expected to be present within the Harwich Formation and possibly the Reading Formation and Quaternary Head deposits. Groundwater levels within the Harwich Formation are expected to be close to the surface. Where the Harwich Formation becomes progressively confined by the overlying London Clay Formation, to the south, groundwater may exhibit artesian behaviour, particularly in areas of low elevation. Groundwater levels within the other deposits overlying the Chalk will be highly dependant on local variations in material properties as well as their lateral and vertical persistence.

5.13.3 Consultation

Consultations are proposed with the following stakeholders:

- Southern Water, regarding drainage and existing infrastructure within the proposed construction area, including the pipeline route;
- the Environment Agency regarding local hydrogeology and hydrology, the FRA to be carried out by Arup, proposals for dewatering and the potential requirement for a temporary abstraction licence; and
- HBC and EHDC regarding any local flood risk maps and local drainage / flooding information, and existing amenities such as public footpaths currently following the Hermitage/ Riders Lane Streams, along which part of the pipeline route will fall.

5.13.4 Potential Issues

As a result of the construction of the reservoir, key impacts on water resources are expected to include:

- diversion of existing watercourses running through the site during construction;
- dewatering of borrow pits, followed by appropriate disposal to surface drainage of the silt-laden water;
- drainage of the embankment during the construction and operational phase.;
- changes to the river bank formation and habitats due to pipeline construction;
- changes to the flow regime in the Hermitage Stream and Riders Lane Stream, and possibly Park Lane Stream, due to the introduction of compensation flows from the reservoir as well as use of the overflow spillway for extreme events, or emergency drawdown testing;
- loss of riverine habitat as a result of reservoir construction. The loss of three small streams that issue from the Forestry Commission area north of the site, flow south through the site to converge at Riders Lane Stream which drains the reservoir site. The total length lost will be approximately 4.1 km;
- altering the quality of water of the downstream watercourses and that entering the designated sites via the Hermitage Stream;
- potential leakage from base of the reservoir, particularly in areas of the site underlain by the Harwich Foundation. Further leakage could occur through the sandy part of the London Clay underlying the proposed embankment;
- water quality changes in groundwater due to leakage. These are expected to be minimal, however, because of the quality of the water that is to be pumped into the reservoir, as

well as the impermeability of the London Clay and Reading Clay formations beneath most of the site. The likelihood of penetrating the chalk aquifer beneath is considered to be low; and

- potential impacts of abstraction from the Havant and Bedhampton Springs to fill and replenish the reservoir.

5.13.5 Scope of Assessment

A number of separate assessments will be required to determine the full scope of water resources impacts.

5.13.5.1 Surface Water Assessment

A geomorphological assessment will be undertaken of the watercourses that may be potentially affected by the construction of the Havant Thicket Reservoir. Watercourses covered by the study include Riders Lane Stream, Park Lane Stream, Hermitage Stream and the three small streams traversing the site. All are un-gauged, except for an Environment Agency gauging station on the lower section of the Hermitage Stream at New Road, Havant. If planning permission for the reservoir scheme is granted, it is likely that a new gauging station will need to be placed just downstream of the planned reservoir outlet to allow continuous flow monitoring on the Riders Lane Stream to be undertaken to inform any decision with respect to the required volume of discharge needed as a compensation flow from the reservoir.

A flood risk assessment (FRA) will be undertaken for the reservoir and surrounding areas. The FRA requirements will be based on PPS25 and guidance from the Environment Agency. It is expected that the existing flood risk is minimal because of the small size of natural catchment, and the construction of the reservoir may reduce flood risk further by attenuating flows.

Construction Phase

The geomorphological assessment will examine the potential for degradation of bankside vegetation during construction, particularly along the portions of the Hermitage Stream and Riders Lane Stream close to which the pipeline will be constructed. It is proposed that the existing watercourses will be diverted as appropriate through the emergency drawdown pipeline in the culvert during construction.

The assessment will suggest mitigation measures, such as the restoration of river banks to their original state at crossover and pinch points where construction directly impacts the stream.

Operational Phase

The operational phase of the reservoir will need to quantify likely proposed discharges from the reservoir site and the pipeline, any surface water or groundwater abstractions and comparison with the baseline. An outline Drainage Strategy would be required as the basis for the assessment. The proposed spillway is currently expected to discharge into the Hermitage Stream, via the Riders Line Stream. The potential impacts on the watercourses, both positive and negative, will be assessed and appropriate mitigation measures proposed.

Compensation flows will be required in the Riders Lane Stream and, based on discussions with the Environment Agency to date, will be expected to mimic natural flow i.e. increase the winter flows and reduce in the summer, following the shape of the natural hydrograph. If planning permission is granted for the reservoir scheme further hydrological assessments and gauging of Riders Lane Stream will be necessary to confirm the existing flow regime of the stream.

Finally, the FRA will determine the level of flood risk posed by the construction of the reservoir, and will determine operational issues, according to PPS25 and guidance from the Environment Agency.

5.13.5.2 Groundwater Assessment

A hydrogeological site investigation will be required. This will be based on recommendations from a hydrogeological desk study currently being undertaken by Arup. The desk study is reviewing the regional and local hydrogeological regime to determine how the construction of the reservoir may impact upon it. Consideration of the local hydrogeological system is key to understanding any risks that groundwater flow beneath the reservoir or embankment dam may present. The study will also consider the water tightness of the reservoir. The study will use existing data along with groundwater models that will be obtained from the Environment Agency.

Construction Phase

The construction site itself is a non-aquifer; however, groundwater in the Harwich Formation is known to rise above ground and could become an issue during construction. Furthermore, upward water pressure could cause unstable ground where excavations are undertaken close to the end of a water-bearing formation.

The hydrogeological assessment will examine the above risks and determine whether dewatering (draining the construction site of groundwater rising to the surface) will be required. The hydrogeological assessment will also determine whether the construction will impact on the chalk aquifer, although this is considered unlikely.

Operational Phase

Over 70% of the Southeast Region's public water supply comes from groundwater, hence the protection of aquifers from over-abstraction and pollution is of particular importance. The Environment Agency also draws attention to the importance of groundwater for maintaining flows in watercourses of ecological importance. While continued abstraction from the Havant and Bedhampton Springs is expected to be within Portsmouth Water's licence, and therefore subject to the controls and monitoring imposed by the licence, a hydrogeological assessment will determine if any long term effects will be expected on the aquifer system. This is being carried out as part of the Appropriate Assessment of Langstone Harbour.

5.13.5.3 Water Quality Assessment

An assessment of the potential quality of water in the reservoir will be carried out, informed by the water quality sampling described in section 5.13.2.2. The assessment will take into consideration the quality of the pumped water from the Havant and Bedhampton Springs, as well as inflows from the catchment. Up to 21 water quality parameters will be modelled, including nitrates, total dissolved solids, turbidity, phosphates, sulphates, dissolved oxygen, iron, manganese and suspended solids. Initial work suggests that the quality of water within the reservoir will be "Good" as defined by the Water Framework Directive for a "Highly modified water body". Stagnation, nutrient enrichment and algal growth appear very unlikely due to the nature of the catchment and the principal source of water (groundwater from the chalk aquifer). This is to be confirmed by the modelling exercise.

Construction Phase

The assessment will need to look at alternatives for disposal of water from the borrow pits, either through discharge to surface water or discharge to sewer, if dewatering is required. The Environment Agency has stated that a temporary discharge licence may be required for this. The assessment will need to address mitigation measures to address the issue of sediment in the water before it is discharged. An assessment will also be required to ensure that watercourses diverted through the emergency drawdown pipeline are not contaminated.

Operational Phase

There is evidence of sediment storage in the Riders Lane Stream (Great Copse) as well as at the confluence with the Hermitage Stream at Stockheath. Potential changes in sediment load and transport are unlikely from the normal operation of the reservoir and these will not be considered in detail as part of the assessment.

5.14 Cumulative Effects

Schedule 4 of the EIA Regulations requires that the assessment of effects includes cumulative effects with other developments. The Regulations do not specifically state which types of development should be included or the stage at which other proposed developments are in the planning process. However it is generally accepted as good practice to include the assessment of committed developments that either have full planning permission or those which have resolution to grant planning consent subject to Section 106 agreement. On this basis there are no known significant development projects in the vicinity of the site that are considered to be required within a cumulative effects assessment.

Land at Dunsbury Hill Farm is identified in the local plan for employment use. HBC has produced a development brief that forms the basis of pre-application engagement with the community that will be undertaken by the developer. In terms of transport effects, a development objective for the allocation is that the site provides an entrance from the A3(M). At this stage the development is allocated but does not have planning consent and therefore it will not be included in the Transport Assessment. It would not be feasible to estimate trip attraction to Dunsbury Hill as part of the assessment.

Hampshire County Council highlighted that Fuller Smith & Turner have been granted planning consent for a distribution warehouse at Dell Piece East, Horndean. The Transport Assessment supporting the application will be used to account for vehicular trips generated by this development in the background traffic flow. No other allocated or committed developments that could affect the scope of the transport assessment are identified. However there may be proposals coming forward that the Local Authorities will be aware of, and information regarding these will be sought as part of the assessment.

Although only one development has specifically been identified for inclusion in the TA this does not mean that the TA will exclude the impact of projected future growth in the area. Growth factors based on TEMPRO will be applied to the existing background traffic flows to account for changes in the number of residences and jobs in the area. TEMPRO (**T**rip **E**nd **M**odel **P**resentation p**RO**gram) is the Integrated Transport and Economics Appraisal developed by the Department for Transport (DfT). The data is itself the output from a series of models developed and run by the DfT. TEMPRO has been in existence for several years and is the standard tool used in assessing the growth of background traffic due to housing and employment development in the local area.

5.14.1 Residential Development at Park House Primary School

Planning permission has been granted for 60 dwellings at the Park House Primary School site in the Bancroft ward. The number of car journeys in the HTWSR peak hour (Sunday 1500-1600) has been estimated using TRICS (a standard modelling tool which uses surveys of existing land uses to predict the number of trips by proposed development). The number of trips is shown below:

Trip Rate	**Arrivals**	**Departures**	**Total**
Per Residence	0.275	0.198	**0.473**
For 60 houses	17	12	**29**

The number of trips going past the reservoir is unlikely to be significant as the majority of trips are likely to be routed along the A3(M). It is therefore proposed that this site is not modelled in the TA, but an allowance for an increase in background flow will be modelled using the TEMPRO programme as outlined above.

FIGURES

Figure 1 Location Plan

Provisional Red Line
Provisional Pipeline Alignment
Ditch
Stream / River
Rail Station
Railway
Motorway
Proposed Top Water Level
Inner Embankment
Outer Embankment

Issue	Date	By	Chkd	Appd
P1	12-02-09	DC	IS	AL

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Client
Portsmouth Water

Job Title
Havant Thicket Winter Storage Reservoir

Drawing Title
Figure 1
Location Plan

Scale at A4
1:25,000

Drawing Status
Preliminary

Job No	Drawing No	Issue
123755	Figure 1	P1

Figure 2 Context Map with Designations

Horndean

Potential Addition to Red Line Area

Cowplain

Havant Thicket

Rowlands Castle Station

Rowlands Castle

A3 (M)

Waterlooville

Southleigh Forest

Leigh Park

Havant

Bedhampton Station

Havant Station

Warblington Station

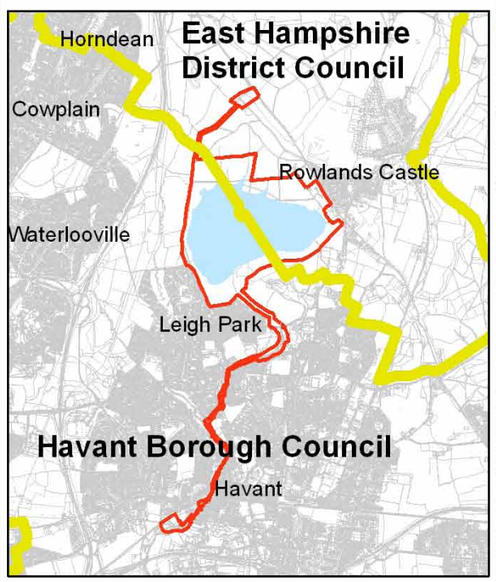
A27 (T)

Emsworth Station

Emsworth

Provisional Red Line
Provisional Pipeline Alignment
Ditch
Stream / River
Train Station
Railway
Motorway
Registered Parks and Gardens
Conservation Areas
Proposed South Downs National Park
Site of Importance for Nature Conservation
Proposed top water level
Local Nature Reserve
Ancient Woodland
Ancient Replanted Woodland
Area of Outstanding Natural Beauty

Administrative Boundaries



P1	12-02-09	DC	IS	AL
Issue	Date	By	Chkd	Appd

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Client
Portsmouth Water

Job Title
Havant Thicket Winter Storage Reservoir

Drawing Title
Figure 2
Context Map with Designations

Scale at A3
1:25,000

Drawing Status
Preliminary

Job No	Drawing No	Issue
123755	Figure 2	P1

Figure 3 Site Layout Plan

471000
472000
111000
110000
109000
108000
107000
Potential Addition to Red Line Area
Culvert
Drawdown Structures
Control House
Havant Thicket
Horsefoot Hill
Stein Wood
Long Wood
Furzy Plain
Blendworth Common
Weirs
Bell's Copse
Middle Clearing
Upper Lake
The Lake
Staunton Country Park
Swallow Holes
Leigh Park
West Leigh
HAVANT
Durrant
High Lawn
Leigh Park Gardens
Great Copse
Stockheath Common
Industrial Estate
Arts Centre
Bedhampton Springs
B2149
Monarch's Way
Staunton Way
Manor Lodge Road
Prospect
Red Hill
Provisional Red Line
Provisional Pipeline Alignment
Culvert
Drawdown Structure
Ditch
Stream / River
Top Water Level
Inner Embankment
Outer Embankment
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P1	12-20-09	DC	IS	AL
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Client
Portsmouth Water
Job Title
Havant Thicket Winter Storage Reservoir
Drawing Title
Figure 3
Site Layout Plan
Scale at A3
1:14,000
Drawing Status
Preliminary
Job No	Drawing No	Issue
123755	Figure 3	P1
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Figure 4 Outline Plan

HAVANT THICKET
WINTER STORAGE RESERVOIR
FIGURE 4 - OUTLINE PLAN
AUGUST 2008

EXISTING
- Existing Viewing Point
- Existing Car Park
- Existing Cycle Hire
- Existing Woodland
- Existing Grassland
- Watercourse
- Existing Path / Track
- Existing Bridleway
- Existing Cyclepath
- Bus Routes
- Staunton Way

PROPOSED
- Marshland
- Reedbed
- New Woodland Planting
- Wildflower Meadow
- Access road (along existing track)
- Proposed Footpath
- Proposed Bridleway
- Proposed Cyclepath
- Reservoir Control House

ACTIVITIES
- Childrens Playground
- Possible Car Park Location
- Slipway
- Water Sports
- Bird Watching
- Picnic Area
- Feature Stairway
- Information Nature Interpretation
- Visitor / Education Centre
- Woodland Adventure Trail
- Boardwalk
- Angling
- Viewing Point

ENERGY
- Energy Recovery Water Power
- Renewable Energy

NATURE CONSERVATION
- Bat Habitat Mitigation
- Dormice Habitat Mitigation
- Wetland Habitat
- Reptile Habitat Mitigation

NOTE: This plan is for illustrative purposes only. All information shown is subject to further consultation and modifcation with the Planning Authorities and other stakeholders.

N

0 m 100 m 200 m 300 m 400 m 500 m

FORESTRY COMMISSION
ROWLANDS CASTLE
WARREN PARK
STAUNTON COUNTRY PARK
Leigh Water
A3 (M)
B2149
Manor Lodge Road
Castle Road
Redhill Road
Whichers Gate Road
Durrants Road
Calshot Road
Saint Clares Avenue
Swanmore Road
39.5m AOD
35.0m AOD
32.5m AOD
30.0m AOD
minimum water level (27.5m AOD)
wave breaking wall (0.4m high)
DISABLED ANGLING
BUS 23
BUS 27
BUS 21

Appendix A

Transport Assessment Scoping Report

A1 Transport Assessment Scoping Report

Portsmouth Water PLC

Havant Thicket Winter Storage Reservoir

Transport Assessment
Scoping Study

Document ref
REP/078/08

REV B

Portsmouth Water PLC

Havant Thicket Winter Storage Reservoir

Transport Assessment Scoping Study

January 2009

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Job number 123755

ARUP

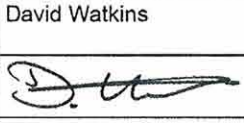
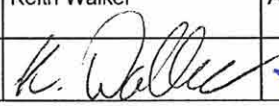
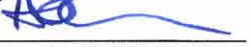
Document Verification

Job title	Havant Thicket Winter Storage Reservoir		Job number 123755
Document title	Transport Assessment Scoping Study		File reference
Document ref	REP/078/08		

Revision	Date				
Draft 1	25/06/08	Filename	0008TJB TA Scoping Study (D1).doc		
		Description	First draft		
			Prepared by	Checked by	Approved by
		Name	Tansin Brown	Keith Walker	Andy Lawton
		Signature			
Draft 2	28/08/08	Filename	0013TJB TA Scoping (D2).doc		
		Description	Takes account of comments received from and discussion with client.		
			Prepared by	Checked by	Approved by
		Name	Tansin Brown	David Watkins	Andy Lawton
		Signature			
Issue	14/10/08	Filename	0003 DJW TA Scoping (I).doc		
		Description	Issued to Highways Agency and Hampshire County Council for discussion following amendments to accommodate client comments on the second draft.		
			Prepared by	Checked by	Approved by
		Name	David Watkins	Ilse Steyl	Andy Lawton
		Signature			
Rev A	09/12/08	Filename	0006 DJW TA Scoping (rev A).doc		
		Description	Amended following meeting with Hampshire County Council and issued to PW for comment.		
			Prepared by	Checked by	Approved by
		Name	David Watkins	Keith Walker	Andy Lawton
		Signature			

Issue Document Verification with Document ✓

Job title	Havant Thicket Winter Storage Reservoir	Job number
		123755
Document title	Transport Assessment Scoping Study	File reference
Document ref	REP/078/08	

Revision	Date				
Rev B	07/01/09	Filename	0007 DJW TA Scoping (Rev B).doc		
		Description	Updated to reflect comments from PW and issued.		
			Prepared by	Checked by	Approved by
		Name	David Watkins	Keith Walker	Andy Lawton
		Signature			
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Contents

Tables

Figures

Appendices

1 Introduction

1.1 This report presents the findings of a transport scoping study for the proposed Havant Thicket Winter Storage Reservoir (HTWSR). Its format is based on the consultation form that is appended to *Guidance on Transport Assessment* (Department for Transport (DfT), March 2007).

1.2 It is not a statutory requirement to submit a scoping report for a Transport Assessment, but it is good practice to prepare and submit such a report for projects that could have significant impact on the transport network. The local highway authority is Hampshire County Council covering both Havant and East Hampshire, and the Highways Agency will also be consulted regarding the A3(M), which is part of the Strategic Road Network.

1.3 A hybrid planning application is to be submitted for the project. The application will provide sufficient detail to allow for early commencement of enabling works, earthworks and other components of infrastructure, whilst allowing flexibility so that those elements of the scheme that are not required to commence early on could be designed and refined later.

1.4 The hybrid application will require some components of the scheme to be in sufficient detail (in order that reserved matter applications will not need to be submitted) and other components to be in outline. Transport and access will be unreserved and sufficient detail on the access proposals for the scheme will be provided within the hybrid application so that further reserved matter applications on access arrangements will not need to be submitted at a later date.

1.5 A transport assessment is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures would be taken to deal with the expected transport impacts of the scheme and to improve accessibility and safety for all modes of travel. Transport and access will cover accessibility to and within the site for pedestrians, cyclists, equestrians, public transport users and vehicles in terms of the positioning and treatment of the access arrangements. The Transport Assessment will look at the potential off-site impacts during both construction and operation and propose appropriate mitigation.

1.6 Figure 1.1 shows a plan of the proposed reservoir's location. The site was purchased by Portsmouth Water in 1965. Most of the land was improved for agriculture and the pasture was then let to a tenant farmer but with public access retained via a bridleway. The site is to the north of the woodland at Staunton Country Park and adjacent to Havant Thicket (Forestry Commission). To the north and west of the site is woodland, and a finger of woodland extends across the site from the south-east to the north-west, known as The Avenue.

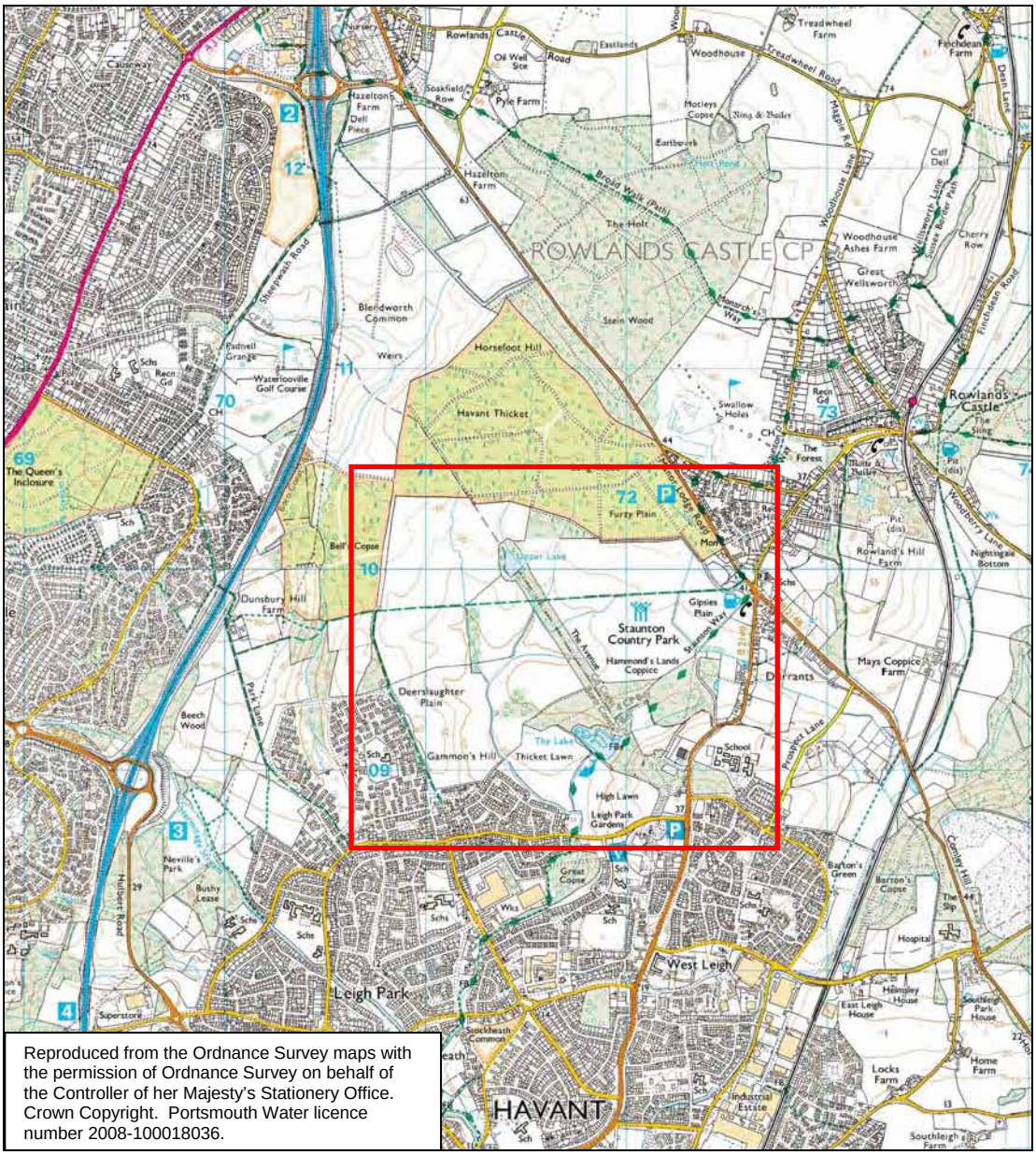


Figure 1.1: Location Plan

1.7 The reservoir would be created from material won within the site through constructing earth embankments around the perimeter. Pipelines would be constructed to convey raw water from the Havant and Bedhampton Springs and Figure 1.2 shows the preferred route as proposed in October 2008. The TA will provide the agreed pipeline route and highlight where this impacts on the highway network.

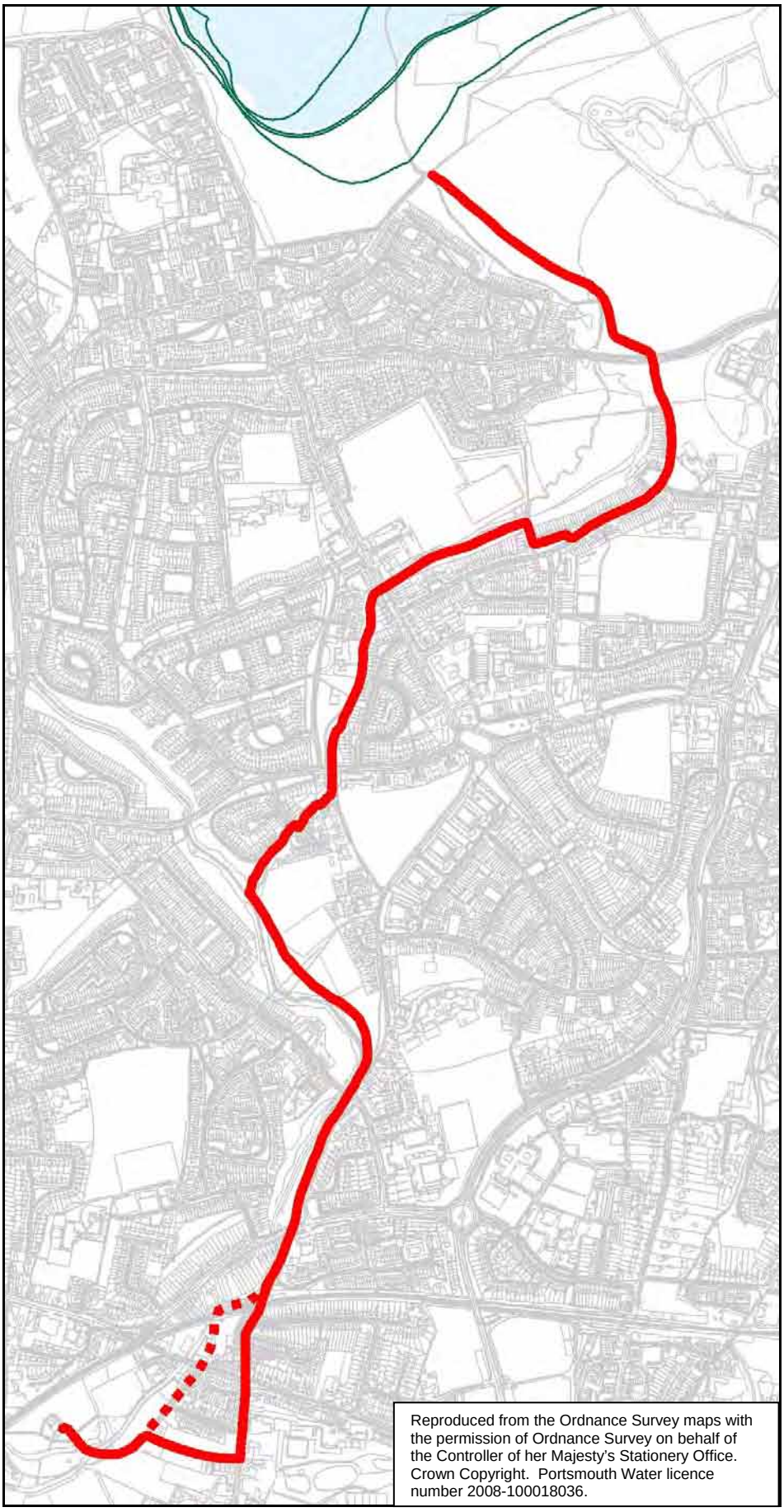


Figure 1.2: Proposed Pipeline Route Option (As proposed October 2008)

1.8 An operational reservoir in itself would attract very few people: occasional maintenance personnel only. Rather, it is the associated facilities that increase a reservoir's attraction and could have potential for attracting significant numbers of people for recreation. As an outcome of the public consultations, a preferred outline plan has evolved that would provide:

- foot/cycle/bridle paths;
- visitor/education centre (including a café);
- angling;
- play areas;
- bird watching;
- supervised water-based activities (eg canoeing); and
- viewing areas.

A copy of the outline plan is provided in Appendix A. In the Transport Assessment Arup will provide information on the number, size and location of facilities wherever possible.

1.9 The proposed facilities associated with the reservoir are, in essence, recreational attractions and are seen as complementary to the existing facilities at Staunton County Park and Havant Thicket (Forestry Commission).

1.10 This scoping report continues in sections 2 and 3 to look at the travel characteristics and transport impact of the proposed development. The need for sections 2 and 3 is set out in the DfT's guidance (see para 1.1 above) on the basis that:

(i) The development is not residential.

(ii) The development is an assembly/leisure attraction and would have a gross floor area (GFA) of between 500m² and 1500m².

(iii) The development is likely to attract over 30 two-way vehicle trips per hour.

(iv) The development is not likely to attract over 10 heavy goods vehicles (HGVs) a day during operation but could do during construction.

(v) The development is not likely to attract one or more special-order or abnormal loads a year but again construction traffic could generate such vehicles.

1.11 A travel plan is a package of site-specific initiatives aimed at improving the availability and choice of travel modes to and from a development. Travel plans will not be submitted in support of the proposed development because the proposed land uses are below the DfT's guidance thresholds. For clarification, the thresholds are:

- non-food retail (A1) 1,500m²,
- restaurant and cafes (A3) 2,500m²,
- assembly and leisure (D2) 1,500m².

It is agreed with the highway authorities that a travel plan is not required in support of the application.

2 Travel Characteristics

Site Context

2.1 At present, the site is accessible on foot, by bicycle and by horse. Figure 2.1 shows the existing transport context. Car parking including two spaces for horse boxes is available off Manor Lodge Road within land managed by the Forestry Commission. The car park is informal and an estimated 16 spaces are available. In practice, if the informal spaces are fully occupied it may be feasible to exceed this number. Nonetheless, this is a low number of car parking spaces that in turn suggests a low trip attraction.

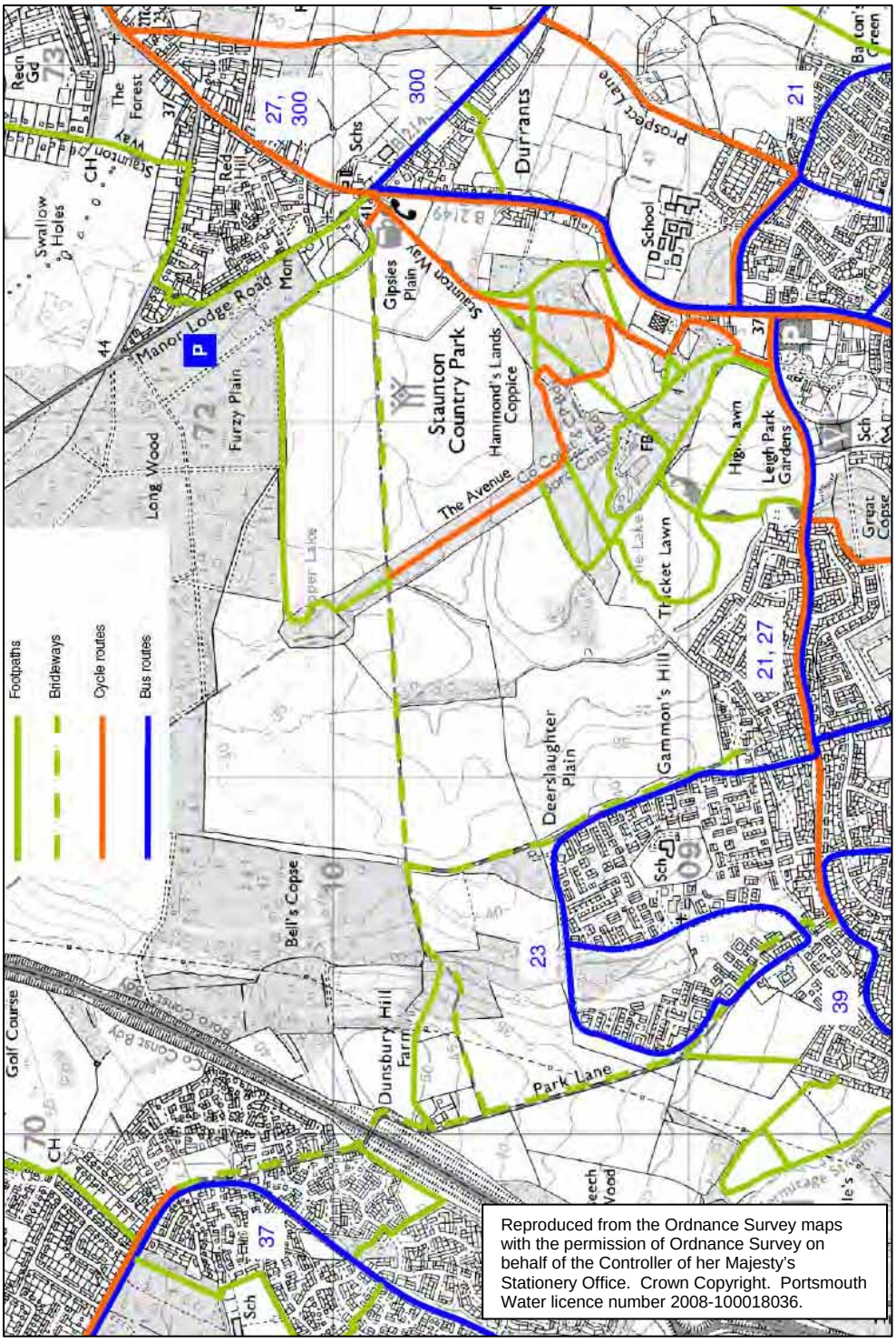


Figure 2.1: Existing Context

2.2 Various routes have been considered for access during construction and operation, and these have been narrowed down to a preferred option in light of responses received from the consultation exercises. The issues on which the preferred route was selected are not just transport-based but also relate to environmental concerns and deliverability. Justification for the preferred route will therefore not be discussed purely in the context of transport but will be discussed in the Environmental Assessment so all influencing issues can be seen together. The transport assessment will present the routes previously discussed to provide context to the proposed scheme.

2.3 Figure 2.2 shows the proposed access route which is via B2149 Manor Lodge Road. This route largely exists already apart from a short length of connecting road and new junction with Manor Lodge Road. It avoids the need to route traffic through the forest and is located close, about 1.5km, to junction 2 of the A3(M). By providing the access for road traffic close to the Strategic Road Network, it is anticipated that there would be fewer trips through Rowlands Castle.

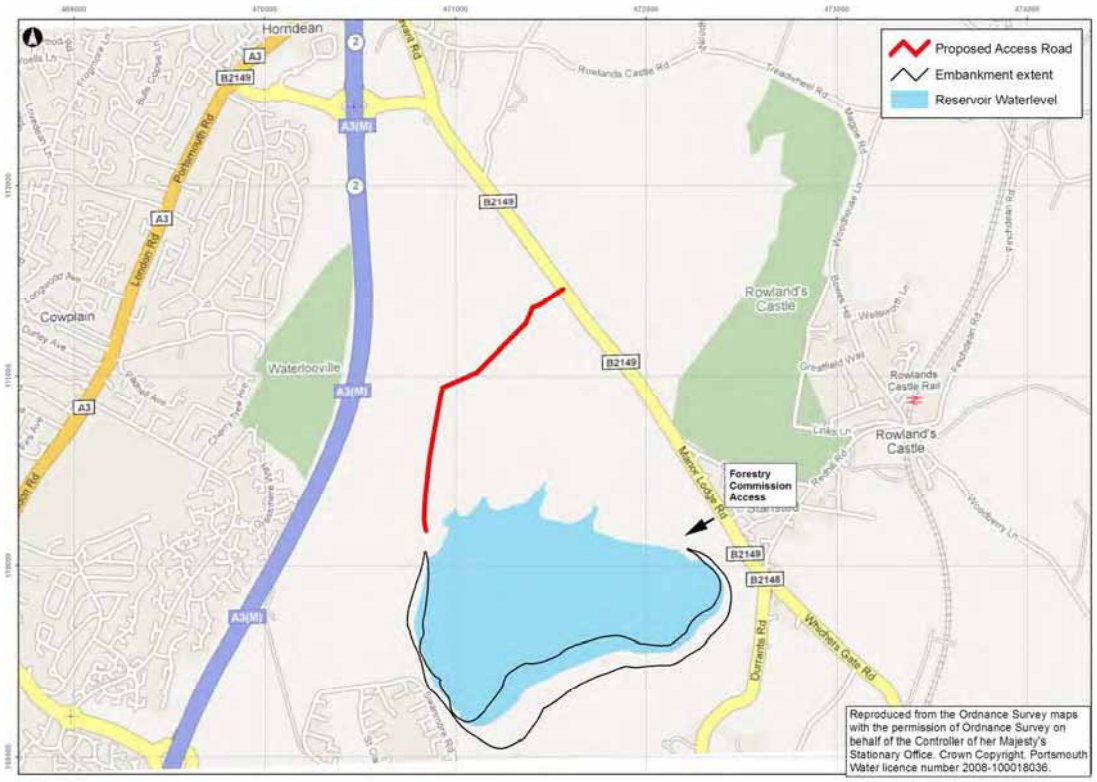


Figure 2.2: Proposed Access Route

2.4 Manor Lodge Road is rural in character. At its southerly end it forms a double mini-roundabout with Redhill Road, Whichers Gate Road and Durrants Road. All these roads have a footway on one side only except for Redhill Road, to Rowlands Castle, which has footways on both sides. Travelling northbound along Manor Lodge Road, a 30mph speed restriction is in place as far as the Forestry Commission access. There is a short length of 40mph speed restriction and then the national speed limit applies up to the junction with the A3(M). The footway ends shortly before the national speed limit is applied.

2.5 On approach to the A3(M) the first junction is a roundabout with Dell Piece and Havant Road. A footway is reintroduced on one side only shortly before the roundabout. This means that there are no footways along Manor Lodge Road for the majority of its length, in keeping with its rural character. Turning west along Dell Piece, the A3(M) junction is a two-bridge grade separated roundabout. West of the A3(M), Dell Piece continues into Horndean, Cowplain and Catherington.

2.6 The nearest bus stops to the main site access are located on Redhill Road, close to the junction with Manor Lodge Road. These are a short walk from Staunton Country Park (CP) and the reservoir site. There are also bus stops to the south close to the entrance of Staunton Country Park and in the west along Swanmore Road.

Trip Attraction

2.7 Visitor numbers to the proposed reservoir would be largely dependent on the facilities on offer. The most obvious uses for a reservoir are angling and watersports, but there is little need for the latter in an area close to the coast and already well provided with facilities for sailing and windsurfing. Following extensive public consultation the focus is therefore on providing facilities that complement those already available at Staunton CP and the Forestry Commission. These facilities are foot/cycle paths, visitor/education centre (including café), angling, play areas, bird watching, classroom, and supervised water activities.

2.8 Visitor numbers are estimated based on existing countryside/water leisure attractions, the principal data source being *Visitor Attraction Trends England 2006* (VisitBritain). The full list of sites referred to is in Appendix B and these are mostly in the South East region. By narrowing down to the appropriate region, account is broadly taken of competing/similar attractions. Sites in other regions may attract fewer visitors because the population catchment is smaller, or attract more visitors because there are fewer similar attractions for people to go to. Of the sites in the full list, at the current time three are considered a good comparison with the proposed reservoir, as tabled below. Table 2.1: Comparable Attractions

Attraction	**Site Area**	**Visitors per Annum**	**Facilities**
Titchfield Haven NNR	150ha	49,100	Visitor centre, café, shop, hides, classroom.
Arundel WWT	26ha	84,100	Café, shop, hides, events.
Waseley Hills CP	60ha	200,000	Visitor centre, café, play areas.
Average	79ha	111,000	

2.9 Arup are looking for other potentially comparable sites and are also trying to update the visitor numbers which are currently for year 2005. As part of this process Arup will clarify what is and is not included in 'visitor' numbers e.g. are these paying entries, visitors to a centre or main area within the attraction or all visitors. The TA will present a discussion of all the attractions considered along with explanations for why these are considered comparable/incomparable to HTWSR.

2.10 The three comparable attractions show that there is no relationship between site area and number of visitors. The range of visitors is 49,100-200,000 per annum with an average of 111,000. In considering the attractiveness of HTWSR, its context needs to be taken into account because it would be adjacent to two existing leisure attractions. There is a limit to how many visitors could be attracted to the proposed facilities; as the number of activities increases it becomes more likely that people would stay longer (or, in commercial terms, spend more money). This can be seen in Appendix B, where very few sites attract over 500,000 visitors per annum. The TA will provide further evidence to support the number of visitors through comparison with other sites and by making reference to the maximum usage of facilities proposed within the site (such as the visitors centre).

2.11 Assuming the number of visitors to HTWSR tends towards the average of 111,000, the overall attractiveness of the three adjacent sites is tabled below. Visitor numbers to Staunton CP are for year 2015/16 and taken from their 10-year management plan. From a base of 169,000 in year 2006/07, the growth would be across all areas but particularly

education visits. The number of visitors to the Forestry Commission is estimated based on the number of car parking spaces.

Table 2.2: Overall Visitor Numbers

Attraction	Visitors per Annum
Staunton CP	339,000
Havant Thicket Forestry Commission	11,800
Havant Thicket WSR	111,000
Total	461,800

2.12 Overall, the three attractions would see over 460,000 visitors per annum. This would be a significant number and would rank in the top 15 major attractions in the South East. The estimated range of visitor numbers is 49,100-200,000 to the proposed site but it seems highly unlikely that the maximum of 200,000 visitors could be achieved, since overall this would be in the top 10 country parks nationally. It would be on par with Lickey Hills in the West Midlands, which includes a golf course and events (similar to those already allowed for in the Staunton CP forecast). Visitor numbers to HTWSR are therefore expected to be in the lower range of 50,000-111,000.

2.13 Having established the number of visitors per annum, the next stage is to assess the seasonality. The data source is *England Leisure Visits 2005 Survey* (Natural England) for the peak month. Visits to country parks show a peak month of June in year 2005. This is consistent with the peak month for all leisure visits, but in year 2002/03 the peak was in July. The latter month seems more logical, since more people would be on holiday and the weather is likely to be better. On this basis, the peak month for HTWSR is assumed to be July with 10% of annual trips. Note that Natural England's survey shows that August is also a very busy month for leisure trips but people are more likely to go to the seaside. The TA will provide a monthly profile for trips to the attraction based on the most recent figures available.

2.14 Discussions are ongoing with Staunton CP as to availability of visitor data although most of their historic information relates to the entries to the farm and gardens as opposed to the country park as a whole. The busiest period (for the farm and gardens) tends to be Easter (eg lambing is popular). Outside of that they tend to follow the more typical school holiday pattern. It is anticipated that peak periods can be worked out quite easily and an additional period to be assessed could be the August bank holiday, which is generally an annual peak for most leisure attractions. Further discussions will be held with Staunton CP to update visitor numbers to include 2008 counts.

2.15 Natural England's survey is also used to establish the pattern of trips to the countryside through the week. This is done by extrapolating the main activities undertaken on countryside visits against the day of week. Over a third (36%) of leisure trips to the countryside are made by people wanting to take a walk. Eat/drink out accounts for 17% and hobby for 11% with the residual 36% dispersed across 11 other activities. The TA will provide a full breakdown of figures for all leisure purposes proposed at HTWSR. The day of week for the main activities varies, for example more trips are made at the weekend because people are at work during the week, although there is little variation Monday-Friday. The average spread of walking, eat/drink and hobby trips through the week is shown in the table below.

Table 2.3: Visits by Day of Week

Day	Proportion of Trips
Five days Monday-Friday	13% daily
Saturday	13%
Sunday	20%
Seven-day total	100%

2.16 Assessment of transport impacts is generally carried out on a peak hour(s) basis. The Trip rate information computer system (Trics) database (version 2008(a) v6.1.1, December 2007) provides vehicular profiles for a number of sites categorised as either *Country Parks* or *Miscellaneous*. Appendix C contains the full list of Trics sites referred to. The resulting distribution of trips by day, as an average of the Trics surveys for arrivals and departures, is tabled below.

Table 2.4: Trips by Time of Day

Hour Beginning	Weekday	Saturday	Sunday
0700	1%	1%	0%
0800	5%	3%	3%
0900	8%	5%	4%
1000	9%	8%	6%
1100	12%	10%	9%
1200	12%	11%	10%
1300	10%	12%	11%
1400	11%	12%	13%
1500	8%	13%	15%
1600	10%	12%	11%
1700	10%	8%	8%
1800	4%	4%	6%
12-hour total	100%	100%	97%

2.17 The table above shows peak hours of 1100-1200 and 1200-1300 hours on a weekday, although 1700-1800 hours, which will be an existing network peak, is almost as many trips. Since residents are already saying the local roads are too busy, this evening peak hour is included in this initial assessment of impact. At the weekend the peak would be 1500-1600 hours.

Mode Share

2.18 The final travel characteristic to be established is mode share. As for seasonality and day of week, the main source is Natural England's survey. However, the survey does not distinguish between car passengers and drivers. Although it does tell us party size, a "party" could actually be in two or more cars, coaches, etc. Other sources of mode share information will be considered in the TA, including if appropriate surveys at comparable attractions. *The National Travel Survey* (DfT, 2006) is therefore referred to for car occupancy, which reports an average of 1.7 for leisure trips. Forecast mode share for

HTWSR based on visits to the countryside is shown below. As a comparison the average for all leisure visits in England is also tabled. Arup are currently trying to obtain figures for 2007 or 2008.

Table 2.5: Main Form of Transport

Mode	Mode Share	
	Countryside	All Leisure Visits
Walk	33%	24%
Cycle	4%	3%
Bus/coach	1%	6%
Car passenger	25%	25%
Car driver	33%	34%
Other	4%	8%

Reference: England Leisure Visits 2005

2.19 Journeys to/from the site, ie two-way, during peak hours are listed in the table below. This is the estimated trip attraction for a peak week in the busiest month of July. With 111,000 trips per annum and 10% of these in July, there would be 2,610 trips per week.

Table 2.6: Peak Hour Trips by Mode

Mode	Weekday			Saturday	Sunday
	1100-1200 Hours	1200-1300 Hours	1700-1800 Hours	1500-1600 Hours	1500-1600 Hours
Walk	27	28	22	30	53
Cycle	3	3	3	4	6
Bus/coach	1	1	1	1	2
Car passenger	20	21	17	22	40
Car driver	27	28	23	30	53
Other	3	3	3	4	6
Total	80	85	68	91	161

Committed Developments

2.20 Land at Dunsbury Hill Farm is identified in the local plan for employment use. Havant Borough Council (HBC) has produced a development brief that forms the basis of pre-application engagement with the community that will be undertaken by the developer. In terms of transport, it is a development objective that the site provides an entrance from the A3(M). At this stage, as far as we are aware, the development is allocated but not committed and it will not therefore be included in the TA for HTWSR. It would be an unreasonably large undertaking to estimate trip attraction to Dunsbury Hill as part of the HTWSR studies.

2.21 Fuller Smith & Turner have been granted planning consent for a distribution warehouse at Dell Piece East, Horndean. The Transport Assessment supporting the application will be used to account for vehicular trips generated by this development in the background traffic flow.

2.22 No other allocated or committed developments that could affect the scope of HTWSR are identified. Other developments and allocations will be accounted for through the use of Tempro and National Traffic forecasts.

3 Transport Impacts

Road Traffic Impact

3.1. An automatic traffic count has been obtained from Hampshire County Council for the B2149 Manor Lodge Road. The count was carried out for one week from 11-17 December 2007. Since the month of interest in this scoping study is July, the council also provided seasonal adjustment factors as tabled below.

Table 3.1: Seasonal Adjustment Factors

Month	Factor
July	1.0797
December	0.9186

Reference: Provided by John Martin of HCC, from an ATC on A3 London Road, Purbrook.

3.2. The factor to convert December flows to July is:

$$1.079/0.9186 = 1.1754$$

3.3. Transport impacts are normally assessed for 10 years after submission of the planning application. However, the proposed water resource is not required until year 2020. Construction will be approximately three years with a filling period of two years. Therefore, the assessment year for transport impacts is 2020, when the reservoir would be fully operational as both a leisure and water resource facility.

3.4. Existing traffic counts for year 2007 are factored for growth to the assessment year using *Road Transport Forecasts for England* (RTF, DfT, 2007). The factor for principal/minor roads in the South East region for the period 2007-2020 is 1.168. Highway link impact in the assessment year 2020 is tabled below for the peak hours. This assumes all visitors driving to the reservoir would be routed from one direction, whereas in practice there would be a north/south split, and the resulting link impact is therefore very much a worst case.

Table 3.2: Link Impact on Manor Lodge Road

Day	Weekday			Saturday	Sunday
	1100-1200 Hours	1200-1300 Hours	1700-1800 Hours	1500-1600 Hours	1500-1600 Hours
December 2007	789	789	1,192	879	832
July 2007	927	927	1,401	1,033	978
July 2020	1,083	1,083	1,636	1,206	1,142
HTWSR cars	27	28	23	30	53
Link impact	2%	3%	1%	3%	5%

3.5. It is generally accepted that an impact of 10% can have a discernible impact on road safety, queues and delays, or 5% in congested locations. The table above shows that the highway link impact in July would be 5% at most. This is despite it being the reservoir's forecast busiest month. Also, the road traffic impact would affect the Sunday off-peak period when there is spare capacity. In existing peak periods such as 1700-1800 hours on a weekday, when road traffic flows are at their highest but there would be fewer trips to the reservoir,

the link impact would be negligible. It is therefore concluded that detailed highway capacity assessment of off-site junctions, such as A3(M) junction 2 or the double mini-roundabout at Rowlands Castle, is not necessary for the proposed HTWSR. Note that even if as a result of ongoing research the estimated number of visitors' were to double, the link impact would still be 7% at most, ie on a Sunday, with an 80/20 north/south split.

3.6. Road traffic surveys have been carried out specifically for this project. Having established that the worst case would be a Sunday in July, counts were carried out on Sunday 20 July 2008 between 1130 and 1730 hours. This was the last Sunday of July that would be within school-term time and was chosen so that it would be fairly typical but also likely to be influenced by better weather and people taking day trips. A second count was carried out on the August bank holiday Monday in case it becomes apparent that this annual peak should be assessed as well.

3.7. The existing count information provides a basis to calculate Sunday traffic flows on the surrounding road network. Count data provided for the B2149 Manor Lodge Road to the north and south of the junction with Dell Piece East provide factors from which PM Peak hour movements can be estimated. To provide a robust assessment PM peak traffic counts will be conducted at the double-mini roundabout at Rowlands Castle to ensure turning movements at this junction do not differ in the PM peak hour compared with the Sunday peak hour. This count will be conducted once the impact of the Christmas holidays has subsided.

On-site Car Parking

3.8. Paras 2.7-2.10 above establish that the proposed reservoir would attract approximately 111,000 visitors per annum. The site list in Appendix B shows that car parking increases with visitor numbers and enables a trend to be interpolated, as tabled below.

Table 3.3: Visitors and Car Parking Numbers

Visitors per Annum	Visitors per Space	Trend[1]
20,000 or less	750	734
20,001 – 50,000	829	734
50,001 – 100,000	625	856
100,001 – 200,000	1,207	1,058
200,001 and over	1,434	1,462

3.9. On the basis of 111,000 visitors per annum and 1,058 visitors per space (as tabled above), HTWSR would require 100 car parking spaces. These spaces would be additional to those already provided at Staunton CP (160 spaces) and the Forestry Commission (16 spaces), providing 276 across the site as a whole. Assuming 460,000 visits to the three attractions (see Table 2.2 above), overall demand would be about 316 spaces. This implies a deficit of 40 spaces but the recent introduction of overflow car parking at Staunton CP should take account of the peak demand. The TA will provide details on arrangements for overflow car parking for special events or days where visitor numbers exceed the maximum identified in the TA.

3.10. It is envisaged that the majority of the new car parking spaces would be located off B4129 Manor Lodge Road with a few spaces off Swanmore Road in Leigh Park and in an expanded Forestry Commission car park. The proposed on-site car parking should be adequate to cater for demand and not lead to any parking on-street. In particular, the

[1] Trend calculated using the Excel TREND function. This calculates the trend line (as a straight line) for known x and y values. The Trend shown in Table 3.3 is therefore visitors per space.

spaces at Leigh Park are proposed to overcome on-street parking that would otherwise be an inconvenience for residents. Catering for demand on site would overcome any potential need for on-street parking restrictions such as yellow lines or a residents' scheme.

3.11. The location of the main car park has yet to be agreed and will be determined primarily by landscape and environmental concerns. The TA will provide information enabling an assessment of the suitability of the internal road network to be made.

Critical Junctions

3.12. Assessment of highway link impact (para 3.5 above) has established that there are no critical junctions, that is to say nearby junctions where the development would increase traffic queues and delays. At the request of HCC the TA will examine the impact of development at the B2149 Manor Lodge Road/Dell Piece East roundabout and at the double mini-roundabout with Redhill Road, Whichers Gate Road and Durrants Road

3.13. The site access off Manor Lodge Road will be examined in detail and visibility splays will be demonstrated for the proposed car park off Swanmore Road and the Forestry Commision car park (if this is expanded). *Geometric Design of Major/Minor Priority Junctions* (TD 42/95, Highways Agency, 1995) indicates that the main site access should be a ghost island T-junction, based on two-way annual average daily traffic (AADT) flows of over 13,000 on Manor Lodge Road and 200 at the site access. Preliminary designs have been shown to HCC who agree with this configuration. HCC have requested that prior to the application any proposed junction schemes are submitted for prior approval and a stage one safety audit is conducted. Junction designs with accompanying stage one safety audits will be provided in the TA.

Environmental Assessment

3.14. The environmental impact of road traffic will be addressed as part of the TA and in line with published guidelines (*Guidelines for the Environmental Assessment of Road Traffic,* Institute of Environmental Management and Assessment, 1992). Impacts assessed will be severance, driver delay, pedestrian delay, pedestrian amenity and road safety. The Government's 10 sub-objectives of transport including noise and air quality will be addressed separately in the Environmental Statement that will support the planning application, subject to scoping with the regulatory bodies.

Construction Vehicles

3.15. The TA will consider the likely impact of construction vehicles on the surrounding highway network. The proposed construction sequence is:

- Two years for environmental works;
- Two years for site preparation/enabling works including the access road;
- Three years for reservoir construction; and
- Two years for the reservoir to fill.

3.16. The construction of the site will involve the removal of topsoil from the reservoir basin which will be taken off-site and sold. The TA will produce estimates for material movements, and by estimating loading per vehicle, derive vehicle movements. The only other significant trip generator during construction is expected to be the removal of oak trees from the site. The removal of trees will be phased to prevent an influx of material impacting on the price of English oak. Vehicular movements will be based on the phasing plan by estimating loads per vehicle (as per topsoil removal). All calculations will be based on 5.5 working days a week.

3.17. Other material movements such as materials for the visitor centre, access road or armouring will be quantified where possible using the process outlined in 3.16. At the current time it is thought that these movements will be far less significant than those identified in 3.16.

3.18. Reservoir construction will involve the use of few heavy machines which will remain on site for the duration of the work. Vehicular movements due to construction workers are unlikely to be significant.

Pipeline Construction

3.19. The TA will provide details showing where the construction of the pipeline route will impact on the highway network. Traffic management plans for each site will not be provided by Arup. These are normally developed by the appointed infrastructure contractor who are best placed to consider traffic management alongside the schedule of works.

4 Transport Impact Mitigation

Road Safety

4.1. Records of road traffic accidents will be obtained from the highway authority for the B2149 Manor Lodge Road. The area of investigation is as shown below and accidents will be considered within a five-year period. Improvement measurements will be proposed at any problem areas that could be adversely affected by people visiting the reservoir.

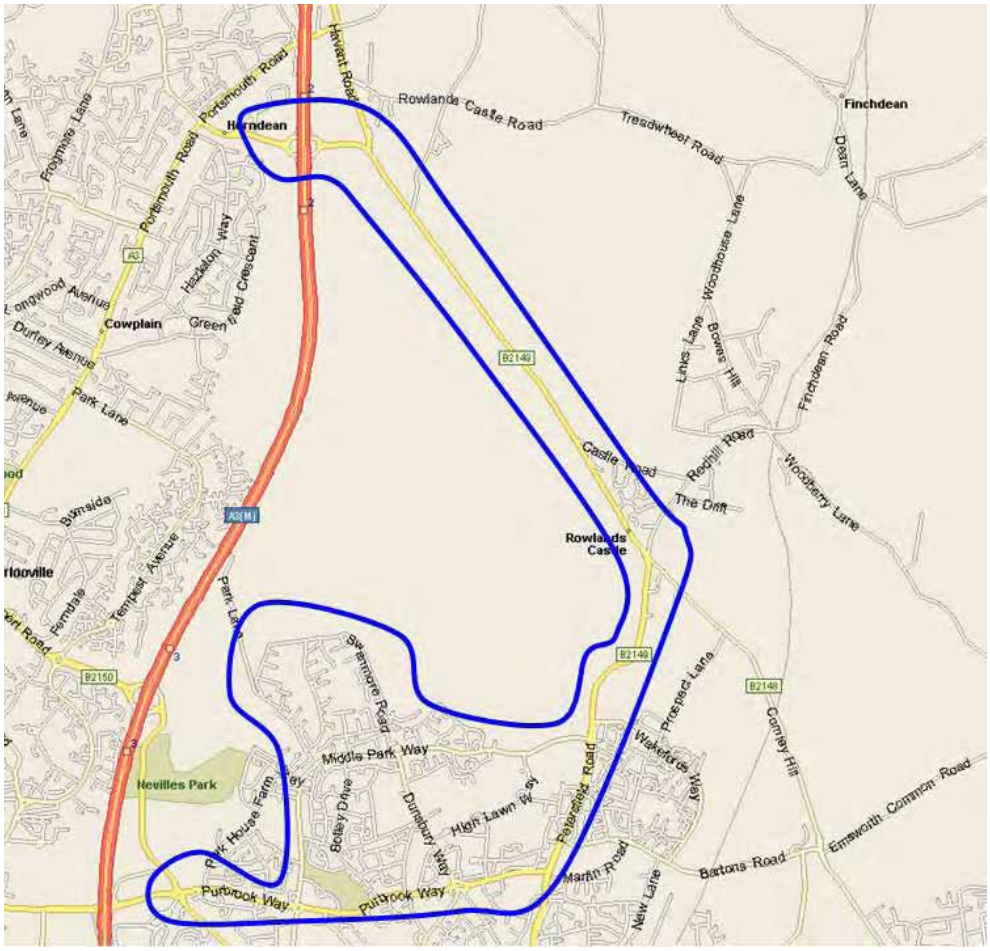


Figure 4.1: Area of Assessment for Road Traffic Accidents

Access on Foot

4.2. HTWSR would be a leisure attraction for walking and one of the main objectives with the masterplan is to provide good penetration for journeys on foot. The area already benefits from good connectivity with its environs, being accessible on foot from all directions. The TA will discuss pedestrian access from within the catchment area, in particular with reference to Rowlands Castle, Leigh Park, Purbrook, Waterlooville and Horndean. The need for new formally controlled pedestrian road crossings will be investigated in the TA in particular from Rowlands Castle.

Access by Bicycle

4.3. HBC's planned cycle network is shown in Appendix D and it can be seen that some of the routes directly benefit the proposed HTWSR.

- Primary route 4 (P4) – Havant to Rowlands Castle (East Hampshire boundary) is complete. This provides good connectivity with the railway station.
- Feeder route 3 (F3) - Park Lane, Cowplain.

- F4 will run along Middle Park Way between Woolston Road and B2149 Petersfield Road.
- F5 will connect Staunton Way with Havant.

The TA will examine cycle proposals by EHDC in addition to those made by HBC.

4.4. The site is also crossed by bridleways, which provide a right of way for cyclists but they must give way to other users. One of the bridleways runs east-west across the reservoir site and would need to be diverted. Portsmouth Water will discuss rerouting of bridleways with officers at HCC prior to submission of the TA. A second route runs north-south linking to Swanmore Road. Opportunities for improving these two bridleways and connections to the cycling strategy will be discussed with the council.

Access by Public Transport

4.5. The nearest bus stops to the site are located on Redhill Road close to the junction with Manor Lodge Road. Bus shelters are not provided but there is no scope for improvement because the footways are too narrow. These stops are a short walk from the site, less than 400m. Buses are also routed along Swanmore Road to the south-west, which is again a very short walk to the site. West of the site, buses are routed along Tempest Avenue, which is a longer walk utilising a footbridge over the A3(M). The distance would be about 1.3km, or 15 minutes for most able-bodied people, and largely off-road. Since many visitors to the reservoir would be intending to walk for leisure purposes, the distance is considered reasonable.

4.6. Table 4.1 lists the routes served and frequency of service to the bus stops listed in 4.5. Bus stops and routes are shown on the outline plan in Appendix A.

Table 4.1: Bus Services

Service	Route	Frequency of Service (minutes)		
		Mon-Sat	Evenings	Sunday
No 21	Havant - Leigh Park - Farlington - Anchorage Park - Copnor - Commercial Road - The Hard	15	60	60
No 23	Leigh Park - Havant - Cosham - North End - Commercial Road - Southsea	10	60	30
No 27	Rowlands Castle - Leigh Park - Havant	60	0	0
No 37	Havant - Leigh Park - Crookhorn - Stakes Hill - Waterlooville - Cowplain - Hazleton Way	30	60	60
No 300	Denmead - Waterlooville - Horndean - Chichester	Wednesdays only		
Average frequency of service		4.6	20	15

4.7. The bus frequencies listed in Table 4.1 are for journeys to Havant, with the same frequency of service provided for journeys from Havant. If services in both directions are considered the overall frequency is two and a half minutes on weekdays, every 10 minutes in the evening, and seven and a half minutes on Sundays. These are high frequencies and it is not proposed to improve upon these as part of the HTWSR development. The area covered by the bus services will be looked at in detail in the Transport Assessment.

4.8. The nearest train station is at Rowlands Castle and is about 1.5km distance. This is along Redhill Road and therefore less attractive than paths free of road traffic. Train services, either from Rowlands Castle or Havant, are more likely to be used by cyclists than walkers.

Access by Car

4.9. The main car park would be accessed from Manor Lodge Road, about 1.5km south of A3(M) junction 2. Within the site, this route would make use of an existing access track but a new junction with the B2149 Manor Lodge Road would be necessary. This is likely to be a ghost island T-junction subject to detailed assessment of layout and capacity. A secondary car park would be provided off Swanmore Road with just a few spaces. Expansion of the Forestry Commission car park could also provide a few spaces.

4.10. It is established in section 3 of this scoping study that vehicular trips attracted to the proposed reservoir would not have a material impact on the road network. Arup will examine the impact of the proposals at the B2149 double mini-roundabout by Rowlands Castle and at the Dell Piece East/B2149 roundabout. It is currently thought that there will be no proposals to improve existing junctions.

4.11. The TA will discuss a signing strategy for the development. The approach agreed with HCC is for all signposting to direct visitors to the main car park (using the A3 where possible) to reduce the number of trips through residential areas. Signposting at the proposed junction with the B2149 Manor Lodge Road and at other junctions where the development has a significant impact will be considered with regards to road safety.

Access by Construction Vehicles

4.12. The TA will consider construction traffic routes to minimise the impact of trips on sensitive areas (such as residential areas or historic settings) and the impact of construction traffic at the junctions named in 4.10.

5 Conclusion

5.1. In summary, the salient issues arising from this scoping study for a transport assessment are:

- A full Transport Assessment is required in support of the planning application.
- The busiest month would be July although the annual peak is likely to be the August bank holiday.
- Up to 90 two-way person trips and 30 car trips would be generated per hour Monday-Saturday.
- Up to 160 person trips and 60 car trips would be generated per hour on a Sunday.
- The reservoir's peak hours would be offset from the existing road network peak hours. The weekday evening peak hour 1700-1800 hours would be one of the reservoir's busier hours but existing traffic would not be adversely affected.
- Car parking would provide 100 spaces on site.
- The proposed development would not have a material impact on the local road network.
- The only critical junctions to be assessed in detail are the site access off Manor Lodge Road, the Dell Piece East/B2149 roundabout and the B2149 double mini-roundabout by Rowlands Castle.
- A travel plan is not appropriate for an informal development with a relatively low trip attraction. The proposed land uses are below the guidance thresholds for travel plans.
- Proposed measures to mitigate the transport impacts will be focussed on improved facilities for walking and cycling.

TABLES

FIGURES

Appendix A

Outline Plan

A1 Outline Plan - This appears as Figure 4 in the main body of the document.

Appendix B

Visits to Country Parks and Other Attractions

B1 Visits to Country Parks and Other Attractions

	Category	Region	Visitors Year 2005	Car Parking	Site Area (ha)
Stour Estuary RSPB	WI	E	15,000	20	
Blacktoft Sands RSPB	WI	Y&H	21,036	30	
Marshside RSPB	WI	NW	25,000	40	
Wilderness Wood	CP	SE	35,000		25
Wicken Fen NNR	WI	E	39,235	50	660
Llanelli WWT	WI	Wales	41,580	90	180
Welney WWT	WI	E	44,986	60	405
Titchfield Haven NNR	WI	SE	49,078	40	150
Langdon Nature Reserve	CP	E	50,000	40	190
Washington WWT	WI	NE	54,083	231	45
Arundel WWT	WI	SE	84,122	150	26
Titchwell Marsh RSPB	WI	E	86,502	140	
Emberton Country Park	CP	SE	100,000		81
Leighton Moss RSPB	WI	NW	100,000	92	130
Staunton Country Park	CP	SE	102,438	160	400
Minsmere RSPB	WI	E	122,734	150	
Manor Farm	CP	SE	135,357		162
Martin Mere WWT	WI	NW	144,425	130	
Bedgebury National Pinetum	CP	SE	180,000	270	129
Slimbridge WWT	WI	SW	187,744	140	325
Wetland Centre, London WWT	WI	LON	196,476	220	43
Bewl Water	CP	SE	200,000	370	320
Ulley Reservoir	CP	Y&H	200,000	66	19
Waseley Hills CP	CP	WM	200,000	110	60
Muiravonside	CP	Scotland	206,508	134	69
Itchen Valley Country Park	CP	SE	225,915	110	178
Hardwick Hall, Sedgefield	CP	NE	239,000	75	17
Lepe CP	CP	SE	252,360		
Tilgate Park & Nature Reserve	CP	SE	280,000	330	
Queen Elizabeth CP	CP	SE	297,923	396	560
Aldenham CP	CP	E	325,000	230	70
Royal Victoria Country Park	CP	SE	500,000		80
Ferry Meadows	CP	E	500,000	540	203
Carsington Water	O	EM	750,000	1,000	

Appendix C

Trics Sites

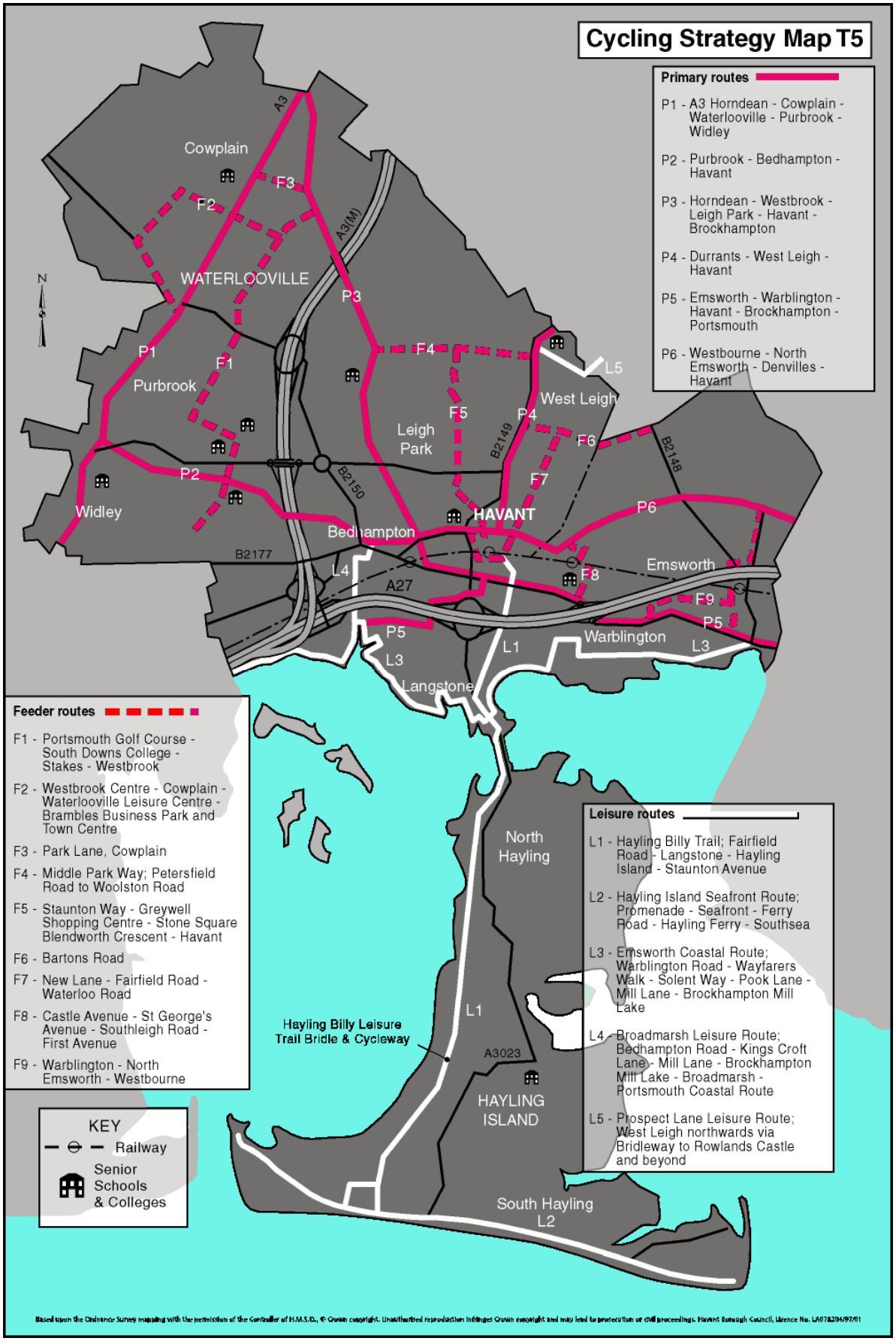
C1 Trics Sites

Site	Reference	Visitors per Annum	Car Parking	Site Area (ha)
Aldenham Reservoir, Elstree	BN-07-M-01	325,000	230	70
Ferry Meadows, Peterborough	CA-07-M-01	500,000	540	203
Hardwick Hall, Sedgefield	DH-07-M-01	239,000	75	17
Muiravonside, Fife	LO-07-M-01	206,500	134	69
Queen Elizabeth, Horndean	HC-07-M-01	298,000	396	560
Leighton Moss RSPB	LC-07-M-02	100,000	92	130
Ulley Reservoir, Rotherham	SY-07-M-01	200,000	66	19
Waseley Hills, Birmingham	WM-07-M-01	200,000	110	60
The Wetland Centre, London	RD-10-A-02	196,000	220	43
Washington WWT	TW-10-A-02	54,100	231	45

Appendix D

Cycling Strategy Map

D1 Cycling Strategy Map



Appendix B

Scope Of On-Going Ecological Survey Work Since 2005

B1 Scope Of On-Going Ecological Survey Work Since 2005

Species	Survey Dates		Methodologies	Guidance Followed
Bats	2005	7 dates June to September	Detector transects - site divided into five transect routes (each walked at least on two occasions)	Bat Conservation Trust 2007 *Bat Surveys Good Practice Guidance.*
	2006	4 dates May to August	As per 2005	Natural England 2004 *Bat Mitigation Guidelines*
	2008	3 visits per month April to August	Detector transects, emergence counts, capture and radio tracking on site.	
		11 visits September to early Oct	Capture of bats at 6 woodlands within 3km of the site potentially suitable to Bechstein's bats.	
	2009	4 day's survey January to February	Proposed inspections of known tree roost sites for hibernating bats and detector surveys to establish extent of winter activity in key areas	
		Further survey visits proposed (detail to be discussed with Natural England)	Proposed further detector transects, emergence counts, capture and radio tracking on site and in woodlands within surrounding 3km.	
Great Crested Newt	2005	Mid April to Early June	All ponds on / immediately adjacent to the site	Natural England 2001 *Great Crested Newt Mitigation Guidelines*
	2006	Mid April to Early June	As above and all ponds within 500m	
		Note: Repeat survey spring	Included egg searches/bottle traps and torch searches (x 4 dates) and netting	

		season prior to construction		
Reptiles	2005	5 visits May to Oct	50 Refugia checked and incidental records when slow walkover and ad hoc records during other site visits	Gent, T. & Gibson, S. 2003 The Herpetofauna Workers' Manual. JNCC. Peterborough.
	2006 2007	Ad hoc checks of refugia when on site, 10 dates August to October	1600 rufugia placed across the site	
	2008	September to October, 15 visits	Survey of Forestry Commission land north of proposed reservoir site using 20 survey transects/ refugia	
Badger	2005		Specific site walkover survey for signs/setts	
	2006		In 2006 to 2008 only incidental observations made	
		Note: Repeat survey proposed prior to construction		
Dormouse	2005	4 visits June to October	68 nest tubes and 98 nest boxes erected in June. 4 checks and nut searches in October	Natural England 2006 2nd ed. *Dormouse Conservation Handbook*
	2006 2007	May to October	3 nest box checks and nut searches on 4 dates between October and November 200 tubes & 100 boxes erected to survey the Avenue and surrounding woodland (inc	

			Hammonds Lands Copse)	
	2008	4 occasional visits June to October	Nest box/tube checks	
Water Vole	2005	Summer	Stream and ditch survey	Strachan, R. & Morhouse, T. 2006 2nd ed. *Water Vole Conservation Handbook*
	2006	July	Stream and ditch survey	
Vegetation	2005 2006	May to Sept	Phase 1 Walkover DAFOR scale used Species linked to **each** vegetation block, quadrats in ditch and hedgerows in selected areas	JNCC 1990 *Handbook for Phase 1 Habitat Survey: a technique for environmental audit* Rodwell, J. S. 2000 British Plant Communities
	2008 2009	June and September April	Note: Full walkover survey in 2008 excluded woodland Proposed National Vegetation Classification (NVC) surveys of ancient woodland communities on site and in immediate surrounding areas.	
Invertebrates	2005	Incidental recording in April, then 3 monthly visits June to August. April to August.	Visual search, hand net or pooter capture, sweeping vegetation, beating foliage and grubbing	
	2006		Note: No survey as 2005 data considered adequate	
	2008	July and October	Survey of river invertebrates	
Rivers & Streams	2008	July	Baseline Geomorphology survey of streams on site and following pipeline	Defra, 2003 *Guidebook for applied Fluvial Geomorphology*

			route	
	2008	July & October	River Habitat Survey of selected sections of streams on site and part of pipeline route	EA, 2003 *River Habitat Survey in Britain and Ireland: Field Survey Guidance Manual*
Wintering Birds	2005/06 2008/09	6 visits November to March December to March Update survey comprising 3 monthly visits, rising to 5 if required (depending on activity).	Transects Transects	Gilbert, G., Gibbon, D., Evans, J. 1998 *Bird Monitoring Methods; a manual of survey techniques for key UK species.*
Breeding Birds (General)	2005	4 visits May and June	Walk over survey and noting any singing/displaying	Gilbert, G., Gibbon, D., Evans, J. 1998 *Bird Monitoring Methods; a manual of survey techniques for key UK species.*
	2008	5 visits May to July	Detailed survey breeding bird communities	
Nightjar	2006	4 visits June and July	Survey of site and surrounding areas.	Gilbert, G., Gibbon, D., Evans, J. 1998 *Bird Monitoring Methods; a manual of survey techniques for key UK species.*
	2008	4 visits June and July	Targeted survey of breeding birds in FC land to north and other observations	
Pipeline survey	2007	1 visit February	Protected species phase 1 survey of northern section	JNCC 1990 *Handbook for Phase 1 Habitat Survey: a technique for environmental audit*

Harbour Surveys Part of Appropriate Assessment for PW abstraction licence	2005/06 2006/07 2007/08	Entec Ecosa	Survey of freshwater creeks and control channels where no freshwater flow. Low water targeted creek counts (x15) over 4 hour low tide cycle. Comparison made to flow in channels.	BTO WeBS methodology

Reports available to date:

HTWSR Ecological Surveys 2005 & 2006, May 2007 (ECOSA)

HTWSR Phase 1 Ecological Survey of adjacent woodlands (March 2007 Ecosa draft)

HTWSR Pipeline northern section, Phase 1 protected species survey (March 2007 Ecosa draft)

Summary of HTWSR reptile survey autumn 2007 (Dec 2007 Ecosa draft)

Summary of dormouse survey autumn 2007 (Dec 2007 Ecosa draft)

Summary of vegetation, bird and dormouse surveys 2007 (Dec 2007 Ecosa draft)

Summary of reptile survey (Dec 2007 Ecosa Draft)

Bat radio tracking report autumn 2008 (Jan 2009, Ecosa draft)

Wintering bird Survey (2005/06 and 2006/07) Langstone and Chichester Harbour, July 2007 (Entec UK Ltd)