Gifford

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GRAVESEND TOWN PIER PONTOON

ECOLOGY DESKTOP ASSESSMENT

Gravesham Council
Civic Centre
132 Windmill Street
Gravesend
Kent

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1. INTRODUCTION

1.1 Gravesend Town Pier

1.1.1 Gravesend Town Pier (TQ 647744) was commissioned in 1834 and is built on the site of the former Town Quay which is mentioned in the Doomsday Book. It is believed to be one of the oldest cast iron pier structures in the world.

1.1.2 The pier was connected to the London Tilbury and Southend Railway's (LT&SR) railway in 1854 and passenger ferries operated to Fenchurch Street. However, the pier closed in 1969 when the passenger ferry was transferred to West Street Pier and the car ferry discontinued.

1.1.3 After closure the pier was subsequently purchased by Gravesham Council. There followed a significant restoration effort which was funded by grants from English Heritage, English Partnerships, Heritage Lottery Fund via Conservation Area Partnership Scheme (CAPS), Kent County Council and The Manifold Trust. The restoration was completed in 2003 and won a silver medal from The Queen's Golden Jubilee Green Apple Awards in 2002. The Council was awarded second place in the 2004 River Thames Society Annual Award.

1.1.4 In relation to the piers' important and historic setting, the Town Pier Square was enhanced through repaving and listed buildings around the square were also improved. Opened in 2006 on the western side, the pier now has a tenanted bar which was joined by a restaurant in 2007. Public access to the end of the pier is achieved along the eastern margin. Gravesham Council aims to make the pier "financially viable" through both uses of the pier deck itself and through vessel traffic utilising associated berths created through the construction of a pontoon facility.

1.2 Description of the Proposed Development

1.2.1 Following feasibility studies a design has been submitted to create a pontoon extending the available berthing area at the end of the pier. The aim is that this will be used by the Gravesend to Tilbury Ferry, and for occasional use by other leisure vessels.

1.3 Aims of the Proposed Development

1.3.1 The aim of the Proposed Development is to provide a new pontoon berth at the end of the Historic Gravesend Town Pier. This will enable viable use by the Gravesend to Tilbury Ferry and occasional visits by passenger carrying leisure craft (e.g. the Waverley and the Balmoral). The overall aim is to allow viable economic operation of the Town Pier.

1.4 Construction Information

1.4.1 It is anticipated that the construction period will last approximately five months (April 2010 to August 2010). Of this period approximately 3 months will consist of offsite fabrication and 2 months of onsite placement of pontoon facilities.

1.4.2 The construction phasing is likely to contain the following elements:

i Fabrication offsite;
ii Mobilisation of plant and placement onsite;
iii Onsite construction;
iv Pontoon installation; and
v De-mobilisation of onsite construction facilities.

2. BASELINE DATA

2.1 Context

2.1.1 This report has been produced to support applications for a Food and Environmental Protection Act 1985 Part II (FEPA) licence and a River Works Licence under Section 66 of the Port of London Act 1968 (as amended).

2.1.2 This section of the report identifies the potential impacts with regard to ecology and nature conservation that may occur during the construction and operation of the Proposed Development.

2.1.3 The Port of London Authority (PLA) has identified ecological aspects and sensitivities as being of significant interest in relation to the Proposed Development. Accordingly a desk based ecological assessment has been undertaken to obtain information on the ecology of the site, surrounding area and potential receptors in sensitive habitats.

2.2 Baseline Information

2.2.1 Gravesend is at the lower limit of brackish water in the Thames (with the area downstream being marine in nature). The oscillating load of sediment which passes the Thames Barrier with each tide (springs) has been estimated at in excess of 100,000 tonnes (www.dft.gov.uk accessed 9 October 2009), so the value for the Gravesend reach is likely to be of the same order of magnitude.

2.2.2 There are nationally, EU and internationally designated sites within the vicinity of Gravesend (Sites of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar sites respectively. The majority of conservation sites in the Thames are in the main, downstream of Gravesend in the outer estuary.

2.2.3 The Thames Estuary and Marshes SPA and Ramsar site is 2.6km from the site at its closest point (and 3.2km from the site at its closest point on the river, downstream); the SPA/Ramsar designations have different boundaries but both cover sites on both banks of the Thames. Over 50% of the SPA is tidal river/estuary/mudflats/sandflats/lagoons and it is designated for internationally important numbers of wintering hen harrier (*Circus cyaneus*) (1% of the GB population) and wintering avocet (*Recurvirostra avosetta*) (28.3% of the GB population). It is designated for a further six species and for regularly supporting 75,019 wildfowl in winter. The site is noted as being vulnerable to indirect disturbance and hydrological effects as a result of development (www.jncc.gov.uk accessed 9 October 2009).

2.2.4 The nearest SSSI is the South Thames Estuary and Marshes SSSI which is approximately 3.1km downstream on the Kent side of the river (and 2.3km from the pier at its closest point inland). Part of this SSSI forms part of the Thames Estuary and Marshes SPA. This site is designated for the extensive mosaic of grazing marsh, saltmarsh, mudflats and shingle characteristic of the estuarine habitats of the north Kent marshes. The site supports outstanding numbers of waterfowl with total counts regularly exceeding 20,000. Natural England's view about the management of this SSSI is that good water quality and sediment quality should be maintained, and the sediment budget within the estuarine or coastal system should not restricted by anthropogenic influences (www.natural-england.org.uk accessed 22 September 2009). Mucking Flats and Marshes SSSI is approximately 4.1km from the site on the Essex bank of the Thames. This is also part of the Thames Estuary and Marshes SPA. The SSSI comprises an extensive stretch of Thames mudflats and saltmarsh, together with sea wall

grassland. Wintering wildfowl and waders reach both nationally and internationally important numbers on the mudflats, roosting and feeding on adjacent saltmarsh and disused silt lagoons.

2.2.5 There are two intertidal SSSIs upstream of Gravesend: one at Thurrock (West Thurrock Lagoons and Marshes SSSI, 6km from the site) and the other at Rainham (Inner Thames Marshes SSSI, 11km from the site). Both of these SSSIs are on the opposite bank to Gravesend. It should also be noted that the designated sites contain saltmarsh and mudflat areas which are priority UK Biodiversity Action Plan (BAP) habitats.

2.2.6 There are no National or Local Nature Reserves within 2km of the site. There are terrestrial locally designated sites within Gravesham Borough.

2.2.7 There are Shellfish beds in the outer estuary which are designated under the EU Shellfish Waters Directive. Although the river has naturally high levels of sediment (see Paragraph 2.2.1), smothering by sediment can cause death or uptake of polluted material which has potential to bioaccumulate through trophic levels.

2.2.8 Thames Estuary and Marshes Important Bird Area (IBA) is in close proximity to the site. It covers 8,987 hectares and is noted as supporting habitat types including extensive grazing marshes, saltmarshes, mudflats and pits, although from digital mapping available it appears that at Town Pier the boundary of the IBA follows the low tide level, rather than river wall.

2.2.9 The Tidal Thames Habitat Action Plan Habitat & Species Audit notes that mud is the main substrate type at Gravesend, with a higher sand component than upstream areas. These muds support a mixture of estuarine and marine invertebrate species, dominated by two *Tubifex* species of oligochaete worms. The amphipod *Corophium volutator* and the ragworm *Nereis diversicolor* often occur in high biomass and numbers. Other less frequent species include *Gammarus zaddachi*, the shore crab *Carcinus maenas* and the bivalve molluscs *Macoma balthica* (Baltic tellin), and *Scrobicularia plana* (peppery furrow shell). The sub-tidal fauna is patchy and dependent upon substrate stability, but tends to be dominated by *C. volutator* with other characteristic species including a number of polychaete and oligochate worm species and the shrimp *Crangon crangon* (Thamesweb.com accessed 22 September 2009). The substrate at the site may have affinities with habitats listed in the UK Biodiversity Action Plan for subtidal sands and gravels.

2.2.10 The river has seen general improvement in water quality since the 1960s and several important pelagic fish indicator species have been moving back up the river. The Thames supports 121 fish species, the majority of available freshwater and marine species (environment-agency.gov.uk, accessed 22 September 2009).

2.2.11 A commercial eel fishery began below Tower Bridge in 1983 and there are commercial fisheries for bass and grey mullet below Woolwich and whiting, sprat, whitebait and shrimp below Gravesend. Since the start of a rehabilitation scheme for atlantic salmon in 1978 up to 338 adult salmon have been recorded ascending the estuary in any one year (UK National Marine Monitoring Programme - Second Report (1999-2001) defra.gov.uk accessed on 9 October 2009). The Thames is now recognised as one of the most important estuaries in the UK for sea bass and Dover sole spawning. Sole are known to spawn below Mucking Flats and sea bass fry are found throughout the tideway during summer months (Thamesweb.com). Other spawning species include the common goby, smelt, sand-smelt and sea lamprey. River lamprey has begun to recolonise the catchment and twaite shad numbers have built up steadily in the lower estuary. These last three species can have Special Areas of Conservation designated by their presence in a river under the EU habitats directive.

2.2.12 The Environment Agency note that the in period March to June salmon smolt migrate through the Thames and from June to October the adults return (Tom Cousins pers. comm.).

2.2.13 The Thames has on occasion had ingress from cetaceans; sightings have not been formally recorded and understanding of their use of the estuary needs to be developed (http://www.pla.co.uk/display_fixedpage.cfm/id/773). The Zoological Society of London note that three cetacean species are seen in the Thames: harbour porpoise (*Phoeona phocoena*) most frequently from January to April, bottlenose dolphin (*Tursiops truncatus*) most frequently from July to August and white-beaked dolphin (*Lagenorhynchus albirostris*) most frequently from June to August.

2.2.14 The immediate terrestrial area adjacent to the proposal site appears to be of limited ecological value. There are gardens associated with buildings on the harbour wall both east and west of the Town Pier square which may attract bird species.

3. DESCRIPTION OF WORK INVOLVED IN THE PROPOSED SCHEME

3.1.1 This section describes the work being carried out in the context of the influences on ecosystems that the activities could have. The work involves the following activities:

- Set up and operation of a site compound. This would be alongside the pier site.
- Installation of 13 steel piles driven into the bed of the Thames from a jack up barge which will work from legs settled on the river bed. Three of the piles are of approximately 1000mm diameter, 10 are of 650mm diameter. This activity is predicted to disturb the surface layer of benthic sediment only. The flow in this reach is particularly strong and dynamic in the absence of piling operations (Provision of Flow Information arising from pontoon extension to Town Pier, Gravesend Reach, Thames Estuary (HR Wallingford 2009)).
- Piling would cause noise and vibration.
- Piling operations would take approximately 15 days and would is scheduled for July 2010.
- Piling would be into sub-tidal sediment; no intertidal areas would be directly affected by this work.
- Pontoons, walkways and associated structures would be fabricated off site and transported to site and installed from barges; there would be no impact on the river bed from this operation and noise and vibration would be less than during the piling operation.

3.1.2 Following construction the pontoon would be used by the Gravesend-Tilbury ferry and for occasional use by other leisure vessels.

4. ECOLOGICAL APPRAISAL

4.1 Screening for Appropriate Assessment

4.1.1 The most significant ecological receptor is the Thames Estuary and Marshes SPA/Ramsar Site and its component SSSIs (Mucking Flats and Marshes SSSI and the South Thames Estuary and Marshes SSSI). This European Site is 2.6km from the pier at its closest point (and 3.2km from the site at its closest point on the river. This section of the report considers impacts on the European Site, and also its SSSI component sites.

4.1.2 The Conservation (Natural Habitats &c.) Regulations 1994 as amended state that any project which is not directly connected with the management of the SPA for nature conservation and either alone or in combination with other plans or projects would be likely to have a significant effect on a European Site needs to be subject to Appropriate Assessment.

Construction Phase

4.1.3 A significant effect on the SPA and its constituent SSSIs from construction is not likely because of the distance from the proposed work to the European Site; there would be no direct impacts on the European Site (e.g. habitat loss) as a result of the proposals.

4.1.4 Birds using the SPA are unlikely to be affected by the proposed construction activity due to the distance from the site and the intervening land use and activity along the southern bank of the Thames which includes other piers and Port of London activities, the work is restricted to the site and would be of short duration in one season. The works are programmed for April to August therefore this is outside the main period when the qualifying species would be present. The piling operation is programmed for July.

4.1.5 Noise from construction may be apparent 3.2km away although this would probably be masked by existing noisy activities closer to the SPA. This is not likely to have a significant effect on SPA due to the short duration of noisy works and the season of works. Vibration from piling is not predicted to affect the SPA.

4.1.6 The amount of sediment likely to be mobilised is negligible in the context of background levels and would be expected to disperse in the 3.2km between the site and the SPA. The change to the flow speeds would be small and localised around the pier (HR Wallingford 2009) and therefore no effects on the intertidal components of the SPA are predicted.

Operational Phase

4.1.7 In the operational phase the Gravesend-Tilbury ferry service would not constitute a new operation, albeit that its Kent terminal would move 150m closer to the SPA. Any additional boat movements in the context of the annual total of 30,000 commercial vessel and 200,000 leisure craft movements in the Thames (PLA Annual Review 2007/2008), are not expected to have a disturbing impact on birds in the SPA. Changes in the sediment regime in the Thames as a result of additional boat movements would not be significant either in the context of background levels. Therefore significant effects on the SPA (disturbance to the qualifying interest species or changes in sedimentation regime in the river) are not anticipated in the operational phase.

4.1.8 An Operational Phase Management Plan for the Royal Town Pier has been produced (Gifford 2009) this describes measures to minimise the environmental impact of the operation of the pier and would be adopted in the operation following the construction phase.

4.1.9 The application for a FEPA licence and a River Works Licence will be considered by the Centre for Fisheries and Aquaculture Science (CEFAS) who consider the schemes environmental implications and liaise with interest parties (PLA, Environment Agency (EA), and Natural England (NE)) to ensure they are satisfied with ecological/environmental considerations. Natural England should determine whether there is a likely significant effect based on the particulars of the proposals and the information presented in this report.

4.2 Consideration of Other Ecological Impacts

Construction Phase

4.2.1 Table 1 presents a summary of consideration of impacts based on the desk study, identifying which likely environmental impacts, with respect to ecology could be significant, and in this case, what mitigation is necessary. The table considers nationally designated sites other than those which form part of the Thames Estuary and Marshes SPA/Ramsar Site which are discussed in the previous section.

Table 1 Construction Phase Impacts

Potential Impact	Significant?	Reason	Mitigation
Effect on Statutory designated sites of nature conservation importance (see Paragraph 4.2.1).	N	There would be no impact on SSSI sites; West Thurrock Lagoons and Marshes SSSI is the nearest SSSI and is 6km from the site upstream on the Thames. Other SSSIs are more distant and equally no impact is predicted.	None required (The works are programmed for April to July which is outside the main period when wintering birds would be present in the SSSI sites)
Impacts on non-statutory designated sites of nature conservation importance	N	Locally designated sites are all terrestrial sites, and as such no significant impact is predicted from construction or operational disturbance and no land take or other direct effects would occur. The Thames Estuary and Marshes Important Bird Area is in close proximity to the site; no significant impact on the integrity of this feature is predicted due to its large extent which would allow any birds present to use different parts of the IBA during works.	None required
Effect on non designated habitats (loss or other direct impacts on benthic or intertidal habitat during construction, affecting benthic invertebrates)	N	The work in the subtidal zone is restricted to the footprint of thirteen piles which forms a very small proportion of the available subtidal habitat on one bank of the Gravesend Reach. Whilst this habitat (which may qualify under a UK Biodiversity Action Plan) would be lost, the invertebrate communities present are widespread in this reach and distributed based on the salinity and type of substrate available. In addition the piles would provide some additional habitat in the operational phase and no scouring of the existing river wall is predicted. Intertidal habitat (the subject of a UK Biodiversity Action Plan) will not be affected by the works which take place in the subtidal zone.	None required. Good practice will minimise the footprint of the works and good planning will minimise the duration of works.

Potential Impact	Significant?	Reason	Mitigation
Impacts on fish	N	There would be disturbance through piling and other construction operations which coincide with the main fish migration period. Whilst The Environment Agency has noted that the period March to October is the most sensitive for Atlantic salmon and the work would be in this period, it is unlikely that the effects of the proposed work on fish (with appropriate mitigation measures in place) would be significant. This is due to the short duration of the most noisy and intrusive work involved (piling) in each working day and in total and the small amount of piling involved. The new structure is aligned largely with the flow and as a result is not predicted to cause a barrier to fish movement past the pier in the operational phase.	Works should be planned to minimise the duration of piling. Impact piling should begin at each new instance of piling with a gradual ramping-up of sound to scare fish away before sound levels reach lethal limits; this should deter those fish able to swim away before the full power of the pile driver is felt through the river. No pile driving should be carried out at night. Work should be programmed for low tide wherever possible.
Impacts on cetaceans	N	Bottlenose and white-beaked dolphins are most frequently recorded in the Thames in the period when piling is proposed. Works are temporary and although whales' use of the estuary is poorly understood, no affect on conservation status of any cetacean species is predicted due to the short duration of the most noisy and intrusive work involved (piling) in each working day and in total and the small amount of piling involved.	Works should be planned to minimise the duration of piling. Impact piling should begin at each new instance of piling with a gradual ramping-up of sound to encourage cetaceans to move away before sound levels increase to their maximum; A non-metallic pad should be used between the hammer and the head of the pile to reduce the noise impact of the piling. Work should be programmed for low tide wherever possible.

Potential Impact	Significant?	Reason	Mitigation
Impacts on birds	N	Impacts on birds outside statutory designated sites are not predicted to be significant as the works would not result in loss or other direct impacts on intertidal habitat. The temporary nature of works in the summer (when overwintering birds are absent) and the extensive suitable habitat for birds feeding on intertidal mud in the Thames means that suitable alterative feeding grounds would be available for any birds disturbed by the construction.	Plan work to minimise the duration, especially of piling.
Impacts on terrestrial habitats and species	N	Due to the nature of the work being carried out no significant impact on terrestrial habitats or species is predicted.	None required.

Operational Phase

4.2.2 In the operational phase the Gravesend-Tilbury ferry service would not constitute a new operation, albeit that its Kent terminal would move 150m closer to the nearest SSSI. Significant effects on the nearest SSSI or any other ecological receptor (for instance from disturbance by users of the extended pontoon or changes in sedimentation regime in the river) are not anticipated in the operational phase.

4.2.3 Any additional boat movements in the context of the annual total of 30,000 commercial vessel and 200,000 leisure craft movements in the Thames (PLA Annual Review 2007/2008), are not expected to have a disturbing impact on birds in the vicinity of the site (in the Thames IBA) or further afield. The new structure may deter some birds from using the intertidal area between the pontoon and the river wall (for instance for feeding) but it is expected that birds would become used to the new structure and that they would still feed on the intertidal area (the ferry moving base may also mean an increase in birds' use of the intertidal habitat around the West Street Pier as a consequence).

4.2.4 Changes in the sedimentation or tidal propagation in the Thames as a result of the new structure or additional boat movements would not be significant in the context of baseline processes and the foreshore fronting the river will not be subject to any scouring from changes in flow caused by the new structure. Therefore there would be no impact on the UKBAP intertidal mud habitat.

4.2.5 The new structure is aligned largely with the flow and as a result is not predicted to cause a barrier to fish movement past the pier.

4.3 Consents

4.3.1 Works within the Thames Estuary are subject to consents which have relevance to ecological issues. The Desk Based Study will highlight specific issues in more detail however consents related to these aspects are detailed below:

i For construction work involving deposition of materials below Mean High water Spring (MHWS), building of harbours, jetties, outfalls etc. a Food and Environment Protection Act (FEPA, 1985) Construction Licence is required. Applications are made through the Maritime Fisheries Agency (MFA) who will place the application with the Centre for Fisheries and Aquaculture Science (CEFAS) who consider the schemes environmental implications and liaise with interest parties (PLA, Environment Agency (EA), Natural England (NE)) to ensure they are satisfied with ecological/environmental considerations.

ii The PLA will consider the environmental and navigational impacts of proposed schemes, accordingly they will require a Riverworks Licence.

5. CONCLUSIONS

5.1.1 The works proposed would be of short duration and would be carried out in a small footprint of the largely sub-tidal river bed in the context of the amount of this habitat in the Gravesend Reach and the wider Thames.

5.1.2 No significant changes to river flow or sediment regime are predicted from the works or the operation of the extended pier.

5.1.3 There are various ecological receptors that may be affected by the proposed work, notably the piling operation which could disturb birds, fish and cetaceans. Works are programmed for April to August which will minimise any effects on wintering birds.

5.1.4 Significant effects on the Thames Estuary and Marshes SPA/Ramsar Site (which is 2.6km from the site) from the construction and operation phases are unlikely. However, Natural England will carry out their own test of likely significance of the proposals to determine whether they consider that further assessment of the project is required (see Section 4.1).

5.1.5 Measures to minimise the impacts of piling on fish and cetaceans have been proposed and the adoption of such measures would mean no significant adverse effect on these receptors is predicted.

5.1.6 Carrying out the works following the recommendations in the table above and according to the terms of the FEPA and River Works Licences would ensure that the impacts of the pier improvement works would be minimised.

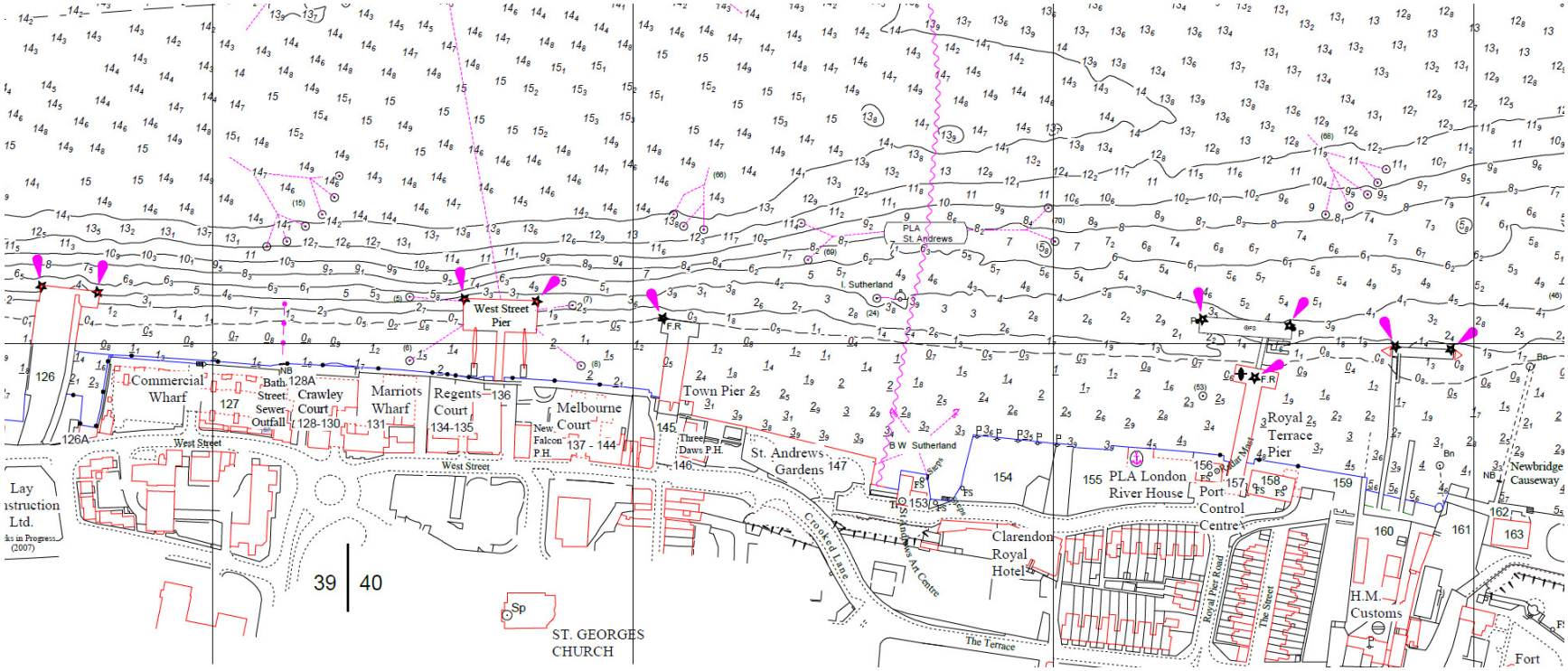

FIGURE 1: EXISTING LAYOUT

Extract from PLA Chart 336 (Sept 2006 – Oct 2007)

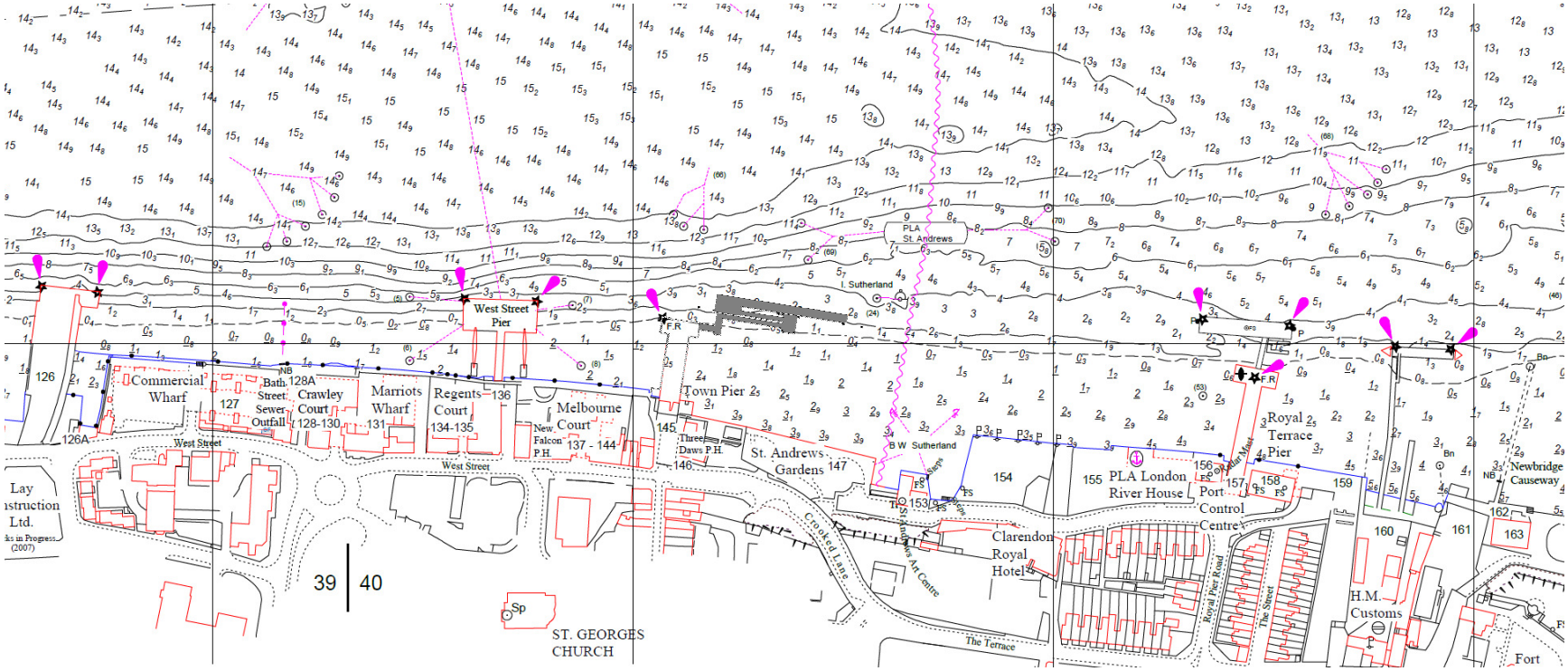

FIGURE 2: LAYOUT SHOWING PROPOSED PONTOON FACILITY

Extract from PLA Chart 336 (Sept 2006 – Oct 2007)

Gravesend Town Pier Pontoon
Environmental Scoping Table

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Item	Aspect/Issue	Comments	Covered In:
Ecology	Terrestrial	Adjacent green areas	Ecology Report
	Marine	Thorough scoping required	Ecology Report
Air Quality	Operational	Effect of emissions from vessels Very minimal change to current levels on river, pontoon significant distance from shore.	No action required
Noise	Construction	Principally piling	Ecology Report
	Operational	No additional noise over current – ferry operates just downstream at the moment.	Operational Environmental Management Plan
Transport	River transport	Generally regarded as beneficial	Thomas Ford & Partners Planning Application
	Land transport	Additional visitors to pontoon. Most visitors come by foot, existing transportation services and parking in town centre close by. Ferry currently operates just downstream.	
Flood Risk	Does new installation affect flood defence	Pontoon located some distance from flood wall – EA indicate land drainage consent not required. Pontoon to be designed for 1/1000 year flood level.	No action required
Hydro-dynamics	Changes to river flow and sedimentation	Will pontoon installation change river flows and cause accretion/erosion	HRW Hydro-dynamic Report & Geomorphic Report
Ground Water Quality	Contamination of aquifer by river water	Hydraulic gradient should preclude ingress of river water to aquifer.	No action required
Surface Water Quality	Contamination of river by sediment	Ecological impact Operational and construction impacts.	Ecology Report & Operational Environmental Management Plan & Geomorphic Report
Landscape and Visual	Setting and context of pontoon	Pontoon facility should not negatively impact on the historic pier visually	Thomas Ford & Partners Planning Application
Archaeology	Contextual		Thomas Ford & Partners Planning Application
	River bed	Potential for historic wrecks, wharfs, causeways etc	Archaeology Report
Social impacts		Positive – part of a wider regeneration scheme	No action required
Economic impacts		Positive – part of a wider regeneration scheme	No action required
Operational Impacts		Effects of waste, fuels, loading, public, litter etc	Operational Environmental Management Plan