



Babcock International

Rosyth International Container Terminal:

**Marine Licence application for in-estuary works -
Scoping Report**

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Proposed in-estuary works at Rosyth International Container Terminal: Request for Marine Licence Scoping Opinion

1.1 Overview and Background

Port Babcock (Rosyth) Ltd formally requests a Scoping Opinion from Marine Scotland under Section 13 of the Marine Works (Environmental Impact Assessment) (As Amended) Regulations 2007, with respect to the in-estuary works at the proposed Rosyth International Container Terminal (RICT).

The overall purpose of the development is the creation of an International Container Terminal, capable of simultaneously accommodating two container ships with a capacity in the range of 500-2000 Twenty-foot Equivalent Units (TEU). It is anticipated that, when fully operational, the Port would operate on a 24-hour per day basis. Construction of the terminal is expected to take approximately 24-months.

It was intended that the scheme would be authorised by a single Harbour Revision Order (HRO) and following submission of a formal screening opinion to the Scottish Government Transport Directorate in July 2010 it was confirmed that an Environmental Impact Assessment (EIA) was required under Section 10(e) of Annex II of Directive 85/337/EEC. The Environmental Statement (ES) was submitted along with the HRO in January 2011. Following a period of public consultation in early 2011 a number of objections to the Order were received.

During the PLI the cases for each party were heard and the environmental information in the ES, along with supplementary environmental information submitted, was taken into account. The Reporters also took cognisance of the information in the Report to Inform an Appropriate Assessment relating to the impact of the proposed development on Natura 2000 sites.

The final recommendations to Scottish Ministers were that the Rosyth International Container Terminal (Harbour Revision) Order 201[X] be made, subject to suggested modifications. In October 2013 the Rosyth International Container Terminal (Harbour Revision) Order 2013 No.288 came into effect.

1.2 Application

Within the HRO (No. 288) it is stated that a Marine Licence for all in-estuary works shall be obtained by Port Babcock (Rosyth) Ltd before any of the works granted by the HRO commence (Article 17(10) of HRO).

Port Babcock (Rosyth) Ltd now aims to progress the scheme by submitting an application for a Marine Licence under the Marine Works (Environmental Impact Assessment) (As Amended) Regulations 2007. The application will be accompanied by a detailed environmental impact assessment (EIA).

To support the Marine Licence application a formal Scoping Opinion is being sought in order to define the proposed activities and works to support the preparation of the ES as part of the EIA regulations (2011) and the Habitats Regulations (2012). This Scoping Report sets out the proposed approach which will utilise and build upon

pre-existing work carried out for the HRO. In setting out this report, specific reference has been given to guidance from the Marine Scotland document 'Marine Licensing in Scotland's Seas Under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009', in particular sections 3.4 and 3.5. Included within this Scoping Report are figures showing the location of the project and regulated activities, a description of the project including the possible effects on the environment and a statement of the working methods. Supporting information relevant to the project and background is also submitted, including the RICT ES (Jacobs, 2011); HRO (no. 288); the PLI report; version 4 of the Construction Environmental Management Plan (certified by Transport Scotland in October 2013 as an attachment to the HRO).

Careful consideration has also been given to the recommendations made by the Reporters in the PLI report. This has assisted in the scoping in/out of various environmental receptors as have a number of points raised throughout the inquiry.

1.3 General Location

The proposed development site is located to the west of the main basin at Port Babcock Rosyth (Figure 1). The onshore part extends to 22.5 hectares and lies largely on reclaimed land. The southern part of the site is dominated by a large void. Together these form what was known as the RD57 site, which was to have been used to construct a nuclear submarine refuelling and refitting facility. In 1993 the Government decided to transfer nuclear refitting work to Devonport and the dockyard, port and RD57 site were sold by the Ministry of Defence to Babcock in 1997. East of the site is Port Babcock Rosyth, whilst further to the east is the Port of Rosyth operated by Forth Ports Ltd. On its west side the development site adjoins Windylaw Bay, to the west of which is a small headland separating it from the adjoining Brucehaven Bay. This bay is backed by a sea wall about two metres high, beyond which is a footpath, and then the rear gardens of houses in Charles Way, Limekilns. The village of Limekilns extends further to the west.

The north-western perimeter of the site is adjacent to the Firth of Forth Special Protection Area (SPA) which is designated for five Annex I bird species under Article 4.1 of the Wild Birds Directive, six species of migratory birds designated under Article 4.2 and a large overwintering waterfowl assemblage. One of the islands which make up the Forth Islands SPA, which is designated for supporting seabird colonies, lies 3.7 kilometres east of the site. The River Teith Special Area of Conservation (SAC), which is designated for migratory fish, is located 45 kilometres upstream of the site. Several Biodiversity Action Plan habitats are present within the bays including 'intertidal mudflats' and most notably the *Zostera noltii* 'eelgrass beds,' both of which are Priority Marine Features (in Scottish territorial waters).

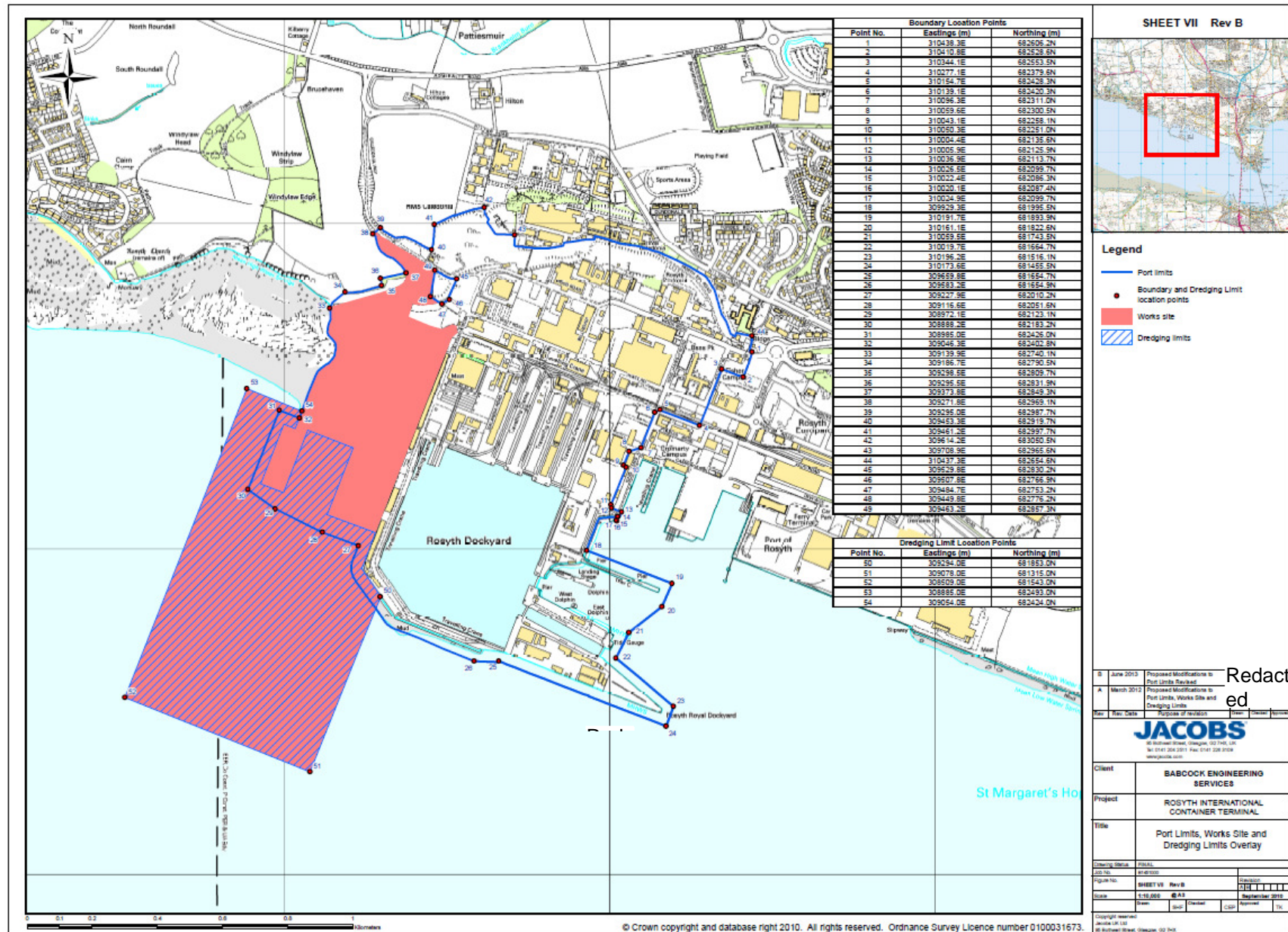


Figure 1: Location of the RICT scheme and limits of dredging activity.

1.4 Assessment

Within the ES, assessment of the potential environmental receptors will be carried out through interpretation of baseline data, review of relevant literature (including original 2011 ES), relevant websites, application of relevant legislation, undertaking consultation and the use of professional judgement. The principles and approach of IEEM, the Guidelines for Ecological Impact Assessment in Britain and Ireland – Marine and Coastal (2010), will be followed and standard impact assessment terms used where appropriate to provide consistency with the other assessments.

1.5 Structure of Environmental Statement

Broadly, the Environmental Statement is likely to take the form of:

- Project introduction, including a statement of need and a description of the EIA process, including details on scoping, consultation and impact assessment;
- Detailed description of the proposed works;
- Detailed description of the existing environment including identification of ecological receptors and their value;
- Detailed description of the potential impacts and mitigation measures identified during the EIA process for each of the environmental issues under consideration. This part of the Environmental Statement will cover both the construction and operational phases of the scheme and both beneficial and adverse impacts;
- Summary of findings, including a table showing the predicted impacts and the residual impacts remaining following mitigation;
- Proposals for monitoring;
- A list of references of information and publications cited in the Environmental Statement;
- Appendices, containing relevant survey information and reports that may be produced during the undertaking of the EIA; and,
- A non-technical summary.

2.1 The proposed development

Article 5(1) of the HRO gives Babcock the power to construct 21 defined works. Principal amongst these is the construction of a berthing pocket capable of accommodating two vessels on the southern part of the RD57 site (utilising part of the existing void), with the necessary quay walls, sea walls and revetment, and dolphins. The remainder of the void would be infilled and the land to the west, north and east of the quay walls used for stacking and handling containers. The development will include the installation of up to two ship-to-shore cranes not exceeding 50 metres in height on the eastern quayside, and up to two mobile harbour cranes not exceeding 40 metres high on the opposite side of the berthing pocket. The HRO authorises the stacking of containers up to five high or 15 metres in height, and the use of rubber tyre gantry cranes (RTG) not exceeding 30 metres high for handling containers. It also authorises the erection of lighting columns up to 25 metres high.

On the northern part of the site, beyond the container stacks, there would be a single-storey freight station of about 3000 square metres accommodating facilities for the loading and inspection of containers, offices, staff accommodation and entry and exit gatehouses. Other buildings proposed include a two-storey administration building of approximately 1000 square metres, canteen and other offices, workshop and maintenance buildings, including for the RTG. Parking provision for 80 cars and a truck holding area for 70 HGVs are included, as well as security fencing and a three-metre high acoustic and visual barrier along the western edge of the site adjacent to the Windylaw Bay foreshore.

Berthing Pocket

Access to the berthing pocket from the Forth would be obtained by removing the existing sea wall embankment and revetment on the south side of the present void, reduction of the underlying bed level and the creation of a dredged channel to a maximum depth of 9.5 metres below Chart Datum extending for approximately 750 metres southwards into the river. The channel would be 150 metres wide at its base with slopes finished to a profile of approximately 1:3. The capital dredging will be carried out by a large back-hoe dredger resulting in removal of approximately 700,000 cubic metres of material. An outline of the proposed channel along with dredging limits is provided (Figure 2) along with outlines showing locations of the relevant additional works (Figures 3 and 4). Maintenance dredging may be required approximately every 4 months.

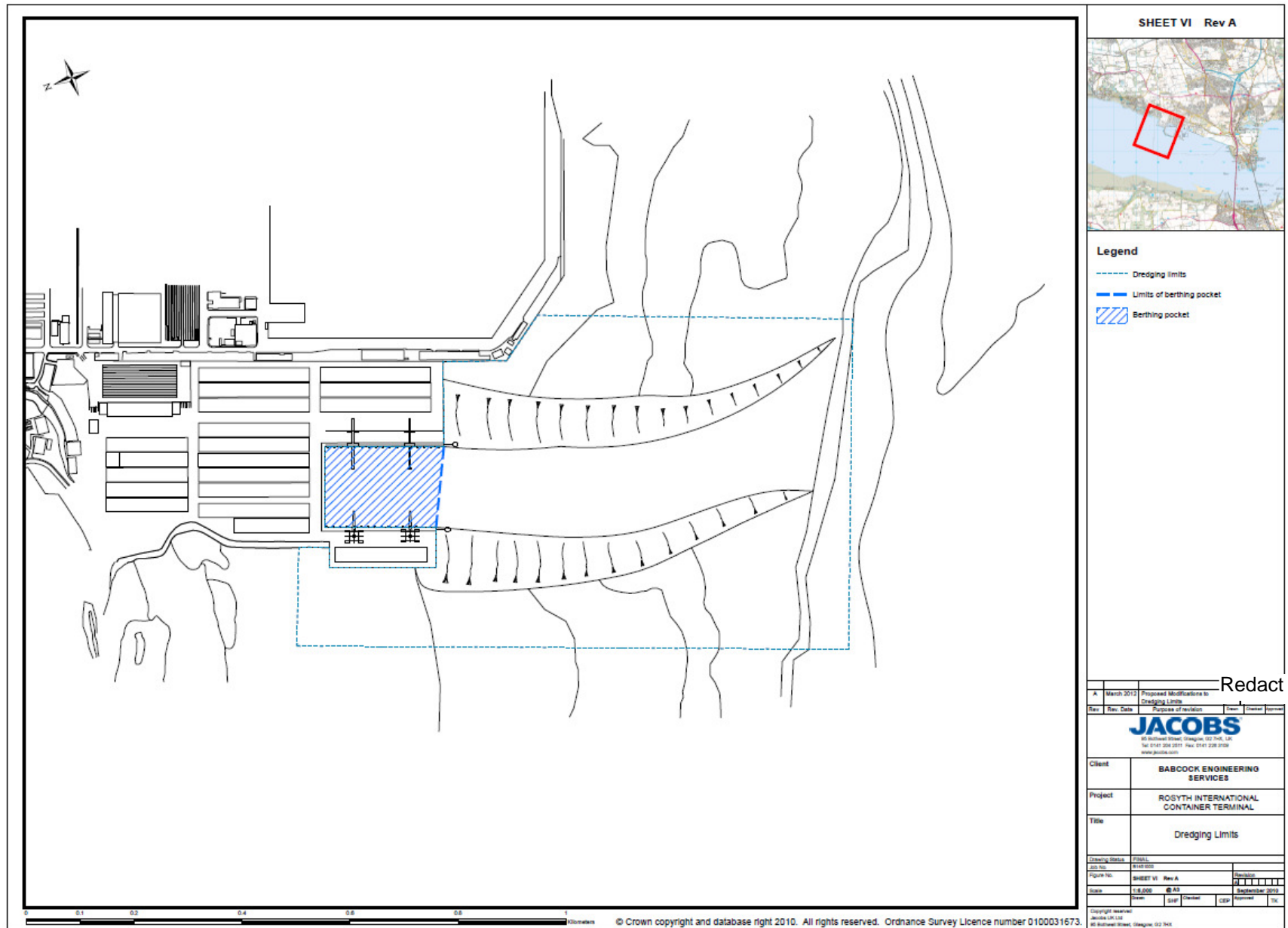


Figure 2: Proposed channel showing limits of dredging and berthing pocket.

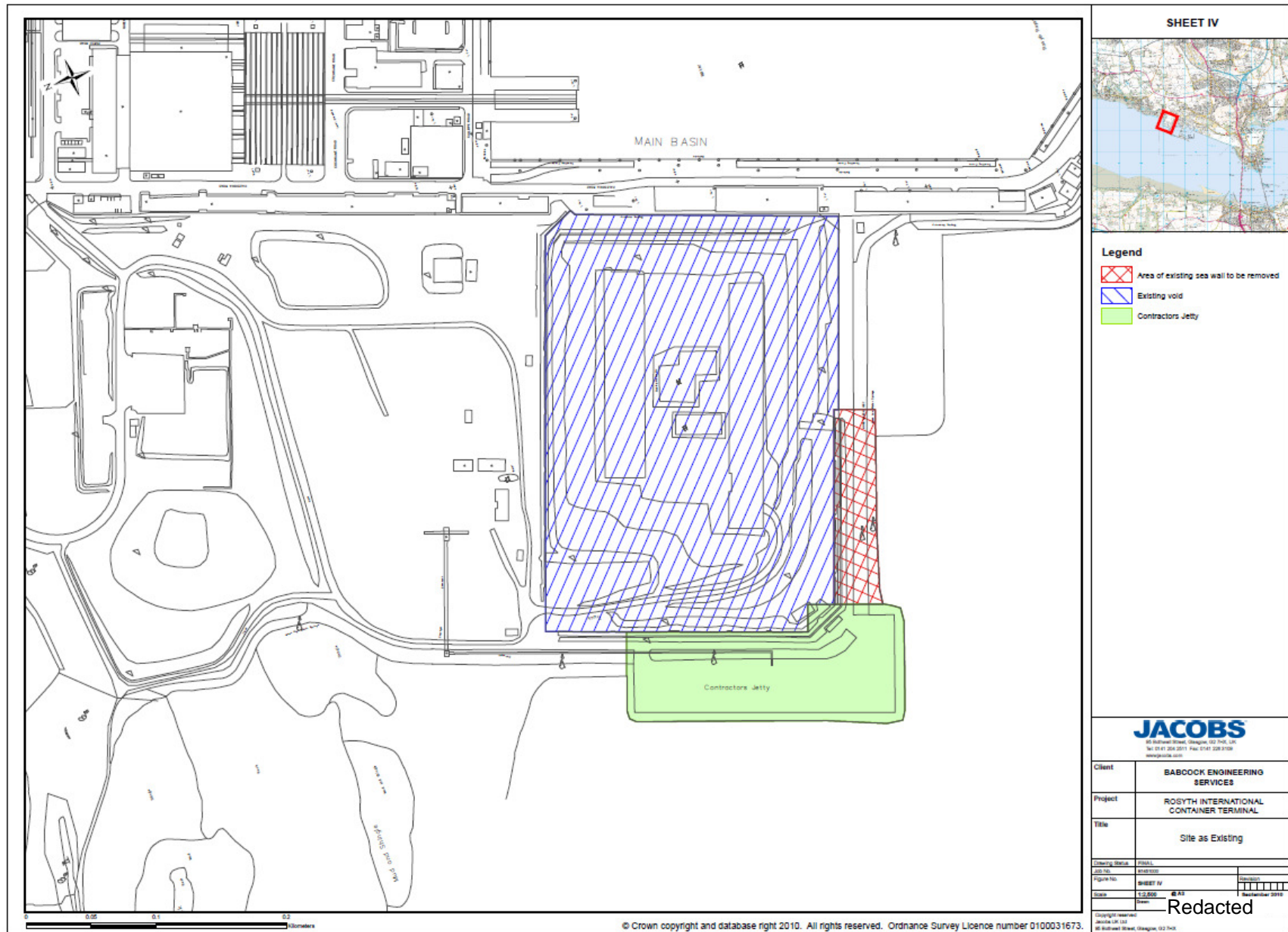


Figure 3: Location of existing sea wall to be removed and contractor's jetty.

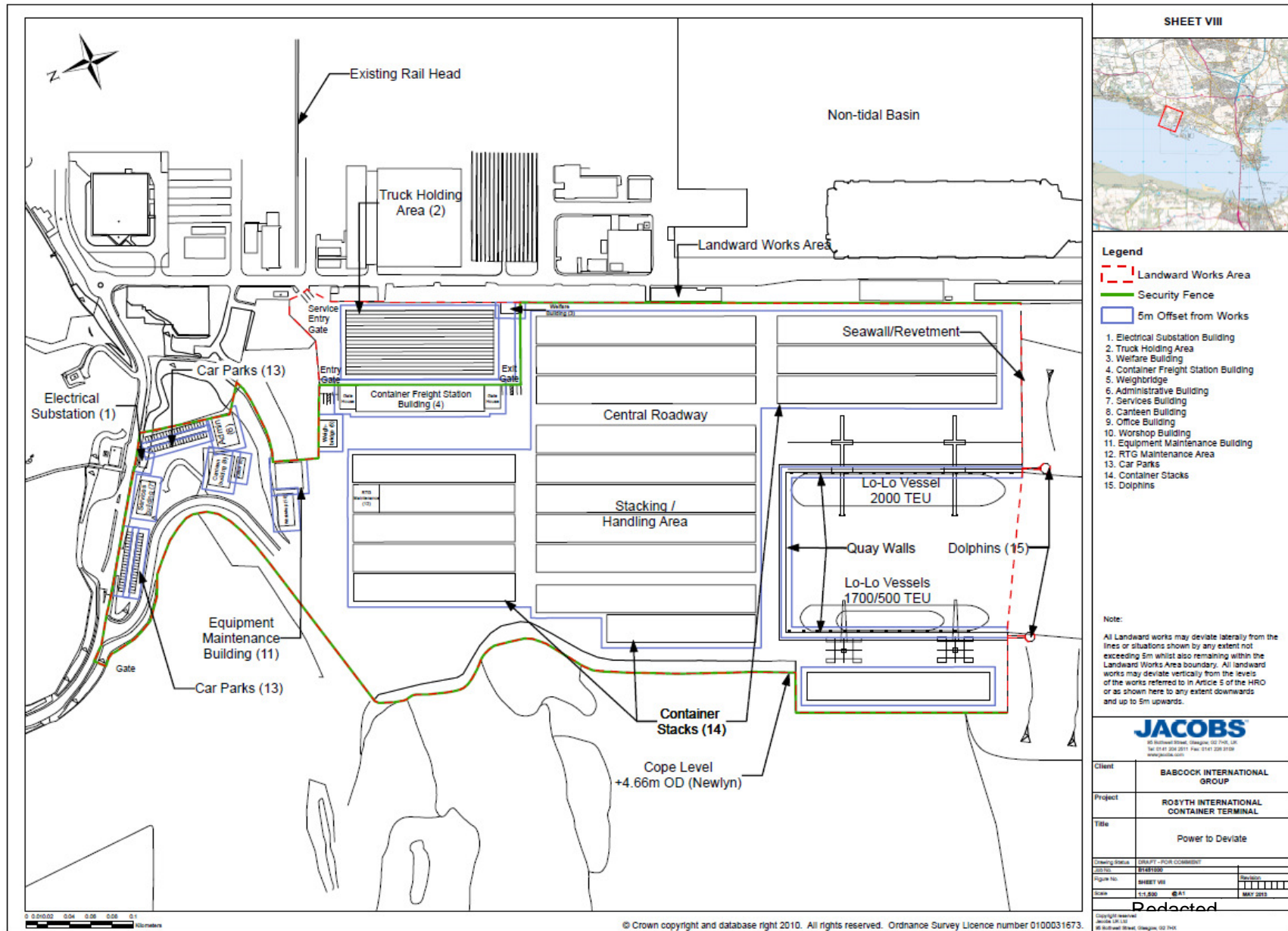


Figure 4: Plan of works showing position of quay walls, dolphins and seawall.

2.2 Construction Environmental Management Plan (CEMP)

As required by Article 17(1) of the HRO an agreed CEMP shall be provided by Port Babcock. In April 2012 a third draft of the CEMP was produced that incorporated all the agreed additions and amendments following a hearing session with representatives of Babcock, Forth Ports, the Joint Action Group (JAG), Fife Council, SEPA and SNH. Written comments were also provided by Marine Scotland and Historic Scotland. Following production of this draft, a number of recommendations were made by the PLI Reporters. Suggested alterations were incorporated to achieve a particular outcome and recommended amendments made to wording in certain paragraphs (see Appendix 6 of PLI report).

The CEMP provides best practices for the construction and operation of the proposed development. It includes provisions for monitoring, enforcement and remediation of the impacts of the RICT with due regard to the ecological receptors. With the various mitigative measures in place, as outlined in the CEMP, an assessment of no significant impact was concluded by the reporters for several environmental topics.

2.3 In-estuary works and possible environmental effects

Within section 2.1 of the document 'Marine Licensing in Scotland's Seas Under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009' licensable marine activities are listed. Reference is made to section 21 of the Marine (Scotland) Act 2010 and section 66 of the Marine and Coastal Access Act 2009 for consideration of which activities require a Marine Licence. Following this the specific works of this development requiring a license are:

- Capital dredging of an approach channel to -9.5m CD.
- Disposal of dredged material.¹
- Construction of quay walls on southern edge of the site.
- Piling for quay walls and dolphins.
- Removal of rock armour and underlying bund.
- Contractor's jetty works.

All of these represent elements of work that are required to be carried out below the mean high water spring tide (MHWS).

Resulting from these works are a number of effects with the potential to impact upon the marine environment: noise/vibration on mammals and fish, degradation of water quality, increase in sediment suspension, release of sediment-bound contamination, and the direct/indirect impact upon adjacent habitats and their resident and migratory species by modification of the physical, chemical and biological environment.

Due consideration has been given to the concluding remarks given by the reporters following the PLI and also to relevant comments made. These have been addressed and are incorporated, where appropriate, into the proposals presented in this report for the potential work required to support the ES, and Marine License application. A summary of the key PLI findings relevant to the in-estuary works are presented below (Table 1).

¹ Disposal of capital dredged material is considered to be at the deepwater sites Blae Rock and Narrow Deep.

Table 1: Relevant topics covered within the PLI and comments

Topic Area	Covered in ES and/or CEMP	Objections/comments	PLI outcome/reporters comments
Water Quality and Contamination	Desk survey carried out using available SEPA data Subtidal sediment samples collected and analysed in accordance with the then FEPA guidelines	Possible contamination of water body during capital dredging Insufficient analyses of sediment	<ul style="list-style-type: none"> Follow CEMP (e.g. monitoring of water during construction as required by SEPA, see section 3.11 of CEMP; follow Pollution Prevention Guidelines given as listed in CEMP) Recognition that additional subtidal sediment sampling programme is required before dredging commences (including chemical and radiological analysis) Follow BPEO for disposal
Hydrodynamics and sediment regime	Desk study and report produced Flow modelling carried out	Adverse impacts upon intertidal area caused by changes in wave, flow and sedimentary regimes	<ul style="list-style-type: none"> Require additional modelling to determine changes in flow, wave and possibly sediment movement More evidence required to determine how changes to physical environment may impact upon intertidal SPA
Non native species	Covered in CEMP	Introduction of non-natives more likely with increase in vessel movements	<ul style="list-style-type: none"> Addition to final draft of CEMP with specific reference to guidance by IMO
Noise and vibration	In ES (2011) and CEMP	<p>Could effect lamprey and salmon i.e. River Teith SAC features – this objection from SNH was withdrawn following additional information</p> <p>SNH and Marine Scotland confirmed they were content with proposed mitigation measures</p>	<ul style="list-style-type: none"> Reporters agreed with ES (2011) that there would be an insignificant impact on marine ecological receptors from operational noise Noise (operation/construction) concluded to have no adverse effect on integrity of Firth of Forth SPA and River Teith SAC MMO should be present during dredging, disposal and piling; 'soft start' procedures in place Follow provision for mammals outlined in CEMP Provision outlined in CEMP for effect of noise on SPA qualifying features
Marine Mammals	In ES (2011) activities assessed as having no significant impact provided mitigation measures in place	SNH and Marine Scotland confirmed they were content with mitigation measures in CEMP	<ul style="list-style-type: none"> MMO should be present during dredging, disposal and piling Follow provision for mammals outlined in CEMP
Lighting	Provision given in CEMP No construction activity after 7pm.	Disturbance of bird populations	<ul style="list-style-type: none"> Adequate provision in CEMP Agree lighting strategy with Fife council and in consultation with SNH

Topic Area	Covered in ES, CEMP or otherwise	Objections/comments	PLI outcome/reporters comments
Intertidal habitats (inc. eelgrass beds of <i>Zostera noltii</i>)	Benthic intertidal survey carried out in spring 2009 and focussed eelgrass survey in May 2009 Sedimentary habitats particularly prone to changes in hydromorphology.	Inadequate survey – not enough samples	<ul style="list-style-type: none"> Link to potential changes in hydrodynamics and sediment regime from dredging Increase in sedimentation on intertidal during dredging activity. Increase number of benthic sampling sites in pre-construction survey as compared to 2009 survey
Subtidal	Subtidal benthic survey carried out in spring 2009 – analysis of infauna and sediment	No objections raised by SNH	<ul style="list-style-type: none"> Loss of subtidal habitat will have negligible impact on SPA Recommended amendment of HRO to include provision for pre-construction surveys
Birds	Bird surveys carried out between April 2009 and April 2010 (to accepted methodology by SNH)	Impact on SPA intertidal areas adjacent to development.	<ul style="list-style-type: none"> Uncertainty whether adverse impact could occur, as result of dredging, on the qualifying features of SPA Provision outlined in CEMP for effect of noise on birds, noise and lighting not considered to have adverse impact on birds from development
Habitat Regulations Assessment	Stage 1 and 2 HRA undertaken	General concerns raised on possibility of significant impact on SPA arising from dredging activity	<ul style="list-style-type: none"> RIAA does not fully address effects of dredging and dredged channel on Firth of Forth SPA Propose that Habitat Regulations Assessment is carried out Present for the competent authority to determine the Appropriate Assessment under the Conservation (Natural Habitats, &c.) Regulations 1994, as amended, must be undertaken Conclude that RICT project will not have adverse effect on River Teith SAC or Forth Islands SPA
In combination assessment (dredging)	In ES (2011) and CEMP. Report on in combination effects of maintenance dredging submitted to Marine Scotland on 28 Oct 2011	Should avoid, as way of mitigation, dredging and disposal activities when similar operations taking place in Firth of Forth	<ul style="list-style-type: none"> Conclusion of report was considered reasonable by Marine Scotland.

Careful consideration of the likely impacts arising from this work, along with the recommendations and comments given at the PLI has resulted in the following environmental topics being 'scoped in' for the ES (see Table 2) or 'scoped out' (Table 3) :

Most of the topics scoped for inclusion will incorporate a desk study of all available and relevant baseline data. This will include, where appropriate, the use of data gathered during the RICT Marine GI, HRO ES (Jacobs, 2011), the Firth of Forth Replacement Crossing ES (Jacobs Arup, 2009) and further data to be gathered during the planned GI. Other potential sources of information are listed below.

3.1 Environmental Topics EIA (scoped in)

Supporting information required to make the impact assessments is detailed below.

Water quality and contamination

A baseline water quality assessment will be carried out using classification data held by SEPA, including the overall ecological status of the water body and any designated areas. A desk top study utilising published data on water quality and in consultation with SEPA, SNH and Marine Scotland will inform the assessment. The RICT ES (Jacobs, 2011) will provide a basis for the review as will data gathered during the Marine GI.

The assessment will identify the sensitivities of the surface waters, their constraints and the potential impacts of the in-estuary activities during the construction and operational phases. Mitigation measures for the potential impacts will be proposed and the resultant residual impacts, taking into account the stated mitigation measures, will be reported. Due regard will be given to the requirements of the CEMP document.

A review will take place of the contamination testing information that has been obtained since the 2011 ES along with that which will be obtained from the planned additional SI. The background data detailed in the previous ES would also be included to provide additional information, where relevant. The PLI Reporters concluded that contamination issues associated with the construction and operation of the RICT could be adequately addressed through the CEMP and other regulatory regimes (section 18.14). However, it was recognised that further sediment sampling would be required prior to the application for a Marine License (Table 1). Results from the Marine GI works, the scope of which was agreed with Marine Scotland in 2012 (Marine Licence application July 2012), will also be used to inform the assessment.

Table 2: Summary of Environmental Topics scoped within the ES for the Marine Licence application.

Environmental Topic	Potential Impact	Comment
Water Quality and Contamination*	Reduced water quality from accidental and operational toxic and nontoxic discharges; Release of toxic and non-toxic contaminants during dredging Release of toxic/non toxic contaminants during disposal Presence of radionuclides in sediment Increase in suspended solids	<ul style="list-style-type: none"> • Programme of sediment sampling in area of dredging activity to determine chemicals and possible presence of radionuclides • Desk study of SEPA data for last 4 years – collate and build on pre-existing data gathered in ES (2011) • Collate and present data from marine GI survey • Guidance included in CEMP to reduce spills and pollution
Hydrodynamics and sediment regime	Impact on SPA intertidal area from change in wave, flow and sediment regime	<ul style="list-style-type: none"> • Present findings of wave and flow modelling in ES • If results of wave and flow models are shown to be negligible then no more modelling required.
Benthic ecology* (Intertidal and subtidal)	Increased sedimentation on intertidal and subtidal habitats Removal of habitat directly (dredge), indirectly (through change in physical processes) Contamination of benthos	<ul style="list-style-type: none"> • Subtidal and intertidal surveys to include: <ul style="list-style-type: none"> .sampling of infauna .physicochemical analysis of sediments .walkover survey of intertidal (inc biotope map) • Incorporate previous 2009 survey data
Eelgrass (<i>Zostera noltii</i>)*	Increased sedimentation during dredging activity Contamination of eelgrass beds Indirect damage from change in coastal processes i.e. erosion, sedimentation	<ul style="list-style-type: none"> • Dedicated eelgrass survey to include map of extent (GIS output) along with shoot density • Sampling of adjacent infauna • Incorporate previous 2009 survey data
Fish (inc migratory species)*	Increased turbidity Changes to local physical processes Removal of food (direct or indirect) Release of contaminants Prevention of migration Physical damage from noise/vibration	<ul style="list-style-type: none"> • Desk study • Build on previous work presented in ES (2011)
Mammals*	Direct impact from vessels (and propellers) on pinnipeds and cetaceans Noise/vibration/light impact on mammal populations	<ul style="list-style-type: none"> • Desk study • Report to build on previous work presented in ES (2011) and cover the potential for 'corkscrew' injuries
Birds*	Changes to intertidal area resulting in adverse impact to food source i.e. erosion, sedimentation, pollution Disruption to feeding/roosting birds by noise/light	<ul style="list-style-type: none"> • Dedicated overwintering bird survey • Report to build on previous 2009/2010 survey

*Denotes topic covered in previous ES (Jacobs, 2011)

Hydrodynamics and sediment regime

It was identified during the PLI that the greatest unknown was the potential effects the proposed channel could have on tidal, sediment and wave regimes upon the adjacent SPA. To understand what degree of change may occur to this habitat, modelling will be carried out.

Although tidal flow modelling was undertaken and the results presented at the PLI, no agreement was reached on the extent and intensity of the changes shown. In addition to the flow modelling, a wave model will be prepared and data analysed. These two models will form part of a staged approach to the modelling. Should the results of these models show negligible changes in the area of concern then no further modelling will be carried out.

A stand alone report will be produced which will focus on the changes in the tidal currents and waves caused by the proposed channel, with a particular focus on the intertidal area to the west of the development site.

Recent bathymetric survey data will allow the possible wave and flow paths across the intertidal area to be represented accurately. Local survey and other bathymetric data will be merged resulting in the final model bathymetry and grid resolution being fine enough to represent the general bathymetry as seen on the Admiralty Charts including the details of the rugged intertidal area.

It is proposed that three representations of the dredged channel will be used in the models. These are as follows:

Baseline – present day bathymetry before the creation of the channel

Immediately post-dredging – seabed bathymetry immediately post capital dredging

Eventual post-dredging – bathymetry following side-slop slumping

Boundary wind, wave and tide conditions are available for input to the model but due consideration will be given to the views of the consultees on appropriate data sources and numerical inputs.

Tidal flows and waves will be modelled approaching from south of east accompanied by appropriate wind conditions at high-tide, mid-tide and low-tide levels. The dredged channel geometry will be the only difference in the input boundary conditions specified for the different scenarios. Although absolute wave heights and current speeds will be reported, the presentation and discussion of the results will focus on changes between the baseline and post-dredging bathymetries.

Flow modelling

A TELEMAC flow model will be set up of the Firth of Forth, from the Kincardine Bridge to at least 10km downstream of Rosyth, to represent flows and any changes due to the creation of the dredged channel, with a particular focus on the intertidal area to the west of the development site. TELEMAC uses an unstructured grid, which can be made coarser away from the area of interest, and as fine as is necessary to represent the bathymetry and flows in and around the dredged channel and inter-tidal areas.

The model will be run for the existing seabed bathymetry for a 15-day spring/neap cycle and validated against Admiralty Diamond data for currents given on the charts. The TELEMAC model will be run for the baseline present-day bathymetry and for

the developed scenarios including the two different representations of the dredged channel. It will be run over a 15-day neap spring tidal cycle. Results will focus on differences in predicted current speeds for the different bathymetries for different states of the tide (high-tide, mid-tide and low-tide), with difference plots comparing post-dredging current speeds with the pre-dredged results.

Wave modelling

A SWAN wave growth and transformation model will be prepared, covering the full width of the river, from the vicinity of Charlestown Harbour (west of Rosyth) to St Davids (just to the east of the Forth Bridges) using present-day bathymetry. Ideally, the unstructured-grid version of SWAN will be used and shared with the TELEMAC model. However, the unstructured-grid version is quite recent, and initial trials of the model suggest it may not be ready for commercial use. If this remains our opinion at the time when the modelling is commissioned, the more traditional nested grid approach will be used; with fine resolution of the dredged channel and inter-tidal area, and a coarser grid towards the boundary of the model.

To keep the number of result plots to a minimum, seven sea conditions are proposed, each one comprising wave height, wave period, wave direction, wind speed, wind direction and sea level. The conditions will be chosen to be representative of the range of possible severe conditions that exist at the site. The water levels used will be one representative high water level and a representative mid-water level, based on Admiralty tidal range information. Based on external comments already received, one low-tide run will also be carried out. The wave condition at the eastern boundary of the SWAN model will have limited effect on wave conditions near Rosyth and can be estimated based on existing reports. The more important wind conditions, which will determine local wind-wave growth within the model, will be taken from an earlier HR Wallingford analysis of measured winds measured at the Forth Road Bridge. These will be appropriately modified for use at the standard level of 10m above the water surface, as required, for forecasting wave generation and growth. It is proposed that three south-easterly wind conditions be tested, e.g. a one-year return period wind speed from the direction of longest local fetch, and either two variations in direction, or one in direction and one in speed.

The SWAN model will be run for the baseline present-day bathymetry and for the two developed scenarios with different representations of the dredged channel. That will make 21 SWAN model runs and 14 percentage difference plots comparing post-dredged to pre-dredged wave heights, namely:

- three wind/wave conditions from the east (we suggest variations on a 1 year return period case);
- for each of high tide and low tide (we suggest present-day mean high and low water springs);
- plus one mid-tide run of whichever wind/wave case above shows the highest changes;
- for each of the three bathymetric scenarios.

Interpretive reports for both the wave and flow modelling will present the results along with overall conclusions. Following this, an assessment of the results will be undertaken to inform the likelihood of significant changes to the adjacent intertidal area. The estimated impact of changes to the physical processes will help inform the assessments of the ecology topics.

Benthic ecology

Potential impacts arising from the works include direct habitat loss, direct physical damage, sedimentation, contamination, and an increase in suspended solids (see Table 2). In addition to the desk study further surveys will be carried out on the subtidal and intertidal habitats, building upon the initial baseline survey data collected in 2009. Following analysis of the data, assessments will be carried out in the ES as outlined below.

Subtidal

The previous subtidal benthic survey (2009) concluded that the habitats and species in close proximity to the RICT scheme were deposit-feeding taxa typical of muddy estuarine sediments. These taxa display a high tolerance to turbid conditions and smothering, many of the infauna having the ability to burrow through the sediment. No species of conservation importance were identified and the impact of dredging was assessed as insignificant in the 2011 ES.

During the PLI no objection was raised by SNH relating to the direct effects of dredging on the subtidal habitats. The reporters' recommendations concluded that the loss of sub tidal habitat of the order discussed would have a negligible impact on the qualifying interests of the SPA (14.227). However, it was also accepted that the scope for recolonisation of the benthos at the bottom of the dredged channel would be limited because of the requirement for regular maintenance dredging.

To supplement pre-existing data from 2009 an additional subtidal benthic survey will be carried out in late May. This will consist of a series of five faunal grab samples within the proposed dredge area and along the peripheral margins. Visual inspections of samples will be made and observations on colour, smell, depth of RPD layer, texture and presence of surface features (accretions, algae, fauna etc.) recorded; photographs will also be taken of undisturbed samples in the grab for future reference if required. Faunal samples will be washed over a 500 µm mesh sieve and all material retained on the sieve fixed with 4% formaldehyde and returned for analysis. The retained material will then be sorted by eye and all fauna extracted, with organisms identified to the lowest practicable taxonomic level, enumerated and the biomass of each sample recorded. Physicochemical samples will also be collected.

Intertidal

In 2009, as part of the ecological assessment of the Scheme, a walkover survey was carried out of the intertidal area to the west of Rosyth, to identify and map intertidal habitats and communities at Windylaw and Bruce Haven.

Work for the Marine Licence ES will build upon work previously undertaken and include a further detailed walkover survey, in late spring/early summer, of the intertidal habitats to the west of the RICT (e.g. Figure 1). This will provide a broad habitat map of the intended survey area and identify areas of soft sediment suitable for coring purposes i.e. out with the eelgrass (*Zostera noltii*) boundary (>5% shoot coverage). The survey will follow JNCC Marine Monitoring Handbook and according to best practice in the MNCR (Marine Nature Conservation Review) rationale and methods. The intertidal areas of Windylaw and Brucehaven will be mapped using differential global positioning system (GPS). Details of the intertidal habitats will be recorded from the lower, middle and upper shore in a systematic fashion and

biotopes ascribed according to the JNCC Marine Biotope Classification for Britain and Ireland.

Faunal cores will be taken in the soft sedimentary habitats to enable a greater degree of resolution for the biotope classification. Interpretation of the biotopes will also be aided by photographs and sediment collected for particle size analysis. Final mapping will be presented using GIS after consideration of the infauna, sediment size and photographic images.

Three replicate 0.01 m² cores will be taken from 6 stations, 2 at low shore 2 at mid shore and 2 at high shore, to a depth of 15 cm; along with an additional core at each station for particle size analysis (PSA). The heterogenous nature of the intertidal, combined with the presence in places of thin layers of sediment (<15cm deep) overlying bedrock will preclude coring in some locations. A further consideration is the presence of seagrass rhizomes below the sediment. The rhizomes are sensitive to physical disturbance and to prevent damage to this Biodiversity Action Plan habitat coring will not be done within the bed.

Faunal samples will be washed over a 500 µm mesh sieve and all material retained on the sieve fixed with 4% formaldehyde. Collected fauna will then be enumerated, identified to the lowest possible taxonomic level and the biomass recorded in line with procedures described by the National Marine Biological Association Quality Control (NMBAQC) scheme.

Intertidal (eelgrass beds– *Zostera noltii*)

This survey is distinct from the benthic intertidal survey as it will require mapping of the bed extent when the plant is at its most floristic (i.e. between June and September). However, the coring element will be carried out during the same time as the benthic coring (late May) to allow accurate spatial comparisons, between the infauna adjacent to the bed and that found in the other sedimentary habitats.

Being mindful of the sensitivity of these beds to physical disturbance a full monitoring assessment will not be carried out. The extent of the beds will be recorded by GPS tracking and notes made of areas where the shoot density is considered to be >5% coverage. General density and health of the *Zostera* will be recorded and photographs taken for reference.

Faunal coring (0.01 m² hand corer) will be done at 4 stations around the bed(s) (3 replicates at each station) in Windylaw and Brucehaven. Sediment will also be collected at each of the stations for physicochemical analysis. To ensure that rhizomes are undamaged during intertidal sampling cores will not be taken through the identified bed(s). However, a coring station adjacent to the eelgrass will allow characterisation of the infauna in this region.

Fish (including migratory species)

A desk study will be carried out on the intertidal and subtidal fish communities. This will be done using data compiled from a variety of sources including previous intertidal (seine netting) surveys, carried out west of the proposal in 2008 and 2009, and subtidal (otter and beam trawling) in 2008; from SEPA; Longannet Power Station impingement data; commercial landings data.

Discussion of the effects arising from piling and dredging in the PLI resulted in the conclusion that the RICT would not have an adverse affect on the integrity of the

River Teith SAC (section 14.233, PLI report) and that fish would not be adversely affected by noise or vibration.

Assessments will then be made on the non-migratory and migratory fish species which will build upon the results of the previous ES (2011).

Marine Mammals

The potential impacts arising from the development on cetaceans and pinnipeds are outlined in Table 2. Detailed provision is given within the CEMP to mitigate the potential for possible impacts. These mitigative measures were discussed and accepted during the course of the PLI. Marine Scotland and SNH confirmed that they were content with the proposed mitigation outlined in the CEMP against the potential negative effects of piling on marine mammals (section 14.183, PLI report).

There is emerging evidence to suggest that seal mortalities from 'corkscrew' injuries are the result of direct impacts with ducted propellers. Although the exact cause of these injuries is still being researched acknowledgment of a possible link between propeller collisions means due regard will be given to this potential impact within the ES.

An up to date desk study will build on the work done in the initial ES (2011) and collect further data on marine mammal sightings within and proximal to the Firth of Forth. This will include any data relating to 'corkscrew' injuries in the Firth of Forth and adjacent waters. Sources of data will include the Sea Mammal Research Unit (SMRU) at St Andrew's University, The Sea Watch Foundation (SWF) and the Lothian Wildlife Information centre (LWIC). Following the results of the desk study an assessment will be carried out to assess the impacts on marine mammals after suitable mitigative measures are put in place.

Birds

The area immediately to the west of the proposed development is designated as a Special Protection Area (SPA) and contains loafing, roosting and feeding habitat for birds that are qualifying features of the SPA. In 2009/2010 a directed bird survey was carried out covering the area west of the proposal site. To augment the initial baseline survey another survey is proposed between November and March following methods utilised by the British Trust for Ornithology when presenting wetland bird survey data.

Surveys will be based on the Through The Tide Count (TTTC) methodology and cover the same survey area as utilised for the RICT Report to Inform Appropriate Assessment (RIAA). A summary of the survey methods in relation to survey effort is provided below.

Six surveys per month (November to March inclusive) will be undertaken in the survey area. On each survey day, at least two tidal states will be surveyed sequentially, e.g. low followed by mid tide or mid followed by high tide. High tide counts will be carried out over a three hour period, 1.5 hours either side of high water, and low tide counts over four hours, two hours either side of low water. Mid-tide counts will be carried out in the tide period between both low and high tide time windows. If in agreement with SNH, the number and the locations of the vantage points will be the same as undertaken to date to inform the environmental assessments for the project. This will ensure data consistency and ease of comparison.

Estuarine bird data obtained from the above surveys will enable the assessment of any implications from in-estuary works as part of the RICT development on estuarine bird assemblages. This information will also be used to inform a Habitats Regulations Assessment for the Marine Licence.

3.2 Topics not included in EIA (scoped out)

A number of technical aspects pertinent to the works were scoped out after consideration (see Table 3)

These aspects were discussed during the recent PLI and following discussions with objectors and recommendations by the reporters an agreed CEMP was accepted by Scottish Ministers. Within the CEMP a number of mitigative measures are outlined for the construction and operation phases which address the aspects of noise and vibration; lighting; non-native species and vessel movements. All the aspects listed above were assessed in the original ES (Jacobs, 2011) and a separate report covering the in-combination effects of maintenance dredging in the Firth of Forth submitted to Marine Scotland.

Noise and vibration

A localised temporary increase is anticipated in both noise and vibration during the in-estuary works. These points were addressed in the previous ES (Jacobs, 2011) and it was concluded that following mitigative measures outlined in the CEMP (e.g. 'soft start' procedures and the presence of Marine Mammal Observer during piling activity) there would be no significant noise impact upon any marine ecological receptors. SNH and MS confirmed that they were content with the proposed mitigation and the PLI reporters concluded that impacts following piling operations would therefore be acceptable; with no significant impacts on marine mammals or the conservation objectives of the River Teith SAC. Similarly the reporters concluded that no significant noise impact to marine mammals would occur from dredging or operation of the container terminal.

Lighting

Lighting from the works was addressed in the ES (Jacobs, 2011), PLI and CEMP. With the mitigative measures in place, as provided in the agreed CEMP, there will be no significant impact on ecological receptors. Babcock will agree a lighting strategy with Fife council and in consultation with SNH

Marine non-native species

With increased movement of boat traffic the risk of introducing non native marine species to the estuary is increased. Specific measures are outlined in the agreed CEMP to minimise the introduction of non-native species including the following of IMO guidance. For this reason it has been scoped out.

Vessel movements

It was acknowledged in the PLI that the potential impacts from vessel movements or chemical spills during the construction and operation phases of the RICT were addressed in the CEMP. For these reasons it has been scoped out.

In-combination assessment

A number of in-combination assessments were carried out in the ES (Jacobs, 2011) and a report on in-combination effects of maintenance dredging submitted to Marine Scotland on 28 Oct 2011. Comment was made by Marine Scotland and accepted in the PLI report that the conclusions made were reasonable. Given the time which has elapsed since this was last examined the potential for cumulative impacts associated with other developments in the vicinity of the RICT and River Forth area will be updated.

Table 3: Summary of Environmental Topics scoped out of ES for the Marine Licence application

Environmental Topic	Potential Impact	Comment
Noise and vibration*	Physical damage to mammals/fish Behavioural change to mammals/fish/birds	<ul style="list-style-type: none"> • Specific provision of MMO during elements of in-estuary construction activities e.g. piling • Presence of EcOW to monitor construction activities/implement environmental safeguards • MS and SNH both content with mitigation measures proposed • Reporters conclude – adequate provision given in CEMP and ES (Jacobs, 2011) for noise/vibration
Lighting*	Behavioural change to mammals/fish/birds	<ul style="list-style-type: none"> • Presence of EcOW to monitor construction activities/implement environmental safeguards • No construction activities, other than dredging, after 7pm • Reporters state – adequate provision given in CEMP • Agree lighting strategy with Fife council and in consultation with SNH
Marine non-native species*	Introduction of non-native species through ballast water	<ul style="list-style-type: none"> • Specific reference in CEMP to compliance with International Maritime Guidance • Provision in CEMP
Vessel movements*	Increased likelihood of collision with pinnipeds/cetaceans Increase in likelihood of pollution/spills	<ul style="list-style-type: none"> • Guidance included in CEMP to reduce spills and pollution • Provision of MMO during elements of in-estuary construction activities • Presence of EcOW to monitor construction activities/implement environmental safeguards
In-combination assessment*	Potential increase in magnitude and occurrence of identified impacts	<ul style="list-style-type: none"> • Reference to in-combination assessment in ES (Jacobs, 2011) • Conclusion of in-combination assessment of dredging report considered reasonable by Marine Scotland.

Denotes topic covered in previous ES (Jacobs, 2011)

3.3 Areas and Features of Special Conservation Interest

A number of statutory conservation areas have been identified. These include:

- Firth of Forth SPA
- Forth Islands SPA
- River Teith SAC
- Firth of Forth SSSI

There are also several habitats present e.g. eelgrass beds, intertidal mudflats which have been designated on a regional or national level i.e. UK BAP habitats, Scottish Priority Marine Features. The value and significance of these features (areas and habitats) will be given due consideration when making an assessment of impacts within the ES.

A Habitats Regulations Assessment (HRA) will be carried out on the potential impacts arising from the in-estuary activities and their significance with regard to the conservation objectives. The HRA will be covered in a separate report, and include an up dated cumulative / in combination assessment. As agreed with Marine Scotland (meeting 21-01-14), the additional information required for the Marine License will be presented as an addendum to the original RIAA document.