Edinburgh Marina Granton Harbour Ltd

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Environmental Impact Assessment Report: Non-Technical Summary

September 2018

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1 INTRODUCTION

1.1 Terms of Reference

This Non-Technical Summary (NTS) is designed to stand apart from the main Environmental Impact Assessment Report (EIAR) whilst providing a summary in non-technical language of the main findings. For full details pertaining to any part of this NTS, please refer to the associated EIAR. The purpose of EIA is to determine the likelihood of the proposed development of causing significant effects on the environment; to predict the magnitude of potential effects and provide mitigating measures that will reduce the significance of such effects.

This NTS has been prepared to accompany an application to Marine Scotland in respect of a proposal by Edinburgh Marina Granton Harbour Ltd for the redevelopment of Edinburgh Marina within Granton Harbour.

The proposed development is part of the Granton Harbour regeneration development; a development that was granted Outline Planning Permission (now Planning Permission in Principle) by City of Edinburgh Council in 2003 under planning application reference 01/00802/OUT, as detailed by the Report of Handling[1].

The application was accompanied by an Environmental Statement (ES) produced by Robert Turley Associate on behalf of Forth Properties Ltd. The application was granted permission subject to a number of planning conditions including one requiring all Reserved Matters Applications to be submitted within 15 years from the date of permission, i.e. by June 2018. Since the original planning permission was granted, a series of revisions to the proposed site layout and development have remained as originally approved. As such, a number of Matters Specified in Conditions (MSC) applications, formerly Reserved Matters Applications, have been submitted and approved for various development plots, and some development plot approvals have already been implemented.

A Formal Screening Request was submitted by Cameron Planning for a Marine Licence application for the Marina Development and associated works: MSC planning permission was granted pursuant to the original permission in April 2017 for, *"the formation of a new Marina Office with associated retail and café space, and new community boat yard with associated dry stack".* Marine Scotland provided a Screening Opinion on the 16th October 2017 and concluded that the proposed works fall under paragraphs 1(e), 10(m), and 12(a) of Schedule 2 of the EIA Regulations and as such, an EIA must be carried out.

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The proposed marine works associated with the wider Edinburgh Marina development comprises:

- Length of stone revetment to harbour;
- Length of vertical quay wall to harbour;
- Backfilling of land protected by quay wall and stone revetment;
- Formation of marina;
- Extension to existing north mole breakwater; and
- Harbour dredging.

[1] http://citydev-portal.edinburgh.gov.uk/idoxpa-web/files/00DB0FD94CC20316931B1A365C15AA5D/pdf/01_00802_OUT-REPORT_OF_HANDLING-3759387.pdf (accessed 26/07/2018)

At a meeting with Victoria Bell and Louise Wilcox in Marine Scotland offices on 14th February 2018 advice was provided that the EIA should focus on the principal issues identified in the 5th February, 2018 EIA Screening Opinion, specifically sediment transportation and coastal processes alongside assessment work relative to the Habitat Regulations Appraisal process.

The EIA Scoping Report submitted to Marine Scotland on 10th April 2018 was based upon the Screening Opinion and subsequent Marine Scotland advice and set out the proposed EIA methodology upon which we requested a formal notification from Marine Scotland within a five week time period as specified under regulation 14 (7) of the EIA Regulations.

An EIA Scoping Opinion was issued on 14th June 2018 with detailed information provided in the specialist topic sections. The Scoping opinion scoped in the following:

- Marine Ecology – Mammals & Non Native Species
- Water Environment & Coastal Processes – Waves
- Water Environment & Coastal Processes – Sediment Transport
- Water Environment & Coastal Processes – Water Quality
- Marine Ecology - Otters
- Marine Ecology – Ornithology
- Noise (marine)
- Major Accidents

The purpose of this NTS is to explain the environmental assessment of the proposed development and report its results, and is designed to stand apart from the main Environmental Impact Assessment Report (EIAR) volume.

1.2 Structure of this Non-Technical Summary

The NTS is set out in the same chapter format as the EIAR, to facilitate cross-referencing and to offer a summary of the environmental findings that will be submitted. The sections within this NTS are therefore as follows:

1 Introduction
2 Proposed Development
3 EIA Methodology and Scoping
4 Water Environment & Coastal Processes
5 Marine Ecology and Ornithology
6 Other Issues
7 Cumulative Effects
8 Conclusions

The NTS summarises the key findings from the environmental impact assessment (EIA) process. Where the assessment results in potential adverse effects on the environment, measures to address and control effects, known as mitigation measures are identified. The assessment then presents the overall effects remaining after mitigation has been applied; these are referred to as the residual effects.

The overall suite of documents associated with the EIA includes the following:

- The Environmental Impact Assessment Report – which reports upon the potentially significant environmental effects of the proposed development on the receiving environment, and comprises of the following:
    - Volume 1 – Written Statement – this includes the written assessment and contains discussion of potentially significant environmental effects;

  - Volume 2; Figures – this volume includes figures, drawings and diagrams which support Volume 1; and
  - Volume 3; Technical Appendices – this volume contains the technical background reports written and used to derive the environmental assessment.
- Non-Technical Summary (NTS) – this document.

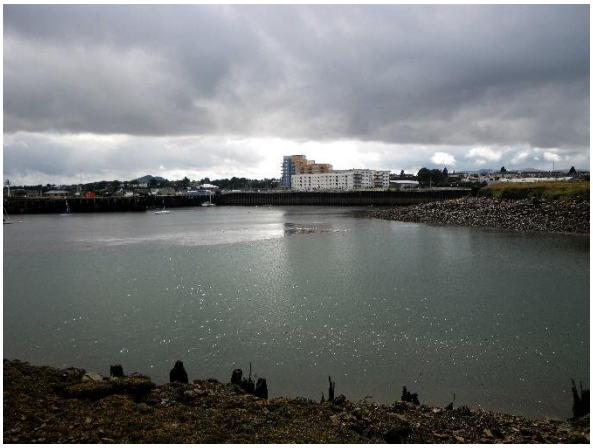
2 THE PROPOSED DEVELOPMENT

2.1 The Site

Granton forms part of Edinburgh's waterfront along the Firth of Forth, and is historically, an industrial area having a large harbour. Granton Harbour was first constructed in the late 1830's, and has since had a number of new berths constructed over the following 180 years. Within the surrounding area there is a combination of commercial/industrial premises, residential and vacant ground.

At present, much of the western harbour at Granton (the site) comprises of predominantly reclaimed land from the sea, consisting of vacant brownfield land which is scheduled for development under the approved 2003 masterplan and a number of subsequent reserved matters and MSC permissions. The overall topography of the surrounding area is generally flat, with the proposed marine works development situated at the edge, and within the extents of the harbour.

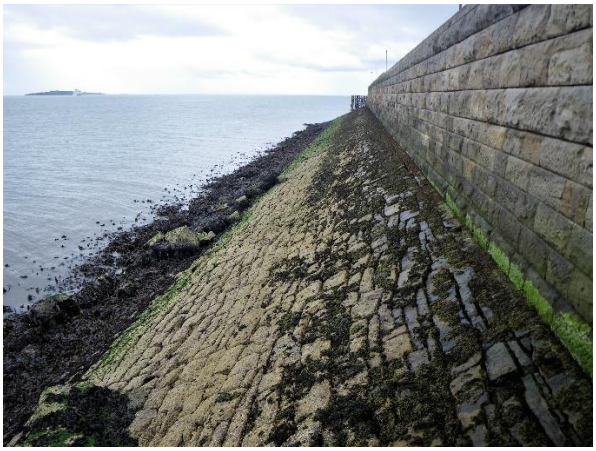
The proposed Edinburgh Marina development sits within the Granton Harbour regeneration development area, approximately 4km north of Edinburgh City Centre and fronting the Firth of Forth. It is approximately 9.5Ha, bounded to the north by the Western Breakwater, to the east by the Eastern Harbour and to the south by wider regeneration proposals and developments. The nearest residential development is situated on Merlin Avenue, approximately 90m south of the proposed development.



Edinburgh Marina from North Mole looking south

Edinburgh Marina – Looking towards North Mole

North Mole – Harbour Side

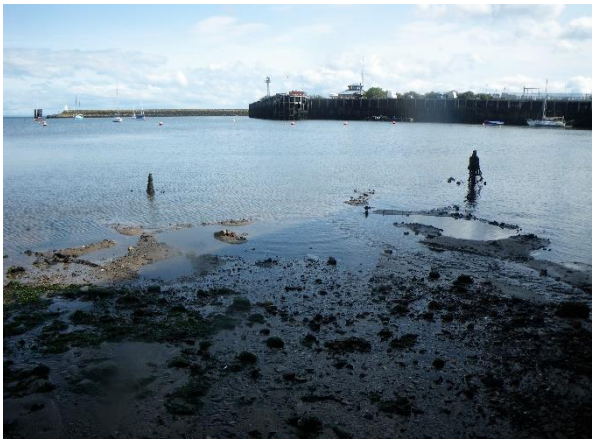


North Mole – Firth of Forth Side

Location of the Western Revetment from North Mole

North Mole from the Proposed Revetment

Southern Quay Wall looking east to Middle Pier



Looking east towards Middle Pier

2.2 The Proposed Development

The proposed development encompasses four aspects of the marine works:

Harbour Dredging – To ensure efficient operation of the existing harbour, the harbour bed needs to be dredged to the required depth. The potential for environmental impact during dredging works and as part of sea disposal of sediment material will be addressed as part of the Marine Scotland Dredging Licence Application and the supporting BPEO.

As part of the separate Marine Scotland Licence application, a Sediment Risk Assessment will be undertaken along with a Best Practicable Environmental Option (BPEO) assessment for the dredging and disposal associated with the Edinburgh Marina Project.

Quay Wall Works – the existing quay wall is dilapidated and poorly defined. The proposed quay wall works aims to formalise the water/land margin, providing the public with context to this area of wider regeneration development. The location and extent of the proposed quay wall and revetment works are demonstrated in Drawing 115875/021 contained within Volume 2 of this EIAR. The northern section of the works will reconstruct the sloping masonry revetment, maintaining the connection to the existing northern breakwater, and will be 225m in length. The southern section of the works will comprise of a vertical quay wall with associated sheet piling that will be 110m in length and situated adjacently to the proposed boatyard.

From the original planning application that was granted planning permission in principle in 2003, there is to be an area of backfill to the west of the revetment and quay wall. This will form the public realm associated with the new hotel and serviced apartments on Plot 35 of the masterplan (The current planning application reference

is 17/05306/AMC). The material to be used to backfill the quay wall has been previously stockpiled on site, and the site to the west and south-west will be regraded to form the approved surface finish levels.

North Mole Extension – Granton Harbour is a long-established harbour which is protected by an existing sea wall to the north. Drawing No. A-P-00G7-005H contained within Volume 2 demonstrates is spatial relationship within the site boundary. The proposed marine works comprise further extension to the existing North Mole structure in order to better protect the harbour mouth from excessive wave action. The proposed linear extent of the North Mole extension is 50m. The extension will be vertical faced on the harbour side and sloping masonry on the seaward side as illustrated in Drawings 115875/0027, contained within Volume 2. A method statement for the North Mole Extension is contained within Volume 3, Technical Appendix 2.1 of this EIAR. The north mole is a partially Listed Building, at its western extremity, and as such, any works to this section require to be considered under Listed Building Regulations. It is understood that any works proposed to this western section will fall under repairs and maintenance to the existing structure.

New Marina – The proposed marina comprises 340 number of berths of different sizes to accommodate varying sized vessels, the proposed layout (dated 9th May, 2017) as detailed by Drawing No. A-P-00G7-005H, contained within Volume 2. The linear extent of the berth is 4,407m and the marina development will extend approximately 32.1% of the available useable water area within the harbour. The marina area will extend to approximately 22,879m². The marina will be formed through a series of floating berths and pontoons that will rise and fall with the tide (Refer to Drawing No. A-P-00G7-005H within Volume 2 of this EIAR).

At present, methods of construction and their timing are not formalised in detail. To ensure that risks of adverse impacts are identified and kept to acceptable limits, construction management plans will be a requirement within construction contracts for individual developers.

It is estimated that the marina development as described above would take approximately 15 months to construct. The proposed development will be indicatively phased as follows.

Proposed Development Component	**Timing**
Dredging and Reclamation	Month 1-3
Construct quay wall and foundations	Month 3-6
Piling	Month 3-6
North Moll Extension and Breakwater	Month 7-8
Place rock armouring	Month 8-10
Construct pontoons	Month 10 -14
Services to pontoons	Month 15

Any assumptions used within the relevant assessments throughout the EIAR have also been included. Where timing is Month 1-3 for example, this implies a 3 month construction period.

2.3 Vehicular Access

Vehicular access to the site is proposed from the existing roundabout junction of Granton Square, with a second access on West Harbour Road. Close liaison with the traffic management section of City of Edinburgh Council should be made in relation to the agreed routes and hours of working for construction vehicles.

3 EIA METHODLOGY AND SCOPING

3.1 General EIA Methodology

The purposed of an EIA is to identify and evaluate the likely significant effects of a proposed development on the environment, and identify measures to mitigate or manage any significant adverse effects before a planning application is determined. The EIA process provides an opportunity to 'design out' adverse effects wherever possible by making alterations to the design of the proposed development before the application is submitted, and is based upon consultee feedback. Where adverse effects cannot be designed out, mitigation measures can be proposed to avoid, compensate, or reduce significant environmental effects to an acceptable level.

The environmental information gathered during the EIA is derived through a systematic process of identification, prediction and evaluation of the likely significant environmental effects of the proposed development. This process includes identifying the sensitivity of the baseline conditions/receptors; predicting the magnitude of potential impacts; predicting the significant effect of the impacts; detailing mitigation measures; predicting the potential residual effects as well as the potential cumulative impacts. The results and findings are presented in full within the EIAR and summarised in this document.

3.2 Scoping as part of the EIA Process

Scoping is defined as 'the way in which key issues are identified from a broad range of potential concerns for inclusion in EIA studies, the areas affected, and the level to which they should be studied'. Furthermore, the scoping process enables the topics to be covered in the Environmental Impact Assessment Report (EIAR) to be agreed and for those topics not considered pertinent to be scoped out of the study or reduced in scope (i.e. topics where it is unlikely that significant environmental effects will occur

3.3 Consultation

Consultation responses were obtained from the following organisations in respect of the Scoping Reports issued to Marine Scotland. On receipt of the scoping opinion request documentation, the Scottish Ministers, in accordance with The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, initiated a 30 day consultation process, which commenced on 12 April 2018. The following bodies were consulted:

- Association of Salmon Fishery Boards
- City of Edinburgh Council
- Executive Health and Safety ("HSE")
- Eyemouth Fishery Office
- Forth District Salmon Fishery Board
- Forth Ports
- Granton and District Community Council
- Historic Environment Scotland ("HES")
- Marine Safety Forum
- Marine Planning and Policy
- Maritime and Coastguard Agency ("MCA")
- Ministry of Defence ("MOD")
- North and East Coast Inshore Fisheries Group
- Northern Lighthouse Board ("NLB")
- Royal Forth Yacht Club
- Royal Society for the Protection of Birds Scotland ("RSPB")
- Royal Yachting Association Scotland ("RYA")

- Scottish Environment Protection Agency ("SEPA")
- Scottish Fishermen's Federation
- Scottish Fishermen's Organisation
- Scottish Natural Heritage
- Scottish Water
- Scottish Wildlife Trust
- The Crown Estate
- Transport Scotland
- UK Chamber of Shipping
- Visit Scotland
- Whale and Dolphin Conservation ("WDC")

3.3.1 Responses received

From the list above a total of 12 responses were received. In addition, relevant advice was sought from Marine Scotland Science. The purpose of the consultation was to obtain advice and guidance from each consultee or advisor as to which potential effects should be scoped in or out of the EIA. The 12 respondents included the following:

1. City of Edinburgh Council
2. Forth Ports
3. Historic Environment Scotland
4. Maritime and Coastguard Agency
5. Ministry of Defence
6. Northern Lighthouse Board
7. Royal Society for the Protection of Birds
8. Royal Yachting Association
9. Scottish Environment Protection Agency
10. Scottish Natural Heritage
11. Transport Scotland
12. Whale and Dolphin Conservation

A Scoping Opinion was received from Marine Scotland on 14th June 2018. The opinions provided in the Scoping Opinions were used to inform the EIA process by shaping the methodologies and the inclusion and exclusion of particular environmental topics and features for assessment.

3.4 Scope of the Environmental Impact Assessment Report (EIAR)

Scoping is defined as 'the way in which key issues are identified from a broad range of potential concerns for inclusion in EIA studies, the areas affected, and the level to which they should be studied'. Furthermore, the scoping process enables the topics to be covered in the ES to be agreed and for those topics not considered pertinent to be scoped out of the study or reduced in scope (i.e. topics where it is unlikely that significant environmental effects will occur).

Based on the consultation undertaken and responses received to date, a view was reached on the key topics to be assessed and included as a full impact assessment chapter as part of the EIA. These were:

- Water Environment;
- Ecology (including Underwater Noise);
- Other Issues (Exportation of Dredge Material by Road, Air Quality, Terrestrial Noise, Population and Human Health, Navigation Climate Change, Natural Disasters, Major Accidents); and
- Cumulative Effects;
- Schedule of Mitigation

4 WATER ENVIRONMENT & COASTAL PROCESSES

4.1 Introduction

Water Environment and Coastal Processes; Chapter 4 of the associated EIAR has assessed potential impacts of the proposed development at Edinburgh Marina for water, sediments and coastal processes.

Due to the marine nature of the construction works, investigations were required to incorporate topographic, bathymetric and hydraulic modelling of the study area to gain an in-depth understanding of local sea bed and wave/tidal climate. Investigations of the physical properties of sea-bed sediment including chemistry, particle size and predicted patterns of sediment distribution were completed by geo-technical specialists.

4.2 Potential Impacts and Significance of Effects

Those construction components which are predicted to have the greatest potential impact upon the water environment are, (i) the dredging of the basin; (ii) construction of infrastructure including North Mole extension /pontoons; and (iii) working operations of the marina.

It is predicted that the specified works could potentially result in some adverse effects upon the water environment and its processes.

Contamination of coastal waters or sediments from construction vehicles is feasible during construction works. Modification of the natural hydrology of a site is another possibility in developments of this nature. Marine construction works also have the potential to alter coastal processes involving wave and tidal regimes and can ultimately influence sediment transport and deposition around the harbour.

The impacts of sediment discharge/dispersion resulting from dredging and piling of the sea bed upon the marine designations are predicted to be negligible in significance while impacts upon the coastal waters and sediment of Granton Harbour is expected to be minor (post-mitigation).

The wave disturbance modelling undertaken for the proposed construction indicates that the new breakwater will result in a reduction in significant wave height within the western harbour of up to -1m compared with existing conditions during a 1 in 50 year storm event from the north-east. Smaller reductions in significant wave height (-0.1 to -0.5m) are predicted in the vicinity of the middle pier, whilst negligible change is predicted within the eastern harbour (-0.1 to +0.1m). Immediately outside the Granton Harbour entrance modelling indicates that wave reflection from the new breakwater will produce minor increases in significant wave height during a 1 in 50 year storm from the north-east. During a 1 in 1 year storm event from the north-east a similar pattern of impact, but of lower magnitude, is observed for all areas of the.

Wave disturbance modelling of storm events from the north-west has also been undertaken to assess the impact of the proposed breakwater. During a 1 in 50 year storm event from the north-west the modelling results indicate that the breakwater construction will result in slight reductions in significant wave height within both the western (-0.05 to -0.3m) and eastern (-0.05 to -0.1m) harbours as a result of attenuation of wave. The breakwater will produce a slight increase in significant wave height within the approaches to the harbour as a result of wave reflection. During a 1 in 1 year storm event from the north-west a similar pattern of impact, but of lower magnitude, is observed for all areas of the harbour

Some of the more enduring effects such as altering of wave climate, although considered to be permanent, remain negligible in significance, with these conclusions being fully supported by wave modelling. Other impacts from pollutant incidences concerning water and sediment quality are heavily mitigated for within the Schedule

of Mitigation, namely the requirement for an over-arching Construction Environmental Management Plan (CEMP). Design mitigation also stated the need for determining the Best Practicable Environmental Option (BPEO) report as part of Marine Licensing obligations for dredge and reclamation material.

Overall, the impact of the proposed development on the wave climate within Granton Harbour is considered to be of negligible magnitude

4.2.1 Significance of Effects

Overall the effects of the proposed development on the water environment and coastal processes are not considered to be significant.

5 MARINE ECOLOGY AND ORNITHOLOGY

5.1 Introduction

The Marine Ecology and Ornithology Chapter of the associated EIAR, has considered the potential for impact of the proposed development upon marine mammals, otter and birds.

For a development of this nature which requires considerable construction works below Mean High Water Springs (MHWS), assessment must consider not only the direct impacts upon marine mammals, otters and birds but on designated nature conservation site, including internationally important such as:

- Firth of Forth SPA
- Forth Islands SPA
- Imperial Dock Lock, Leith SPA

Their qualifying Important Ecological Features (IEF) include Grey Seal. Those specified marine mammals were consequently included in the assessment. Birds were scoped out of the assessment whilst bit were subsequently scoped back in at the request of the Regulators as were otters.

5.2 Potential Impacts and Significance of Effects

The criteria used for predicting impact upon ecological systems considers magnitude, extent, duration, reversibility, timing and frequency of the potential effect of the proposed development.

The assessment concurred that underwater noise and acoustic disturbance, vibration; and suspended sediment derived from marine construction works were identified as potentially significant in their impact upon the above specified marine mammals, birds, otters and habitat receptors.

Left unmitigated, dredging and piling have potential to disturb the foraging and migratory behaviour in fish or cause hearing injuries to marine mammals.

Pollution to water bodies from construction vehicles, refuelling and storage of oils, fuels and chemicals, engineering works and use of artificial lighting were also identified as possible factors in the assessment.

In line with the findings of CEDA (2011), noise associated with dredging is unlikely to be significant and will not cause injury to marine mammals, otters or birds.

However, there is the potential for piling noise to affect cetaceans and migratory fish. The effects of piling noise are therefore predicted to be Intermittent and most severe locally although of potentially some relevance over a moderate extent (e.g. 1 km from the marina). For cetaceans such effects are predicted to only affect a small number of animals due to the low significance of the area. Whilst there may be effects on seals, this area is not recognised as being of specific importance for seal species. In addition they are less sensitive to noise than cetaceans. The development area is considered to be of any particular importance for salmonids during the run however this period will be avoided. With regards to birds, the effects of piling with be restricted to startling birds.

Once the piling is complete marine mammals, otters and birds will repopulate the area and so the impacts will be short term, intermittent and negligible. Noise during operation will be confined to intermittent vessel engine noise and maintenance dredging.

With reference to piling, the high pressure of the impulsive sounds originating from pile driving activity can cause physical damage to marine organisms that are close to the origin of the sound. The zone for this type of impact, the zone of injury, is defined as the range over which received sound pressures may cause an animal to suffer from physical injury or loss of sensitivity in its auditory system (Madsen et al. 2006).

While piling will be "noisier" than dredging operations, the *Zone of injury* – Area closest to the noise source where the noise levels may be high enough to cause a physiological impact such as TTS or PTS

5.3 Potential Effects after Mitigation

The ecology chapter concludes that following the proposed mitigation, which has been designed upon review of engineering design and construction techniques, adverse effects will not be significant.

6 OTHER ISSUES

6.1 Exportation of Dredge Material

Dredging works and subsequent sediment analysis as detailed within the Best Practicable Option Report (BPEO), has outlined the need for both land and sea-based disposal of dredged sediment of varying chemical composition. Table 6-1 provides a breakdown of material which will be deposited at sea and that which will come ashore for disposal.

Table 6-1 Dredge Volumes

Dredge	Volume (m^3)	Comment
Total Dredge Nett Volume	241,365	Total proposed dredge volume
Dredge Volume for Areas for surface to 1.2m Dredge	86,980	Proposed for Sea Disposal
Dredge Volume from below 1.2mto base of dredge plus Area around VC8 & VC9 with Shallow Contamination	154,385	Land Based Disposal Options
Total Infill (Nett) Volume	19,322	

In order to progress with upgrade works at Edinburgh Marina, the efficient transportation of this material together with minimum impact on the existing road network is required. Leaving material in situ or restating as beach nourishment/reclamation was not considered an option due to the silty composition and unsuitability of the sediment for construction needs. For the purpose of predicting trip generation, the total dredge was split by environmental quality and consequent disposal destination.

Results show that the proposed development will generate an average of 64 (32in/32out) HGV movements per day or 6 (2.9in/2.9out) HGV movements per hour. Based on a daily variation of 20%, this equates to 78 (39in/39out) HGV movements per day or 7 (3.5in/3.5out) HGV movements per hour.

Overall, it is not considered that the proposed development will have any material traffic and transportation impacts to the surrounding road network, in terms of both the additional number of HGV movements and the haulage route to be used by the HGV's.

6.2 Air Quality

Despite its industrial location, air quality in the vicinity of the proposed development is good and well below the relevant National Air Quality Objectives for No_2, $PM_{2.5}$ and PM_{10}. Potential impacts of the proposed development have been identified as, (i) potential increase in traffic emissions from the surrounding road network; and (ii) the possibility of dust emissions in the vicinity of construction works.

Of the six Air Quality Management Areas (AQMA) within the region of City of Edinburgh Council, the closest is 2 km south-east of the site at Inverleith Road AQMA. The nearest Automatic Monitoring Station is 3.5km east (Salamander Street). For these reasons, site conditions are not accurately represented from these locations.

Presently, there is not expected to be a substantial increase traffic emissions. Should No_2, $PM_{2.5}$ and PM_{10} become elevated from baseline levels then City of Edinburgh Council Environmental Health with be re-consulted on mitigative measures. Dust emissions will likewise be mitigated for within the Dust Management Plan which falls under provisions of the Construction Environmental Management Plan (CEMP). Exact methodology of the Dust Management Plan will be outlined on the appointment of the contractor prior to the commencement of construction works.

6.3 Terrestrial Noise

Baseline noise surveys were completed by EnviroCentre for early morning and daytime in close proximity to the proposed development (as part of a noise assessment carried out for an associated planning application on behalf of Granton Central Developments) in August 2017. Baseline noise comprised of road and air traffic and birdcalls (seagull) in addition to construction activity during the day – denoting an overall residential/commercial/industrial land use of the study area.

The proposed development requires substantial engineering of marina infrastructure and associated noisy construction activities such as piling and dredging of components such as the quay wall and infill of the reclamation. Noise impacts upon local sensitive receptors are subsequently expected. At present, construction methodology has not been detailed or scheduled and as such it is not possible to set out precise noise impacts in terms of nature, activity combinations and durations as yet. Furthermore, operating times and mitigative measures will only become apparent on confirmation of engineering specification. It should be noted however that informed co-ordination of construction activities, schedules and durations will go some way in alleviating noise impacts from the construction phase of the proposed development.

On the basis of assessment of comparable projects, noise impacts are not anticipated to be significant due to the temporary nature of construction works.

6.4 Population and Human Health

The focus of a population and health assessment should be in direct proportion with likely significant effects of the development. In the case of Granton Harbour, effects pertaining to human health have been identified as noise, vibration and air quality – as outlined in sections 4.2 and 4.3. Due to the temporary nature of the construction phase, it is concluded that effects will not be significant upon Population and Human Health.

6.5 Navigation

The construction and operational phase of the proposed development pose specific navigational considerations pertaining to each phase.

Construction-phase impacts are expected to arise from the placement of a construction plant at the dredged inner-construction area. The requirement for a floating piling rig and barge (for pile transportation) will likely potentially impede vessel movements of existing traffic to some extent.

The introduction of marina and breakwater structures may initially increase risk of collision and lessen capacity for safe manoeuvring in the vicinity of the proposed development. On its completion, an increase in the number of marina users will be likely be the case, contributing overall to conflicting use of shipping and ferry vessel routes in the Firth of Forth.

Plans to extend the North Mole (the existing northern breakwater) by 50m are included within proposals. This sea wall already promotes ease of navigation by forming the outer margin of the navigation channel. Three new approach markers (port and starboard flashing hand buoys) will signal the approach channel. Notice to mariners will be issued prior to works in keeping with harbour emergency procedures and to ensure the safe operation of the harbour for existing marine traffic. Construction-related mitigation will be based upon risk assessments of individual components/activities in the marine environment (ie. piling operations in the navigation channel, use of cranage). Construction-based mitigation will be consolidated when the methodology is established/approved by the engineering consultants.

6.6 Climate Change

Climate change has taken a prominent position within policy and legislation at a national level, with the Climate Change (Scotland) Act 2009 creating a long-term framework for ensuring reduction in Scottish greenhouse gas emissions of 80% by 2050.

Under Schedule 4(4), the EIA Regulations require *"a description of the factors specified in 4(3) likely to be significant affected by the development… (Including) climate (for example greenhouse gas emissions, impacts relevant to adaption)". In addition, Schedule 4(5) (f) of the EIA Regulations requires a "description of the likely significant effects of the development on the environment resulting from…the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change".*

It is considered that the proposed development would not result in a significant effect upon climate given the nature of the development. Any increase in emissions created during either construction or operation is likely to be negligible, and pollution and emissions control would be discussed within a detailed Construction Environmental Management Plan (CEMP). Discussion of the vulnerability of the project to climate change is primarily concerned with the water environment, including flood risk. Flooding is being scoped out of the EIA as it does not constitute a significant environmental aspect.

6.7 Natural Disasters

The proposed development is not located within an area of significant seismic activity, nor are climatic factors prone to creating disasters such as tsunamis, hurricanes or catastrophic flooding. Accordingly consideration of natural disasters was scoped out of the EIA.

6.8 Major Accidents

The site is set within the wider Granton Development Area, and considered to be at negligible risk of Major Accidents.

The Proposed Development will be designed to current best practice, in respect of safety and design

During construction, activities will be controlled through a Construction Environmental Management Plan (CEMP) which will ensure compliance with the Construction (Design and Management) Regulations 2015.

It is therefore considered that while there is always a potential risk that a major accident, fire or natural disaster could result in a significant environmental impact, given the nature of the Proposed Development, this risk can be appropriately mitigated though embedded design measures and through compliance with statutory design guidelines. Table 6-2 shows a summary of potential effects in response to major accidents.

Table 6-2: Assessment of Potential Effects – Major Accidents

Summary description of the identified impact	Probability of Risk	Potential Severity	Significance and Nature of Effect	Additional Mitigation	Confidence Level
Risks from spills, fire or explosion	Unlikely	Severe	Low/Moderate	While no significant impacts have been identified during construction, activities	High
Handling of hazardous materials	Unlikely	Severe	Low/Moderate		High

Risks of vessel accidents (including spillages and pollution incidents) (Construction)	Unlikely	Severe	Low/Moderate	will be controlled through a CEMP which will ensure compliance with the health and safety Construction Regulations	High
Risks from spills, fire or explosion	Unlikely	Severe	Low/Moderate	None Required	High
Risks of vessel accidents (including spillages and pollution incidents) (Operation)	Unlikely	Severe	Low/Moderate	None Required	High

7 CUMULATIVE EFFECTS

Terrestrial Effects

There are likely to be in-combination effects arising from the other works planned as part of the Granton Harbour Regeneration Programme. Cumulatively, the proposed Edinburgh Marina development is part of a wider series of proposed developments by the Applicant which aims to realise the aspirations of previous Masterplans. The requirements include the need for comprehensive proposals which maximise the development potential of the area, the provision of mixed use sustainable neighbourhoods, a mix of house types, sizes and affordability and the provision of open space, retail, leisure and tourism attractions.

The proposals are a key part of the redevelopment of over 60 acres (24ha) of land stretching along the Firth of Forth and will provide new jobs, new housing, new facilities and a rejuvenated link between Edinburgh city centre and the Forth estuary. At the heart of the regeneration is the building of over 1,800 new homes, all-suite Spa Hotel, together with a local centre with up to 18,500 sq. m of new retail, leisure and commercial space including a new medical facility at Chestnut Yard.

Terrestrial developments are unlikely to have any cumulative effects with the development proposed, particularly given the location of the proposed development within an already developed harbour, and the marina development being entirely created from the harbour and Firth of Forth corridor rather than land side.

Marine Effects

Based on a dredging plan for the harbour which is provided in Appendix 2 of the Best Practicable Environmental Option Report (Refer to Volume 3, BPEO Technical Appendix 4-3) the dredge volume split at Granton Harbour is as follows based on chemical quality (Table 7-1).

Table 7-1: Dredge Volumes

Dredge	Volume (m^3)	Comment
Total Dredge Volume	241,365	Total proposed dredge volume
Dredge Volume for Areas for surface to 1.2m Dredge	86,980	Proposed for Sea Disposal
Dredge Volume from below 1.2m to base of dredge plus Area around VC8 & VC9 with Shallow Contamination	154,385	Land Based Disposal Options

There are multiple disposal grounds in proximity to the site which are summarised below in Table 7-2. They are provided in order of distance closest to Granton Harbour. The information below was provided by Marine Scotland.

Table 7.2: Summary of Disposal Sites

Site ID	2018 Licensed Capacity	2017 Deposited volumes	2016 Deposited volumes
FO038 – Narrow Deep and Narrow Deep B	No set capacity	0	0
FO041 – Oxcars Main	No set capacity	84,185 tonnes	159,057 tonnes
FO042 – Oxcars Ext A	No set capacity	87,610 tonnes	0
FO043 – Oxcars Ext B	No set capacity	407,720 tonnes	0
FO044 – Bo'Ness	No set capacity	1,074,335 tonnes	0

The closest disposal site to Granton Harbour is FO038 Narrow Deep and Narrow Deep (B).

Review of available information has highlighted that although several chemical contaminants exceed RAL1 within the sediments which have been identified for a sea based disposal (0-1.2m below surface), assessment of key receptors identified from the Water Framework Directive assessment for estuarine and coastal waters concluded that there is a low risk to the key receptor of Water Quality. The chemical levels in the sediment are not considered likely to have a significant impact on the sediment quality already located within the disposal grounds and it is recognised that this part of the sea floor is a sacrificial site for the disposal of dredge material. The preferred disposal site would be FO038 Narrow Deep due to its proximity to Granton Harbour.

The potential for cumulative effects is a matter for consideration under the EIA Regulations. Cumulative effects of the dredging and sea disposal aspects of the works at Granton assessed against dredging operations taking place in the wider Firth of Forth, for example Leith which uses the same disposal site as proposed for Granton and Rosyth have been reviewed. Table 7-3 provides a summary of those two projects.

Table 7-3 Dredge material from Rosyth and Leith Maintenance Dredge

Location of Dredge	Type of Dredge	Amount of Dredge Material	Disposal Site
Forth Ports - Rosyth	Maintenance	520,000 wet tonnes	Oxcars Main FO041, Oxcars Ext A FO042, Oxcars Ext B FO043
Forth Ports - Leith	Maintenance	130,000 wet tonnes	Narrow Deep B FO038

The other point to consider as part of this assessment of cumulative effects is the proposed volume total in comparison to the total volumes of sediment disposed of within the various licensed disposal site within the Firth of Forth. Data supplied by Marine Scotland indicated that just under 1.25 million tonnes (wet) of dredged material were disposed of within the licensed sites in 2017.

In comparison, the proposed material for disposal form Granton Harbour is 86,980m^3, assuming a bulk density of 1.8, would equate to 156,564 tonnes wet of material.

Given the small scale dredge and disposal volumes going to sea and the similar chemical composition of other dredge operations within the Firth of Forth, the dredge and disposal operations associated with Granton Harbour are unlikely to have any cumulative effects either by volume or chemical composition.

8 CONCLUSIONS

This NTS reports upon the findings of the EIAR, which has been shaped by, consultation and assessment. The purpose of the EIAR, and the EIA process, is to establish potentially significant environmental effects and avoid or mitigate these where applicable.

The EIAR has established a schedule of mitigation contained within Chapter 8: Schedule of Mitigation contained within the EIAR. Mitigation and enhancement measures shall be implemented through-out the construction and operation of the proposed development.

The EIAR has established that due to the iterative design process and implementation of suitable mitigation measures, potentially significant adverse effects resulting from the proposed development have been minimised.

The associated EIAR concluded that through the implementation of prescribed mitigation measures during the construction phase, and in light of the new recreational function proposed by the marina; that environmental effects are either localised (i.e. wave action); or short-term (i.e. for underwater noise) and to be expected with developments of this nature.

APPENDICES

A FIGURES

Site Location

Legend

Site Boundary

Do not scale this map

Client

Cameron Planning

Project

Edinburgh Marina

Title

Figure 1: Site Location Plan

Status

FINAL

Drawing No.	Revision
770288-001	

Scale		Date
1:15,000	A3	19 Feb 2017

Drawn	Checked	Approved
GV	GV	IB

ENVIRO Centre

Craighall Business Park, Eagle Street, Glasgow, G4 9XA
Tel: 0141 341 5040
Fax: 0141 341 5045

Masterplan

0 10 20 50 100

Metres

THE NORTH MOLE

North mole flat top extended 50m measured at inside corner

Revetment to be at Nh height of MHWS for Nh distance of 25m from end of North Mole extension

35m ø turning circle

Revetment to engineer's details

STOFFORD PARADE

green parking

MHWS

8A

Marina Office

8B

Boat yard Parking (Permit)

HESPERUS WALK

HESPERUS PLACE

38m ø turning circle

38m ø turning circle

38m ø turning circle

fuel point

MIDDLE PIER

boat hoist

pedestrian walkway

pilot station

EAST GRANTON

Ledgend Total Berths – 340

- 76 No 10m x 4m
- 56 No 12m x 4.5m
- 107 No 14m x 4.9m
- 59 No 16m x 5.15m
- 27 No 18m x 5.75m
- 9 No 25m x 7.5m
- 5 No 30m x 9m
- 1 No 45m x 11m

Inner Marina Dredge Level CD −2.5m

Hoist Access + Mid Marina Dredge Level CD −3.0m

Channel + Outer Marina Dredge Level CD −4.0m

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THE ROYAL INCORPORATION OF ARCHITECTS IN SCOTLAND CHARTERED PRACTICE

RIBA Chartered Practice

Notes.

Rev.	Description	Date	By
H	MHWS added,	29.09.16	KM
G	Berth number updated,	04.05.16	KM
F	Redlined FB4 B4 & B8, middle pier, and berth layout.	03.05.16	KM
E	Redlined and revised sheet,	14.03.16	KB

Granton Central Developments Ltd

Edinburgh Marina
Granton Harbour, Edinburgh

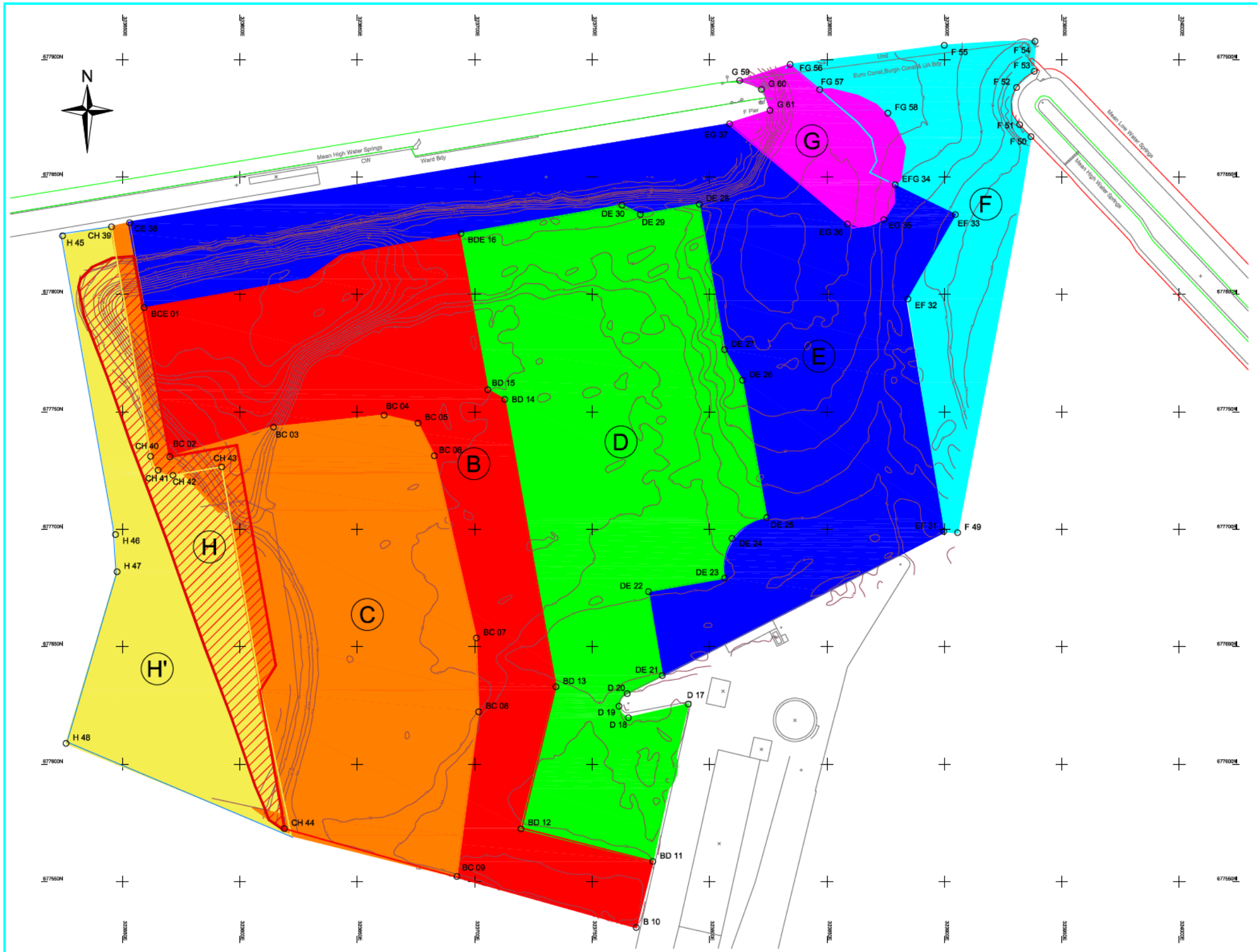
Masterplan
Marina Extract

Planning

Project number	60074
Date	10/02/2016
Drawn by	WG
Checked by	WG
Drawing No.	A-P-00-G7-005
Revision	H
Scale	NTS @A1

Dredge Areas & Volumes

Do not scale from this drawing.



PLAN
(SCALE 1:1000)

Zone	Volume for Disposal at Sea (m^3) (Top 1.2m where applicable)	Volume for Disposal on Land (m^3)	NETT VOLUME (m^3)	Factored by 1.8 wet tonnes/m^3
A			N/A	
B	20,344	7,936	28,280	50,904
C		47,094	47,094	84,769
D	25,698	20,620	46,318	83,372
E	27,349	40,928	68,277	122,898
F	10,073	21,400	31,472	56,650
G	3,516	16,408	19,924	35,863
Total Nett Volume	**86,980**	**154,385**	**241,365**	**434,457**

H			19,322	34,780
Total Infill Volume			**19,322**	**34,780**

COORDINATES

POINTS	EASTING	NORTHING	LATITUDE	LONGITUDE
BCE 01	323559	677794	55° 59.220' N	3° 13.609' N
BC 02	323570	677731	55° 59.186' N	3° 13.597' N
BC 03	323614	677744	55° 59.194' N	3° 13.555' N
BC 04	323661	677749	55° 59.197' N	3° 13.510' N
BC 05	323676	677745	55° 59.195' N	3° 13.496' N
BC 06	323683	677731	55° 59.187' N	3° 13.489' N
BC 07	323701	677654	55° 59.146' N	3° 13.470' N
BC 08	323702	677622	55° 59.129' N	3° 13.468' N
BC 09	323692	677552	55° 59.091' N	3° 13.477' N
B 10	323769	677530	55° 59.080' N	3° 13.402' N
BD 11	323776	677559	55° 59.096' N	3° 13.396' N
BD 12	323720	677572	55° 59.102' N	3° 13.450' N
BD 13	323735	677633	55° 59.135' N	3° 13.437' N
BD 14	323713	677755	55° 59.201' N	3° 13.460' N
BD 15	323706	677759	55° 59.203' N	3° 13.467' N
BDE 16	323694	677826	55° 59.239' N	3° 13.480' N
D 17	323791	677626	55° 59.132' N	3° 13.383' N
D 18	323766	677620	55° 59.128' N	3° 13.407' N
D 19	323761	677625	55° 59.131' N	3° 13.412' N
D 20	323765	677630	55° 59.134' N	3° 13.408' N
DE 21	323780	677638	55° 59.138' N	3° 13.394' N
DE 22	323774	677673	55° 59.157' N	3° 13.400' N
DE 23	323806	677679	55° 59.161' N	3° 13.369' N
DE 24	323810	677696	55° 59.170' N	3° 13.366' N
DE 25	323824	677705	55° 59.175' N	3° 13.353' N
DE 26	323814	677763	55° 59.206' N	3° 13.363' N
DE 27	323806	677776	55° 59.213' N	3° 13.371' N
DE 28	323796	677838	55° 59.246' N	3° 13.382' N
DE 29	323771	677834	55° 59.244' N	3° 13.406' N
DE 30	323763	677838	55° 59.246' N	3° 13.413' N
EF 31	323900	677699	55° 59.172' N	3° 13.279' N
EF 32	323884	677798	55° 59.225' N	3° 13.296' N
EF 33	323905	677834	55° 59.245' N	3° 13.277' N
EFG 34	323879	677847	55° 59.252' N	3° 13.302' N
EG 35	323874	677832	55° 59.244' N	3° 13.307' N
EG 36	323859	677830	55° 59.242' N	3° 13.321' N
EG 37	323809	677873	55° 59.265' N	3° 13.370' N
CE 38	323553	677831	55° 59.240' N	3° 13.615' N
CH 39	323545	677829	55° 59.239' N	3° 13.623' N
CH 40	323562	677731	55° 59.186' N	3° 13.605' N
CH 41	323565	677725	55° 59.183' N	3° 13.602' N
CH 42	323572	677723	55° 59.182' N	3° 13.595' N
CH 43	323592	677727	55° 59.184' N	3° 13.576' N
CH 44	323619	677573	55° 59.102' N	3° 13.547' N
H 45	323525	677825	55° 59.237' N	3° 13.642' N
H 46	323547	677698	55° 59.168' N	3° 13.619' N
H 47	323548	677682	55° 59.160' N	3° 13.618' N
H 48	323526	677609	55° 59.120' N	3° 13.637' N
F 49	323906	677699	55° 59.172' N	3° 13.274' N
F 50	323937	677867	55° 59.263' N	3° 13.247' N
F 51	323932	677872	55° 59.266' N	3° 13.252' N
F 52	323931	677888	55° 59.274' N	3° 13.253' N
F 53	323938	677895	55° 59.278' N	3° 13.246' N
F 54	323939	677908	55° 59.285' N	3° 13.245' N
F 55	323900	677906	55° 59.284' N	3° 13.283' N
FG 56	323834	677898	55° 59.279' N	3° 13.346' N
FG 57	323847	677887	55° 59.273' N	3° 13.334' N
FG 58	323876	677877	55° 59.268' N	3° 13.305' N
G 59	323813	677891	55° 59.275' N	3° 13.366' N
G 60	323822	677887	55° 59.273' N	3° 13.358' N
G 61	323826	677878	55° 59.268' N	3° 13.354' N

Rev.	Date	Description	Drawn	Checked	Approved

NOTES:

1. DREDGE VOLUMES ARE ESTIMATED BASED ON BATHYMETRIC SURVEY COMPLETED BY ASPECT ON MAY 2017.
2. FINISHED DREDGE LEVELS TAKEN FROM WILSON AND GUNN ARCHITECTS DRAWING "A-P-00-G7-005 REV H" REVISED ON 26TH SEPTEMBER 2018.
3. VOLUMES HAVE BEEN FACTORED USING AN ASSUMED UNIT WEIGHT 1.8T/m^3 OF WET DENSITY.

Client: EDINBURGH MARINA

Project Title: MARINA BASIN

Drawing Title: PROPOSED DREDGE WORKS

FAIRHURST
225 Bath Street,
GLASGOW, G2 4GZ
Tel: 0141 204 8800 Fax: 0141 204 8801

Scale at A1:	Status:	
AS SHOWN	For Information	
Drawn: KAB	Checked: MM	Approved: GSDS
Date: 27/09/2018	Date: 27/09/2018	Date: 27/09/2018
Drawing No.: 115875/0101		Revision: –