

BYRNELOOBY



Dundee City Council

Broughty Ferry FPS

Marine Scotland Licence Application Report

Report No. CM1151-MA-R1203

8 October 2019

Revision 02

Document Control

Document: Marine Scotland Licence Application Report

Project: Broughty Ferry FPS

Client: Dundee City Council

Report Number: CM1151-MA-R1203

File Origin: Z:\PROJECTS 2018\CM1151 Broughty Coastal Defences
McLaughlin & Harvey\5 BLP Reports\12 MS
Application\CM1151 MA R1203 02 Marine Scotland
Licence Application Report.docx

Document Checking:

Revision	Revision/ Review Date	Details of Issue	Authorised		
			Prepared By	Checked By	Approved By
02	8 October 2019	MS Application	SMC	AC	AC
01	25 September 2019	Draft	SMC	AC	AC
00	16 September 2019	Draft	SMC	AC	AC
Disclaimer: Please note that this report is based on specific information, instructions and information from our Client and should not be relied upon by third parties.					

Contents

1	Introduction	1
2	Existing Infrastructure.....	4
3	Proposed Development	5
4	Operational Stage	7
5	Licensable Activities	8
6	Site Data.....	10
7	Seabed Sediment Analysis	13
8	Outline Construction Method Statement	17
9	Environmental Statement.....	23
10	Scotland's National Marine Plan	34

1 Introduction

1.1 Introduction

Dundee City Council is the local authority with responsibility for the Broughty Ferry area of Dundee. Under the Flood Risk Management (Scotland) Act 2009, Dundee City Council are legally obliged to manage flood risks in the area.

Dundee City Council undertook a Stage 1 Coastal Study for the area in 2007, which investigated the existing sea defences at Broughty Ferry, and their condition. In 2013, this progressed to a Stage 2 Coastal Study for the area which determined the need to improve flood defences in Broughty Ferry in order to protect the town of Broughty Ferry from flooding.

Since then, Dundee City Council have been developing design solutions for proposed sea defences. On 3rd December 2018, Scottish Ministers granted planning permission under Section 57 of the Town and Country Planning (Scotland) Act 1997.

Dundee City Council is submitting an Application to Marine Scotland Licensing Operations Team (MS-LOT) to undertake a Flood Protection Scheme at Broughty Ferry. For the purposes of this Marine Scotland Application, three distinct Sections of work are proposed:

- Section 1: New sea wall between Douglas Terrace and Fisher Street.
- Section 2: New sea wall at between Fisher Street.
- Section 3: New terrace steps at Beach Crescent.

1.2 Project History

The Broughty Ferry Flood Protection Scheme has been identified and delivered with regards to the Flood Risk Management (Scotland) Act 2009 and The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Regulations 2010.

The Flood Risk Management Regulations have required Dundee City Council to follow a clearly defined legal process in order to attain the permissions to build the scheme. Various consultations were held, as described below:

1.2.1 EIA Screening Opinion

Commencing in February 2017, Dundee City Council wrote to Scottish Environmental Protection Agency, Scottish National Heritage, Scottish Water, Marine Scotland, and Historic Scotland, seeking an opinion if Environmental Impact Assessment is required. All bodies determined that EIA is not required, Scottish National Heritage determined that a Report to Inform Appropriate Assessment (RIAA) is required. The RIAA assessed the impact on Natura 2000 sites based on a proposed design and construction methodology and determined that

the development will not adversely affect the site integrity of the Natura 2000 sites. Scottish National Heritage were consulted during the preparation of RIAA.

1.2.2 Public Consultations

- A public Exhibition was held on 1st June 2016 at the Broughty Ferry Castle Bowling Club between 10am and 8pm. The event was publicised in the local Paper and social media and letters sent to all residences that are in the immediate vicinity of the scheme the local community council was also invited. Invitations were sent on the 25th May 2016. The event was well attended with over 200 people attending. Each person was invited to leave comments regarding the project. A report summarising the public feedback was compiled and published online for those wishing to read.
- A presentation was undertaken to the Local Community Council on the evening of 9th June 2016. This was also well attended by the community.
- A second Exhibition was held on the 13th December 2016 at the Castle Green Community Centre between 11am and 7pm. The event was publicised in the local Paper and social media and letters sent to all residences that are in the immediate vicinity of the scheme the local community council was also invited. Invitations were sent on the 30th November 2016. The event was well attended, and comments left.
- A presentation was undertaken to the local community council on the 6th March 2018 prior to the formal legal notification of the project.
- Local Elected members have been invited to update meetings where council engineers have provided updates on the project. This information has been fed back to their constituents.
- A website was set up to share information and provide members of the public the background of the scheme. This has been updated regularly throughout the public consultation of the scheme. <https://www.dundee.gov.uk/service-area/city-development/broughty-ferry-flood-protection-scheme>.
- A Marine Scotland pre-application consultation event was held on 24th July 2019. The Pre-Application Consultation Report is enclosed with this application

1.2.3 Legal Notice of Flood Protection Scheme

The legal notice of the project was published on the 4th April 2018. It was published online, in a local paper, the Edinburgh Gazette and notices were displayed along the full length of the project. All Land owners were contacted. this included Crown Estate, Historic Scotland, RNLI, Dundee Port Authority, local residents, elected members of the council, Local community council, council heads of departments and the Consultative bodies mentioned above (including Marine Scotland). Letters were also delivered to local residents within the immediate vicinity of the project.

1.2.4 Legal Notice of Confirmation of Flood Protection Scheme

A confirmation notice was issued on the 5th October 2018 which gave 28 days for persons to object to on any legal grounds that the correct procedure was followed. It was published online, in a local paper, the Edinburgh Gazette and notices were displayed along the full length of the project. Letters were sent to all land owners, objectors and residents as before. No objections were received.

1.2.5 Scottish Government Deemed Planning

All gathered information was issued to the Scottish Government with a request to grant deemed planning permission. This included the scheme documents, Planning assessment, original screening letters/responses and all objections. All planning documents are available to view at <https://www.dundee.gov.uk/service-area/city-development/broughty-ferry-flood-protection-scheme>.

2 Existing Infrastructure

The existing infrastructure at Broughty Ferry comprises inclined stone faced revetments and concrete or masonry vertical walls. There are a number of access steps and public slipways to the beach. The Lifeboat Pier and Pilot Jetty are also located in the area, but these do not form part of the development. The condition of the infrastructure is poor, with Dundee City Council carrying out continual maintenance of the structures. There have been incidents of flooding of the adjacent roads and footpaths in the past, and as identified in the Coastal Study, there will likely be increased incidents of coastal flooding in the future.



Figure 2-1 Coastal Flooding at Broughty Ferry (Dundee City Council)

The existing footpaths located at the top of the existing revetments and walls are relatively narrow with limited fall protection. This therefore poses a safety risk to pedestrians, cyclists and motorists.

3 Proposed Development

The proposed development comprises the Broughty Ferry Flood Protection Scheme. The primary aim of the scheme is to reduce the risk of coastal flooding in Broughty Ferry by installing improved defences between Douglas Terrace and Broughty Castle. Works will be carried out above and below Mean Low Water Springs. Activities which are subject to marine licence are:

- Excavation works;
- Foundation installation;
- Construction of new concrete walls;
- Construction of a new concrete terrace;
- Construction of access steps;
- Construction of emergency and maintenance access ramps;
- Installation of scour protection;
- Installation of storm water outfalls;
- Installation and removal of a temporary bund;
- General site works.

3.1 Section 1

Section 1 will comprise a new sea wall with an approximate length of 680m. The new wall will be offset from the existing footpath at James Place and Douglas Terrace by approximately 5m resulting, providing a new public footpath and cycle way.

New stairwells will be constructed which will allow access for the general public to the beach. A new emergency access ramps will be constructed at the east end of Section 1 to enable access for emergency vehicles to the beach near the RNLI station.

The foundation of the structure will comprise continuous flight auger (CFA) piles. The superstructure will be built on the CFA piles and will comprise precast and insitu concrete elements. The new sea wall will be constructed with a patterned finish which will resemble a natural stonework finish.

In order to prevent undermining of the structure, a scour protection mattress will be constructed. This will be buried under the beach level so will not be visible from the beach.

A number of outfalls through the proposed primary wall will be required to allow the new surface water drainage system to discharge to the beach.

3.2 Section 2

Section 2 will comprise a new sea wall with an approximate length of 110m. The new wall will be offset from the existing footpath at Fisher Street, to allow for the installation of the new public footpath and cycle way.

The structural and geotechnical design will be similar to that of Section 1 (i.e. CFA piling with precast and insitu elements), with a patterned finish. Scour protection mattresses will also be installed. Access ramps and stairwells are not proposed, as the level difference between the proposed deck and existing beach do not warrant these.

3.3 Section 3

Section 3 will comprise a circa 200m long terrace area. The terraces will be a public amenity used for seating. The terraces will be accessed via access steps which will be constructed in 3 locations along the terraces. The new public footpath and cycleway will continue from Sections 1 and 2 along the top of the terrace

The foundation of the bottom step of the terrace will comprise a line of sheet piles which will be installed at beach level. The sheet piles will not be visible when the works are completed. The terraces and steps will be constructed from precast concrete.

Scour protection mattresses are not proposed in this area.

An access ramp will be provided to the south east of the terrace to allow Dundee City Council vehicle access only for cleaning and maintenance.

4 Operational Stage

The operational stage of the development will be beneficial for the following reasons:

- The risks of flooding of the town of Broughty Ferry will be reduced;
- The proposed development will enhance the use of the marine amenities in Broughty Ferry, as it will provide a new promenade, and improved access to the foreshore;
- The new handrails will improve safety along the existing footpath which are currently unprotected;
- Maintenance of the existing structures will be reduced;
- New public footpaths and cycleways will be introduced.

5 Licensable Activities

The proposed licensable activities will comprise temporary and permanent works below mean high water springs:

- Temporary Works
 - Installation of temporary works bund and revetment;
 - Removal of temporary works bund and revetment;
 - Vehicles and plant tracking on the beach.
- Permanent Works
 - Excavation of beach material for foundations;
 - Installation of continuous flight auger (CFA) piles at Section 1 and 2;
 - Installation of sheet piles at Section 3;
 - Installation of precast concrete units (foundations, new sea walls, stairwells, terrace steps, access steps);
 - Installation of in-situ concrete (foundations, capping beams);
 - Installation of drainage and outfalls;
 - Installation of engineering fill;
 - Installation of scour protection mattresses;
 - Installation of concrete ramps;
 - Refilling with previously excavated beach material.

The following other works will be carried out as part of the development which are not licensable:

- Installation of a new setback wall (flood defence) with cladding;
- Installation of flood gates;
- Construction of natural stone paving footpath (cycle and walkway);
- Installation of street lighting;
- Installation of railings;

- Installation of other miscellaneous furniture.

6 Site Data

6.1 Datum

The datum used as part of this project is Ordnance Datum.

6.2 Tide Levels

Tide Levels are described as follows:

Datum	Ordnance Datum
ESWL	+4.40m
HAT	+3.38m
MHWS	+2.70m
MHWN	+1.40m
MLWN	-0.90m
MLWS	-2.10m
LAT	-2.84m

Figure 6-1 Tide Levels

The development will not impact tide levels.

6.3 Bed Levels

The bed levels of the beach at the location of the proposed works are described as follows:

- Section 1: +1.70m to +2.50m.
- Section 2: +3.00m to +3.50m.
- Section 3: +0.50m to +1.50m (toe of terrace).

The sea bed will be returned to its original levels upon completion of the works.

6.4 Waves

Swell waves and locally generated wind waves are discussed in this section. There is a potential that the waves incident on the new sea wall will cause localised scouring of the sea bed. In order to limit the risk of scouring on the stability of the structures, scour protection mattresses are proposed.

The proposed flood protection structures will prevent wave overtopping onto the public road and limit the risk to pedestrians and properties.

6.4.1 Swell Waves

Atkins carried out a Meteorological & Tidal Effects Assessment on behalf of Dundee City Council in 2007. Part of this report models the resultant wave heights in the Firth of Tay as a result of offshore waves propagating into the Firth. 16 different model cases were run to determine the nearshore wave heights between the Tay Rail Bridge and Broughty Castle. The maximum 1 in 100 year significant wave height (H_s) predicted at the proposed site is 0.80m.

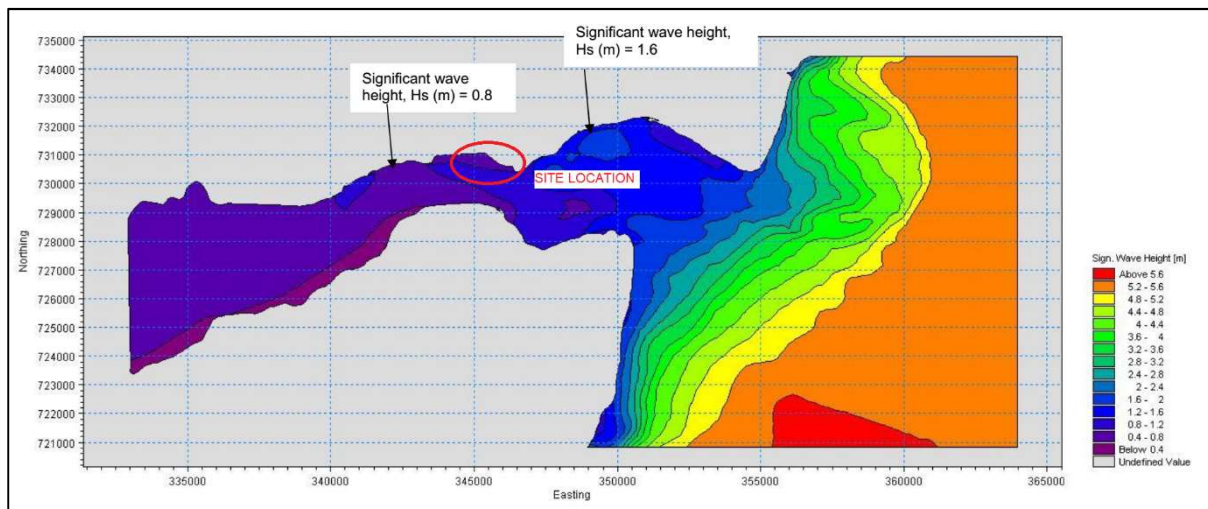


Figure 6-2 Swell waves at the site location (Atkins, 2007)

6.4.2 Locally Generated Wind Waves

Mott MacDonald carried out a Coastal Defence Assessment on behalf of Dundee City Council in 2017. As part of this assessment, wind data was used to hindcast locally generated wind waves at the site (fetch-limited waves). An over water fetch length of 24km to Newburgh was used to determine a 1 in 100 year significant wave height (H_s) of 2.28m. This value is a conservative value and in reality likely to be limited by the shallow banks located west of the Tay Road Bridge.

6.5 Currents

Maximum tidal velocities of 1.9m/s (3.7 knots) have been recorded to the west of Broughty Castle¹.

The works will not have an impact on currents locally or in the Firth of Tay. The majority of the proposed structures in surface contact with the water will be positioned above Mean High Water Neaps, so the overall change to the cross section of the Firth of Tay will be negligible.

¹ Bates, C. R., Moore, C. G., Malthus, T., Mair, J. M. and Karpouzli, E. (2004). Broad scale mapping of habitats in the Firth of Tay and Eden Estuary, Scotland. Scottish Natural Heritage Commissioned Report No. 007 (ROAME No. F01AA401D).

7 Seabed Sediment Analysis

(Please note that provisional results only of the sediment analysis have been received. ByrneLooby will furnish Marine Scotland with the MS-LOT Pre-Disposal Sampling Results Form format upon receipt.)

7.1 General

The proposed works will comprise the following groundworks:

- Localised excavation of the existing revetment to facilitate the construction of the precast concrete base;
- Localised excavation of the sea bed to facilitate the construction of the precast concrete base and scour protection mattress;
- Augering of the sea bed material to facilitate the installation of the CFA piles;
- Temporary storage of the excavated and augered sea bed material and storage on the beach;
- Refilling on the top of the scour protection mattress with the excavated sea bed material;
- Disposal of the man-made materials (concrete and revetment) at a suitably licenced site.

7.2 Construction Methodology

The methodology of the proposed works is described in Section 8.

All excavation will be carried out from shore based plant. The maximum depth of excavation of the sea bed will be approximately 1.5m below the existing sea bed level.

CFA Piling will result in sea bed material to a maximum depth of 10m being removed.

The proposed CFA Piles will limit the depth of excavation for the works, thus reducing the volume of material excavation.

7.3 Volumes

The following are estimates of the volumes of materials to be excavated:

Element	Volume (m ³)
Excavation for wall foundation	7,085
Excavation for scour protection mattress	5,590
CFA arisings	785
Excavation for Section 3 capping beam	4,400
Total	17,860

7.4 Analysis Locations

The analysis locations are identified in Figure 7-1, and described in Table 7-1.

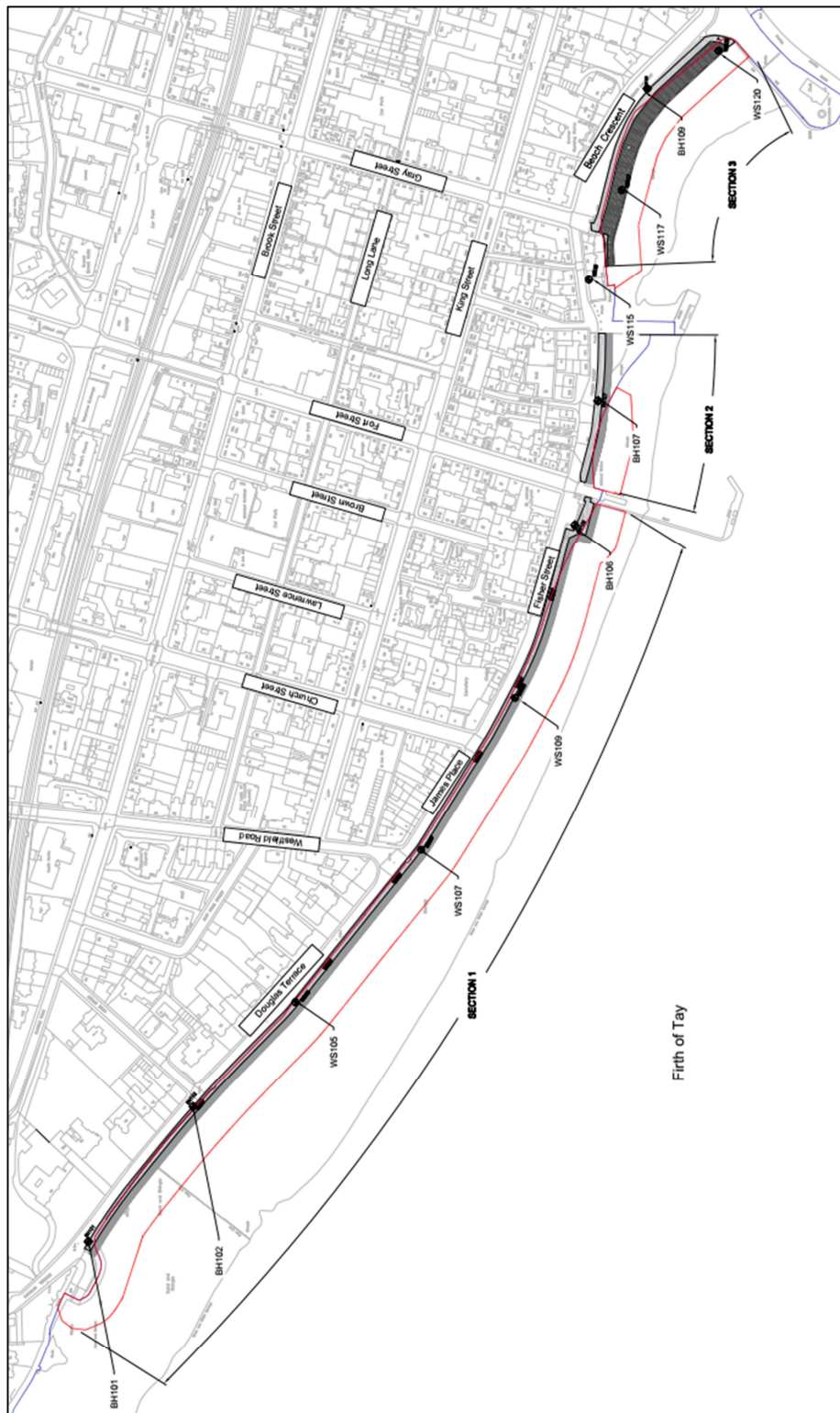


Figure 7-1 Analysis Locations

ID	Section	Location	Depth OD
BH101	1	Proposed setback wall.	+0.53m
BH102	1	Proposed setback wall.	-3.14m
WS105	1	Existing beach / proposed CFA piling & scour mattress location.	-0.82m
WS107	1	Existing beach / proposed CFA piling & scour mattress location.	-1.20m
WS109	1	Existing beach / proposed CFA piling & scour mattress location.	+0.47m
BH106	1	Proposed setback wall at emergency access ramp.	+1.39m
BH107	2	Existing beach / proposed CFA piling & scour mattress location.	-4.87m
WS115	3	Non- Marine based.	+3.03m
WS117	3	Existing beach / proposed capping beam and sheet pile location.	+0.07m
BH109	3	Top of proposed terrace.	-6.45m
WS120	3	Existing beach / proposed capping beam and sheet pile location.	-0.06m

Table 7-1 Analysis Locations and Depths

7.5 Analysis Results

The analysis results are provided in Appendix A.

All contaminants fall below the Action Level 2 levels prescribed by Marine Scotland, with the exception of Lead (Pb) at WS107 was recorded at 675mg/kg.

It is not proposed to dispose any materials at sea. Materials will be redistributed in their original position on the beach.

8 Outline Construction Method Statement

This construction method statement is outline only and subject to any changes based on the marine licensing process.

8.1 Mobilisation

A pre-condition survey of the site will be carried out to determine the suitability of the plant proposed. Vibration monitoring stations will be set up to determine a baseline for vibration. Condition surveys and monitoring of sensitive properties will be carried out in advance of mobilisation. The following plant shall be mobilised and will be located on site for the duration of the works:

- Backhoe excavator x 4 (8t to 20t);
- Long reach excavator x 1;
- 65tonne crawler crane;
- 20tonne CFA piling rig;
- Piling Hammer (vibro and impact – Section 3 only);
- 200tonne mobile crane (Section 3 only)
- Articulated dump trucks x 2;
- 8 wheel tipper trucks x 10;
- 9t dumper x 2;
- Crawler tractor (dozer) x 1;
- Tractor & trailer x1;
- 13tonne roller;
- 5tonne roller;
- Safety tender (afloat at high tide only).

8.2 Site Compound

A site compound will be set up on a phased basis as indicated in Appendix D. The purpose of the phasing is to limit the impact on residents, and to limit traffic and parking disruptions. The proposed temporary works bund will remain in position for the duration of the works in order to facilitate access along the linear site, thus reducing the impact on residents. The individual Sections of works are described as follows:

8.3 Section 1

1. The Contractor will mobilise to site and erect site boundary fence on the landward side and define the site extents on the seaward side.
2. A temporary car park area will be constructed for the RNLI;
3. A temporary access point to the beach will be constructed. A geotextile separation membrane will be placed on the exiting beach under the footprint of the proposed temporary works bund;
4. Using a combination of excavators, dozers and tipper lorries place, engineering fill material will be imported to site by road and placed on the beach forming the temporary works bund (platform). Rock armour will be placed to the front of the temporary works bund to prevent erosion of the bund during the construction stage.
5. The temporary works bund will be locally excavated at each pile location to remove any potential high level obstructions and/or the toe of the existing stone pitched revetment. This will be then be backfilled with aggregate.
6. The CFA piles will subsequently be installed using a CFA piling rig which will be positioned on the temporary works bund. A sacrificial steel liner will be placed around the annulus of the CFA pile to reduce the potential for the washout of concrete into the water column or existing seabed during construction. This liner will be placed as the augering commences. The CFA piling rig will commence drilling. The auger on the rig will remove overburden material from the beach. When the Auger achieves the required pile toe depth the concrete will be pumped as the auger is extracted. On completion of the concrete works the steel reinforcement cage will be installed into the fresh concrete.
7. As the concrete cures, excavation for the proposed U-Precast Beam will commence. This will require excavation of the existing beach material. This material, with the material removed by the CFA auger, will be placed locally on the existing sea bed, within the proposed licence boundary. This material will be regraded / levelled upon completion of the works.
8. Where stairwells are proposed, greater depths of excavation will be required as the stairwells will be located within the area of the existing sea wall. In order to stabilise the existing sea wall and road, temporary sheet piling will be required. This piling will be carried out using an excavator mounted vibrating hammer. These sheet piles will be subsequently removed. The length of the sheet piles on plan will be approximately 10m per stairwell.
9. The excavation for the U-Precast beams will be trimmed level and a blinding layer of concrete placed around each pile to provide temporary support for the U-Precast beam.

10. The U-precast beam will be lifted into position using a crawler crane working on the temporary works bund.
11. The U-precast beam will be backfilled on either side to provide additional temporary stability during the concreting phase.
12. The steel reinforcement cage will be fixed inside the U-precast beam and a temporary stop end erected.
13. Concrete will be placed into the U-precast beam using a concrete skip or pump, with the concrete compacted using vibrating concrete pokers and the concrete will be finished to level.
14. The precast L-precast units will be delivered to Broughty Ferry and stored on a land based compound until they are due to be incorporated into the works. When the units are delivered to the site, they will be lifted into position using a crawler crane which will be positioned on the temporary works bund. The units will be held in position using temporary push/pull props.
15. The heel (base to the rear) of the proposed L shaped wall will be constructed from in-situ concrete. The steel reinforcement for the heel will be fixed after the L-precast units are installed. Formwork will be erected, then the concrete to the base will be poured and compacted using vibrators.
16. After the in-situ concrete has cured sufficiently, engineered fill material will be imported and placed behind the new wall structure. Back of wall drainage, main line drainage, outfall manholes and outfalls will be constructed as the works progress. Further backfilling and compaction will take place to the underside of the pavement formation.
17. The height of the temporary works bund will then be raised locally on the outside of the new wall to allow the construction of the capping beam. The capping beam will be constructed from in-situ concrete. The raised level will allow ease of access for formwork and reinforcement installation. After the concrete has been poured and allowed to cure, the formwork will be struck, and the temporary works bund will be returned to the level indicated on the drawings. Handrails will be erected on the capping beam from the shore side.
18. On completion of the works the temporary works bund will be excavated and removed from the site. The geotextile membrane will then be removed from the foreshore.
19. As the bund is removed, local excavation of the existing beach (max depth approx. 1.5m) will be required to allow for the installation of the proposed scour protection mattress. The excavated material will be stored on the existing beach within the proposed Marine Scotland licence boundary. beach for the scour protection will take place, with the material temporarily stockpiled on the beach within the site boundary.

20. The scour protection mattress will comprise prefabricated units. They will be delivered to site and installed using excavators positioned on the beach. The mattresses will be connected via sockets to the U-Precast beams.
21. When installed, the beach stored excavated material will be used to back fill the void. The materials will be graded to approximately match the pre-construction beach profile.
22. The onshore works will be carried out in tandem with the water-side works, such as the installation of the paving, furniture, services etc.

8.4 Section 2

The proposed construction methodology for Section 2 is similar to that of Section 1. The installation of stairwells (point 8) will not be required.

8.5 Section 3

1. The Contractor will mobilise to site and erect site boundary fence on the landward side and define the site extents on the seaward side.
2. Temporary access points to the beach will be constructed. A geotextile separation membrane will be placed on the exiting beach under the footprint of the proposed temporary works bund;
3. Using a combination of excavators, dozers and tipper lorries place, engineering fill material will be imported to site by road and placed on the beach forming the temporary works bund (platform). Rock armour will be placed to the front of the temporary works bund to prevent erosion of the bund during the construction stage.
4. Using a vibrating piling hammer, the contractor will drive sheet piles through the temporary works bund and natural beach material to the required level. It is anticipated that vibrating hammers only will be required, but there may be instances where impact hammers will be required to drive the sheet piles through obstructions or firmer materials to the required levels.
5. The sheet piles will be used for both the temporary and permanent works: During the temporary works, they will act as a temporary cofferdam, allowing greater working hours at the toe of the proposed terrace, thus reducing down-time associated with the tidal cycle; During the permanent works, the sheet piles will act as a foundation and a scour protection to the proposed terrace.
6. Engineered fill material will be imported to the inside of the sheet pile wall and graded to match the slope of the proposed terraces.

7. Screed rails will be set up on the engineered fill to allow for the installation of blinding concrete. The blinding concrete will be placed using a pump or concrete skip. The concrete will be vibrated using concrete pokers and finished to the required level and slopes.
8. The precast concrete terraces and steps will be imported to site and temporarily stored before being incorporated into the works.
9. Using a crane and lifting frame, the precast concrete terrace steps will be lifted into position.
10. The annulus of the steps will be grouted using a tremie pipe. Care will be taken to ensure the grout rises evenly and that no excess grout is poured.
11. The temporary works bund will be excavated either side of the sheet pile, to allow the sheet pile to be cut to the required level. Weep holes will be cut into the sheet piles to allow for the release of hydrostatic pressures behind the proposed terrace during the permanent works. The excavated material will be stored locally within the proposed Marine Scotland licence boundary. This material will be regraded upon completion of the works.
12. The capping beam for the sheet piles will be comprise in-situ concrete, which will allow the precast steps to be tied into the capping beam. Formwork and steel reinforcement will be installed, before the concrete is poured using a concrete skip. Vibrating concrete pokers will be used to compact the concrete and achieve the required level.
13. On completion of the works the temporary works bund will be excavated and removed from the site. The geotextile membrane will then be removed from the foreshore.
14. The materials previously stored on the beach will be graded to approximately match the pre-construction beach profile.
15. The onshore works will be carried out in tandem with the water-side works, such as the installation of the paving, furniture, services etc.

8.6 Outline Construction Programme

The follow is an outline of the programme of works and is subject to change:

Section	Outline Dates
1	January 2020 to March 2021
2	September 2020 to June 2021
3	October 2020 to October 2021

Table 8-1 Outline Construction Programme

9 Environmental Statement

9.1 Report to Inform Appropriate Assessment

A Report to Inform Appropriate Assessment is provided in Appendix B.

It must be noted that the form of construction has changed slightly since the preparation of the initial RIAA. Changes include:

1. Use of CFA piling for the new sea wall foundation:
 - a. CFA piling will have a low noise impact.
 - b. The use of CFA piling will not result in additional permanent loss of habitat.
 - c. CFA piling will be carried out inside the temporary works bund, so effectively undertaken 'in the dry'.
2. Installation of scour protection mattresses:
 - a. The proposed scour protection mattresses will be buried under the existing beach level. There will therefore be no permanent loss of habitat.
3. Installation of scour protection mattresses:
 - a. The proposed scour protection mattresses will be buried under the existing beach level. There will therefore be no permanent loss of habitat.
4. Excavation
 - a. The volumes of excavation will be less than that proposed in the RIAA. The intention of the RIAA was to reuse the excavated material as fill behind the wall. Structural design of the wall has determined that engineering fill will be required behind the wall. This fill will be imported to site and used as the temporary works bund before being incorporated into the permanent works.
 - b. Excavated sea bed material will be temporarily stored on the foreshore (as per the RIAA) before being redistributed in front of the new sea wall, on top of the scour protection mattress.
 - c. Artificial material (such as concrete) and Marine Scotland deemed contaminated material shall be disposed of at a suitably licensed site.

9.2 Archaeological Mitigation Statement

An Archaeological Mitigation Statement is provided in Appendix C. The statement concludes that

“the site to be developed is deeply unlikely to contain any significant archaeological structures, features or deposits given that the footprint of development:

- is an historically undeveloped, fluid stratigraphical beachfront environment*
- has been effectively archaeologically sterilised by previous, extensive modern sub-surface ground disturbance (caused by the installation of a Scottish Water rising main and culvert in the 1980s? (see drawing: CM1151_MA_0508_DWG_00 Section 1 Construction Phasing)*
- that no active archaeological mitigation is required (but that the onsite contractors should be instructed to halt works and seek archaeological advice in the unlikely event that any pre-modern archaeological artefacts, features or deposits are encountered)*
- the visual impact on the local built historic environment is considered to be low, if not a net environmental improvement. Development will have no direct negative impacts on the key beachfront listed buildings identified by HES - Broughty Castle, Broughty lifeboat house and slipway, Fisher Street quay and pier and Broughty Ferry Harbour.*

This report concludes that no pre-development archaeological site investigation works are required and that no monitoring of works in progress is required. Instead, archaeological mitigation will take the form of an archaeological response protocol.

The site engineer will be briefed about the potential for archaeological artefacts and deposits to be encountered during ground disturbance works. It will be agreed that should archaeological deposits be encountered, then works will stop until such time as the site has been inspected by Dundee City Council’s archaeological advisor (Douglas Speirs, Fife Council Archaeologist).”

9.3 EIA Screening Opinion

Marine Scotland have provided an EIA screening opinion which is found in Appendix E.

9.4 Construction Environmental Management Plan

This section comprises a draft high level Construction Environmental Management Plan (CEMP) for the works. The final CEMP can only be prepared subject after Marine Scotland Licensing.

9.4.1 Responsible Person

Dundee City Council will appoint a competent and experienced Contractor. The Contractor will be required to be suitably qualified and have the relevant experience in relation to construction environmental management and health and safety. Regular meetings will be held between the Contractor and Dundee City Council's representatives in relation to the CEMP.

9.4.2 Working Hours

It is anticipated that works will take place between 7am and 9pm Monday to Saturday (subject to tidal levels and noise levels).

9.4.3 Traffic Management Plan

A Traffic Management Plan (TMP) will be agreed with Dundee City Council, the Police, local residents, and where necessary, Transport Scotland.

The appointed Contractor will be responsible for:

- The implementation of the TMP;
- Design, planning, installation, maintenance and decommissioning of traffic safety measures as required;
- Detailed traffic management plans including:
 - Phasing of works;
 - Detailed traffic management drawings;
 - Traffic management for plant;
 - Access for residents;
 - Timing of operations and works;
 - Road lighting;
- Compliance with the Roads (Scotland) Act 1984;
- Public signage;
- Temporary warning and information signs;

- Traffic cones and taping;
- Road danger lamps;
- Temporary construction of roadways;
- Appointment of Traffic Safety and Control Officer, responsible for:
 - Liaison with Dundee City Council, the Police, and local residents;
 - Management of traffic;
 - Notification of accidents to the Police;
 - Ensure the safe working operation of plant, and machinery;
 - Pre and post works road condition surveys;
 - Weekly reporting to Dundee City Council;
- Issuing of notices to the Scottish Road Work Commissioner and local newspapers where required;
- Cleaning of internal site roads;
- Making traffic orders, authorisation of signage and signals;

9.4.4 Management of Waste

A Site Waste Management Plan will be agreed with Dundee City Council.

Site contractors will be responsible for the collection, control and disposal of all wastes generated by the construction works.

Likely wastes generated include:

- Excavated Marine Scotland deemed contaminated seabed material;
- Excavated concrete;
- Surplus concrete;
- Timber formwork;
- Steel off cuts;

Excavated materials will be separated on site where possible. Material washing will not be required. Suitable excavated bedrock and gravel shall be used to fill the void behind the new quay wall. Material which does not have the required engineering properties shall be disposed of at a suitably licenced site.

The reinforcement shall be removed from the excavated reinforced concrete quay deck where possible. The excavated concrete shall be used as fill material behind the quay wall. The steel reinforcement is recyclable and will be placed in a segregated skip before being accepted by a recycling company.

In the unlikely event that surplus concrete is ordered, the Contractor will use the surplus material as blinding concrete.

All timber formwork shall be recovered by the Contractor and reused on alternative sites as it will be the property of the Contractor.

Due to the variable nature of the bedrock, a number of the sheet piles (Section 3) may not meet the required top level. The piles that exceed the top level will be cut to size. The off cuts will be used to extend any piles that do not reach the top level. Any other surplus steel will be placed in a segregated skip for recycling.

The temporary sheet piles proposed for the stairwells in Section 1 will be reusable for each stairwell.

Any cardboard packaging will be recycled after being flattened and placed in a covered skip.

On-site storage of hazardous waste will be minimised. Potential wastes will include waste fuel, paints, or other residues. These will be suitably banded. Hazardous wastes will be recovered wherever possible and failing this, disposed of appropriately.

A general skip will be maintained on site for general waste that is non-recyclable, such as food waste, contaminated plastic and cardboard, polystyrene etc. Suitable municipal waste recycling facilities will be made available on site for glass, cardboard, plastic etc.

Sewage generated during the construction works will be disposed of by a suitably licenced waste disposal company.

9.4.5 Noise Management

As part of the design process, CFA piles have been proposed for Sections 1 and 2. The installation of CFA piles have a lower noise impact compared to other construction activities.

A variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. There will be vehicular movements to and from the site that will make use of the existing local road network towards the port.

Due to the nature of the activities undertaken on a construction site, there is potential for generation of increased levels of noise. The potential for vibration at neighbouring buildings and residential dwellings is typically limited to HGV movements.

The proposed works is however unlikely to result in significant vibration at local residences from on-site construction activities due to the separation distances.

A Noise Management Plan will be agreed with Dundee City Council. The following mitigation measures are proposed:

With regard to construction activities, reference will be made to "*BS5228: Noise Control on Construction and Open Sites*", which offers detailed guidance on the control of noise from demolition and construction activities. In particular, it is proposed that various practices be adopted during construction, including:

- Appointing a site representative responsible for matters relating to noise;
- Monitoring typical levels of noise during critical periods and at sensitive locations.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These will include:

- Selection of plant with low inherent potential for generation of noise;
- Siting of noisy plant as far away from sensitive properties as permitted by site constraints;
- Any ancillary pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the manufacturers;
- Machines shall be shut down when not being used;
- Handling of plant and materials shall take place in a manner that minimises noise emissions;
- Generators, compressors and pumps shall be placed behind existing structures, where possible, to act as a screen;
- Vehicle audible warning systems shall be set to the minimum volume as required by the PSCS and Health and Safety Authority.

For works which are likely to have a significant impact on the local community in terms of noise and vibration, the Contractor will apply to Dundee City Council for a Section 61 Consent under the Control of Pollution Act, 1974.

9.4.5.1 Sheet Piling

Sheet piling will be carried out at the toe of the proposed terrace steps at Section 3. It is anticipated that the majority of this piling will be carried out by vibration hammering, but it is possible, depending on ground conditions, that impact hammering may be required for the

final 1-2m depth. Impact hammering of the sheet piles has the potential to harm marine mammals.

A proposed activity profile has been issued to Joint Nature Conservation Committee in accordance with the requirements of Marine Scotland. The maximum pressure level (137dB) and sound exposure level (124dB) have been selected based on a proposed 110kilojoule impact pile hammer. It is likely that the sound pressure and exposure levels incident in the water column will be significantly less, for the following reasons:

1. Impact hammering, if required, will be carried out from a temporary works bund. There will be a minimum of 2m of fill material/rock armour between the pile and the water column;
2. At Mean Low Water Springs, the water column is a minimum of 25m from the source of the noise source.

Minor sections of sheet piling (less than 10m length) may be required for the proposed stairwell locations as Section 1. These sheet piles will be installed using a vibration hammer and will subsequently be withdrawn for reuse.

9.4.6 Vibration

9.4.7 Vibration Guidance

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration. For example, rock breaking and piling, two of the primary sources of vibration during construction, are typically tolerated at vibration levels up to 12mm/s and 5mm/s respectively. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard BS 7385 (1993): *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*, and;
- British Standard BS 5228: *Noise control on construction and open sites, Part 4 Code of Practice for Noise and Vibration control applicable to piling operations*

BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15mm/s at low frequencies (<15Hz) rising to 20mm/s at 15Hz and 50mm/s at 40Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak particle velocity of 10mm/s for intermittent vibration and 5mm/s for continuous vibration.

9.4.8 Expected Vibrations

A similar CFA piling technique and pile diameter has been installed recently by Aberdeenshire Council for Stonehaven Flood Protection Scheme. Vibration monitoring was carried out by the Contractor for this scheme (McLaughlin and Harvey). Monitors were installed at sensitive properties, approximately 5m-15m from the CFA pile installation. A maximum peak particle velocity of 2.36mm/s for frequencies in the range of 10Hz to 100Hz was recorded at the receptors. This is below the threshold of 10mm/s for intermittent vibration recommended in BS5228.

The closest property to the proposed CFA piling work is the RNLI Station, which will be located circa 3.5m from the closest CFA pile. It is therefore anticipated that the CFA piling will not negatively impact adjacent properties.

9.4.9 Mitigation

Vibration monitoring station will be installed at sensitive receptors adjacent to the site, such as the RNLI Station. In the unlikely event that a threshold of 10mm/s is exceeded, alternative design solutions will be implemented.

9.4.10 Management of Dust, Odour and Air Quality

9.4.10.1 Management of Dust

Dust and particulate matter emissions may arise from the delivery of material and other goods to the site and from the storage of material on the site.

Potential causes of dust and particulate matter emissions may include the following:

- Unpaved haul routes – poor quality haul routes will result in the amount of dust generated being exacerbated. All routes are paved on approach to the site;
- Stockpiles and storage compounds – the stockpiling of material for long periods of time will result in an increase in dust emissions. This is dependent on the type of material, the quantity of silt contained therein and the moisture content of the material;
- Demolition works, which is inherently dusty;
- Excavation and earthworks;
- Concrete batching;
- Cutting, grinding and sawing;
- Scabbling;
- Waste disposal and burning.

Dust and particulate matter become airborne when either the wind causes the material to be picked up, or mechanical actions as outlined above causes them to be thrown up into the air. The distance that the dust and particulate matter re-settles depends on the size of the particulates, the wind speed and other atmospheric conditions. Smaller particles can travel a greater distance in general. Long spells of dry weather exacerbate the conditions.

Site hoarding will be erected to limit the amount of dust generated. The majority of excavation works will be on the seaward side of the existing sea wall. This is a tidal area so will dampen the materials, reducing the risk of dust.

9.4.11 Mitigation Measures

The following mitigation measures are proposed:

- Excavation of the existing road and footpath will require cutting, grinding and sawing. In order to minimise the dust generated, the deck will be regularly watered;
- Site roads shall be regularly swept, cleaned and maintained as appropriate. Vehicles departing the site shall be subject to wheel washing;
- Public roads outside the site shall be regularly checked for cleanliness and cleaned as necessary;
- Stock piling of material shall be minimised, and exposure to wind shall be minimised where possible. This will be facilitated by storage of materials on the beach.
- Stock piled material shall be sprayed if required;
- Burning shall not be permitted.

9.4.12 Management of Odour

Excavation works will be required to facilitate the new foundations. The depths of excavation are limited to approximately 1.5m, so it is not anticipated that there will be significant odour generation.

A complaint investigation plan will be implemented to record any complaints regarding odour. If the complaint is verified, mitigation measures shall be implemented (such as temporary suspension of the works).

9.4.13 Marine Mammals

As identified in the RIAA, *"No intrusive works e.g. piling will take place below tide level where noise transmission would be an issue. Neither construction nor operation will result in any increase in underwater noise levels and therefore there will be no adverse effects on dolphin communication and activity. No "in-water" piling is proposed."*

9.4.14 Archaeology

The Contractor will be briefed about the potential for archaeological artefacts and deposits to be encountered during ground disturbance works. Should archaeological deposits be encountered, then works will stop until such time as the site has been inspected by Dundee City Council's archaeological advisor.

9.4.15 Water Quality

The Contractor shall only store excavated beach material and clean imported material for the temporary works bund on the beach.

The majority of concrete works will be precast concrete elements which will be imported to the site. In-situ concrete works will either be contained within the precast elements or be located landward side of the temporary works bund. The bund will act as a barrier to insitu concrete entering the water course.

All works will be carried out in accordance with the Coastal and Marine Environmental Site Guide (Ciria 584), 2003.

9.4.16 Health and Safety

Dundee City Council is aware of the duties of the Client in accordance with the Construction (Design and Management) Regulations (CDM Regulations) 2016.

Designers, Principal Designers, Principal Contractors and Contractors have been / will be appointed.

10 Scotland's National Marine Plan

Reference is made to Scotland's National Marine Plan as Follows:

10.1 GEN 7 – Landscape/Seascape

Scotland's National Marine Plan (GEN 7) states:

"Marine planners and decision makers should ensure that development and use of the marine environment take seascape, landscape and visual impacts into account."

Dundee City Council have been cognisant of the seascape, landscape and visual impact of the development. The conversation statement which formed part of the planning documentation states:

"Broughty Ferry is within a Conservation area and therefore the designers have been aware that the final design shall be required to enhance the unique character and appearance of the area. As the proposed scheme will present a visual change on the area it has been important to identify where the design can be developed to help the final works complement the aesthetics of the area."

The main visual feature of the proposed works is the setback wall. This wall runs the whole of the scheme and helps to provide the flood protection solution. The material proposed is a local sandstone, quarried at Denfind Quarry, Monikie. This material was selected to match the stone that was used in the area to build a large percentage of the buildings in Broughty Ferry. This stone also matches sections of the existing sea wall. See photo 19-20 below.

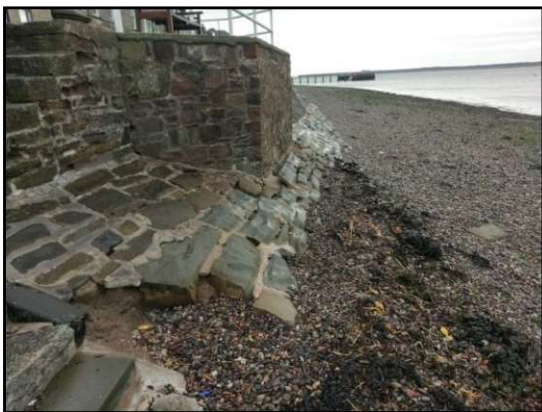


Photo 19



Photo 20

The area contains a number of benches that vary significantly in terms of appearance and materials. The scheme intends to replace and standardise these retaining the memorial plaques where currently present.

It is proposed to use natural stone paving for the new promenade at Beach Crescent and Fisher Street (East of the Lifeboat House) the colour of this is to match other slabbing in the area (Brook Street).

It is proposed to upgrade the street lighting as part of the scheme. New columns will be in keeping with the look of the area when adjacent to the listed historic columns which will be retained as part of the scheme.

The decorative boat planter located on the grass beach at Fisher Street will be protected during the works and be retained within the final design."

The proposed patterned finish to the sea wall will enhance the view of the promenade from the beach.

The proposed terrace steps at Section 3 will enhance the public enjoyment of the seascape and visual amenities in Broughty Ferry.

10.2 GEN 13 – Noise

Scotland's National Marine Plan (GEN 13) states:

"Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects."

Species sensitive to noise and vibration have been considered in the Report to Inform Appropriate Assessment, and in the Construction Environmental Management Plan.

Appendix A – Seabed Sediment Analysis

(Please note that provisional results only of the sediment analysis have been received. ByrneLooby will furnish Marine Scotland with the MS-LOT Pre-Disposal Sampling Results Form format upon receipt.)

Appendix B – Report to Inform Appropriate Assessment