

REPORT

Millport Coastal Flood Protection Scheme

Description of Operations

Client: North Ayrshire Council

Reference: PB4749-RHD-ZZ-XX-RP-Z-0021

Status: Final/F001

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1 General

In exercise of the powers conferred upon it by Section 60 of the Flood Risk Management (Scotland) Act 2009 (hereinafter “the Act”), North Ayrshire Council (hereinafter “the Council”) hereby makes the following Flood Protection Scheme (hereinafter “the Scheme”). The purpose of the Scheme is to reduce the risk of flooding to Millport from overtopping due to wave action from the Firth of Clyde.

2 Local Flood Risk Management Plan Context

The Scheme is included in the measures in the draft Local Flood Risk Management Plans and contributes to the aims set out therein by reducing the risk of flooding.

3 Flood Protection Scheme Location

The Scheme works are located offshore in Millport Bay, on the foreshore, and on land within the Millport seafront area. The scheme location is shown on drawing PB4749-RHD-XX-XX-DR-C-1001; Location plan and General Arrangement.

4 Description of the Operations

4.1 General

The Flood Protection Scheme Operations (hereinafter “the operations”) and ancillary operations to be carried out in terms of the scheme are shown on the drawings marked as listed below (hereinafter “the drawings”).

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-XX-DR-C-1001 | LOCATION PLAN AND GENERAL ARRANGEMENT |
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-CS-DR-C-1003 | CLYDE STREET & STUART STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-GS-DR-C-1004 | GUILDFORD STREET & GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KB-DR-C-1007 | KAMES BAY & MARINE PARADE, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-OB-DR-C-1008 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 1 of 2 |
| PB4749-RHD-XX-OB-DR-C-1009 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 2 of 2 |
| PB4749-RHD-FW-WB-DR-C-1010 | WEST BAY ROAD & MILLBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |
| PB4749-RHD-FW-CS-DR-C-1011 | CRICHTON STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1012 | CLYDE STREET & GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1013 | GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-KB-DR-C-1015 | KAMES BAY & MARINE PARADE, CROSS SECTIONS, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-OB-DR-C-1016 | OFFSHORE BREAKWATER, CROSS SECTIONS, GENERAL ARRANGEMENT |

The works are subject to detailed design to confirm final form and layout. Minor adjustments to the final position of the flood walls will be agreed with the planning authority if required. The top level of the flood walls will be no more than 100mm above the levels shown in the scheme drawings. The top level of the rock structures will be no more than 200mm above the levels shown in the drawings.

There are not anticipated to be any service diversions required for the works in Millport. The requirements for any works to or in the vicinity of services will be confirmed prior to construction. All services that may be affected by the operations will be protected as appropriate. Specifications and working methods will be agreed with the relevant undertakers prior to construction.

Operations to install new concrete flood walls and crest walls will include materials and surface finishes to complement the existing environment and Conservation Area, to the approval of the Planning Authority.

4.2 Offshore Breakwaters

Operation OB-01: Offshore breakwater between The Leug and The Spoig

A rock armour breakwater will be built between The Leug and The Spoig rock outcrops in Millport Bay. The breakwater will be 120m long or thereby and 60m wide or thereby at its base, with a crest level of +4.4m AOD, which is 9m or thereby above the sea bed level. The offshore breakwater will be constructed using primary rock armour of between 5 and 8 tonnes over an underlayer of 0.3 to 1.0 tonnes and a crushed rock core. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-OB-DR-C-1008 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 1 of 2 |
| PB4749-RHD-XX-OB-DR-C-1009 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 2 of 2 |
| PB4749-RHD-RR-OB-DR-C-1016 | OFFSHORE BREAKWATER, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation OB-02: Offshore breakwater between The Spoig and the south Eilean

A rock armour breakwater will be built between The Spoig and the south Eilean in Millport Bay. The breakwater will be 210m long or thereby and 70m wide or thereby at its base, with a crest level of +4.4m AOD, which is 12m or thereby above the sea bed level. The offshore breakwater will be constructed using primary rock armour of between 5 and 8 tonnes over an underlayer of 0.3 to 1.0 tonnes and a crushed rock core. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-OB-DR-C-1008 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 1 of 2 |
| PB4749-RHD-XX-OB-DR-C-1009 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 2 of 2 |
| PB4749-RHD-RR-OB-DR-C-1016 | OFFSHORE BREAKWATER, CROSS SECTIONS, GENERAL ARRANGEMENT |

4.3 Works on the Foreshore

Operation FW-01: Rock revetment to Clyde Street

A rock armour revetment will be constructed over the rock foreshore to the seaward side of Clyde Street for a length of 150m or thereby. The revetment will have a base width of 20m or thereby and a crest level of +4.0m AOD, which is up to 6m or thereby above the foreshore. The rock armour revetment will be constructed using primary rock armour of between 3 and 6 tonnes over a crushed rock core. The toe of the revetment will be secured by a concrete beam with steel dowels drilled and grouted into the rock foreshore. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-CS-DR-C-1003 | CLYDE STREET & STUART STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1012 | CLYDE STREET & GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation FW-02: Shore Connected Rock Armour Breakwater

A rock armour breakwater will be built over the rock foreshore at the junction of Millburn Street and Crichton Street. The breakwater will be 70m long or thereby and 25m wide or thereby along its trunk, increasing to 35m wide or thereby at the seaward end. The breakwater will have a crest level of up to +4.0m AOD, which is up to 5m or thereby above the level of the rock foreshore. The rock armour breakwater will be constructed using primary rock armour of between 3 and 6 tonnes over a crushed rock core. The toe of the revetment will be secured by a concrete beam with steel dowels drilled and grouted into the rock foreshore. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-CS-DR-C-1003 | CLYDE STREET & STUART STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1012 | CLYDE STREET & GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

4.4 Improvements to Coast Protection Structures

Operation WB-01: West Bay Road crest wall

Along part of West Bay Road, the existing parapet handrails will be removed and a reinforced concrete crest wall installed on top of the existing masonry sea wall, for a length of 60m or thereby. The crest wall will be up to 1.1m high above the existing promenade level. The crest wall will incorporate drainage holes. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-FW-WB-DR-C-1010 | WEST BAY ROAD & MILLBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation MS-01: Millburn Street crest wall

Along part of Millburn Street, from Crawford Street to Crichton Street, a reinforced concrete crest wall will be built along the existing cress verge, for a length of 65m or thereby. The crest wall will be up to 1.2m high above the existing promenade level. The crest wall will incorporate drainage holes. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-FW-WB-DR-C-1010 | WEST BAY ROAD & MILLBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation MS-02: Millburn Street access ramp

The existing concrete access ramp adjacent to Crawford Street will be replaced with a new ramp up to 2.5m wide and up to 30m long. Rock armour of between 3 and 6 tonnes will be installed along the seaward side

of this ramp. The rock armour protection will have a width of up to 10m and will be up to 3m high above the existing beach level. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-FW-WB-DR-C-1010 | WEST BAY ROAD & MILLBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation SS-01: Stuart Street crest wall

The existing concrete crest wall along Stuart Street will be repaired by encasing the landward face in concrete over a length of 175m or thereby. The height of the concrete encasement will be 1.0m or thereby; the height of this wall will not be increased. Additional drainage gullies may be added along Stuart Street. The location of this operation is shown on the drawings as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-CS-DR-C-1003 | CLYDE STREET & STUART STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1012 | CLYDE STREET & GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation JJ-01: Repairs to Strathwherry Jetty and Leck (Crocodile) Jetty

The existing jetty will be refurbished as required by repairing the deck slabs, repointing the masonry, infilling any voids and providing mass concrete toe protection. Concrete toe protection will be up to 1.5m wide and extend to up to 1.0m above the beach level. The location of this operation is shown on the drawings as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-CS-DR-C-1003 | CLYDE STREET & STUART STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-GS-DR-C-1004 | GUILDFORD STREET & GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |

Operation CS-01: Crichton Street concrete stepped revetment

The existing masonry and concrete revetment along the Crichton Street foreshore will be replaced with reinforced concrete steps. The new concrete stepped revetment will be 70m long or thereby, 8m wide or thereby and up 2.5m high. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-FW-CS-DR-C-1011 | CRICHTON STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation CH-01: Cross House concrete stepped revetment

To the west of the Cross House, the existing masonry revetment between the promenade and the foreshore will be replaced with reinforced concrete steps. The new concrete stepped revetment will be 140m long or thereby, 10m wide or thereby and up 3m high. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1013 | GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation MP-01: Marine Parade crest wall

Along Marine Parade, for a length of 150m or thereby to the south of the Kames bay promenade, the existing parapet handrail will be removed and a reinforced concrete crest wall will be built along the seaward side of the existing footway. The height of the crest wall will be up to 0.9m above the existing promenade level. The crest wall will incorporate drainage holes. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-KB-DR-C-1007 | KAMES BAY & MARINE PARADE, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-KB-DR-C-1015 | KAMES BAY & MARINE PARADE, CROSS SECTIONS, GENERAL ARRANGEMENT |

4.5 Flood Walls

Operation CS-02: Crichton Street flood wall

A new reinforced concrete flood wall will be built along the seaward edge of the footway along Crichton Street. The flood wall will be 90m long or thereby and up to 1.0m high. Access to the foreshore is included in the design of this flood wall, which also provides drainage. The flood wall will also incorporate drainage holes. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-FW-CS-DR-C-1011 | CRICHTON STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation GS-01: Glasgow Street flood wall (Garrison House)

A new reinforced concrete flood wall, incorporating seating, will be built between the promenade and footway from Clifton Street to College Street, for a length of 130m or thereby. The flood wall will be up to 1.0m high, and will incorporate drainage holes. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-GS-DR-C-1004 | GUILDFORD STREET & GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1013 | GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation GS-02: Glasgow Street flood wall

A new reinforced concrete flood wall, incorporating seating, will be built along the seaward side of the grass area to the east of College Street. The flood wall will be 40m long or thereby and up to 1.0m high. Local ground levels will be designed to enable drainage of residual overtopping and surface water around this wall. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-GS-DR-C-1004 | GUILDFORD STREET & GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1013 | GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation GS-03: Glasgow Street flood wall

A new reinforced concrete flood wall, incorporating seating, will be built along the landward side of the grass area to the west of Mountstuart Street. The flood wall will be 30m long or thereby and up to 1.0m high. Local ground levels will be designed to enable drainage of residual overtopping and surface water around this wall. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1013 | GLASGOW STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation GS-04: Glasgow Street flood wall (west of the Cross House)

From Mountstuart Street to the Cross House, a new reinforced concrete flood wall will be built. The flood wall will be up to 1.2m high and 70m long or thereby. The flood wall will incorporate drainage holes. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation CH-02: Flood wall to the Cross House garden

The southern part of the garden wall to the Cross House will be replaced by a new reinforced concrete flood wall. The flood wall will be 35m long or thereby and up to 1.8m high above the level of the Cross House garden. The flood wall will be up to 1.2m high above the level of the grass area seaward of the wall. The new flood wall will not be higher than the existing garden wall. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation CH-03: Flood gate at the Cross House

A flood gate up to 2m long will be installed between the Cross House garden wall (Operation CH-02) and the flood wall in front of the Cross House (Operation CH-04). The flood gate will be up to 1.0m high. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |

Operation CH-04: Flood wall in front of the Cross House

A new reinforced concrete flood wall, incorporating seating, will be constructed seaward of the Cross House, 5m or thereby from the property. The wall will be 25m long or thereby and up to 1.0m high. Local ground levels will be designed to enable drainage of residual overtopping and surface water past this wall. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation CH-05: Flood wall east of the Cross House

A new reinforced concrete flood wall will be built to the east of the Cross House. The flood wall will be 70m long or thereby and up to 1.7m high. Seating will be incorporated into the wall on the seaward side. The flood wall will incorporate drainage holes and local ground levels will be designed to enable drainage of residual overtopping and surface water. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

4.6 Raise Ground Levels

Operation GS-05: Raise ground levels to Glasgow Street

The level of the grass areas along Glasgow Street will be raised using earth fill to provide a crest level of up to 5.3m AOD, up to 1.2m above the existing level. A new concrete kerb will be installed around the seaward edge of these grass areas. The grass will be mounded to give a smooth profile and topsoil and grass seeding will be reinstated to these areas. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation KS-01: Raise ground levels to Kelburn Street

The level of the grass area adjacent to Kelburn Street will be raised using earth fill to provide a crest level of up to 5.75m AOD, up to 1.0m above the existing level. A new concrete kerb will be installed around the seaward edge of this grass area. The grass will be mounded to give a smooth profile and topsoil and grass seeding will be reinstated. The existing cycle path will be retained, with the falls and levels adjusted by resurfacing where required. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-GS-DR-C-1014 | GLASGOW STREET & KELBURN STREET, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation KB-01: Raise ground levels to Kames Bay

The level of the grass area along Kames Bay will be raised using earth fill to provide a crest level of up to 5.75m AOD, up to 1.8m above the existing level. The grass will be mounded to give a smooth profile and topsoil and grass seeding will be reinstated. The existing access paths and cycle path will be retained, with the falls and levels adjusted by resurfacing where required. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-KB-DR-C-1015 | KAMES BAY & MARINE PARADE, CROSS SECTIONS, GENERAL ARRANGEMENT |

Operation KB-02: Concrete stepped terrace to Kames Bay

Along the seaward side of the grass areas to Kames Bay, a new reinforced concrete stepped terrace will be installed between the raised grass area (Operation KB-01) and the promenade. The concrete steps will be up to 1.4m high above the promenade and up to 3.5m wide. This operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-RR-KB-DR-C-1015 | KAMES BAY & MARINE PARADE, CROSS SECTIONS, GENERAL ARRANGEMENT |

5 Description of the Ancillary Operations

The ancillary operations described in this section are not required for the Scheme to function, but are required to enable the operations to be carried out or to mitigate identified environmental impacts.

Ancillary Operation AW-01: Site compound and materials storage

A site compound and materials storage areas will be required to safely store construction plant and materials, and for the site offices. Fencing will be erected around each working area as required. The location of these compounds will be confirmed prior to construction and agreed with the Planning Authority. The location of the site compound may be outwith the working area for the scheme. A potentially suitable location for the main site compound has been identified as the grass area near to the children's playground on West Bay Road. The Quayhead (Millport Pier) might also be used for the temporary storage of construction plant and/or materials. Temporary works may be required to Millport Pier if this is to be used for materials delivery or storage.

Ancillary Operation AW-02: Dredging

Dredging may be required to remove loose sands and gravels from parts of the sea bed prior to constructing the breakwater. Up to 2m depth of sediment may need to be dredged over the footprint of the offshore breakwaters. It is currently expected that dredging can be limited to specific small areas of loose material, or pockets of deeper sediment. This will be confirmed prior to construction and agree with the relevant organisations.

Ancillary Operation AW-03: Aids to Navigation

Aids to navigation will be installed to mark the new navigation channel between the Leug and the shore. It is currently expected that the following aids to navigation will be installed:

- A navigation light (port hand or East cardinal) on The Clach;
- A navigation light (starboard hand) on The Leug;
- Hazard marker on the Crichton Street/Millburn Street rock breakwater;
- Discontinuation of the existing rear leading light and the light on The Eileans.

The locations and form of construction of the navigation aids will be agreed with the relevant organisations prior to construction.

Ancillary Operation AW-04: Works to Scottish Water assets at Clyde Street

Construction works may be required to modify the concrete surround to the Scottish Water sewer located along the upper foreshore between the southern end of Clyde Street and Crichton Street. The requirements for these works will be agreed with Scottish Water prior to construction. The location of this ancillary operation is shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |

Ancillary Operation AW-05: Access paths

Existing access paths will be retained. In some locations the access paths may need to be resurfaced or reconstructed to raise their level to the same as the adjacent grass areas, or to provide drainage routes for residual overtopping and surface water. The locations of the access paths are shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KB-DR-C-1007 | KAMES BAY & MARINE PARADE, PLAN, GENERAL ARRANGEMENT |

Ancillary Operation AW-06: Repairs to existing masonry revetments and sea walls

The existing masonry revetments and masonry and concrete sea walls throughout Millport will be repointed and any voids infilled. Additional mass concrete toe protection may be provided if required. This ancillary operation will reduce the risk of failure of the existing structures. Concrete toe protection will be up to 1.5m wide and extend to up to 1.0m above the beach level.

Ancillary Operation AW-07: Concrete Access Steps

New reinforced concrete access steps will be constructed to replace the existing access steps to the beach along Glasgow Street at two locations. The new access steps will be up to 2m wide and up to 2.5m high. Additional beach access steps may be added at locations to be agreed with the Planning Authority. The locations of the existing steps are shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|--|
| PB4749-RHD-XX-GS-DR-C-1004 | GUILDFORD STREET & GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |

Ancillary Operation AW-08: Promenade resurfacing

The promenade will be resurfaced in those areas where works will be undertaken adjacent to the promenade. Where necessary the promenade levels will be raised to minimise the height of the adjacent flood walls.

Ancillary Operation AW-09: Handrails

New handrails may be installed as required for the concrete stepped revetments (Operation CS-01 and Operation CH-01) and the concrete stepped terrace (Operation KB-02), to the agreement of the planning authority. Additional handrails will be installed or replaced elsewhere if required by the planning authority.

Ancillary Operation AW-10: Drainage improvements

Drainage through and/or past the concrete crest walls and flood walls will be included in the detailed design. This will primarily include modifying the falls and levels of surfaces as necessary so that existing drainage flow paths are maintained. Holes through the flood walls and crest walls and new drainage gullies will be included where required.

All active outfalls which discharge on the foreshore will be surveyed prior to construction, and, if required, non-return devices will be fitted to those outfalls. Any redundant outfalls may be removed, on agreement with the statutory undertaker.

Ancillary Operation AW-11: Signage

Signs will be provided to warn of the risks of climbing on the rock armour structures, and of the impact to the natural environment of landing on the Eileans. Interpretation boards describing the features of the local area will be installed in locations throughout Millport, to be agreed with the planning authority.

Ancillary Operation AW-12: Landscaping

The operations along Glasgow Street and Kames Bay will be finished with a scheme of planting and landscaping, to complement the existing environment and Conservation Area, to the approval of the Planning Authority. This will include reinstating the grass areas, adjusting the levels if required. Existing trees will be retained if possible, and any trees that are removed in order to undertake the operations will be replaced.

6 Land

The land which the Council considers may be affected by the Operations, or which the Council will be required to enter for the purposes of carrying out the Operations is as shown on the drawings marked as listed below:

| Drawing Number | Drawing Title |
|----------------------------|---|
| PB4749-RHD-XX-XX-DR-C-1001 | LOCATION PLAN AND GENERAL ARRANGEMENT |
| PB4749-RHD-XX-WB-DR-C-1002 | WEST BAY ROAD, MILLBURN STREET, CRICHTON STREET & CLYDE STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-CS-DR-C-1003 | CLYDE STREET & STUART STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-GS-DR-C-1004 | GUILDFORD STREET & GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-GS-DR-C-1005 | GLASGOW STREET, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KS-DR-C-1006 | KELBURN STREET & KAMES BAY, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-KB-DR-C-1007 | KAMES BAY & MARINE PARADE, PLAN, GENERAL ARRANGEMENT |
| PB4749-RHD-XX-OB-DR-C-1008 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 1 of 2 |
| PB4749-RHD-XX-OB-DR-C-1009 | OFFSHORE BREAKWATER, PLAN, GENERAL ARRANGEMENT, SHEET 2 of 2 |

7 Environmental Impact

The flood protection scheme is likely to have a significant effect on the environment and an environmental impact assessment has been undertaken. The findings of the environmental impact assessment have been incorporated into an Environmental Statement which is included with the scheme documents.

8 Statement of Costs

The estimated cost of the Scheme, to include all operations detailed above, is twenty five million three hundred and ninety five thousand seven hundred and seventy eight pounds (£25,395,778).



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