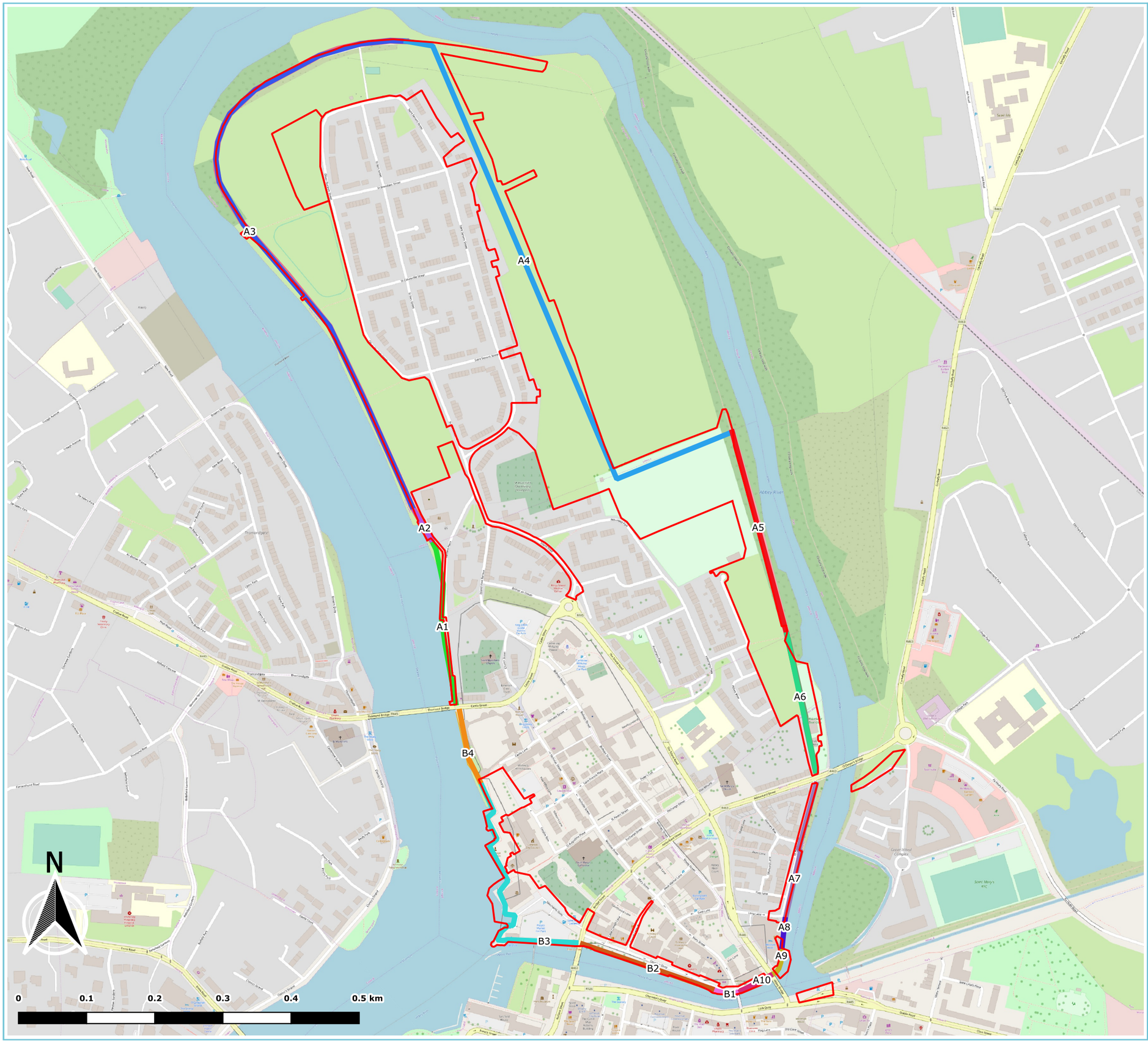

Legend

- Site Boundary

Flood Cell Sub-Areas

- A1 - Thomond Bridge and Verdant Place
- A2 - Verdant Place Steps and Crèche
- A3 - North West Embankments
- A4 - North East Embankments
- A5 - Star Rovers to Athlunkard Boat Club
- A6 - Athlunkard Boat Club
- A7 - Sir Harry's Mall
- A8 - Absolute Boardwalk
- A9 - South of Boardwalk to Abbey Bridge
- A10 - Abbey Bridge to Baal's Bridge
- B1 - George's Quay
- B2 - George's Quay
- B3 - Potato Market and Civic Buildings
- B4 - King John's Castle

KING'S ISLAND
FLOOD RELIEF SCHEME

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Natura Impact Statement
Figure A.3 - Flood Cell Sub Areas

Drawn by: ELR	Scale: 1:5500
Checked by: ES	
Approved by: BOC	
File Name:2015s3353_current_defences_20190610	
Status: Current	

B Description of Proposed Development

B.1 Proposed Option

The proposed development is a series of flood defences positioned around King's Island comprising both new and upgraded flood walls (incorporating transparent panels in the urban areas) and earth embankments plus associated public realm improvements. It is discussed in detail below.

B.1.1 Area A1 - Thomond Bridge and Verdant Place (Ch 0+00 to 0+260)

Area A1 extends north from Thomond Bridge along Verdant Place to where the footpath on the western side of the island meets the road. Flood defence works were carried out along this length of Verdant Place in 2017. The existing wall was raised by 0.6m and reinforced from the inside, and then was capped with concrete coping. The inside of the wall (road site) of Verdant Place was resurfaced with a stone finish to resemble the outside of the wall (river side).

The southern, smaller section of the wall, which is lower than the northern section, has not yet been altered as the ground is above the flood defence level for this area.

A1 Design Proposal

Currently, the concrete coping is visually intrusive, as it is much lighter in colour compared to the rest of the wall, especially when viewed from the river side. To resolve this, it is proposed to paint the existing coping and new southern coping with a darker shade of grey to blend in with the wall, as shown in photomontage 2. Note photomontage are included in a separate volume.

Verdant Place drainage has been addressed as part of the initial Advanced Contract as undertaken by Wills Bros Ltd. in 2016.

A new coping and protruding railing to meet the required guarding height will be added, and the old safety railing will be removed.

A1 Drainage Design

Verdant Place drainage has been addressed as part of the initial Advanced Contract as undertaken by Wills Bros Ltd. in 2016. No further construction works are proposed.

B.1.2 Area A2 - Verdant Place Steps and Crèche (Ch 0+260 to 0+365)

A2 Existing Condition

Behind the creche, an old embankment exists which is in poor repair and is located on the boundary of the SAC. Between the crèche fence and the embankment there is a footpath which is approximately 1.5m wide. The Verdant Place Steps are located just to the south west of the creche and lead down to the perimeter edge of the River Shannon. The flood upgrade works carried out in 2017 included the addition of a temporary concrete barrier where the Verdant Place steps are located, and the addition of an access staircase over the wall which leads down onto the steps.

A2 Design Proposal

Beyond the crèche, there is not enough space to accommodate an embankment between the walkway without encroaching into the SAC. It is therefore proposed instead to replace the old embankment and temporary concrete barriers with a new reinforced concrete wall, approximately 70m in length. This stretch of wall will require piled foundations due to the poor ground conditions in the area. The wall will be designed to match the rest of the RC wall along Verdant Place and with stone facing on both sides. The exposed coping will be painted a darker grey colour to match the other side at Verdant Place. The access staircase will be left in place to provide access over the wall and down to the Verdant Place steps, as it is used by locals in the area for recreation and views to the River Shannon. The proposed wall would will extend northward from the crèche and up to the adjacent next proposed embankment (described in the following section) and will be completed when it meets a ground level of 5.3m. The existing footpath will be raised and resurfaced to tie in with the existing walkway and the proposed new walkway along the proposed new embankments. The raising of the existing walkway will also provide views of the River Shannon. Street lighting will be provided along this stretch with columns 6m in height, which will be consistent with the lighting proposed along the proposed embankments around the north of the island.

A2 Drainage Design

There is an existing storm outfall immediately west of St Mary's Crèche and Community Centre. The existing tideflex valve is damaged and will be replaced as part of the main King's Island Flood Relief Scheme works. An overflow will be provided to the filter drain to the north to cater for pluvial events while the outfall is surcharged.

Refer to Drainage drawings 2015s3218-001 and 2015s3218-002 provided in Volume 3.

B.1.3 Area A3 - North West Embankment (Ch 0+365 to 1+250)

A3 Existing Condition

There is currently an existing embankment encircling the north of the island and an associated footpath. Approximately 520m of the existing embankment is located within the SAC. The crest of the embankment is formed by large sandbags which were installed as temporary flood defence measures during previous high flood events, however many of these sandbags are damaged and no longer provide adequate defence. There is an open drain on the eastern side of the existing embankment which currently contains a protected species, pondweed (*Groenlandia densa*).

A3 Design Proposal

A new earth embankment is proposed along 885m of the northwest perimeter of the island, set back on the inside of the existing embankments. The top of the embankments will be at the FDL height of 5.3m, constructed of impermeable clay, with a top width of circa 5m. Local widening points will also be constructed to allow for the inclusion of street furniture by LCCC at a later date. The clay will slope down at a 1 to 3 slope on both sides. The embankments will be graded and surfaced with landscape fill and topsoil respectively, at a slope varying between 1:10 and 1:30 on the side of St. Mary's Park, and sloped downward so that the end meets the top of the existing embankment. Overall, the total width of the embankment will range from 16 to 70m but will vary at different locations and is designed to blend into the open space in St. Mary's Park. The surface will be seeded with meadow grassland. A new bitmac footpath (3m wide) is proposed along the top of the embankment, with breakout areas to allow street furniture in the future. Additional connecting paths are proposed to connect the embankment to the St. Mary's Park housing estate to the east and south. Street lighting (columns 6m high) is proposed along the outside of the walkway, which will be directed inward and away from the SAC.

The proposed embankment will envelop the existing drainage ditch to the west and the open drain to the east which currently contains the protected pondweed, and filter drains are proposed on the inside of the proposed embankments. A new open drain is also proposed along the northwest corner of the island on the inside of the proposed embankment. The open drain will allow pondweed (Groenlandia densa) to be translocated under licence from the existing ditch.

It is proposed to provide an access ramp adjacent to the embankment to allow fishermen access to existing mooring points in the area between Ch. 0+850 and 0+950.

A3 Drainage Design

There is an existing outfall to the River Shannon from an existing open drain on the inside of the existing flood embankment, with the outfall location towards the north-west corner of the island. This outfall will be decommissioned, and a new outfall will be constructed. The new outfall location will be at the southern end of a new open drain on the inside of the new flood embankment which is required to translocate the opposite leaved pondweed in the existing open drain. A filter drain at the toe of the new flood embankment will run from the filter drain to the north of St. Mary's Crèche towards the new open drain. A second open drain to the north of the island will capture runoff from the embankment from the west of the handball alley to the proposed open drain.

Refer Drainage drawings no. 2015s3218-003 to 2015s3218-004 provided in Volume 3.

B.1.4 Area A4 - North East Embankment (Ch 1+250 to 1+920)

A4 Existing Condition

As with the north west of the island, there is an existing embankment in poor repair wrapping along the perimeter of the island (within the SAC) with badly damaged sandbags. A section of this embankment was breached in the past and has since been temporarily repaired with sheet piling that is protruding out of the ground by more than 2 meters in some places. There is a historic

remediated landfill to the rear of the houses along St. Munchin's Street and further south there is a Japanese Knotweed Bund, which must remain on King's Island.

A4 Design Proposal

The proposed embankment is to be approximately 850m in length and is to run along the rear of the houses on St. Munchin's Street. The existing sheetpiling will be cut down to 200mm below ground level and topped with a footpath with a width of 2.5m. Where the embankment is to meet the Japanese Knotweed bund, part of the northern end of the bund will need to be excavated and relocated to the southern part of the bund (not within the SAC) to allow the embankment to continue without the need for a retaining structure.

The dimensions of the embankment will be similar to the north west embankment, (5m top width in most areas except for at the sheetpiling location), composed of impermeable clay, subsoil and seeded with meadow grassland. As the embankments will be constrained for space (by the rear of the back gardens of the houses on St. Munchin's Street to the west, and the SAC to the east), they will not be graded to the same extent as in St. Mary's Park. Connecting paths will be provided to connect the houses to the path. Street lighting will be installed on the outside of the walkway, as with the north west embankments. Tree planting will be implemented between the houses and the embankment to limit the views into the properties from the raised ground level.

The existing footpath along the existing embankments on the eastern side of the island adjacent to the River Abbey will remain in place. The short length of track adjacent to and inside the sheet piling will be replaced with a bitmac footpath to form a defined pathway to encourage a straight walking route along the river edge. This will help avoid encroachment onto the SAC which borders the alignment of the sheet piles.

A4 Drainage Design

At present, overland flows from the rear of houses fronting St Munchin's Street discharge to the SAC and ultimately to the Abbey River via the ‘Green Lady’ outfall which is located towards the north-east of the Island.

Drainage from the inside of the new flood embankment will be conveyed to extended open drains from within the SAC. It is proposed that the outfall and header walls will be constructed outside of the SAC prior to extending the existing open drains to connect with same. The northernmost outfall through the eastern embankment will discharge at ground level outside of the SAC boundary. Non-return valves will be provided to all outfalls. The filter drain running along the inside of the embankment at the southern end of area A4 will discharge to the existing open drain to the north of Star Rovers.

Refer to Drainage drawing no. 2015s3218-005 and 2015s3218-006 provided in Volume 3.

B.1.5 Area A5 - Star Rovers to Athlunkard Boat Club (Ch 1+920 to 2+500)

A5 Existing Condition

The existing embankment and sandbags are in disrepair and continue along the perimeter of the island until the boundary of the Athlunkard Boat Club. There is an existing open drain running along the perimeter of the Star Rovers field.

A5 Design Proposal

To accommodate new embankments around the sports pitches, three of the pitches will be moved and reconstructed including an Astro-turf training pitch. The proposed embankment will extend approximately 400m around the sports fields along the northern and eastern sides until the boundary with the boat club. The SAC is very closely aligned along the northern and eastern sides of the Star Rovers FC pitches, therefore the embankment will be graded in between the edge of the pitches and the SAC boundary, and not encroach on the east-west open drain. The existing north-south open drain will be filled in, in order to provide a formation of for the proposed embankment. A badger sett will be destroyed when filling the open drain.

In order to provide sufficient space for the proposed embankment along the northern side of the sport fields, the AstroTurf pitch will be relocated south by approximately 17m. This will result in temporary disruption to the playing area during construction and the loss of 6 parking spaces and storage area on the western side accessed off Assumpta Park. A 2m high fence will be erected at the top of the embankment adjacent to the walkway, the fence will be located at the base of the

embankment adjacent to the AstoTurf pitch. High netting will also be erected behind the goals. A row of trees will be planted along the western edge of the sports area to filter visibility of training pitches for residents in Assumpta Park. The proposals in this area are illustrated in photomontages 4 and 5, Volume 4.

A5 Drainage Design

Drainage from the inside of the proposed new embankment both to the north and east of the Star Rovers pitch will discharge to the existing open drain at the south-east corner of the SAC. This drainage will also pick up any existing drainage to the existing playing pitches. A non-return valve will be provided to the proposed outfall.

Refer to drawing no. 2015s3218-007 provided in Volume 3.

B.1.6 Area A6 - Athlunkard Boat Club (Ch 2+500 to 2+655)

A6 Existing Condition

The existing boundary of the boat club is made up of concrete walls, stone walls, security railings and a security gate. On either side of the security gate are one-tonne sandbags and some gravel. There is a walkway that is also used by boat club user vehicles approximately one meter from the edge of the walls/railings, leaving a strip of grass, briars, elder and ivy.

There is currently a sewer drain outletting from the boat club directly into the Abbey River.

A6 Design Proposal

A new access track is proposed into the northwest corner of the boat club; the proposed embankment will be graded down from an elevation of 5.30m OD Malin to existing ground level of 4.20m AOD on the northern side of the boat club. The existing wall along the western side of the boat club will be raised to a height of 2.75m, it will be stone faced on the public footpath façade and plaster finish on the river side, it will be simplified in design to remove a stepped change in level. The proposal in this area is illustrated in photomontage 6, Volume 4.

The path will be graded down to the existing public footpath on the western side of the boat club wall, and the footpath will be widened to 3m for continuity with the rest of the new footpath around the island. Vehicle access will be extended as far as the existing boat club entrance to maintain the existing access route from back of 3 no. houses along Athlunkard Street.

A new sewer system for the boat club will be constructed. Sewage from the boat club will be redirected and connected to the main Limerick sewer system, which is directed to a treatment plant to the west of the city. A manhole will be installed at a depth of approximately 4m to complete these works. The existing foul sewer will be abandoned.

A6 Drainage Design

There are 2 outfalls to the Abbey River, one of which drains Abbey View estate and some local roads via a 600mm diameter culvert. This outfall has a tideflex valve in-situ. Inter-tidal storage will be provided via an underground concrete tank to temporarily store storm water during high tide conditions in the Abbey River.

The adjacent outfall is understood to be an overflow from a soakaway to the underside of the green open space fronting Lee Estate. This outfall will be fitted with a non-return valve to prevent inundation of the tide.

There are existing toilets and showers from Athlunkard Boat Club currently discharging to the Abbey River. As part of the Flood scheme works, such flows will be diverted and connected to the existing Limerick Main Drainage sewer which runs parallel to the western boundary of Athlunkard Boat Club.

To accommodate the softened side slopes on the inside of the proposed flood embankment, a number of existing foul manholes will be raised by c.1.5m.

Refer to drawing no. 2015s3218-008 and 2015s3218-009 provided in Volume 3.

B.1.7 Area A7 - Sir Harry's Mall (Ch 2+670 to 2+880)

A7 Existing Condition

An existing flood defence wall runs along the length of Sir Harry's Mall (approx. 216m) but does not reach the required height for the AEP 0.5%. There is a footpath running along the wall, and a wide road with one lane dedicated to parking in front of the houses along the Mall.

A7 Design Proposal

The existing wall will be raised to the flood defence level and strengthened, requiring excavation to construct the wall foundations. The wall will be finished to match the existing wall surfacing. At the north end of the Mall, the footpath will remain at the existing level with a width of 1m. To the south end, the footpath will be raised to maintain a 1.1m guarding height, and views to the river over the raised wall, and widened to 2m with accessibility ramps on either end and steps stepping down to the road level to improve pedestrian access in the area. A railing will be provided to protect pedestrians from the traffic on the road at the bottom of the steps. The road will be narrowed as a result of the widening of the footpath, and some parking spaces lost, however one lane of traffic and one lane of parking spaces will be available to accommodate the already one-way street. The proposal in this area is illustrated in photomontage 7, Volume 4.

A7 Drainage Design

Storm water drainage along Sir Harry's Mall is currently drained to the Limerick Main Drainage sewer via existing road gullies. Some road gullies will be relocated as part of the flood scheme works to accommodate the raised and stepped access on the inside of the existing flood wall which is to be raised by c.300mm.

Refer to drawing no. 2015s3218-010 provided in Volume 3.

B.1.8 Area A8 - Absolute Hotel Boardwalk (Ch 2+880 to 2+910)

A8 Existing Condition

The boardwalk is at a level of 5.1m OD Malin and meets the flood defence level.

A8 Design Proposal

The access landings at either end of the boardwalk have an existing level of slightly less than 5.1m AOD. As a result, it is proposed that they will be raised by 10cm to 5.1m OD Malin to meet the required flood defence level.

A8 Drainage Design

The existing drainage system will remain as it-is with existing gullies connected to the Limerick Main Drainage sewer.

B.1.9 Area A9 - Absolute Hotel Boardwalk to Abbey Bridge (Ch 2+910 to 2+960)

A9 Existing Condition

This 40m stretch is currently a parapet wall with a railing on top set at a height of 4.68m AOD with a walkway running between the wall and the Absolute Hotel.

A9 Design Proposal

The parapet wall is to be replaced with a reinforced concrete wall, to a height of 1.4m, and the railing will be removed. The new wall will be supported on piles through the existing wall. The existing wall will be cleaned, repairs, grouted and repointed to reduce water permeability. The new concrete wall will be clad to match the adjacent wall.

A9 Drainage Design

Drainage will remain as-is with existing gullies connected to the Limerick Main Drainage sewer.

B.1.10 Area A10 - Abbey Bridge to Baal's Bridge (Ch 2+965 to 3+020)

A10 Existing Condition

There is an existing masonry quay wall which runs along this 60m stretch of the Abbey River. There are three distinct sections of the wall which comprise different finishes. The western half of the wall meets the flood defence requirement height, and the eastern half does not.

A10 Design Proposal

The entire length of the wall will be replaced with a new concrete wall with masonry cladding at a maximum height of 1.4m, which will be surfaced to match the existing stone finish. A mass concrete backing wall will be constructed for support, as well as ground anchors for additional foundation strength. The existing wall will be cleaned, repairs, grouted and repointed to facilitate this construction. As the existing finishes will be retained, but are different on the eastern and western sides, a new pier is proposed to define the change between the sections of the wall. The proposal in this area is illustrated in photomontage 8.

A10 Drainage Design

The existing drainage system will remain as it is with existing gullies connected to the Limerick Main Drainage sewer. The existing 150mm diameter outfall will be replaced with a 225MM diameter pipe with a WaStop or similar installed.

Refer to drawing 2015s3218-013 provided in Volume 3.

B.1.11 Areas B1&B2 - George's Quay (Ch 3+035 to 3+265)

B1/B2 Existing Condition

The majority of the wall in this stretch (approximately 240m) is composed of a quay wall. The wall is broken in one place by the access to the pontoon opposite Barrington's Hospital, and in 3 places in the western part to form seating areas across from the Locke Bar. A 24m length of the existing wall is above the required flood height at the easternmost section but does not always provide the required guarding height of 1.1m. There are currently railings installed on the inside of this section. The remainder of the wall is below the required flood defence height level.

B1/B2 Design Proposal

The wall is to be replaced by a concrete wall (240m) to meet the flood defence level and achieve the pedestrian guarding height of 1.1m. The wall is to be built off the existing quay wall with ground anchors to provide additional strength. The ground anchors will be approx. 10m in length, to be cored through the existing wall to bedrock. The existing wall will be cleaned, repairs, grouted and repointed to reduce water permeability. The concrete wall will be interspersed with stretched of glass flood defence panels built off a mass concrete backing. Glass panels will be located in front of the stretch of restaurants beside the Locke Bar, two sections in front of the Limerick School of Art and Design, and a section east of Barrington's Hospital. Twelve trees of medium and high amenity value are located along this stretch, species include Common Lime, Norway Maple and Oriental Plane. Due to the high amenity value of the trees they will be protected, managed (crown raised and removal of basal sucker) and retained during the construction of the new concrete wall, hence the need for the proposed ground anchors.

The existing wooden pontoon has open access to George's Quay, and does not provide the required flood defence height. The pontoon will remain in place; however, the new wall will be built up around the pontoon with some glass panelling and new access steps over the wall. Flood gates were considered for this section to provide ramped access to the pontoon, however this proposal was rejected by LCCC.

As requested by LCCC, the existing steps down to the river will be cleaned and repaired. The proposal in this area is illustrated in photomontage 9.

Road raising at Bridge Street junction will also be carried out as a back-up flood defence in case of a flood gate failure in Area B3. The centre of the road will be raised to flood defence level and the surrounding road area sloped appropriately to meet this level.

B1 Drainage Design

The existing 150mm diameter surface water sewer will be upgraded to 225mm diameter and the existing outfalls will be abandoned, and the proposed sewer will instead discharge to the Abbey River via a new outfall to the west. A non-return valve will be provided on the outlet pipe.

Refer to drawing 2015s3218-013 provided in Volume 3.

B2 Drainage Design

The existing 150mm diameter sewers will be replaced with larger pipes. Gullies at the proposed ramp location on Bridge Street will convey flows from Bridge Street towards the proposed network at Georges Quay and discharge to the Abbey River via the existing outfall. Gullies and rainwater downpipes from the buildings along Creagh Street will be disconnected from the existing LMD combined sewer and diverted to a new SW sewer along the street. An overflow to the LMD sewer will be provided within the final manhole at a level of 3.75m, which is located at the lowest point along the street. This will allow the sewer network to surcharge prior to overflowing in the event of a large pluvial event coinciding with a tide level of 3.75m higher in the Abbey River.

Refer to drawing 2015s3218-013 provided in Volume 3.

B.1.12 Area B3 - Potato Market to King John's Castle (Ch 3+275 to3+705)

B3 Existing Condition

There is an existing cantilevered viewing platform in the Potato Market and the Sylvester O'Halloran bridge access, which are below the required flood protection level. The Curragower Boat Club entrance and the Court House boardwalk/wall are also below the required flood level.

A railing runs along the quay edge, alternating with sections of quay wall, and terminates in the corner adjacent to the outer wall of King John's Castle.

B3 Design Proposal

The cantilevered viewing platform in the Potato Market will be replaced with flood resistant glass panelling, supported by a mass concrete backing wall. At the existing access opening to Sarsfield bridge, a flood wall will be constructed to cover the opening, with steps over the top and ramped access. The walls along the Potato Market and the boat club will be repaired where necessary to achieve the required flood levels. A new concrete L-wall will be constructed adjacent to the existing wall at locations where the existing wall has insufficient strength for the required flood load. The proposed flood defence ramp will be offset 0.5m from the Potato Market. A new flood wall will extend from the high point of the riverside adjacent to the Curragower boat club slipway. New sewer and drainage proposals will be completed at the Potato Market.

An automatic flood gate will be constructed at the entrance to the Curragower club which will be triggered by an ultrasound level signal. A hinged automatic flood gate is proposed with a manual override option.

It is proposed to raise the road level of Bridge Street (between the Potato Market and the Locke Bar) to ensure that George's Quay is protected in the event that the flood gate at the Curragower Boat Club fails to raise during a flood event.

Along the cantilevered boardwalk by the Court House, glass panelling is proposed. The walkway will be moved back slightly toward the Court House, leaving sufficient distance between the building and the walkway with a railing/fence in between so that there is a separation between the Court House windows and the public space. This glass panelling will extend to the northern boundary of the Court House. A mass concrete backing wall will be installed for a foundation.

Beyond the Court House, further glass panelling is proposed until King John's Castle is encountered. A mass concrete backing wall will be constructed as a foundation for the glass panels. Some sections of wall, including those associated with the former Brewery Mill, will be retained and the glass panels constructed inside of the parapet walls. The proposed wall below the panelling will be cladded to match the existing wall. The proposals in this area is illustrated in photomontages 10 and 11.

B3 Drainage Design

There are a number of outfalls discharging to the River Shannon from the Potato Market, Courthouse and the rear of City Hall.

There are 2No. outfalls from the Potato Market carpark to be made redundant as part of the flood scheme works. A new storm outfall will be provided to accommodate storm drainage from the Potato Market carpark and the access road in/out of Merchants Quay. A by-pass petrol interceptor will be constructed to enhance the water quality prior to discharge. An inter-tidal storage tank will be constructed to prevent flooding on the surface during high tide conditions in the Shannon. This inter-tidal storage tank will replace the existing tank within the car park.

The existing outfall to the south-west of the civic building will be increased in size with a WaSTOP or similar approved non-return valve installed. An overflow within the final manhole will convey flows to the proposed inter-tidal storage tank to the north while the outfall is surcharged.

The existing outfall to the rear of the City Hall will be increased in size with a WaSTOP or similar approved non-return valve installed. Inter-tidal storage for existing paved areas behind the new glass panel and the wider contributing area will be provided adjacent the outfall such that flooding on the surface does not occur during high tide conditions in the Shannon.

The existing outfall to the south-west corner of King Johns Castle will be increased in size with a WaSTOP or similar approved non-return valve installed. As this outfall drains existing car-parking predominantly to the west of City Hall, a by-pass petrol interceptor will be constructed to enhance the water quality prior to discharge.

Refer to drawings 2015s3218-011 and 2015s3218-012 provided in Volume 3.

B.2 Outline Construction Method Statement

C Ecology

C.1 Location of Fisheries Studies Area at King's Island, Limerick City