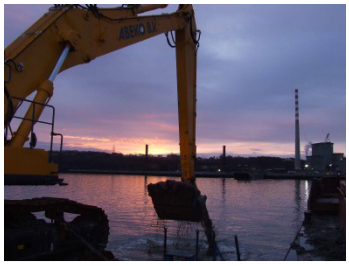
Appendix A15.6

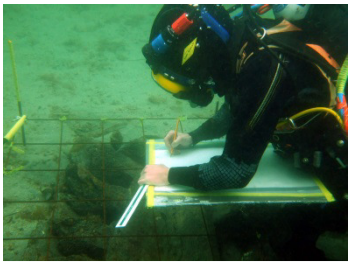
Underwater Archaeological Impact Assessment (UAIA) BusConnects Dublin – BusConnects Project Proposed Boardwalks Custom House Quay and North Wall

Underwater Archaeological Impact Assessment (UAIA)
Proposed Boardwalks Locations
Custom House Quay and North Wall Quay
River Liffey, Dublin City

As part of the
Ringsend to City Centre Core Bus Corridor Scheme (of the BusConnects Dublin - Core Bus Corridor Infrastructure Works).

21D0050, 21R0110



Underwater Archaeological Impact Assessment (UAIA)
Proposed Boardwalk Locations
Custom House Quay and North Wall Quay
River Liffey, Dublin City

As part of the
Ringsend to City Centre Core Bus Corridor Scheme (of the BusConnects Dublin - Core Bus Corridor Infrastructure Works).

21D0050, 21R0110

23 November 2021

Client **ROD for Jacobs/NTA**

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CONTENTS

LIST OF ABBREVIATIONS

ADCO	The Archaeological Diving Company Ltd
ACA	Architectural Conservation Area
DCIHR	Dublin City Industrial Heritage Record
DHLGH	Department of Housing, Local Government and Heritage
DGPS	Differential Geographic Positioning System
DSV	Dive Support Vessel
ING	Irish National Grid
ITM	Irish Transverse Mercator
LWM	Low Water Mark
E	Easting
N	Northing
NGR	National Grid Reference
NIAH	National Inventory of Architectural Heritage
OD	Ordnance Datum
OS	Ordnance Survey
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
SSDE	Surface Supplied Diving Equipment
SMR	Sites and Monuments Record
UAIA	Underwater Archaeological Impact Assessment
UAU	The Underwater Archaeology Unit

EXECUTIVE SUMMARY

The Archaeological Diving Company Ltd (ADCO) was appointed by Roughan & O'Donovan, on behalf of Jacobs and the National Transport Authority (NTA), to carry out an Underwater Archaeological Impact Assessment (UAIA) at three (3) quayside/riverbed impact locations associated with the Ringsend to City Centre Core Bus Corridor Scheme (of the Bus Connects Dublin - Core Bus Corridor Infrastructure Works).

The Bus Connects project proposes continuous bus lanes in both directions on Custom House Quay and the North Wall Quay, between Matt Talbot Bridge and Tom Clarke Bridge. In order to accommodate this, the construction of boardwalk structures at two (2) locations on the north side of the River Liffey is required. These include Custom House Quay (NIAH 50060556), adjacent to Commons Road, and the North Wall Quay (RMP DU018-020564-/ NIAH 50010011), adjacent to Excise Walk.

This endeavour will impact these structures at three (3) locations, as indicated below:

- Custom House Quay, a 94.61m section of extending between ITM 716672E, 734449N and ITM 716737E, 734448N.
- Custom House Quay, a 6.35m section of extending between ITM 716756E, 734451N and 716762E, 734451N.
- North Wall Quay, a 58.33m section of the extending between ITM 716672E, 734449N and ITM 716737E, 734448N.

The UAIA comprised systematic visual inspection of the in-water and quayside extent of the proposed boardwalk structures. The assessment sought to record riverbed topography, assess the potential of riverbed deposits to retain archaeological material, and identify any additional features/structures of archaeological or historic significance that are present. This work also included detailed recording of quayside façades and a walkover of the adjacent *campshire* areas. In addition, targeted metal-detection was employed to help assess the riverbed and highlight any metallic concentrations present.

The assessment areas lies within a historically rich landscape, highlighted by the development of this section of the River Liffey for maritime use in the late eighteenth- and early/mid-nineteenth century; the opposing Custom House Quay/ North Wall Quay and City Quay/ Sir John Rogerson's Quay forming tangible reminders of that maritime industrial past.

The on-site work was carried out on 19th June 2021, under licence from the DHLGH; licence numbers 21D0050, and 21R0110.

The current report, based on the current level of information available, recommends that further onsite archaeological assessment of the riverbed areas in advance of construction is not required. However, it is recommended that archaeological monitoring of ground/ riverbed disturbances during construction be undertaken, by a suitably qualified and experienced maritime archaeologist, with the proviso to resolve fully any archaeological material observed at that point. In particular, archaeological monitoring of all quayside disturbances will be required; allowing further recording of those sections of quayside impacted by the development to be made. Moreover, this work should include an assessment and full recording of the internal fabric of the quay structures, as/when it becomes exposed. In addition, any quayside masonry or associated fixtures/fittings (e.g. wrought iron mooring hoops/hooks) that are to be removed as part of the development should retained and subject to additional recording.

The recommendations in the report are subject to the approval of the National Monuments Service at the Department of the Housing, Local Government (DHLGH).

LIST OF FIGURES

LIST OF PLATES

1.0 INTRODUCTION

The Archaeological Diving Company Ltd was appointed by Roughan and O'Donovan, on behalf of Jacobs and the National Transport Authority (NTA), to carry out an Underwater Archaeological Impact Assessment (UAIA) at two (2) quayside locations on the north side of the River Liffey, Dublin City (Figure 1). This work was carried out as part of the pre-planning requirement for the Ringsend to City Centre Core Bus Corridor Scheme.

The project proposes to create continuous bus lanes in both directions on Custom House Quay and the North Wall Quay, located between Matt Talbot Bridge and Tom Clarke Bridge. In order to accommodate this, the construction of cantilevered boardwalk structures will be required at two (2) quayside locations. These include Custom House Quay (NIAH 50060556), adjacent to Commons Road, and the North Wall Quay (RMP DU018-020564-/ NIAH 50010011), adjacent to Excise Walk.

ADCO is familiar with the section of the River Liffey under assessment, having carried out previous underwater archaeological impact assessments within the vicinity, including for the following projects: Dublin Bridges project (2016), the Dodder Opening Public Transport Bridge project (2019), and the Dublin Dockland Area Opening Bridges (Blood Stoney Bridge) project (2019).

The archaeological current work was carried out in accordance with Section 5 of the National Monuments Act (2004 Amendment) by a team of underwater archaeologists and a certified surveyor on the 19th June 2021, under licence from the DHLGH; licence numbers 21D0050 and 21R0110. The UAIA included the following items:

1. Comprehensive underwater assessment, including targeted metal-detection, of the riverbed adjacent to the proposed boardwalk locations, extending the survey beyond the potential construction footprint at each location. This work recorded riverbed topography and provides a detailed account of the existing riverine environment.
2. Systematic inspection of the quay walls, *campshires*, and any associated quayside features present.
3. Detailed recording (laser scanning) of the upper parts of the quay wall, covering the proposed impact areas.

The survey was position-fixed using Total Station and DGPS recording, with the resulting data referenced to Irish Transverse Mercator and to Malin Head Ordnance Datum.

The UAIA report presents the following: a desktop review of the development area (Section 3.0); the findings from the onsite work (Section 5.0); the methodology applied to that work (Section 4.0); assess the level of impacts arising from the proposed development (Section 6.0); and makes general recommendations for future archaeological mitigation associated with the development (Section 7.0). An outline of the proposed boardwalk development is provided below in Section 2.0.

2.0 PROPOSED DEVELOPMENT

As part of the Bus Connects project, continuous bus lanes are proposed in both directions on Custom House Quay and the North Wall Quay, between the Matt Talbot Bridge and the Tom Clarke Bridge. To facilitate this, it is planned to relocate the historic *Scherzer* Bridges that constrain the road width at the crossing of the canal entrances to George's Dock and the Royal Canal, at Spencer Dock. These structures will be repositioned to either side of the new bus and general traffic lanes, allowing a pedestrian footway and cycle track to pass through them instead. In order to protect bus priority, right-turning restrictions are proposed at most junctions along the north quays, where alternative access is available from Seville Place and Sheriff Street Upper to the north. The two-way cycle infrastructure on the North Wall Quay will be enhanced and will continue along the full extent of the north quays. A general landscaping arrangement is proposed along the north quays, with two lines of trees along the proposed cycleway. There are width constraints at the location of two small restaurant buildings at the Excise Walk junction, where a new boardwalk is proposed to overhang the river for a wider pedestrian riverside space. Another boardwalk is also proposed upstream alongside Custom House Quay.

The larger of the two boardwalks (located alongside Custom House Quay) is to comprise a 6m wide deck space that will extend over the river channel for a distance of 4.2m (Figure 2). The overall structure is to measure 120m length, the majority of which will be cantilevered from the quay. However, a small section, located on the east side of the boardwalk area, will require additional support. This will be in the form of three (3) tubular mono-piles measuring *c.* 900mm in diameter.

The smaller boardwalk is to be located downstream, cantilevered off the North Wall Quay at a point adjacent to Excise Walk (Figure 3). The structure is to measure 58.33m in length and will include a 6.9m wide deck that overhangs the river channel by 3.2m. No in-river supports are required for this structure.

3.0 RECEIVING ENVIRONMENT

This following section provides a concise account of the heritage asset surrounding the proposed quayside impact areas at Custom House Quay and North Wall Quay. For a detailed account of the wider heritage landscape present, the reader is directed to the Draft EIAR Chapter prepared for the project by Courtney Deery Heritage Consultancy Ltd.[1]

[1] EIAR (Draft) Volume 2, 'Ringsend to City Centre Bus connects Scheme, Chapter 15-Archaeology and Cultural Heritage', pp.8-27.

The River Liffey rises at an elevation of 540m above sea level near Kippure in the Wicklow Mountains, *c.* 20km south of Dublin. The river forms a large arc as it flows westward, then northward, and finally eastwards through Dublin City to its confluence with the Irish Sea at Dublin Bay. It flows over a range of different geological formations; from granite, to sandstone, to sandstone-limestone and finally pure limestone. The River Liffey has a drainage catchment area of just over 1380 km². Extensive reclamation of the river floodplain has been undertaken since the seventeenth-century. This reclamation and adaptation of the natural environment was extended to the river as it flowed through the city; the river currently being delineated by a series of eighteenth and nineteenth-century quayside structures.

Maritime activity within the River Liffey is documented from the eighth-century onwards and it is clear that the area under assessment has a long history of human landscape intervention, adapting the topography of the river to conditions favourable for navigation and anchorage of vessels within the area. City Centre excavations at Winetavern Street and Wood Quay uncovered large wooden revetments dating to around 1200AD. These structures are thought to form part of an early reclamation and dockside area at Wood Quay.[2] In addition, extensive seventeenth to nineteenth-century land reclamation was undertaken, dramatically changing the landscape along the river's mouth. Indeed, this reclamation process coupled with the eastward shift in bridge construction across the Liffey resulted in the movement of port and shipping activity from the city centre to the easternmost parts of the river. Early maps of Dublin, including John Speed's Map of 1610 and Hermon Moll's of 1714, show a largely unaltered estuary environment. In contrast, it is evident in John Roque's map of 1756 that extensive reclamation has taken place with the construction of the north wall (1710-1718), facing the river channel, and the East Wall (1718-1729); running northwards along the line of the present day East Wall Road. These constructions provided a tidal barrier behind which extensive land reclamation could take place, a process that lasted until the early part of the nineteenth-century and significantly extended the land mass on the north side of the River Liffey. As a result, a total of 263 plots of land, ranging in size from an acre to three-and-a-half acres, were created and sold by the City Council.[3]

This historic reclamation process has been highlighted by recent excavations undertaken along Ormond Quay and Custom House Quay. These excavations have produced evidence of seventeenth-century reclamation deposits with eighteenth-century structures built above (see Section 3.7). Moreover, excavations at the site of Building C, Spencer Dock, North Wall Quay (Excavations Bulletin Entry 2004:565) identified three principle phases of activity.[4]

[2] Halpin, Andrew, *The Port of Medieval Dublin*, Four Courts Press, Dublin, pp.179-80.
[3] De Courcy, J.W., *Anna Liffey, The River of Dublin*, (O'Brien Press, Dublin 1988), p.47.
[4] McQuade, Melanie, *'Building C, Spencer Dock, North Wall Quay, Dublin'*, in Isabel Bennett (ed.), Excavations 2004, (Dublin, 2007), 128-9.565; McQuade, Melanie, *'Gone Fishing'*, Archaeology Ireland, (2008), 22 (1), 8-11.

These included a series of Late Mesolithic fish traps located on the old shoreline of the Liffey channel, artefacts from the eighteen and nineteenth-century reclamation of that area, and structures from the nineteenth and twentieth-century development of that reclamation land.

Further development within the vicinity included the construction of a new Custom House in 1791, Custom House Dock in 1796 (DU18-020564A), a boat-building/repair yard and Patent Slipway, completed in 1833, and the construction of Dublin's first dry-dock, completed in 1860. Prior to these constructions, the majority of the port trade took place on the south side of the river, however, the establishment of the Custom House and associated quayside structures facilitated a lasting shift in port development to the north side of the waterway (Plate 1).

Construction of the Grand Canal began in 1755 to link Dublin with the River Shannon to the west and the River Barrow to the southeast. It forms the southernmost of two waterways that almost encircle the inner city of Dublin; the other being the Royal Canal located on the north side of the River Liffey. The canal reached Ringsend in 1791 and the Grand Canal Docks were completed in 1796.

The present day river area, extending between Talbot Bridge and the East Link Bridge (Tom Clarke Bridge), is delineated by four (4) quayside structures, constructed at the end of the eighteenth and in the early part nineteenth-century. Custom House Quay leading onto North Wall Quay forms the north side of the river channel, with City Quay leading onto Sir John Rogerson's Quay the south. A chronology relating to the construction of the various quay structures located along the River Liffey is tabulated in Appendix 1.[5]

3.1 Cartographic Information

John Rocque's Maps of 1756 and 1760 show extensively reclaimed areas of river estuary with increased use/development of water-frontage along the river (Figure 4).[6] Aston Quay, Georges Quay, and Sir John Rogerson's Quay delineate the south side of the river, with Bachelors Walk and the North Wall Quay to the north. In addition, large scale reclamation works are evident on the north side of the river estuary with the construction of the North Wall (1710-1718) and the East Wall (1718-1729), allowing for extensive reclamation of the area in the seventeenth and eighteenth centuries.

A large amount of shipping is depicted along these quays, alluding to the navigable nature and concentrated use of the river at that time (Plate 2). These maps depict the river area prior to construction of the Grand Canal Docks, at a time when little or no development had taken

[5] De Courcey, J.w., *Anna Liffey: The River of Dublin*, O'Brien, Dublin, 1988, 16
[6] John Roque, *Exact Survey of the City and Suburbs of Dublin, 1756.*

place on the southern side of the Liffey. According to the mapping, the eastern side of the River Dodder was largely undeveloped and no housing or warehouse plots were present along the south side of the River Liffey; the present day location of Sir John Rogerson's Quay. However, the mapping does depict a quay wall at this location, constructed in 1716 in order to prevent flooding and allow reclamation of the adjacent mudflats; a process of reclamation that is clearly evident by 1760.

Greater development is depicted for the north side of the Liffey, the river channel being delineated by a quayside that runs the length of the North Wall, behind which the reclaimed land (*The North Lotts*) has been subdivided by the insertion of a grid-iron street pattern annotated with the following (north-south orientated) streets: '*Commons Street'*, '*Guild Street'*, '*Wapping Street'*, and '*Fish Street'*.

The First Edition (1837) OS mapping shows wide-scale development across the north and south sides of the River Liffey, depicting a similar ground plan and street layout to that of the present-day (Figure 5). Three (3) docks are present to the west and northwest of the assessment area; '*Old Dock'*, '*Georges Dock*', and the '*Inner Dock*'. Downstream, a sea-lock providing access to the '*Royal Canal Docks*' is also depicted. A '*Sugar Store*' and '*Tobacco Store*' are located either side (east and west) of George's Dock.

Boat/ vessel access to Old Dock, George's Dock, and Royal Canal Dock is via the main river channel, while the Inner Dock comprises a secondary dock, accessed from north side George's Dock. A series of narrow bridge structures are shown at the lock entry points, providing access between Custom House Quay and North Wall Quay.

A timber yard, '*Queen's Timber Yard*', and an '*Excise Store*' are shown to occupy the waterfront area immediately to the north of the quayside assessment areas. No bridges or in-river structures are shown for this stretch of the River Liffey, although two (2) river crossing points are depicted, annotated '*Ferry*'; in operation from City Quay to Custom House Quay and Sir John Rogerson's to North Wall Quay.

Intertidal mudflats are shown, on the south side of the river, extending from the base of the quay walls (ranging between 14m-21m in width); while none are depicted alongside Customs House Quay or the upstream part of the North Wall Quay. This indicates the presence of deeper water along the north side of the river channel, perhaps corresponding with increased marine traffic on this side of the river.

It is clear from the OS First Edition mapping that the focus of maritime activity in the early-mid nineteenth-century was on the north side of the river, extending between the Custom House and the newly built Patent Slip at East Wall Quay.

The OS 25-inch map (1906-1909) depicts continued development on the north side the river, primarily for industrial reasons, much of which is focussed across land extending eastward from Commons Street (Figure 6). This development includes a series of '*Goods Sheds*' and '*Bonded Stores*'; the establishment of a railway station comprising the '*North Wall Station*', '*Goods Station*', and associated branch lines; an '*Iron Works*', '*Coal Yard'*, '*Saw Mills*' and a '*Slate and Tile Yard'.* However, the most prominent development is that of Alexandra Basin, which was to permanently shift maritime traffic/trade to the mouth of the River Liffey and lay the foundations of the present-day Dublin Port.

Extracts from the Port of Dublin Archives (PDA), Drawing No. 7200 (1868-1876), provides detailed records of Custom House Quay and North Wall Quay in the form of nineteenth-century cross-sectional engineer's drawings (Figure 7).

A cross-section drawing from Custom House Quay (dated 1868) indicates a substantial quay, comprising thirteen (13) courses of masonry (forming the upper quay wall) that extends to a depth of 14ft (4.26m). This masonry is keyed into two (2) large blocks, presumably comprising reinforced concrete, that measure 6ft 9" (2m) and 5ft 8" (1.72m); top and bottom respectively. An anchor block and iron tie-rod are also depicted, running through the main-body of the quay, at a point in line with lowest course of masonry in the quay's façade. The quay has been laid above a series of substantial timber piles, measuring 18ft 2" (5.8m) in length, behind which a mass of rubble-stone/mortar is located (measuring *c.* 1.8m width x *c.* 3m length). The drawing indicates a batter of 1" in 6ft, extending across the structure's face and associated foundations.

The cross-section drawing from the North Wall Quay (dated 1871-1876) details an even more robust construction. The quay wall comprises fifteen (15) courses of masonry, which faces and is keyed into two (2) concrete blocks. A distinctive *champher* is present at the base of the lowest masonry course. Two (2) further blocks extend to a depth of 21ft 6" (6.55m) and are laid above a large rectangular foundation block, measuring 19ft (5.8m) horizontally and between 8-9 foot (2.43m-2.74m) vertically. The drawing indicates a batter of 1" in 6ft for the lower part of the structure and a batter of 1" in 12ft for the upper part.

Inspection of the visible extents of the present day quayside structures confirms that the quay structures remain, in the most part, unchanged to those shown within these drawings.

3.2 Known Sites and Monuments

The Record of Monuments and Places (RMP) is a list of archaeological sites based on the Sites and Monuments Record (SMR) files, maintained by the National Monuments Section at the DHLGH. SMR entries include detailed descriptions of archaeological sites based on site visits and historic studies and associated mapping where available. The SMR focuses on sites that are pre-1700AD in date. While later buildings are not well represented in the archive, all structures that are more than 100 years old are considered as archaeological sites today.

A number of historically significant structures are listed in the Record of Monuments and Places (RMP) for the location of the proposed boardwalks and the surrounding river area (see Figures 5-6). These include the following quay structures, North Quay Wall (DU018-020-564), Sir John Rogerson's Quay (DU018-020-201) and the upstream City Quay (DU018-020-479). Moreover, the area under assessment is located within the zone of archaeological potential defined for the historic city of Dublin, RMP DU018-020.

RMP Number	Classification	ITM	Proximity
DU018-020	Dublin Historic City, Zone of Archaeological Potential	------	------
DU18-020564-	Historic Quay [North Wall Quay]	717148E, 734461N-718021E, 734384N	0m
DU018-020479-	Historic Quay [City Quay]	716406E, 734450N-716773E, 734374N	90m south
DU018-020201-	Historic Quay [Sir John Rogerson's Quay]	716773E, 734374N-717805E, 734273N	228m southeast
DU18-020152-	Glasshouse [site of]	716519E, 734551N	148m west-northwest
DU018-020505-	Sea Wall [site of]	716399E, 734651N	306m west-northwest
DU018-020347-	Church	716472E, 734146N	401m south-southwest
DU018-020439-	Brickworks [site of]	716572E, 734084N	427m south
DU018-020325-	Glassworks	716648E, 734086N	409m south

Table 1: Known sites and monuments listed in the RMP within a 500m radius of the area under assessment.

3.3 National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is a county-by-county database that identifies, records, and evaluates the post-1700 architectural heritage of Ireland as an aid to the protection and conservation of the nations' built heritage. The NIAH surveys provide the basis for the recommendations of the Minister for the DHLGH to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

The NIAH includes ten (10) entries, within the vicinity of the proposed boardwalk development, that directly relate to Industrial Period developments along the River Liffey (Table 2). These include North Wall Quay, two pairs of *Scherzer* rolling lift-bridges, a dock (George's Dock) and associated infrastructure, and a number of nineteenth-century buildings (warehousing) located on Sir John Rogerson's Quay.

Reg. No.	Date	ITM	Description
50010009 [Bridge]	1930-1940	717143E, 734482N	Pair of wrought-iron *Scherzer* rolling-lift bascule bridges, erected c.1935, modelled on bridges of 1911-12 on North Wall Quay, and carrying east and west carriageways over Royal Canal as it meets the River Liffey.
50010001 [Bridge]	1930-1935	716583E, 734526N	Pair of single-span bascule or rolling lift bridges over lock, installed 1932-4. Fixed, 2001. Sited spanning lock with limestone ashlar battered retaining walls having cut-granite coping.
50010131 [Lock Gates/ Walls]	1810-1830	716576E, 734566	Limestone lock, built c.1820, connecting George's Dock to River Liffey. Pair of squared coursed limestone ashlar lock-walls, slightly battered, with granite coping at ground level enclosing lock to the east and west. Timber and steel lock gates to north end below recent steel and timber humpback footbridge. Pair of granite steps to both walls adjacent to lock gates. Pair of granite bollards to either end. Curved walls to north opening into Georges Dock with south end obscured by enclosure below pair of *Scherzer* Bridges opening into Liffey (50010001).
50010006 [George's Dock]	1820-1840	716561E, 734570N	Pair of cast and wrought-iron winches, erected c.1830, to either side of south lock to George's Dock. Iron cog wheels on axles and two crank handles supported on pair of iron brackets fixed to granite paving with replacement steel grille covering chute to dock below.
50011219 [Archway]	1810-1815	716606E, 734557N	Freestanding limestone triumphal arch, built 1813, transplanted to Custom House Quay from Amiens Street in 1998. Ashlar walling with plinth, impost course and with moulded string course to parapet level. Arch elevations proper set back slightly from main elevations within square-headed recess. Evidence for jambs of gateway to interior.
50010011 [North Wall Quay]	1780-1820	717358E, 734456N	Stretch of quay wall, erected c.1800, along north embankment of Liffey between Convention Centre and New Wapping Street. Coursed squared granite ashlar quay walls with granite coping, flush to embankment with bull-nosed edges. Several paired iron mooring hooks set into coping and three shallow recesses containing iron ladders.
50020258 [City Quay]	1800-1820	716531E, 734423N	Dressed ashlar granite quays, constructed c.1810, having cut granite coping, recent steel railing, cast-iron mooring hooks, granite quay steps and attached cast-iron ladders. Situated to south of river.
50020465 [Sir John Rogerson's Quay]	1860-1880	716920E, 734361N	Ashlar granite quay wall, erected c.1870, with ashlar granite coping. Cast-iron mooring hooks and mooring rings. Timber fenders to north of B. J. Marine building. Granite steps with cast-iron railings. Stone setts and inset cast-iron rails to campshire. Raised in height to east and west of

Reg. No.	Date	ITM	Description
			Samuel Beckett Bridge as part of recent works.
50020466 [Warehouse]	1870-1890	716852E, 734362N	Detached five-bay double-height former warehouse, built c.1880, now disused. A quay side warehouse on a different footprint is shown on a late nineteenth-century map, indicating that this warehouse postdates the rebuilding of the quay. Goods were unloaded directly into the building for storage and it is recorded as a 'landing store' in the 1908-1915 electoral rolls.
50020467 [Warehouse]	1870-1890	716995E, 734347N	Detached six-bay double-height former warehouse, built c.1880, now a coffee shop. A quayside warehouse with a different footprint is shown on the second edition Ordnance Survey map, indicating that the current structure postdates the rebuilding of the quay in 1869-70.

Table 2: NIAH entries, located within the vicinity of the proposed development that are associated with the nineteenth and twentieth-century development of the River Liffey.

3.4 Dublin City Industrial Heritage Records

The Dublin City Industrial Heritage Recorded was developed between 2021-2016. This record provides a catalogue of entries that refer to industrial activities of the past and associated infrastructure that includes a range of buildings, artefacts, features and ancillary features. The DCIHR survey makes recommendations for sites to be added to the list of Protected Structures. A series of entries are included for the river area extending downstream of Talbot Memorial Bridge, these are tabulated below in Table 3.

Reg. No.	ITM	Site Type/Location
DCHR-11-115 [RPS 896]	716580E, 734526N	Pair of *Scherzer* Bridges, George's Dock/Custom House Quay
DCIHR 18-11-159	716417E, 734548N	Lock (site of), Custom House Quay
DCIHR 18-11-158	716249E, 734548N	Swivel Bridge, Custom House Quay
DCIHR 18-11-154 [RPS 3173]	716584E, 734554N	Lock, George's Dock, Custom House Quay
DCIHR 18-12-060	717120E, 734512N	Royal Canal Office (site of), North Wall Quay
DCIHR 18-12-063 [RPS No. 912]	717144E, 734483N	The Royal Canal/Spencer Dock, North Wall Quay
DCIHR 18-11-152	716518E, 734514N	Goods Sheds (site of), Custom House Quay
DCIHR 18-12-006	716721E, 734508N	Goods Sheds (site of), North Wall Quay
DCIHR 18-12-058	716930E, 734483N	Wooden Wharf, North Wall Quay
DCIHR 18-12-011	716990E, 734483N	Goods Shed site of), North Wall Quay
DCIHR 18-12-073	717353E, 734453N	Goods Shed (site of), North Wall Quay
DCIHR 18-12-076	717617E, 734427N	Goods Shed (site of), North Wall Quay
DCIHR 18-12-092/093	718058E, 734412N	Light House (site of), North Wall Quay

Table 3: DCIHR entries for river area extending downstream of Talbot Memorial Bridge.

3.5 Shipwreck Inventory

The Shipwreck Inventory in the DHLGH archive is a list of recorded instances of wrecking since 1750. The details provided describe the type of vessel, the journey it foundered on, and

information on the ultimate plight of the vessel and its crew, where possible. In describing the wrecking event, the records will locate the incident in relation to the nearest headland or other topographic marker where known. This is not however a record of where the wreckage lies, since the historic records generally only deal with the vessel before it sunk. Such finer details emerge from other sources, such as fishermens' records of snag points and diver records of sites located underwater. These are included in the Inventory wherever possible but it is true to say that most entries lack this final level of data. Finally, it should be pointed out that while the Inventory provides a record of wrecking incidents since 1750, it does not claim to be a comprehensive record for earlier events, and therefore the medieval and prehistoric periods are not represented in this archive.

A total of four-hundred and sixty-three (463) shipwrecks are listed in the inventory for the Dublin Bay. Topographic references from the list include: The Horrocks, west side of Dublin Harbour, Old pier at Dublin, Behind the piles at Dublin, 1 mile off Dun Laoghaire east pier, Near Dublin, Dublin Bay, Dublin Bar, Dublin Harbour/Port, Dublin, McCarthy's wharf, River Liffey/Dublin River, Quay Wall/River Liffey, North Wall, South Wall, St John's Quay, Pigeon House (Fort), Bailey Light, Poolbeg (Harbour), North Bull, South Bull, Bull Island, Clontarf, Sutton, Blackrock, Ringsend (Point), Howth (off Howth, Howth Head, near Howth and Howth harbour), Dalkey.

A total of twenty-six (26) wrecks are listed in the inventory for the River Liffey and surrounding area (Appendix 2). This includes: seventeen listed as River Liffey/Dublin River, five for Ringsend, one for Sir John's Quay, one for the South Wall, one for Pigeon Hole, one for Halpin's Pond, and one for Pigeon House. The earliest of the listed wrecks date from the 1760s, with the latest recorded dating to 1892. There are no entries listed for the River Liffey at North Wall Quay or along Sir John Rogerson's Quay.

3.6 Topographic Archive

The National Museum of Ireland Topographical Files is the national archive of all known antiquities recorded by the National Museum. These files relate primarily to artefacts but also include references to monuments and also contain a unique archive of records of previous archaeological excavations. The Museum's files present an accurate catalogue of objects reported to that institution from 1928. There is a computerised database of finds from the 1980s onwards. They are categorised by their location into county and further into townland, town, city, street or river where they come from. There are rarely any grid co-ordinates to precisely locate find-spots. However, where find-spots of artefacts are established they can prove an important indication of the archaeological potential of the related or surrounding area.

A large number of artefacts have been recovered form excavations undertaken close to the existing River Liffey. Among the earliest artefacts encountered were those recovered from excavations at Fishamble Street, these included: two flint blades of Larnian style (similar pieces dated to about 3350BC at Sutton and on Dalkey Island), a Neolithic polished stone axe-head, and a barbed and tanged flint arrowhead of Early Bronze Age type. [7] However, only total of twenty-six artefacts have been listed in the topographic files for the River Liffey and its associated quay structures (Appendix 3). Listed artefacts range in date from the early Bronze Age (axe-head, 1922:4) to nineteenth-century material (clay pipe fragments, etc., 1937: 2379-2416). Only eleven artefacts are listed as coming from the River Liffey itself, the rest being recovered during quayside excavation works. One artefact, an iron sword (1964:1), is listed as coming directly form riverbed deposits; recovered from the River Liffey, *c.*10ft from the edge of Arran Quay.

While there is no specific reference to archaeological material being recovered from the two riverbed areas under assessment, it should be noted that the systematic recording of maritime/riverine data is a recent phenomenon. Moreover, it is clear that the River Liffey has a long history of maritime activity and has been of importance form at least the medieval period. However, this is counter-balanced by the fact that both the River Liffey would have undergone successive dredging works from the nineteenth-century onwards, an activity that could greatly limit the archaeological potential of the riverbed.

3.7 Excavations Bulletin

The *excavations bulletin* provides a published and online summary of accounts of archaeological excavations undertaken throughout Ireland.[8] Summaries may also be submitted for inter-tidal survey, underwater assessments, and the archaeological monitoring of marine dredging works. The majority of the entries relate to development-led archaeological work. Appendix 4 summarizes the entries relating to the River Liffey and its surrounding environs, including: River Liffey, River Liffey Quays, and the North Wall.

As previously discussed, one entry is of particular interest and refers to the excavations at the site of Building C, Spencer Dock, North Wall Quay (Bulletin entry 2004: 565). The excavation identified three principle phases of activity. These included a series of Late Mesolithic fish traps located on the old shoreline of the Liffey channel, artefacts from the eighteen and nineteenth-century reclamation of that area, and structures from the nineteenth and twentieth-century development of that reclamation land.

[7] Mitchell, G.F., *Archaeology and Environment in Early Dublin*, Royal Irish Academy, Dublin, p.7.
[8] Isabel Bennett (ed.) *Excavations Bulletin: summary accounts of archaeological excavations in Ireland*, Wordwell./ www.excavations.ie

3.8 Conclusion

It evident that significant maritime activity has taken place within the city to stimulate river adaptation, the Liffey providing an essential artery for trade imports and exports to and from the city. This activity is reflected in the number of shipwreck events listed in shipwreck inventory, which records four-hundred and sixty four (464 wrecks) around Dublin and includes twenty-six wrecks near or from the River Liffey; the majority dating from the eighteenth and nineteenth century when river use by shipping was at its peak.

The current study attests to this long history of river adaptation, and river area under assessment retains a number of historic features that correspond with this river development, namely: Custom House Quay and North Wall Quay. These structures are of historic/ industrial archaeological value. No other structures of archaeological significance were identified in the desktop study for the immediate development area associated with the two proposed Boardwalk structures. However, the potential that features, deposits, and artefacts of archaeological significance remain buried within riverbed and reclamation deposits should be considered high.

4.0 SURVEY METHODOLOGY

The UAIA comprised the following items:

1. Comprehensive underwater assessment of the riverbed, including targeted metal-detection, adjacent to the proposed boardwalk locations, extending the survey beyond the potential construction footprint at each location. This work recorded riverbed topography and provides a detailed account of the existing riverine environment.
2. Systematic inspection of the quay walls, *campshires*, and any associated quayside features present.
3. Detailed recording (laser scanning) of the upper parts of the quay wall, covering the proposed impact areas.

The underwater survey was carried out on a suitable Low Water tide cycle. It recorded riverbed topography and sought to provide a detailed account of the existing riverine environment. The survey covered a 206m east-west x 20m north-south area of riverbed adjacent to Custom House Quay/ North Wall Quay and a 94m east-west x 10m north-south area adjacent to the North Wall Quay at Excise Walk (Figure 8). Particular attention was paid to the riverbed at the impact locations for the three (3) mono-piles that will support the east side of the proposed Boardwalk at Custom House Quay.

In addition, a metal detection survey was undertaken in an attempt to plot the distribution of metallic objects across the riverbed survey area; highlighting any material concentrations present. A Fisher *Aquanaut* 1280U metal detector was used for the magnetometer survey. A

finds retrieval strategy dealing with conservation issues, cataloguing, and locational recording was in place to deal with any artefacts recovered during the survey.

Dive operations were carried out to HSA/HSE standards, using surface supplied equipment, from a licensed Dive Support Vessel (Plate 3). All work was carried out in accordance with the Safety in Industry (Diving Operations) Regulations 1981, SI 422 and the recently updated HSA diving regulations (2019). Mobile/ VHF communications to the Port Operations Centre at Dublin Port were also maintained throughout. The on-site work was carried out between the 19th June 2021, under licence from the DCHG; licence numbers 21D0050 (dive survey) and 21R0110 (detection device).[9]

The in-water work was completed by a six (6) man dive-team comprising, maritime archaeologists, a diving engineer, and Dive Supervisor. Underwater visibility of 500mm-1m was present and a maximum depth of 5m was recorded. No limitations to the completion of the UAIA were experienced on the day of the survey, although the low visibility and degree of sediment backscatter present did not allow for suitable underwater photography.

An inspection of the above water elements of the quays was also carried out. This included the quay facades, cap-stones, and associated fixtures and fittings. A walkover survey of the *campshire* areas was also undertaken. Any features encountered were subject to written and photographic record and positioned according to Irish Transverse Mercator (ITM).

Lastly, a laser-scan survey of the upper parts of the quay facades was carried out using a hand-held scanner. The survey extended beyond the identified quayside impact locations and sought to provide a detailed record of the exiting condition of the masonry walls that from the in-river extent of Custom House Quay and North Quay Wall. As a result, a series of scaled point-cloud elevations were produced, these are included as Figures 9-12 in this report.

4.1 Terminology

When referring to the degree of compaction observed for the riverbed deposits under inspection, the terms loose, medium, and hard are relative and do not relate to the measured properties of these deposits. All dimensions in this report are provided in either millimetres or meters according to scale. When referring to sediment grain size, the Wentworth scale has been adopted, as detailed in Table 4.

[9] The onsite work is below the threshold of DSDP requirements (comprising non-disturbance survey); however, the Project Supervisor for the Design Process was notified by ROD and a detailed RAMS was also submitted in advance of the works taking place.

Size (mm)	Grade
>256	Boulder
>64	Cobble
>4	Pebble
>2	Granule (gravel)
>1	Very coarse sand
>1/2	Coarse sand
>1/4	Medium sand
>1/8	Fine sand
>1/16	Very fine sand
>1/32	Coarse silt
>1/64	Medium silt
>1/128	Fine silt
>1/256	Very fine silt
<1/256	Clay

Table 4: Sediment grain size categories as applied to the riverbed deposits discussed in this report.

5.0 ARCHAEOLOGICAL ASSESSMENT

5.1 River Topography

The riverbed across the two (2) assessment areas comprises light-grey silt (100mm-200mm depth) that overlies a substratum of fine silty-clay (dark-grey in colour) of soft-medium compaction. This deposit measures 1m+ in depth. The surface is relatively sterile in nature, only occasional tree-branch material, leaf-litter, and modern debris (aluminium drinks cans, etc.) being evident. However, frequent modern debris was encountered deeper within this deposit, predominantly lying at depths of between 300mm and 500mm below the bed-level. The presence of modern material, located at depth within the riverbed, attests to the good-holding content present. As such, it is likely that any archaeological/historic layers/material would likely remain buried at considerable depth with riverbed sub-stratum.

The riverbed slopes gently, at a *c.* 15º angle for approximately 6m, from the base of North Wall Quay. Travelling upstream, to a point opposite custom House Quay, the slope flattens out, comprising a *c.* 5º angle that slopes from the base of the quay wall for a distance of 8m.

5.2 Visual Survey and Assessment

A systematic visual survey was conducted along the extent of the proposed boardwalks, with particular attention being paid to the three (3) riverbed impacts (mono-pile locations) associated with the structure at Custom House Quay. Considerable modern debris was observed and included the following items: numerous glass bottles, twenty (20) discarded metal stools/ chairs, six (6) traffic cones, three (3) bicycles, lengths of re-enforcing bar, mobile

phones, and an e-scooter. No archaeologically significant material was encountered as part of the underwater survey.

Custom House Quay [Figures 8-9, Plates 4-5]
Custom House (NIAH 50060556) delineates the north side of river channel, extending from Butt Bridge to a point 114m downstream of Sean O' Casey Bridge, where it conjoins with the North Wall Quay at ITM 716771E, 734494N. The quay wall is composed of neatly-cut/faced (regularly coursed) granite blocks measuring between 600mm-1m in length and a uniform 300mm in height (Plate 4). This uniformity of construction is evident across the visible extent of the quay's façade (above and below the LWM); up to nine (9) courses being partially visible. The structure's capping stones have been removed along much of quay wall, having been replaced with poured-mass concrete. However, a few still remain *in situ* at the downstream terminus of the quay; these cap-stones measuring 1.4m length, 1.2m width, and 600mm in depth/height. In addition, a number of service pipes/electricity wires run along the upper part of the quay wall, associated with a building located within the adjacent DCC yard.

Two (2) river access ladders (AL01-AL02) are present at ITM 716690E, 734496N and ITM 716731E, 734493N (Elevations 1-2). These features are integral to the quay's design, being recessed into the quay wall, rather than retro-fitted at a later date. However, both ladders represent replacements to the original wrought-iron versions that would have been used. Moreover, the top part (650mm) of the downstream ladder (AL02) has been truncated as part of later remedial work to the quayside. A recessed timber fender is also located at a point roughly halfway between the two river access ladders, ITM 716715E, 734493N (Elevation 2).

A metal-gangway provides access to a series of floating pontoons that are positioned parallel to Custom House Quay/ North Wall Quay. The gangway structure is recessed into the top of the quay wall at ITM 716769E, 73449N and measures 1.5m width. The gangway extends in an east-southeast direction for a distance of 20m to land upon the downstream side of the pontoon structure; the conjoined pontoons measuring 160m in overall length (Plate 5). The upstream half (80m section) of the structure has been anchored to the base of the quay wall using a Seaflex mooring system. A total of eight (8) anchor points were identified as part of the underwater survey, each of which comprise a steel plate measuring 300mm x 600m (bolted to the quay wall) from which a bundle of six (6) anchor-cables rise to fasten to base of the floating pontoons.

Despite the absence of many of the original capstones, the quayside is still in a medium-good state of preservation. Several repairs to the quay were noted along its extent, most prominent of these being a 7m section of quay wall that has undergone re-pointing using cement (ITM 716716E 734493N - ITM 71622E, 734493N); carried out in an attempt to prevent further

slumping/separation of the masonry blocks at that location. In addition, masonry is missing from a section of quay wall at a location further downstream (ITM 716749E, 734491N); 370mm wide section that extends *c.* 1.4m vertically up the face of the quay wall.
Below the Low Water Mark, the quay wall was also observed to be in a medium-good state of preservation, despite a series of gaps in the masonry being noted (separations up to 15mm width). No foundation elements were evident along the bottom of the Custom House Quay. These lie at depth below the existing bed-level, considerable deposits having built-up against the base of the quay structure.

North Wall Quay [Figures 8, 10-12, Plates 6-12]
The North Wall Quay (RMP DU018-020-564/ NIAH 50010011) is composed of neatly-cut/faced, regularly coursed, granite blocks measuring a between 1.20m length x 200mm height and 800mm length x 200mm height (Plates 6-8). Larger capping stones are present measuring 1m in length and 500m in height (Plate 9). A *champher* in the quay wall is located *c.* 5m from the top of the structure, at a point *c.* 3m below Mean Low Water.

A series of thirteen (13) mooring hooks (MH01-MH13) adorn the top of the quay wall, as detailed in Figure 8. These hooks are of differing styles, some comprising a pair of simple ring-forged hooks, while others are formed using more robust ironwork (Plates 10-11). The majority form paired-hooks that are fastened using a swivel bracket which in turn is attached snuggly to a 30mmØ iron-ring (inset into the top of the quay). Others have been ring-forged onto small iron-hoops that are inset into the upper part of the capstones.

Three (3) recessed mooring hoops (RMH01-RMH03) are located along the extent of the downstream survey area, adjacent to Excise walk (Elevations 7-9); positioned at ITM 716903E, 734483N, 716937E, 734480N, and 716991E, 724475N. These recesses in the quay wall measure 250mm depth, 600mm height, and 1.2m length. The mooring itself comprises a wrought-iron ring measuring 400m in diameter (internal) and 70mm in thickness (Plate 12).

Four river access ladders (AL03-AL06) are located within the survey area. As observed for Custom House Quay, these features are recessed into the quay wall (Elevations 6-9). However, none of the original wrought-iron ladders remain *in situ*, having been replaced by more recent versions. Only the 'grab handle' component of the ladder assemblage retains some age, being an earlier replacement. These handle features form simple wrought-iron loops, inset into the cap-stones at the recessed ladder locations; typically positioned at a point 100mm from the edge of the quay (see Figure 8 images and locational details).

A flight of masonry steps is also present at ITM 71680E, 734494N (centrepoint). These steps are recessed into the quayside and provide access to the river at a point *c.* 3m downstream of the western terminus of North Wall Quay (Figure 11). This feature measures 6.3 length and 1.7m in width.

Three (3) sets of metal-fenders are located along the extent of the survey area at North Wall Quay (Elevations 4, 7, and 8); fastened to the quay wall at ITM 716790E, 734492N, ITM 716923E, 7344811N, and ITM 716934, 734480. These later additions, comprising pairs of vertically fastened H-Beams (beam-width 200m), are likely of mid twentieth-century date,

An eighteenth century repair to one of the quays capstones was observed at ITM 716989E, 734475N (MB-01). It comprises a granite block, measuring 760mm x 670mm, that has been inset into an existing capstone (Plate 13).

Two (2) capstones have been removed from the quay wall, replaced with poured concrete, at ITM 716949E, 734478N and ITM 716925E, 734480N. Moreover, a 1.6m (vertical) x 2.1m (horizontal) section of masonry from the quay's façade is missing at ITM 716903E, 734482N; also replaced using concrete repair. The above repair-work aside, the quayside appears to be in a relatively good state of preservation overall. Below the Low Water Mark, the quay wall presents a medium-good state of preservation, although gaps in the masonry were frequently observed; separations in the masonry being up 20mm in width. In addition, pieces of masonry are missing in a number of places and these have been similarly subject to modern repair.

No foundation elements were evident along the bottom of the North Wall Quay. As noted for Custom House Quay, these lie at depth below the existing bed-level, considerable deposits having built-up against the base of the quay structure.

Campshires

The *campshire* area extending between Custom House Quay and the north Wall Quay comprises a paved pedestrian walkway (running parallel to the top of the quay wall), behind which there is a tree-lined, cobbled, walkway with regularly-spaced seating (low concrete/ wood benches) that face the river (Plates 14-15). A cycle lane is also included, running parallel to the roadway. Two (2) modern building, comprising restaurants, occupy the central part of the *campshire*, immediately adjacent to the proposed boardwalk at Excise Walk. Similar, a large rectangular building, forming part of the DCC yard, occupies much of the *campshire* area at Custom House quay.

5.3 Metal-detection Survey

Metal-detection survey of the riverbed proved impractical across much the underwater survey areas, due to the large number of targets encountered. The survey revealed an almost

constant hit ratio and, as such, it was not possible to tune out the background metallic signature generated by the volume of modern metallic debris present. The majority of these represented of sub-surface targets, all of which proved to be of modern origin upon inspection and included aluminium drinks can, lead fishing weights, pieces of reinforcing bar, flaking metal barrel fragments, modern coins, keys, etc.

5.4 Conclusion

The archaeological assessment was systematic and comprehensive, extending well beyond the potential construction footprint associated with the proposed boardwalk structures. No archaeologically significant material, structures, or deposits were encountered as part of the underwater survey. However, given deep deposits of silty-clay have been observed forming the riverbed at this location, within which frequent modern debris is present at depth, it is likely that any potential archaeological material present is limited to deeper/older layers, located at *c.* 2m+ in depth below the existing riverbed surface. Both of the historic quays were subject to detailed archaeological recoding and a series of quayside fixtures/fittings were identified. A number of these items will require removal as part of the development and corresponding archaeological mitigation has been provided in Section 7 of this report.

6.0 PROPOSED IMPACTS[10]

Custom House Quay Boardwalk (Commons Road)

The larger, upstream, boardwalk structure is to be located alongside Custom House Quay; situated across two (2) sections of quayside comprising a 94.5m section of Custom House Quay and a 6.35m section of North Quay Wall. It is understood that the removal of masonry from the quay structure, including its capstones, is not required a part of this endeavour. Rather, the primary support will be from an adjacent building, with an ancillary longitudinal support sitting atop the capping stones of the quay walls. In addition, anchor-points for the cantilevered (94.5m) section of the boardwalk are to be driven through the main body of the quay. These are to comprise a series of 300mm Ø tubular piles, positioned at a distance of 1.8m from the edge of the quay wall. The eastern terminus of the main boardwalk, including the smaller section of the structure (where it travels northeast to meet the North Wall Quay), will be supported by three (3) tubular mono-piles. The exact specification of these piles is yet to be confirmed. However, it is anticipated that they will be *c.* 900mm in diameter. The following construction sequence is anticipated at this location:[11]

1) Erection of site hoarding;

[10] This section does not purport to relate to precise engineering details but is rather an attempt to understand the nature of the impact on the potential archaeological environment, based on the supplied data.

[11] Construction sequence as described in EIAR (Draft) Volume 2, 'Ringsend to City Centre Bus Connects Scheme, Chapter 15- Archaeology and Cultural Heritage', p.49.

2) Installation of landside environmental protection measures including any noise or dust suppression systems;
3) Site clearance and removal of railings, etc;
4) Installation of barge(s) and associated riverside environmental protection measures, including silt screens;
5) Preparatory works to quay walls including repairing any damaged elements;
6) Installation of 3 No. hollow steel piles to carry the eastern freestanding part of the structure. These are to be driven from a landside or barge mounted vibratory piling machine depending on the Contractor's equipment availability and/or preference.
7) Once the above has been completed, the steel structure can be assembled *in situ* from a combination of the landside and the barge side;
8) Once the steel structure has been assembled, the deck can be installed atop;
9) Fixtures and finishes including parapets, lighting, ancillary landscaping; and decommissioning and removal of barge(s).

North Wall Quay Boardwalk (Excise Walk)

A second, smaller, boardwalk structure is to be located downstream, cantilevered off the North Wall Quay (at a point adjacent to Excise Walk). The structure is to measure 58.33m in length, impacting the topmost part of the quay wall to a depth of *c.* 200mm. A series of paired micro-piles will be driven into the main body of the quay to anchor the structure; positioned at a distance of 1.5m from the edge of the quay wall. In addition, a series of tubular struts will be affixed to the outer face of the quay, helping support the structure. A total of ten (10) steel plates will be fastened to quay wall to accommodate these elements. The steel plates are to be positioned *c.* 2.5m from the top of the quay and will measure 1m length (vertical) x 5000mm width (horizontal). The following construction sequence is anticipated at this location:[12]

1) Erection of site hoarding;
2) Installation of landside environmental protection measures including any noise or dust suppression systems;
3) Site clearance and removal of railings, etc;
4) Installation of barge and associated riverside environmental protection measures, including silt screens and the like;
5) Preparatory works to quay walls including repairing any damaged elements;
6) Coring through quay walls to facilitate installation of ground anchors;
7) Drilling of holes from the surface to allow injection of grout;
8) Installation of grout monitoring equipment;
9) Installation of ground anchors from the barge side through the core holes in the quay;
10) Installation of grout from the land side with appropriate seals at the river side to prevent overtopping of surplus grout towards the riverside;
11) Installation of fixings for support rods in the quay walls. This will require drilling and steelwork to fix the brackets in place;
12) Installation of substructure for the landside support;

[12] Construction sequence as described in EIAR (Draft) Volume 2, 'Ringsend to City Centre Bus Connects Scheme, Chapter 15- Archaeology and Cultural Heritage', p.50.

13) Once the above has been completed, the steel structure can be assembled in situ from the barge side;
14) Once the steel structure has been assembled, the deck can be installed, over-spanning the capping stones to meet the landside support;
15) Fixtures and finishes including parapets, lighting, ancillary landscaping; and
16) Decommissioning and removal of barge.

The above construction methods seek to minimise potential impacts to the historic quay structures. Only slight impacts to the quay façade areas can be expected and these should be counter-balanced by the planned remedial works to repair, consolidate, and re-point these areas. Rather, it is the topmost parts of the quay-wall (capstone areas) and the main-body of the quay structure (at a remove of between 1.5 and 1.8m from the quay façades) that will be impacted to a greater extent from the proposed development.

6.1 Impact Categories

Impact/effect categories will typically have regard to those set out in the 'Guidelines on the information to be contained in Environmental Impact Statements', 2002 and Revised Draft 2017, EPA; 'Advice notes on Current Practice (in preparation of Environmental Impact Statements), 2003 and Revised Draft 2015, EPA; Strategic Environmental Assessment (SEA), 2010; and Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes, 2006, National Roads Authority. Impacts/effects are generally categorised as either being a direct impact, an indirect impact or as having no predicted impact.

Impacts are generally categorised as either being a direct impact, an indirect impact or as having no predicted impact:

Direct impact occurs when an item of archaeological or architectural heritage is located within the centreline of the proposed route alignment and entails the removal of part, or all, of the monument or feature.

Indirect impact may be caused where a feature or site of archaeological or architectural interest is located in close proximity of the proposed development.

No predicted impact occurs when the proposed route option does not adversely or positively affect an archaeological or architectural heritage site.

These impact categories are further assessed in terms of their quality i.e. positive, negative, neutral (or direct and indirect).

Negative Impact is a change that will detract from or permanently remove an archaeological or architectural monument from the landscape.

Neutral Impact is a change that does not affect the archaeological or architectural heritage.

Positive Impact is a change that improves or enhances the setting of an archaeological or architectural monument.

A significance rating for these impacts is then given i.e. slight, moderate, significant or profound.

Profound applies where mitigation would be unlikely to remove adverse effects. This is reserved for adverse, negative effects only. These effects arise where an archaeological or architectural site is completely and irreversibly destroyed by a proposed development.

Significant is an impact that, by its magnitude, duration or intensity alters an important aspect of the environment. An impact like this would be where the part of a site would be permanently impacted upon leading to a loss of character, integrity and data about the archaeological or architectural feature/site.

Moderate is a moderate direct impact that arises where a change to the site is proposed which, though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological or architectural feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.

Slight is an impact that causes changes in the character of the environment that are not significant or profound and do not directly impact or affect an archaeological or architectural feature or monument.

Imperceptible is an impact capable of measurement but without noticeable consequences.

In addition, the duration of Impacts is assessed and has been sub-divided into the following categories:

- **Temporary Impact**, where an Impact lasts for one year or less
- **Short-term Impacts**, where an Impact lasts one to seven years
- **Medium-term Impact**, where an Impact lasts seven to fifteen years
- **Long-term Impact**, where an Impact lasts fifteen to sixty years.
- **Permanent Impact**, where an Impact lasts over sixty years.

Potential impacts associated with the boardwalk developments and corresponding impact classifications have been tabulated in Table 5 below.

Description	Proposed works	Potential Impacts	Classification of Impact
Riverbed (River Liffey)	Three (3 nr.) in-river, tubular, mono-piles measuring *c.*900mm Ø to be driven into the riverbed.	• No known impact to any visible archaeologically or historically significant features.	N/A
Custom House Quay [NIAH 50060556] Nineteenth-century masonry quayside on north side of the River Liffey.	Insertion of 120m-long boardwalk structure adjacent to Commons Road.	• Groundworks to impact the main body of quayside. • Potential impact to lower courses of masonry during construction (original capstones not *in situ* for this section of CHQ).	• Direct, negative, impact; moderate and permanent in nature.
North Wall Quay [DU018-020-564/ NIAH 50010011] Nineteenth-century masonry quayside on north side of the River.	Insertion of 58.33m-long boardwalk structure adjacent to Excise Walk. Insertion of *c.*7m section of boardwalk associated with the upstream structure at CHQ, located at	• Groundworks to impact the main body of quayside. • Removal of some masonry (**capstones**) to facilitate boardwalks at two (2) locations across the NWQ. • Removal of two (2)	• Direct, negative, impact; moderate and permanent in nature.

Description	Proposed works	Potential Impacts	Classification of Impact
	terminus of NWQ.	mooring hooks [**MH-09** and **MH10**] from the top of quay wall. • Impact to top of River Access Ladder **AL-05.** • Potential impact to Mooring Hoop [**RMH-02**].	
Campshires	Insertion of two-way cycle track.	• Minimal ground disturbances anticipated.	• Direct, negative, impact to sub-surface features; moderate and permanent in nature.

Table 5: Nature and classification of impacts arising from the construction of proposed boardwalk structures as part of the Bus Connects project.

7.0 RECOMMENDATIONS

7.1 Pre-construction Measures

At present, no further ameliorative measures are recommended in advance of construction commencing at the two (2) quayside locations. However, in the event that in-river/ quayside preparatory works and/or geotechnical site investigation woks are required in advance of construction, Archaeological Monitoring of these works would be required. In addition, should any alterations to the current project design take place, extending the proposed impacts outside the limits of survey area identified for the current UAIA, additional archaeological assessment/reporting would be required in advance of construction taking place.

7.2 Construction Phase Measures

It is understood that three (3) in-river mono-piles will be driven into the riverbed and, as such, there is limited scope for archaeological mitigation during construction regarding this element. However, should the removal of any riverbed deposits become necessary during the construction process, such work is to be subject to Archaeological Monitoring.

Custom House Quay and North Wall Quay will both be directly impacted by the proposed development. However, these impacts are expected to be localised and relatively slight in nature. Archaeological Monitoring of all excavation works and/or interventions upon/alongside the historic quay structures is required. This is to include any excavation work carried out within the *campshires*, comprising the area between the quay wall and the adjacent roadway. This will ensure that appropriate recording of the inertial fabric of the quay structures and any associated (buried) features is undertaken during the construction process.

The removal of quayside masonry (capstones elements) will likely be required for localised sections of the North Quay Wall. This work should be carried out under archaeological

supervision, allowing the archaeologist to obtain additional information and undertake supplementary recoding, as may become required during that process. It is recommended that the masonry is retained and placed in suitable storage as part of the removal process. In addition, any quayside fixtures or fittings that are subject impact should be removed under archaeological supervision and retained as part of the development.

The archaeological work should be carried out in accordance with the terms of Section 5 of the National Monuments Act (2004 Amendment).

RETAINING AN ARCHAEOLOGIST/S. An archaeologist should be retained for the duration of the relevant works. The archaeologist should be familiar with and experienced in river/estuarine environments and have a good understanding of riverine archaeology and its associated features.

THE TIME SCALE for the construction phase should be made available to the archaeologist, with information on where and when ground disturbances and/or dredging will take place.

SUFFICIENT NOTICE. It is essential for the developer to give sufficient notice to the archaeologist/s in advance of the construction works commencing. This will allow for prompt arrival on site to monitor the ground disturbances. As often happens, intervals may occur during the construction phase. In this case, it is also necessary to inform the archaeologist/s as to when ground disturbance works will recommence.

DISCOVERY OF ARCHAEOLOGICAL MATERIAL. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that any machine work cease in the immediate area to allow the archaeologist/s to inspect any such material.

ARCHAEOLOGICAL MATERIAL. Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended. If it is not possible for the construction works to avoid the material, full excavation would be recommended. The extent and duration of excavation would be a matter for discussion between the client and the statutory authorities.

ARCHAEOLOGICAL TEAM. It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation.

SECURE SITE OFFICES and facilities should be provided on or near those sites where excavation is required.

FENCING of any such areas would be necessary once discovered and during excavation.

ADEQUATE FUNDS to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available.

MACHINERY TRAFFIC during construction must be restricted as to avoid any of the selected sites and their environs.

SPOIL should not be dumped on any of the selected sites or their environs.

PLEASE NOTE: All of the above recommendations are based on the information supplied for the proposed Ringsend to City Centre Core Bus Corridor Scheme (of the Bus Connects Dublin - Core Bus Corridor Infrastructure Works). Should any alteration occur, further assessment maybe required.

PLEASE NOTE: Recommendations are subject to the approval of The Department Housing, Local Government and Heritage.

8.0 ACKNOWLEDGEMENTS

Thanks are extended to Robert Fadden, Senior Environment Consultant, and Oonagh Duffy, Technical Director Environment, at Jacobs and Eoin Ó Catháin, Technical Director, at Roughan O'Donovan for their assistance with the project. The Survey Team comprised Rex Bangerter (Archaeological Director/ HSE Diver), Dominick Gallagher (Archaeologist/ Dive Tender), Daniel Lenehan (Archaeologist/ Dive Tender), Feargal Morrissey (HSE Diver/ Engineer), Kyle McCoy (HSE Diver), and Brian McAllister (Diver Supervisor), and Derek Copeland (Surveyor). The report was written by Bangerter.

Appendix 1: Chronological List of Quay Structures built along the River Liffey on the North and South sides of the river.

Location	Name	Approximate Construction Date
South Quay	Wood Quay (Coal Quay)	900
South Quay	Merchants Quay (Bridge Street Quay and, jointly with Wood Quay, Dublin Quay)	1300
South Quay	Blind Quay	Early 1700s
South Quay	Old Custom House Quay	1620
South Quay	Usher's, Quay	1650
South Quay	Usher's, Quay	1650
South Quay	Essex Quay	1680
South Quay	Aston Quay	1700
South Quay	Saint George's Quay; known as Georges Quay and included Whites Quay.	1700
South Quay	City Quay	1700
South Quay	Sir John Rogerson's Quay	1720 [replaced *c.* 1875]
South Quay	Burgh Quay	1800
South Quay	Wellington Quay	1820
South Quay	Victoria Quay	1850
South Quay	South Quay; South Bank Quay.	1960
North Quay	Inns Quay; developed in 1700 (King's Inns Quay)	1250
North Quay	Ormond Quay Lower	1700
North Quay	Ormond Quay Upper	1700
North Quay	Arran Quay	1700
North Quay	Bachelors Walk; this originally included part of Eden Quay.	1700
North Quay	**North Wall Quay (North Quay)**	**1800**
North Quay	Ellis Quay, eastern part built 1760 and called Black Quay.	1750
North Quay	Eden Quay; included the earlier Iron Quay.	1800
North Quay	**Custom House**	**1800**
North Quay	**Custom House Quay**	**1820**
North Quay	Sarsfield Quay; built Pembroke Quay and included earlier Sand Quay.	1830
North Quay	Wofle Tone Quay (Albert Quay).	1800
North Quay	North Quay (North Wall Extension)	1890
North Quay	Alexandra Quay	1935
North Quay	Alexandra Quay East	1955

Appendix 2: Shipwrecks listed in the Shipwreck Inventory for the River Liffey Area.

Location	Name	Date	Ship Type	Information
Opposite the old coastguard station at Ringsend, River Liffey	*Argo*	10/12/1892	31-year old, 46-ton, Dublin, wooden fishing smack	Moored in the River Liffey.
Between the walls at Dublin	*Britannia*	6/5/1774	----	This vessel was en route from London, under Captain Williams, when she hit an anchor. She went ashore.
River Liffey	*Carolina*	5/10/1799	Galliot of Oporto	Ran aground and sank.
Dublin River	*Commerce*	25/10/1811		En route from Dublin when sank.
Between the city of Dublin Company's jetty and breakwater head	*Edith*	8/9/1875	London and Noth-Western Railway Company Steamer aboard.	En route from the company's wharf to Greenore. She departed at around 1.25am but collided with another London and North-Western Railway Company vessel, the Duchess of Sutherland. This vessel was under the command of Captain Beaumont and was en route from North Wall Dublin. The Edith was violently struck on the starboard bow and sank within a quarter of an hour. A fireman called Jones and his brother who slept in the forecastle were drowned. The weather was clear and calm at the time of the incident. Cargo: 60 to 80 passengers
Sir John's Quay, Dublin	*Emma*	17/06/1851	Smack	En route from Liverpool ran aground and listed on her beam ends. She was seriously strained and brought to Eden Quay where she filled. The cargo was damaged. Cargo: Wheat and staves
South Wall	*Henry*	23/11/1798	Brig of Liverpool	Wrecked
River Liffey	*Hibernia*	22/03/1776	----	Vessel was burnt
Pigeon Hole, Dublin River	*James and Ann*	7/2/1812	----	En route from Drogheda was hit by a collier brig and sank.
'Dublin River'	*Langston*	21/03/1812	----	Portsmouth vessel was reported lost.
River Liffey, Dublin	*Leonard*	10/01/1853	----	Struck by a steamer.
Entrance to Dublin River	*Maria Carolina*	16/8/1799	----	En route from Oporto to Dublin when she sank. The cargo was landed.

Location	Name	Date	Ship Type	Information
Abreast of no 2 bouy, River Liffey	*Mermaid*	16/07/1892	Unregistered wooden yacht/cutter was 5 yrs old and weighed 1 ton.	The master and owner was P. Carolan, Clontarf, Dublin. She was en route from Clontarf to Dublin, in ballast, with 6 crew. She sank in an easterly force 6 wind but was later raised. 4 lives were lost
The Liffey	*Newport*	20/05/1851	Montrose schooner	En-route up the Liffey when she came in contact with Hebden from Barbados, which made a hole in her stern.
Dublin River	*Nosha Squera de Bonamo*	28/06/1798	Brig of Oporto	Ran onto a bank.
Ringsend, R. Liffey	*Pelican*	8/4/1889	37-ton 32-year old wooden smack of Dublin	At anchor at Ringsend when burnt. Vessel in ballst
Behind piles at Dublin	*Providence*	5/02/1771	----	En route from London, under Capt Mayne, when she was lost
Opposite Halpins Pond, River Liffey	*Rat*	25/05/1891	10-year old wooden pleasure sailing boat	Capsized and was wrecked during pleasure trip.
River Liffey	*Times*	1-2/06/1853	Dublin vessel	En route from Dublin to Liverpool encountered easterly wind. Her boilers burst while in river. Cargo: Passengers
Off Pigeon House	*Times*	13/09-29/11/1851	Steamer	Steamer plying to and from Dublin went ashore but got off again after discharging some cargo.
Dublin River	*William*	10/01/1812	----	Went aground.
Ringsend	Unknown	1760s (Oct.)	----	A severe gale in Dublin Bay wrecked two ships.
Dublin River	*Usk*	8/10/1856	----	This vessel, en route from Dublin to Wexford, became stranded.

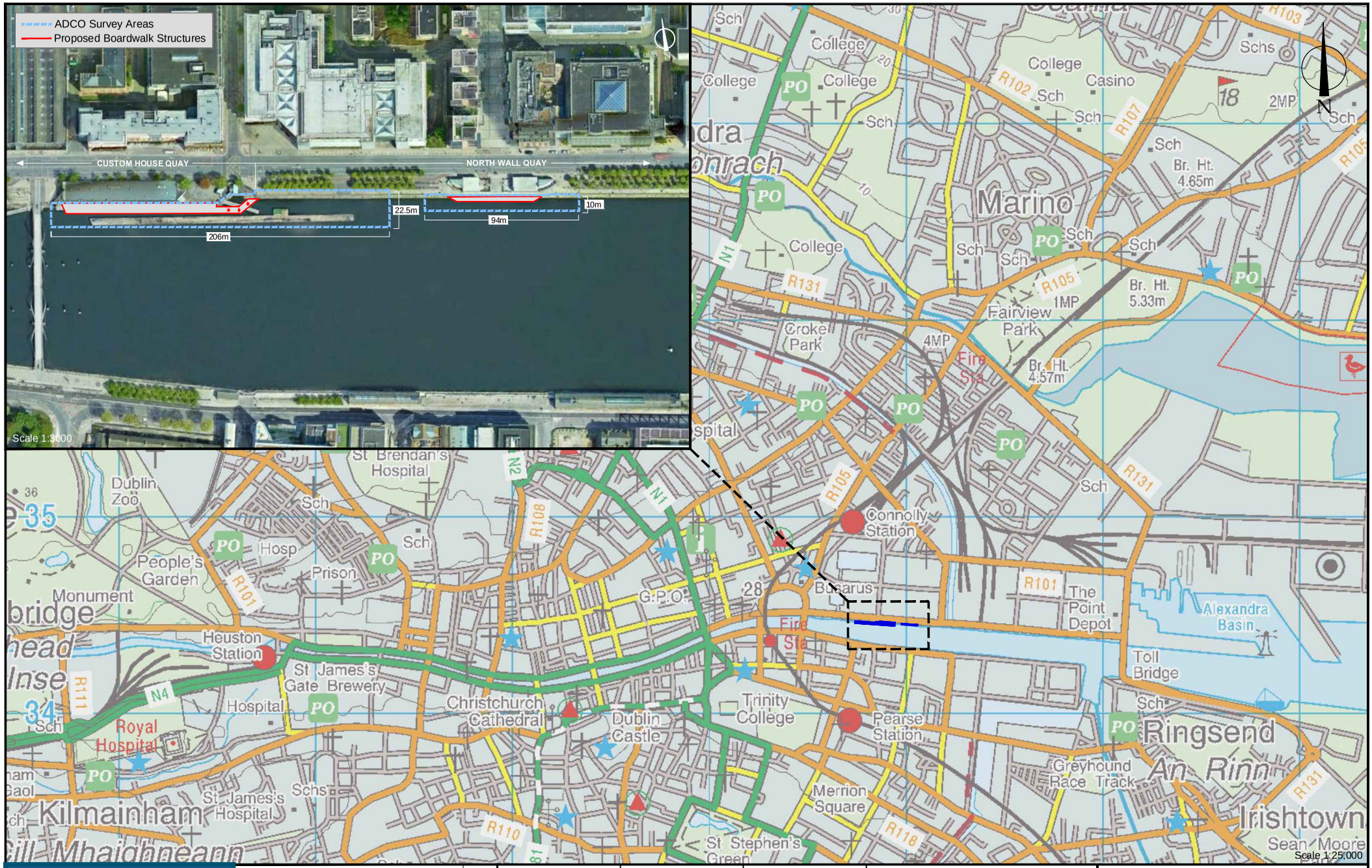
Appendix 3: Artefact Entries from the Topographic Files at the National Museum of Ireland listed for the River Liffey.

Artefact	Find place	NMI Reg. No.	Description
Glass Bead	River Liffey	4042:WK428	Found with other beads and an iron sword pommel
Glass Bead	River Liffey	4041:WK427	Found with other beads and an iron sword pommel
Glass Bead	River Liffey	4034:WK420	Found with other beads and an iron sword pommel
Glass Bead	River Liffey	4034:WK419	Found with other beads and an iron sword pommel
Glass ring	River Liffey	4031:WK417	Found with other beads and an iron sword pommel
Glass Bead	River Liffey	4030:WK416	------
Glass Bead	River Liffey	4029:WK415	------
Iron sword, Sudanese?	River Liffey at Arran Quay	1964:1	Found in the bed of the River Liffey about 10ft out from the edge at Arran Quay. It is Sudanese dating from fourteenth to nineteenth century. Length 100cm, length of blade 88cm, width across cross-guard 15.5cm. The blade is long tapered and flexible tapering to a blunt rounded point.

Appendix 4: Summary of Excavations Bulletin Entries for River Liffey, River Liffey Quays, and the North Wall.

Entry Number	Location	National Grid Reference	Licence Number	Summary Description
2000:0245	River Liffey, Blackhall Place	31413E, 23429N	00E0733	Riverbed with Medieval and later artefacts. Site of eighteenth-century slipway.
2001:365	River Liffey, Blackhall Place	31413E, 23429N	01E0246	Post-medieval/early modern quays
2002:0518	River Liffey, Blackhall Place	31413E, 23429N	01E0246ext.	Post-medieval/early modern quays
2002:0543	River Liffey, Guild Street/Macken Street	------	02E1811	No archaeological significance
2003:509	River Liffey, City Quay/Custom House Quay	31665E, 23440N	03E1060	No archaeological significance
2003:520	River Liffey, Custom House Quay/City Quay	------	03D0363	Riverbed deposits and associated quayside features/walls
2003:527	7–8 Eden Quay, Dublin	31603E, 23447N	SMR 18:20 02E1713	Human skull and 13th–18th-century finds in river gravels.
2002:0516	14–18 Aston Quay	311580E,233435N	02E1621	Urban, eighteenth-century
2003:495	14–18 Aston	31489E, 23336N	02E1621	Urban post-medieval

Entry Number	Location	National Grid Reference	Licence Number	Summary Description
	Quay, Dublin			
2003:509	River Liffey, City Quay/Custom House Quay	31665E, 23440N	03E1060	No archaeological significance
2003:520	River Liffey, Custom House Quay/City Quay	------	03D0363; 03R107	Riverbed deposits and associated quayside features/walls
2003:0576	Spencer Dock, Sheriff Street	317169E, 234711N	03E0654	Post-medieval industrial
2004:0565	Building C, Spencer Dock, North Wall	317169E, 234711N	03E0654	Late Mesolithic fish traps and post-medieval structures
1995:080	8 Ormond Quay Lower, Dublin	31550E, 23430N	95E063	Mid to late seventeenth-century reclamation, eighteenth-century houses
1996:106	22—23 Ormonde Quay, Dublin	31530E, 23420N	96E272	River shoreline up to the seventeenth century when land was reclaimed. Houses are eighteenth century
1997:155	40 Ormond Quay, Dublin	315550E, 234250N	97E013	Urban, eighteenth century
1997:156	15 Ormond Quay Lower, Dublin	315550E, 234250N	97E265	Urban, post-medieval reclamation
1999:222	31A-36 Ormond Quay Ormond Upper/Charles Street West, Dublin	315250E, 234200N	99E0126	Urban post-medieval
2000:280	24–27 Ormond Quay Lower, Dublin	315600E, 234208N	00E0162	Urban post-medieval
2003:520	River Liffey, Custom House Quay/City Quay, Dublin	316650E, 234400N	03D063; 03R107	Riverbed deposits and associated quayside features/walls
2003:527	7–8 Eden Quay, Dublin	316030E, 234470N	02E1713	Human skull in river gravels
2003:562	14 Ormond Quay/11–14 Strand Street, Dublin	315500E, 234300N	03E0964	Urban post medieval
2003:563	14 Ormond Quay/11–14 Strand Street, Dublin	31550E, 23430N	03E0964 ext.	Urban post-medieval
2004:0569	31-36 Ormond Quay Upper/Ormond Place/Charles Street West/Ormond Square, Dublin	31540E, 234230N	04E1206	Urban post-medieval



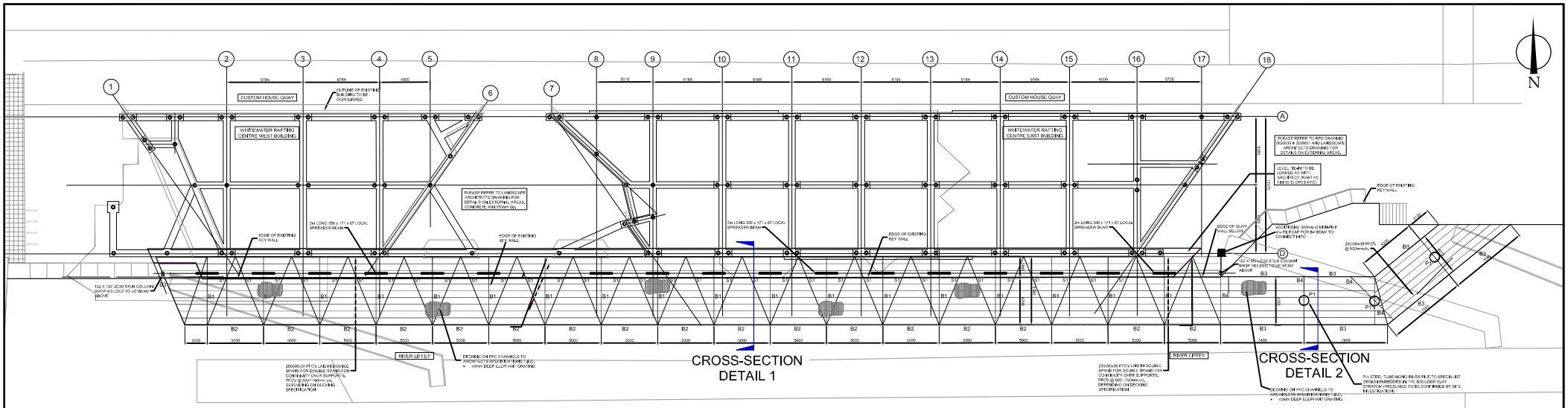
ADCO

Notes
Source:
Main- OSi Discovery Series (1:50,000) Mapping
Inset- Google Satellite Image [captured 04.2021]

A4

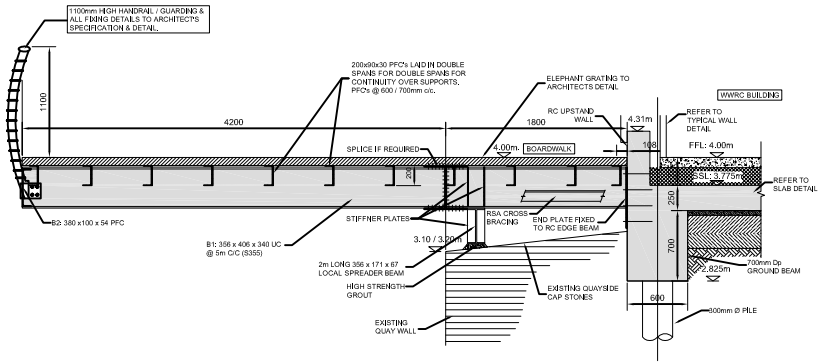
Job/Exc No.	Compiled by	CAD reference	Client
21D0050	R.Bangerter	Liffey_BusConnects	Roughan and O'Donovan for the NTA
Date	**Scale**	**Drawing No.**	**Project**
21.07.17	1:25,000/ 1:5000	Figure 1	UAIA, Proposed Boardwalks, Bus Connects Project

Title
Figure 1- Location of UAIA at Custom House Quay and the North Wall Quay, River Liffey, Dublin City.



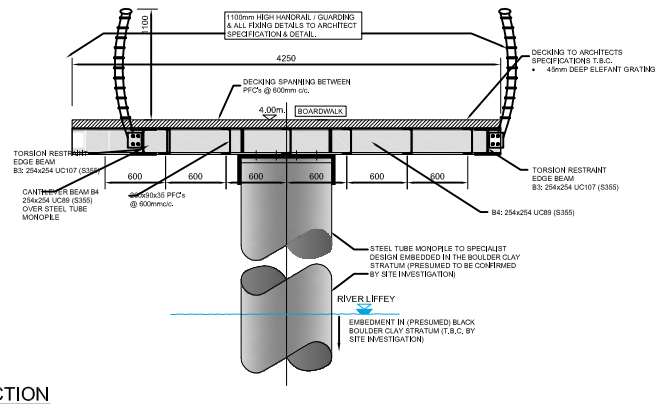
STEELWORK LAYOUT PLAN-
CUSTOM HOUSE QUAY BOARDWALK

Scale 1:500



DETAIL 1
BOARDWALK SECTION

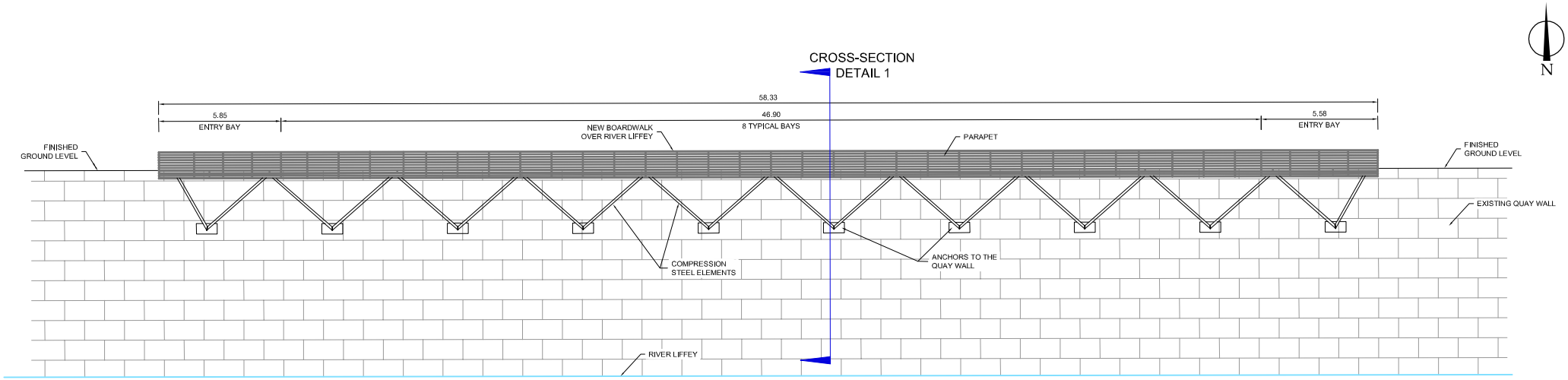
Scale 1:75



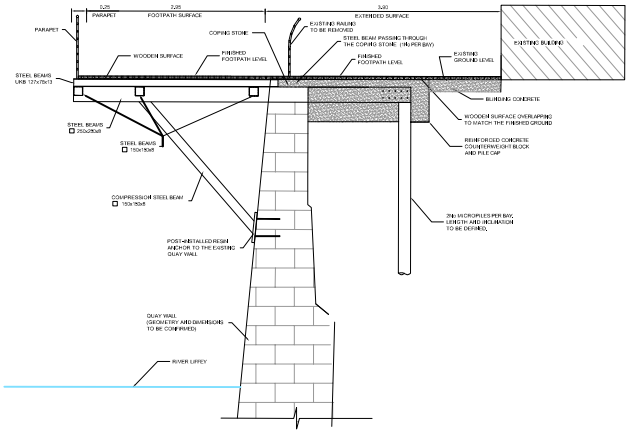
DETAIL 2
BOARDWALK SECTION

Scale 1:75

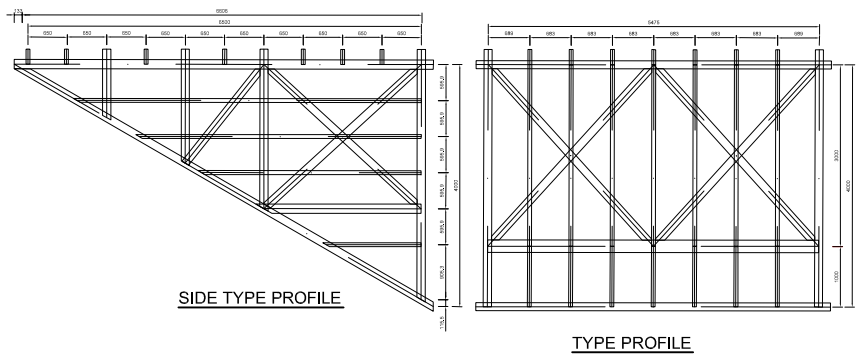
ADCO	**Notes** Source: figure adapted from Project Drawing MDCOF16-RPS-00-XX-DR-S-DG001-DG003 [supplied by ROD].	A4	**Job/Exc No.** 21D0050	**Compiled by** R.Bangerter	**CAD reference** Liffey_BusConnects	**Client** Roughan and O'Donovan for the NTA	**Title** Figure 2- Extract from Draft Project Drawing showing proposed Custom House Quay Boardwalk in Plan and Cross-section.
			Date 22.07.17	**Scale** 1:500/ 1:75	**Drawing No.** Figure 2	**Project** UAIA, Proposed Boardwalks, Bus Connects Project	



STEELWORK ELEVATION VIEW
NORTH WALL QUAY BOARDWALK
Scale 1:275

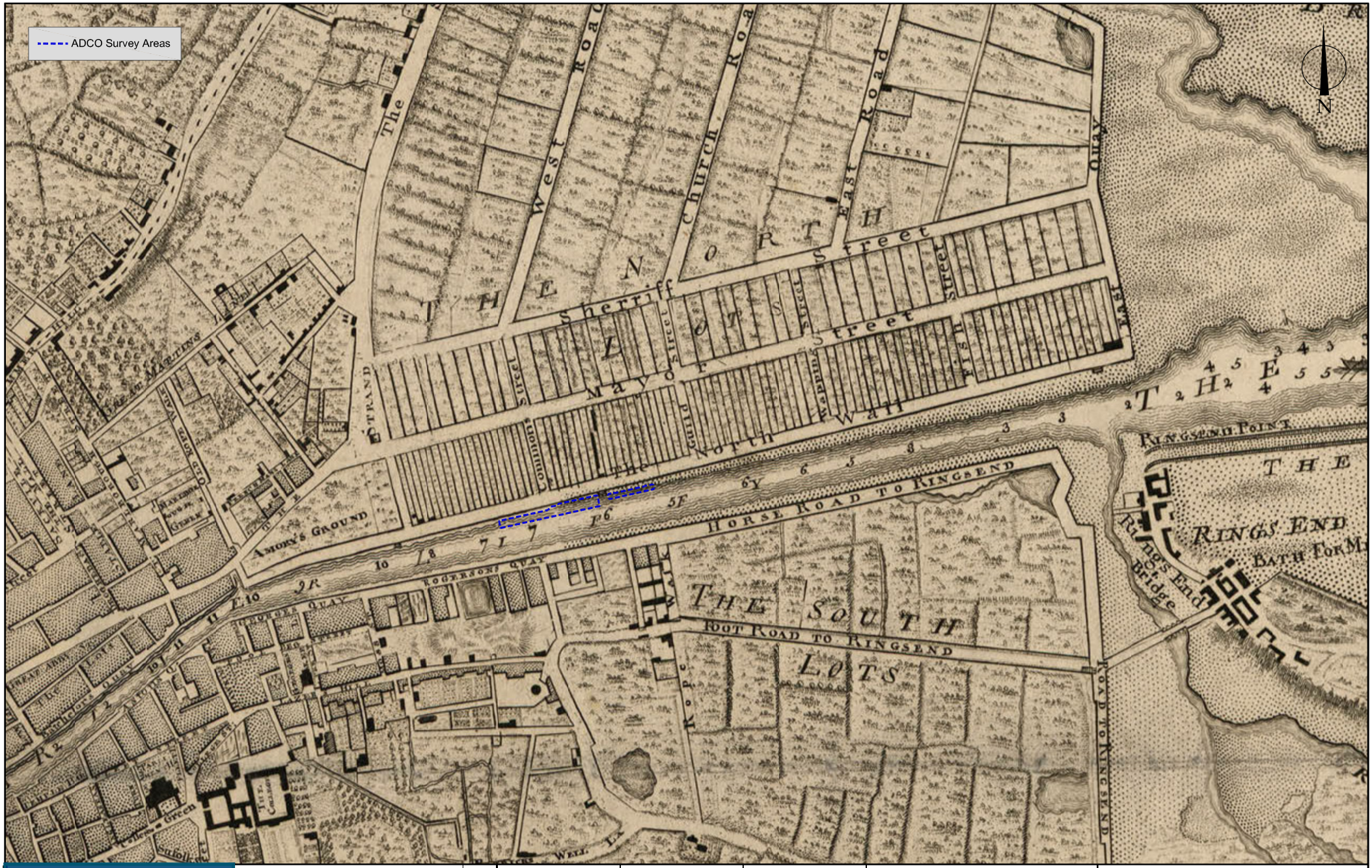


DETAIL 1
BOARDWALK SECTION
Scale 1:125



DETAIL 2
STEELWORK DECK
Scale 1:125

ADCO	**Notes** Source: figure adapted from Project Drawing BCIDD-ROT-STR_ZZ-0016_XX_00-DR-SS-004, Rev. L02 [supplied by ROD].	A4	**Job/Exc No.** 21D0050	**Compiled by** R.Bangerter	**CAD reference** Liffey_BusConnects	**Client** Roughan and O'Donovan for the NTA	**Title** Figure 3- Extract from Draft Project Drawing showing proposed North Wall Quay Boardwalk in Elevation, Plan, and Cross-section.
			Date 23.11.21	**Scale** 1:175/ 1:125	**Drawing No.** Figure 3	**Project** UAIA, Proposed Boardwalks, Bus Connects Project	

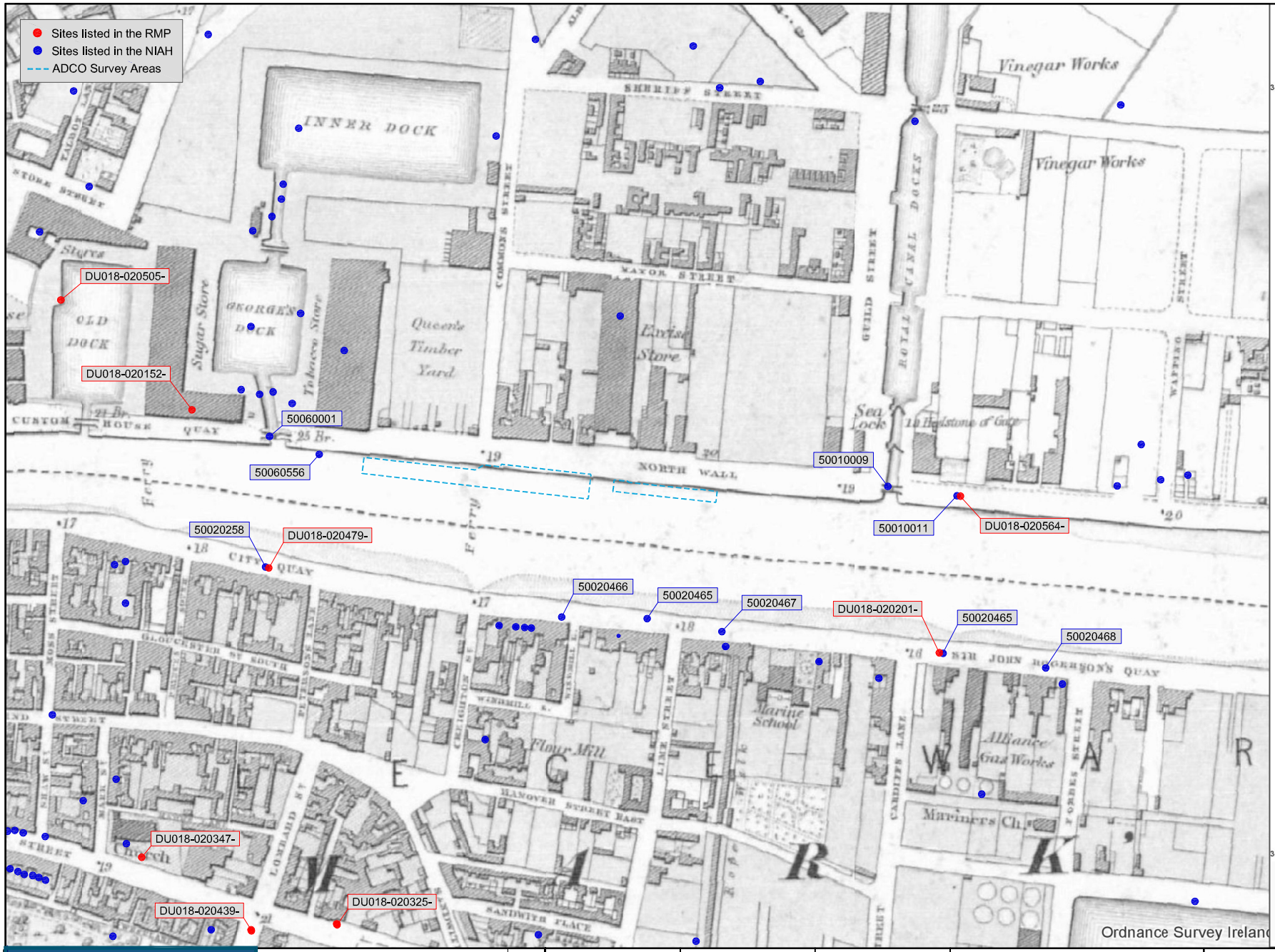


ADCO	**Notes** Source: bllotecdlgltalhlspanlca.bne.es	A4	**Job/Exc No.** 21D0050	**Compiled by** R.Bangerter	**CAD reference** LIffey_BusConnects
			Date 22.07.21	**Scale** 1:10,000	**Drawing No.** Figure 4

Client Roughan and O'Donovan for the NTA

Project UAIA, Proposed Boardwalks, Bus Connects Project

Title Figure 4- Extract from John Roque's map of 1756, '*A Survey of the City, Harbour, and Environs of Dublin*', with approximate location of ADCO Survey Areas superimposed.



34903

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National Mapping Agency

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ITM 716918,734473

PUBLISHED: 21/07/2021
ORDER NO.: 50208492_1

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MAP SHEETS: DN018

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34043

0m 50m 100m

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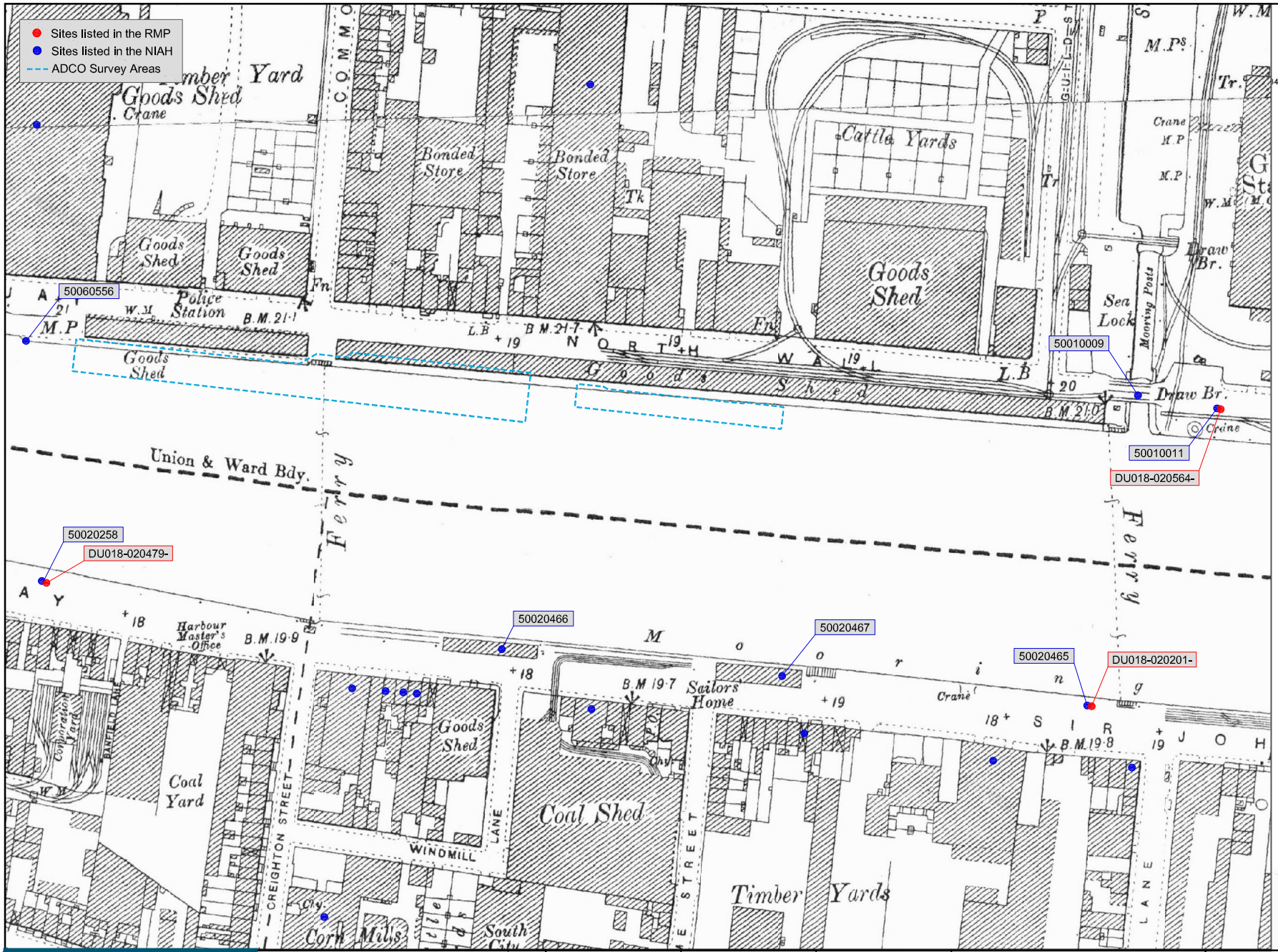
Notes
Source: OSI Historic Map Archive

A4

Job/Exc No.	Compiled by	CAD reference	Client
21D0050	R.Bangerter	Lffe_BusConnects	Roughan and O'Donovan for the NTA
Date	**Scale**	**Drawing No.**	**Project**
21.07.21	1:5000	Figure 5	UAIA, Proposed Boardwalks, Bus Connects Project

Title
Figure 5- Extract from OS First Edition (1837) map with extent of ADCO Survey Area and RMP/NIAH Sites superimposed.



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CENTRE COORDINATES:
ITM 716917,734444

PUBLISHED: 21/07/2021
ORDER NO.: 50208492_2

MAP SERIES: 25 Inch Raster, 25 Inch Raster
MAP SHEETS: DN018-08, DN018-12

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0m 50m 100m

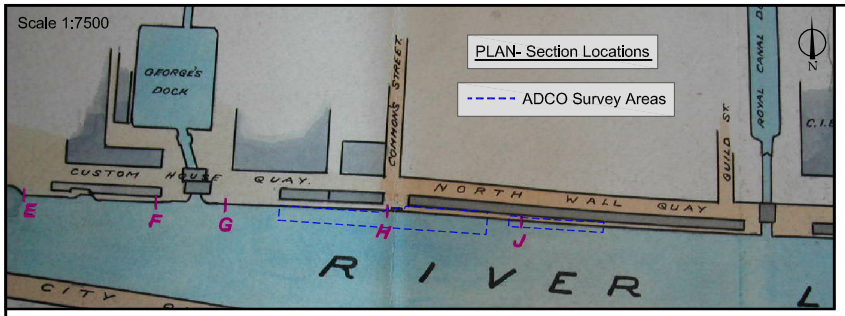
ADCO

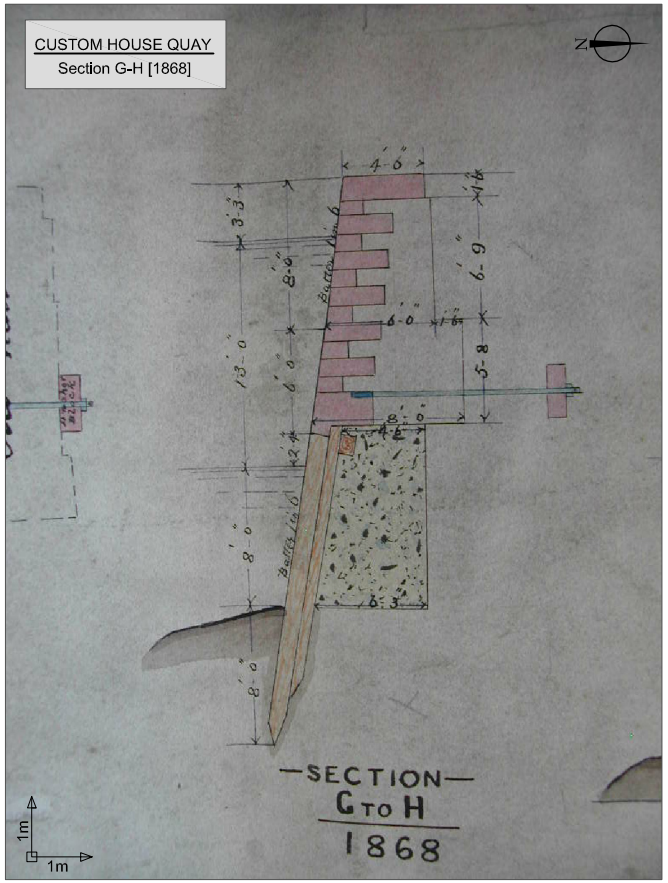
Notes
Source: OSI Historic Map Archive

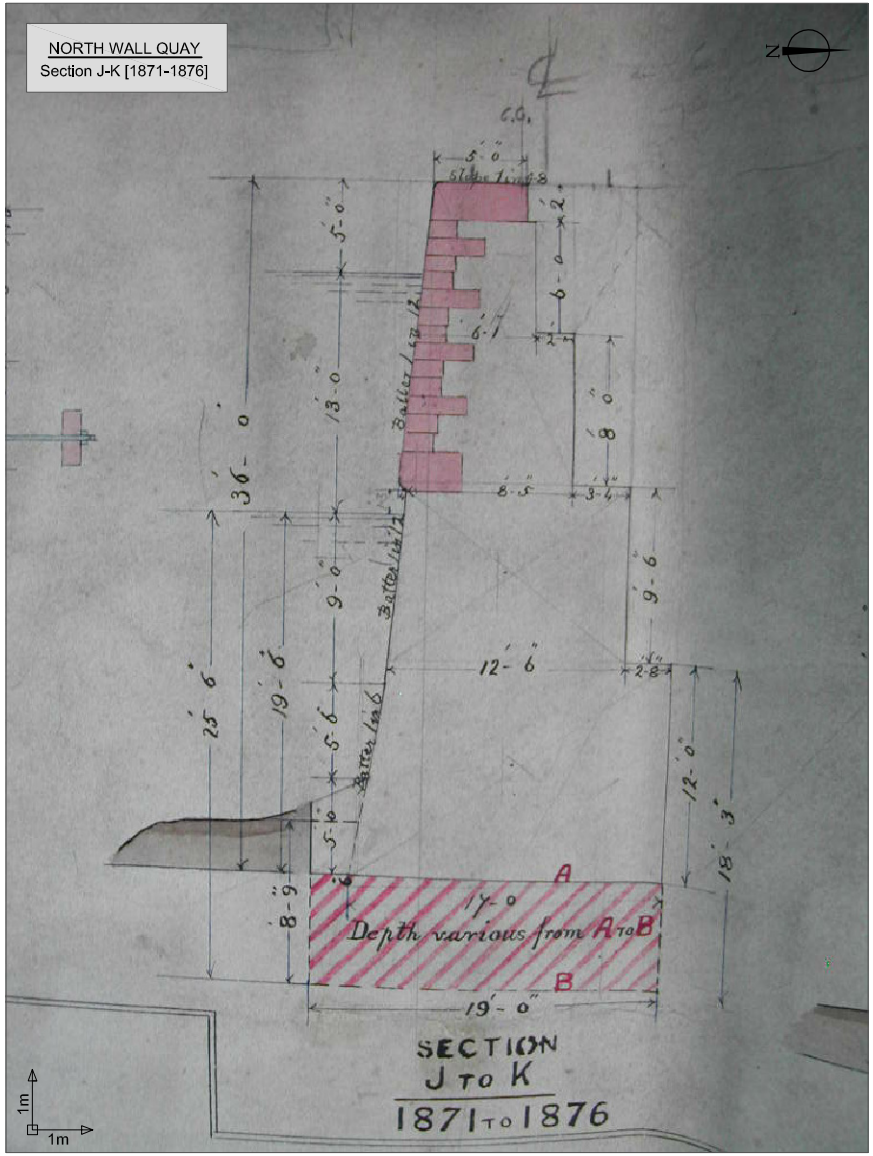
A4

Job/Exc No.	Compiled by	CAD reference	Client
21D0050	R.Bangerter	Liffey_BusConnects	Roughan and O'Donovan for the NTA
Date	**Scale**	**Drawing No.**	**Project**
21.07.21	1:2500	Figure 6	UAIA, Proposed Boardwalks, Bus Connects Project

Title
Figure 6- Extract from OS 25-Edition (1906-1909) map with extent of ADCO Survey Area and RMP/NIAH Sites superimposed.

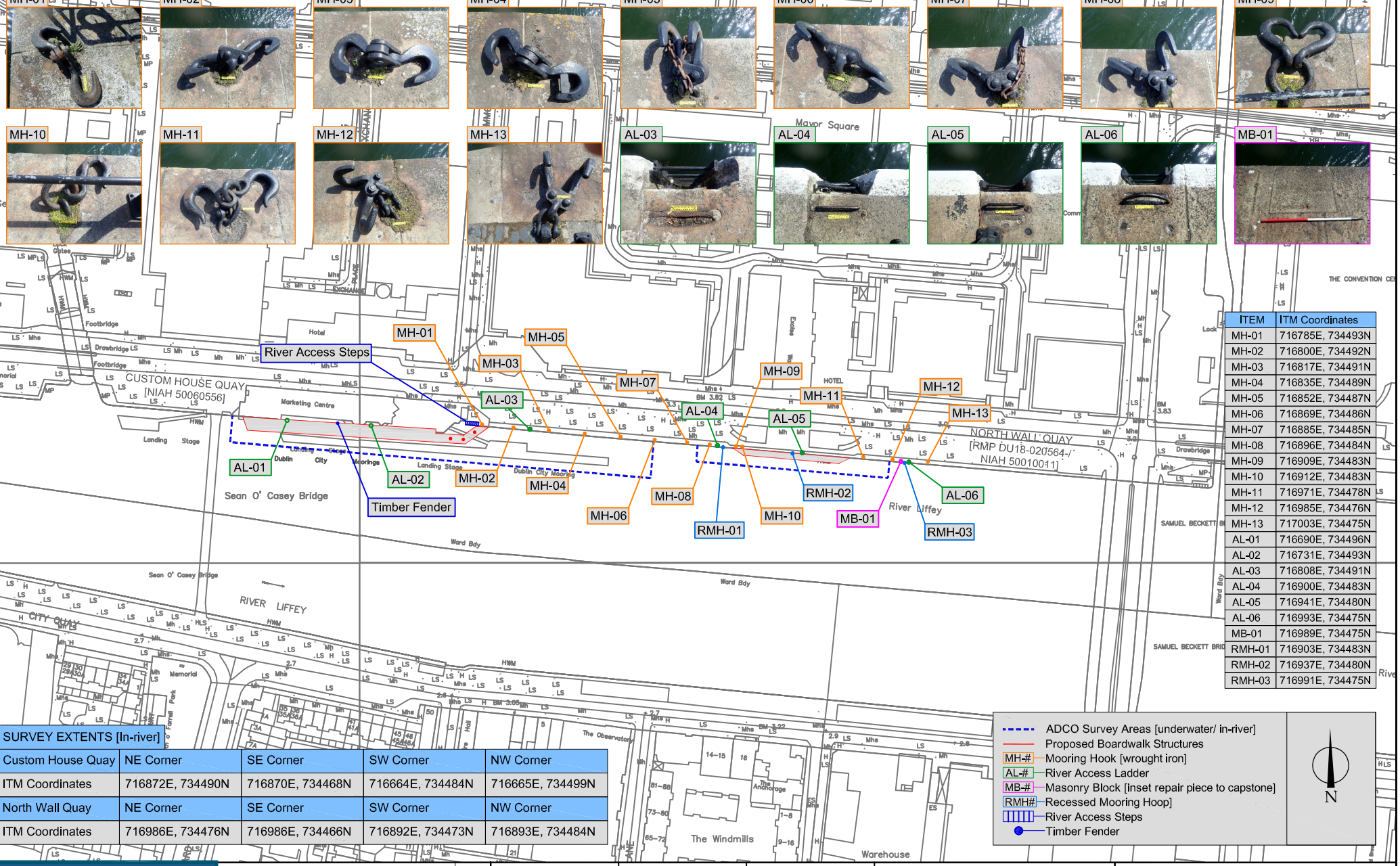






Scale 1:125

Notes	A4	Job/Exc No.	Compiled by	CAD reference	Client	Title
Source: Dublin Port Company Archives, Drawing No. 7200		21D0050	R.Bangerter	Liffey_BusConnects	Roughan and O'Donovan for the NTA	Figure 7- Extract from Dublin Port Map Archive showing nineteenth-century section drawings of Custom House Quay and the North Wall Quay.
		Date 22.07.21	Scale 1:100/ 1:7500	Drawing No. Figure 7	Project UAIA, Proposed Boardwalks, Bus Connects Project	



ITEM	ITM Coordinates
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MH-03	716817E, 734491N
MH-04	716835E, 734489N
MH-05	716852E, 734487N
MH-06	716869E, 734486N
MH-07	716885E, 734485N
MH-08	716896E, 734484N
MH-09	716909E, 734483N
MH-10	716912E, 734483N
MH-11	716971E, 734478N
MH-12	716985E, 734476N
MH-13	717003E, 734475N
AL-01	716690E, 734496N
AL-02	716731E, 734493N
AL-03	716808E, 734491N
AL-04	716900E, 734483N
AL-05	716941E, 734480N
AL-06	716993E, 734475N
MB-01	716989E, 734475N
RMH-01	716903E, 734483N
RMH-02	716937E, 734480N
RMH-03	716991E, 734475N

SURVEY EXTENTS [In-river]				
Custom House Quay	NE Corner	SE Corner	SW Corner	NW Corner
ITM Coordinates	716872E, 734490N	716870E, 734468N	716664E, 734484N	716665E, 734499N
North Wall Quay	NE Corner	SE Corner	SW Corner	NW Corner
ITM Coordinates	716986E, 734476N	716986E, 734466N	716892E, 734473N	716893E, 734484N

- ADCO Survey Areas [underwater/ in-river]
- Proposed Boardwalk Structures
- MH-# Mooring Hook [wrought iron]
- AL-# River Access Ladder
- MB-# Masonry Block [inset repair piece to capstone]
- RMH# Recessed Mooring Hoop]
- River Access Steps
- Timber Fender

N

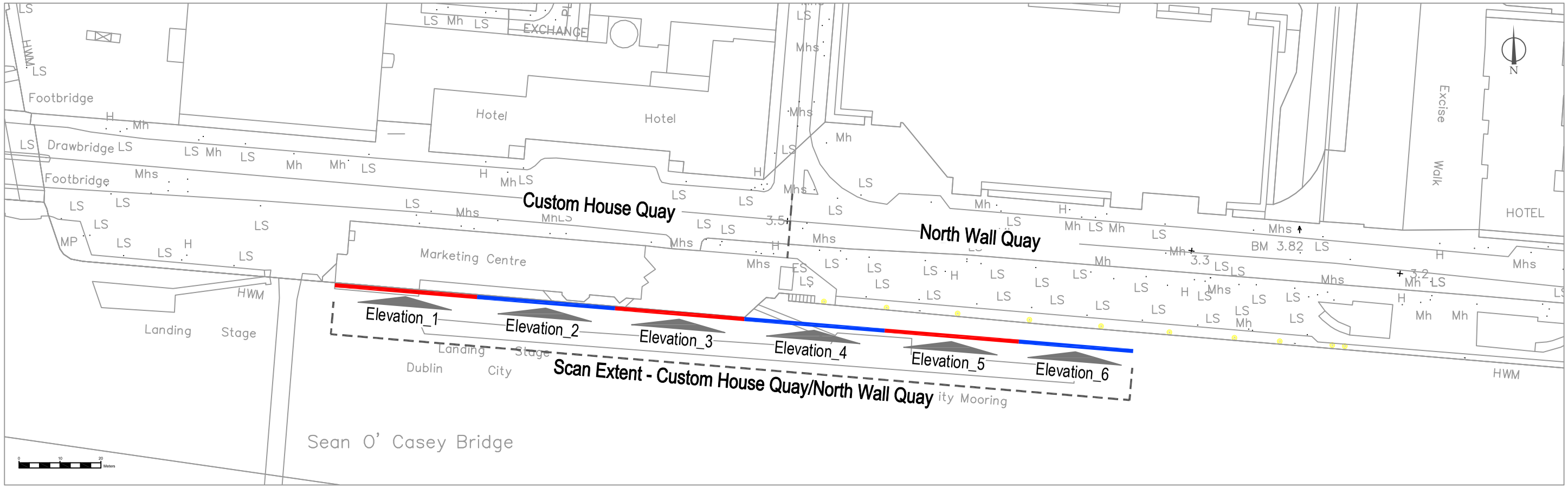
ADCO

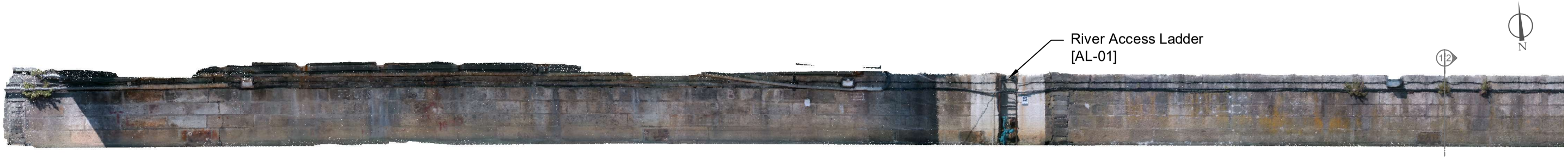
Notes
Source: ADCO onsite survey, June 2021.
[see Figures 9-12 for quay wall elevations]

A4

Job/Exc No.	Compiled by	CAD reference	Client
21D0050	R.Bangerter	Liffey_BusConnects	Roughan and O'Donovan for the NTA
Date	**Scale**	**Drawing No.**	**Project**
24.07.21	1:2,500	Figure 8	UAIA, Proposed Boardwalks, Bus Connects Project

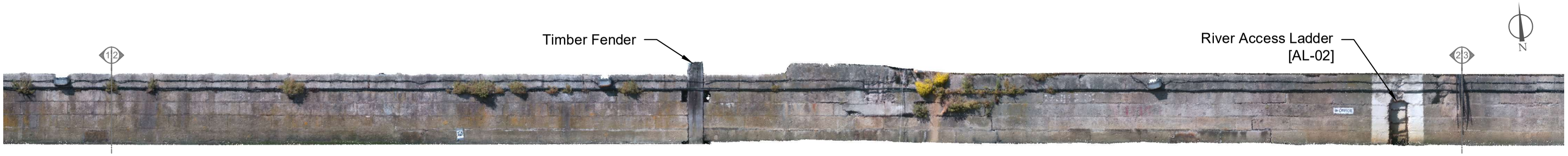
Title
Figure 8- OS Background Mapping with proposed boardwalk locations, ADCO Survey Areas, and selected quayside features superimposed.
[See Figures 9-12 for Elevation Drawings]





Elevation_1
Scale 1:100

MSL



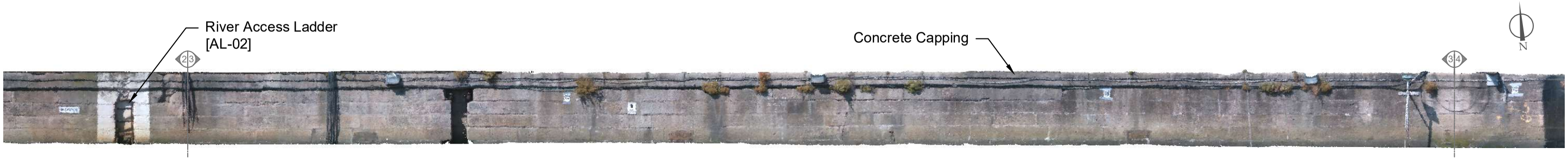
Elevation_2
Scale 1:100

MSL

Notes Survey performed using DGPS, Total Station and Hand-held Laser Scanner. Not to be used for Engineering measurements.	A3	**Job/Exc No.** 21D0050	**Compiled by** D.Copeland	**CAD reference** Liffey_BusConnects	**Client** Roughan O'Donovan for Dublin City Council
		Date 25.07.21	**Scale** 1:1000 / 1:100	**Drawing No.** Figure 9	**Project** UAIA, Proposed Boardwalks, BusConnects Project

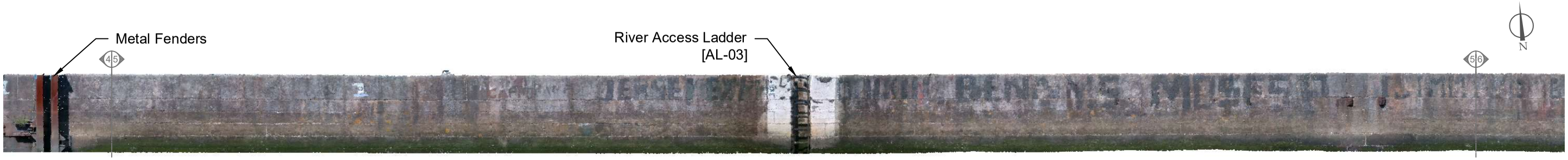
Title
Figure 9 - Point Cloud Elevations 1-2, Custom House Quay.

ORIGINAL SIZE – A3

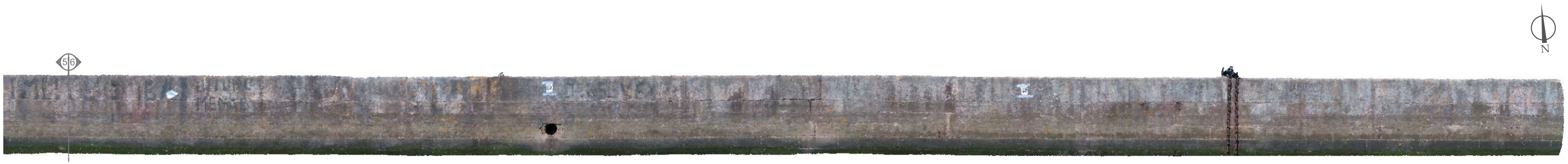


Elevation_3
Scale 1:100
MSL

Elevation_4
Scale 1:100
MSL



Elevation_5
Scale 1:100
MSL

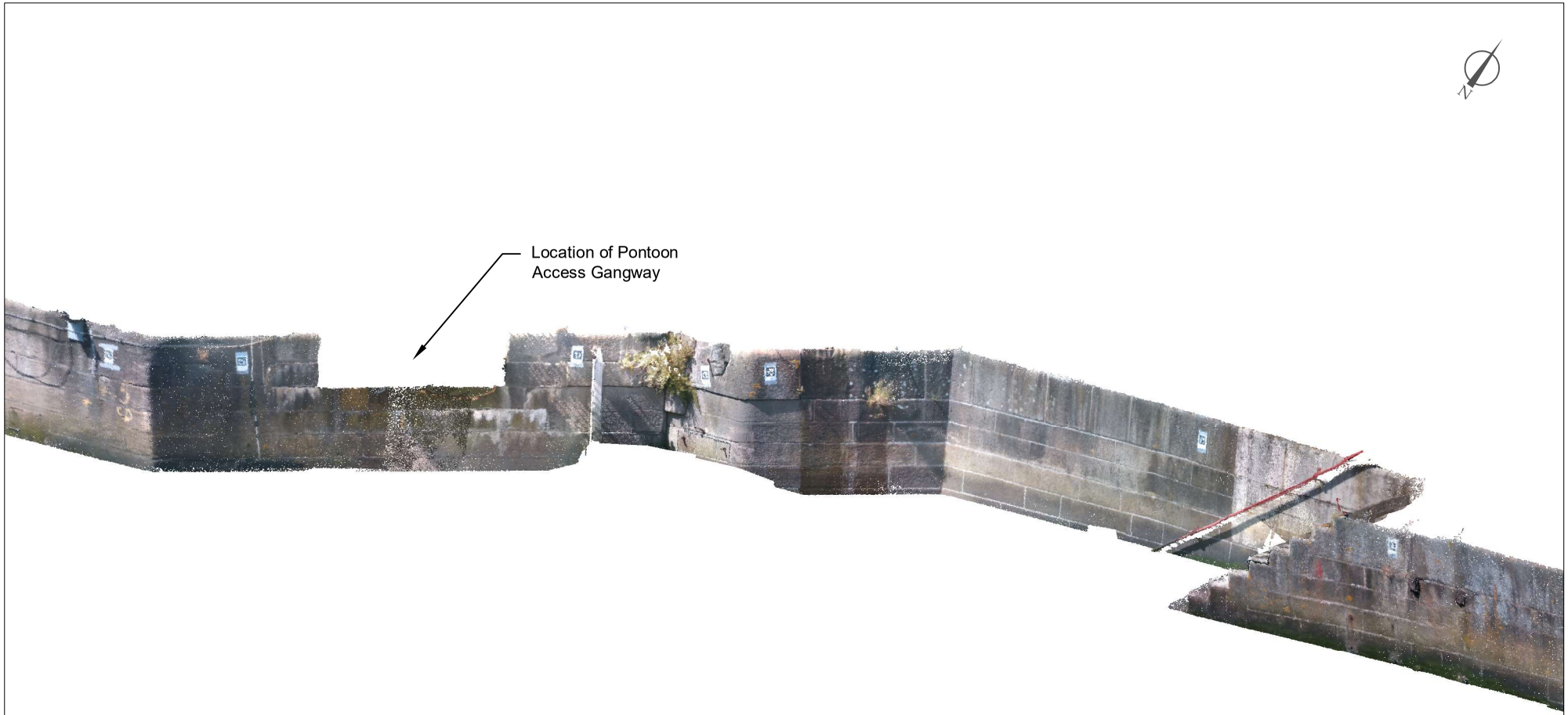


Elevation_6
Scale 1:100
MSL

0 1 2 Meters

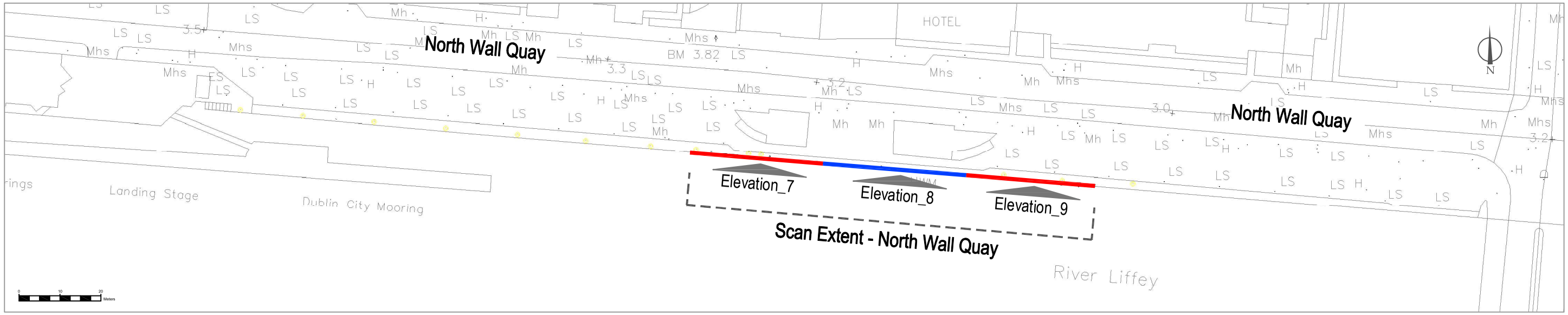
ADCO	**Notes** Survey performed using DGPS, Total Station and Hand-held Laser Scanner. Not to be used for Engineering measurements.	A3	**Job/Exc No.** 21D0050	**Compiled by** D.Copeland	**CAD reference** Liffey_BusConnects	**Client** Roughan O'Donovan for Dublin City Council	**Title** Figure 10 - Point Cloud Elevations 3-6, Custom House Quay / North Wall Quay.
			Date 25.07.21	**Scale** 1:100	**Drawing No.** Figure 10	**Project** UAIA, Proposed Boardwalks, BusConnects Project	

50mm 20mm ORIGINAL SIZE – A3



ADCO	**Notes** Survey performed using DGPS, Total Station and Hand-held Laser Scanner. Not to be used for Engineering measurements.	A4	**Job/Exc No.** 21D0050	**Compiled by** D. Copeland	**CAD reference** Liffey_BusConnects	**Client** Roughan O'Donovan for Dublin City Council	**Title** Figure 11 - Point Cloud perspective view of River Access Steps located at the upstream terminus of North Wall Quay.
			Date 25.07.21	**Scale** 1:75	**Drawing No.** Figure 11	**Project** UAIA, Proposed Boardwalks, BusConnects Project	

ORIGINAL SIZE – A4 50mm 20mm



Elevation_7
Scale 1:100
MSL

Elevation_8
Scale 1:100
MSL

Elevation_9
Scale 1:100
MSL

ADCO	**Notes** Survey performed using DGPS, Total Station and Hand-held Laser Scanner. Not to be used for Engineering measurements.	A3	**Job/Exc No.** 21D0050	**Compiled by** D.Copeland	**CAD reference** Liffey_BusConnects	**Client** Roughan & O'Donovan for the NTA	**Title** Figure 12 - Point Cloud Elevations 7-9, North Wall Quay.
			Date 26.07.21	**Scale** 1:1000 / 1:100	**Drawing No.** Figure 12	**Project** UAIA, Proposed Boardwalks, BusConnects Project	

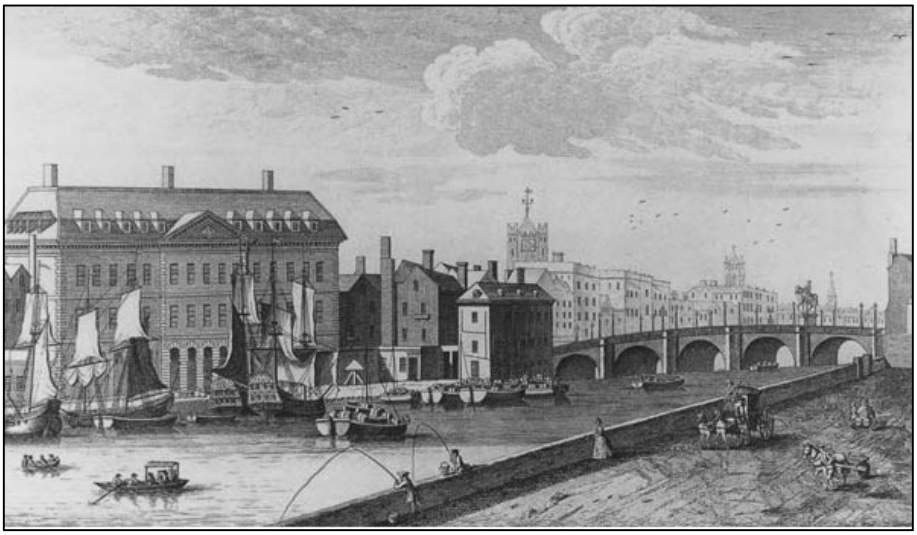


Plate 1: Extract from a print by Joseph Tudor (*c.* 1750) entitled *'A Prospect of Custom House quay and Essex Bridge, Dublin.'*

Plate 2: Extract from Rocque's map an '*Exact Survey of the City and Suburbs of Dublin*', dated 1760.

Plate 3: Working shot of diver returning to DSV on completion of underwater survey alongside Custom House Quay.

Plate 4: East-facing view of quay wall at Custom House Quay; shot taken on upstream side of assessment area.

Plate 5: North-facing view of the existing floating pontoon structure located alongside Custom House Quay, downstream of Sean O' Casey Bridge.

Plate 6: North-facing view of quay façade at location of proposed downstream boardwalk structure (adjacent to Excise Walk).

Plate 7: West-facing view of masonry forming the quay wall (North Wall Quay) taken from downstream extent of assessment area for the boardwalk structure adjacent to Excise Walk.

Plate 8: East-facing view of masonry forming the quay wall (North Wall Quay) taken from upstream extent of assessment area for the boardwalk structure adjacent to Excise Walk.

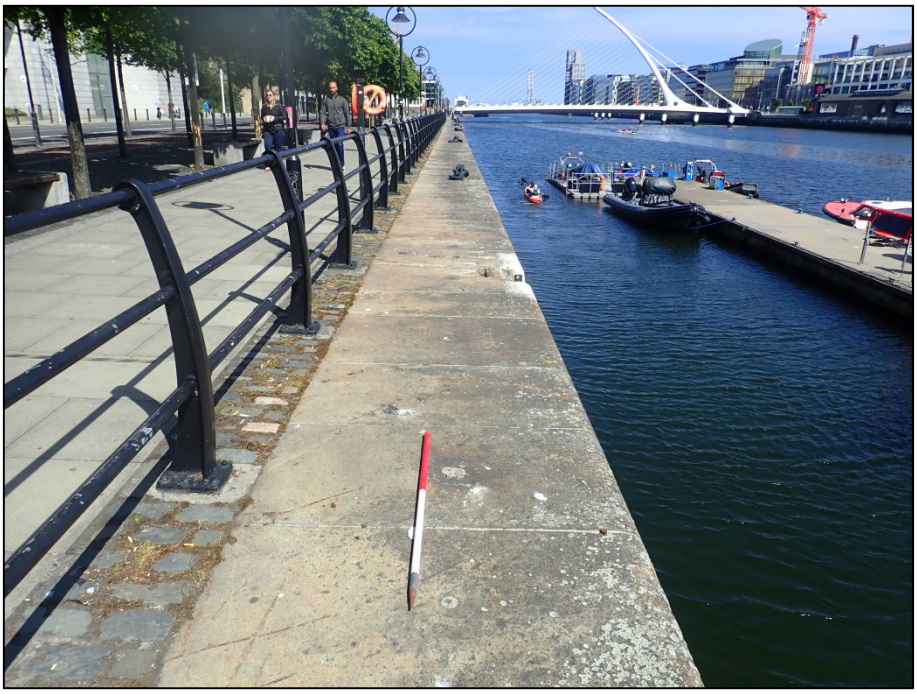


Plate 9: East-facing view along top of the North Quay Wall showing uniform size of the capstones used in its construction (1m scale).

Plate 10: Example shot of a pair of mooring hooks [MH-09] adorning the North Wall Quay (150mm scale).

Plate 11: Example shot of a pair of mooring hooks [MH-05] adorning the North Wall Quay (150mm scale).

Plate 12: Example shot of one of the recessed mooring hoops [MH03] located within the assessment area along the North Wall Quay.

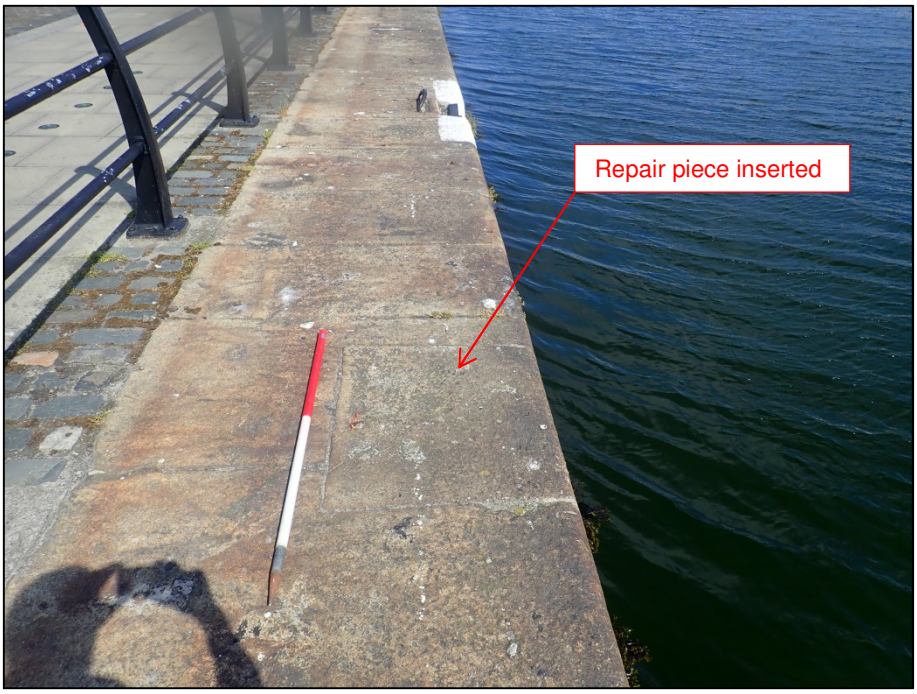


Plate 13: East-facing view along top of the North Quay Wall showing historic repair to capstone (1m scale).

Plate 14: West-facing view of *campshire* running alongside the North Wall Quay.

Plate 15: East-facing view of *campshire* running alongside the North Wall Quay.

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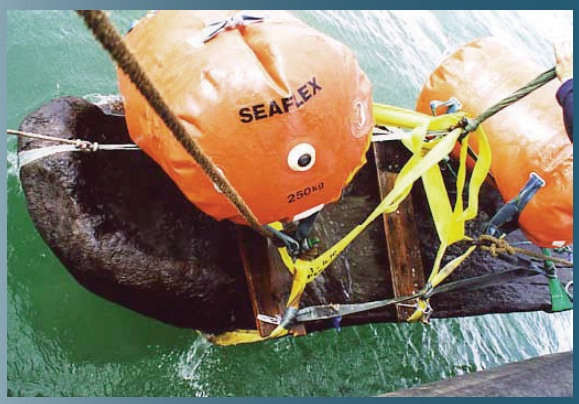

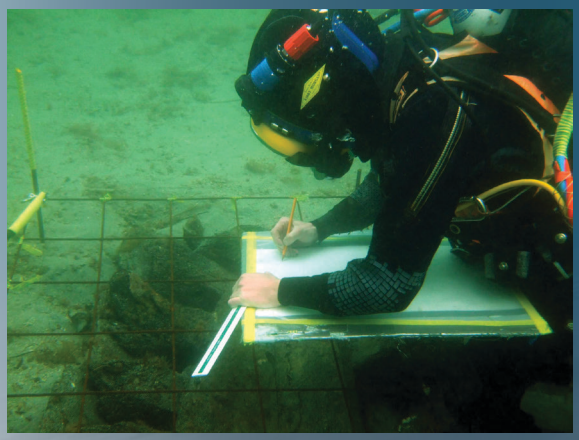

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