11 Archaeological, Architectural and Cultural Heritage

11.1 Introduction

This is the Archaeological, Architectural and Cultural Heritage chapter of the Arklow Flood Relief Scheme (FRS) EIAR. This chapter of the EIAR describes the baseline archaeological, architectural and cultural heritage environment and identifies the likely significant impacts (positive and negative) on this environment, associated with the site preparation, construction and operation phases of the proposed scheme.

Chapter 4, *Description of the Proposed Scheme* provides a full description of the proposed development whilst **Chapter 5,** *Construction Strategy* describes the construction aspects of the scheme. Reference should be had to the full set of planning drawings accompanying the application for approval. A summary set of drawings in A3 format are included in **Appendix 4.1** and **Appendix 4.2.**

11.2 Assessment Methodology

The baseline archaeological, architectural and cultural heritage environment has been defined through a desktop study of available documentary and mapping sources of cultural heritage assets (**Table 11.1**) such as recorded archaeological monuments (the Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR), archaeological excavations, protected structures and features of architectural heritage interest (NIAH for Wicklow), the topographical files from the National Museum of Ireland, consultation with relevant stakeholders and field surveys including walkover surveys of terrestrial elements and archaeological inspection of the riverine environment through dive survey, visual inspection and geophysical survey.

Arklow Bridge (a protected structure (A26)) was inspected by a conservation engineer and underwater archaeologists during investigation works undertaken to inform the design process. Archaeological monitoring and test excavation has also taken place to inform the decision-making process and to provide greater certainty as to the below ground potential throughout the scheme.

A baseline rating has then been categorised and assigned which takes account of the significance and sensitivity of each individual cultural heritage asset. The baseline ratings are subsequently used in the impact assessment, (**Section 11.2.6 and 11.2.7**), and assist in determining the impact significance and appropriate mitigation strategy to be employed (**Appendix 11.1; Impact Assessment**).

11.2.1 General

This chapter describes the proposed flood alleviation measures for the Arklow FRS and assesses the potential impact on archaeological, architectural heritage and cultural heritage assets.

A number of appendices have been collated and the presented information informs the impact assessment and mitigation process. These are:

Appendix 11.1 Glossary of Impact and Assessment Criteria

Appendix 11.2 Archaeological Inventory

Appendix 11.3 Architectural and Cultural Heritage Inventory

Appendix 11.4 Arklow & Environs Local Area Plan 2018-2024

As part of the reporting process, the chapter assessed and collated information from archaeological and conservation assessments and investigations conducted to inform this scheme, namely:

- Archaeological Impact Assessment Report, Arklow Town Marsh and Ferrybank Licence No. 18E0263 (CDHC, Deery, 2020) (**Appendix 11.5**).
- Underwater archaeological impact assessment, Avoca River, Arklow Flood Relief Scheme Licence No. 17D0078 (ADCO, Brady, 2021) (**Appendix 11.6**).
- Arklow Bridge (NIAH 16322046) site investigations 2019 Licence No. 17E0482 (ADCO, Brady, 2020) (**Appendix 11.7**).
- Arklow Bridge, Structural report on existing masonry 19 arch bridge and advice regarding impacts of proposed Flood Alleviation scheme on bridge (CORA, Edden, 2021) (**Appendix 11.8**).
- Proposed Flood Relief Works, Arklow, Co Wicklow. Arklow Test Excavations, Licence Reference 20E0675 (RedArc Consulting, 2021) (**Appendix 11.9**)

All proposed works to take place within a riverine, wetland, dryland and built environment have been appropriately assessed and where required archaeologically investigated in order to inform this study.

Commissioned dive and wade surveys and archaeological test investigation and monitoring as well as photographic surveys and architectural heritage surveys and recordings, all informed the decision-making process and assisted in the design detail.

11.2.2 Guidance and Legislation

As well as considering the relevant Environmental Protection Agency (EPA) guidance with respect to EIARs, the scope and methodology for the baseline assessment has been devised in consideration of the following guidelines:

- Framework and Principles for the Protection of Archaeological Heritage (1999) (Department of Arts, Heritage, Gaeltacht and the Islands),
- Guidelines for the Testing and Mitigations of the Wetland Archaeological Heritage for National Road Schemes (2005a) (TII formerly NRA),
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (2005b) (TII formerly NRA),

- Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes (2005c) (TII formerly NRA),
- Architectural Heritage Guidelines for Planning Authorities (2011) (Department of Arts Heritage and the Gaeltacht),
- Guidance Notes for the appraisal of historic gardens, demesnes, estates and their settings (2006) (Cork County Council),
- National Monuments Act, 1930, as amended,
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000,
- Local Government (Planning and Development Act, 2000) as amended,
- Council of Europe Convention for the Protection of Architectural Heritage (Granada) 1985, ratified by Ireland 1991,
- Council of Europe European Convention on the protection of Archaeological Heritage (Valletta) 1992, ratified by Ireland in 1997,
- Dresden Declaration on Flood Protection for Historic Sites. Adopted at the International Conference Flood Protection for Historic Sites. 'Integrating Heritage Conservation and Flood Control Concepts', Dresden 2014
- Wicklow County Development Plan 2016-2022,
- Arklow & Environs Local Area Plan 2018-2024,
- County Wicklow Heritage Plan 2017-2022,
- Cultural Heritage Guidelines for Electricity Transmission Projects (2015) (EirGrid).

The data sources used to compile the baseline are presented in **Table 11.1**.

Table 11.1: Baseline Data

Information Acquired	Data Source
General information	Cartographic sources including historic Ordnance Survey of Ireland (OS) maps (first edition, 6-inch 1838-41 and revised 25-inch edition 1888-1913). Archaeological Survey of Ireland Database, National Monuments Service, The Urban Archaeological Survey of Ireland for Arklow town, Placename database of Ireland, Shipwreck inventory of Ireland – Louth, Meath, Dublin and Wicklow

Information Acquired	Data Source
National Monuments, Recorded Monuments, Monuments with a preservation order, Register of Historic Monuments	Archaeological Survey of Ireland Database, National Monuments Service Record of Monuments and Places, National Monuments Service.
Protected Structures (RPS)	Wicklow County Development Plan 2016-2022.
Sites and areas of architectural heritage interest	National Inventory of Architectural Heritage (NIAH)http://www.buildingsofireland.ie8/ for Buildings and Historic Gardens and designed landscape survey.
Recently identified archaeological sites revealed through excavation and investigations, Sites of industrial heritage interest Assessment of archaeological potential	Database of Irish Excavation Reports, Archaeological Survey of Ireland Database, and the Record of Monuments and Places, National Monuments Service, Cartographic and photographic sources, Aerial photography, Other published sources, Field and site survey, dive and wade survey, archaeological test excavation.
Artefacts and finds from the River Avoca	Consultation with the National Museum of Ireland and the Topographical files of the National Museum of Ireland. Dive Survey

11.2.3 Study Area

The extent of the study area is shown on **Figure 11.1**, however for the purpose of understanding the archaeological potential within the river, along the quays and within the marsh area – where work is proposed, the development of the historic town of Arklow has been charted and discussed within this chapter.

The overall scheme layout is shown on **Drawing No. 1002, Appendix 4.1** and includes the location of the gravel trap and debris trap, the northern riverbank extension, the extent of dredging, bridge works and the extent of the flood embankment and realigned drainage channel along with the location of the flood wall. Working areas including construction compounds are shown on **Drawing No. 1065, Appendix 4.1**.

Recorded monuments, protected structures (RPS) and sites of architectural and industrial heritage interest (NIAH) that are located with 50m of the proposed works have been identified and considered as part of the impact assessment.

11.2.4 Site Visits

Site surveys and visits to the study area were undertaken on the following dates: 20th February 2018, 5th March 2018, 18th September 2019, 19th November 2019 and the 17th September 2020.

A visual inspection of the study area took place as well as monitoring of geotechnical works in the Arklow Town Marsh and Ferrybank.

A report on archaeological monitoring (Licence No. 18E0263) was produced and submitted to the statutory authorities in January 2020 (**Appendix 11.5**).

Archaeological test excavation took place in December 2020 at three of the compound locations (SC1, 3 and 6) in the townland lands of Ferrybank, Marsh and Tinnahask. Details are provided in **Appendix 11.9.** The remaining locations for compounds (SC2, 4 and 5) are unlikely to sustain direct impacts on material of an archaeological origin as the areas will be built up or existing levels/ surfaces will be reused resulting in no alteration to the topographic level of the site.

Site visits undertaken by the underwater archaeological survey team and the conservation engineer are detailed in **Appendices 11.6 - 11.8.**

11.2.5 Consultation

In 2012 initial stakeholder's consultation took place with the National Monuments Service (NMS), the Underwater Archaeological Unit (UAU) and the Architectural Heritage Advisory Unit (AHAU) of the Department of Arts, Heritage and the Gaeltacht (now referred to as the Department of Culture, Heritage and the Gaeltacht) advising the statutory body of the scope and objectives of the then perceived project. Discussion also took place with the National Museum of Ireland in relation to the then recent findings in the Avoca River.

For the presented project, early stakeholder engagement took place on 16th January 2018 and a further meeting was held on the 19th of June 2018 with representatives from the NMS, AHAU and the UAU. Discussion took place to introduce the project and the various elements concerning underwater archaeology, conservation practices and the historic built environment.

A final pre-planning consultation was held with the NMS and UAU on 26th August 2020 and with the Built Heritage section of the Department on the 30th September 2020. These meetings discussed the results of the surveys that had taken place in order to inform the EIAR process.

The Heritage Officer from Wicklow County Council was consulted on 28th September 2020 and has reverted that the assessment has been completed in accordance with statutory obligations and heritage best practice.

Figure 11.1: Study Area (extracted from drawing no 1065 in Appendix 4.1). Not to scale.

11.2.6 Categorisation of the Baseline Environment

The archaeological, architectural and cultural heritage environment is assigned a baseline rating, taking account of the importance and sensitivity (and existing adverse effects where applicable) of the receiving environment. The professional opinion of the assessor also played an important role in assigning the baseline rating.

11.2.7 Impact Assessment Methodology

Archaeological and cultural heritage sites are considered to be a non-renewable resource and such material assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity and ground disturbance works, could adversely affect these sites.

Architectural heritage is a unique and irreplaceable material asset which is given value by its design, setting, quality of workmanship and use of materials.

In this context, any change to the architectural heritage fabric, structure and setting, resulting from construction and operation activity, may adversely affect these sites.

The likely significance of all impacts is determined in consideration of the magnitude of the impact and the baseline rating upon which the impact has an effect (i.e. the sensitivity or value of the asset). Having assessed the predicted magnitude of impact with respect to the sensitivity / value of the asset, the overall significance of the impact is then classified as imperceptible, slight, moderate, significant, very significant, or profound.

A glossary of impact assessment terms, including the criteria for the assessment of impact significance, is contained in **Appendix 11.1, Glossary of Impacts and Assessment Criteria**.

11.3 Baseline Conditions

The vison for Arklow and environs as described in the Local Area Plan (2018-2024) is

To recognise, protect and strengthen the unique character, built heritage, seaside location, maritime history and natural environment of the area ,ensuring that this heritage can continue to contribute positively to the overall quality of life, biodiversity, recreation and tourism role of the settlement.

An overview of the archaeological, architectural and cultural heritage background of the study area and its receiving environment is provided in this section.

This section presents the findings of a detailed desktop study as well as a site and riverine inspection of the study area, in order to assess and illustrate the archaeological, architectural and cultural heritage potential of the area.

The desktop study includes a review of literary and cartographic sources, results of previous archaeological investigation, the RMP Archives and the topographical files of the National Museum of Ireland (NMI). While from an architectural heritage perspective Protected Structures, structures and historic gardens of an architectural heritage interest (NIAH) and structures of industrial heritage interest were assessed and reviewed in relation to the scheme.

The results of the wade and dive surveys, archaeological test excavations and architectural heritage surveys are also included in order to fully understand and assess the impact of the scheme on the receiving cultural heritage environment and individual heritage assets (**Appendices 11.2, 11.3 and 11.5-11.9**).

A description outlining the chronological development of the study area from the prehistoric to modern period is provided.

Aspects of the proposed scheme are described from west to east (i.e. from upstream to downstream). Where relevant, elements to the south of the river are described first, followed by the works to the north of the river channel, with the description of the marine elements last.

11.3.1 Prehistoric Period

The earliest known evidence for prehistoric activity in Arklow dates to the Bronze Age, though later Mesolithic flint scatters have been found along Wicklow's coastline, attesting to much earlier human activity (Grogan and Kilfeather 1997).

The most impressive Late Bronze Age assemblage from the county is that contained in the hoard from Kish, c. 2.8km south of Arklow town. The hoard was found in the last century, during the removal of a field fence, and contained a socketed spearhead, two axeheads and a knife (Eogan 1983).

Settlement evidence is difficult to pinpoint for the later Bronze Age period in the county, however, fulachta fia may be indicative of the nature of lowland settlement during this period. These have a limited distribution in Wicklow, being confined to the eastern half of the county. During archaeological monitoring along the then-proposed bypass of Arklow town, a burnt mound was identified. The site was situated c. 1.5 miles south of Arklow, and to the west of the old Dublin–Wexford road. Excavation revealed three subcircular areas of burnt stone and charcoal concentrations. Some shattered flint and one fragmented worked piece was recovered. A wooden feature was also revealed, partly underlying the burnt spreads. The wooden feature consisted of c. 23 narrow lengths of wood, laid in a north–south direction, forming a deliberately prepared surface. Under this feature, a series of moderately preserved wooden stakes were excavated. A sample of this wood was dated, and a felling date of BC 856 was recorded (Licence No. 97E0128; Excavations Bulletin Ref. 1997:609; SMR WI045-015).

11.3.2 Pre-Viking Settlement

Arklow is generally considered as being a town of Viking origins, however long before the Vikings arrived there was a settled fishing community at the estuary of the river Avoca. Though not dated, a section of an early dugout canoe was found on the south side of the river measuring 6ft long and 25 inches in maximum width, which may provide evidence for pre-Viking activity in the area.

In the 2nd century BC, the Greek cartographer Ptolemy on his map of the world indicated on the Irish coast a settlement called *Manapii* which historians now agree is Arklow.

The town also has associations with St. Kevin in the 5th century where it is said that he blessed the fishermen and their boats, that year we are told that the sea yielded a rich crop and the community was free from sickness (Rees, & Charlton, 1985).

11.3.3 Viking Arklow

Arklow has a rich maritime history and tradition. The name Arklow is claimed to derive from its Viking heritage; from 'Ark' and 'Lo' meaning Arknell's river meadow or in Irish 'An tInbhear Mor' which means the great haven, both explanations provide a reference to its location at the mouth of the Avoca River. The Vikings are said to have established a permanent port here in the 9th century and this was consolidated in the 12th century by the Anglo Normans.

The river estuary would have been an attractive feature and presumably provided safe harbour for the Viking ships. It is not known when a more formal harbour was constructed, but the repair of the 'haven' is mentioned in the 1571 covenant between the earl of Ormond and the burgesses of Arklow (the townsmen) (Curtis 1932, 43). According to the Urban Archaeological Survey for Arklow, the original harbour was probably located on the east side of the town where there are still quays today (Bradley and King 1989).

However, another possibility for the location of the harbour was suggested by Rees (2008b, 389) as the section of river that is located at the edge of a steep scarp from where the castle is situated. In today's terms this is located to the north of Main Street to the rear of St Mary's Park and carpark. This section of the river known today as *Pound-a-Cholly*, which is thought to be a corruption from the Irish meaning 'Harbour Pool' and may indicate the location of the town's harbour in the middle ages. The underwater archaeological report (**Appendix 11.6, ADCO 2020**) provides further observations on this and details of their findings from underwater surveys of the area.

There is direct and circumstantial evidence of an early Viking raiding base on the Wicklow coast, probably at Arklow, in the mid-830s. Heathens from 'Inber Dee', which may well refer to Arklow, are mentioned in the annals as having raided the ecclesiastical establishment at Glendalough, and other monastic settlements. However, there is no indication as to whether or not the 'Inber Dee' base marks the beginning of permanent inhabitation of the County Wicklow coast. Burials, south of Three Mile Water, and the Murragh, at Wicklow, seems to imply more regular inhabitation of the Arklow–Wicklow region before the second half of the 10th century.

If the 12th century extents of the lands of Arklow and Wicklow area are at all reliable indicators, there must also have been a considerable rural, agriculture-based, settlement in this region, for which it is conceivable that Arklow and Wicklow were themselves the urban nuclei. The degree to which they were true towns like Dublin, with a trading economy and professional craftsmen, is indeterminable (Etchingham 1994) and no material evidence has been revealed through excavation to date.

11.3.4 The Development of Arklow Town (south of the river channel)

The medieval town of Arklow was situated at the foot of a hill, on the south bank of the Avoca River and its estuary. Theobald Fitzwalter was granted the manor of

Arklow by Prince John, in 1185. The property remained in the hands of Theobald's descendants, the Butlers, throughout the Middle Ages.

The medieval parish church of St Mary (RMP WI040:02903) is believed to have been located on the north side of Main Street. St Mary's was the secular parish church for the townspeople of Arklow during the medieval period. It was established shortly after the town the arrival of the Anglo-Normans in the late 12th century. The exact location of St Marys Church is unknown and archaeological investigations have yet to reveal its location.

Thomas Fitzwalter founded the Dominican Friary (RMP WI 040:02901) in 1264. He was buried there in 1285. The Dominican friary was located in the rectangular site marked 'graveyard' on the south side of Main Street. The friary was suppressed in 1539, but parts of the church and claustral buildings survived until the mid–eighteenth century (Gwynn and Hadcock 1970). No buildings survive today and, like the parish church of St. Mary, the site just south of Main Street, has been turned into a public park. Price also suggested that there was a passage (RMP WI040-029005) leading north from the Dominican Friary towards the south bank of the River Avoca. The passage at one time contained a small stream, but it has now been filled in and covered over.

The 1571 covenant between the earl of Ormond and the burgesses of Arklow mentions that the burgesses shall 'at their own charge make strong gates, ditches and pales for the better defence of said town' (Curtis 1932-43, v, p.211). There is no conclusive evidence that these defences were ever built, and there are no surviving remains. The alignment and length of the long boundary, however, that delimits the plots on the south side of Main Street suggests that some form of defence probably existed, possibly an earthen rampart and fosse.

The street plan is linear based on the Main Street which runs east-west following the line of the river and has an extension at the eastern end towards the river. The burgage plot pattern is clearly visibly on the historic Ordnance Survey mapping where narrow properties run back to the river on the north side and have what is virtually a common boundary along the south. The bridge and Bridge Street connecting the town with Ferrybank clearly cuts across this pattern and is evidently a later development.

The 13th century castle (RMP WI040:02902) whose remains sit on high ground at the west end of the town, overlooking the river, possibly replaced a pre-Norman structure (Bradley and King 1989). The remains of randomly coursed rubble stone consist of a stretch of curtain wall and a circular corner tower built on a rock outcrop. There is a basal batter approximately 2.5m high on the north side. The curtain wall, some 8m high at its western end, runs southeast from the angle tower before turning almost due south, where it reduces in height from 6m to 4m.

In the 14th century, Arklow came under pressure from the native Irish, and the castle (RMP WI040:02902) was captured in 1331. The town, however, survived the Gaelic resurgence and managed to remain a bastion of the Pale and in the sixteenth century saw the Butlers reasserting their interests in the manor. An important document from 1571 states that the town was in a state of dilapidation, and the castle, harbour and defences are specifically mentioned as being in poor

condition. The town remained loyal to the crown during the nine years' war, and it was a supporter of the confederate cause between 1641 and 1649.

The town surrendered to Cromwell in September 1649, as his army passed through, on route to Wexford.

In 1700 the Butlers sold out their interest in the town and manor of Arklow to John Allen of Stillorgan; an event which effectively closes the history of the medieval town.

By the early 19th century a lucrative oyster fishery had been cultivated by the local fishermen and Arklow was one of the few ports whose fishermen were 'constantly engaged in fishing', which implied that fishing was their sole means of livelihood (Rees 2008a, 30). A barter system was in place whereby the fishermen would exchange the oysters for coal from England (Flynn 2003, 66). In 1824, the Arklow Lifeboat Station was established and the following decades witnessed Arklow developing into one of Ireland's most important maritime ports (Flynn 2003, 66-67).

Lewis (1837, 60) describes Arklow as a sea-port, market and post-town and states that in the early 19th century, the harbour was accessible only to small boats because the passage was sinuous and subject to shifting sands.

The town was divided into the Upper and Lower towns, of which the latter is called the "*Fishery*" on the south bank of the Avoca River. The Upper town corresponds to the settlement centred on Main Street with the houses being "*neatly built*". The houses of the "*Fishery*" or Lower town contained 702 houses in 1831 and these were mostly of thatched houses. The area flourished in the period between 1800 and 1950 and maintained a separateness from the main town, being seen as a distinct location. The parish rector, for example, Rev. Henry Lambert Bayly, wrote in the early 19th century that the fishermen 'are a race distinct from the other inhabitants, occupying a separate part of the town' (Rees 2008a, 30). George du Noyer in 1861 depicted the fisheries as shown below:

Figure 11.2: George du Noyer 1861 depicting the area known as 'the fisheries' on the South Quay

A fever hospital and dispensary were erected in 1821 at an expense of £550. The fever hospital is described by Lewis as a "neat square building, in a healthy situation just within the town".

Lewis records that there were several public schools, six private schools and two Sunday schools (Lewis 1837, 61).

The Dublin-Wexford Rail Line and the success of the Avoca Copper Mines resulted in the further growth of the port in Arklow. New piers were constructed to facilitate additional ships to export ore from the mines.

By the 1870s Arklow had become one of the main schooner and fishing ports in the country and carried cargoes from Mediterranean and Atlantic ports (Flynn 2003, 66-67).

The Avoca River played a vital role in the historical development of Arklow's seafaring economy and maritime culture, providing a transport conduit for the import and export of minerals to service the upstream mining activities around Avoca. By the late 19th century Arklow was a thriving port town with its own fishing and shipbuilding industry.

11.3.5 The Development of Ferrybank (north of the river channel)

The topographical files from the National Museum of Ireland (NMI) refers to a mound in Ferrybank on the northern bank of the Avoca River where finds consisting of a cist containing an urn and human remains were revealed (there is no NMI register number). The discovery was made in 1839 and appears to be consistent with the findings of a late Bronze Age (1200BC-500BC) burial place. Price (1934, 51) records the site as '*at Ferrybank near Arklow there was in 1839 according to O'Curry a green mount in which whilst digging and carrying away for manuring land, there were found some sepulchral urns containing ashes and bones partly consumed by fire. Several pieces of broken urns are still visible, unfortunately none of the pottery was preserved*'. As the site's exact location is unknown, it is not scheduled for inclusion in the next revision of the RMP. There is no visible trace of this site today.

The Arklow Town Marsh lies adjacent and to the west of an area recorded as a site of a graveyard (RMP WI040-029008-), this area is now occupied by houses along Ferrybank Road.

The site of this graveyard (RMP WI040-029008) has been identified by O'Curry and Ronan as the site of the Cistercian Abbey (RMP WI040-029004). The site is described in the Archaeological Inventory of Wicklow as '*situated on low-lying marshy ground, probably the site of a Cistercian Abbey, granted by Theobald Walter to the Cistercians of Furness. The abbey possibly was only in existence for a short period of time'* (Gwynn & Hadcock 1970, 126). The abbey (RMP WI040-029004) was founded on the 'island of Arklow' at the beginning of the 13th century (Gwynn & Hadcock 1970, 126). Lewis noted that in 1837 'the cemetery of the Cistercian Abbey is still being used as a burying-place by the Roman Catholics'.

The description of the abbey being founded on 'an island' and the discovery of the graveyard in the sandbank support the view that they were located in the same place. It was part of the medieval borough of Arklow.

The site (the 'Island of Arklow') was granted by Theobald FitzWalter to the Cistercians of Furness for the foundation of an abbey, which may indicate the beginnings of Arklow as an Anglo-Norman town (Bradley & King 1989). The Cistercians commonly preferred isolated, rural, locations, perhaps indicating that the Viking settlement here was no longer in existence or simply that this area was sufficiently removed from the Viking settlement south of the river.

By 1205 Fitzwalter had transferred the monks to a new monastery in Abington, Co. Limerick (Gwynn & Hadcock 1970, 126). Presumably they had established some form of temporary church by this time but it is not clear what happened to it after 1205. O 'Curry (O.S. Letters: Wicklow) noted that:

'an ancient graveyard with the site of a church was founded on the north side of the Bridge of Arklow in a sandbank in Ferrybank townland in this [Kilbride] parish. Several skeletons were found here, which were covered in flags, the sides being built with stones of various sizes and forms. The surface of the place is still covered with human bones…' (Ronan 1927, 103-4, note 9).

Human skeletons in what appear to have been lintelled graves or long cists were found on this site prior to 1927 (marked as 'Site of Grave Yard' on the First edition 1838 OS six inch map). Ronan (JRSAI 1927, 103) describes the site as follows *"An ancient graveyard with the site of a church was found on the north side of the bridge at Arklow. Several graves containing skeletons were found here which were covered with large flags. The surface of the place is still covered over with human bones"*.

A trapezoidal tombstone, possibly medieval in date was also found and relocated to Shelton Abbey. Houses and associated gardens that face on to Ferrybank Road now occupy the site (Inventory Ref. No. 828, survey date 1990). There are no extant remains of the burial ground (RMP WI040-029008) or abbey (RMP WI040-029004) but remains may survive beneath the existing gardens.

In support of this theory, in 1997, at Ferrybank, human remains were revealed when drainage work was taking place on the opposite side of the road to this recorded burial ground/ graveyard. The human remains were found in a trench, oriented east-west within the footpath outside the local Centra Shop and along the road extending north to south at a depth of approximately 1m. The disarticulated bone was found below existing services in a bed of yellow sand and this may indicate that the burial area could extend beneath the existing road from the recorded burial site/ graveyard (RMP WI040-029008).

The assemblage was analysed in 1997 and again in 2012 and was found that the disarticulated remains comprised 17 individuals (O'Meara 2012). Two dates were obtained between 1200-1300 AD, placing the remains in the medieval period. The remains comprised:

- 1 middle adult male (35-49)
- 1 middle adult female (35-49)

- 1 young to middle adult female (38.2 +/- 10.9 years)
- 1 older adult female (50+)
- 3 adult females
- 3 adult males
- 2 late adolescents (one female approximately 18 years old)
- 3 juveniles (2-13 years)
- 1 infant (birth to 2 years)
- 1 perinate (in or around the time of birth)

At the east end of the north quay, the Kynoch explosive plant was located from 1895 to 1918 and it its peak during World War One employed over 3000 people. The factory covered over 400 acres and was in many ways a self-contained complex of buildings and streets with its own hospital, housing and entertainment venues.

The discovery of three Anglo-Norman coins, deposited c. 1207 was provenanced to a sandbank at the mouth of the River Avoca in 1834 (UJA xxix 1966, 133-4).

Evidence supporting the Viking origins of Arklow is attested to by the discovery of a possible female Viking grave containing two, very ornate oval “tortoise” brooches with an interconnecting silver chain and textiles surviving from the tenth century burial (NMI S.A. 1901: 50-52). The burial was discovered in 1900/1901 and cannot be more accurately provenanced than being discovered between Threemilewater and Arklow Town.

The National Museum of Ireland’s (NMI) Register for stray finds in Arklow are presented in **Table 11.2**.

Table 11.2: NMI Register for Arklow, Co Wicklow

NMI Register No	Find	Material	Townland	Find Place	County
1935:56	Needle	Copper alloy	Arklow	unknown	Wicklow
SA1901:50 & 51	Brooch x 2	Copper alloy	Unknown	Between Three Mile Water and Arklow	Wicklow
SA1901:52	Chain	Silver	Unknown	Between Three Mile Water and Arklow	Wicklow
2012:86 -94	Human remains	Bone	Ferrybank	Ferrybank. R772	Wicklow

NMI Register No	Find	Material	Townland	Find Place	County
2012:95	Animal remains	Bone	Ferrybank	Ferrybank. R772	Wicklow
2012:96-100	Human remains	Bone	Ferrybank	Ferrybank. R772	Wicklow

11.3.6 The Avoca River

The Avoca River played a vital role in the historical development of Arklow's seafaring economy and maritime culture, providing a transport conduit for the import and export of minerals to service the upstream mining activities around Avoca. By the late 19th century Arklow was a thriving port town with its own fishing and shipbuilding industry. The underwater archaeology assessment report (**Appendix 11.6**) describes this environment in detail.

The riverine environment is considered to be of significant archaeological potential and as stated above would have attracted settlement and passage through all periods. This is borne out by the settlement of Arklow town which developed because of the strategic importance it held along the Avoca River. Throughout the ages, the river has been as an important route way between the Wicklow Mountains and the Irish Sea.

The zone of archaeological potential for the historic town of Arklow (RMP WI040-029) encompasses the north and south banks of the River Avoca from where the river widens before it enters Arklow town. The location of Arklow Bridge within Arklow town may coincide with the earliest fording point across the river Avoca. There is a potential, that an earlier crossing point may have been located at this point as there can be successive use of such strategic locations due to the particular suitability of the river crossing (e.g. width of channel, flow of water etc.).

The present bridge dates to the 18th century and is a protected structure (RPS A26) and is listed by the NIAH (Reg. 16322046) and attributed a rating of regional significance. The bridge is described in detail in the architectural heritage section of the report and the conservation report (**Appendix 11.8**, CORA 2021).

It is possible that subsurface archaeological evidence, such as previously unrecorded and submerged river crossings, landing points or stray finds, may come to light during any dredging works of the river. This has been attested to by the findings of the underwater archaeological assessment (**Appendix 11.6, Figure 9**). Previous to this, canoe was identified (NMI I.A. 46/66) in 1966 on the south bank of the Avoca River, in the townland of Tinahask Lower (4 South Quay Arklow). Upon inspection by the National Museum of Ireland, it was suggested that the boat had been washed down from further upstream after a period of flooding and has been attributed to Yardland townland, west of the town of Arklow. The vessel was of indeterminate date.

In 2010, a wooden vessel (NMI IA32/2010; 245) was revealed just upstream of Arklow Bridge. It was inspected from a secondary position by the National Museum of Ireland (NMI) and removed to Lanesboro for conservation purposes (pers. comm. Nessa O'Connor, NMI, 2012).

Stray finds located to the Avoca River that are on the National Museum of Ireland's (NMI) Register are presented in **Table 11.3**.

Table 11.3: NMI Register for the Avoca River, Arklow

NMI Register No	Find	Material	Townland	Find Place	County
2002:209	Ship timber	Wood	Ferrybank	North beach, Arklow	Wicklow
2010:245	Logboat	Wood	Arklow	Avoca	Wicklow

11.3.7 Recorded Archaeological Monuments

Only the south-eastern tip of Arklow Town Marsh is located within the zone of archaeological potential (ZAP) for the Historic Town of Arklow (RMP WI040-029), as represented on the RMP published map (1995) (**Figure 11.3** and **Figure 11.4**).

The ZAP as currently represented on the Archaeological Survey of Ireland (ASI) online Historic Environment Viewer has been enlarged to incorporate the north bank of the river / southern edge of the Marsh and to encompass the junction of the R772 Road (Ferrybank). The enlargement of the ZAP at Ferrybank allows the inclusion of the recorded site of a graveyard and a Cistercian abbey (RMP WI040-029008 & -029004).

Figure 11.3: Published RMP map showing Zone of Archaeological Potential (in blue/purple) for the Historic Town of Arklow, (RMP WI040-029)

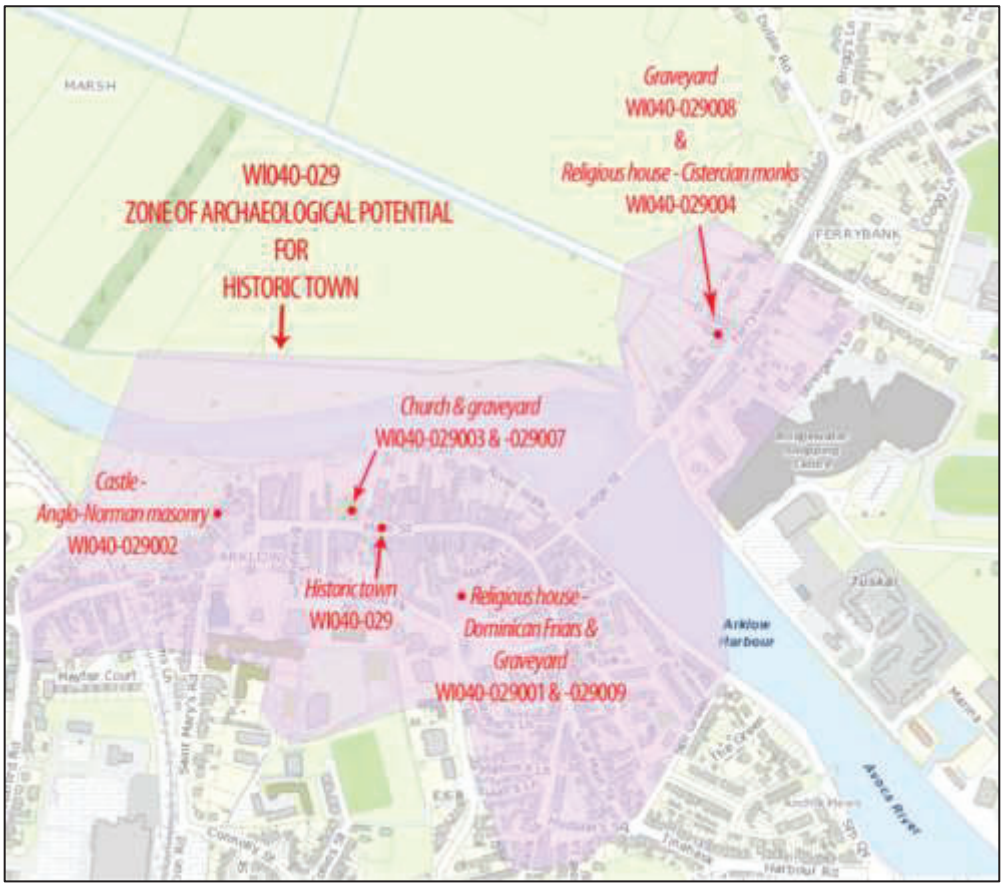

Figure 11.4: Archaeological Survey of Ireland, Historic Online viewer showing Zone of Archaeological Potential for the Historic Town of Arklow (RMP WI040-029) and individual RMP sites

11.3.8 Previous Archaeological Investigations – Arklow Town

Below is a list of archaeological investigations that have taken place within and adjacent to the area of archaeological potential for the historic town of Arklow (RMP WI040-029). These investigations are shown on **Figure 11.5**.

Table 11.4: Archaeological Investigations

License No	Bulletin No	Archaeologist	Location	Findings
00E0891 & 00E0826	2000:1078 2000:1095 2001:1383	Redmond Tobin, c/o Margaret Gowen & Co Ltd	Rathnew to Arklow Feeder Mains Pipeline	No archaeological significance
00E0891	2001:1078	Redmond Tobin, c/o Margaret Gowen & Co Ltd	Arklow Town Gas Pipeline	No archaeological significance
00E0891 ext	2003:2065	Redmond Tobin, c/o Margaret Gowen & Co Ltd	Main Street, Arklow, gas pipeline	Urban medieval and post-medieval
98E0187	1998:684	Donald Murphy c/o Archaeological Consultancy Services Ltd.	South Quay, Arklow	No archaeological significance

License No	Bulletin No	Archaeologist	Location	Findings
03E0737	2003:2064	Kieran Campbell, Boland Archaeological Services Ltd	Ferrybank	Post Medieval/ Modern stoneware vessels
05E0686	2005:1691	Eoin Sullivan, Margaret Gowen & Co. Ltd	Bridgewater Centre, North Quay	No archaeological significance
05E1375	2005:1692, 2006:2144	Melanie McQuade, Margaret Gowen & Co. Ltd	4 River Walk	No archaeological significance
06D059, 06R129	2006:2143	Rex Bangerter, The Archaeological Diving Co. Ltd	North Quay, Arklow	No archaeological significance
07E0433	2007:1997	Catherine McLoughlin, Stafford McLoughlin Archaeology	62 Main Street, Arklow	No archaeological significance
07E0315	2007:1998	Maurice Hurley	Main Street Upper, Arklow	Post-medieval deposits
12D008, 12R036	2012:637	Rex Bangerter, The Archaeological Diving Co. Ltd	River Avoca	Riverine. No archaeological significance.
12E162 ext	2013_523	Yvonne Whitty, De Faoite Archaeology	Arklow town	No archaeological significance
15E0118	2015:228	Paul Duffy, IAC	South Green and Harbour Road, Arklow	No archaeological significance
16R0219	N/A	Niall Brady, ADCO	Arklow Bay	Marine geophysical survey.
17D0078, 17R0197	N/A	Niall Brady, ADCO	Arklow Bay	Underwater inspection confirmed the absence of archaeologically significant features exposed on the seabed surface.
18E0363	2020:109	Siobhan Deery, CDHC	Arklow Town Marsh & Ferrybank	No archaeological significance
17E0482	N/A	Niall Brady, ADCO	Arklow Bridge	Riverine. Starling piles at the base of the bridge piers on the west side of Arklow Bridge were recorded.
18E0084	2018:172	Faith Bailey, IAC	Boland's, Main Street	No archaeological significance
18E0304	2019:152	Yvonne Whitty	Back Street	Urban post medieval
19E0072	2019:311	TVAS	Abbey Street	No archaeological significance

License No	Bulletin No	Archaeologist	Location	Findings
20E0675	N/A	RedArc Consulting Ltd	Tinahask Lower, Marsh, Ferrybank	Post medieval structural remains, cut archaeological features, prehistoric lithics, medieval and post medieval pottery revealed.

Archaeological monitoring was carried out for the Rathnew to Arklow gas pipeline (Licence No. 00E0891). In Arklow town, the route traverses the zone of archaeological potential for the historic town (WI 040:029). Planning permission was approved to strap the gas pipeline to the side of the bridge in order to avoid any excavation works in the river. Trenching on the south quays revealed that a 0.5m deep concrete road surface sealed 1.6m+ of infill. The fill was mainly composed of sand, course gravel and pockets of large cobbles and clay. Further south and for the length of the quay, the underlying stratigraphy was composed of natural yellow/red, sandy clay sealed by the road surface.

Monitoring took place within the zone of archaeological potential for the historic town along Main Street (WI040-029) of Arklow. The trench was 1.5m deep and 0.5m wide and revealed post-medieval material confirming that the present streetscape is relatively unchanged. Archaeological deposits were sealed beneath the existing footpaths, the street is cut by post medieval culverts placed to carry storm and wastewater to the river.

Along Abbey Lane, located to the south of Main Street, a number of burials were encountered outside the bounds of the Dominican Abbey (RMP WI040-029009). These burials were cut into a significant disturbed linear area which follows the line of the rear boundaries of Main Street. This feature may represent a section of the 19th century town defences. _

An archaeological assessment at south quay in Arklow for a proposed residential development was carried out under licence no. 98E0187. The excavation took place on the south bank of the Avoca River within 300 metres east of the archaeological zone of potential for the historic town of Arklow (WI 040:029). Two trenches were dug. Trench 1 was 88m long, 1m wide and 2m deep. At the south end of the trench was a black, organic layer, 0.3m thick, containing 19th-century pottery. It sat on natural estuarine gravels. At the north end a layer of red brick rubble overlay the natural gravel indicating post-medieval archaeological deposits. (Excavations 1998).

The excavation of a trench for electricity cables which extended from the landfall on the North Pier to an ESB substation at Killiniskyduff, (c.3.2km in length) was archaeologically monitored (Licence No. 03E0737) for a distance of 1800m. This is the section that ran along the former foreshore and reclaimed salt marsh. The cable trench was 1.2-1.4m deep and comprised stone rubble and industrial waste which was dateable to the late 20th century.

Monitoring also recorded the reclaimed salt marsh level with modern household rubbish overlying it. Many fragments from large chemical stoneware vessels occurred within the sand at a depth of 0.6-0.9m.

The vessels were flat-bottomed, straight-sided containers and bore an oval stamp, 'DOULTON & CO. LIMITED LAMBETH'.

Monitoring (Licence No. 05E0686) in advance of the construction of the Bridgewater Shopping Centre revealed that the shallow topsoil (0.15m) overlay disturbed clay which contained a high proportion of 20th century refuse, including ceramics from the pottery works in the town. The refuse deposits were in excess of 2m deep.

At 4 River Walk on the south bank upstream of Arklow Bridge, the monitoring (Licence No. 05E1375) of the excavation of the footprint of a building revealed fill and sterile gravel deposits up to 0.6m below the current ground level with some demolition rubble in the upper level.

During the laying of a 750mm diameter flood relief outfall pipe along the north quay to the Bridgewater Centre, no archaeologically significant material or structures were encountered as part of the survey (Licence No. 06D059 and 6R129).

Test excavation at No. 62 Main Street did not uncover anything of an archaeological significance (Licence No. 07E0433). Test excavation also took place in the vicinity of the Ormond Cinema and the castle on Main Street. Test trenches were excavated in two areas by Maurice Hurley, associated with the castle/barracks site (Area 1) and with the southern slopes of the Avoca valley and in 'the fosse' (Area 2) (in reality a natural steep-sided valley). Finds of seventeenth–twentieth-century date occurred in unstratified contexts on the southern slopes of the 'fosse' (below the castle walls and to the west). The area in the south-west of the 'fosse' is made ground (long used as a dump known locally as 'Anthony's Alps'). The backyards of Nos 32–34 Main Street consist of *c*. 3m of modern made ground. To the west of the 'Hall' (Area 1), late seventeenth-century to modern material occurred in a garden soil that overlay natural subsoil and similar material occurred to the south-east of the Hall. Modern material overlay subsoil throughout most of Area 1, while a cobblestone surface overlay subsoil in Trench 5. No datable material was associated with the cobblestones but the surface may be associated with the military barracks and thus of 17th century or later in date. No other finds or features were revealed (Licence No. 07E0315).

As part of the Arklow Main Drainage Scheme, an area measuring 66m north-south and 30m north-west/south-east in the River Avoca, downstream of the bridge was assessed by an underwater dive survey (Licence No. 12D008, 12R036). No material of an archaeological significance was encountered. Modern debris including 20th century pottery fragments, redbrick and metallic debris was noted within the matrix of a shingle deposit located on the southern side of the river.

In 2013, site investigation works were carried out to locate the watermain, part of which was located within the historic town of Arklow and another sensitive area was the grounds of Templerainey Church. No finds or features of archaeological significance was exposed in any of the excavated trenches (Licence No. 12E162 Ext).

Monitoring (licence no. 15E0118) in advance of the Arklow Town Main Drainage Scheme at South Green and Harbour Road revealed a stratigraphy of road formation deposits overlying reclamation deposits and contaminated sands, which in turn, overlay estuarine deposits and reflects the reclaimed nature of the south quays and industrial nature of the land use. Ten metres north of the junction between South Green and Tinahask, an organic mid-brown peaty marl was encountered at a depth of 1.8m below present ground level. This could represent the former edge of the estuary which appears to have been a marshy area of shallow, brackish standing water. A fragment of Leinster cooking ware was retrieved from this context but could have been washed into the estuary and cannot be considered conclusively for dating purposes.

Underwater archaeological surveys by ADCO took place under the following licence Nos. 16R0219, 17D078, 17R197 and 17E482 (**Appendices 11.6 and 11.7**).

Ground investigation works were undertaken between September and October 2019 at the marsh in Arklow town, Co Wicklow (Licence No.18E0263) (**Appendix 11.5**) in advance of the proposed flood alleviation scheme. These works were archaeologically monitored under licence to the National Monuments Service and the National Museum of Ireland. Site investigations were initially to take the form of test pits approximately 2m x 2m, however, due to the wet ground conditions experienced in the marsh area, window sampling in 12 locations took place.

This process was archaeologically observed, and from an analysis of the logs, the sequence of strata encountered can be summarised as

- Peat –encountered in all exploratory holes and was present to a maximum depth of 3.00m BGL.
- Cohesive Deposits – encountered beneath and between the peat and were described as brownish grey or dark brown slightly sandy, slightly gravelly slit with occasional rootlets and wood fragments present.
- Granular Deposits – encountered below the base of the cohesive deposits and were bluish grey clayey slightly sandy subrounded to subangular fine to coarse sand with occasional rootlets.

An assemblage of largely nineteenth-century material was recovered by Yvonne Whitty from the uppermost demolition layer at Back Street (Licence No. 18E0304). All horizons above the natural sand bed exhibited evidence of considerable disturbance, which began in the nineteenth century and continued into living memory. The site is located 200-300m from the nearest recorded monument and the stratigraphy indicates that this area may have been prone to flooding by the Avoca River in antiquity.

Monitoring of pipe laying was carried out by TVAS Ltd on various streets in Arklow town (Licence No. 19E0072). No finds or features of an archaeological significance were revealed.

Archaeological test excavation (Licence No. 20E0675) took place at the proposed location of three of the compound areas associated with the proposed scheme, namely Site Compound 1 (SC1), Site Compound 3 (SC3) and at Site Compound 6 (SC6) at Ferrybank, Marsh and Tinnahask Lower respectively (**Appendix 11.9**).

Testing revealed that SC6 is located on reclaimed ground and produced no archaeological finds or features. It was concluded that no further archaeological work is required at this location.

Archaeological investigation at SC3 at Marsh townland produced evidence for a basement structure (1845-1865) while a disused watercourse was revealed along the northern boundary.

Structural stonework, in the form of extent walls showed that a substantial basement level has survived of Ferrybank House, a structure formerly on the NIAH (Reg. No. 16322077) which was demolished in 2012. Test excavation demonstrated that the basement was 9.00m in length southwest to northeast and 3.80m in width. The external walls of roughly coursed rubble and are generally 0.65m thick and more substantial at the gable walls of the structure. The ground floor remains of the 1865 extension was also identified to the north.

In addition to the structural remains of Ferrybank House, the remains of a well-defined stone-faced water channel and a cut granite segmental stone arch was revealed along the northern boundary of SC3. The watercourse can be followed to the north west in the form of a linear depression indicative of the extant remains of a silted up or deliberately infilled channel.

At SC1 in Ferrybank townland, archaeological activity in the form of cut features and postholes were revealed. Finds from the area included prehistoric lithics, medieval pottery (Leinster Cooking Ware and Dublin type fine ware) and post medieval pottery. While the artefacts cannot be linked directly to any activity on SC1 they should be viewed as potentially indicative of both prehistoric and medieval activity.

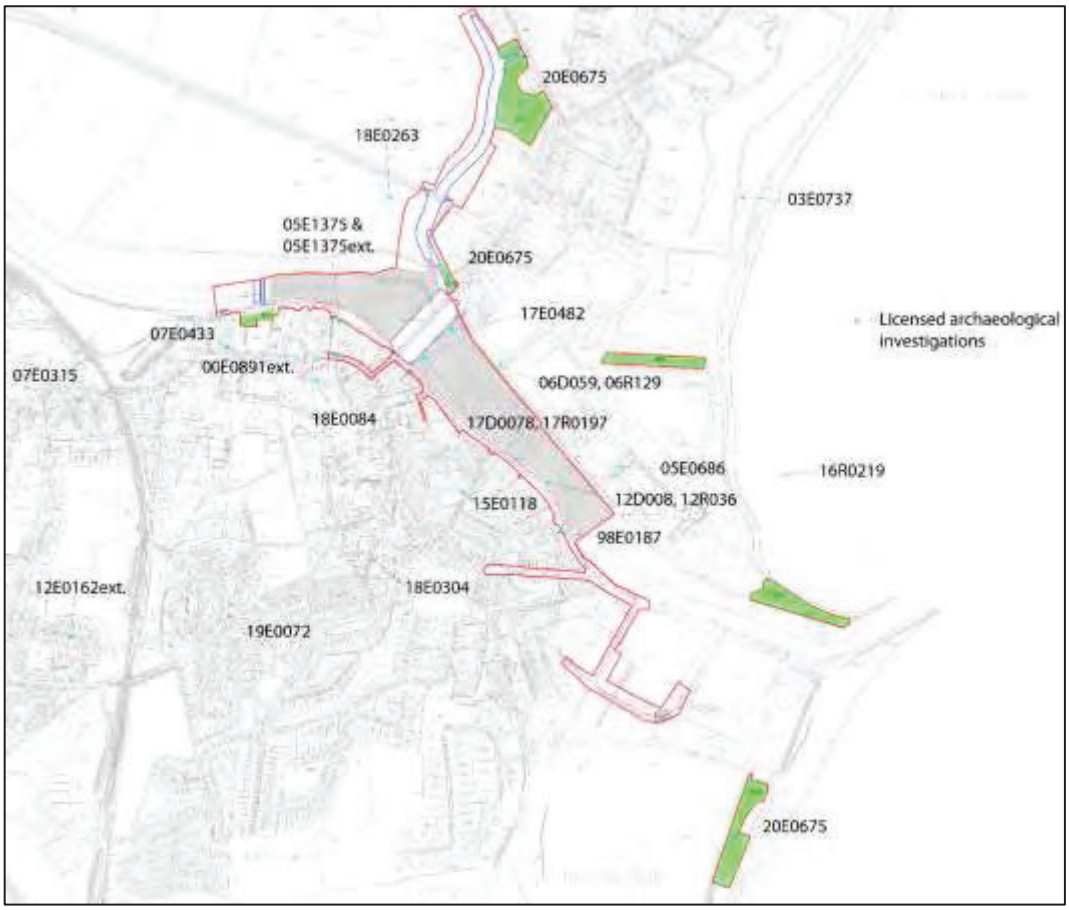

Figure 11.5: Archaeological Investigations in Arklow. Not to scale. Extracted from Drawing No 1065

11.3.9 Archaeological Underwater Survey Results

An Underwater Archaeological Impact Assessment (UAIA) was carried out by the Archaeological Diving Company Ltd (ADCO) of the Avoca River as it passes through Arklow Town to inform the Arklow Flood Relief Scheme (FRS) (**Appendices 11.6** and **7**).

The UAIA comprised a desktop review and a detailed swim search of the river channel, extending from below the M11 motorway bridge upstream of the town at, to a point downstream of Arklow Bridge, terminating at the marina on the North Quay.

The survey identified nineteen features in the river channel, all but two lie upstream of Arklow Bridge (**Appendix 11.6**, ADCO, Brady 2021, **Figure 6**).

- F01: Riverbed deposits, Avoca River
- F02: Possible section of log-boat or part of revetment
- F03: Series of stakes protruding from clay bank
- F04: Four *in situ*, vertically set, timber posts; probable remains of jetty structure.
- F05: Large, conical-shaped, riveted iron object (poss. nineteenth century)

- F06: Large length of shaped timber, semi-circular in cross section.
- F07: Iron Anchor and length of attached open-link chain
- F08: 2.5m long section of timber planking, poss. boat plank
- F09: Series of un-bonded limestone blocks
- F10: Timber plank with fitting attached to it
- F11: Displaced length of timber, probable shuttering
- F12: Displaced length of timber, probable shuttering
- F13: *In situ* timber pile/ shuttering
- F14: Timber Pile
- F15: Timber Pile
- F16: Timber Pile
- F17: Timber Pile
- F18: Arklow Bridge
- F19: *In situ* section of wreckage (boat/ship) comprising six lengths of timber planking and underlying framing piece that protrude from the riverbed.
- 17D0078:001, Ship's block

Features F02–F04 are located upstream of the FRS works and therefore there is no impact on these features as a result of the proposed scheme.

The river dredging will impact on the locations of features F1, F05-F19 and 17D0078:001.

Site Investigations (SI) at Arklow Bridge were carried out in November 2017 and in October–November 2019, aimed at gaining an understanding of the buried structure of the bridge foundations, to inform project design engineering for the FRS.

The SI works in 2017 comprised a series shell-and-auger boreholes. Three boreholes located downstream of Arklow Bridge revealed only river gravel.

The SI works in 2019 comprised a series of trial pits located under bridge arches 1, 2, 3 and 4 on the downstream side of the bridge, and a further trial pit was located immediately upstream of bridge arches 1, 2 and 3. The work focused on the south end of the bridge.

Starling piles under the foundations of the bridge were identified in the excavated trial pits undertaken as part of the SI works for the bridge. It is likely that these were installed as a protective measure to strengthen the ground and help prevent the scouring under the piers. In one instance (Pier 1, Trial Pit TP-02) it was possible to observe the stone that is inside the line of starlings, and this is interpreted as evidence for the plinth of the bridge pier (**Appendix 11.6, ADCO, Brady 2021**, plate 64).

The trial pits identified the following sequence of construction at the south end of the stone bridge:

1. Bridge piers.
2. Stone apron added between the bridge piers, effectively raising the bed level in the modern period.
3. Concrete surrounds added to the base of the bridge piers.
4. Concrete added on top of the stone apron, raising the bed level to a standard height.
5. Bridge-widening in the 1970s with an addition to the bridge piers and apron on the north/upstream side

As part of the enabling works, river bunds and vehicle way leaves will be created along the river banks to facilitate access for the dredging plant.

The works at Arklow Bridge will require the creation of bunds within the river channel at the bridge site to facilitate access.

The various way leaves and bunds will be created from existing river shingle and supplemented with introduced material where necessary.

The bunds and way leaves will be constructed each season and removed at the end of each season. This represents direct and continuous impacts on the underlying riverbed sediments over the course of the FRS construction period.

The gravel and debris trap will require a deeper level of excavation across the riverbed than is otherwise the case for the dredging regime. As such there is an opportunity to observe a deeper level of riverbed deposits at this archaeologically sensitive location (**Appendix 11.6,** ADCO 2020, **Figure 8**). An advance archaeological underwater survey will take place to examine the riverbed deposits at the location of the gravel trap.

Advance works in the form of further underwear archaeological investigation will take place on the timbers (F11-F17) that were identified upstream of Arklow Bridge. Advance works will also take place to recover the boat wreck (F19) from downstream of Arklow Bridge.

Archaeological monitoring of dredging works and all riverbed disturbance will take place. A portion of dredged material will be inspected and metal detected at site compounds SC1,2,5 and 6.

The percentage of dredged material requiring inspection will be reviewed as works progress and, if appropriate, a reduced inspection rate will be agreed with the Underwater Archaeological Unit of the National Monuments Service of the Department of Housing, Local Government and Heritage.

All work will take place under license to the National Monuments Service and the National Museum of Ireland.

11.3.10 Architectural and Cultural Heritage

Arklow has a wealth of buildings and structures of architectural heritage merit (WCC 2018 and Arklow and Environs LAP 2018-2024). There are 39 structures within the LAP boundary recorded for heritage value and listed on the Wicklow Record of Protected Structures (WCDD 2018, **Appendix 11.4**).

The historic core of Arklow is designated as an area of archaeological potential which extends to Ferrybank on the north side of the Avoca River. Despite growth over the years, the town centre has generally retained its compact form and essential architectural heritage qualities, while Main Street retains it medieval layout in the form of long, narrow, linear plots of land extending at right angles from the street to the river. Arklow was divided into upper and lower towns, the former corresponds to the settlement centred on Main Street with the houses being "neatly built" (Lewis 1837).

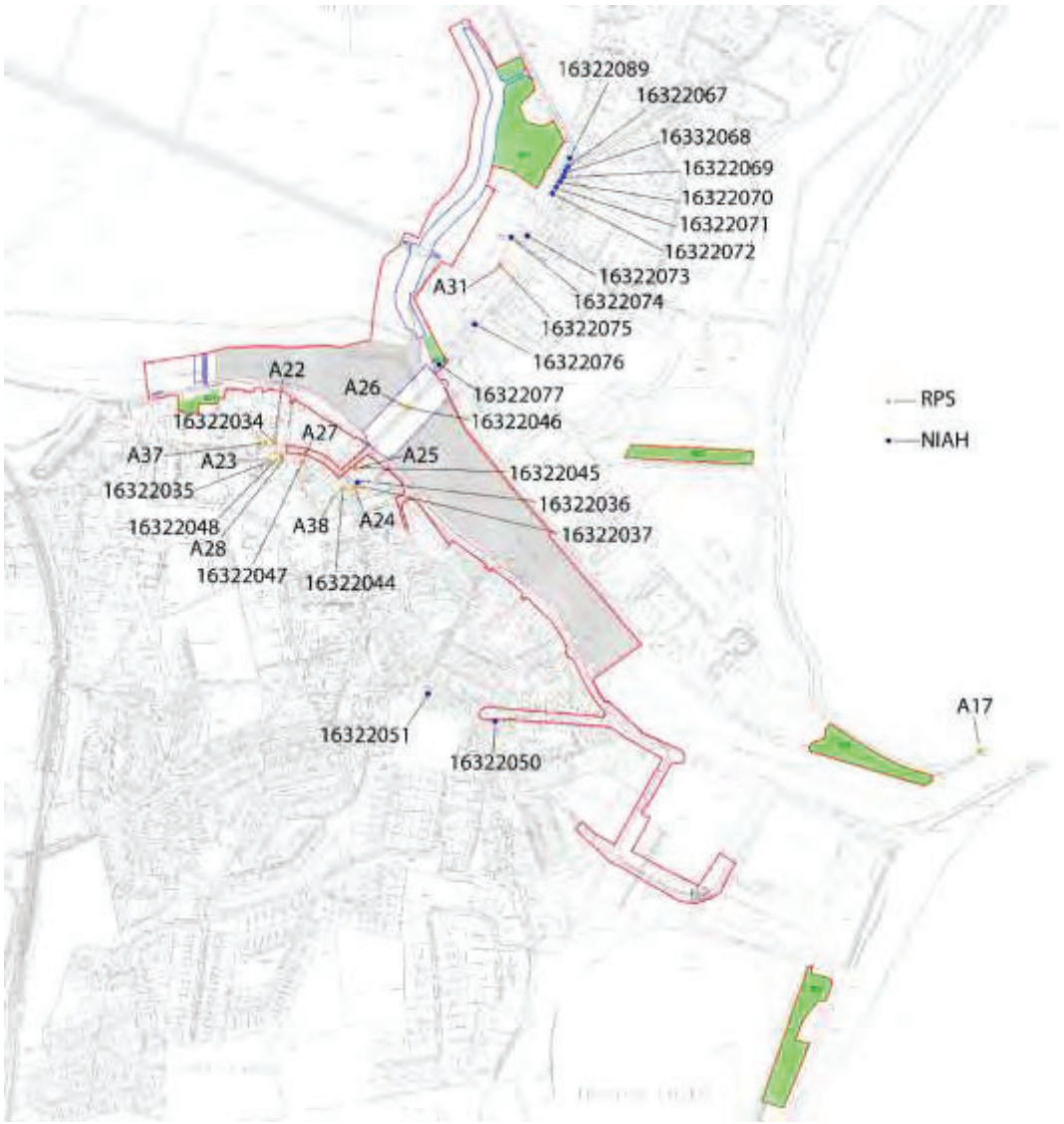

Figure 11.6: Structures of Architectural Heritage Interest (RPS and NIAH) in proximity to the proposed scheme. Not to scale. Extracted from Drawing No 1065

In direct contrast to this, the lower town or the area known locally as 'the fisheries' developed on the south bank of the Avoca River and to the east of Arklow Bridge. This area developed in a haphazard manner and was occupied by temporary structures as shown on a drawing by George du Noyer in 1861 (**Figure 11.7**). The houses of the "Fishery" or Lower town contained 702 houses in 1831 and these were mostly one storey thatched dwellings. The area grew up around the successful fishing economy and was home to the many fishermen, who lived apart from the townsfolk in the upper town.

In 1866, the cholera epidemic had the result of changing the lifestyles of the inhabitants of The Fisheries and improving living conditions in a gradual manner. Many believed the existing conditions and congested lanes contributed to the high death rate in this area of Arklow. The first phase of new housing was constructed in 1875 and consisted of a straight row of fourteen houses, in total three phases of building took place resulting in twenty four houses (St Michael's Terrace or Proby's Row) (Rees 2004).

Figure 11.7: George du Noyer 1861

Arklow Bridge (c.1755) was designed by Andrew Noble and is the longest multiple-arch bridges in Ireland, known as 'the nineteen arches'. The original design by Noble accommodated eighteen arches. The nineteenth arch was added in the 1760s to take the overflow from drainage canals that were excavated across the Marsh in order to drain the area.

The bridge presents as a nineteen-arch, stone-built, road-bridge over the Avoca River. It has a large central pier with cutwaters to both the north and south sides of the other smaller piers. The arches have roughly dressed voussoirs with areas covered in cement render above. The low parapet is also cement rendered and is topped with c. 1960s replacement metal railings (NIAH 2020).

The bridge has a total of nineteen segmental arches, ranging in span from 15ft to 23ft (4.57m – 7.01m), with a rise to span ratio of around 0.18. The original width of the bridge was about 21ft 6 inches but this was increased to 37ft 4 inches as a result of these works.

The overall length of the bridge is 495ft (150.876m) (Cox & Gould 1998, 97) however, on a map by Leut. Col. Hardy (1821) the bridge is described and shown as being 471ft long (**Figure 11.14**). The difference may be attributed to additions and alterations to the bridge over the years.

The bridge was the focal point of the Battle of Arklow in 1798 when the United Irishmen from north Wexford attempted to defeat the royalist garrison in Arklow and march on Dublin. It is estimated that 1,200 rebels and 96 defenders were killed in the Battle of Arklow and that the dead were buried in the sand pits on the northern banks of the river, some of which were exposed when the Kynoch's factory was constructed in 1897.

With the development of Ferrybank and the Kynoch's factory on the north side of the river, John Dorricot constructed a wrought iron pedestrian pathway in 1898. This intervention along with the installation of three oil operated lamps assisted pedestrian passage across the bridge from the town centre to the beginning of the suburbs.

In 1959, it was widened in order to cope with increasing traffic levels. As a result, the upstream elevation of the bridge is disguised and replaced by the presence of three concrete uprights which support the modern decking. This reinforced concrete substructure accommodates an additional carriageway and a footpath on either side of the bridge.

The bridge has been subject to periodic maintenance and repair work over the years. Apparently during underpinning works in the 1970s wickerwork mats were found under some of its piers and it has been asserted that the 1755 bridge replaced an earlier one (it may have been a timber bridge like that at Enniscorthy as there is a fortification pier in the centre of the present bridge) (O'Keeffe & Simington 1991).

However, there is no evidence to substantiate this brief reference and discussions with the Underwater Archaeological Unit (UAU) have suggested that matting within the core of a bridge maybe a protective measure (pers comm. Karl Brady, UAU, 2012) and does not always imply evidence of an earlier structure. Herman Moll's *A New Map of Ireland* (1714) does not provide any information or clarification as to the location of an earlier bridge, however it does show a series of roads on both sides of the Avoca River, possibly suggesting that a ferry service was in use or implying but not showing a bridge.

Indeed, the Urban Archaeological Survey (Bradley & King 1989) has suggested that the very name 'Ferrybank' indicates that contact between the north and south banks of the Avoca was originally by ferry or boat rather than by bridge.

In 1982, the earlier masonry work was repointed and repaired (Cox & Gould 1998, 97).

In 2013, Larsen Contracts were appointed as a specialist structural refurbishment contractor to undertake an inspection of the bridge and having identified defective areas of concrete, repairs were undertaken and a protective coating system applied.

In advance of the proposed flood alleviation scheme, the bridge has been archaeologically inspected by ADCO (ADCO 2020, **Appendix 11.7**) and structurally inspected by conservation engineers (CORA 2020, **Appendix 11.8**) findings include evidence of an historic apron between the piers, comprising stone blocks set in mortar (measuring between 300mm by 280mm, and 800mm by 500mm in size), while the stone façades of each pier are evident.

Although there have been modifications to the parapet and significant alterations to the upstream appearance of the bridge, the bridge is a landmark structure, impressive in scale and a valuable asset to the street and river scape of Arklow town.

Figure 11.8: Photo of Arklow Bridge, date unknown, taken from the South Quay showing the bridge in advance of the modern interventions., showing the wrought iron pedestrian pathway and oil lamps

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Figure 11.9: Photo of Arklow Bridge, date unknown, taken from the North Quay showing the bridge in advance of the addition of a reinforced concrete structure

By the middle of the 18th century many landowners were affluent enough to make important architectural statements in their own right and in doing so influence the building of more modest structures in their environs. Such is the case at Shelton Abbey (1770-1819), a relatively plain, eleven-bay, two storey late 18th century mansion built by Ralph Howard, the 1st Viscount of Wicklow.

The house was reinvented as an elaborate Gothic fantasy in the early 19th century to the designs of Sir Richard Morrison (the 4th Earl of Wicklow) and is viewed as a castellated and turreted structure with a single slender tower forming a focal point on the roofline. Even with this remodelling, the mid Georgian symmetry of the original building is still apparent.

The growing prosperity of the urban middle, merchant and professional classes led to an increase in large and modest size town houses. This trend is reflected in the building style of town houses on the Main Street in Arklow as well as along Ferrybank. Here the well-proportioned, neatly railed houses with low stone walls provide a suitable backdrop on either side of the entrance to Shelton Abbey from Arklow Town through the marshes. The building style reflecting the grand building at Shelton.

There is one protected structure located to the east of Ferrybank Road, this is a Methodist Church (RPS A31 and NIAH 16322074). In addition to this there are a number of residential properties that are listed in the NIAH (these are further described and photographed in the architectural heritage inventory, **Appendix 11.3**).

None of these structures or their rear gardens will be directly impacted by works involving the construction of an earthen embankment running north-south in the Arklow Town Marsh.

The boundaries to these properties are varied in material and height and consist of mature trees, hedgerows, earthen bank and ditches, walls and wooden fences and will remain unaffected by the proposed scheme.

The proposed flood wall and embankment on the north bank are shown on **Drawing Nos 1031** to **1035** inclusive in **Appendix 4.1**. A flood defence earthen embankment will be constructed running north-south on the eastern side of Arklow Marsh. It will be approximately 545m long. The embankment will be constructed with side slopes of 1:2 with a 2.5m wide flat crest at the top of the embankment to facilitate routine inspection and maintenance. It is proposed to grass this bank so over time so it will blend into its receiving environment and minimise any effect to the setting of the structures on Ferrybank Road (Appendix 11.3 details the impact to structures of an architectural and cultural heritage interest along Ferrybank Road).

A permanent 4.0m wide track will be constructed along the dry side of the embankment to facilitate future inspection and maintenance. The access track will be extended to the Dublin Road towards the northern end of the embankment. A permanent timber post and rail fence will be erected along the access track.

A planning permission was granted to demolish Ferrybank House in 2011 (Reg. Ref.114 Arklow Town Council). The structure, a three bay, two storey house with later extension to the north was built on reclaimed land sometime after 1838-41. The area now presents as open land at the northwest end of Arklow Bridge. Archaeological test excavation has revealed evidence for a basement of the three bay two storey structure dating to 1845 and the ground floor of the northern extension (1865) (**Appendix 11.9; figure 2.3, plates 2.1-2.5 and plate 2.7**).

The steeple of Saint Saviour's Church (1899) designed by English architect Sir Arthur Bloomfield presents as a graceful landmark in the skyline of Arklow.

Arklow's coastal location has greatly influenced its socio-economic development and is an important element in the sense of identity and culture within the town. While historically dependant on fishing, the development of Arklow in the mid to late 19th century relied on the development of the port to cater for the increased production of the Avoca Copper Mines. To service this trade and exports from the quarried stone from Arklow Rock, chemical for the Arklow Manure Company and Kynoch munitions factory, Arklow developed an extensive fleet of ships by the late 19th century.

To this end, quay walls were constructed to guarantee ease of export. These walls along with slip ways are located within the study area and represent an important phase in the town's industrial development. Although the quay walls have no legal protection, they are of local heritage merit.

The south quay is first shown and annotated on the 1885 OS Map of Arklow, 1:500 scale (Sheet XL.16.18 and 16.24), (**Figures 11.10 and 11.11**) and again on the 1910 25-inch revised OS mapping. By all accounts, the south quay was constructed at a later stage to the north quay which began in 1814 (see cartographic section of the report). The north quay will not be disturbed by the proposed works while sections of the south quay wall will be preserved in-situ and buried beneath the proposed flood infrastructure.

Figure 11.10: 1885 OS Map of Arklow 1:500 scale (Sheet XL.16.18) showing the line of the south quays but development to the south of Arklow Bridge

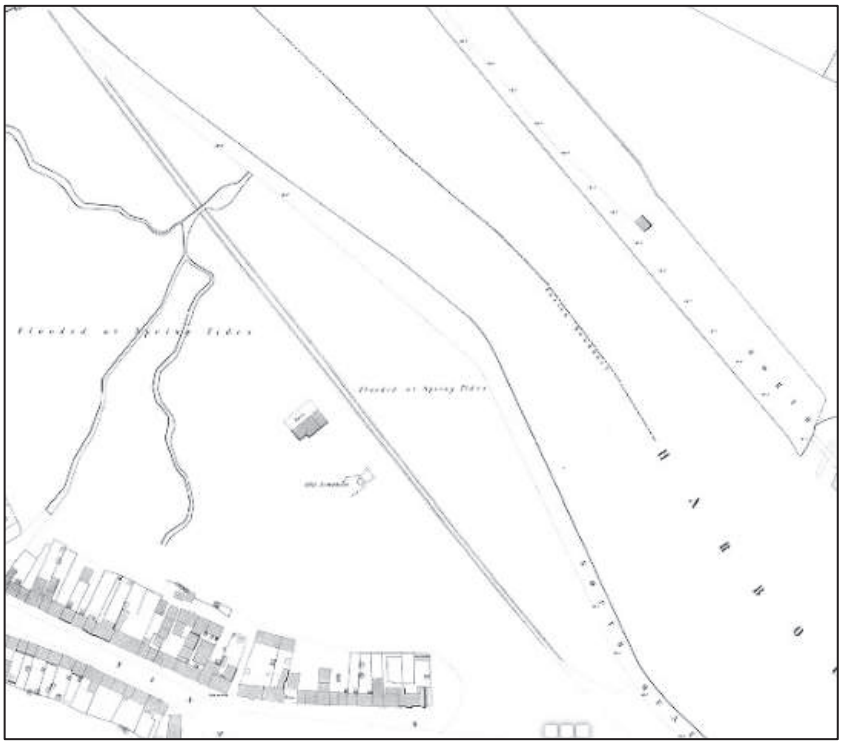


Figure 11.11: 1885 OS Map of Arklow 1:500 scale (Sheet XL.16.24) showing the line of the south quays but no development along it

The south quay wall, a late 19th century construct, appears as an intermittent structure with significant sections of rebuild, sections augmented with concrete plinths and cement facing, areas of localised rebuild and repair. The original structure consists of a rubble stone mortared wall capped with granite stone flags.

Approximately 120m of the existing quay wall will be retained at the "pinch point" along South Quay (**Appendix 11.3**). The wall will be repaired, joints raked out and repointed and missing stones replaced. This section of quay will be protected by the placing of rip-rap along its base (**Drawing No. 1047**).

Existing mooring posts located along the extent of the proposed new wall on South Quay will be removed and replaced along the section of existing quay wall to be retained (**Drawing No. 1047**).

Hyder Consulting Ltd (2008) was commissioned by White Young Green (WYG) to carry out a stability assessment on sections of the existing masonry quay walls along the Avoca River. The results obtained indicated failure in about 50% of the wall sections (2008, 7). The external stability analyses carried out on 14 wall sections revealed that the walls had factors of safety less than unity for either sliding, bearing capacity or overturning. These results concurred with the visual inspection survey, which found that between 60-70% of the walls inspected show signs of distress either in the form of cracking or ground settlement behind the wall. The report concluded that the construction of sheet pile walls is the most favourable method to improve stability as the existing quay walls cannot support the proposed flood protection works.

During the 19th century, the town had the largest fishing fleet in the Irish Sea and a thriving shipbuilding industry as evidenced by the slipway way and boat lines that used to extend out from Tyrrells & Sons boatyard (now a residential development called Anchor Mews).

Boatbuilding in Arklow is historically connected with names such as Tracey, Canterbury and the Tyrrell family. Originally at the beginning of the 1800's this work was carried out in an area known as the Back Guts or Back Cuts on the north side of the river – now Arklow Marina.

In the late 1800's John Tyrrell opened a boatyard on the south side of the river and this yard became synonymous with innovation in boat design. Initially, Tyrrell built boats were contracted by the Congested Districts Board in the 1890's to teach fishermen in the west of Ireland how to develop a fishing industry. The OVOCA followed in 1908, this was the first motorised fishing boat in Ireland or Britain and demand was high for this vessel bring increased business and expansion. While a fire in 1914 cause major damage to the yard, work and craftsmanship prevailed with the development of full-powered coasters in the shape of the JT&S (John Tyrrell & Sons) in 1919 and the INVERMORE. The most famous of the yachts to be designed and built here was the GYPSY MOTH III in which Francis Chichester won the first solo transatlantic yacht race in 1960.

The ASGARD II was designed by Jack Tyrrell and launched from the boat lift constructed in the late 1960's. John Tyrrell & Sons closed in 1994. Tyrrell built boats are still built in Arklow by the fourth generation of the family under the company name Arklow Marine Services Ltd on the North Quay.

A slipway and boat rails across the road are the only physical heritage reminders of the Tyrrell boatyard (detailed in **Appendix 11.3**).

Throughout the years, especially from 1860-1920, the hayday of the docks, the maritime culture of Arklow port, fishing and boat building provided the main source of employment and influenced the location of houses, the development of local schools, shops and services. Today it contributes greatly to the character of the town (WCC 2018).

Other elements that contribute to the maritime character of Arklow such as mooring stones and posts that are located along the South Quay and South Dock as well as ship rails that cross the road at the South Dock are detailed in **Appendix 11.3 9 (Figure 11.12)**.

During the 20th century the role of the state in providing adequate housing through local authority developments, for example Rory O'Connor Place and Abbey Street, resulted in an acceleration in the growth of Arklow from the 1900's onwards.

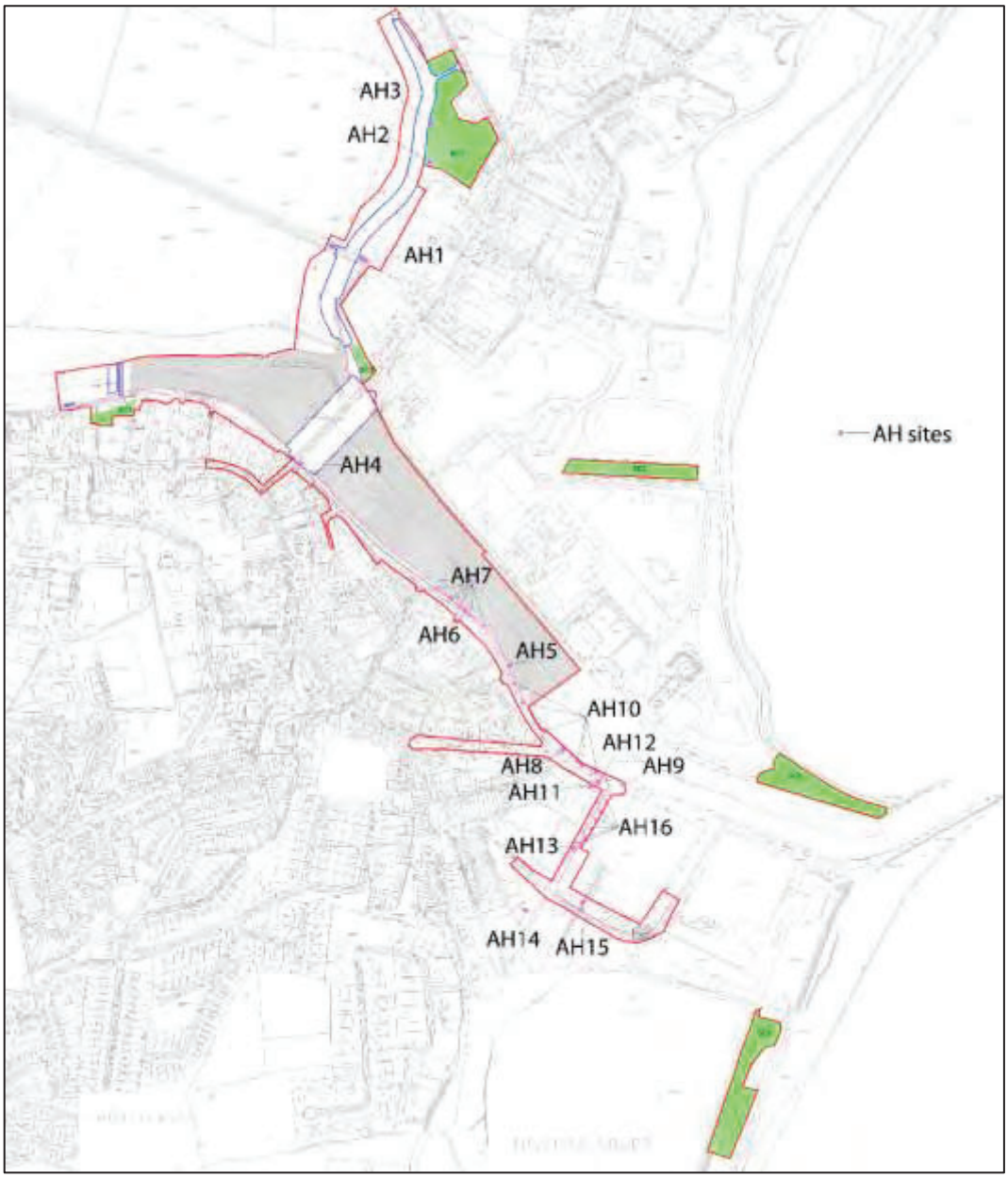


Figure 11.12 Cultural heritage sites (AH) Not to scale. Extracted from Drawing No 1065

11.3.11 Conservation Survey of Arklow Bridge

A structural survey and report of Arklow Bridge was conducted by a conservation engineer (CORA 2021) (**Appendix 11.8**). This survey addressed the proposed modifications and the lowering of the floor of Arklow Bridge. These works include the underpinning of the piers and southern abutment, remedial works, removal of existing scour slab and lowering the floor of Arklow Bridge by approximately 1m, construction of new scour protection and remedial works to bridge masonry. The survey noted that there have been significant interventions over the years and the following observations were noted to the structure:

- The bridge is structurally stable but has localised areas of masonry and mortar loss, for example at the tidal range of the piers,

- The central pier has excessive vegetation growth,
- Loose stonework was observed to the weather tops of the piers,
- The underside of the arches have been extensively shot-creted and this surface potentially obscures issues which lie underneath it,
- Tying works at arches 1,3,5 and 6 are showing signs of corrosion,

The original anti-scour riverbed detail exists in many places. This will be retained and reinstated under:

- Arch 1 – reinstate at current level over the new main sewer.
- Arch 19 – retain in-situ, existing services make this area difficult to access.

Conclusions

The three methods or combination of methods for the stabilisation of the bridge and increasing the depth of the pier have potential benefits and drawbacks (**Appendix 11.8** within Appendix 4.1, CORA 2021), in summary:

A successful underpinning regime will leave the bridge in its original form and will involve a number of steps including both temporary and permanent works. Traditional underpinning will comprise the removal of existing natural material below the existing formation level of each abutment and pier in a phased manner from the underside of each pier to a depth of approximately 1.5m below existing bed level and replaced with concrete. The work will be carried out from the existing bed level. Grouting will be utilised under the arches to control ground water and support the sides of the excavations.

Micro-piling from the riverbed level, around the base of the piers is the least invasive option but leaves a larger visual impact to each pier and reduces the area between the arch bases.

Mini- piling from the bridge deck through the piers causes the largest disruption to the original fabric and structure of the bridge and this methodology will also require grouting. However, this method is the least visually obtrusive and in the long term will allow a better understanding of the historic structure.

All these options require grouting, this is required:

- To improve the structural strength of the bridge piers;
- To improve the bearing capacity and stability of the underlying natural material below pier formation level; and
- To control ground water flow where excavations are required below existing bed level.

Grouting is irreversible and can change the fabric of the historic masonry structure. Further site investigations will be scheduled for the first year of the programme and will fully define the extent of specialist masonry repair works required. These investigations are likely to confirm the existence of any previous grouting and allow an appropriate grouting regime to be established for an historic structure.

The grouting process will be preceded by water flushing to determine if there are any paths through to the face of the historic masonry. Any routes found will be plugged with mortar appropriate to the historic masonry.

Critical to the success of the underpinning process is the soil type under each of the piers as previous SI works indicate softer ground at lower levels and therefore the depth of the underpinning may become critical. The detailed design will determine the likely methodologies and more than one are likely to be suitable. The rotary drilling for the grouting will provide the most detailed and extensive information on the underlying soils and allow the contractor to select the most appropriate method. A phased programme for underpinning has been designed where works will take place to one third of the bridge each summer over three summers (Chapter 5, Figures 5.14-5.16).

Recommendations

Maintenance and repair works to take place include vegetation growth, mortar loss, loose stonework, corroding ties and obscured issues behind later shotcrete. Specifications for repair works are outlined in **Appendix 11.8** within Appendices 4.3 and 4.4, drawings SK-01-SK-10 (CORA 2021).

Works to the masonry of the historic part of Arklow Bridge will include repairs to the previously applied gunite to the soffits of the arches, repairs to the masonry of the older sections of Arklow Bridge and removal of the vegetation growing on the bridge. Defective joints will be raked out and repointed. Deeply embedded roots will be drilled and injected with a suitable herbicide where to remove them would prove destructive to the integrity of the masonry. All loose stones will be re-seated and eroded mortar raked out and repointed with appropriate mortars. The render to the underside of the arches will be checked for integrity and where defective, removed and the masonry repaired. Areas of render requiring repair / reinstatement will be carried out in materials more appropriate to the original stonework. Specifications for masonry repair works will be a result of consultation with lime suppliers and conservation engineers. All works will be in accordance with the Conservation Engineering Report contained in **Appendix 11.8**.

An earlier anti-scour riverbed detail is still existent in many places which takes the form of large interlocking stones. Where possible this detail should be retained and or reinstated. There are two locations where this can occur:

Arch No 1 adjoining the south bank where the riverbed is to be reinstated at current level over the new main sewer. The proposed service installation to Arch No. 1 below the riverbed level will allow further exploration of the below riverbed detail and also presents an opportunity for the reinstatement of historic riverbed features. Arch No 19 adjoining the north bank where the existing riverbed level is being maintained and repairs to the existing anti-scour interlocking stonework may be necessary.

Further site investigations to take place as an advance contract to further inform methodologies for grouting and underpinning /piling options.

11.3.12 The Record of Protected Structures (RPS) and the National Inventory of Architectural Heritage (NIAH)

A number of structures are recorded in the RPS as well as the NIAH in the environs of Arklow Town. The only structure directly affected by the proposed works is Arklow Bridge (RPS A26, NIAH 16322046) where intervention will be necessary in order to achieve the required flood relief measures. While the rest of the structures will not be physically impacted by the proposed development, mitigation measures will address any potential temporary or short term visual or setting impacts during construction (**Appendix 11.3**). **Appendix 11.4** lists and tabulates NIAH and RPS structures within Arklow which are relevant to the scheme (**Figure 11.6**).

11.3.13 Cartographic Mapping

11.3.13.1 Down Survey c.1656

One of the earliest representations of Arklow town is the Down Survey map of the Barony of Arklow, which dates to c.1656 (**Figure 11.13**). Though not very illustrative the map does show the important elements that made up Arklow town at that time: 'Arklow Castle', 'Abbyland' and the 'Abby' (the Dominican abbey south of the river). A number of large houses are depicted in the vicinity, including two houses to the east of 'Arklow Castle' and west of the 'Abby', while five houses of diverse sizes are located east of the 'Abby', closer to the coast. The town marsh or Avoca River are not indicated on the map, nor are the sites of the recorded graveyard and Cistercian abbey to the north of the river or a bridge leading to this side of the town.

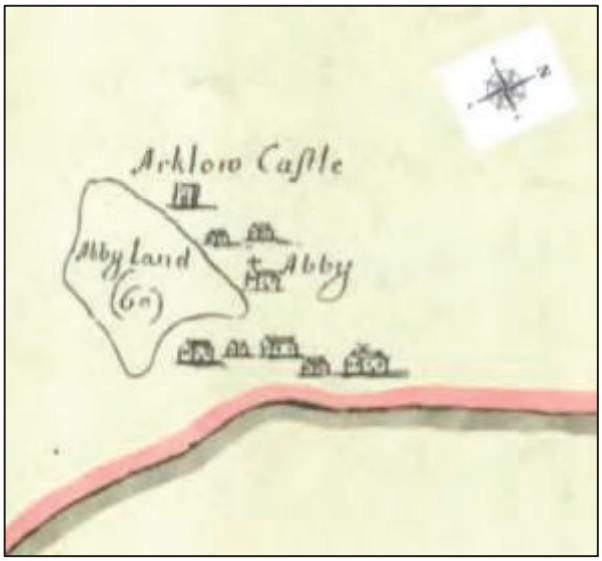


Figure 11.13: Down Survey Maps of the Barony of Arklow, Co Wicklow 1656.

11.3.13.2 Plan of the Mouth of Ovoca, 1821

The containment of the River Avoca began in 1814 on the north side of the river. This map, drawn up in 1821, shows the extent of the works in the form of a wall, soil embankment and stone wall along with the intended works. It also shows the south side of the river as undeveloped land apart from the 'South Rood runs to Sand Beach' and annotated as 'low, marshy and flooded'. Arklow Bridge is described as being 471 feet long.

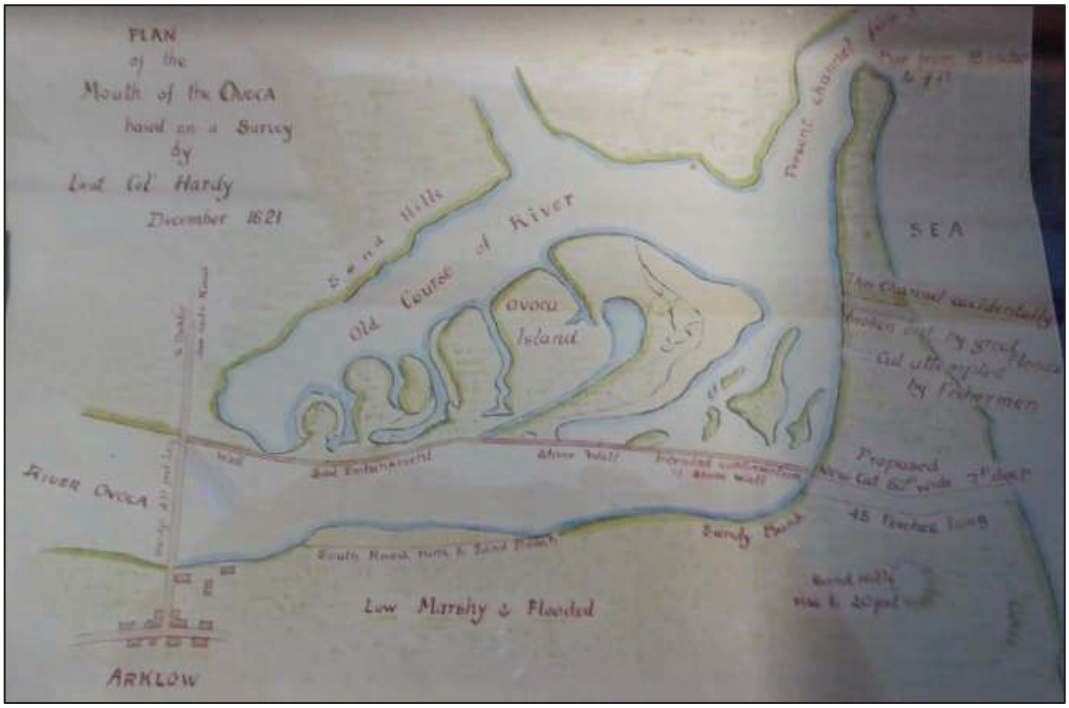


Figure 11.14: Plan of the Mouth of Ovoca by Leut. Col. Hardy December 1821

11.3.13.3 Ordnance Survey Mapping

First edition OS 1838 (published 1839)

The town of Arklow is shown as located on the south bank of the River Avoca. The commercial development of the Main Street is largely located around the castle site, church and graveyard on high ground overlooking the River Avoca. Premises and dwellings are located along the east-west axis of this street with property boundaries extending in a north-south direction in long narrow plots. Upstream of Arklow Bridge the plots extend to the river frontage while downstream, the plot size is smaller and more irregular and located further south away from the river and the low-lying marshy ground. Arklow Bridge is named and connects the town with the Ferrybank townland. The north side of the river bank is undeveloped and upstream of the bridge is shown as wetland in the townland of Marsh while downstream the area is shown as a series of mud flats and sand bars.

Of note on the Ferrybank Road is the site of a 'Graveyard' and the access way through the lands of Shelton Abbey and the 'Ovoca Brewery'.

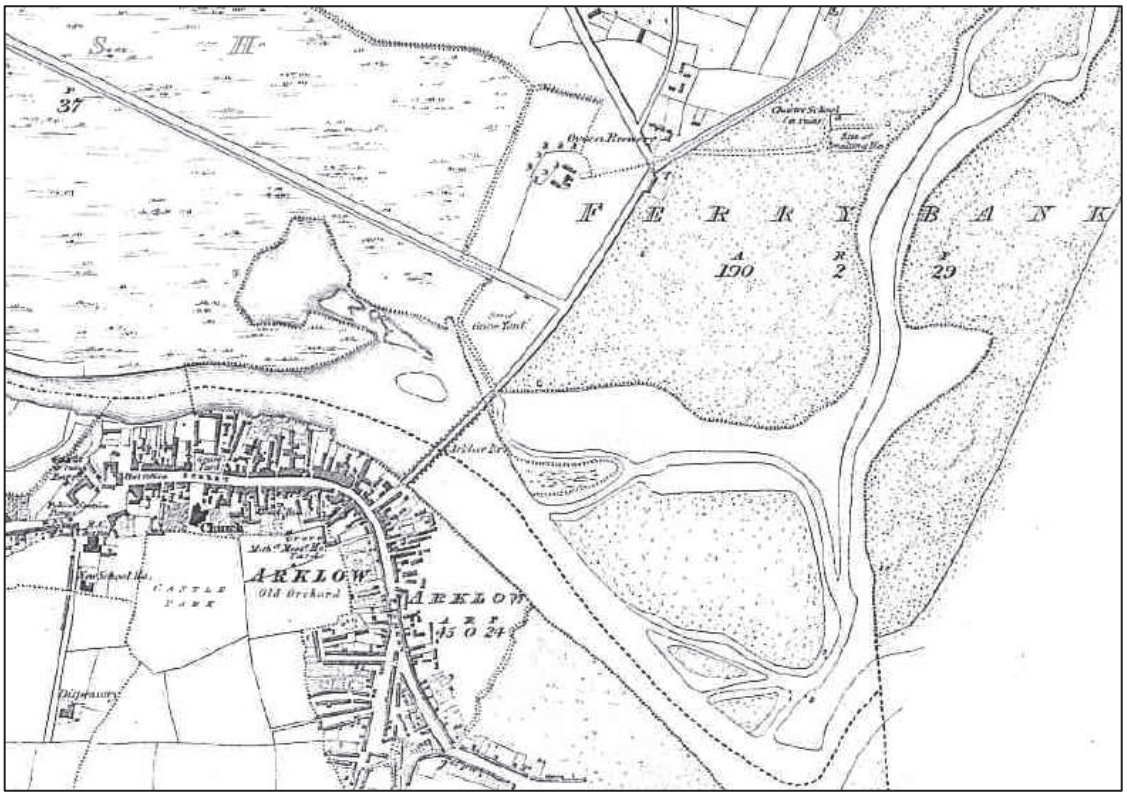


Figure 11.15: First edition OS 1838 (published 1839) six-inch map of Arklow

Revised edition OS 1887 (published 1988)

This map charts the development of the town, within 50 years of the last OS mapping edition both sides of the road at Ferrybank are aligned with buildings with the Methodist Chapel and the gate lodge to Shelton Abbey named. The site of the graveyard has been built over. The Marsh area still has the causeway leading to Shelton Abbey running through it with the marsh land to the south appearing to be planted with trees in linear transepts that act as drains to the Avoca River. Downstream of the Arklow Bridge, the north quay is named and the Arklow Chemical Works are shown with a swivel bridge and salvage store shown in an area traditionally known as the Back Guts or Cuts. The south quay is still largely undeveloped and shown as liable to floods. Arklow Town is now serviced by the Dublin & South Eastern Railway which ran from Dublin to Wexford.

Figure 11.16: Revised Edition OS 1887 (published 1988) Six-inch Map of Arklow

Revised edition OS 1907-08 (published 1910)

The building of St Saviour's Church marks an expansion to the west of the town. Both the south and north quays are shown and named with mooring posts annotated along both sides. The boatbuilding yard (Tyrrells) and slip are shown and a footpath is shown on the south side of the river leading to this establishment. Structures align Lower Main Street, Tinahask and Harbour Road on the south bank. Arklow Bridge is named as is the Avoca River. Ferry Bank is aligned with buildings with the Methodist Church, Masonic Hall as well as the Lodge to Shelton Abbey named. The Chemical Works with additional Magazines are located on the northern bank along the coast.

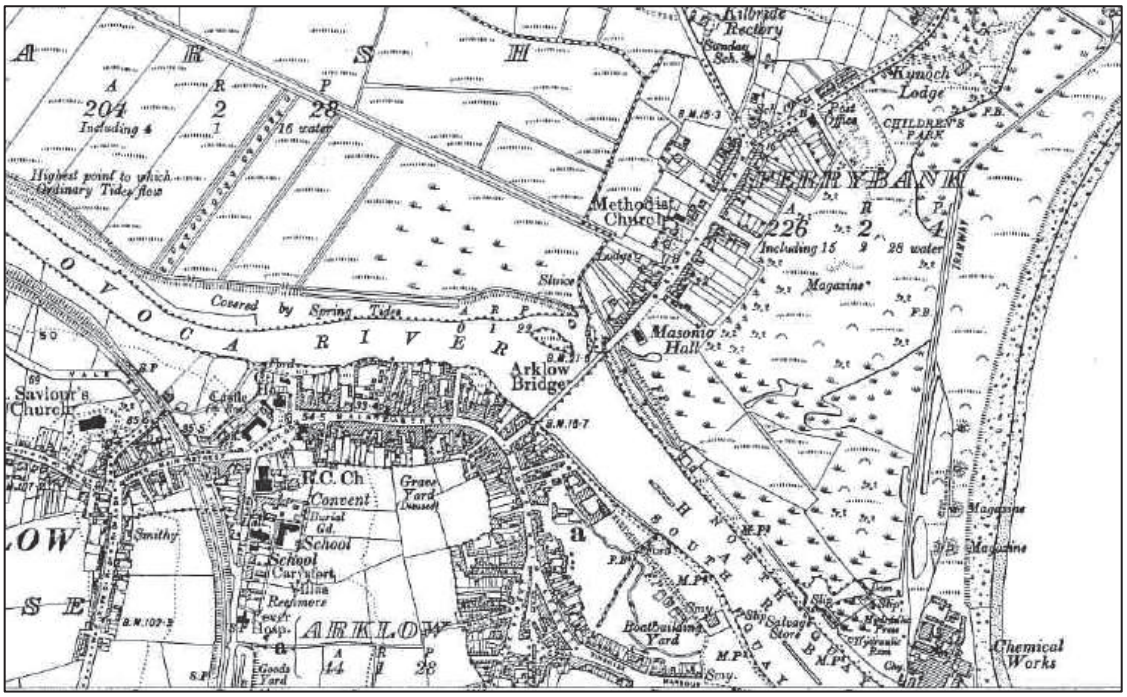


Figure 11.17: Revised Edition OS 1907-08 (published 1910) Six-inch Map of Arklow

11.3.14 Townland Names

The following table (**Table 11.5**) lists the townland names, derivation and possible meaning of the name. Townland names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on the history, the archaeological monuments and folklore of an area. A placename may refer to a long-forgotten site and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830s and 1840s, when the entire country was mapped for the first time. Most of the townland names in the study have Irish origins and have been anglicised through time.

Townlands are a unique feature in the Irish landscape, and their origins are undoubtedly of great antiquity, most certainly pre-Norman. They existed well before the establishment of parishes or counties. Townlands can take the form of natural boundaries such as the River Avoca, or route ways as well as artificially constructed earthen banks and ditch divisions, they are predominantly formed by well-built boundaries that demarcate the townland which are usually distinguishable from standard field division boundaries. There are 62,000 townlands in Ireland, grouped into civil parishes, then counties and finally provinces. The townland boundaries within the study area include Marsh, Tiknock and Ferrybank on the northern banks of the river and, Arklow, and Tinahask Lower on the southern bank of the Avoca River with Yardland and Abbeylands townlands adjacent to the proposed works.

Table 11.5: Townland Names

Townland	Derivation	Possible Meaning
Avoca	Oboka (Greek) Abhóca Contains the Irish element *"Áth"*	Oboka. This name according to Joyce (vol.II) 1995 is derived from the name given to the river by Ptolemy, the greek cartographer in the first century AD. (Ovoca). The Gaelicised version contains the element "*Áth"* referring to a fording place.
Abbeylands	English	Referring to the lands associated with the Friary in Arklow town founded by the Dominicans in 1264 by Thomas Theobald FitzWalter.
Arklow	Viking –Ark & lo Gaelicised –An tInbhear Mór	'Lo' refers to the river meadow and 'Ark' is from the Viking name Arknell i.e. Arknell's Meadow. Gaelicised –The great haven
Ferrybank	English	Indicates that contact north and south of River Avoca was facilitated by ferry's prior to the construction of Arklow Bridge.
Marsh	English	The townland comprises of Marshy land, prone to flooding by the River Avoca.
Tinahask Lower	From the Irish word *"Tigh na heasca"*	House of the quagmire or quagmire stream (Joyce vol. III 1995). This refers to a marshy area on the south bank of the Avoca River.
Tiknock	Contains Irish element *Tígh & "Cnoic".*	The house /residence on the hill.
Yardlands	English	Probably referring to the burgage plots/lands held outside of the medieval town walls by inhabitants of Arklow.

11.3.15 Compound, river access and additional areas

In order to facilitate construction, six compound areas are proposed for offices, storage, plant, parking and the temporary stockpiling of excavated material (**Figure 11.18**).

Site Compound 1 (SC1)

This compound is located in a green field and marsh land to the rear of houses located along Ferrybank Road. Access is proposed from the Dublin Road. Part of this site compound is shown on the first edition OS six-inch map as the location of the 'Ovoca Brewery' and the townland boundary between Ferrybank and Ticknock is also shown traversing the site. A very small section of the townland boundary remains in place and is represent by a mature treeline and earthen bank some of which is lined with coursed stone.

Presently, the area is accessed via a narrow stone-lined laneway from Ferrybank Road. A two-storey derelict structure is located at the end of this laneway, immediately to the south of the proposed boundary for the construction compound. The structure is roofless and has been rendered, where the render is coming away, exposed stone and redbrick can be seen. The structure is in the same location as one of the structures shown on the first edition OS and while it has changed in form over the years, as evidenced on later OS mapping editions, it probably retains some of the original foundations and features from the original structure. There is no access to the structure as it has been filled with debris and dumped material. No other structures are present.

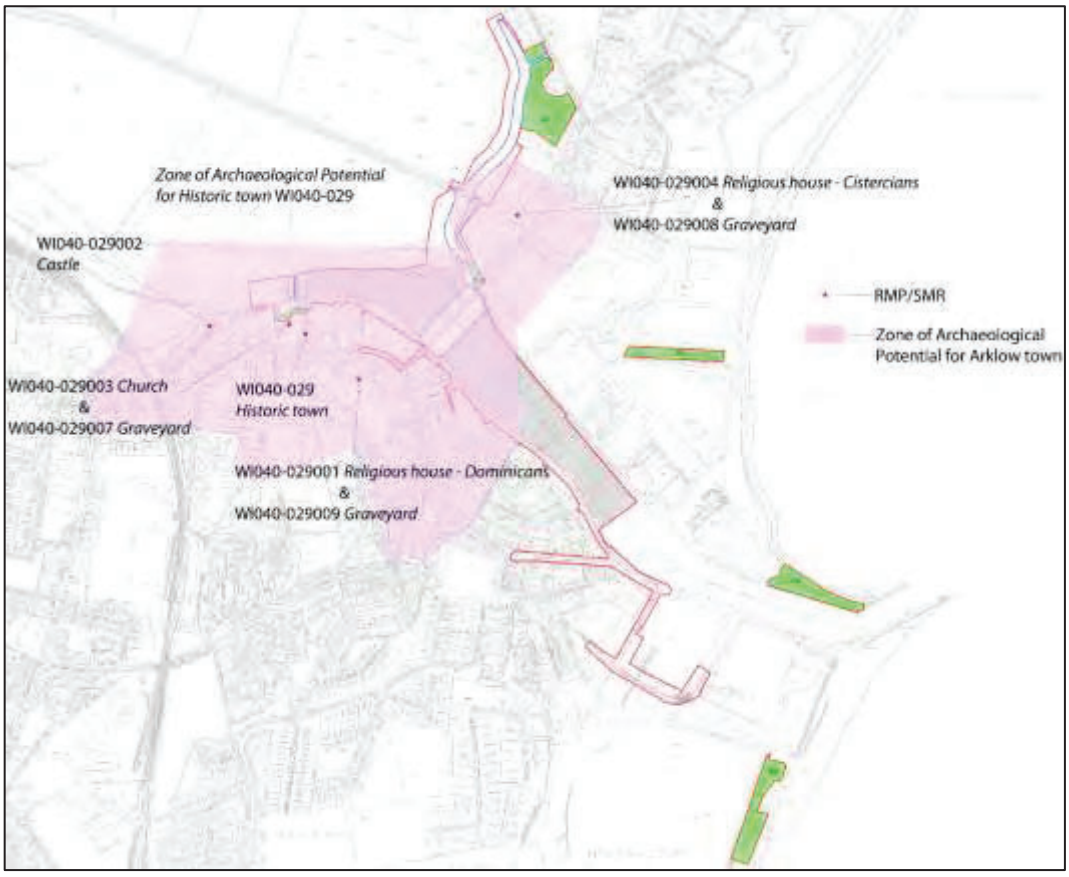


Figure 11.18: Site Compounds (in green) shown in relation to recorded monuments. Not to scale. Extracted from Drawing No 1065

The area has experienced recent disturbance and there is evidence for dumping of material as well as removal of vegetation and trees and opening and clearing of ditches.

To the north of the service station along Dublin Road, the area is overgrown with dense shrub and vegetation and the land is wet and marshy underfoot with the presence of bullrushes over 2m high (Figures 11.21-11.25).

SC1 has been subject to archaeological test excavation (**Section 11.3.8** and **Appendix 11.9,** RedArc Consulting 2021) and the findings suggest that archaeological mitigation is required to resolve the cut features and postholes that were identified.

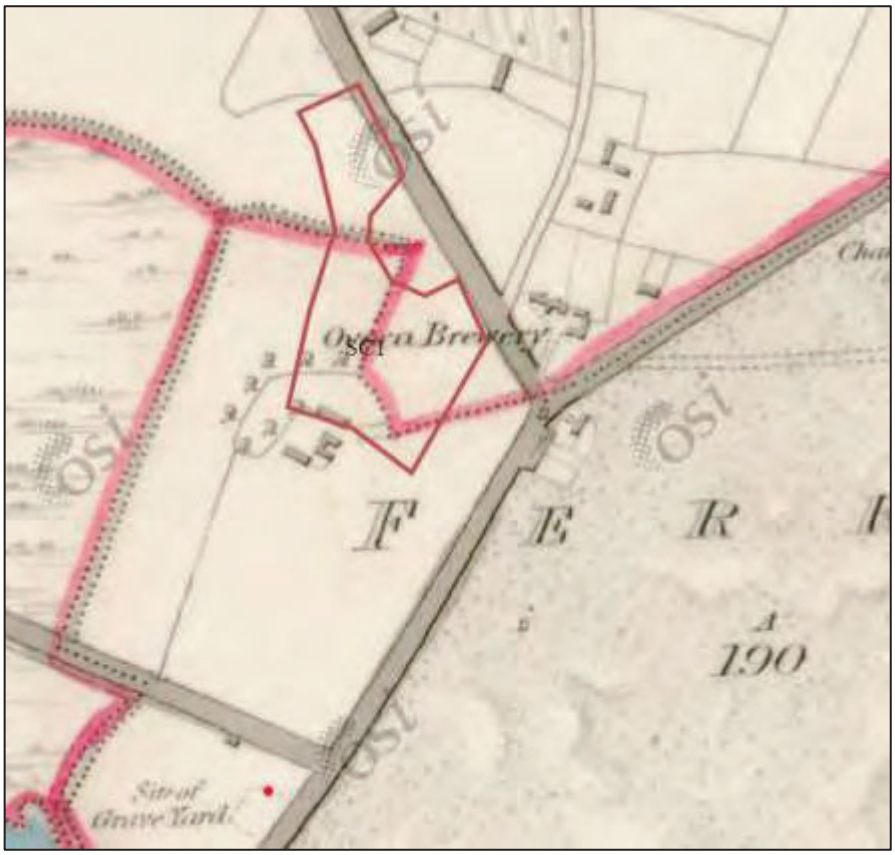


Figure 11.19: First edition six-inch OS (1838) with SC1 overlay

Figure 11.20: OS Map of Arklow (1885) 1:500 scale

Figure 11.21: Recent vegetation and tree clearance and the opening of ditches on the site.

Figure 11.22: View to the south east showing the rear of structures on Ferrybank Road and the townland boundary

Figure 11.23: Potential access to the compound from the Dublin Road to the southeast of the service area

Figure 11.24: Northern extent of SC1 - marsh land

Figure 11.25: Derelict structure located immediately to the south of SC1

Site Compound 2 (SC2)

This area is located in an area of made ground to the south of a running track. The area presents as a grassed bund (as it rises to the south) and no features of a cultural heritage interest were noted. Formerly, these lands were shown on the first edition OS, six-inch map as mud flats with water channels winding through the sand banks. On later OS edition mapping, the area is shown as being reclaimed and as wetlands, liable to flooding.

Monitoring of ground works associated with the Bridgewater Centre and the network of surrounding roads revealed a shallow topsoil (0.15m deep) overlying disturbed clay containing a high proportion of 20th century refuse. This deposit was over 2m deep in areas and no features or strata of archaeological significance were present on the site (Sullivan 2005, Licence No. 05E0686) (**Section 11.3.8**).

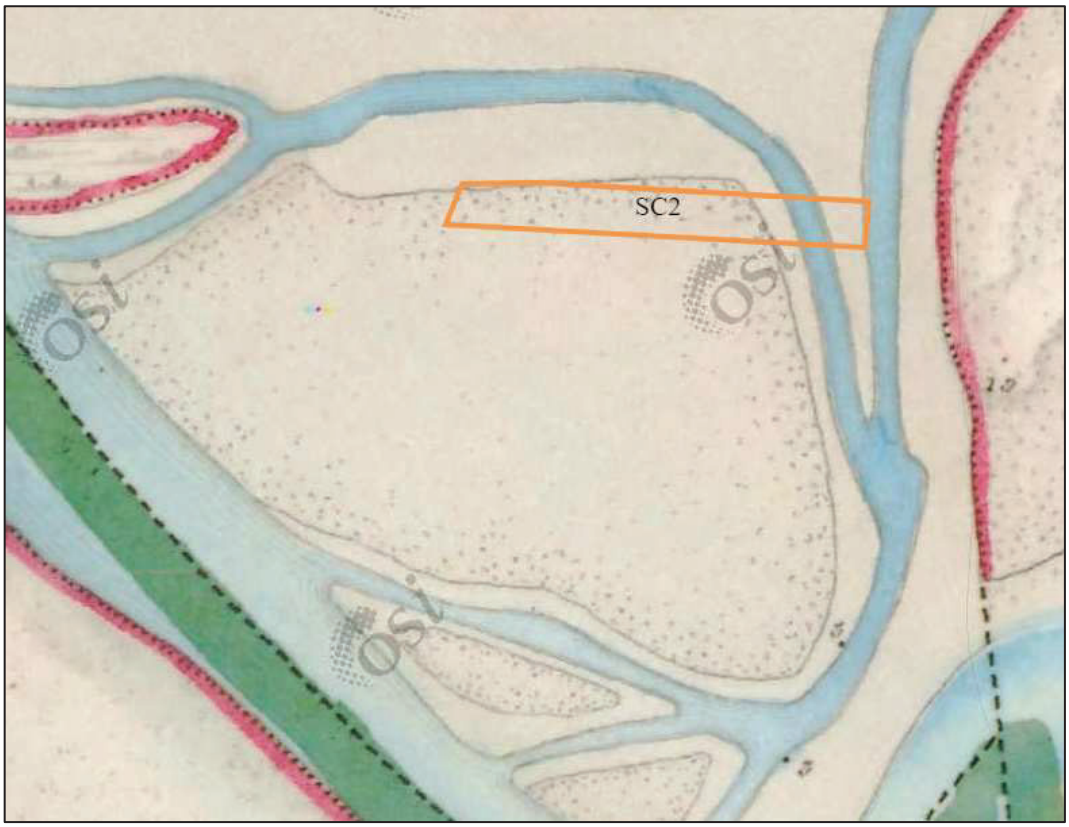


Figure 11.26: First edition six-inch OS map with SC2 overlay

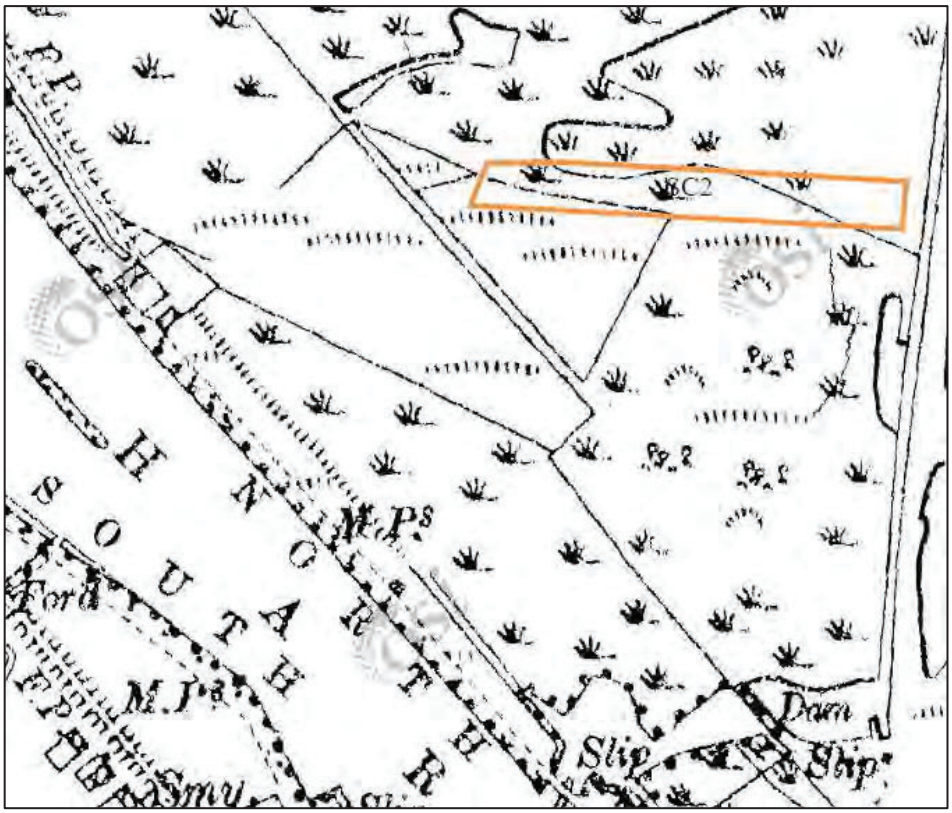


Figure 11.27: Revised edition six-inch OS map with SC2 overlay

Figure 11.28: showing the location of SC2 looking west to the Bridgewater Centre

Site Compound 3 (SC3)

Formally this was the site of Ferrybank House, a two storey four bay structure dating to *c*.1845 which was extended to the north in 1865 (NIAH Reg. No. 16322077). The structure was demolished in 2012 and the area is covered with compacted gravels and slopes to the river edge. The ground level slopes to the north and the area is overgrown with vegetation. Pipework is located to the east along the river's edge and overhead power lines are present towards the rear of the plot (north).

The topographical files from the National Museum of Ireland (NMI) refers to a mound in Ferrybank on the northern bank of the Avoca River where finds consisting of a cist containing an urn and human remains were revealed (there is no NMI register number). The discovery was made in 1839 and appears to be consistent with the findings of a late Bronze Age (1200BC-500BC) burial place (Price 1934, 51).

As this site is located adjacent to the Avoca River and to the north of Arklow Bridge (A26), there is the potential to reveal deeply buried organic deposits, and features that may be associated with an earlier river crossing or the remains of an earlier wooden bridge structure as possibly indicated by the underwater archaeological impact assessment (**Section 11.3.9** and **Appendix 11.6,** ADCO 2020, **Figure 6, Plates 55 and 56**) where wooden posts and horizontal timbers were noted on the river bed upstream of Arklow Bridge. The timber pile features (F11-F17) form a small cluster upstream of Arklow Bridge and highlight the potential for the individual exposed timbers to be part of a great composite piece that lies buried in the river silts.

While archaeological test excavation at SC3 was constrained due to the presence of pipework along the river bank and overhead cables, it did reveal the below ground structural extent of the former Ferrybank House (**Section 11.3.8 and Appendix 11.9**, RedArc Consulting 2021) and to the north of this the remains of a disused infilled stone-faced water channel.

Archaeological test excavation has demonstrated that deposits requiring excavation and recording are present below existing ground level at SC3.

Figure 11.29: First edition six-inch OS map with SC3

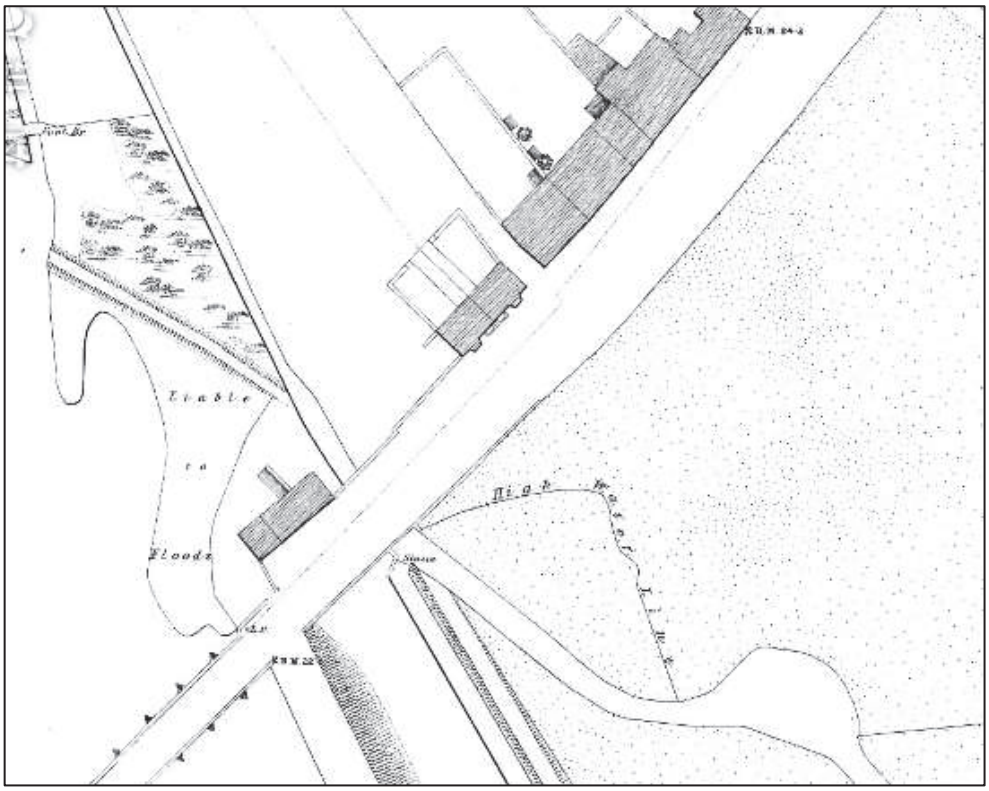


Figure 11.30: OS Map of Arklow, 1:500 scale 1885 (sheet XL.16.19) showing the former Ferrybank House and Arklow Bridge

Figure 11.31: View looking northeast at SC3

Figure 11.32: View looking northwest at SC3

Site Compound 4 (SC4)

SC4 is located within a carpark. Historically the lands are associated with the site of a graveyard (RMP WI04-029007) belonging to the medieval church of St Mary which was located on the northern side of Main Street. A public park now displays the 18th and 19th century headstones which have been arranged around the perimeter of the park. There are 62 surviving gravestones and a number of plain marker stones buried under the grass.

Locally, it is noted that the cemetery originally extended to the river margins but was never utilised in this area due to flooding.

It is thought that the burial practices of the 19th century and the increased population of Arklow and localised epidemics led to the overcrowding of the cemetery and the development of the raised burial ground for St Marys. At this time, the growth of the burial ground was restricted due to the presence of buildings (**Figure 11.34**). The burial ground now appears as a pocket park and is substantially higher than the surrounding street and road level. The site is also located within the zone of archaeological potential for Arklow.

The carpark is located to the north of the park and is black topped. The surface is slightly undulating in nature and slopes to the north and east. The western boundary is defined by a masonry wall over 4m in height in places.

Further north there is a steep grassed bank that leads to the path along the riverbank.

Figure 11.33: First edition OS six-inch mapping (1838) showing the approximate location of SC4

Figure 11.34: Map of Arklow OS 1885 1:500 scale (sheet XL.16.18)

Figure 11.35: SC4 view to the south, showing western boundary wall

Figure 11.36: View to the north showing the steep grassed bank and riverine environment

Figure 11.37: Gravestones of St Mary's burial ground

Site Compound 5 (SC5)

This compound is located to the west of the North Pier. The area is shown as part of the coastal landscape and is part of the marine environment on the first edition six-inch OS mapping (**Figure 11.38**). It is not until later OS editions that it has been built up and forms part of the North Harbour. The existing area is industrial in nature and slopes gradually to the south to the harbour. The surface is a mixture of grass and gravel (**Figures 11.39 and 11.40**).

The navigation beacon located at the end of the north pier is a protected structure (A17) and will not be impacted by the location of a compound in this area.

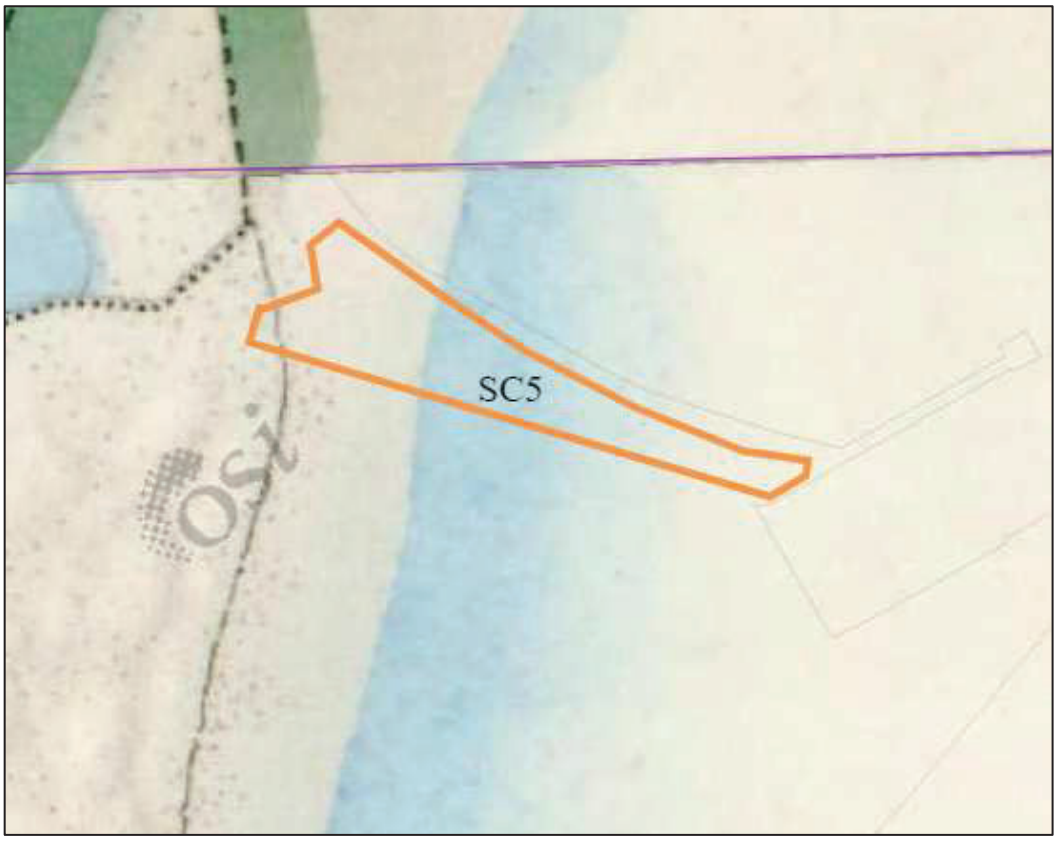


Figure 11.38: First edition OS six-inch mapping (1838) showing the location of SC5

Figure 11.39: SC5 looking east towards North Pier

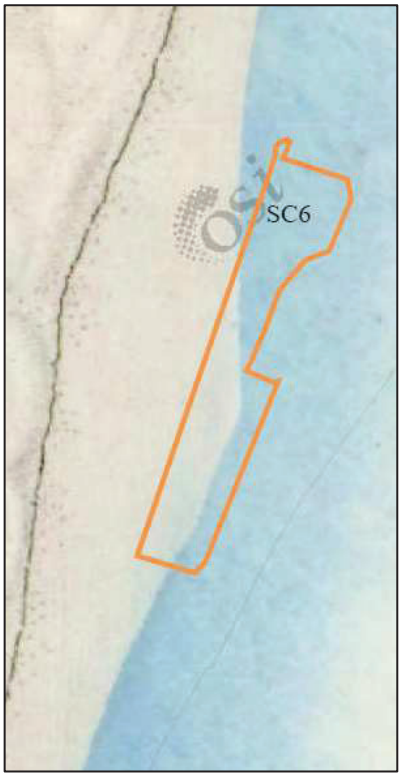
Figure 11.40: SC5 looking west

Site Compound 6 (SC6)

This site currently presents as an amenity area to the west of Arklow Beach. It is a level grassed area with picnic tables and carparking facilities to the north and south.

Cartographic analysis suggests that this area was reclaimed during the 19th century. The area appears to be in the marine environment on the first edition six-inch OS map and reclaimed as sand hills and rough, marshy ground on subsequent OS mapping. The site is also located close to the former Arklow Pottery factory.

Test excavation took place to establish the below ground stratigraphy and to assess if this area had been used as a dump for the ceramic waste from the pottery factory (**Appendix 11.9**, RedArc, 2021). The excavated test trenches confirmed that this area was reclaimed by using imported and dredged material from the river to infill this area. The reclamation deposits were extremely varied and contained waste of modern date throughout their depth. No archaeological finds, features or deposits were revealed and it was concluded that no further archaeological assessment is required at this location if FRS is granted planning.



Figures 11.41 and 11.42: First and revised editions OS six-inch mapping with SC6 overlay

Figure 11.43: SC6 looking southwest

Figure 11.44: SC6 looking north

The works will also require access to the river in eight separate areas (**Figure 11.45**) these are as follows:

River Access 1

Located to the west of Arklow Bridge on the north bank (**Figure 11.45**), design details demonstrate that there is no impact to this protected structure. This is a dedicated construction access to the Avoca River for the bridge works.

River Access 1 is located within the zone of archaeological potential for the historic town of Arklow (RMP WI040-029). The location of Arklow Bridge within Arklow town may coincide with the earliest fording point across the river Avoca. There is a potential, that an earlier crossing point may have been located at this point as there can be successive use of such strategic locations due to the particular suitability of the river crossing (e.g. width of channel, flow of water etc.) The potential of this area has been demonstrated within the findings of the underwater archaeological survey with a cluster of timber piles being revealed upstream from Arklow Bridge (**Appendix 11.6**, ADCO, 2020, **Figure 6**).

River Access 2

Located to the east of Arklow Bridge on the north bank, access will take advantage of a mound of clay and rubble along the quay front already in place (**Figure 11.45**). This area was used previously for access to the river. This is the dedicated construction access to the Avoca River for the bridge works.

River Access 2 is located within the zone of archaeological potential for the historic town of Arklow (RMP WI040-029). The location of Arklow Bridge within Arklow town may coincide with the earliest fording point across the river Avoca.

There is a potential, that an earlier crossing point may have been located at this point as there can be successive use of such strategic locations due to the particular suitability of the river crossing (e.g. width of channel, flow of water etc.).

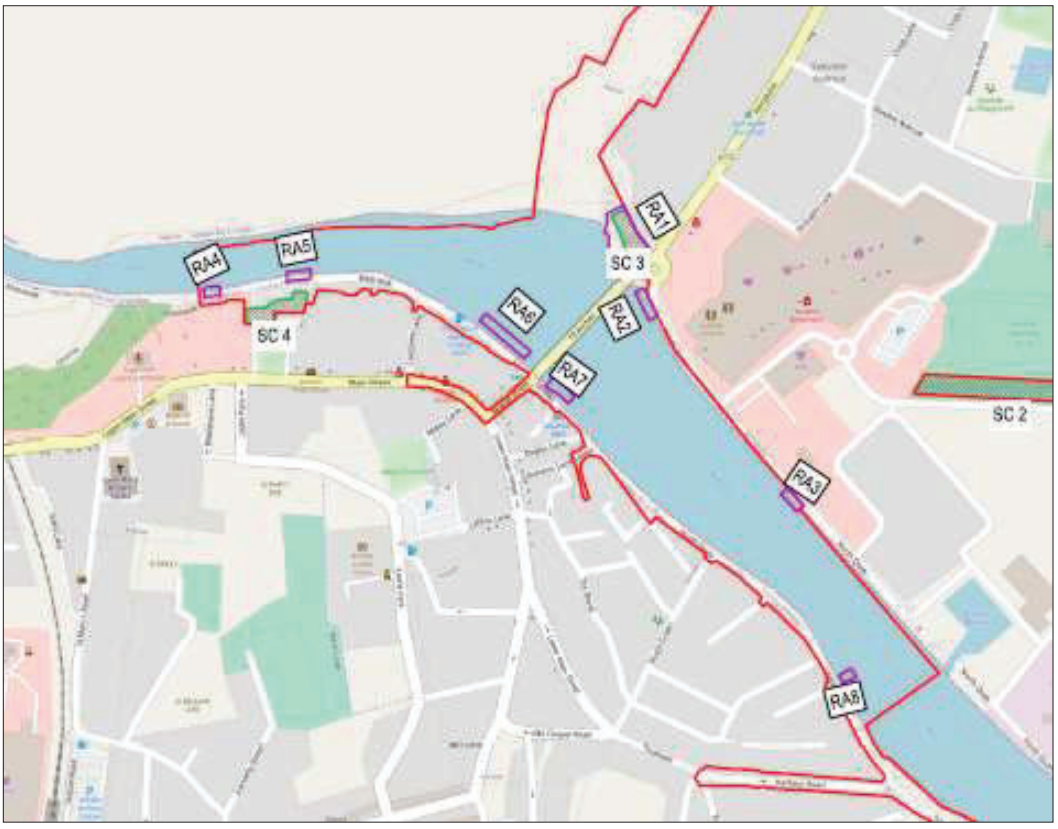


Figure 11.45: River Access Locations (extracted from Figure 5.3 of Chapter 5 -refer to Fig 5.3 for more details) Not to scale. Extracted from Drawing No 1003

Figure 11.46: View to the northwest and riverbank from Arklow Bridge

Figure 11.47: View to the southwest showing existing pipework and Avoca River

Figure 11.48: View to the northwest showing proposed River Access 2 and Arklow Bridge

River Access 3

RA3 is located on the north quay and examination of the quay side will have to take place in advance of the river access works to establish the presence of original quay material (**Figure 11.45**). At this location, a concrete caisson solution marks the North quay. There are galvanized gangways to access the floating pontoon (**Appendix 11.6**, ADCO, Brady, Plate 25 and 26).

Figure 11.49: View of North Quay at RA3

River Access 4 and 5

River Access 4 and 5 upstream of Arklow Bridge on the south bank are both located within the zone of archaeological potential for the historic town of Arklow (RMP WI040-029), in an area considered to be of archaeological potential given the proximity of St Mary's, an Anglo-Norman establishment (WI040-029007) uphill and to the south.

This section of the river is known today as Pound-a-Cholly, which is thought to be a corruption from the Irish meaning 'Harbour Pool', and may indicate the location of the town's harbour in the middle ages (Rees 2008, 389).

A modern wooden sculpture located on the riverbank will have to be removed for the duration of the works.

Figure 11.50: looking east towards RA4

Figure 11.51: Looking east towards RA5 and existing modern slip way

Figure 11.52: Modern wooden sculpture of cultural heritage interest

River Access 6 and 7

These are dedicated construction access ways on the south bank to the Avoca River for the bridge works.

River Access 6 and 7 are both located within the zone of archaeological potential for the historic town of Arklow (RMP WI040-029). The location of Arklow Bridge within Arklow town may coincide with the earliest fording point across the river Avoca. There is a potential, that an earlier crossing point may have been located at this point as there can be successive use of such strategic locations due to the particular suitability of the river crossing (e.g. width of channel, flow of water etc.).

Also of a cultural heritage interest is the presence of the south quay wall, delineated by a modern concrete plinth at this location and a modern concrete slip (also referred to as Coal Quay slip) way (disused and broken up) at RA7. The remains of this structure will be removed as part of the permanent works.

Figure 11.53: Looking west from Arklow Bridge towards RA6

Figure 11.54: Looking southeast from Arklow Bridge towards RA7 and ruined concrete slipway at Coal Quay

River Access 8

Located on the south quay (**Figure 11.45**). Access is proposed to the east of the historic slip way associated with Tyrrell's boatyard (**Appendix 11.6**, Plate 40 ADCO, Brady 2021). The concrete slip and boat tracks across the road (**Appendix 11.3**) are the last physical remnants of the boat building industry which took place at this location for 130 years. These features will be retained and will remain in place.

11.3.16 Water drainage and Pump Stations

A surface water drainage network and pumping stations will be constructed on the dry side of the flood defence walls along River Walk, Main Street, Bridge Street, South Quay, Harbour Road and the Dock to prevent flooding occurring from rainwater run-off from hardstanding areas in the flood zone when gravity discharge is prevented by high water levels in the river. The construction of the stormwater drainage system and pump stations will be carried out in parallel with the flood defence wall construction. The proposed stormwater drainage is shown on **Drawing Nos. 1051 to 1058** inclusive in **Appendix 4.1**.

It is proposed to construct the stormwater drainage using the open cut method upstream and downstream of Arklow Bridge.

The pipeline ranges from approximately 450mm-750mm in diameter and invert levels are between 1.5m and 0.4m below existing ground level.

To form a trench for the stormwater drainage, the overburden will be excavated, and a drag box or trench box will be installed as the excavation progresses. The excavation areas will be sized accordingly to accommodate the trench box/drag box.

The excavation material will be removed (using excavators at ground level). This process will be repeated until formation level has been reached to enable the laying of the stormwater drainage.

There are two types of pump station proposed, a wet/ dry well pumping station that will use standard excavation methods through the soil. A kiosk pumping station will be approximately 1.2m high x 0.6m wide x 0.3m deep and will be a prefabricated cabinet, green in colour.

All site preparation and construction activities associated with the pipeline will be archaeologically assessed by monitored and **Appendices 11.2 and 11.3** detail all the archaeological sites and areas of archaeological potential as well as architectural heritage structures and features of cultural heritage along the route of the stormwater drainage for the scheme. **Figure 11.6** shows all features of architectural heritage along the proposed pipeline for the stormwater drainage system. **Figure 11.12** shows features of a cultural heritage interest along the proposed route for the stormwater drainage system.

11.3.17 WwTP Sewer

As noted previously in **Chapter 4** *Description of the Proposed Development*, should the construction of the FRS progress before the WwTP, an interceptor sewer forming part of the WwTP Project will be constructed as part of the FRS works. It will run along the riverside of the existing quay wall and below existing river bed level on South Quay, through the southern arch (Arch 1) of the bridge and part of River Walk and then under the street on River Walk to westernmost point of the FRS construction. The sewer diameter will vary from 450mm to 1200mm. The indicative location of this sewer is shown on **Drawing Nos. 1053** to **1055** in **Appendix 4.1.** Refer to further details in Section 4.4.5.4 of **Chapter 4** *Description of the Proposed Scheme.*

11.4 Likely Significant Effects

In accordance with EPA guidelines, the context, character, significance and sensitivity of each heritage asset, was evaluated. The significance of the impact is then determined by consideration of the significance of the asset and the predicted magnitude of impact.

A glossary of impacts as defined by the EPA is provided in **Appendix 11.1**. The assessment has been carried out according to best practice and guidelines relating to archaeological and architectural heritage assessment, and in the context of similar large-scale flood relief and infrastructural projects.

The assessment of effects are described on a geographical basis (as in the main text) and includes a brief description of the proposed interventions and how these will impact on the heritage assets namely – archaeology (terrestrial and underwater), architectural heritage and cultural heritage.

The proposed works have been divided into 5 work packages (**Table 4.1** in **Chapter 4,** *Description of the Proposed Scheme***)**

Work Package 1: Arklow Bridge Works

Work Package 2: River Dredging Works

Works Package 3: Debris and Gravel Traps

Work Package 4: Flood Defences – South Bank

Work Package 5: Flood Defences – North Bank

11.4.1 North of the River (Works located within Marsh, Tiknock and Ferrybank townlands)

Works at this location (also known as Work Package 5 (WP5) are to take place within the eastern edge of Arklow Town Marsh, a proposed Natural Heritage Area (pNHA, Site Code 001931). The area presents as a large marsh north of the Avoca Estuary on the perimeter of Arklow town. WP5 is located on the north bank of the river channel upstream of Arklow Bridge. A disused raised causeway (which formerly led to Shelton Abbey) bisects the area from east to west.

The area is overgrown and dominated by reeds, large tussocks of grass and sedges **(Figure 4.33** of **Chapter 4,** *Description of the Proposed Scheme*).

The works will include approximately 545m flood defence earthen embankment with adjoining maintenance track and approximately 155m sheet-piled wall with concrete cap. It will also include a permanent access road from the Dublin Road to the maintenance track (Refer to **Section 4.4.6** of **Chapter 4,** *Description of the Proposed Scheme* for further details. The proposed flood wall and embankment on the north bank are shown on **Drawing Nos 1031** to **1035** inclusive in **Appendix 4.1, (AAP1 Appendix 11.2).**

Figure 5.33 of **Chapter 5** *Construction Strategy* illustrates the location of the working area, river access and site compounds 3 and 1 for WP5In order to carry out these works existing overhead electricity powerlines and underground cabling (**Drawing No. 1062**) will have to be diverted, so earthmoving activities can take place in a safe environment. This diversion will have to take place in advance of any other works occurring in this area.

The working area will support the construction of the flood defence earth embankment and sheet piled wall. (**Figure 5.33** of **Chapter 5,** *Construction Strategy*).

The flood defence earthen embankment will be constructed running north-south on the eastern side of Arklow Town Marsh (**Drawing Nos. 1032** and **1033**). The embankment will be constructed at side slopes of 1:2 with a 2.5m wide flat crest at the top of the embankment to facilitate future maintenance (**Drawing No. 1035**). Part of the embankment material will be sourced from the channel dredged material. The top level of the embankment will vary from a maximum of approximately 4m above existing ground level at its southern end and taper to existing ground level at its northern end based on the design flood level including an allowance for freeboard and settlement (**Drawing No. 1034**). The embankment will be planted with a suitable grass and will be approximately 545m long. **Figure 4.35** of **Chapter 4,** *Description of the Proposed Scheme* illustrates a typical cross-section along the flood defence earth embankment. **Drawing No. 1035** illustrates the cross sections of the embankment.

Foundation preparations will consist of clearing, grubbing, to remove stumps and large roots to approximately a 1m depth, and stripping to remove sod, topsoil, boulders, organic materials, rubbish fills, and other undesirable materials.

As part of these works, the marsh drainage channel will be diverted and will be placed to the west of the earthen embankment and to the north of the proposed flood wall defence wall at Ferrybank (**Drawing No. 1032**).

As part of Work Package 2 (channel dredging), the northern bank, upstream of the diverted drainage channel will be extended into the river and landscaped as ecological mitigation for the removal of islands within the river channel. Refer to **Drawing Nos 301** and **304** of **Appendix 4.2** for landscape details.

A sheet piled flood defence wall with concrete capping will be constructed from the riverbank before interfacing with the flood defence embankment (**Drawing No. 1032**).

The top of the wall will vary from a maximum of 2.4m above existing ground level (**Drawing Nos. 1034** and **1035**). In order to reduce the visual presence of this piece of infrastructure from the river side, it is proposed to increase the existing levels of the river bank along the base of the new wall and to tie it into the main embankment so that only the top 1.0m of wall remains visible (**Drawing No. 1035** and **Figure 4.16** of **Chapter 4,** *Description of the Proposed Scheme*).

The site of Ferrybank House is shown at this location on the OS six-inch first edition map and has been archaeologically investigated by test trenching (**Appendix 11.9** RedArc Consulting 2021). This is also the proposed site for Site Compound 3 (SC3).

Site Compound 1 is located in Ferrybank townland and will be in use during Work Packages 1, 2, 3 and 5. Site Compound 3 will be in use during Work Packages 1, 2 and 5.

11.4.1.1 Archaeology

There are no National Monuments or recorded monuments located along the proposed embankment alignment or within Working Area 5 of within Site Compounds 1 and 3.

The southern extent of the embankment proposals extends into the zone of archaeological potential for Arklow town (WI040-029). Specifically, there are two sites of note in this area, a recorded monument (a church and graveyard (site of) WI040-02904, now occupied by houses and gardens) and the site of a mound in Ferrybank is referred to in the Topographical files from the National Museum of Ireland (however there is no known location for this feature).

Waterlogged areas are considered to be of high archaeological potential given the quality of organic preservation in such environments. In waterlogged anaerobic conditions, the normal processes of biological decay are inhibited and wooden structures may endure for centuries, along with leather objects, bone, and hoards of metalwork. As this site is located adjacent to the Avoca River and to the north of Arklow Bridge (A26), there is the potential to reveal deeply buried organic deposits, and features that may be associated with an earlier river crossing.

Monitoring of site investigation works has taken place and no archaeological features were revealed. Archaeological test excavation (**Appendix 11.9**) revealed below ground features of an archaeological interest at SC1 and SC3 both suggestive of post-medieval activity. In addition to this, given the proximity to the recorded archaeological presence in the area, the finds revealed as a result of the testing are suggestive of prehistoric and medieval activity.

The development of a new northern shoreline upstream from Arklow Bridge represents an interaction between WP5 and WP2 and between the underwater and terrestrial archaeological surveys. The underwater archaeological potential of this area has been demonstrated within the findings of the underwater archaeological survey with a cluster of timber piles being revealed upstream from Arklow Bridge (Appendix 11.6, ADCO, Brady 2021, Figure 6).

The timber pile features (F11-F17) highlight the potential for the individual exposed timbers to be part of a larger composite piece that lies buried in the river silts and deeply buried beneath the riverbank.

It is anticipated that site preparation works may lead to a Negative, Moderate and Permanent impact to below ground archaeological remains for works north of the river (WP5).

11.4.1.2 Architectural Heritage

The proposed earthen embankment will traverse Arklow Marsh to the rear of properties located along Ferrybank Road. These structures include a Methodist Church, which is a protected structure (RPS Ref: A31) and a number of businesses and residences recorded in the NIAH (**Appendix 11.3**). These structures and their rear boundaries are all avoided by the proposed works.

Any Negative, Slight and Permanent impact to the setting of these structures caused by the proposed works outside and west of the rear boundary by of these structures will be offset by landscaping and screening works that will assist in blending in the new works. There is also a Positive, Significant and Permanent impact due to the prevention of flooding in the future.

Site Compound (SC1) is located to the rear of structures on Ferrybank Road and will be accessed by a new entrance from the Dublin Road. For the duration that the compound will be in place, there will be a Negative, Slight and Short Term impact to the rear of the structures that front out to Ferrybank Road. This is due to the change in the character of the receiving environment which does not directly impact the heritage asset, in this case a NIAH structure (**Appendix 11.3**). During the operation stage of this project, this area will be planted with native woodland trees and shrubs (**Drawing No. 6545_305_R01**), resulting in a Positive, Moderate and Long Term impact.

Archaeological test excavation at SC3 revealed the below ground structural extent of the former Ferrybank House (Section 11.3.8 and **Appendix 11.9**, RedArc Consulting, 2021). Works within SC3 will remove these remains, resulting in a Negative, Moderate, Permanent impact.

11.4.1.3 Cultural Heritage

Within SC3, in Ferrybank townland, archaeological test excavation (**Appendix 11.9**) revealed a disused, infilled and stone-faced water channel along the northern boundary and a segmental archway at the existing roadside. The proposed works will result in the removal of this feature resulting in a Negative, Moderate and Permanent impact.

A section of the former laneway/ linear causeway leading to Shelton Abbey (AH1), some 18.5m wide (14.5m wide embankment and a 4m wide maintenance access track) will be crossed by the proposed embankment resulting in a Negative, Slight and Permanent impact.

At the site of SC1, (AH2, **Appendix 11.3**) archaeological test excavation took place to the north of a complex of structures shown on the first edition six-inch OS map, that is possibly the site of the 'Ovoca Brewery'. While subsurface features were revealed, no evidence was revealed to assist in establishing the nature of the site (for example metalled surfaces, industrial activity, glassware etc) and whether or not a brewery was located in this area.

While this area has experienced a great deal of ground disturbance, archaeological testing has demonstrated that there is the potential to reveal archaeological activity in the form of below ground features, deposits and finds resulting in a Negative, Moderate and Permanent impact.

The embankment and associated activity along with the location of SC1 has the potential to impact on the former townland boundary between Tiknock, Ferrybank and Marsh townlands (AH3). Test excavation (**Appendix 11.9**) revealed a number of possible postholes which may be associated with the former townland boundary between Ferrybank and Tiknock resulting in a Negative, Moderate and Permanent impact.

11.4.2 Arklow Bridge and the River Avoca

All works carried out to Arklow Bridge will be carried out under Work Package 1 and works within the River Avoca will be carried out under Work Packages 2-4. **Chapter 12,** *Landscape and Visual Impact* describes how Arklow Bridge will be incorporated into the proposed public realm works designed to allow the full length of the elevation of the 19 arch bridge to remain visible from both sides and allows the historic bridge to be clearly distinguished and showcased from any later adjoining structural and design interventions.

11.4.2.1 Lowering of the floor of Arklow Bridge

It is proposed to lower the floor of Arches 2 through to 18 of the 19 bays of Arklow Bridge by 1.0m to which, along with associated upstream and downstream river dredging, will increase the conveyance through the bridge and hence, reduce flood levels upstream of the bridge (refer to **Dwg. Nos. 1007-1010 of Appendix 4.1**).

The riverbed of Arch 1 will be reinstated to its current level to accommodate an interceptor sewer forming part of WwTP Scheme (**Appendix 4.1, Drawing No. 1005**). The reinstatement will be to its historic form. Arch 19 will not be altered due to the services passing through this arch.

The lowering of the floor of the bridge will require underpinning of the bridge abutments and piers and the reconstruction of the scour protection slab at the new riverbed level (Refer to **Chapters 4** and **5** for further details).

The works will excavate the river shingle that underlies the stone apron. The excavated estuarine material from this process will be transported to SC1 for archaeological inspection.

The works will directly impact the starling piles that are a primary feature of the stone piers.

11.4.2.2 Scour protection of Arklow Bridge

To ensure against potential long-term effects from scour on the riverbed, suitable protection of Arklow Bridge piers is required. The works will entail the following:

- Demolition of the existing concrete scour protection slab and lowering of the floor of the bridge (as described above) and the riverbed immediately upstream and downstream of the bridge.
- Construction of a new concrete scour protection slab (400m thick) from 10m upstream to 15m downstream of the bridge and beneath the arches of the bridge to a level of approximately 1m below the existing riverbed level and the placement of riprap along the upstream and downstream edges of the concrete slab (refer to **Dwg. Nos. 1007-1010 Appendix 4.1**).

The proposed new concrete apron will extend upstream of the bridge and will impact the location of timbers (F11–F17) (**Appendix 11.5**, ADCO, Brady 2021, **Figure 9**) which are recorded upstream of the bridge on its east side.

11.4.2.3 Underpinning of Arklow Bridge

Bridge underpinning will be constructed using either 1) traditional underpinning, 2) micro piling from riverbed level, 3) mini-piling from road (bridge deck) level or 4) extensive formation improvement under each pier. A combination of options may be utilised depending on the specific ground conditions found at each pier. **Section 5.5** of **Chapter 5** *Construction Strategy* provides details on the four underpinning construction methodologies.

All of these options will require grouting works, this process will be preceded by water flushing to determine if there are any paths through to the face of the historic masonry. Any routes found will be plugged with mortar appropriate to the historic masonry.

Options 2, 3 and 4 will require a reinforced concrete wall to be constructed around the perimeter of each pier from existing masonry stone level to the new concrete scour slab level.

11.4.2.4 Remedial Works to Arklow Bridge

Works to the masonry of the historic part of Arklow Bridge will include the removal of the vegetation growing on the bridge and repairs to the masonry (**Appendix 11.8**, CORA, Edden, 2021, **(Appendices 1.3-1.4)).** Deeply embedded roots will be drilled and injected with a suitable herbicide where to remove them by other methods would prove destructive to the integrity of the masonry. All loose stones will be reseated and eroded mortar raked out and repointed with appropriate mortars. The render to the underside of the arches will be checked for integrity and where defective removed and the masonry repaired.

Areas of render requiring repair / reinstatement will be carried out in materials more appropriate to the original stone work. .

11.4.2.5 Riverbed dredging

To improve the conveyance through Arklow Bridge in conjunction with the lowering of the floor of the bridge, river dredging (WP2) is proposed over an 850m length of the Avoca River, less the river bed lowering carried out as part of WP1, extending to within 2m of the existing riverbanks or proposed river walls as applicable.

These works will comprise dredging of the river channel from 10m upstream to 320m upstream of Arklow Bridge (as far as the junction of River Lane and River Walk) and from 25m downstream to 520m downstream of Arklow Bridge (as far as the junction of South Quay and Harbour Road). The dredging will include the removal of in- river sandbanks and vegetated islands upstream of Arklow Bridge. The proposed channel dredging works are shown on **Drawing Nos. 1003** and **1011 to 1020** inclusive in **Appendix 4.1**. Refer to **Section 4.4.3** of **Chapter 4** *Description of Proposed Scheme* and **Section 5.5.2** of **Chapter 5** *Construction Strategy* for further details.

The riverbed dredging depth will typically vary from approximately 1.2m at the channel edge to zero. The potential for the discovery of cultural heritage material is highlighted by the archaeological features F1, F05-F19 and 17D0078:001. There is significant potential to recover archaeological material.

Riverbed dredging works will not impact on the stone wall sections of North Quay and South Quay, as the dredging operations will be stepped out at least 2m into the river channel so as to not impact or undermine the quaysides (**Section 4.4.3** of **Chapter 4,** *Description of the Proposed Scheme*, and **Section 5.5.2** of **Chapter 5,** *Construction Strategy*).

11.4.2.6 Gravel and debris trap

The construction of a gravel trap in the former historic harbour of Arklow town will require excavation across the river to a depth that will be deeper than the dredging that is otherwise proposed along the river (**Drawing Nos. 1021, 1022**, **Section 4.4.2 and Figure 4.20** of **Chapter 4,** *Description of the Proposed Scheme***; Section 5.5.3** of **Chapter 5,** *Construction Strategy*). Construction of the gravel trap will involve the excavation of a trench 12m wide by up to 1.0m deep in the river bed for the full width of the river channel upstream of the debris trap.

This area is archaeologically sensitive and the recording of a substantial timber (F06) off the north bank and an anchor (F07) off the south bank close to the gravel trap location highlight the potential for the excavation of sediment in this location to retain maritime cultural heritage material (Appendix 11.5, ADCO, Brady, 2021, Figure 8).

11.4.2.7 Enabling and Temporary Works

River bunds and vehicle way leaves will be created along the river banks to facilitate access for the dredging plant.

The works at Arklow Bridge will require the creation of bunds within the river channel at the bridge site to facilitate access. The various way leaves and bunds will be created from existing river shingle and supplemented with introduced material where necessary.

Eight River Access Areas are proposed to facilitate works within the river (Figure 11.45) (Section 11.4.7).

Maintenance access formed from riverbed material, typically comprising gravels and sands will be required to access the debris and gravel traps on a periodic basis.

The bunds and way leaves will be constructed each season and removed at the end of each season. This represents direct and continuous impacts on the underlying riverbed sediments over the course of the FRS construction period. This may result in a potentially Negative, Moderate and Permanent impact to archaeological deposits and features within the estuarine environment.

11.4.2.8 Underwater Archaeology

As attested to by the underwater surveys undertaken to date there is a significant potential to uncover and identify archaeological features, deposits and artefacts from the Avoca River as a result of the activities proposed for the Flood Relief Scheme.

Within the riverine environment, the proposed works will have a Negative, Significant and Permanent impact on the newly identified archaeological features and artefacts as described above.

11.4.2.9 Architectural Heritage

Arklow Bridge is a protected structure and the during construction, the proposed works and interventions have the potential to impact the historic structure in a Negative, Significant and Permanent manner.

The risk of bridge collapse during the underpinning of Arklow Bridge is considered ‘highly unlikely’. An assessment of the stability and overall condition of Arklow Bridge was undertaken by CORA and detailed **Appendix 11.8**. The construction phase of the proposed development will be carried out in accordance with best practise construction methodologies, all relevant health and safety guidance and legislation, as well as the provisions of the CEMP (**Appendix 4.1).**

By undertaking the structural and remedial maintenance work, it will protect the bridge against storm surges and flood events in the future which is essential for its long-term stability.

While the underpinning will be engineering led, the repair and remedial works present an opportunity for a conservation led approach that will safeguard the historic fabric of the bridge and will contribute in a positive manner to the character, condition and significance of the structure.

By lowering the floor of Arklow Bridge, it will directly impact the masonry anti-scour riverbed detail, the removal of this stone feature, where it survives will result in a Negative, Moderate and Permanent impact. However, as a conservation measure, the historic stone apron at Arch No.1 will be reinstated to its current state reusing any existing stones which can be recovered in an adequate condition and at Arch No. 19, the stone apron will be retained as is (**Appendix 11.6**, ADCO, **Plate 58**).

The Public Realm design has been developed iteratively in collaboration with project teams for the Arklow WwTP and the Flood Relief Scheme so as to ensure the new infrastructure does not obscure the important downstream elevation of the bridge and that none of the infrastructural components clutter or detract from the character of the bridge.

11.4.3 River Walk (upstream of Arklow Bridge)

The works as detailed in **Section 4.4.5** of **Chapter 4** *Description of the Proposed Scheme* will include the demolition of existing walls and river access point and provision of approximately 330m of flood defence concrete finish wall founded on sheet piles and concrete foundations with intermittent glass panels upstream of Arklow Bridge on River Walk. These will be undertaken upon the completion of the first phase of bridge underpinning works. The proposed flood walls and drainage along the south bank upstream of Arklow Bridge are shown on **Drawing Nos 1031, 1036** to **1039** inclusive, **1051, 1053** and **1056** in **Appendix 4.1.** The works will also include the construction of the surface water drainage system and pump stations and the construction of the WWTP interceptor sewer (See **sections 11.3.16** and **11.3.17** above) both of which will be carried out in parallel with the wall construction. The indicative location of the interceptor sewer is shown on **Drawing Nos. 1053** to **1055** in **Appendix 4.1.** The proposed stormwater drainage is shown on **Drawing Nos. 1051 to 1058** inclusive in **Appendix 4.1**.

As part of the public realm works proposed for the scheme, a new continuous riverside promenade will extend for over 1.0km from upstream of the town carpark along River Walk and South Quay to the Arklow Harbour. The promenade will by exclusively for pedestrians and will typically be a minimum of 3.0m in width but incorporating a series of wider terraces, green spaces and viewing platforms. The promenade will tie into the existing riverine River Walk upstream of the carpark and will continue around Arklow Harbour to tie in with South Pier and South Beach. Refer to **Section 4.4.7** of **Chapter 4** *Description of the Proposed Scheme.* The drawings, illustrating the proposed landscape design and public realm, are available in **Appendix 4.2.**

11.4.3.1 Archaeology

As riverside areas are prone to fewer disturbances and have attracted human activity throughout the ages, there is a potential that subsurface prehistoric settlement activity or later may come to light during any channel modification.

There are no recorded monuments along this section of proposed works. Proximity to the zone of archaeological potential for Arklow Town (RMP WI040-029) and the possible former harbour area increases this potential as associated features such as landing points, causeways etc. may once have been located along the southern shore of the river west of Arklow Bridge. Works, including river access 4, 5 and 6 within the zone of archaeological potential for the historic town of Arklow will result in Negative, Moderate-Significant and Permanent impact on below ground remains and on buried archaeological soils.

11.4.3.2 Architectural Heritage

There are no architectural heritage impacts along this section of the proposed works. Significant public realm works have been designed to provide new attractive amenity areas along the river side (**Appendix 4.2**).

The objective of the public realm design is to integrate the necessary infrastructure with River Walk and South Quays in a manner that re-invents the public amenity value of the river edge for the town and its people.

11.4.3.3 Cultural Heritage

For the duration of the construction works any memorials or sculptures may have to be removed and stored at an agreed location with the statutory authorities, resulting in a Negative, Slight and Short-Term impact.

11.4.4 South Quay (downstream of Arklow Bridge)

Downstream of Arklow Bridge, works will continue for 1150m along South Quay from Arklow Bridge to Arklow docks. The works as detailed in **Section 4.4.5** of **Chapter 4** *Description of the Proposed Scheme* will include the:

- demolition of some existing walls and unused coal quay slipway, provision of approximately 655m of flood defence concrete finish wall founded on sheet piles and concrete foundations with intermittent glass panels and modifications to approximately 20m of existing wall downstream of Arklow Bridge on the south bank (South Quay / the Dock).
- installation of demountable flood barriers normally closed at 2 locations and a self-closing flood gate around the Dock in the harbour area.
- construction of the surface water drainage system and pump stations and the construction of the WWTP interceptor sewer (See **sections 11.3.16** and **11.3.17** above) both of which will be carried out in parallel with the wall construction.

The proposed flood defence walls and drainage along the south bank downstream of Arklow Bridge are shown on **Drawing Nos 1031, 1040** to **1049** inclusive, **1051, 1054** to **1055** inclusive and **1057** to **1058** inclusive in **Appendix 4.1.**

Public realm works will be carried out on completion of the structural elements of the flood defences.

At the South Quay, where the flood defence wall will be located within the river channel, sheet piles will form the foundation of the new defence walls (**Drawing Nos 1040, 1041, 1046, 1047**). In these locations, the existing quay wall where it exists, will be enclosed within the new construction. Sheet piles will be driven into the channel outside of the quay walls and then the space between the pile and the wall will be backfilled.

Where the South Quay has its original stone structure visible to the riverfront downstream of South Green Street and upstream of the boatyard slipway it will remain *in situ.* The new flood relief wall will be aligned inside (west) of the quayside (see project **Drawing Nos. 1041, 1047**). This will require crossing over the stone quay at either end and relevelling the ground surface of the grass verge between the quay and the roadway.

The white-painted stone mooring posts will be repositioned as part of this process, reasserting their integral relationship to the quay wall where possible (**Drawing No. 6545-302 Appendix 4.2** *Landscape Design and Public Realm* and **Drawing No. 1041 Appendix 4.1**).

The former slipway associated with Tyrrell's boatyard will remain *in situ*.

No archaeological features were encountered during the archaeological monitoring schemes at the South Quay (Excavations 2001, No. 1383, 00E0826 and 00E0891, www.excavations.ie). The stratigraphy encountered consisted of 1.6m of infill below the road surface, composed of sand, course gravel and pockets of large cobbles and clay.

11.4.4.1 Archaeology

There are no recorded monuments along this section of the proposed scheme and previous monitoring of pipelines and utilities along the south quay have not encountered archaeological deposits.

There is a potential that subsurface archaeological features may come to light during the proposed construction of walls as part of the proposed works are located in the zone of archaeological potential for Arklow Town (RMP WI040-029).

Ground-breaking and excavation works, for example the undergrounding of ESB cables and the laying of a sewer a well as storm drainage within this designated ZAP and along the South Quays has the potential to result in a Negative, Moderate and Permanent impact on any previously unknown archaeological sites or features which survive below ground.

11.4.4.2 Architectural Heritage

The are no protected structures and features listed on the National Inventory Architectural Heritage (NIAH) along this section of the proposed scheme. Improved public realm amenities are detailed in **Chapter 11** *Landscape and Visual* of the EIAR. Features and structures of an industrial maritime interest which contribute to the heritage of Arklow town are considered under 11.4.4.3 Cultural Heritage.

11.4.4.3 Cultural Heritage

The proposed works will form a modern solution to flooding at Arklow and help protect dwellings and structures located along South Quay. There is also the opportunity to create a coherent structure that is reflective of the past industrial and shipping heritage while functional from a flood relief perspective.

The South Quay wall (AH6), a late 19th century construct as shown on Figure 11.11 (1885 OS Map of Arklow, 1:500 scale (Sheet XL.16.24). It now appears as an intermittent structure with significant sections of rebuild, sections augmented with concrete plinths and cement facing, areas of localised rebuild and repair. The original structure consists of a rubble stone mortared wall capped with stone flags.

There is approximately 74m of exposed, original quay wall still visible when viewed from the river or North Quay. This is present from the junction of South Green and the South Quay to The Green and South Quay. It presents as a rubble stone wall, with a slight batter, capped with levelled granite cap stones at ground level. The quay is flush with the street level (**Appendix 11.3**).

As a result of the type of intervention required to provide a flood defence solution along the South Quay, different impacts are anticipated along the length of the quay wall and this will result in different mitigation measures being applied.

Where possible the wall, will be preserved in situ and encased by a sheet pile wall to the front over which a raised footpath and freeboard will be constructed.

It will be possible to present the original exposed quay wall for a distance of 35m – this section of walling will be consolidated and repaired according to best conservation practice measures. Further to this, it appears that for the next 65m the wall and cap stones are encased in a cement render that is currently failing in places. It is proposed to clean this back, remove the failing cement and expose the original quay wall. Allowing a presentation of approximately 100m of original stone quay wall (see **Drawing no. 1041**).

There will be a Negative, Significant and Permanent impact to the original South Quay wall, however the design proposal includes for conservation led remedial and repair works to a visible section of the wall, that will allow it to be retained in situ, exposed and presented as part of the public realm works (**Drawing No. 1041 and 1047).**

Six mooring posts/stones (AH7) (approximately placed at 18-20m intervals) are located along south quay. These present as small, granite circular blocks, painted white. They are set back approximately 2m from the quay side in the grass verge.

They measure approximately 0.20m-0.45m high and 0.40m in diameter. The intent is to move them locally to an optimum location and reset them along the outside of the flood relief wall and on the quay wall, maintaining the authenticity and integrity of the mooring stones with the original quay wall (**Drawing no.1041**). A Negative, Moderate, Temporary impact is anticipated as a result of the removal, storage and reinstatement of the mooring stones (AH7).

The ruined, concrete slipway at Coal Quay (AH4) will be removed as a result of the proposed scheme, this will result in a Negative, Moderate and Permanent impact.

The slipway (AH5) associated with the Tyrrell's boatyard and ship tracks will be retained in situ. The concrete slip and boat tracks across the road are the last physical remnants of the boat building industry which took place at this location for 130 years. The boat building yard with slip first appears on the revised 6-inch 1907-8 OS mapping, however the yard was in operation at this stage. The existing rail tracks in the roadway will remain insitu and the carriageway paved with setts. New paving along the proposed promenade will continue across the top of the slipway and the line of the rail tracks will be demarcated in the new paving. The slip way will be retained insitu, however, as a result of flood defence measures there will be no direct access to the feature. As such, even though there is no direct physical impact on the structure, there is a loss of function resulting in a Negative, Significant and Permanent impact.

A quay side seated area with an anchor sculpture (AH8) will be retained and incorporated into the overall public realm works resulting in a Positive, Slight Long Term impact.

As part of the proposed scheme, there is an opportunity to provide an integrated signage trail relating to items of cultural interest and industrial heritage features associated with Arklow's rich maritime heritage and an opportunity to promote Cultural Heritage Institutions of Arklow Town such as the Maritime Museum of Arklow.

11.4.5 Bridge Street and Main Street

In addition to River Walk, the South Quay and Arklow Dock, surface water drainage works are proposed along Bridge Street extending into Main Street (**Section 11.3.15**). Medieval and post medieval finds have been revealed from previous monitoring in this area (**Section 11.3.8**). There is the potential to reveal possible house foundations, refuse pits and property boundaries surviving below the existing streetscape within the zone of archaeological potential of the historic town of Arklow.

If encountered, there will be a Negative, Moderate and Permanent impact to below ground remains of an archaeological significance on Bridge Street and Main Street.

There is no anticipated direct impact to features of an architectural or cultural heritage significance within this area as a result of the FRS.

For the duration of the works there will be disruption, altering the visual appreciation of the structures that align the street. Resulting in a Negative, Not Significant and Temporary impact.

11.4.6 Arklow Dock

Arklow Dock is on the southern bank of the Avoca River. The existing roads and platforms around the dock have been built on sheet pile walls. There is a road around the dock yard onto which a number of existing buildings front. The majority of the road and building floor levels are below the estimate design flood level. **Appendix 11.6,** ADCO, Brady, 2021, **Plate 6** shows Arklow Harbour in 1956 taken by Alexander Morgan, sourced from the National Library of Ireland (NLI).

Flood protection will be provided by the construction of a concrete plinth or wall between the dock yard and the existing road.

Flood barriers will be installed in two locations in the dock area as shown on **Drawing No 1042** in **Appendix 4.1**. Two 8m wide demountable flood barriers will be provided to allow access shipyard and to the slipway.

The two existing slipways at the docks will therefore be preserved in situ and will be protected from flooding by using demountable flood barriers.

Drainage works will take place on the western and southern Dock Road. Boat rails (**Appendix 11.3, AH15**) will be impacted by trenching, but will be reinstated resulting in a Negative, Moderate and Temporary impact for the duration of the works.

Drainage works will take place in the road outside the Seafarer's Memorial Garden (AH14). For the duration of the works there will be a Negative, Not Significant and Temporary impact.

A mixture of metal and concrete mooring posts present in various sizes and forms such as mushroom shaped or as narrow two headed posts some of which are painted white and are all set on the edge of the quay wall at the South Dock (AH9, 10, 13 and 16 **Appendix 11.3**). As part of the maritime heritage of Arklow and a working dock if these are removed during construction for their protection they will be reinstated resulting in a Negative, Moderate and Temporary impact.

All site preparation and construction activities associated with the drainage works will be archaeologically assessed by monitoring and **Appendices 11.2 and 11.3** detail all the archaeological sites and areas of archaeological potential as well as architectural heritage structures and features of cultural heritage along the route of the stormwater drainage for the scheme. **Figure 11.6** shows all features of architectural heritage along the proposed pipeline for the stormwater drainage system. **Figure 11.12** shows features of a cultural heritage interest along the proposed route for the stormwater drainage system.

11.4.7 Compounds and River Access Areas

Site Compound 1 (SC1)

SC1within Ferrybank townland has been subject to archaeological test excavation (**Section 11.3.8 and 11.3.15** and **Appendix 11.9,** RedArc Consulting 2021).The area is located to the rear of structures fronting on to Ferrybank Road and is separated by a narrow laneway which provides rear access to these structures. This terrace of housing is of architectural heritage value and recorded in the NIAH. A Negative, Slight and Short Term impact will be present for the duration that SC1 is active **(Section 11.4.1.1 and 11.4.1.2)**.

Site Compound 2 (SC2)

According to Wicklow County Council, this site is located on an old municipal landfill (1950s-1970s) and it is the intention that the contractor will add capping material when establishing the compound and will not excavate so as to minimise any risk of egress from historic waste. There is no anticipated impact on heritage assets as a result of SC2.

Site Compound 3 (SC3)

The compound is located at the northwest end of Arklow Bridge (a protected structure, A26) and is overlooked by a terrace of houses located to the northeast, dating to the late 19th - early 20th. Archaeological test excavation at SC3 revealed the below ground structural extent of the former Ferrybank House (**Section 11.3.8** and **Appendix 11.9**, RedArc Consulting 2021) and a disused infill stone channel. Works within SC3 will remove these remains, resulting in a Negative, Moderate, Permanent impact. Due to its river bank location, works have the potential to reveal deeply buried archaeological deposits possibly associated with an earlier river crossing (Appendix 11.6) and possibly prehistoric features and finds.

Site Compound 4 (SC4)

The compound will sit on the existing tarmac surface (black top) of the carpark and no excavation works are required. Therefore, there will be no impact on the archaeology of the area. Access to the park and former graveyard will be ongoing during the construction works.

Site Compound 5 (SC5)

According to Wicklow County Council there is a history of munitions in this area, given the proximity of the Kynoch Works (1895-1918). The area is shown as Chemical Works on later OS editions. There is the intention that the contractor will add capping material when establishing the compound and no excavation will take place so as to minimise any risk of egress from historic waste. No heritage impact is anticipated.

The closest protected structure (A17) is a navigation beacon and is located at the end of the north pier. There will be no impact to this structure by locating SC5 in this area.

Site Compound 6 (SC6)

Test excavation took place at this greenfield site and revealed no archaeological finds, features or deposits. No archaeological impact is anticipated.

River Access 1 – 8

Works to facilitate river access works may result in a Negative, Moderate and Permanent impact on archaeological features in the estuarine environment as well as deposits along the river bank as well as the removal of a former, disused slip way (AH4) at 'Coal Quay' resulting in a Negative, Moderate and Permanent impact.

11.4.8 Assessment of effects during operation

All heritage issues will be resolved during the pre-construction and construction phase, therefore no effects on heritage assets will occur during operation.

An ongoing maintenance review of works to the historic fabric of Arklow Bridge and the South Quay wall will be undertaken at appropriate intervals by a conservation engineer who will advise if any future remedial works are necessary.

Archaeological monitoring will take place during maintenance clearances at the debris and gravel trap and at periodic and ongoing dredging operations in the river

No indirect effects have been identified in relation to archaeology during operation.

As cultural heritage elements will have been either removed, restored and integrated into the new flood relief scheme, there will be no additional indirect effects on cultural heritage during the operational phase.

The surviving above-ground structures associated with the industrial maritime heritage and the setting of the historic buildings / monuments in the surrounding urban landscape will be complemented by the proposed public realm design which will enhance the amenity space of the riverside.

11.5 Mitigation Measures and Monitoring

11.5.1 Project Archaeologist

Due to the complex nature of the work packages proposed for this scheme, it is proposed that a Project Archaeologist is appointed to provide a consistent, independent approach to the portfolio of individual work packages and to manage a centralised framework for the development of all archaeological, architectural and cultural heritage considerations.

Subject to obtaining planning approval it is expected that the scheme will be delivered through the following five Work Packages (WP) over a number of years (Refer to **Chapter 5** *Construction Strategy* for details):

- WP 1: Lowering the floor of Arklow Bridge including Bridge underpinning, Bridge remedial works and scour protection works.
- WP 2: Channel dredging upstream and downstream of Arklow Bridge.
- WP 3: Construction of debris and gravel traps with associated maintenance access ramp.
- WP 4: Construction of flood defence walls along River Walk, South Quay and around the dock on the south (right) bank, upstream and downstream of Arklow Bridge including the adjacent stormwater drainage.
- WP 5: Construction of flood defence earth embankment and wall on north (left) bank along eastern side of Arklow Town marsh

In addition to making consistent recommendations and approving mitigation strategies and ensuring open lines of communication, the Project Archaeologist can provide archaeological training to operators and provide an advisory role, offering practical advice on specific archaeological issues encountered in the field while promoting awareness of cultural heritage assets.

Given that works will be taking place on a number of different fronts, it is recommended that a Project Archaeologist is employed to develop a framework for the archaeological works (including advance archaeological contracts) while securing an approach that will allow the development and construction to proceed in an effective and efficient manner.

The Project Archaeologist will be engaged prior to the construction phase of the project to organise and devise the advance archaeological contracts and oversee the implementation of these contracts and the appointment of the contracting archaeologists.

- The appointment of a Project Archaeologist will ensure the smooth running of this scheme while providing a control on budgets. In addition to this the list of services and expertise, a Project Archaeologist can bring to the FRS includes:Design of tender specifications and archaeological contracts.
- Programme the sequencing of archaeological investigations in line with the proposed work packages.
- Oversee the conduct of the archaeological excavations.
- Review the archaeological and conservation requirements as the works proceed. Implement any required changes to approved methodologies as works and investigations proceed.
- Certify all archaeological costs.
- Oversee all post excavation works and certify all post excavation costs.
- Review the content of reports prepared by the Archaeological Contractor and ensure that the archaeological contractor provides all appropriate reports on their work in accordance with the contract conditions.
- Provide ongoing consultation with the heritage authorities.

- Ensure all work is proceeding according to archaeological licensing or consent requirements.
- Identify the requirement for additional testing or excavation works.
- Where possible implement time and cost-effective strategies that are in line with best practice guidelines and statutory authority approvals.
- Provide advice to Wicklow County Council and the OPW.
- Provide advice to the design and construction team including the contractor.

11.5.2 Archaeological Management Mitigations

The programme and schedule for the site preparation/ construction phase and each of the Work Packages (WP1-WP5) will be made available to the Project Archaeologist and the contracted archaeologists, with up to date information on where and when the various elements and ground disturbances and dredging will take place.

It is essential for the client and all contractors to provide sufficient notice to the Project Archaeologist and contracting archaeologist/s in advance of the site preparation/ construction works commencing. This will allow for prompt arrival on site to undertake additional surveys and to monitor 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.

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.

Once the presence of archaeologically significant material is established this will be reported to the statutory authorities by the Project Archaeologist. If it is not possible for the construction works to avoid the material, full excavation will be recommended. The extent and duration of excavation will be advised by the Project Archaeologist and is a matter for discussion between the client and the licensing authorities.

It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This will be complimented in the event of a full excavation. The team will include provision for an archaeological dive team, in the event that discoveries are made underwater during dredging.

Site offices and facilities will be provided on or near those sites where excavation is required.

Secure wet and dry storage for artefacts recovered during the course of the monitoring and related work will be provided on or near those sites where excavation is required.

Adequate funds to cover excavation, post-excavation analysis, and any testing or conservation work required will be made available.

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

Spoil management will take place and no spoil will be dumped on any of the selected sites or their environs.

11.5.3 Mitigation Prior to Construction - Advance Contracts

Subject to obtaining planning approval and due to programme and seasonal constraints, a series of advance archaeological works will be conducted throughout the scheme. Such work will be licensed by the Department of Housing, Local Government and Heritage.

These advance surveys, investigations and excavations will take place at the following area of the scheme and will take the form of:

11.5.3.1 Embankment at Ferrybank, relocation of utilities

Prior to any work taking place at Ferrybank and Marsh townlands, the electricity overhead lines and any underground buried cables within the proposed works area will have to be diverted. All work will be archaeologically monitored and undertaken in accordance to the EirGrid Guidelines (2015).

The removal of these constraints will allow further archaeological test excavation to take place within an agreed wayleave.

11.5.3.2 Arklow Bridge

As Arklow Bridge is a protected structure and it falls within the zone of archaeological potential for the historic town of Arklow, works taking place to this structure will be carried out with the advice of a conservation engineer in order to preserve the functionality, character and special interest of the structure and ensure its stability through compatible and durable interventions.

Further site investigation works will be undertaken as a standalone contract at Arklow Bridge. These will be procured during the detailed design stage of the project and will progress on a phased basis over the first year of the programme. This work will include a detailed assessment of the existing masonry bridge structure to fully define the extent of specialist masonry repair works required. This assessment will confirm the presence of previous grouting regimes and will allow an appropriate grouting regime to be established where grouting is required to the piers. Further site investigations will assist in fully understanding the existing foundation detail including the presence and condition of starling piles and the ground conditions under the piers. Site investigation works will be in the attendance of an underwater archaeologist who will systematically record all historic detail and fabric that may be revealed as a result of the works. This work will be carried in accordance with best practice procedure under a detailed methodology agreed with the heritage authorities.

The former historic stone apron consisting of large interlocking stones identified in Appendix 11.8, CORA 2021 and Appendix 11.6 and 11.7 ADCO, Brady 2021(Plate 58) will be fully recorded by a geodetic survey, photographic record and written description.

The stone apron that exists between the bridge arches lies underneath a concrete skim in places (this will be lifted where possible to aid recording) and comprises substantial stones bedded in a mortar mix. Investigation to date has concluded that the inclusion of plastic and modern material indicates that the apron is not original to the construction of the bridge and not of a significant age. The stone apron is still part of the historic makeup of the structure and as such it will be fully recorded.

As a conservation measure after recording has taken place, the stones that form the stone apron under Arch No. 1 will be labelled, removed (where possible recovered intact and largely undamaged), stored securely, and reinstated to their original form after the works have been carried out (section 11.5.4.5). No work will take place at Arch. No. 19 where the scour apron will be retained insitu.

All temporary access work in the river, required to facilitate the test investigation work at the bridge will be carried out in agreement with the heritage authorities. Any disturbance of riverbed materials will be monitored by a licensed archaeologist. Design proposals associated with stabilizing the bridge ahead of excavation of the river gravels will be reviewed by an archaeologist and a conservation engineer to ensure that the proposals are in line with best practice from a conservation perspective.

11.5.3.3 Underwater Archaeology

An experienced and competent licence-eligible maritime archaeologist will be appointed directly by the client to advise the project team on archaeological and cultural heritage matters during construction; to acquire any consents required to conduct the work, and to supervise and direct the archaeological measures associated with the scheme, including to undertake the advance works archaeological mitigations, and to undertake the construction phase archaeological monitoring.

The consents required include an archaeological Excavation Licence. Licence applications are made by the licence-eligible archaeologist on behalf of the client to the National Monuments Service at the Department of Housing, Local Government and Heritage. In addition to a detailed method statement, the applications must include a letter from the client on client letterhead that confirms the availability of adequate funding. There is a prescribed format for the letter that must be followed. Other consents include a Dive Survey licence to conduct archaeological dive work, and a Detection Device licence to use a metal-detector.

All management issues associated with carrying out an underwater archaeological survey assessment are detailed in **Appendix 11.6, Section 5.3**, ADCO 2020).

It is proposed that investigation of the timbers F11–F17 (**Appendix 11.6**, ADCO 2020, **Figure 9**) and associated riverbed will take place as an advance works underwater archaeological contract, to safeguard against the discovery of a composite archaeological feature/s immediately upstream of Arklow Bridge in a location that will be impacted directly by the proposed new upstream bridge apron.

Such work will be an underwater archaeological investigation where a team of archaeological divers employing Surface Supplied Diving Equipment will excavate a trench/es across the riverbed at the location of the known timbers to assess the presence of archaeological material in the riverbed. Should the investigation observe that the timbers are associated with a larger feature/s, that feature/s will need to be archaeologically resolved in advance of construction works. Sufficient lead time will be allowed for in the project schedule to permit the investigation and resolution of features in this location.

It is proposed that investigation of the boat wreck feature F19 (**Appendix 11.6**, ADCO 2020, **Figure 9**) and associated riverbed will take place as an advance works underwater archaeological contract, to safeguard against the discovery of a larger boat wreck feature at this location downstream of Arklow Bridge and close to the former Tyrell's boatyard slipway. Such work will be an underwater archaeological investigation where a team of archaeological divers employing Surface Supplied Diving Equipment will excavate around the piece of boat wreck to expose it more fully and to ascertain whether there are related elements buried or close by. The investigation should result in the proper recording of the vessel remains on the riverbed, and its removal from the riverbed for storage in secure waterlogged conditions that meet the requirements of the National Museum of Ireland. Such will permit the fuller study of the vessel remains and will inform decisions as to its permanent storage context.

An archaeological examination of the quay side will take place in advance of the River Access works (RA1-8) to establish the presence of original quay material. This will take the form of a visual inspection, stripping any existing render and recording all historic material (photographic and written description). All locations of historic fabric will be mapped and surveyed.

11.5.3.4 Debris and Gravel Trap Investigation

It is proposed that investigation of the riverbed at the gravel trap will take place as an advance works underwater archaeological contract, to safeguard against the discovery of archaeological material at the location of the former harbour of Arklow town (**Appendix 11.6**, ADCO 2020, **Figure 8**). Such work will be an underwater archaeological investigation where a team of archaeological divers employing Surface Supplied Diving Equipment will excavate a trench across the riverbed at the location of the silt trap to assess the presence of archaeological material in the riverbed. Construction of the gravel trap will involve the excavation of a trench 12m wide by up to 1.0m deep in the river bed for the full width of the river channel upstream of the debris trap

In tandem with the underwater archaeological investigation, the working area shown in **Figure 4.17** of **Chapter 4,** *Description of the Proposed Scheme* (Drawing Nos. 1003, 1021-1023) will be subject to archaeological investigation as part of the advance archaeological contract.

11.5.3.5 South Quay Wall and Mooring Posts

In order for remedial and repair work to take place at the existing quay wall that will be exposed at the 'pinch point'– a conservation engineer will be required to advise on the design and conservation specifications at the detailed design stage of the project.

At the 'pinch point' and to the north of it- where the quay wall is already exposed (approx. 74m, South Green – The Green, South Quay), this section of wall will be subject to advance contract works in the form of a rectified photographic record and detailed recording.

Where the sheet pile wall transitions from going in-front of the old quay wall to behind the old quay wall (i.e. where it becomes exposed)- a small section of the old quay wall will be removed either site- at these transition locations. The contractor will seek to reuse this stone in repairing the old quay wall in other locations/capping. The transition section/face of the old quay wall will therefore become exposed on either side. Detailed recording by photographic record will occur in the advance works contract and full archaeological recording will take place during the dismantling of these sections of the wall.

Where reconstruction works are required to tie into the existing wall at these transition areas, salvaged stone can be reused as required.

Similarly, where there are any other interventions with the old quay wall throughout the scheme, these interventions will also be monitored and recorded by the Project Archaeologist as part of the construction programme.

The Mooring posts will be removed locally by archaeological excavation and will be accommodated within a 2m area between the old quay wall and the new quay wall, thereby retaining their authenticity along the quay side **(Drawing No. 6545-302** *Landscape Design and Public Realm* **Appendix 4.2**). Once removed these stones will be labelled, stored at a secure location until reinstatement can take place.

11.5.3.6 Compounds

Advance archaeological test excavation has taken place (Appendix 11.9) Red Arc Ltd 2021) at SC1, SC3, SC6. There are no anticipated excavation works at compounds SC2, SC4 and SC5 and therefore no archaeological mitigation works are required.

In Marsh townland, the extant remains of Ferrybank House that were revealed through test excavation (**Appendix 11.9**) will be excavated as an archaeological exercise in advance of works taking place for SC3.

The extant remains of a linear stone-faced water channel and stone arch at SC3 that were previously identified by archaeological testing (Appendix 11.9)will be excavated, surveyed and recorded as an advance contract .

At SC6 no further archaeological work is anticipated at the site preparation as no archaeological features were revealed as a result of archaeological testing.

11.5.4 Mitigation During Construction

11.5.4.1 Compounds

Advance archaeological test excavation has taken place (Red Arc Ltd 2021) at SC1, SC3, SC6. There are no anticipated excavation works at compounds SC2, SC4 and SC5 and therefore no archaeological mitigation works are required.

At SC1 given the archaeological findings, it is proposed to topsoil strip the area proposed for the compound as an archaeological exercise. Should archaeological features be detected these shall be excavated by a team of archaeologists.

Excavation at SC1 will take place once the utilities have been diverted. The archaeological works will take place in advance of any construction works associated with WP5 and site preparations for SC1. Within the construction programme, a suitable amount of time will be allowed for the archaeological excavation to take place.

At SC3 once the excavation of Ferrybank House has taken place and the stone faced water channel has been recorded monitoring will take place during the relocation of utilities in this area. All clearance and site preparation works will be archaeologically monitored. Should any archaeological finds, deposits or material be encountered all work will cease in that given area and be archaeologically investigated.

The proposed relocation of utility services (powerlines) at Arklow Marsh (Drawing No. 1062) will be archaeologically monitored in advance of the archaeological investigations taking place. If it is decided to bury the powercables, this activity (trenching) will be monitored as well.

At SC6 no further archaeological work is anticipated at the site preparation as no archaeological features were revealed as a result of archaeological testing.

11.5.4.2 Embankment

The proposed embankment on the north bank **(**Drawing Nos 1031 to 1035 inclusive**, Appendix 4.1)** will be constructed running north-south on the eastern side of Arklow Marsh. It will be approximately 545m long. A permanent 4.0m wide track will be constructed along the dry side of the embankment to facilitate future inspection and maintenance.

Once the utilities have been diverted, archaeological inspection and test excavation of the line of the embankment and associated permanent works will take place**.** The archaeological works will take place in advance of any construction works associated with WP5. Within the construction programme, a suitable amount of time will be allowed for the archaeological **investigation** to take place**.**

A programme of archaeological test trenching will be designed in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits that may be present within the landtake of the Proposed Permanent Works.

Should any subsurface archaeological stratigraphy, material, feature be encountered, an appropriate ameliorative strategy approved by the authorities will be implemented. This will entail licensed archaeological excavation in full or part of any identified archaeological remains (preservation by record) or preservation insitu (by design).

11.5.4.3 Archaeological Monitoring

Archaeological monitoring licensed by the Department of Housing, Local Government and Heritage is required of all ground and riverbed disturbances associated with the Proposed Scheme.

This will be designed in order to establish the presence or absence, as well as the nature and extent, of any archaeological deposits, features or sites that may be present within the land take of the Proposed Scheme, where ground investigation and earth-moving works are taking place. This includes but is not exclusive to:

- All works taking place within the designated ZAP for the historic town of Wicklow (WI040-029).
- All proposed works to the bridge will be archaeologically monitored and surveyed by an archaeologist experienced in recording bridge structures and working in a riverine environment.
- Archaeological monitoring of works associated with extending downward all the bridge piers, and the excavation and removal of the bridge's stone apron and underlying river shingle will be carried out. This work will be conducted with the aim of recording all bridge elements that are exposed in the course of such works and before such elements may be removed by such works. The monitoring will record fully such features in writing and photographically, and will include metrically accurate measurements and drawings to permit the generation of scaled drawings that illustrate the history of bridge construction that may be revealed in the course of such work.
- All works (including enabling works) within the river including bunds to enable the remedial works for Arklow Bridge, temporary haul roads and the temporary causeway will require archaeological monitoring.
- Construction access roads from RA1, 2, 6 and 7 (**Figure 5.5.3** of **Chapter 5,** *Construction Strategy*) within the river channel will be formed on top of the bunds to run from the river access points to the bridge work areas. These may be located wholly or partially on top of the bunds to avoid and reduce the impact on the work area. The access road will approximately be 4m wide where it meets the public road with suitable protection/ containment of the road edge. This will allow sufficient space for trucks to stop and allow drain water to drain from excavated material. All disturbance of riverbed materials will be monitored by a licensed archaeologist.
- Monitoring will take place at all River Access areas 1-8, in order to identify any features or deposits of an archaeological nature. For example, the bankside works at River Access 4 and 5 will impact on made ground surfaces that are built up over pre-existing ground levels that could retain cultural layers and deposits.

This is the case upstream of Arklow Bridge where the works will take place along the south bank that is reclaimed land adjacent to the medieval town and its former harbour.

- Archaeological monitoring of the active dredging phases is required to ensure that material exposed/recovered during the dredging works is recovered and stored securely. Such dredging faces include the works required to establish way leaves and bunds where such work requires the use of river gravels whose excavation have not been previously archaeologically monitored.

The movement and relocation of drainage diversion, utilities and services will require archaeological monitoring.

- Archaeological monitoring will take place in the greenfield and brownfield areas proposed for the compounds and the proposed access roads.
- Archaeological monitoring will take place during the construction of the sheet pile walls along the quays.
- Part of the quay wall is obscured and already encased in concrete or has other additions such as a low plinth attached to the top. It is anticipated that the quay wall will be left in situ and retained behind the sheet pile wall. Where interventions are required, a monitoring archaeologist will undertake a photographic and written record as part of the construction programme. As this section of the quay wall is essential hidden, monitoring will occur as works are scheduled and as areas are revealed.

Archaeological monitoring will ensure the full recognition of, and the proper excavation and recording of, all archaeological soils, features, finds and deposits which may be disturbed below the ground surface and within the Avoca River.

All archaeological issues will be resolved to the satisfaction of the Project Archaeologist, DHLGH and the NMI. The licensed archaeologist will have provision to inspect all excavation to natural soil level and to temporarily halt the excavation work, if and as necessary. They will be given provision to ensure the temporary protection of any features of archaeological importance identified.

11.5.4.4 Examination of dredged spoils at site compounds

Archaeological monitoring licensed by the Department of Housing, Local Government and Heritage will be required of all ground and riverbed disturbances associated with the proposed scheme.

Archaeological examination of the dredge material by metal detection and visual inspection will be required. The dredge material will be transported to the construction compounds prior to removal offsite. This will provide a second opportunity to assess the archaeological potential of the sediments and recover material of archaeological interest. This archaeological examination will be based on a percentage of the dredge material to be agreed with the National Monuments Service and the National Museum of Ireland. A higher percentage of such monitoring is anticipated for dredge material from archaeologically sensitive locations upstream of Arklow Bridge and from Arklow Bridge itself.

A lower percentage is anticipated for dredge materials from downstream of Arklow Bridge, where the archaeological sensitivity is less. Archaeological examination of the dredge material at the various construction compounds is detailed further in Sections 5.3.2 and 5.5.2 below.

11.5.4.5 Architectural Heritage

The Avoca River played a vital role in the historical development of Arklow's seafaring economy and maritime culture, providing a transport conduit for the import and export of minerals to service the upstream mining activities around Avoca.

In order to provide an appropriate level of flood defence, this scheme will alter the existing river embankments and quay walls and necessitate works to Arklow Bridge, a protected structure (A26). In response to this and in parallel with the civil engineering works, a public realm design has been developed. The objective of the Public Realm project is to ensure the effective integration of the infrastructural project with the townscape and river setting in a manner that seeks to ensure the value of the river frontage in its new form can contribute positively to the townscape taking into consideration the historic and maritime heritage of Arklow (**Drawing Nos. 6545-300-306 Landscape Design and Public Realm – Appendix 4.2**). In the long term, there is a significant positive impact on the architectural heritage structures of Arklow due to the prevention of flooding.

The public realm design has been developed iteratively in collaboration with Arklow WwTP and the Flood Relief Scheme so as to ensure the new infrastructure does not obscure the important downstream elevation of the bridge and that none of the infrastructural components clutter or detract from the character of the bridge.

All works carried out at Arklow Bridge (as detailed above, **Section 11.5.2.2**) will be assessed by a conservation engineer.

The conservation engineer will identify suitable locations for vibration monitors to be placed for the duration of works at and in proximity to Arklow Bridge. Vibration monitors will be set in accordance to standard guidance for protected structures (historic buildings). In the unlikely event of vibration limits being exceeded, works will cease and alternative construction methods will be used (**Chapter 9 Noise and Vibration**).

As part of the conservation mitigation measures for Arklow Bridge, the riverbed of Arch 1 is to be reinstated to its original form and Arch 19 is to be retained as is , keeping in place the historic stone scour apron (section 11.5.3.2)(**Appendix 11.8 CORA 2021**).

A detailed methodology of all the proposed interventions in terms of grouting, underpinning (type and combination to be employed) and the lowering of the riverbed will be agreed with a conservation engineer and statutory authorities in advance of the finalised detail design.

Maintenance and localised repair works including vegetation growth, mortar loss, loose stonework, corroding ties and obscured issues behind later shotcrete have been identified as issues to address in the conservation structural report (**Appendix 11.8** CORA 2021). Specifications for repair works are outlined in **Appendix 11.8** within Appendices 4.3 and 4.4, and drawings SK-01-SK-10 (CORA 2021) show where these works need to take place. These works will be undertaken at the appropriate time under the guidance and advice of a conservation engineer.

Works to the masonry of the historic part of Arklow Bridge will include repairs to the previously applied gunite to the soffits of the arches, repairs to the masonry of the older sections of Arklow Bridge and removal of the vegetation growing on the bridge. Defective joints will be raked out and repointed. Deeply embedded roots will be drilled and injected with a suitable herbicide where to remove them would prove destructive to the integrity of the masonry. All loose stones will be re-seated and eroded mortar raked out and repointed with appropriate mortars. The render to the underside of the arches will be checked for integrity and where defective, removed and the masonry repaired. Areas of render requiring repair / reinstatement will be carried out in materials more appropriate to the original stonework. All works will be in accordance with the Conservation Engineering Report contained in **Appendix 11.8**.

Where required, method statements for the river access areas (RA1, 2, 6 and 7) located in proximity to the bridge structure detailing the construction strategy will be developed for approval from the statutory authorities including the Architectural Heritage Unit of the Department.

A continuous river side promenade will be provided along River Walk and South Quay to Arklow Harbour. From South Green - The Green at South Quay, the promenade will incorporate a section of the original stone wall quay by locating the proposed new flood relief wall inside the original quay wall (**Drawing No. 6545-302, Landscape Design and Public Realm – Appendix 4.2**). A conservation engineer will examine the existing quay wall (**Appendix 11.3, AH6**) and advise on the remedial and repair work.

At Ferrybank to the rear of properties facing onto Ferrybank Road, the setting of structures of an architectural heritage interest will be offset by proposed native woodland planting, landscaping and screening works that will assist in blending in the new works in Arklow Marsh.

11.5.4.6 Cultural Heritage

There is potential to have a significant, positive and permanent impact on the setting and understanding of the historic maritime significance of Arklow along the new quay side through improved access, upgrading of public realm works and heritage signage.

Where the South Quay wall (AH6, Appendix 11.3) cannot be presented and retained as described in section 11.5.3.5, it will be recorded. Section 11.5.4.3 describes how the quay wall and river banks will be archaeologically recorded.

Where interventions are required, a monitoring archaeologist will undertake a photographic and written record as part of the construction programme. As these sections of the quay wall are essentially hidden or obscured as the wall is encased in concrete or has other additions such as a low plinth attached to the top, monitoring will occur as works are scheduled and as areas are revealed.

The historic slip known as Tyrrell's slip and boat tracks (AH5) will be recorded by means of photography and written description prior to commencement of works so a full record of the feature is present prior to any interventions. All works in the vicinity of the historic slip will be archaeologically monitored.

Glass panels will be inserted into the flood defence walling proposed across the slip way, so the structure can be viewed. At present there is heritage signage providing information about this feature.

In consultation with interested stakeholders, local heritage groups and the Maritime Museum of Arklow it is proposed to provide a newly developed heritage trail that provides information at points of industrial heritage and maritime interest along the quays.

A seated amenity area (AH8) with an anchor forming the focal point in Tinahask Lower will be enhanced and incorporated into the public realm works.

Features of a cultural heritage interest that are required to be removed on a temporary basis or for a short-term period, will be removed, under archaeological supervision and in accordance with a method statement agreed with the statutory authorities. This will protect the heritage asset from any adverse impacts and ensure that it is stored safely at an agreed location.

Mooring posts (**Appendix 11.3, AH7**) removed as part of the advance works (Section 11.5.3.5) will be reinstated along the south quay reasserting their connection with the original quay wall.

The removal of the ruined and broken up slipway (**Appendix 11.3, AH4**) at Coal Quay will be archaeologically recorded by a written description, photographic and scaled drawing record.

Boat rails (AH15) that traverse the road from a former ship-building yard to Arklow Docks on the Dock Road in Tinnahask Lower townland will be lifted and removed prior to trench excavation taking place for drainage works. The rails will be stored at an agreed location and will be re-instated upon the completion of the works and the resurfaced road.

The Project Archaeologist will ensure that contractors are made aware of features of a cultural heritage interest that align the river at the South Dock and at Ferrybank. If necessary, protection measures such as localised hoarding will be put in place to protect features in situ, for example AH16, Mooring points and AH12, a water pump (Appendix 11.3).

At Tinnahask Lower (along the south quay and at the south Dock) it will be important to maintain the authenticity and integrity of the mooring points (Appendix 11.3, AH10) with the original quay wall.

While they are movable objects, they are set in the ground and will removed be under archaeological supervision and stored at an agreed and secure location for the duration of the project. The intent is to reinstate them or as agreed with the statutory authorities to move them locally to an optimum location.

In Marsh townland, the infilled stone line water channel (**Appendix 11.9**) that was identified on the northern boundary of SC3 will by archaeologically recorded in advance of works taking place and the area monitored as part of the construction contract.

At Ferrybank, a former laneway (AH1) will be traversed by the permanent works for the embankment. The section of causeway to be impacted will be recorded by a photographic and written survey and these works will be archaeological monitored.

National Monuments Legislation (1930–2004) states that in the event of the discovery of archaeological finds or remains, the National Museum of Ireland should be notified immediately. Provision must be made to allow for, and fund any, archaeological work that may be needed if any remains should be noted during ground preparation works or during construction. As described above, if features are revealed, the area will need to be investigated, allowing no further development to take place until the site is fully identified, recorded and excavated or, alternatively, avoided.

11.5.5 Mitigation During Operation

All heritage issues will be resolved during the pre-construction and construction phase.

An ongoing maintenance review of works to the historic fabric of Arklow Bridge will be undertaken at appropriate intervals by a conservation engineer who will advise if any future remedial works are necessary.

Archaeological monitoring will take place during maintenance clearances at the debris and gravel trap and at periodic and ongoing dredging operations in the river.

11.6 Cumulative Effects

A cumulative effect is defined in the Draft EPA 2017 guidelines as the addition of minor or significant effects, including effects of other projects, to create larger, more significant effects. A number of developments have been granted permission within the Arklow region, these are listed in **Table 20.1** in **Chapter 20** *Cumulative Impacts and Interactions of Effects* of the EIAR.

These schemes include the following permitted developments:

- Action Health Enterprises GP Limited the Former Boland's Builders Providers, Castle Park (181170) - This project relates to the development of a primary care facility at Castle Park.

- Gaines Europe Ltd Unit 1A Lower Tinahisk, South Quay (16248) - This project relates to the development of a new warehouse and distribution facility at Arklow Harbour.
- Gaines Europe Ltd Tinahisk Lower, South Quay (16414) - This project relates to the demolition of an existing industrial building at Arklow Harbour.
- Mill Sea Ltd North Quay, Arklow (18316) - This project relates to the demolition of existing structures at Arklow Harbour.
- Joby Developments North Quay, Arklow (15857) - This project relates to the demolition of existing structures and construction of retail and residential units at North Quay.
- Wicklow County Council Inner Harbour / Dock, Off South Quay (20469) - This project relates to the development of storage units at Arklow Harbour.
- Crag Digital Avoca Limited (18940/201285) – Works proposed at Avoca River, Shelton Abbey & Kilbride
- Arklow, Co. Wicklow- Pre-Application (306662) - This project relates to the development of onshore transmission connection infrastructure related to the Arklow Bank Wind Park offshore wind energy project.
- Parade Ground- WCC Part 8 - This project relates to public realm improvement works at Parade Ground, Arklow.

The development of these individual schemes will not result in a negative, likely significant, direct, indirect or cumulative effect when assessed in relation to the proposed works necessary during the construction and operational phases to deliver the Arklow Flood Relief Scheme from an archaeological, architectural heritage and cultural heritage perspective. This is due to the nature of the proposed scheme and the proximity to all other permitted projects.

Four projects have been identified where there is potential for a cumulative effect:

- Frank & Sandra Duffy No 7 and 8 Bridge Street &, No 34 Main Street (19750) - The project relates to the demolition of 2 existing buildings and the construction of a new retail and commercial building on Main Street.

This redevelopment is occurring at the corner of Bridge Street and Main Street in proximity to the proposed storm drainage element of the FRS. Both development are located with the zone of archaeological potential for the historic town of Arklow. No significant cumulative effects will occur from an archaeological, architectural heritage and cultural heritage perspective.

- Circle K Safeway Service Station (20426) - This project relates to the demolition of the existing, and construction of a new, fuel forecourt at the existing Circle K service station, which is located adjacent to Arklow Town Marsh and SC1 of the proposed scheme. This Circle K project involves development of over ground and underground fuel infrastructure.

Even through this development is in close proximity to the proposed works within the Marsh and at SC1, this proposal is for a rebuild of a brownfield site already disturbed from an archaeological perspective. No significant cumulative effects will occur.

- FS007049 SSE/Sure Partners Site Investigations at Arklow Bank – Site investigations proposed at the site and the harbour marina on the south shore immediately adjacent to works proposed at the marina for the Arklow FRS development area.

No significant cumulative effects will occur.

- FS006862 Irish Water - Arklow Waste Water Treatment Plant - The proposed Arklow Wastewater Treatment Plant Project comprising a new Wastewater Treatment Plant, associated infrastructure including sewer network and marine outfalls as well as an upgrade to existing coastal revetment. The WwTP shares common areas within Arklow town with the FRS and as such has the potential for in-combination with activities proposed for the FRS development.

In August 2019, Irish Water were granted permission to develop the WwTP Project. As currently proposed, the proposed Arklow WwTP works will overlap with the proposed flood relief scheme in terms of construction areas, structural components and possibly construction programme. The common work locations are set out in **Table 5.1** of **Chapter 5** *Construction Strategy*. There are also common works required by both schemes as detailed in **Section 5.2.3** of **Chapter 5** *Construction Strategy.* The promoters of this scheme, the Office of Public Works and Wicklow County Council, and Irish Water; the promoter of the WwTP Project, have agreed that whichever scheme commences first will carry out the common works. Furthermore, should the FRS proceed before the WwTP, a section of the WwTP interceptor sewer will be constructed as part of the FRS scheme (Refer to **Chapter 5** *Construction Strategy*)

From a heritage interest, other elements of design coordination between both projects include:

Works within the zone of archaeological potential for Arklow Town.

Works along the South Quay and the development of a new quay wall downstream of Arklow Bridge.

Arklow Bridge, a protected structure, where underpinning of the two southernmost arches is required.

Development of a tunnel shaft at the location of the former Ferrybank House to be carried out by the WwTP.

Both projects have been developed as standalone projects, capable of being built independently of one another. In order to progress each project, it has been agreed that the project that is first able to progress, will carry out the directly overlapping on site construction works.

Depending on the final construction programme for both the WwTP and FRS, construction works for both projects may occur in parallel or sequentially.

The sequential (both before and after) and concurrent construction of the WwTP project and the FRS have been considered to identify the worst-case scenario of likely significant effects for the purposes of the cumulative impact assessment.

As part of the FRS, works within the river such as the debris trap, dredging, the lowering the bridge apron and underpinning of the bridge and within the Marsh will require archaeological investigation, monitoring and architectural heritage recording and assessment. The extent of this work, in these environments will be more extensive than envisaged for the WwTP. If this scheme is progressed first, the works within the common areas will be completed as part of this scheme, these are concentrated around the town and are partly located within the zone of archaeological potential for the historic town of Arklow. This approach allows work for both schemes within a sensitive archaeological and built heritage environment to be completed, with the WwTP works incorporated with the minimum amount of disruption occurring. The FRS will be progressed with an integrated public realm element, providing an opportunity to improve amenities and landscaping along the Avoca River and Arklow town and integrating features of a built heritage nature.

If the schemes are carried out at the same time, the cumulative effect to features of an archaeological, architectural and cultural heritage will be completed at the same time and a public realm works progressed immediately.

If the WwTP is progressed first, the common areas to both schemes will be progressed along with other elements such as the development of the WwTP, a long sea outfall pipe, the interceptor sewer within the river channel and upgrading to existing outfall and coastal revetments. With this permitted development, all cultural heritage and archaeological and architectural heritage works can be mitigated through archaeological monitoring (terrestrial and underwater) and architectural heritage recording and assessment by a conservation engineer. Works to Arklow Bridge will be limited to the two most southern arches resulting in a lower overall impact to a protected structure.

In summary the prior to mitigation measures being applied the FRS will have a greater significant cumulative effect to features of an underwater archaeological potential and built heritage interest and a similar impact to features of an archaeological potential (terrestrial) to the permitted WwTP.

However, following the implementation of the mitigation measures including public realm works for the FRS, there will not be a significant cumulative effect whether both schemes (the FRS and WwTP) are undertaken concurrently or consecutively.

11.7 Residual Effects

No residual effects were identified during the course of the assessment on heritage assets.

Should any archaeological remains be uncovered, they will be fully resolved prior to the main construction stage where possible, either through preservation in situ or preservation by record.

There is an opportunity to provide a coherent and cohesive cultural heritage identity, incorporating the maritime and industrial heritage features of the town's historic past into the proposed public realm design works.

The provision of information panels at features and items of an historical heritage interest will result in a slight positive residual effect on cultural heritage.

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www.logainm.ie	A website that provides information in relation to the origins of townland and placenames in Ireland.
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www.osi.ie	This site provides access to digital Ordnance Survey maps.
www.buildingsofireland.ie	This site describes the structures and buildings listed on the National Inventory of Architectural Heritage (NIAH)