# 5 Conclusions and next steps

The geomorphological audit has shown that the Glashaboy is presently not actively transporting much gravel sized material. The river in its upper reaches has good floodplain connectivity, but in its lower reaches, as the urban influences encroach into the channel and floodplain and confine the river corridor, instabilities in the channel occur and erosional processes increase.

Sediment deposition is generally at a low level. The main supply of sediment into the system is from bank erosion, steep tributaries and glacial sediment re-working (in the very upper reaches). Run off from agricultural areas also inputs fine sediment in to the system with limited buffer strips due to a poor quality riparian zone in many locations. Where sediment accumulation issues exist within the system these tend to be as a result of modifications to the channel which has acted to disrupt the natural river system processes. This includes impoundment disrupting the downstream transport of sediment, over widening which reduces channels velocity (increasing sedimentation), channel narrowing increasing velocities (decreasing sedimentation and increasing bank erosion) and poor placement of in channel features and structures.

In relation to potential flood management solutions, opportunities exist to improve floodplain connectivity in several areas upstream of urban locations. This could help reduce flow energy causing erosion in key areas such as adjacent to the shopping centre. However, the steepness of the banks adjacent to the shopping centre and the limited easement between the top of bank and buildings means careful consideration should be given to bank stability, as the current ad-hoc method of bank protection could lead to long term issues. On the tributaries culvert replacement works are planned, and sediment transport processes will be temporarily impacted. The mitigation measures detailed in Environment Agency guidance for culverts and for fish passage will be required to reduce the long term impact of these works. Monitoring of these measures is essential through further audits and channel maintenance activities.

# A Appendix 1: Geomorphology Addendum (August 2016)

## A.1 C09_B01: Replace existing twin 0.9m dia. culverts with new 1.6m by 1.2m high rect. culvert

Bleach Hill Stream at this location is entrenched (overly deep). As a result there is little floodplain connectivity except when flood water backs up behind the structure. The stream is dominated by a gravel and cobble bed which appears partially mobile (i.e. limited evidence of armouring). During flood conditions it is likely that this sediment will be mobilised and transported downstream, whilst new sediment will be delivered from upstream reaches. Due to the existing small culverts some sediment has accumulated upstream of the bridge. Whilst the existing culverts appear to be capable of allowing sediment to move downstream, it is likely that the culverts frequently become blocked with trash and debris which will hinder sediment continuity to downstream reaches.

The proposed larger culvert will improve sediment continuity through the system. The existing bed material should be maintained and matched where possible, however, any disturbance to the bed will quickly be rectified during subsequent high flow events. High flows event will be capable of transporting sediment to the structure from upstream reaches and the bed will quickly re stabilise.

## A.2 C01_L01: Concrete flood defence (Old weir at Petrol Stn North of Sallybrook)

There is an impounded reach upstream of an old weir adjacent to the petrol station. The weir is partially collapsed and appears unmaintained. The reach upstream of the weir exhibits low velocities due to the impoundment impacts. The weir has also, over time acted to trap sediment upstream which in turn has elevated the upstream channel bed level.

The main flow route over the weir is towards the left bank (outside bed) at the weir site. The steep gradient of the weir acts to elevate velocities and this has caused outer bank erosion problems.

Measures to protect the banks from erosion have been implemented using boulders and concrete which appear to be working in the short term.

In the long term there is a risk that the existing bank protection measures could fail due to their ad-hoc nature and the old weir structure could fail. If this occurs the existing river bed upstream of the weir will naturally lower as the trapped sediment is released. There may be a case for further investigation to determine the impact of the failure of this old weir structure on both the bed and bank upstream. Works are planned on the left hand bank, and this will stabilise this bank.

Any future failure would release trapped sediment downstream (which may impact structures) and cause upstream bank instability (which may impact the existing and future flood defences and erosion protection measures depending on foundation depth). This issue should be monitored and action taken if conditions deteriorate.

## A.3 C08_700: Silted mill race


The redundant weir (noted above) feeds into the mill race shown in the photographs above. This is heavily silted due to the low velocities and limited variation in flow. Limited change is expected in this area following the construction of the new flood defences.

## A.4 Cols na Gleann Stream: Replace existing culvert with a new 2m wide by 0.9m high rectangular culvert




The Cols na Gleann Stream is a small steep channel dominated by cobbles and gravels, which appear to readily transported downstream. The channel is very narrow and it is likely that it has been straightened historically. Such modifications act to elevate in channel velocities. Sediment has accumulated upstream of the culvert. Downstream of the culvert the channel gradient reduces and smaller gravels have been deposited (due to the reduced velocities associated with the reduced gradient). Within this area gravels dominate the channel bed and less cobbles are present. The existing culvert appears to disrupt the downstream continuity of sediment due to blockages at the small trash screen and the undersized nature of the bridge.

The proposals at this location should improve sediment continuity downstream. Care will be required to ensure large cobbles do not become trapped against the upstream trash screen (if one is to be constructed) as the high energy conditions will still be present.

## A.5 C01_C01, B02, C02: Proposed flood relief channel and culvert

The existing channel at this location is dominated by cobbles and gravels. The bed is partially armoured (evidenced by the moss over some of the larger cobbles) which suggests limited large sediment delivery. However, site conditions suggest higher velocity flows frequently transport smaller gravels through this reach. The construction of a flood relief channel is unlikely to significantly alter existing morphological conditions. However, the invert of the flood relief channel should be set at a point as to not decrease velocity as this could lead to an increase in deposition if in channel velocities are reduced significantly.

The existing bed material should be maintained and matched where possible. High flows event will be capable of transporting sediment; however several flood events may need to pass through the system before the bed restabilises.

## A.6 C01_B03: Replace bridge

The channel at this location is currently over wide which acts to influence morphological processes. As a consequence, depositional zones are noted within this reach. (i.e. the over wide nature of the channel may lead to lower velocities which in turn may encourage deposition). The proposed new

bridge should not change the existing morphological regime, as the channel width is remaining the same.

Upstream and downstream of this bridge some channel erosion is evident. In particular, downstream of the bridge, existing gabion basket protection has begun to fail on the outside of the bend. An alternative solution to bank protection is recommended at this location.

The existing bed material should be maintained and matched where possible. High flow events will be capable of transporting sediment, however several flood events may need to pass through the system before the bed destabilises.

## A.7 C06_B01: Replace existing twin 0.4m dia culverts with a new 1.8m wide by 0.9m high rect culvert

No safe access could be sought to see this culvert on the Springmount stream. However, extensive gravels and sands were present downstream. A wooden weir structure is also in place downstream which acts to impound water upstream for an unspecified distance. This appears to have collected a substantial amount of sediment. If this weir fails it could impact the stability of the channel upstream in the short term. Further investigation should be sought to see if this weir influences flow conditions at the upstream culvert.

## A.8 C01_C03: Bridge arch to be cleared by removing vegetation




Sediment was in the process of being removed from the channel during the site visit on the 03/07/16. Sediment was being removed several hundred metres upstream and downstream of the bridge. Some banks remain steeply profiled and could be subject to erosion until vegetation re-establishes.

Nevertheless, it is expected that the channel will quickly recover and new gravel bars will reform and the river attempts to re-establish a sediment equilibrium.

## A.9 C09_C01 (channel deepening), C05_B01 (replace culverts), C05_C02 (channel widening), C05_C03 (widening)


Deepening and increasing the culvert size will increase conveyance through the bridge. There will be limited impact on the channel morphology. The weir downstream of the bridge acts to trap some sediment.

The delivery of sediment within this reach appears to be lower than over reaches. This means that the channel may take longer to recover following any in channel works.

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# Appendix 7.2

Observations and Objectives from the Cork Development Plan (2014) and Blarney Local Area Plan (2015)

# Appendix 7.2

The following extracts, policies and objectives are listed from the Cork County Development Plan 2014, the Blarney Electoral Local Area Plan 2011 (2nd Ed 2015) for their relevance and implications of the Glashaboy River Drainage Scheme in relation to landscape, townscape and amenity concerns. Ecological, built heritage and amenity concerns are elaborated on in Chapters 6, 8 and 14.

## County Development Plan

***Objective GI 6-1: Landscape***

a) *Protect the visual and scenic amenities of County Cork's built and natural environment.*

b) *Landscape issues will be an important factor in all land-use proposals, ensuring that a pro-active view of development is undertaken while maintain respect for the environment and heritage general in line with the principle of sustainability.*

c) *Ensure that new development meets high standards of siting and design*

d) *Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or distinctive boundary treatments.*

***Objective GI 6-2: Draft Landscape Strategy:*** *Ensure that the management of development throughout the county will have regard for the value of the landscape, its character, distinctiveness and sensitivity as recognised in the Cork County Draft Landscape Strategy and its recommendations, in order to minimise the visual and environmental impact of development, particularly in areas designated as High Value Landscapes where higher development standards (layout, design, landscaping, materials used) will be required.*

***Objective GI 7-1: General Views and Prospects:*** *Preserve the character of all importance view and prospects, particularly sea views, river or lake views, views of unspoilt mountains, upland or coastal landscapes, views of historical or cultural*

*significance (including buildings and townscapes) and views of natural beauty as recognised in the Draft Landscape Strategy.*

***Objective G 7-3: Development on Scenic Routes:***

a) *Require those seeking to carry out development in the environs of a scenic route and/or an area with important views and prospects, to demonstrate that there will be no adverse obstruction or degradation of the views towards and from vulnerable landscape features. In such areas, appropriateness of the design site layout, and landscaping of the proposed development must be demonstrated along with mitigation measures to prevent significant alterations to the appearance or character of the area.*

b) *Encourage appropriate landscaping and screen planting of developments along scenic routes which provides guidance in relation to landscaping.*

***Objective GI 7-4: Development on the approaches to Towns and Villages:*** *Ensure that the approach roads to towns and villages are protected from inappropriate development, which would detract from the setting and historic character of these settlements.*

## Blarney Electoral Local Area Plan

***3.2.18.*** *"While the status of this section of the Glashaboy River is good, the South West River Basin Management Plan has identified that this area is at risk from future waste water and surface water discharges. This issue will need to be addressed if the current status is to be maintained".*

***3.4.13*** *"The Hazelwood centre has been identified as the focal point for retail provision in the town. While the centre performs an important function, its layout and design do little to create a pedestrian orientated urban environment. One of the principle aims of this plan is to enhance the quality of retail services offered in Glanmire by extending the town centre to include parts of Riverstown".*

***3.4.14.*** *"A key element of this strategy is the need to ensure appropriate pedestrian and cycling connectivity within this extended town centre. This can be achieved by paying particular attention to public realm enhancements in Hazelwood and by improving the quality of the streetscape in Riverstown".*

***Objective O-01: "****Open Space. This prominent slope makes a significant contribution to the setting of Riverstown. There is a presumption against development on these lands because of the importance of the hillside to the setting of the area".*

***Objective O-04****: "Open space for informal recreation including the provision of an amenity walk. This open space contains the Town Park, an important community amenity.*

***Objective O-08****: "Open space where existing land uses will remain largely unchanged. The management of this land may be carried out in accordance with the approved brief and associated contributions from any development proposals on adjacent lands"*

***Objective U-02:*** *Develop and maintain pedestrian walk through existing open space and extend through proposed open space (O-04) along river bank.*

## Appendix 13.1

Published Information in the Archaeological Inventory of Co Cork (Power 1994) and published files of the Archaeological Survey of Ireland

# Appendix 13.1

## Published information in Archaeological Inventory of Co Cork (Power 1994) and published files of the Archaeological Survey of Ireland

C064-044 Sarsfieldscourt Castle

In pasture, on S-facing slope. No visible surface trace; demolished in the 1950s after a collapse; some cut stone in nearby garden of landowner. According to Healy (1988, 68), the building consisted of 'a high tower containing a flight of steps and a bell tower', it was apparently 'a semi-fortified house' erected in the middle of the seventeenth century' by Sarsfield family (Power 1923, 205).

CO063-092 Knocknahorgan Ringfort

In pasture, on S-facing slope. Shown as circular enclosure (diam. c. 25m) on 1842 OS 6-inch map; field fences run off from N and S banks. Levelled; no visible surface trace.

CO063-093 Knocknahorgan Cloth mill

On S bank of Glashaboy River c. 1.5km N of Sallybrook. Remains of large complex shown on 1842 OS 6-inch map as 'Bleach and Cloth Mill'; on 1902 and 1935 OS 6-inch maps as 'Silversprings Starch Works'. Tall roofless gable-ended structure (ext. 10m E-W; int. 2.55m N-S); tall archway in E wall; raised platform (H 1.7m) at W end. Attached to N wall are low remains of structure (3.8m N-S; 9.65m E-W). At E side of complex is a 1-storey gable-ended structure; brick detail quoins and surrounds to opes with date stone '1897' on E gable. Late 19th/early 20th century residential house in centre of complex. Other wall fragments survive. Underground tunnel; indicated on 1842 OS 6-inch map running SW of complex to chimney, survives as partially collapsed brick-lined tunnel (H c. 0.5m; Wth c. 0.8m); leads uphill c. 100m to SW to an overgrown stone-built chimney (H c. 12m).

CO063-094 Riverstown Cloth mill

On E bank of Glashaboy river in Sallybrook. Shown on 1842 OS 6-inch map as 'Bleach and Cloth Mill', 1904 as 'Pike Mill (Dyeing)'; on 1935 as 'Glansillagh Mills (Waterproof Goods)'. In poor condition after fires in late 1980s. Mill complex consists of multiperiod 2-storey E-W range, wheel-pit on W side; roofless 2-storey 4-bay structure (long axis N-S) attached to SE corner; remains of other structures to SE. Wheel-pit (Wth 4.85m) has mid-19th century flat-roofed wheel house, N wall of which is an extension of structure to W; wide brick arch over head-race in N elevation. Tail race exits between two tall round-headed arches and flows underground to S. Structure to W of wheel house is 2-storey gable-ended (long axis N-S), with brick detail; key stone in S wall bears date 1851. Two-storey gable-ended projection at N end of W elevation; similar to early 19th century structure attached to N, both pedimented

on W gables with oculi. Mill pond immediately to N with head race flowing S from it. Access to interior of mill not gained.

CO063-069 Riverstown Paper mill

On E side of Glashaboy river. Named 'Paper Mill' on 1842 OS 6-inch map, 'Sallybrook Woollen Mill' on 1902 and 1936 OS 6-inch maps. Present structure is rectangular in plan (long axis E-W); 3-storey, 8-bay, gable-ended. According to local information mill wheel, removed c. 1968, positioned along E side of structure.

CO064-047 Hermitage Standing stone

In pasture on E-facing slope. Rectangular stone (H 2.26m; 0.82m x 0.2m), long axis N-S. Packing stones exposed at base. Some striations on N edge of stone. Standing stone (CO064-048---), similar in shape and size, c. 120m to S.

CO064-048 Hermitage Standing stone

In pasture, on E-facing slope. Rectangular stone (H 2.26m; 0.82m x 0.2m), long axis N-S. Packing stones exposed at base. Some striations on N side of stone. Standing stone (CO064-047---) of similar shape and size, c. 120m to N.

CO064-051 Riverstown Country house

An early 18th century house, enlarged and remodelled in 1730s into its present shape (Bence-Jones 1978, 242). Entrance front (W) 2 storey with 4 bays, off-centre doorway flanked by narrow windows; elevation extended to N by 1-bay, 3-storey addition. Double-geble ended elevation to S. Garden front (E) of 2 storeys over basement (basement hidden to front), 7 bays wide. Hipped bow-ended elevations to N. Interior rich in design and ornamentation with plasterwork by the Francini brothers 'probably their earliest work in Ireland and dating from ca. 1734' (Bence-Jones ibid.; see photos Lee 1927). Ornamental lake, known as the "Fairy Pond", to NW. House open to public.

CO064-111 Riverstown Poulacurry North Poulacurry South Bridge

Hump-backed road bridge (Wth 4.75m) over Glashaboy river. Five semicircular arches with roughly cut voussoirs; low pointed breakwaters.

CO064-142 Riverstown Lime kiln

Roadside, adjacent to Butlerstown river on estate of Riverstown House (CO064-051---). Front (L 3.12m) E-facing; blocked stone-arched recess (H 2m) spanning full width of wall;

small rectangular ope at base leads into funnel. Projecting end walls. Stone-lined funnel (diam. 4.66m), barrel-shaped in section. Ramp on S side.

CO074-071 Poulacurry South Mound

In pasture, on grounds of Castle Jane House. Oval grass-covered mound (5.5m x 8m; H 1.2m) locally regarded as ancient site.

CO074-104 Poulacurry South Church of Ireland church

In Glanmire village, St. Mary and All Saints C of I church. Built in 1784 on privately donated site (Lewis 1837, vol. 1, 654). Shown on 1842 OS 6-inch map as plain rectangle with small extension to W. Nave has pointed 1- and2- light windows on rendered N wall; aisle of uncoursed limestone blocks added to S with 2- and 3-light pointed windows. Short chancel, also of limestone blocks, has single pointed windows in N and S walls; central E window, 5 pointed lights divided by mullions. Vestry on S side of chancel. Rendered tower at W end; pointed arch entrance with traceried pointed fanlight on W face; blocked window on N face surmounted by clock; upper levels have octagonal belfry with slender spire.

CO075-001 Poulacurry South Cloth mill

On W bank of Glashaboy river 0.5km N of Glanmire. L-shaped complex shown on 1842 OS 6-inch map as Cloth mill; shown as Beetling mill on 1902 OS 6-inch map. Present L-shaped layout is constructed in two phases. Earliest structure (long axis N-S) on W side is of 4 storeys gable-ended with attic; stone-arched window opes. Attached to S end E wall is 4-storey, 7-bay mill (long axis E-W), with wheel-pit along E wall. Windows with brick surrounds with roof gabled to W, half hipped to E; date plaque (1796) on weatherslated S elevation. Smaller mid/late 19th century mill (long axis E-W) to N; decorated bargeboards along gable ends; wheel pit along E gable. Mill pond to N; two millraces flow S to power both mills. According to local information turbine installed 1929. Access to interior not gained. Functioned as saw-mill in recent past, now functions as furniture factory.

CO075-002001- Ballinglanna Corn mill

Indicated on 1842 OS 6-inch map as large complex on E bank of Glashaboy river. Rectangular mill (19.85m N-S; 12.5m E-W) survives; double gable-ended except for hipped E end of southern roof, with roof vent. W elevation of coursed limestone ashlar; two elliptically-headed doors at ground floorwith limestone surrounds, brick surrounds to rest of opes. Wheel-pit (Wth 4.1m) along E elevation; houses low breastshot iron waterwheel with pinion wheel attached to shrouding. Mill race still flowing approaching mill from N; remains of sluice-gate just N of wheel-pit. Five-bay extension from E elevation of mill survive; connected mill to large complex of buildings indicated to E of mill on 1842 and 1902 OS 6-inch maps but which no longer survive; straddling wheel-pit, burnt 1960 and subsequently rebuilt to present 1-storey height.

CO075-002002- Ballinglanna Lime kiln

In grounds of flour mill (CO075-00201-). Partially collapsed; front has arched recess (H 2.3m; Wth 2.9m); joist-holes above recess to support lean-to structure. Rear of kiln inaccessible.

CO075-003 Ballinglanna Distillery

In Riverstown, on S bank of Glashaboy river. Early/mid-19th century complex marked 'Distillery' on 1842 OS 6-inch map, of which only two buildings remain. Rectangular gable-ended structure built into slope, known locally as "the maltings". Four-storey N elevation, 11 bays. S elevation of 3 storeys; camber-headed brick-arched windows. Wide central doorway on each floor of W gable. Three-storey rectangular structure to NW (long axis E-W), adjacent to stream; elevation of 12 bays; now used as garage. Complex named' Brewery' on 1902 OS 6-inch map, indicating change in function.

CO075-069 Ballinglanna Coaching house

Late 18th/early 19th century 2-storey (over basement) coaching house of Glyntown House (in ruins) to SW. Hipped roof. Entrance front (S) of 5 bays; central 3-bay pedimented breakfront with wide arched doorway flanked by narrower arched door opes. Oval-shaped 1st floor windows with brick surrounds; oculus in pediment with brick surrounds. Brick string course between floors.

CO075-048 Ballinglanna Poulacurry South Bridge

Hump-backed road bridge (Wth 8.85m) over Glashaboy river. Three semicircular arches with dressed voussoirs; pointed breakwaters.

CO075-094001- Ballinglanna Architectural Fragment

The well is built into a slight S-facing slope in ground, in a field of pasture. Water from the spring flows out from it and thus creates a wet boggy area immediately to the front. The well has an apsidal stone-built surround, built into the sloping ground. The top of the vault stones are now exposed, probably due to erosion. The front of the wall has a built façade but this has been damaged and only the west side is now intact; only the two basal stones survive in situ on the east side. The stones from which this façade is built are mostly dressed and two are from the arch of a 15th century ogee-headed window light. They both have a deep outer chamfered edge and a shallow inner chamfer. Only one of these is still in place, the other is now lying loose beside the well. These window stones formed the upper end stones of the facade and are inscribed with the date “1788”. This is presumably the date when the surround of the well was built. The surviving arch stone of the well surround is also likely to be 15th century though it is not chamfered, and judging by the similarity of the dressing on the other

stones of the façade these are also likely to late-medieval as well. There is no tradition that this well was ever venerated and is likely to be a secular well. A short distance to the north is a folly building (CO075-094002-) which also contains reused 15th century dressed stone matching in style the well stones and it is likely the well surround and the folly building were built at the same time. These dressed stones must have come from a nearby tower house but there is no tradition or local information regarding this, nor is any castle marked in this location on the OS maps.

CO075-094002- Ballinglanna Architectural Fragment

This is a two-phased construction. At the west end is a lime kiln and onto the east side of this a folly castellated building has been added creating a façade which disguises the lime kiln as part of the folly. The front opening of the kiln has been blocked up but the funnel is still evident from above though the top of the kiln is partially covered by scrub and ivy. The folly building is now a shell and the top part of the front wall has fallen though it is clear that the top of the wall was battlemented- these survive where the wall still stands to full height though that part now covered by ivy. The building is built against a rock outcrop on its north side so that it is not a free-standing structure (typically lime kilns are built into sloping ground). The front façade consists of a central ground-floor door, flanked on its west side by the blocked-up kiln opening and on its east side by a star-shaped recess. On the first floor there is a window ope directly above the ground-floor door. This is flanked by two niches with bluntly-pointed arched heads. The inside of the door surround is a re-set 15th century two-centred pointed arched surround. The inwardly curve of the jamb stones show this to have been a doorway in a spiral stairs. There is a deep chamfered edge and on the east side a pyramidal stop-chamfer with a plain horizontal roll at its apex. Also of this date and matching both the door and the stones at the nearby well (CO075-094001-) is the surround of the single-light window directly above. The top of this is now covered by ivy but the ogee-head is clear as is a recessed spandrel (at last on the west side). These dressed stones must have come from a nearby tower house but there is no tradition or local information regarding this, nor is any castle marked in this location on the OS maps.

CO064-049 Hermitage Sweathouse

Built into natural slope on steep overgrown N bank of Butlerstown river. Mentioned by Power (1923, 204) as 'clochán-like structure, now very decayed....it was roofed on the beehive principal and was furnished with fireplace and chimney'. Remains of circular stone-built structure (int. H 1.6m; diam. 3.3m; wall thickness 0.63m); lintelled fireplace in W wall; break in wall to SE may be entrance. Only indication of corbelling is short section to N comprised of two courses of oversailing masonry.

CO064-052 Brooklodge Fulling mill

To E of Butlerstown river, c. 1.2km N of Riverstown. Remains of mill structure (long axis NE-SW; L 5.2m), SE end replaced by long (int. L 15.5m) mid/late 19th century addition. Wheel pit (Wth 2.5m) along NW wall which housed a low breastshot or poncelot wheel.

CO064-055 Brooklodge Castle

Shown on 1842 OS 6-inch map; by 1904 OS 6-inch map new road going through area of site. Immediately to E, 1842 map shows site of 'old fish pond'; this also probably destroyed when new road constructed. Possibly a castle of the Barrys (O Murchadha 1985, 30).

CO064-056 Brooklodge Fish pond

This pond is shown and named 'Old Fish Pond' on the 1842 OS 6-inch map in the townland of Brooklodge Upper (now known as Brooklodge townland). This fish-pond is referred to in the 'Archaeological Inventory of County Cork - vol. 2 East and South Cork' (1994, -209) under the entry (no. 5522) for an unclassified castle (CO064-055----). The fish-pond is mentioned as follows: 'Immediately to E, 1842 map shows site of 'old fish pond'; also probably destroyed when new road constructed…'.

CO074-026 Lotamore Country house

Overlooking Lee estuary to S and mouth of Glashaboy River to W, built 1765 to design of Davis Duckart. Central block 3-storey, 9-bay; prominent quoins and elaborately carved cornice. Central 3-bay breakfront with pedimenta bove Baroque porch; above porch four pilasters enclose 3 central bays, surmounted by urns on the parapet (Glin 1967, 739). Symmetrical arcaded wings extend from rear of W and E elevations to pyramidal-roofed pavilions. 'The interior has an elaborate, double-ramp mahogany staircase' (Glin ibid.). 18th century prints show a plainer house with string course between ground and 1st floors. Plaster window surrounds, string courses at base of 1st and 2nd floor windows and pediment over breakfront all added. Roof originally parapeted; raised to extend to upper edge parapet; gabled roofs of wings also raised and pavilions heavily altered. Now owned by Brothers of Charity.

# Appendix 13.2

Wading and Metal Detection Survey at Glenmore Stream, Ballinglanna Riverstown Unnamed channel at sallybrook House, Riverstown an Bleach Hill stream, Sarsfieldcourt, Glanmire, Co Cork

# Note - Appendix 13.2 and 13.3

Both **Appendix 13.2** (Wading Survey) and **Appendix 13.3** (Dive Survey) were carried out during the course of the compilation of the EIA as a direct response to consultations with the Underwater Archaeological Unit of the National Monuments Service. The design of the scheme had not been finalised in advance of either survey. Following the completion of both, design changes were implemented which are not reflected in the wading survey and dive survey reports. Full and final details of the scheme are included in **Chapter 13**.

**Wading and Metal Detection Survey**

**at**

**Glenmore Stream, Ballinglanna & Riverstown**

**Unnamed channel at Sallybrook House, Riverstown**

**and Bleach Hill Stream, Sarsfieldscourt, Glanmire, Co Cork**

Licence Number 16D0054 & 16R0082

Avril Purcell MA MIAI

July 2016

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Lane Purcell Archaeology,

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on behalf of

Office of Public Works

## 1 Introduction

1.1 The Office of Public Works are undertaking the Glashaboy Flood Relief Scheme. The scheme will include works at a number of locations along the Glashaboy River and its tributaries including Bleach Hill Stream, Cois na Gleann Stream, Springmount Stream, Butlerstown Stream and Glenmore Stream (Figs. 1 and 2). An Environmental Impact Assessment (EIA) is currently being prepared on the scheme. As part of this EIA, the Underwater Archaeological Unit at the Department of Arts Heritage and the Gaeltacht were consulted and they recommended archaeological wading and metal detector surveys at a number of locations where works are proposed for the scheme in order to assess the archaeological potential of the watercourses and their environs.

1.2 The proposed scheme is designed to reduce the flood risk in the suburban villages of Sallybrook, Riverstown and Glanmire on the northern side of Cork city. Glanmire is north east of the city with Riverstown and Sallybrook located further north and upstream. The village of Glanmire marks the opening of the Glashaboy River into a wide tidal mud flat as it flows into the upper reaches of Cork harbour. Upstream of this the river is fast flowing and is crossed by numerous bridges which, in effect, mark the development of Glanmire from its industrial beginnings in the 19th century to its current phase as a commuter suburb to Cork city. The river and its tributaries are open and flow generally within their original channels in the suburban areas. Some sections remain culverted, since their use in the 19th century when they provided power to the various mills in the area.

1.3 The intertidal and metal detection surveys were carried out by the author on the 1st and 11th of July 2016 under licence numbers 16D54 and 16R82. The surveys were undertaken on sections of three watercourses, Bleach Hill Stream, Sarsfieldscourt; an unnamed channel at Sallybrook House in Riverstown townland; and the Glenmore Stream, Brooklodge Upper and Ballinglanna. There are no sites listed in the Record of Monuments and Places (RMP) for Co Cork on the watercourses. The nearest is a mill in

Riverstown (CO0063-069) which is 40m north of the unnamed channel at Sallybrook House.

1.4 This report was compiled by Avril Purcell, Lane Purcell Archaeology, 64 Fr Mathew Road, Turner's Cross, Cork on behalf of Arup, 15 Oliver Plunkett St, Cork.

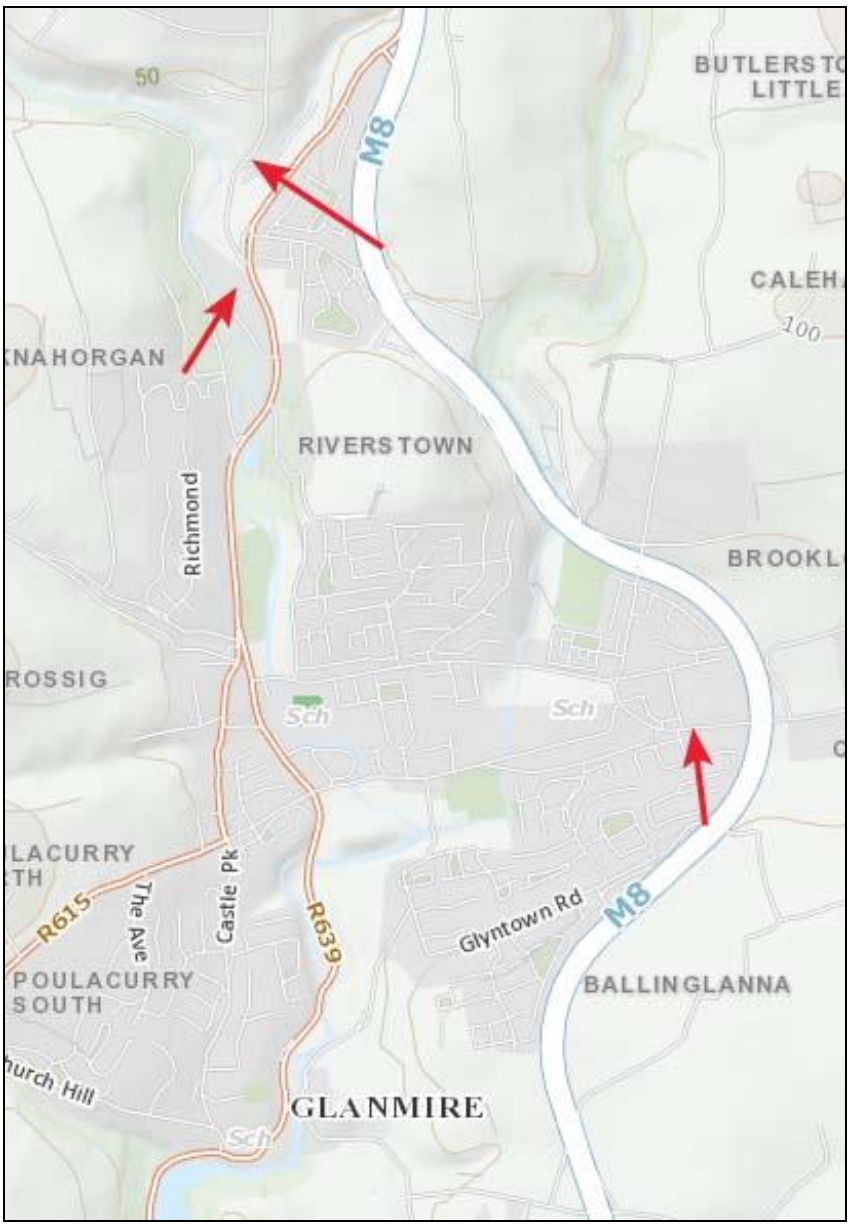


**Figure 1:** OSI map showing locations with red arrows where survey was carried out

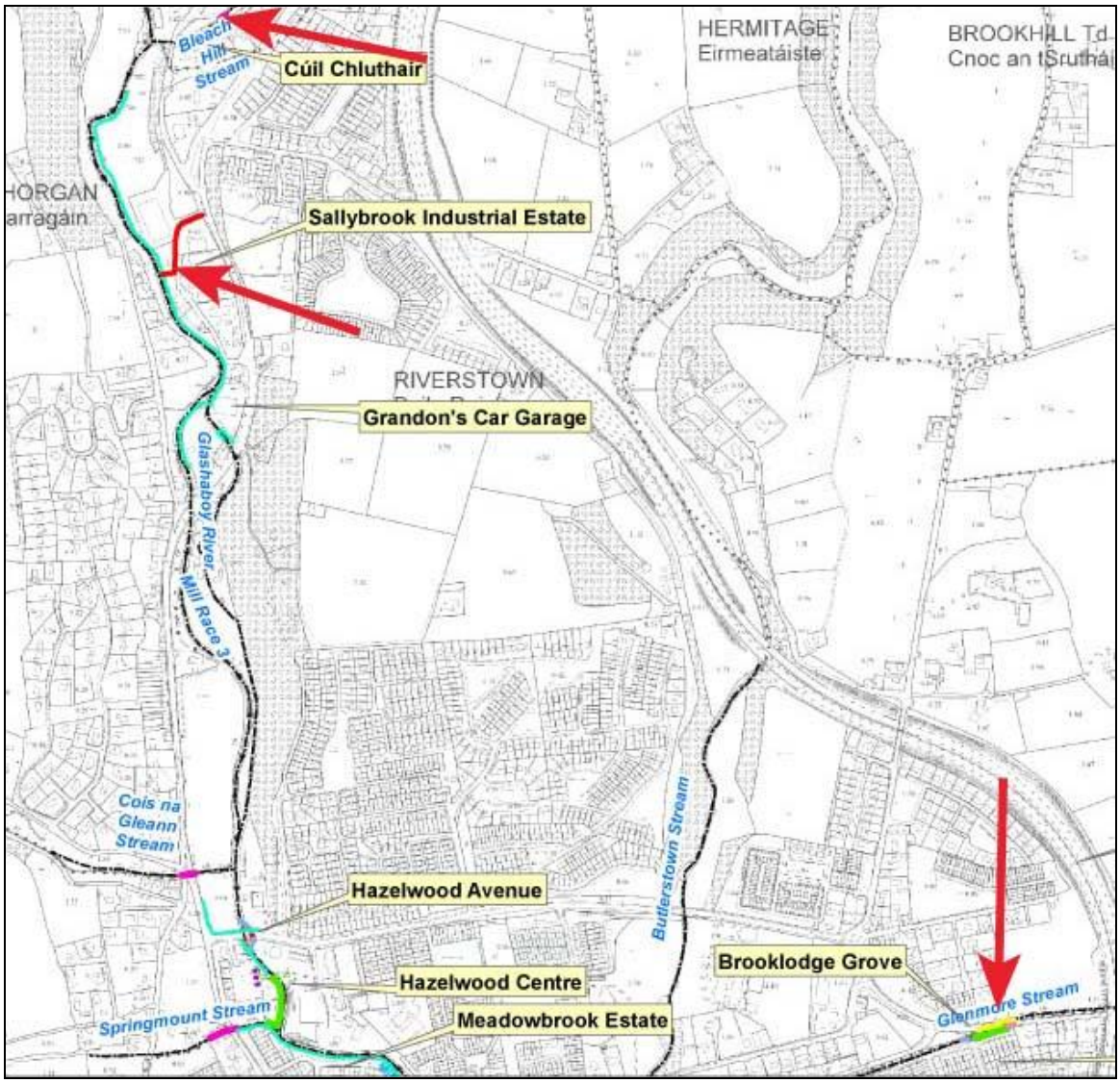


**Figure 2:** Areas of works for Glashaboy Flood Relief Scheme included in survey shown in red (after Arup)

## 2 Existing Site and Proposed Development

2.1 Flood relief works are proposed at a number of locations along the existing watercourses in Glanmire, Riverstown and Sallybrook. The wading and metal detector surveys focused on areas within the scheme which were possible to wade and where the original watercourses appear to survive despite some modifications. A dive survey of the Glashaboy River is being carried out under a separate licence. The areas of proposed works included in the wading and metal detector survey are as follows:

- *Bleach Hill Stream: Cúil Chluthair, Sarsfieldcourt townland (Figs. 3 and 4)*
  Works will comprise the replacement of the existing culvert under the road with a new 1.6m wide and 1.2m high rectangular culvert.
- *Unnamed channel south and east of Sallybrook House: Riverstown townland (Fig. 3)*
  Works will include culverting the existing open channel which will be cut off by the construction of the flood defences on the Glashaboy River.
- *Glenmore Stream at and near the entrance to Copper Valley Vue and Brooklodge Grove Road, Brooklodge Upper and Ballinglanna townlands (Fig. 5)*
  Works will comprise the replacement of the existing culvert at the entrance to Copper Valley Vue with a new wider culvert. The culvert approximately 50m to the east of the entrance under Brooklodge Grove Road will be replaced by a new deeper, wider culvert.

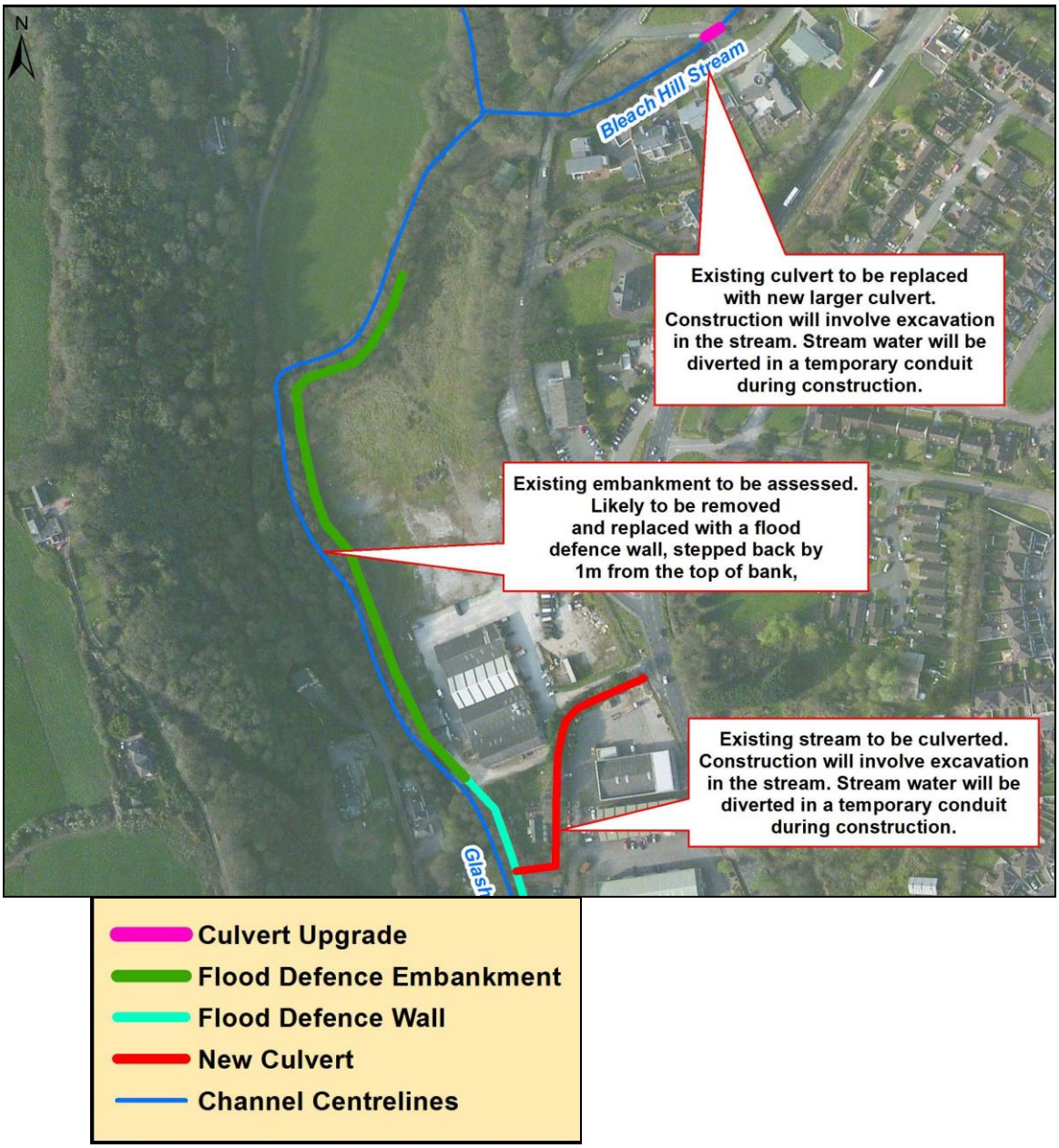


**Figure 3:** Proposed works to Bleach Hill Stream and unnamed channel at Sallybrook House in red (after Arup)

| Interference Reference | Channel Chainage (m) | Proposed Works Chainage (m) | General Description of Proposed Works |
|---|---|---|---|
| C09_B01 | - | 0 to 9 | Replace existing twin 0.9m diameter culverts with new 1.6m wide by 1.2m high rectangular culvert. |

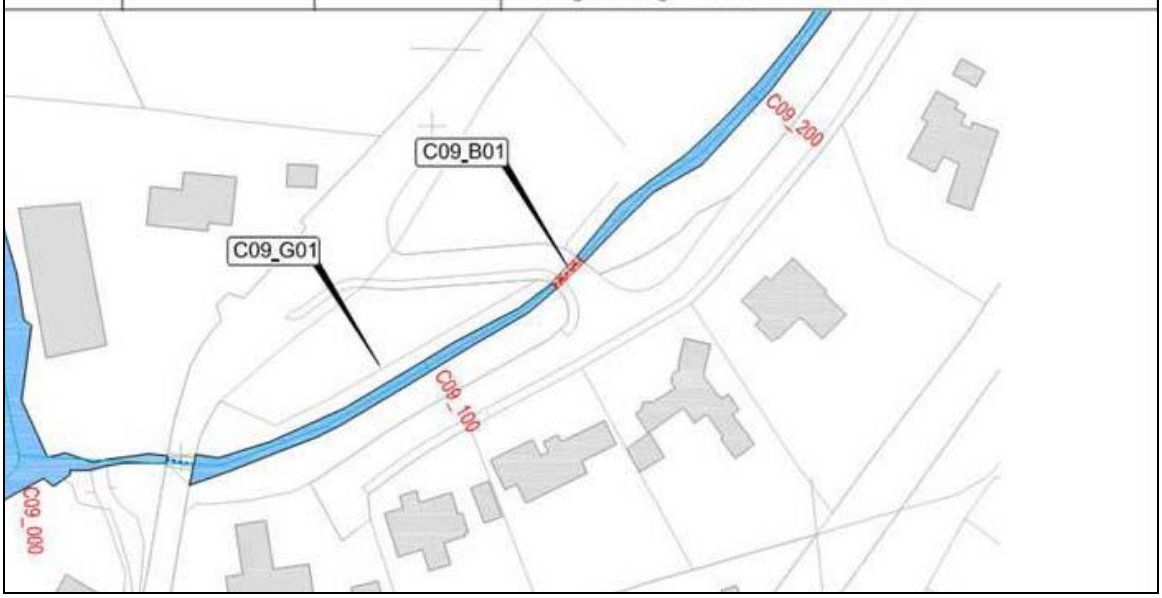


**Figure 4:** Proposed works to Bleach Hill Stream (after Arup)

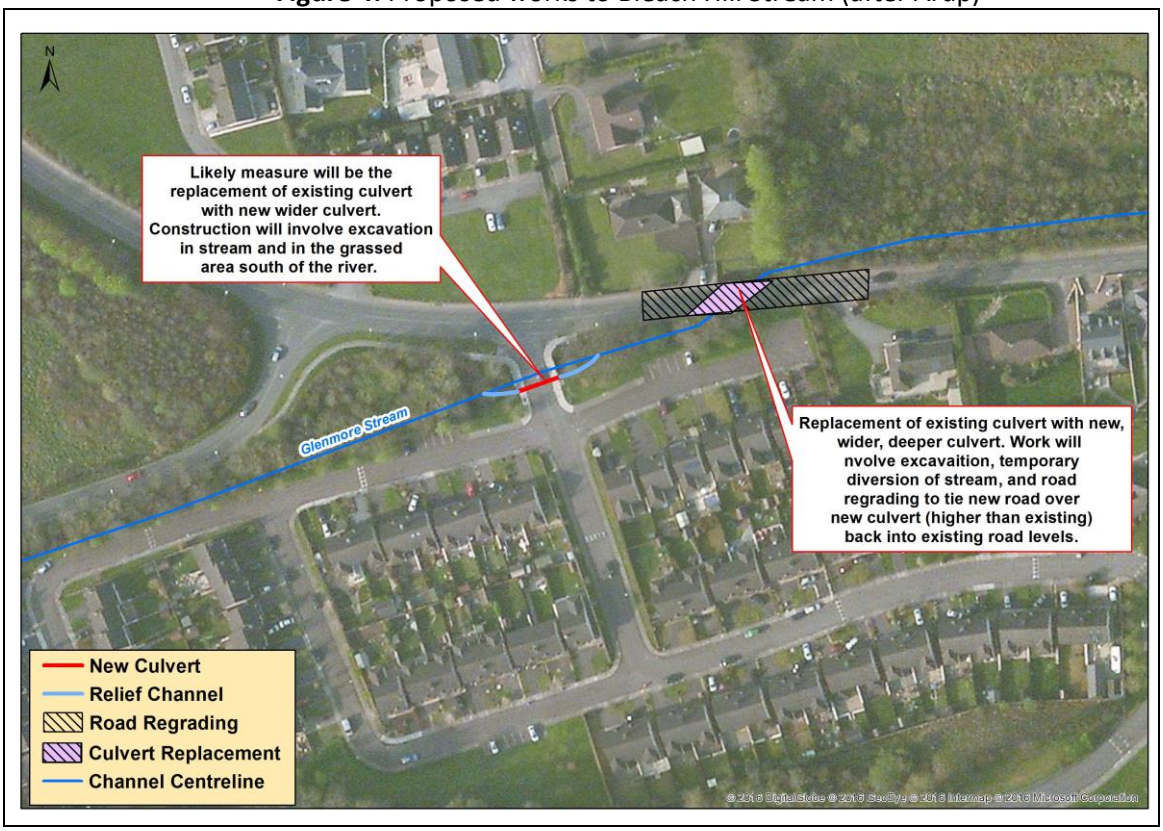


**Figure 5:** Proposed works to Glenmore Stream at Copper Valley Vue and culvert under Brooklodge Grove Road (after Arup)

## 3 Historical Background

3.1 The Glashaboy River and it's tributaries were the focus of much of the industrial activity in the broader Glanmire area in the 18th and 19th centuries. Water power was harnessed to operate flour mills, a paper mill (which later became a woollen mill), a bleach and cloth mill, a pike mill and a distillery. Elements of the physical remains of many of these industries survive, albeit in an incomplete state. In the second half of the 20th century Glanmire expanded into a commuter town to Cork city located approximately 5km to the southwest. It has merged with the adjoining villages of Riverstown and Sallybrook to form a large, almost continuous, suburban settlement spanning both banks of the Glashaboy and its tributaries. The M8 Cork-Dublin motorway runs roughly north from Dunkettle and this has largely defined the eastern extent of the suburban expansion, while it is contained to the west by higher ground.

3.2 There are no recorded archaeological monuments listed in the Record of Monuments and Places (RMP) or the Sites and Monuments Record (SMR) database of the Archaeological Survey of Ireland within the area of the Bleach Hill Stream or the Glenmore Stream (Figs. 6 and 7). The archaeological potential of watercourse has, however, long been recognised. In prehistoric and historic times watercourses were a focus of ritual activity, habitation and industrial sites and as well as providing important transport links and routeways. The unnamed channel to the south and east of Sallybrook House may be an overflow channel to the mill race of a paper mill (CO063-069) approximately 40m to the north and on the eastern bank of the Glashaboy River (Fig. 6). The channel itself appears to have been constructed following the construction of an access road to Sallybrook Industrial Estate in the second half of the 20th century. The above mentioned mill was named as a paper mill on the 1842 Ordnance Survey (OS) 6-inch map (Fig. 8) and Sallybrook (Woollen) Mill on the 1902 OS 25-inch map (Fig. 9) and 1936 OS 6-inch map (not depicted). This was one of at least 11 paper mills in operation in Cork city and hinterland by the middle of the 19th century. The paper milling industry was focused on the catchment area of the Glashaboy River to the northeast of the city and was at the centre of the Munster paper industry during the

18th and 19th centuries (Rynne 2006, 307). Its surviving remains now comprise some of the buildings in Sallybrook Industrial Estate. The mill is included in the Archaeological Inventory of County Cork (Power 1994) as follows:

*On E side of Glashaboy river. Named 'Paper Mill' on 1842 OS 6-inch map, 'Sallybrook Woollen Mill' on 1902 and 1936 OS 6-inch maps. Present structure is, rectangular in plan (long axis E-W); 3-storey, 8-bay, gable-ended. According to local information mill wheel, removed c. 1968, positioned along E side of structure.*


**Figure 6:** Extract from OSI map showing recorded archaeological sites near Bleach Hill Stream. Sallybrook House is shown as a blue dot and the channel, which is not shown, lies to the south and east of the house as indicated by red arrow (www.archaeology.ie)

Sallybrook House (Ref. 20906332) is included in the National Inventory of Architectural Heritage (NIAH) and is described and appraised as follows:

*Detached three-bay two-storey former miller's house built c. 1880, with flat-roofed single-bay two-storey extension and recent flat-roofed two-bay single-storey extension to rear (west) elevation. Now in use as house. Pitched slate roof with cast-iron rainwater goods and rendered chimneystacks. Rendered walls. Camber-headed openings with*

*concrete sills, moulded render surrounds with two-over-two pane timber sliding sash windows, one-over-one pane to north gable. Camber-headed window openings with two-over-two pane and one-over-one pane timber sliding sash windows to rear elevation and square-headed openings with steel casement windows to two-storey extension. Camber-headed opening with moulded render surround incorporating keystone detail, timber panelled half-glazed door and overlight. Timber footbridge over ditch to front of house.*

*Simple symmetrical façade enhanced by camber-headed windows with moulded render surrounds, evidence of conscious design and craftman's skill. Retention of timber sash windows and roof slates is significant.*

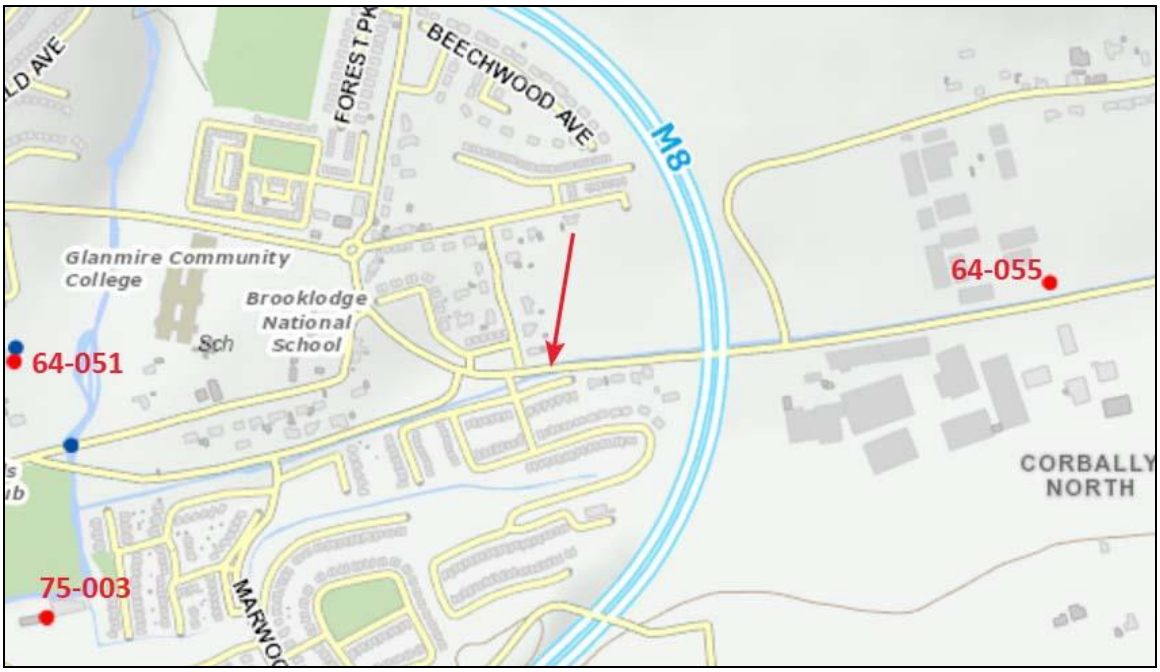


**Figure 7:** Extract from OSI map showing recorded archaeological sites near Glenmore Stream (www.archaeology.ie)

3.3 The unnamed channel around Sallybrook House is not shown or named on the 1842, 1902 or 1936 OS maps (Figs. 8 and 9). Instead a culverted channel is indicated running southwest from the mill to the northeast side of Sallybrook House and the 1902 map indicates this extending to the south of the house. This is then shown on the three maps as an open channel running south-southeast of Sallybrook House and converging with the river a short distance to the south. The access road to Glanmire Industrial Estate now runs largely along the line of this channel which may have been modified to facilitate the

construction of the road in the second half of the 20th century and it was probably at this time that the unnamed channel was constructed. No indication of a channel running to the east and south of Sallybrook House is shown on the 1842, 1902 or 1936 OS maps.

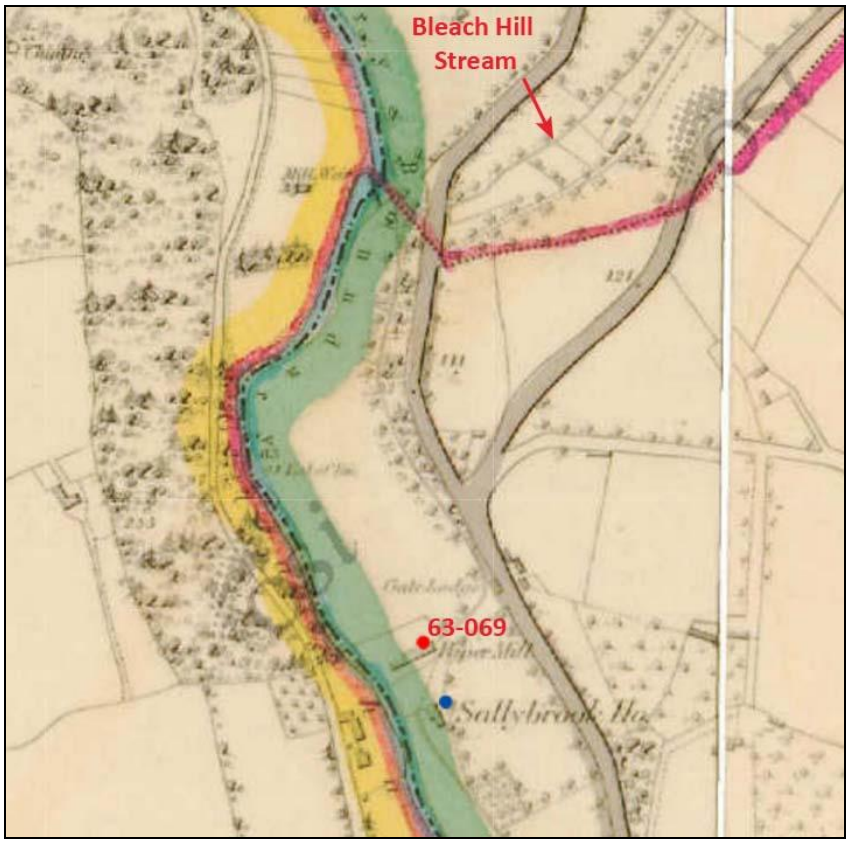


**Figure 8:** Extract from 6-inch OS map (1842) showing Sallybrook House and environs and route of Bleach Hill Stream (www.archaeology.ie)

3.4 The Bleach Hill Stream is a small watercourse which runs south into the Glashaboy River at Sarsfieldscourt. The nearest archaeological monument to the stream is the aforementioned paper mill in Riverstown (CO063-069) (Fig. 6). The stream is shown, but not named, on the 1842, 1902 and 1935 editions of the OS maps. The 1842 OS map shows the stream running into the Glashaboy River at the southern end of Sarsfieldcourt townland close to a mill weir named and depicted on the river. A mill race to the paper mill (CO063-069) runs south of the confluence of the Glashaboy and the Bleach Hill Stream parallel to the local road to the east (Fig. 8). The 1902 (not depicted) and 1936 map (Fig. 10) depict and name a sluice a short distance south of where the mill race begins. The 1936 map shows a bridge approximately 30m upstream of the existing Bleach Hill culvert, which provided access to an unnamed structure. A modern housing

estate called Cúil Chluthair was built on the eastern side of the stream in the early 2000s and a small part of the stream was culverted to provide access to this estate. It is on this culvert that works will take place.

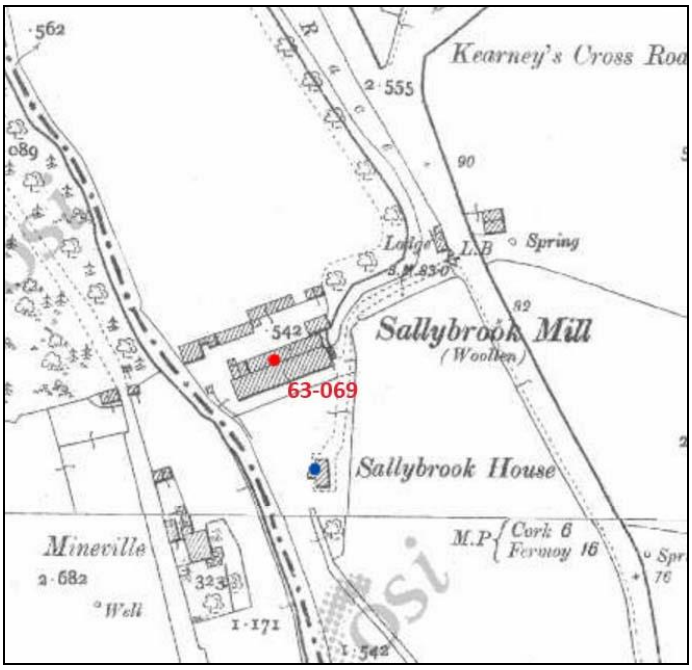


**Figure 9:** Extract from 25-inch (1902) OS map showing Sallybrook House, mill and environs (www.archaeology.ie)

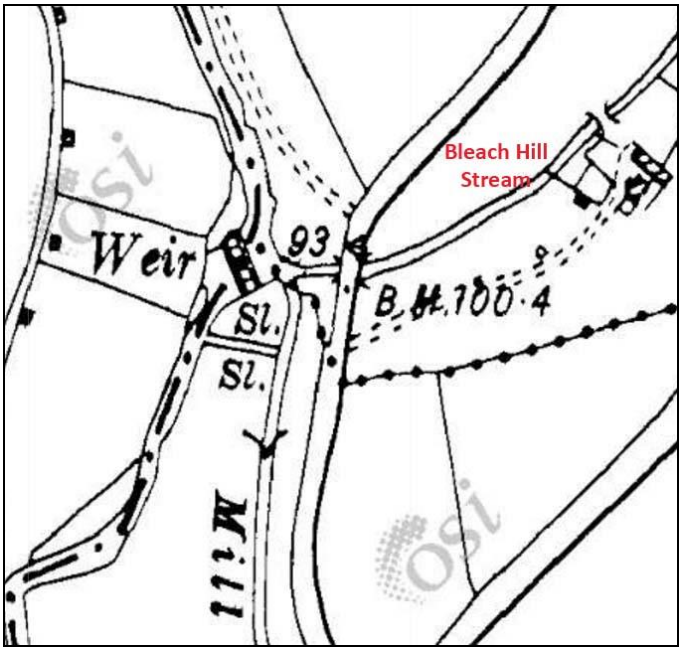


**Fig. 10:** Extract from 6-inch map (1936) showing Bleach Hill Stream and Glashaboy River (www.archaeology.ie)

3.5 The nearest recorded archaeological monuments to the Glenmore Stream are a castle in Brooklodge (CO064-055) approximately 700m to the east; Riverstown country house (CO064-051) approximately 700m to the west; and a distillery in Ballinglanna (CO075-003) approximately 750m to the west-southwest (Fig. 7). The stream itself forms the townland boundary between Ballinglanna and Riverstown and it is along this boundary that the proposed works are to take place. It is shown on the 1842 OS map (Fig. 11) as a west flowing stream discharging into the Butlerstown Stream several hundred metres further to the west. By 1902 (Fig. 12) a road, now called Brooklodge Grove Road but unnamed then, had been constructed beside the stream with the stream running on its northern side, crossing under the road in a culvert and continuing on its south side. The road layout remains the same and now there is an entrance to a modern housing estate, Copper Valley Vue, approximately 50m to the west.

3.6 The Underwater Archaeology Unit of the National Monuments Service maintains files on the Ports Piers and Harbours of Ireland and the Shipwreck Inventory of Ireland. There are no references in the files to the watercourses or settlements in the vicinity of the watercourses that are the subject of this report.

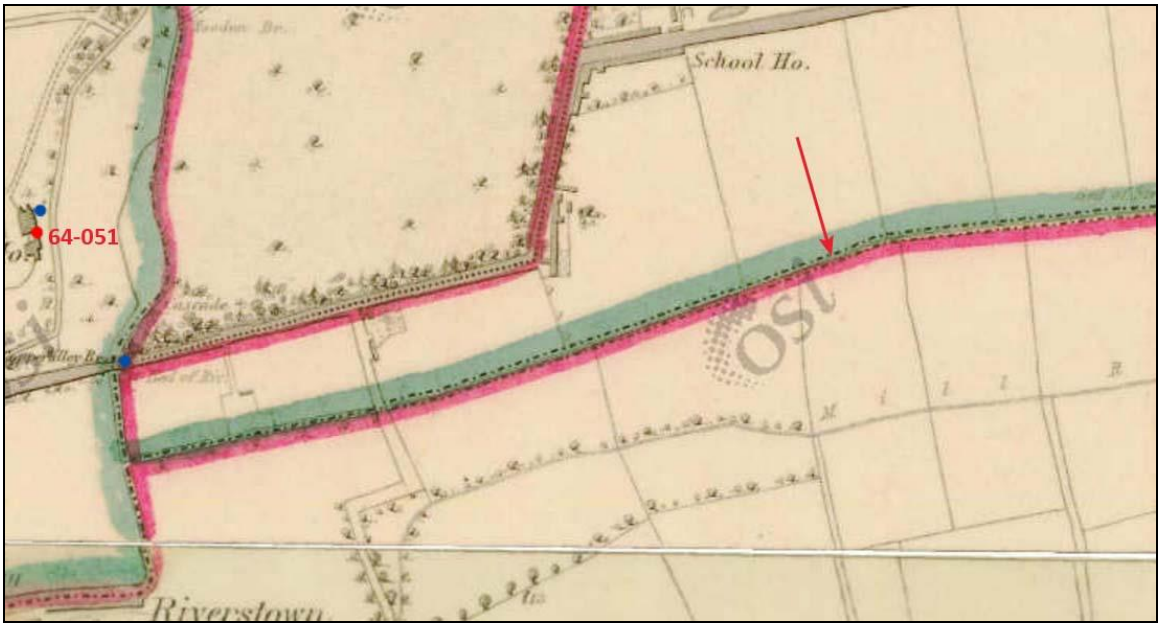


**Fig. 11:** Extract from 6-inch OS map (1842) showing the Glenmore Stream with arrow showing approximate works location (www.archaeology.ie)

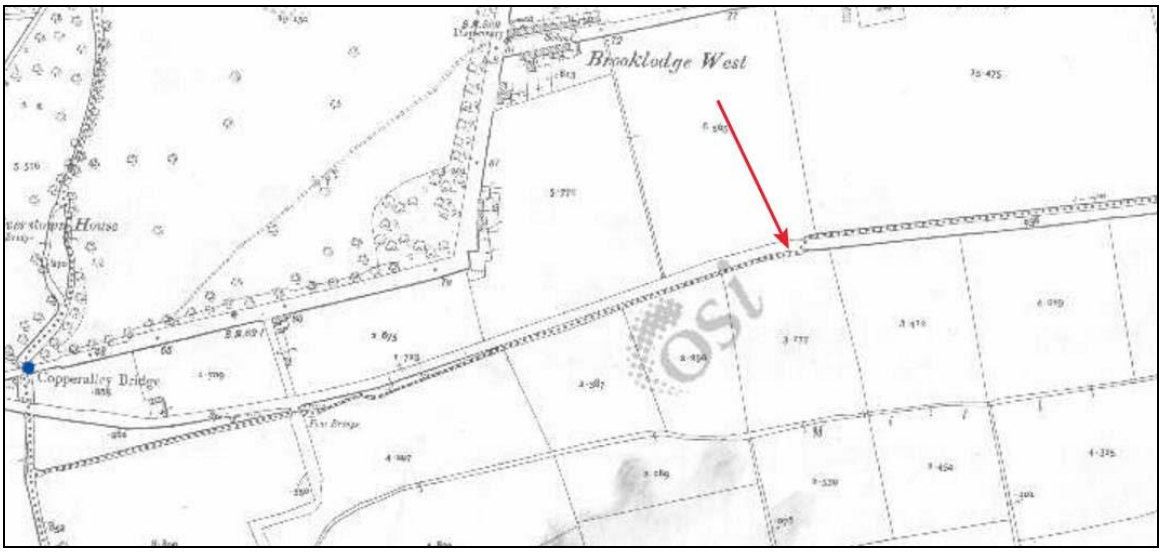


**Fig. 12:** Extract from 25-inch (1902) OS map showing road constructed beside Glenmore Stream with arrow showing approximate works location (www.archaeology.ie)

3.7 The National Museum of Ireland maintains topographic files containing reports, including correspondence, present location and occasionally, illustrations of archaeological material recovered throughout the country. There are no records of finds from any of the townlands in the vicinity of the watercourses that are the subject of this report

3.8 One archaeological excavation has been undertaken several hundred metres northeast of the proposed works area for the Glenmore Stream when a corn drying kiln was excavated in advance of the construction of the Ballincollig Little Island gas pipeline in 1999 (Clinton 1999).

## 4 The Intertidal and Metal Detection Survey

4.1 Wading and metal detector surveys were carried out in the proposed flood relief works areas to assess their archaeological potential on the 1st and 11th July 2016. The surveys were undertaken by the author under licence numbers 16D54 and 16R82. Water levels were low at the time after a period of dry weather and conditions were favourable for inspecting the water channels. Each watercourse was waded and metal detected and the banks and beds visually inspected. Surrounding ground was inspected for any evidence of modifications to the channels or evidence of original channels.

### *4.2 The Watercourses*

*4.2.1 Bleach Hill Stream: Cúil Chluthair, Sarsfieldcourt townland (Plates 1 and 2)*

The stream runs southwest within a natural earthen channel divided into two sections by a culverted portion which runs under the access road to Cúil Chluthair. The bed of the stream is very stoney as are the sides. The western bank is defined by a near vertical slope while the eastern bank slopes steeply. Material has been dumped on the high ground at the top of the eastern bank.

The stream was generally quite clean although some metal pipes and debris were identified during the metal detector survey, all were modern in nature. There is a large concrete man-hole on the eastern bank of the stream on the southern downstream section. Otherwise this section was more overgrown than the upstream northern section. No features or finds of archaeological potential were identified.

**Plate 1:** Bleach Hill Stream, looking southwest

**Plate 2:** Bleach Hill Stream, opening of culvert under road, looking southwest

*4.2.2 Unnamed channel south at Sallybrook House: Riverstown townland (Plates 3 – 5)*

The watercourse runs in an earth-cut, L-shaped channel around the southern and eastern sides of Sallybrook House and drains into the eastern side of the Glashaboy River approximately 20m southwest of the house. It is crossed by a modern timber foot-bridge which provides access to the house. The channel begins to the northeast of Sallybrook House where it emerges from a culvert running through the Pat O'Donnell & Co. property. It is culverted through all of this property except for a small open section of approximately 5m at the northeast where it emerges from under the R639 road into the Pat O'Donnell & Co property.

The channel bed is mostly stoney with some silty patches particularly where rubbish has built up. The rubbish is generally plastic and occasional modern metal objects were detected in the course of metal detecting. The sides are evenly cut and slope quite steeply and its appearance is consistent with a fairly recently constructed channel from the mid/late 20th century. Semi-mature trees have grown up around the channel. No features or finds of archaeological potential were identified.

**Plate 3:** Unnamed channel discharging into the Glashaboy River, looking west

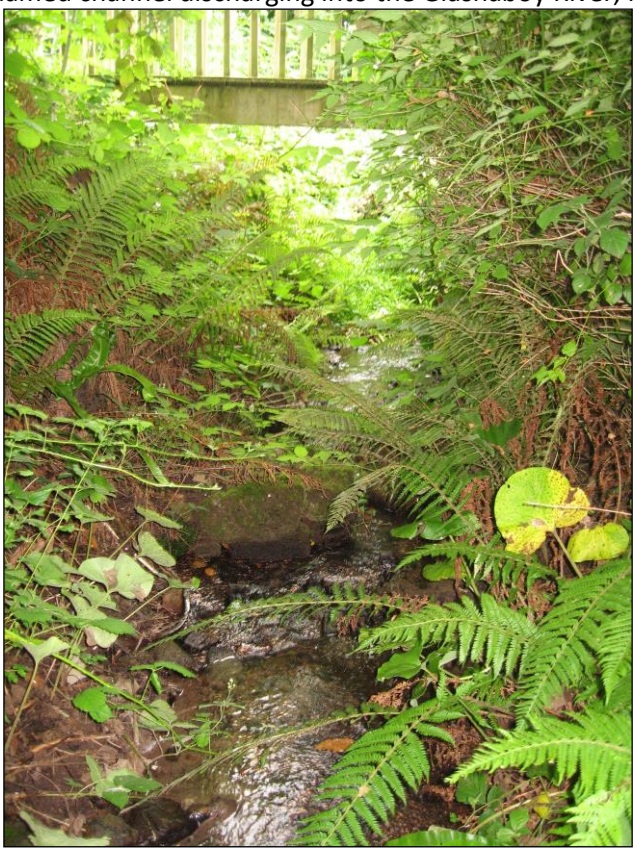

**Plate 4:** Unnamed channel showing bridge to Sallybrook House, looking northeast

### *4.2.3 Glenmore Stream at entrance to Copper Valley Vue and Brooklodge Grove Road (Plates 5 – 10)*

The stream runs west in two open sections divided by a large culverted section (comprising three separate culverts) running under Brooklodge Grove Road. The works will extend at the west end to the entrance to Copper Valley Vue. The eastern section runs at the southern end of a front garden of a detached house with the road immediately to the south. The channel is fenced off from the garden and at the east end is wide and earth cut with a stoney and silty bed. Approaching the culverts running under the road, random rubble walls define both sides and there is a small stone weir approximately 1.2m wide and 0.15m deep at the upstream end extending across the stream. The weir is of concrete construction and partially covered in vegetation. There are three channels extending under the road, the eastern one upstream of the weir and two western ones downstream of it. The eastern channel comprises a narrow, random rubble, segmental arch and its bed is heavily silted. The silting to the southern (downstream) side was such that there was no through flow of water (given the low water level at the time of the survey in July), however, on previous visits in April there was a shallow flow passing through this channel. The two western channels are rectangular in section and of concrete construction and both carry a steady flow of water.

To the south of the road and culverts the stream was quite wide and shallow with a stoney bed. The southern bank was earthen and most of the northern one was concrete with an open metal barrier above defining the southern side of Brooklodge Grove Road. A small section of the northern bank was earthen, approaching the access road to Copper Valley Vue. Mature trees line the southern bank and the western section of the northern one.

The eastern section of the stream was very clean with some modern pipes along the northern bank. The western section contained some modern rubbish including metal pipes and plastic rubbish. No archaeological features or finds were noted.

**Plate 5:** Glenmore Stream eastern section with garden to north (left) and Brooklodge Grove Road to south (right). Opening to the rectangular culverted channels are visible at bottom right, looking east

**Plate 6:** Eastern culvert opening, north-facing elevation

**Plate 7:** Eastern culvert opening, showing dry south-facing elevation

**Plate 8:** Western culvert openings, south-facing elevation

**Plate 9:** Glenmore Stream western section, looking east

**Plate 10:** Glenmore Stream western section, looking west

## 5 Conclusion and Recommendations

5.1 A licensed wading and metal detector survey on sections of 2 streams and an unnamed channel was carried out in July 2016 as part of the Glashaboy Flood Relief Scheme. The Bleach Hill Stream at Cúil Chluthair, Sarsfieldcourt, the Glenmore Stream at the entrance to Copper Valley Vue and Brooklodge Grove Road in Brooklodge Upper and Ballinglanna and the unnamed channel at Sallybrook House in Riverstown formed the basis for the survey. Each section was waded, metal detected and visually inspected to assess its archaeological potential.

5.2 No finds of archaeological potential were revealed. A number of modern metal objects were detected, none of which were of archaeological significance. Modern, generally plastic rubbish, was apparent in the Glenmore Stream and unnamed channel at Sallybrook House. A small stone weir was noted in the Glenmore Stream, this was approximately 1.2m wide and 0.15m deep at the upstream side and extended across the stream between three culverts. The weir and the segmental arched random rubble culvert, immediately downstream of it, probably relate to the construction of the adjoining Brooklodge Grove Road which is first shown on the 1902 25-inch map. No other features were noted in/on the banks, edges or surrounding ground.

5.3 Ground disturbance associated with the proposed works for the flood relief scheme include replacing existing culverts at Bleach Hill Stream and the Glenmore Stream and the culverting of the existing unnamed channel at Sallybrook House. There is evidence that all of these watercourses have been disturbed by earlier construction works; Bleach Hill Stream by the construction of the access road and culvert in the early 2000s, the Glenmore Stream was realigned when the road was built in the late 19$^{th}$ century and later when the access road was built to Copper Valley Vue in the early 2000s and the construction of the unnamed channel at Sallybrook House appears to date to second half of the 20$^{th}$ century. Notwithstanding the evidence of disturbance to these watercourses, however, archaeological monitoring of the construction works at Bleach Hill and Glenmore Streams is recommended. Both streams run largely along their

original course and the archaeological potential of such watercourses has long being recognised. The unnamed channel at Sallybrook House appears to date to the second half of the 20th century and does not appear to be on the line of an original watercourse, therefore its archaeological potential is considered low.

5.4 Works to the Glenmore Stream will comprise the replacement of the three existing culverts (two of concrete and one of random rubble) and construction of a single new larger one. Work will comprise excavation, temporary diversion of the stream and road re-grading to tie the new road over the new culvert back into the existing road levels. These works will impact the weir which is located between the culverts. The weir and the random rubble culvert date, probably, to the construction of the adjoining Brooklodge Grove Road at the turn of the 20th century. It is recommended that the weir and random rubble culvert will be recorded prior to works commencing at this location.

5.5 In the event that archaeological features are identified during archaeological monitoring, consultation will be undertaken with the National Monuments Service and the features will be fully resolved to professional standards of archaeological practice. Such material will be preserved *in situ* or preserved by record, as appropriate, as outlined in Policy and Guidelines on Archaeological Excavation – Department of Arts, Heritage, Gaeltacht and the Islands.

5.6 All recommendations are subject to the approval of the National Monuments Service and the planning authority.

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**Files Consulted**

National Museum of Ireland topographic files

The Shipwreck Inventory of Ireland at the Archive Unit of the National Monuments Service, Department of Arts Heritage and the Gaeltacht

The Ports, Piers and Harbours Inventory of Ireland at the Archive Unit of the National Monuments Service, Department of Arts Heritage and the Gaeltacht

# Appendix 13.3

Dive Survey of the Glashaboy River

# Note - Appendix 13.2 and 13.3

Both **Appendix 13.2** (Wading Survey) and **Appendix 13.3** (Dive Survey) were carried out during the course of the compilation of the EIA as a direct response to consultations with the Underwater Archaeological Unit of the National Monuments Service. The design of the scheme had not been finalised in advance of either survey. Following the completion of both, design changes were implemented which are not reflected in the wading survey and dive survey reports. Full and final details of the scheme are included in **Chapter 13**.

JULIANNA ODONOGHUE
ARCHAEOLOGICAL SERVICES

**Project:** **Glashaboy Flood Relief Scheme**

**Underwater Archaeological Impact Assessment Report**

**Prepared by:** **Julianna O'Donoghue**

**on behalf of Lane Purcell Archaeology**

**Date:** **September 2016**

**Address:** Julianna O'Donoghue Archaeological Services, 61 Lady's Cross, Clonakilty, Co. Cork.
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# Contents

# List of Figures

# List of Plates

**Plate 31:** View of headrace CHS 11, taken from west.

**Plate 32:** View of stone feature, possible remains of weir, taken from west

**Plate 33:** View of CHS 12, bridge taken from northeast

**Plate 34:** View of CHS 12, bridge with pedestrian bridge extension and recent earthen embankment to northeast.

**Plate 35:** View of CHS 12, bridge, blocked up arch on northwest.

**Plate 36:** View of CHS 12, bridge, carriageway.

**Plate 37:** View of CHS 12, bridge, western side of downstream elevation.

**Plate 38:** View of CHS 12, bridge, cutwater on downstream elevation.

**Plate 39:** View of CHS 12, bridge, downstream elevation.

**Plate 40:** View of CHS 13, from south.

**Plate 41:** View of CHS 13, from south.

**Plate 42:** View of CHS 13, from south.

**Plate 43:** View of CHS 13, from south.

**Plate 44:** View of CHS 15, revetment wall, taken from southeast.

**Plate 45:** View of CHS 16, revetment wall, taken from east.

**Plate 46:** View of CHS 17, revetment wall, taken from west.

**Plate 47:** View of CHS 17, revetment wall, taken from northwest.

**Plate 48:** View of CHS 17, revetment wall, taken from west.

**Plate 49:** View of CHS 18, tailrace, taken from west.

**Plate 50:** View of CHS 18, tailrace taken from southwest.

**Plate 51:** View of CHS 20, revetment wall, taken from south.

**Plate 52:** View of CHS 19, revetment wall, taken from north.

**Plate 53:** View of CHS 20, Sand Quay.

**Plate 54:** View of Glashaboy Estuary.

# 1. Introduction

This underwater archaeological survey report was undertaken by Julianna O'Donoghue Archaeological Services as an appendix to the Cultural Heritage Section of the Glashaboy Flood Relief Scheme EIS. The primary objective of the study was to determine the cultural heritage resource / asset of the Glashaboy River in order to assess and mitigate the potential impacts of the proposed flood relief scheme on that cultural resource.

As this intra-riverine study constitutes an appendix to Cultural Heritage Chapter of the EIS it should be read in association with it. Consequently, this report only briefly references the wider cultural heritage resource, and its association with the significance of the Glashaboy River.

# 2. Location

The Glashaboy River (*An Ghlaise Bhuí* - the yellow stream) rises on the south-eastern limits of Bottle Hill *c.*6km north-east of the village of Carrignavar (*Carraig na bhFear* - rock of the men) in the townland of Glashaboy North. The river which gives its name to three townlands viz Glasaboy, North, South and East, flows in a general south-south-easterly direction through the villages of Carrignavar, Sallybrook and Glanmire before issuing into the estuary of the Lee River at Dunkettle in the inner reaches of Cork Harbour. Along its route the Glashaboy is joined by a myriad of rivulets and streams that collectively were harnessed to power what became one of the most important milling regions in County Cork during the 19$^{th}$ century (O'Flanagan 1993, 444-6). The assessment consisted of seven distinct sections of the Glashaboy River between Sally Brook and Glanmire.

# 3. Methodology

The study comprised desktop research and a licensed intra-riverine visual and metal detection survey. The study area was based on two designated maps supplied by Purcell Lane Archaeology titled Works Overview 1 & 2 (Figs.2 & 3).

## 3.1 Desktop Study

- The Record of Monuments and Places (RMP) compiled by the Archaeological Survey of Ireland comprises lists, classifications of monuments, and maps of all recorded monuments with known locations and zones of archaeological significance. The monument records are also accessible online from the National Monuments Service (NMS) of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs at www.archaeology.ie. These were used to establish the archaeological context of the site.
- The Excavations Bulletin and its online database which contains summaries of all archaeological excavations carried out in Ireland, was also examined (www.excavations.ie).
- Cartography: Several historic maps and charts were examined (see references below for a full list).
- Aerial Photography: A variety of low and high altitude aerial photography was examined.
- Documentary sources: Several sources were examined, for a full list of all sources examined see References below.

### 3.2 Visual and metal detection survey

Seven areas of watercourse along the Glashaboy River were visited and examined by a team of three underwater archaeologists. A visual and metal detection survey was carried out under a licence (Licence Numbers 16E316, 16D0057, 16R0102) issued to Julianna O'Donoghue. Identified features were recorded photographed and GPS referenced.

### 3.3 Underwater Survey

Seven separate areas (Study Areas 1-7) were designated for inspection on the Works Overview Map 1 & 2 provided by Lane Purcell Archaeology. Cultural heritage sites recorded during the survey were assigned generic numbers commencing with CHS 1. A total of twenty cultural heritage sites were recorded along the entire study area.

## 4. Constraints and Technical Difficulties

Only preliminary location maps (Fig. 2 & 3) were provided for undertaking the survey as the design of the flood relief scheme was not finalised at that stage. Detailed drawings of the proposed flood defences were provided upon the completion of the fieldwork.

The extent of proposed channel clearance/dredging is not yet determined, therefore the impact of the dredging on the cultural heritage could not be fullly determined.


**Figure 1:** Site Location Map

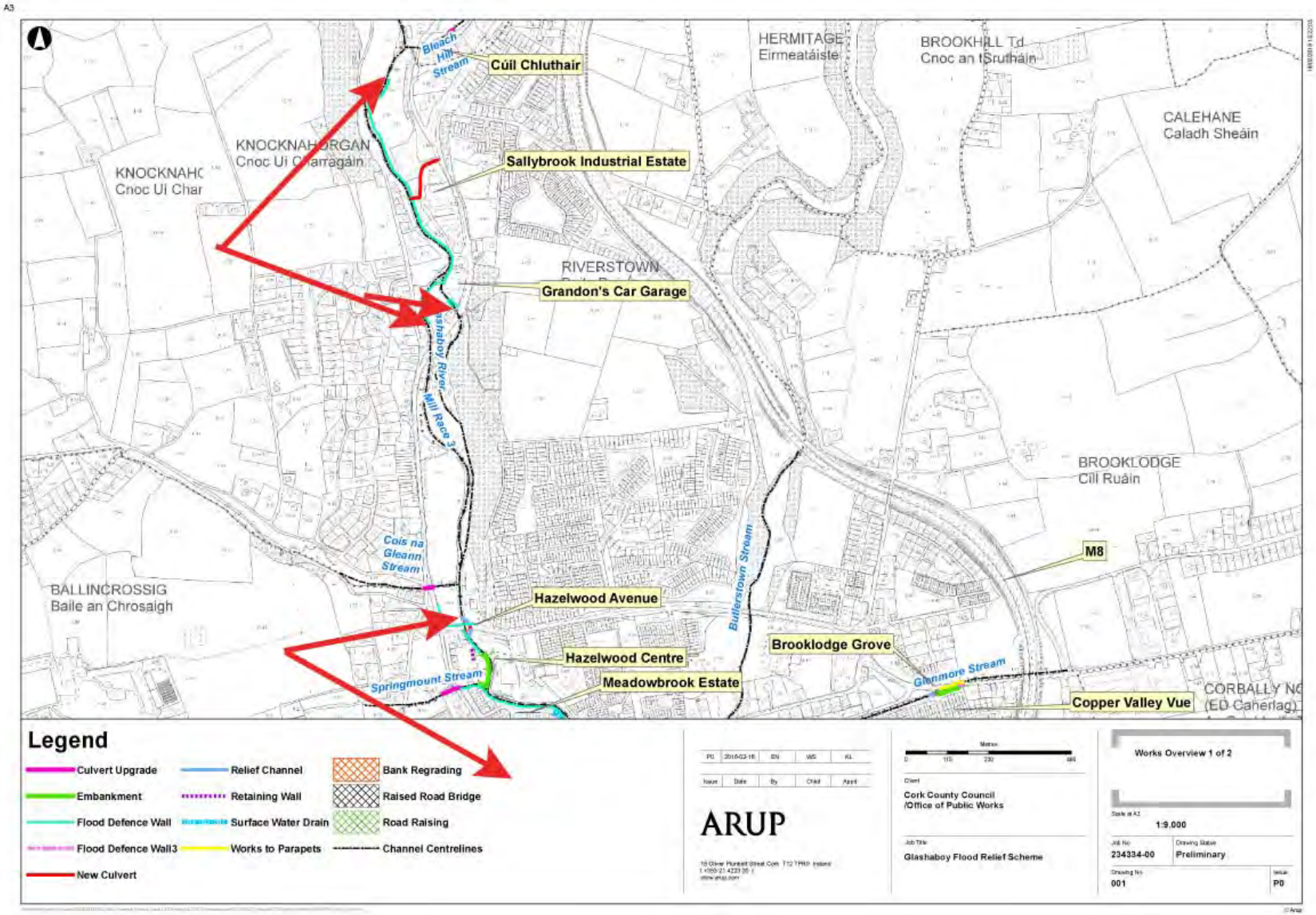



**Figure 2**: Works Overview Map 1 supplied by Lane Purcell Archaeology

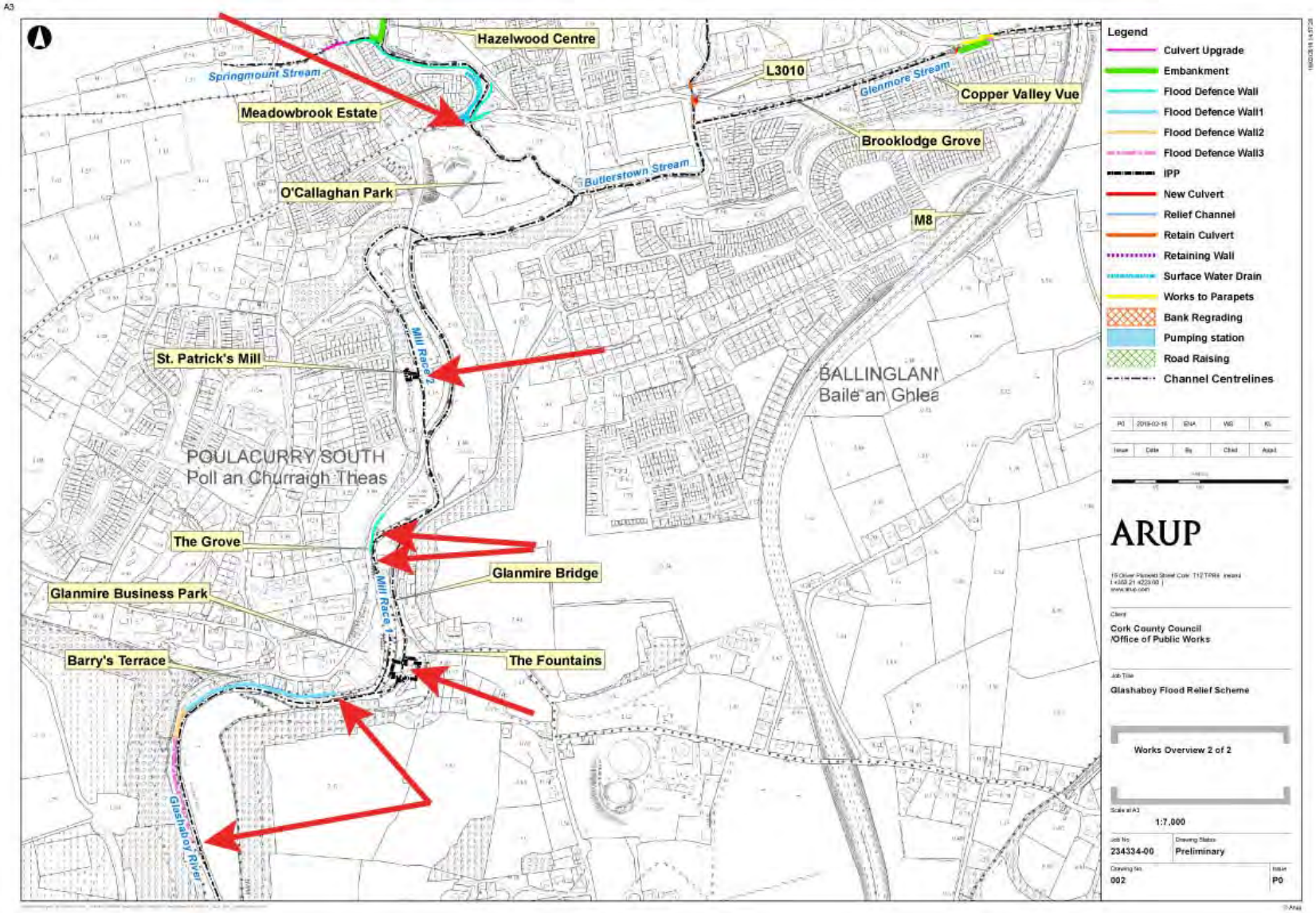



**Figure 3**: Works Overview Map 2 supplied by Lane Purcell Archaeology

# 5. Archaeological and Historical Context

## 5.1 Preamble

Archaeologically the Glashaboy River should be interpreted as an important cultural resource asset for this area of Cork as it would have served as strategic geographic link and conduit for prehistoric settlers and historic communities. The river was central to the establishment of Riverstown and Glanmire and contributed enormously to the local economy.

## 5.2 Mesolithic Period

Estuaries, rivers and their tributaries were and continue to be important route-ways for people throughout all the cultural periods. The earliest people to exploit the harbour area, along its estuaries, creeks and rivers, were Mesolithic hunter-gatherer-fisher groups. The rich riverine and marine resources provided a wealth and of fish, shell-fish, wild fowl and wild boar as well as a plethora of seasonal gathered fruits and edible roots and plants. The Irish Mesolithic (c. 8000-4000 BC) is particularly characterised by fishing and exploiting of coastal riverine resources as large mammals such as deer or wild cattle did not exist (O'Brien 2012, 32). Although Mesolithic sites are rare in Ireland, they are usually found in low-lying areas close to water, along the islands coastline, rivers and lakes; the waterways providing a means of movement through the landscape. The main indicators of Mesolithic activity in Ireland take the form of flint scatters and shell middens etc. which have been identified at several locations, especially along the coasts and river valleys. In Munster, the majority of the evidence (flint scatters) for Mesolithic occupation has 'come from the Blackwater valley in Co. Cork' (Woodman 1989, 116). Flint scatters were recorded in the townlands of Kilcummer Lower on the banks of the Blackwater, Ballynamona and Wallstown on the Awbeg River and at Goretore and Ballinglanna on the Funcheon River.

Despite the general under-representation of recorded Mesolithic sites in the surrounding hinterland of the Glashaboy River, this does not discount the possibility of Mesolithic activity in the area. The valley slopes overlooking the Glashaboy River and its tributaries may have been ideal locations for temporary settlement at certain times of the year for early Mesolithic hunter-gatherers. As a result, it is possible Mesolithic material culture could be retained with the river deposits and along adjacent river banks.

## 5.3 Neolithic Period

The first people to settle and farm the area date to the Neolithic period (c.4000BC–2400BC). These first farmers cleared space in the forests, built rectangular wooden houses, made pottery and shaped the land, and fished and migrated along the harbour, estuaries and rivers using dugout canoes. The excavated remains of their houses and tools have been found at a number of locations around Cork.

In prehistory and up to the advent of Christianity, rivers, lakes and ponds were often seen as 'liminal' places or locations 'between worlds', where spirits, gods or even ancestors could be communicated with. Many rivers both in Ireland and abroad are named after female goddesses e.g. the Boyne, Shannon Feale etc. This is evident from the numerous deliberate deposits of Neolithic stone axes and Late Bronze Age metalwork in some large rivers in Ireland. The stone axe is predominantly a diagnostic tool of the Neolithic period and an essential item for forest clearance. In recent years the total number of stone axes recorded in Ireland has risen from 16,000 specimens to over 20,000 (Cooney and Mandal 1998, 28). Of this total 45% have been recovered from riverbeds. While some of these were probably accidentally lost and some river finds may derive from riverside settlements,

others may represent deliberate ritual offerings. Although no such artefacts have thus far been recovered from the Glashaboy, it is possible that some locations along the river were selected for deliberate votive deposition in prehistory.

Neolithic farmers rendered major transformations in the Irish landscape – clearing dense woodlands with stone axes to create fields. Many Irish Neolithic houses are located on sheltered, south-facing slopes overlooking large lakes or rivers and estuaries (Grogan 1996, 57). This indicates that large freshwater sources were equally important during this period due to the importance of pastoral farming and the need for water to be available to cattle herds. At Gortore, North Cork, two Neolithic houses flanked both banks of the River Funshion, while two other houses at Ballinglanna North were situated adjacent to the Glencorra Stream.

The Neolithic is a period in which pyrotechnology became more sophisticated. Hearths and fire installations began to be used for different purposes other than for cooking and warmth. Fire, along with water, fuel and stone tempers were used in the production of pottery, while similar resources were also needed for pyrolithic water-boiling (Hawkes 2014). It is therefore possible that 'activity areas' close to rivers were chosen for specific actions requiring water and other raw materials such as woods and clays.

## 5.4 The Chalcolithic and Bronze Age

It is broadly accepted that there was an important transition period at the end of the Neolithic in Ireland that spanned the second half of the third millennium BC. This was marked by the introduction of an already developed copper metallurgy around 2500 BC, coincident with the first use of Beaker pottery, a new monument tradition and changed funerary practices. In the centuries that followed there was widespread production of copper objects and, to a lesser extent, goldwork, on a technological par with contemporary metalworking in Europe. This transition period ended around 2150–2000 BC, with a slow introduction of tin-bronze metallurgy and the declining use of Beaker pottery in favour of new ceramic traditions that marked the developed Bronze Age.

Bronze Age activity in the Glashaboy study area is indicated by the presence of standing stones and *fulachta fiadh*. Standing stones are generally thought to be of Bronze Age date, but may also be later extending into the Iron Age or historical period. A number of *fulachta fiadh* are also recorded in the vicinity of the Glashaboy River. *Fulachta fiadh,* also referred to as burnt mounds, are manifest by the presence of one or more low mounds or spreads of heat-shattered stone and charcoal, which often overlie a hearth feature and a pit used as a water trough. The burnt mound material was produced by the use of a pyrolithic technology, whereby hot stones from the hearth were immersed in the trough to heat water. After numerous firings these stones were eventually shattered by the sudden cooling process and casually discarded. Through time the discarded shattered stones gradually accumulated to form a low mound or spread also containing charcoal. They are usually situated in low-lying, poorly drained, marginal land close to a water source, such as a river, stream, spring, pond, lake, turlough bog or marshy area. While no *fulachta fiadh* are recorded along the banks of the Glashaboy, many are situated in the environs of the river, in wet marshy locations. Typically, burnt mounds in this part of Cork do not have a surface expression and therefore many could lie unrecorded closer to the Glashaboy itself. The mounds may have been levelled in the past or covered with alluvial silts from the river.

During excavations in 2000 at Killalough, *c.* 2km NE of the Glashaboy and on a tributary of it a Middle Bronze Age a possible dugout canoe was re-used as a trough in a *fulacht fiadh* (CO064-152), (Hanley and Hurley 2013, 128).

The advent of the discovery of bronze witnessed the manufacture of an expansive array of tools and weaponry (most notably in the Later Bronze Age). Much of the bronze weaponry has been recovered from water contexts. These bronzes were valuable commodities not lightly discarded and this, therefore, may well have been an elite ritual activity. Some finds may reflect the proximity of settlements and others may be the result of loss – for river systems, such as Glashaboy were undoubtedly important route-ways and they may have also provided suitable locations for barter and exchange. Again, while no Bronze Age artefacts have been recovered from the Glashaboy, the dense Bronze Age presence in this part of Cork would indicate that the Glashaboy River played an important role.

The dry ridges alongside rivers would have been the foci for settlement and river crossing-points would have been important locations for local communication needs. Knowledge of fording points were crucially important for communities and travellers for moving family and livestock and goods. As people were vulnerable at fording points, they were often attacked there with the loss of goods. Consequently, they are often productive as find spots for artefacts.

As well as functioning as an important communication network, rivers also served as important boundaries as population levels increased and landownership developed. The Glashaboy River functioned as part of the boundary between the ancient baronies of Cork and Barrymore and later as Parliamentary, Parish and townland boundaries.

## 5.5 The Iron Age

The Iron Age (600BC- AD400) is possibly the most obscure period in Irish prehistoric archaeology. In comparison to the Bronze Age, relatively little is known about the Iron Age in Munster. This is largely because of reduced archaeological visibility and a general absence of monuments and material culture characteristic of this period. One of the few upstanding Iron remains in Co. Cork is the Cliadh Dubh, a name given to three separate stretches of linear earthworks in County Cork.

Settlement evidence in the Iron Age is absent from the study area although recent excavations associated with roadwork construction have identified a number of round houses from the period near Ballincollig and Youghal and Mitchelstown (ibid 235). Evidence of Iron Age activity in the Cork Harbour area is best exemplified artefactually by a set of three bronze horns, known as the 'Cork Horns' that were found in mud dredged from the River Lee Channel in 1909 near Victoria Road Evidence of trade into Cork Harbour from the Roman Empire is shown by a hoard of ten Roman coins from Cuskinny, Cobh (ibid). In the late 1880's Roman coins ranging in date from Claudius Gothicus (AD 278-270) and the younger Constantine (AD 337) as well as coins from Chlorus and Constantine the Great were found as well as others from Ballyphehane in Cork City (O'Brien 2012 249-250).

## 5.6 The Early Medieval Period

The archaeology of the early medieval period in the study area is exemplified by ringforts. These monuments (generally known by their Irish names *Rath* and *Lios*) are the most obvious extant monuments in the landscape. These sites consist of circular or roughly circular enclosures with earthen banks and external ditches or fosses. Ringforts were essentially the dispersed rural farmsteads of the Early Medieval Period.

It is evident that the Glashaboy River served as an important source of power for mills during the eighteenth and nineteenth centuries. However, it is also possible that the river and its tributaries functioned in a similar way during the early medieval period, driving timber-built horizontal water mills. There is one horizontal wheeled mill (CO064-146) in Crushyriree in the central part of the Study Area. This was identified during drainage works in 1994 on a stream which flows into the Butlerstown River and was subsequently excavated and dated to approximatley AD 800 (Cotter 1994).

Horizontal wheeled mills are the earliest example of hydro-engineering known in Ireland and usually are revealed during drainage or land improvement works. The horizontal watermill was the preferred form in early medieval Ireland, probably because it was better suited to small, fast-flowing steams and, also, because of the absence of gears, it was comparatively simple and cheap to build. Typically, the horizontal mill was housed within a two-storey, rectangular structure consisting of an upper and a lower room. The upper room contained the grinding stones and the hopper mechanism for the grain, while a vertical shaft connected the upper grinding stone with a horizontal water-wheel, composed of paddles, in the chamber below. Water was channelled by means of a millrace and a chute so that it fell onto the horizontal wheel causing it to turn. Despite the ubiquity of watermills in early medieval Ireland, the grinding of grain by hand, using quern stones, remained commonplace. This changed after the Anglo-Norman invasion, when all grain had to be ground at designated mills. Such mills were a significant source of income for the ecclesiastical and territorial lords who monopolized the manufacture of flour until the close of the Middle Ages.

## 5.7 The High Medieval Period

In 1169 the first advance wave of Anglo-Normans, invaders arrived at Wexford. During the late twelfth and thirteenth centuries, the Anglo-Norman invasion and colonisation had a major impact on the Irish landscape. Nucleated settlements were established and a manorial / baronial economy introduced which led to increased woodland clearance, more emphasis on arable agriculture and a burgeoning economy in the intensely settled lands of the east. In terms of archaeological sites, the period is marked by the construction of mottes, moated sites, castles and churches, though many of the latter were probably built on the sites of earlier churches. Earthwork fortifications of this period are surprisingly rare in the East and North Cork areas, considering that the area was intensively settled by the Anglo-Normans.

In Cork the period was marked by the eastward advance of the MacCarthys to the extent that their lands eventually encircled Cork City, and by frequent dissention among the Anglo-Norman lords themselves.

Moated sites provide the earliest physical evidence for Anglo-Norman settlement in the country. These were manorial centres from which control was exerted over agricultural production in the surrounding landscape. They were most likely the homes of minor lords and well-to-do tenant farmers and would have formed the focal point of large agricultural estates. In some instance they may also have represented outlying grange farms associated with monastic establishments. They were often built on the outer edges of the Anglo-Norman colonies and it has been suggested that they may represent a second wave of settlement into more marginal land (Empey 1982). These areas came under increasing pressure from Irish attacks in the 13th and 14th centuries and this may have necessitated the construction of more defensive settlement types (see Barry 1987). Moated sites are normally defined by a large and deep ditch, with an internal bank of clay (the ditches are often no longer visible, having completely silted up). For added protection the bank would have been surmounted by a wooden palisade of stakes or planks. There are four moated sites in the Study Area and a further five possible examples, one of which was partially excavated at Ballinvinny in advance of the N8 Glanmire Watergrasshill by-pass. The Glashaboy River would have been an equally important route-way during this period and would have facilitated trade to moated sites, tower houses and religious houses.

There are a number of annalistic references to the use of boats on Irish lakes and rivers between 1100 and 1534. Several dug-out canoes dating to this period have been discovered in Irish rivers. Crafts such as these may have been commonplace on the Glashaboy River during the medieval period used by farmers and fishermen inhabiting areas close to the riverbanks and the southern slopes of the Glashaboy Valley.

## 5.8 The Post-Medieval and Modern Period

Archaeologically, this period can be characterised by the rapid large-scale reorganisation of the landscape, peaking in the late 18th/early 19th century, when the modern field systems of linear hedgerows began to emerge, almost completely erasing the former later medieval landscape of open countryside and clustered village strip fields. In many cases, such as in large swaths of County Cork, the 'big country house' of the typically Protestant landlord or head tenant eclipsed the later medieval village as the economic power centre in rural areas (Smyth 1993, 670). Expansive areas of former open countryside were enclosed, forming completely new field systems; new roads and trackways were constructed; quarries opened and limekilns produced lime for fertiliser and mortar; brick kilns provided building materials and mills helped process and output commodities at a more industrial scale. Those working the land—the typically Catholic cottiers, labourers and tenant farmers—eked out a modest existence in small cottage plots, applying what trades and skills they could, in the context of a greatly expanding population and the corresponding demand on resources that ensued.

During the post-medieval period the Glashaboy valley became a centre of industrial activity. There are a large number of mills of various types along its course. These include woollen mills, paper mills, cloth mills, spade mills, tuck mills and corn mills. All of these mills were strategically placed to harness the water power of the Glashaboy River. Manufactured goods and produce from the mills could be transported by water-carriage via the river to a quay at Glanmire Village. All of the mills are shown on the 1842 OS map and many are shown and named on subsequent editions, often after their use had been changed. During the period 1700-1900, the mills brought social and economic stability to areas along the Glashaboy. For instance, the Riverstown Paper Mill, established during the 1700s, produced 190 reams of brown paper per week for the local market during the early

1880s. As major employers, the mills provided an alternative to agricultural work, employing coopers, carpenters, blacksmiths, millwrights, fitters, labourers, spinners and weavers.

Most of these mills are situated on, and were powered from, the Glashaboy River except the paper mill in Ballycurreen known in 1842 as the Glenmore Paper Mill, which is on the Glenmore River and the Tuck Mill in Brooklodge, which is located on the Butlerstown River. Associated with many of the mills are mill ponds and mill races, and other associated buildings and structures. There is also a distillery recorded at Ballinglanna on the Glashaboy River. This was founded in 1820 by the Lyons family. With a workforce of 60, the distillery produced 180,000 gallons of whiskey every year. Coal and other resources for the distillery was transported from Cork by water-carriage via the Glashaboy River to the quay at Glanmire Village. The building was named 'Distillery' on the 1842 OS map and Brewery on the 1902 edition reflecting its change of use.

It is clear that the Glashaboy and its tributaries played an important role in the development of this area of Cork from its earliest times to the more recent past. Rivers have been used by humans for thousands of years – serving as important food, resources, route-ways, crossing points and as useful power sources. While the Glashaboy River Valleys more recent history is still quite evident along its course, earlier societies' impact and use of the river is less visible. However, it must be remembered that much of this archaeological evidence lies hidden either within the river itself or along its banks, floodplains and southern slopes.

# 6. Results

## Survey Area 1

**ITM Co-ordinates:** E572498, N577136 to E572566, N576428
**Townland:** Riverstown / Knockhorgan
**Figures:** 4-6 **Plates:** 1 – 22

Survey Area 1 commenced in the Glashaboy River just south of the junction of three townlands, Sarsfieldscourt, Knocknahorgan and Riverstown beside the L2973 roadway. The end point for Survey Area 1 was to the south of a weir associated with Pike Mill.

Six features of cultural heritage were recorded in Survey Area 1. Two cultural heritage features are situated just outside the study area; a mill-weir and mill-race (headrace) associated with Sallybrook Mill (RMP CO063-069). The mill-weir and headrace are denoted on the 1st edition 6" OS map as integral elements of a paper mill complex associated with Sallybrook House immediately downriver. By the turn of the century the paper mill had been adapted as a Woollen Mill and two sluices provided to control water entering the headrace beside the weir. The substantial 377m headrace extends in a general southerly direction before making a sharp westerly turn into the mill structure. The headrace runs parallel to the driveway entrance to Sallybrook House. Sallybrook House (NIAH Reg. No. 20906332) was formerly the miller's house constructed *c*. 1880.

### CHS No. 01

Within the river and close to the location of the sluice is a detached coherent *ex situ* mass of bonded redbrick on the western side partially exposed in the riverine gravels and cobbles. The redbrick feature measured 0.8m N-S by 1.5m E-W. As the overburden reached 0.7m in depth, its extent could not be fully uncovered (Plate 3). Some 20m downstream another *ex situ* block of bonded redbrick was discovered as well as several other individual red bricks strewn on the riverbed (Plate 4). One of the bricks lying on the riverbed was stamped 'Youghal Brick Co. Ltd. Youghal' (Plate 5). It may represent the remains of a collapsed wall or culvert.

#### Impact

No impact.

#### Mitigation

No mitigation required.

### CHS No. 02 Boundary Wall

This is a robust boundary wall on a very steep sloping section of the west bank covered in vegetation (Plates 6 & 7). On the 1st and 2nd edition OS map a boundary is shown at this location marking the limits of Knocknahorgan Woods opposite Sallybrook Mill. The wall is orientated in an ENE-WSW direction. It is constructed of rubblestone built to courses and bonded with a gravel mortar. It is a substantial wall measuring 1.08m in thickness with a maximum height of 3.20m.

#### Impact

No impact.

### Mitigation
No mitigation required.

## CHS 03 Revetment wall on East bank
A revetment wall was recorded along the eastern bank between Sallybrook House and Sallybrook Industrial Estate (Fig. 4-6, Plates 8-10). The wall is constructed of uncoursed rubble sandstone (Plate 8). The stones generally measure between 0.3m x 0.20m x 0.20m and 0.60m x 0.40m x 0.30m. The best surviving section of the wall measures 1.6m in height. It evidently extended beyond its current limits but due to bank erosion and tree root action the wall is in a poor state of preservation (Plate 9). It was traced for a distance of 80m but it has collapsed in some sections. It is significantly undermined in places with the current riverbed level circa 0.6m below the base of the wall. The wall is obscured by sheets of corrugated iron at the southern end of Sallybrook Industrial Estate. Part of the wall has been replaced by rock armour and concrete to the rear of Grandon's Garage.

Given its location it appears to be part of the curtilage of the RPS Sallybrook House and Sallybrook Mill. However, there is no zone of notification associated with the recorded monument Sallybrook Mill (CO063-069) on the National Monuments Service on-line database.

### Impact
Possibility of negative impact on sections of existing river revetment wall by proposed construction works.

### Mitigation
Mitigation by archaeological record. Full archaeological recording should be undertaken of any sections of the original river revetment walling which will be impacted by the construction work.

## CHS 04 Revetment wall on west bank
A revetment wall is located in the southern half of the Survey Area 1 on the western bank (Fig. 4-6, Plates 11-14). It is of random rubble construction and survives to a maximum height of 1.7m. The wall is very much eroded and only portions of it survive (Plates 11-14). It is undermined and disturbed by tree root activity and water erosion. This revetment wall appears to be strategically situated on a bend of the Glashaboy River to counter erosion from river action especially when it is spate.

### Impact
No impact.

### Mitigation
No mitigation required.

## CHS 05 Tailrace Sallybrook Mill
This component of the recorded monument of Sallybrook Mill is cartographically indicated on the 1st and 2nd edition OS maps (Figures 5 & 6). Of interest is that the tailrace of Sallybrook formed the headrace of a second mill complex immediately downriver (see Pike Mill, CHS6 below). The eastern riverbank was examined for any surviving elements of the tailrace but no physical remains were

identified and it appears to have been backfilled. However, it is possible that sub-surface remains of tailrace may be preserved within the riverbank and grounds of Sallybrook Industrial Estate.

### Impact

Potential discrete subsurface sections of the Sallybrook Mill tailrace may be impacted by the proposed construction works.

### Mitigation

Licensed archaeological monitoring should be undertaken by an experienced underwater archaeologist.

## CHS No. 06 Pike Mill weir and sluice

This weir and headrace is shown on the 1st and 2nd edition OS maps (Fig 6-7). The Pike Mill weir extends diagonally across the river in an NNW- SSE direction for a distance of 18.70m (Plates 16-22). The diagonally disposed weir thus creates a controlled head of water for release into the headrace. The river would have been widened and modified to create the weir originally. In profile the weir has low vertical sides and a moderately sloping 2.0m wide glacis. The northern elevation consists of nicely dressed limestone blocks set on edge between 1.63m and 2.02m in length and 0.15m in thickness. The northern elevation is currently 0.28m in height and a build-up of sediment was noted at its base. The glacis masonry is constructed of small tightly set well matched stones, averaging 0.35m x 0.10m, laid on edge at a 90˚ angle to the limestone blocks forming the north face. A small number of larger squared limestone blocks also form its surface.

The main channel flows on the eastern side of the weir. The NW corner of the weir connects to the western riverbank which is concealed beneath dense vegetation that restricted close inspection. The SE limit of the weir abuts the sluice which serviced Pike Mill. The latter corner has been impacted by inappropriate modifications to the bank including the pouring of concrete onto the weir structure where it ties into the headrace. The consequential damage to the weir has negatively impacted the wider cultural aesthetics of the site.

### Impacts

- There will be no impact on the weir by the proposed works.
- Possibility of impact by the proposed works on a section of walling on the east bank that formed part of the feeder or training wall into the sluice of the mill race.

### Mitigation

Mitigation by avoidance. Where possible, impact by the construction works on the existing sluice wall should be avoided. If unavoidable the proposed construction works should be faced with sympathetic material to minimise potential negative aesthetic visual impacts.

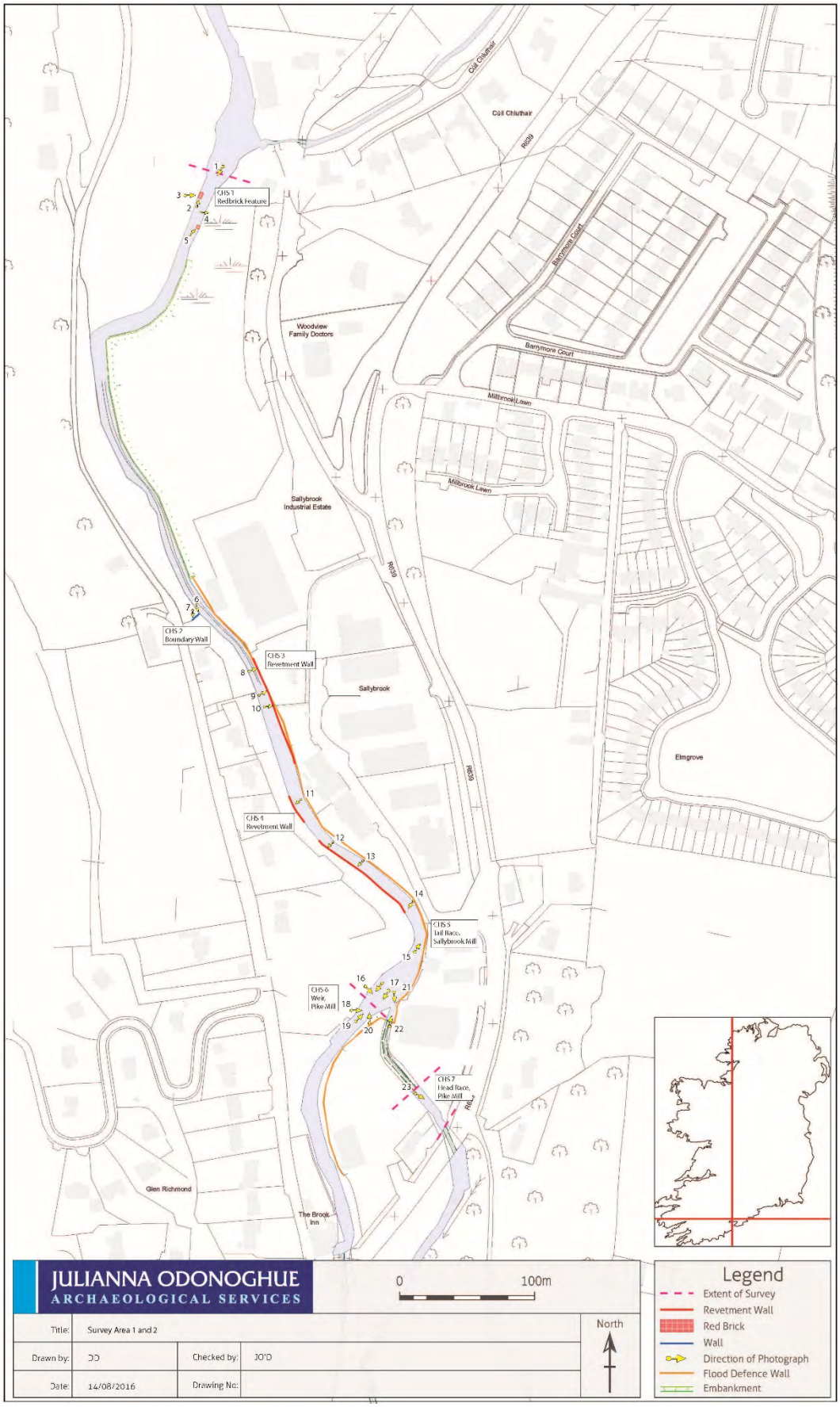
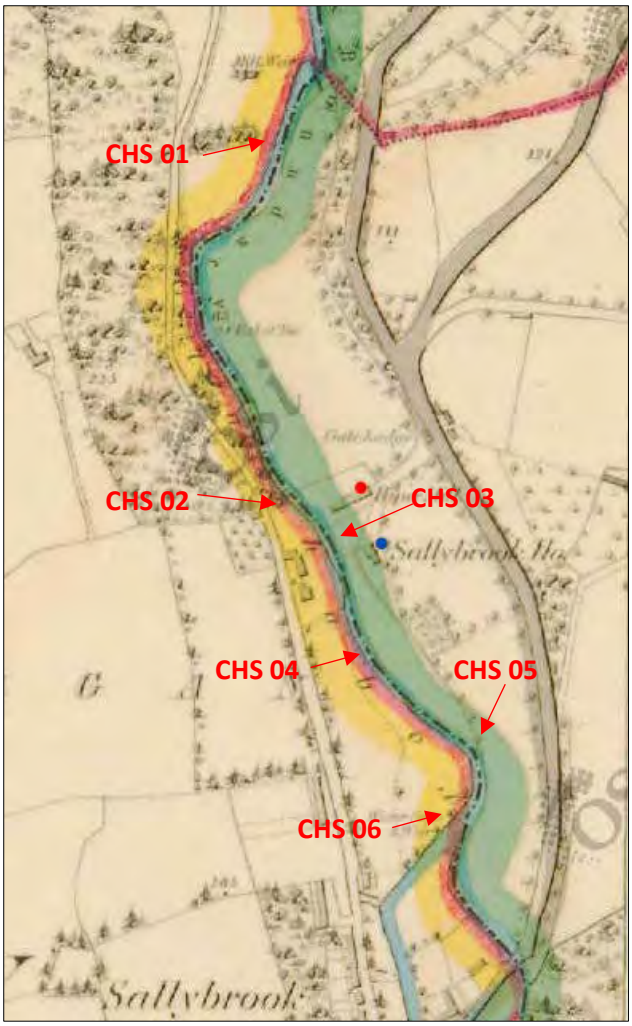
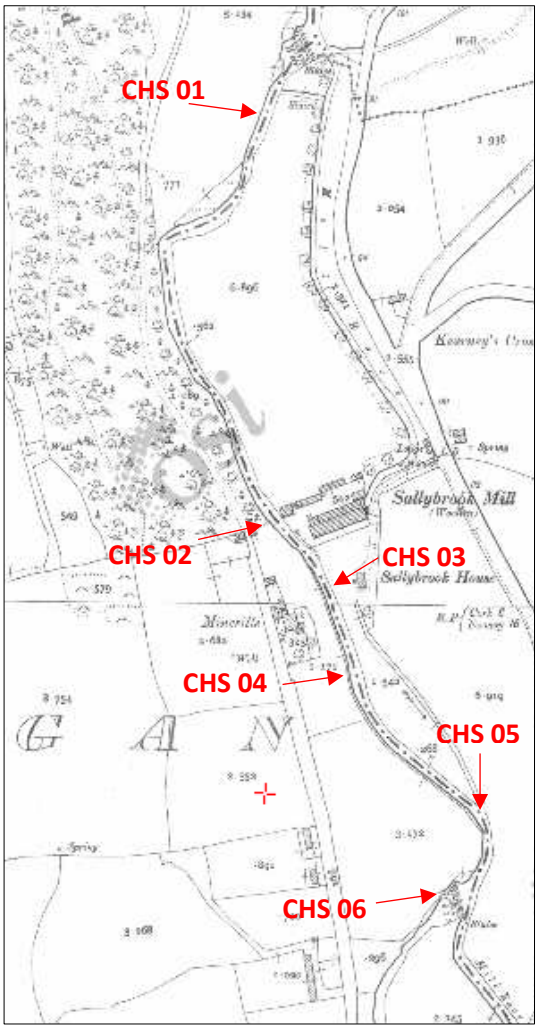



**Figure 4**: Site location Map, showing survey area 1, CHS 1-6 and proposed flood relief measures.




**Top left Figure 5**: Extract from 1st edition Ordnance Survey map, showing survey area 1, CHS 1-6

**Top right Figure 6:** Extract from 2nd edition Ordnance Survey map, showing survey area 1, CHS 1-6

**Plate 1:** View of Glashaboy River, looking downstream, taken at northern limit of survey

**Plate 2:** View of CHS 01, taken from south.

**Plate 3:** View of CHS 01, taken from west.

**Plate 4:** View of redbrick on east bank of river.


**Plate 5:** View of inscribed redbrick.

**Plate 6:** View of CHS 02 Boundary wall, taken from northeast.

**Plate 7:** View of CHS 02 Boundary wall, taken from northeast.

**Plate 8:** View of CHS 03, revetment wall, taken from west.

**Plate 9:** View of CHS 03, revetment wall, taken from west.

**Plate 10:** View of CHS 03, revetment wall, taken from west.

**Plate 11:** View of CHS 04 revetment wall, taken from northeast.

**Plate 12:** View of CHS 04 revetment wall, taken from northeast

**Plate 13:** View of CHS 04 revetment wall, taken from northeast.

**Plate 14:** View of CHS 04 revetment wall, taken from northeast

**Plate 15:** View of CHS 05 tailrace, Sallybrook Mill, taken from southwest.

**Plate 16:** View of CHS 06 weir, Pike Mill, taken from north-northwest.

**Plate 17:** View of CHS 06 weir, Pike Mill, taken from northeast.

**Plate 18:** View of CHS 06 weir, Pike Mill, taken from west-southwest

**Plate 19:** View of southeast side of CHS 06 weir, Pike Mill, taken from southwest.

**Plate 20:** View of CHS 06 weir, Pike Mill, taken from south.

**Plate 21:** View race/sluice, Pike Mill, taken from weir to north.

**Plate 22:** View of CHS 06 weir, Pike Mill, taken from south.