Kilkee Flood Relief Scheme

Final Report

Natura Impact Statement

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This report relates to the Kilkee Flood Relief Scheme commissioned by Clare County Council, on behalf of the Office of Public Works. Johanna Healy, Dominic Tilley and Anne Mullen of JBA Consulting/JB Barry carried out this work.

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Purpose

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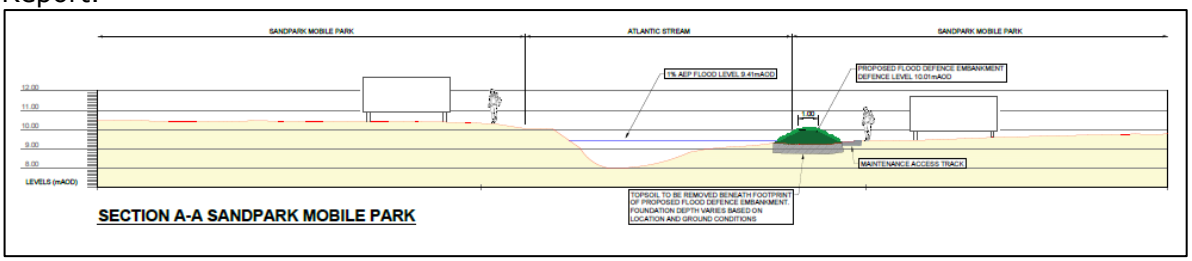

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Abbreviations

AA	Appropriate Assessment
CO	Conservation Objectives
CIEEM	Chartered Institute of Ecology and Environmental Management
DEHLG	Department of the Environment, Heritage and Local Government
DHLGH	Department for Housing, Local Government and Heritage
EC	European Community
ECoW	Environmental/Ecological Clerks of Work
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EU	European Union
FRS	Flood Relief Scheme
GIS	Geographical Information System
GSI	Geological Survey Ireland
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
NIS	Natura Impact Statement
NBDC	National Biodiversity Data Centre
NPWS	National Parks and Wildlife Services
NRA	National Roads Authority
OPR	Office of the Planning Regulator
OPW	Office of Public Works
QI	Qualifying Interests
SAC	Special Area of Conservation
SPA	Special Protection Area
WFD	Water Framework Directive
WWTP	Waste Water Treatment Plant
ZOI	Zone of Influence

1 Introduction

1.1 Background

JBA Consulting Engineers and Scientists Ltd (hereafter JBA has been appointed by Clare County Council, to undertake Environmental Consultancy services in relation to the Kilkee Flood Relief Scheme (FRS) in Kilkee, Co. Clare.

The proposed development, which will be submitted under Part 10 of the Planning and Development Act (2000) as amended, consists of development of a flood relief scheme to minimise the risks currently posed to people, the community, social amenity, environment and landscape.

A Screening for Appropriate Assessment has been carried out, and should be read in conjunction with this document (JBA 2023). The screening identified that likely significant effects on the Kikee Bay Special Area of Conservation (SAC) could not be excluded, and considered that a Stage 2 Appropriate Assessment (Natura Impact Statement (NIS)) would be required.

1.2 Legislative Context

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe.

The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means inter alia the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 / 2011).

Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland the network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), and also candidate sites, which form the Natura 2000 network.

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the Natura 2000 network), "*any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to* ***appropriate assessment*** *of its implications for the site in view of the site's conservation objectives*".

A competent authority, in this case An Board Pleanála as a public body, can only grant consent to a plan or project after having determined that it will not adversely affect the integrity of any European site, in light of its conservation objectives and best scientific evidence, either alone or in combination with other plans or projects.

Under article 6(4) of the Directive, if adverse impacts are likely, and in the absence of alternative options, a plan or project must nevertheless proceed for imperative reasons of overriding public interest (IROPI), including social or economic reasons, a Member State is required to take all compensatory measures necessary to ensure the overall integrity of the Natura 2000 site.

1.3 Appropriate Assessment Process

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG, 2010). These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1-1.

Figure 1-1: The Appropriate Assessment Process.

1.3.1 Stage 1 - Screening for AA

The initial, screening stage of the Appropriate Assessment is to determine:

- whether the proposed plan or project is directly connected with or necessary for the management of the European designated site for nature conservation
- if it is likely to have a significant adverse effect on the European designated site, either individually or in combination with other plans or projects

For those sites where potential adverse impacts are identified, either alone or in combination with other plans or projects, further assessment is necessary to determine if the proposals will have a likely significant effect on the integrity of a European designated site, in view of the site's conservation objectives (i.e., the process proceeds to Stage 2).

1.3.2 Stage 2 - AA

This stage requires a more in-depth evaluation of the plan or project, and the potential direct and indirect adverse impacts of them on the integrity and interest features of the European designated site(s), alone and in-combination with other plans and projects, taking into account the site's structure, function and conservation objectives. Where required, mitigation or avoidance measures will be suggested.

The competent authority can only agree to the plan or project after having ascertained that it will not adversely affect the integrity of any European site, in light of its conservation objectives and best scientific evidence, either alone or in combination with other plans or projects, after mitigation measures have been applied, and the mitigation measures are certain and capable of being successfully implemented. If this cannot be determined, then alternative solutions will need to be considered (i.e., the process proceeds to Stage 3).

1.3.3 Stage 3 - Alternative Solutions

Where adverse impacts on the integrity of *European* sites are identified, after mitigation measures have been applied, or the mitigation measures are not certain / capable of being successfully implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the process proceeds to Stage 4.

1.3.4 Stage 4 - IROPI

Where adverse impacts of a plan or project on the integrity of *European* sites are identified and no alternative solutions exist, the plan will only be allowed to progress if imperative reasons of overriding public interest (IROPI) can be demonstrated. In this case compensatory measures will be required.

The process only proceeds through each of the four stages for certain plans or projects. For example, for a plan or project, not connected with management of a site, but where no likely significant impacts are identified, the process stops at stage 1. Throughout the process, the precautionary principle must be applied, so that any uncertainties do not result in adverse impacts on a site.

1.3.5 Recent judgements of the Court of Justice of the European Union (CJEU)

The CJEU issued a ruling on the consideration of avoidance and reduction measures as a result of the case known as People over Wind, Peter Sweetman v Coillte Teoranta (Case C-323/17). This judgement stated that measures intended to reduce or avoid effects on a European site should only be considered within the framework of an AA, and it is not permissible to take into account such measures at the screening stage. In practice, this means that any activities that are not integral to the project (i.e. the project could conceivably take place without them) and have the effect of avoiding or reducing an impact on a European site, cannot be considered at the screening stage.

The CJEU ruling in the case of Grace & Sweetman [2018] (C-164/17) clarified the difference between avoidance and reduction (mitigation) measures and compensation. Measures intended to compensate for the negative effects of a project cannot be taken into account in the assessment of the implications of a project, and instead are considered under Article 6(4). This means that any project where an effect on the integrity of a European site remains and can only be offset by compensation, would need to proceed under Article 6(4), demonstrating "imperative reasons of overriding public interest".

The judgements referred to as the Dutch Nitrogen cases [2018] (C-293/17 and C-294/17) have important implications for projects that could potentially impact on sites that are exceeding critical thresholds for input of damaging ammonia (but could also reasonably apply where other nutrients are impacting European sites). The judgements state that the use of thresholds to exclude project impacts is acceptable in principle, and that strategic plans can be used as mitigation but only with consideration of the certainty (or otherwise) of the outcomes of those strategic plans. It clarifies that where the status of a habitat type is already unfavourable the possibility of authorising activities which increase the problem is necessarily limited.

The CJEU ruling in the case of Holohan v An Bord Pleanála [2018] (C-461/17) also clarified the importance in AA of taking into account habitat types and species outside the boundary of the European site, where implications of the impacts on those habitat and species may impact the conservation objectives of the European site. In this assessment functionally linked and supporting habitat for species outside of European site boundaries are assessed where they could potentially impact the conservation objectives of any screened in European sites.

The CJEU ruling in response to questions referred by the Irish High Court in the Eco Advocacy case (C-721/21) indicated that an applicant for permission in its AA screening report/and a decision maker in undertaking its AA screening can take into account "standard features", i.e. all the constituent elements of that project inherent in it/elements that are incorporated into a projects design not with the aim of reducing its negative effects (even where these have the effect of reducing harmful effects on a European site).

1.4 Structure of this report

To provide the competent authority with the relevant information to determine with confidence their conclusions on the overall impacts of the project to the integrity of the sites concerned, this NIS presents the following:

Section 2: Details of the methods used in this assessment.

Section 3: Description of the proposed project.

Section 4: Summary of the AA Screening and a description of those Natura 2000 sites that are screened in for being at risk for potential adverse impacts from the proposed works.

Section 5: Detailed description of the baseline conditions with regard for the Qualifying Interests (QIs) of the Kilkee Reefs SAC.

Section 6: Other Relevant Plans and Projects in the area, to allow a cumulative assessment to carried out.

Section 7: Identification of potential sources of impact to the screened in Natura 2000 site and assessment of the potential for adverse impacts on the Kilkee Reefs SAC.

Section 8: Mitigation for protection Kilkee Reefs SAC at construction and operation phase. Assessment of post-mitigation impacts (Residual Impacts) on the QIs in

Table 9-1.

Section 9.3: Summary of the impacts and mitigation with overall assessment on the coherence of the Natura 2000 network.

2 Methodology

2.1 Guidance

This Natura Impact Statement has been prepared having regard to the Birds and Habitats Directives, the European Communities (Birds and Natural Habitats) Regulations 2011-15 as amended and relevant jurisprudence of the EU and Irish courts. The following documents have also been used to provide guidance for the assessment:

- DEHLG (2009 rev 2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government (DEHLG, 2009).
- Office of the Planning Regulator (2021) OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management (OPR 2021).
- European Communities (EC) (2019) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission (European Commission 2019).
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. (European Commission 2021)
- EC (2022) Guidance document on assessment of plans and projects in relation to Natura 2000 sites. (European Commission. Directorate General for Environment. 2022)
- EC (2002) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission (European Commission et al. 2002).
- EC (2013) Interpretation manual of European Union habitats. Version EUR 28. (EC 2013).
- EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission Management (European Commission, 2007).
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal, Second Ed. (Chartered Institute of Ecology and Environmental), updated 2022.

2.2 Desktop Study

A desktop study was conducted of available published and unpublished information, along with a review of data available on the National Parks and Wildlife Service (NPWS) and National Biodiversity Data Centre (NBDC) web-based databases, in order to identify key habitats and species (including legally protected and species of conservation concern) that may be present within ecologically relevant distances from the project as explained below. A baseline habitat assessment was performed using satellite imagery of the site. The data sources below (accessed June 2023) were consulted for the desktop study:

- Aerial photography available from Google Satellite imagery and Esri World Imagery.

- NPWS website (www.npws.ie) where Natura 2000 site synopses, data forms and conservation objectives were obtained along with Annex I habitat distribution data and status reports.
- River Basin Management Plans (www.wfdireland.ie).
- NBDC species data within a custom polygon covering the study area with an additional 5km buffer.
- NBDC Biodiversity Maps (maps.biodiversityireland.ie).
- Catchments (www.catchments.ie).
- Environmental Protection Agency Maps (https://gis.epa.ie/EPAMaps).
- Geological Survey Ireland (GSI) website (www.gsi.ie).
- GSI - Groundwater data viewer (https://dcenr.maps.arcgis.com).
- Planning Applications (myplan.ie).

2.3 Ecological Site Surveys

Various ecological site surveys were performed by JBA Ecologists Anne Mullen, Damien McAndrew, Johanna Healy, Hannah Mulcahy, Dominic Tilley, Joe Freijser, Eilis Hogan, Colm O'Leary and Karen Van Dorp. Table 2-1contains further details on survey dates and type of survey undertaken.

The ecological walkover survey recorded habitats and protected species, following the methods outlined in the documents below:

- Heritage Council (2011): Best Practice Guidance for Habitat Survey and Mapping (Smith et al. 2011).
- Fossitt (2000): A Guide to Habitats in Ireland. The Heritage Council, Kilkenny.
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009b).

Aerial photographs and site maps assisted the survey. Habitats have been named and described following Fossitt (2000). Nomenclature for higher plants principally follows that given in The New Flora of the British Isles 4th Edition (Clive Stace 2019). Identification of Irish plants generally follows that given in Webb's An Irish Flora (Parnell and Curtis, 2012).

Table 2-1 Ecological surveys undertaken in the study area.

Survey	Date	Surveyor(s)
Multi-disciplinary walkover survey (habitat mapping, protected and invasive species)	29/05/2020	KvD, JF
Wintering bird habitat suitability scoping surveys	24/02/2021	AM, EH
Wintering bird surveys	20/01/2022 22/02/2022 30/03/2022 22/11/2022 12/01/2023 02/03/2023	AM, JF, DM, JH
Dusk bird survey	20/01/2022	AM, JF
Nesting bird surveys	13/05/2022	HM, DM
Additional habitat surveys	01/07/2022	AM

Survey	Date	Surveyor(s)
Fisheries and in-stream electrofishing surveys	15/09/2022	*Triturus Environmental Ltd.*
Breeding bird surveys	04/05/2023 05/05/2023 26/06/2023 27/06/2023	DT
Additional habitat surveys	04/08/2023	JH, MH
JBA Ecologists: AM = Anne Mullen, JF = Joe Freijser, COL = Colm O'Leary, DM = Damien McAndrew, HM = Hannah Mulcahy, JH = Johanna Healy, DT = Dominic Tilley, EH = Eilis Hogan, MH = Mia Heigh		

2.4 Assessment Criteria

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of qualifying interest. The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Upon the conclusion of the AA, the competent authority may grant consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the Natura 2000 site(s) concerned.

2.4.1 The Adverse Effect on Site Integrity Test

An assessment of whether there could be an adverse effect on site integrity is done using the source-pathway-receptor model which is used to determine the risk of impact to a site or Qualifying Interests (QIs) (OPR 2021; Ryan Hanley 2014b). Risk is the likelihood or expected frequency of a specified adverse consequence or impact.

Applied to the Scheme, it expresses the likelihood of an adverse impact arising because of the Scheme activities. A hazard presents a risk when it is likely to affect something of value (i.e. the Natura 2000 sites and their QIs). It is the combination of the probability of the hazard occurring and its consequences that is the basis of a risk assessment which an NIS essentially is:

Risk = probability of an event x consequential damage

The source-pathway-receptor model is a useful tool to determine if a risk is present, and to help quantify the risk to see if the threshold of an adverse effect on site integrity is reached. For a risk to be present, all three elements must be present.

Source: The source considered in this NIS is the proposed works or activity that will occur as a result of the Scheme. Key considerations in assessing the source are the nature and scale of the potential impacts that may arise, e.g. type of contaminants that may arise, the contaminant loading and other physical attributes. The point of occurrence is a critical reference point for assessing the attributes of the source of any potential adverse impacts.

Pathway: Pathways are established by surface water, ground water, and land and air connections. The pathway includes everything between the source and the receptor; from point of release of potential adverse impacts, such as contaminants, to the receptor. The location, nature, connectivity and extent of wells, groundwater dependent ecosystems, aquifers and faults can all influence the nature of a pathway. Rivers, streams and drainage ditches could all act as potential pathways for potential waterborne impacts. The pathway includes assessment of surface and groundwater bodies, and WFD status may be reviewed as relevant. Land and air pathways to be considered include those that may transfer direct

physical impacts, noise and visual disturbance (vibrations) and dust or other airborne particles.

Receptor: The receptor is the QI features of the relevant Natura 2000 sites, their Conservation Objectives (COs) and the overall integrity of the Natura 2000 sites. To determine the significance of potential adverse impacts on the integrity of the Natura 2000 site, the COs of each site are assessed relative to the potential impacts that may occur because of the proposed works. The conservation objectives are the fundamental unit on which the assessment is based. If the project were to undermine or make these objectives more difficult to achieve, the conservation status of the QI features becomes harder to achieve, and the quality and condition of the site will be reduced, reducing the 'integrity' of the Natura 2000 site. Each Natura 2000 site will either have specific or generic conservation objectives.

The overall aim of COs is to maintain or restore the favourable conservation conditions of the Annex I habitats and/or the Annex II species for which a SAC has been selected, under which the site-specific objectives contain more detailed attributes, measures and targets.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The conservation objectives for SPAs are also to maintain or restore the favourable conservation condition of the bird species listed as QIs for SPAs, which are defined by the following list of attributes and targets:

- Population trend: Measure of percentage change and whether the long-term population trend is stable or increasing.
- Distribution: Number, range, timing and intensity of use of areas. There is to be no significant decrease in the range, timing or intensity of use of areas by specific or generic bird species, other than that occurring from natural patterns of variation.

The conservation objectives for non-breeding birds QIs for SPAs are as follows:

- To maintain the favourable conservation condition of the non-breeding water bird Special Conservation Interest species listed for a SPA.
- To maintain the favourable conservation condition of the wetland habitat for a SPA as a resource for the regularly occurring migratory water birds that utilise it.

Some Natura 2000 sites do not have specific COs for each QI and instead have only the general objectives listed above. Where these sites are screened into the assessment,

detailed COs have been derived from other nearby Natura 2000 sites with the same QIs. In these cases, the necessary assumption has been made that the sites have similar characteristics, and the conservation objectives are likely to be similar for the specific habitat or species type in terms of conservation requirements.

Site integrity is assessed on the basis of each conservation objective of each qualifying interest feature. Should any conservation objective be undermined by the proposed scheme/development, the site integrity will therefore be adversely affected. Low-impact effects that are too small or short-lived to undermine the achievements of the conservation objectives are therefore not likely to adversely affect the site integrity.

2.4.2 Avoidance and Mitigation Measures

To ensure that any mitigation measures are sufficient and proven to be successful, they are designed in accordance with the most up to date best practice guidelines and tailored where necessary to the conditions on-site and nature of the relevant receptors.

Guidance utilised during the avoidance of impact and the design of mitigation measures include:

- (SEPA 2009) Engineering in the Water Environment Good Practice Guide: Temporary Construction Methods And the series of guidelines.
- (IFI 2016) Guidelines on protection of fisheries during construction works in and adjacent to waters.
- (IFI 2020) Planning for Watercourses in the Urban Environment: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning.
- (Brew and Gilligan 2019) Environmental Guidance: Drainage Maintenance and Construction. Series of Ecological Assessments on Arterial Drainage Maintenance. No 13.
- (OPW 2021) Design Guidance For Fish Passage On Small Barriers.

A more comprehensive list is presented in Section 8: Mitigation.

Avoidance and mitigation measures are assessed for evidence of their effectiveness and the certainty with which they can be implemented, as well as certainty with which they will avoid or reduce impacts. This forms a critical part of the assessment of residual effects and whether these could still result in adverse impacts.

2.4.3 In-combination Assessment

The in-combination assessment followed the process for in-combination assessment set out by the DTA Handbook (Tyldesley and Chapman 2013), accessed 2023. The in-combination impacts are considered only after the assessment of the project alone. If the result of this is that the project will have no effect at all on a European site, then no in-combination assessment would be necessary. However, where there is no adverse effect on site integrity, but some adverse effect locally an assessment of this adverse effect in-combination with other plans or projects is carried out. Other plans or projects were searched for using the National Planning Application Database, EIA portal and Myplan.ie databases all accessed online. If no other plans or projects are identified, then the assessment is complete. Where other plans or projects are identified then initially a review is made of its AA screening, or AA, and if the Competent Authority for the plan or project has made a final determination of no effect on the integrity of any European site, either alone or in-combination, this determination is used in this assessment. Where there is not a full AA, or the findings are unclear or out of date, the plan or project documentation is checked for credible evidence of real (not hypothetical) risk to a European site. Where

these are identified then a detailed assessment is carried out. A summary of the approach is presented in Figure 2-1 .

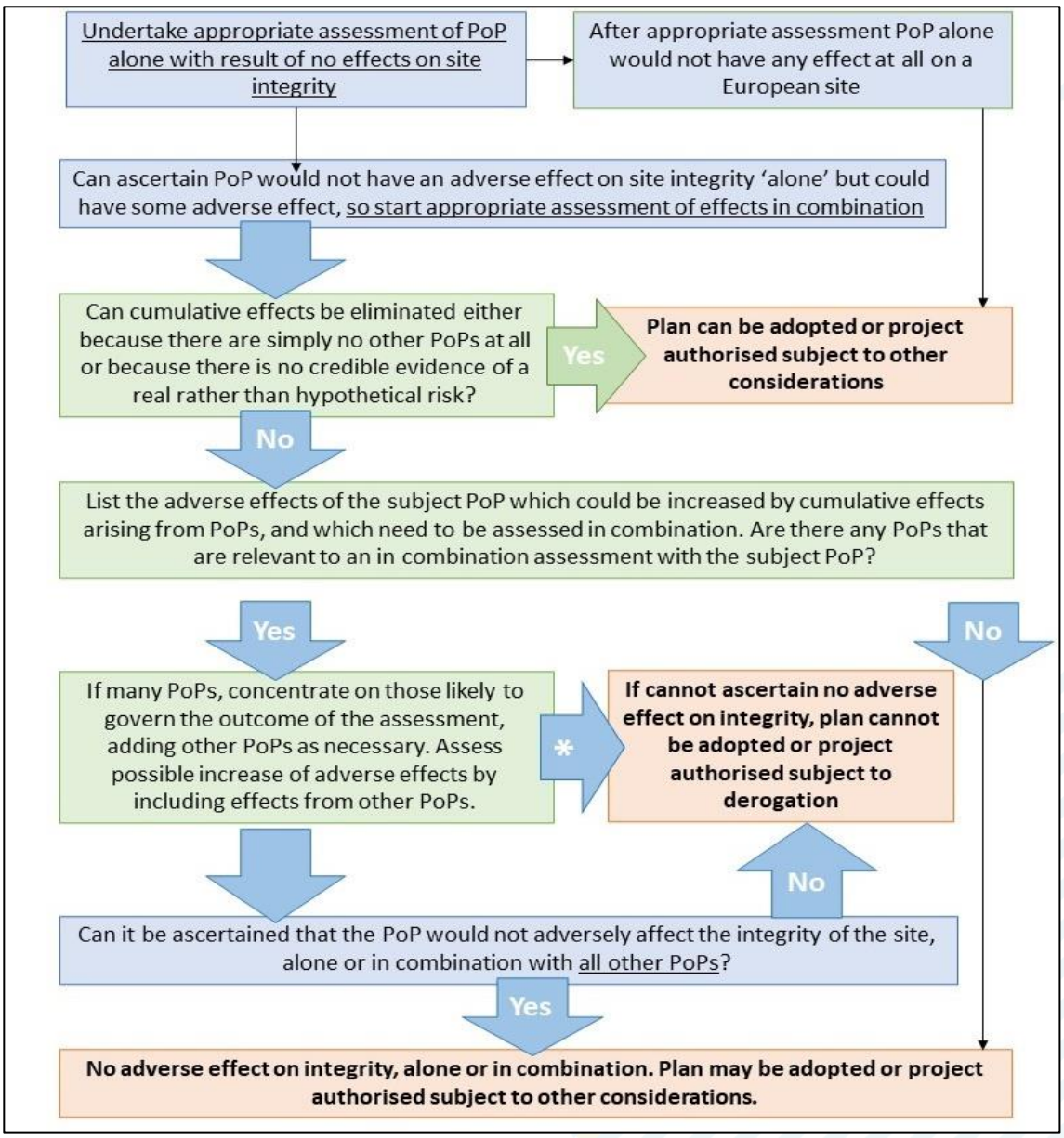

Figure 2-1: Flow diagram of process for in-combination assessment (modified from Tyldesley & Chapman, 2013).

Potential sources of cumulative impacts were identified based on the ecology of valued ecological features only for features where this is a residual or non-significant impact. Potential sources of cumulative impacts were sought within an area where there is the potential for a significant impact on relevant Natura sites identified in Section 3.

2.5 Competent Persons

The assessment has been carried out by Anne Mullen BSc (Hons), MSc and Dominic Tilley BSc (Hons), MSc, PhD. They are ecologists with JBA and have undertaken numerous Appropriate Assessment Screening and NIS assessments. The assessment has been reviewed by Patricia Byrne BSc, PhD, MCIEEM and Rachael Brady BSc, MSc, CEcol, MCIEEM, with extensive experience in undertaking assessments under the Habitats Directive.

2.6 Consultation

Consultation is ongoing with a number of key stakeholders in relation to EU Natura 2000 sites which includes, but is not limited to the following:

- Clare County Council – ongoing consultation through the steering group. Consultation for other project in relation to the cumulative assessment about potential projects in the area that are not yet in planning.
- Irish Water – information on the proposed new WWTP in Kilkee (by email November & December 2023).
- National Parks and Wildlife Services – informal consultation with presentation of project formally through the scoping with the Development Applications Unit (DAU) (August 2023 and October 2023 for DAU)
- IFI – informal consultation for design review and advice, especially with regard for stream realignment (October 2023, by phone and email).

2.7 Limitations and Constraints

The NIS assessment necessarily relies on some assumptions, and it was inevitably subject to some limitations. These would not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Information on the works and conditions on site are based on current knowledge at the time of writing. Changes to the site since surveys were undertaken cannot be accounted for, however the site surveys have followed the CIEEM guidance provided on suitable lifespan for surveys (CIEEM 2019 - Advice note on the lifespan of ecological reports and surveys).
- Information on the works and conditions on site are based on current knowledge at the time of writing. Changes to the site since surveys were undertaken cannot be accounted for.
- This assessment is based on the methodology for proposed works as described in this report. Where changes to methodology occur, an ecologist will need to be consulted to determine if the changes need reassessment.
- Adverse weather can cause delays to the schedule and alter the timing of works. This has been accounted for using a worst-case scenario where necessary.
- The precautionary principle is used at all times when determining potential ecological sensitivity of the site.
- The NIS addresses issues around European designated sites and does not exempt works from responsibilities related to habitats and species covered under separate national legislation.

3 Project Description

3.1 The 'Project'

The proposed flood relief scheme (FRS) in Kilkee, hereafter referred to as 'Kilkee FRS' meets the criteria of a 'Project' as defined in the Habitats Directive and is not directly connected with or necessary to the management of any Natura 2000 site. Therefore, the project is subject to the requirements of the Appropriate Assessment process. A Stage 1 AA Screening has been completed. This report provides a Stage 2 Appropriate Assessment (or NIS).

3.2 Project location

The proposed FRS is located within Kilkee town. Proposed works are to take place in two main sites for fluvial options: the Victoria stream and adjoining lands to the west of the study area, and the Atlantic stream and adjoining lands to the east. The footprint of the proposed FRS works is presented in Figure 3-1.

3.3 Description of Proposed Development

A Buildability Report has been prepared for the proposed FRS which outlines the construction methodology and phasing. This report will remain a live document until after the planning application stage, when the finalised detailed design of the scheme is complete.

An overview of the proposed fluvial options for the Victoria and Well stream is given in Figure 3-2 and Atlantic stream sites in Figure 3-3. A summary of the main works also presented, but the Buildability Report should be read in conjunction with this NIS for full details on the works to be carried out at each site.

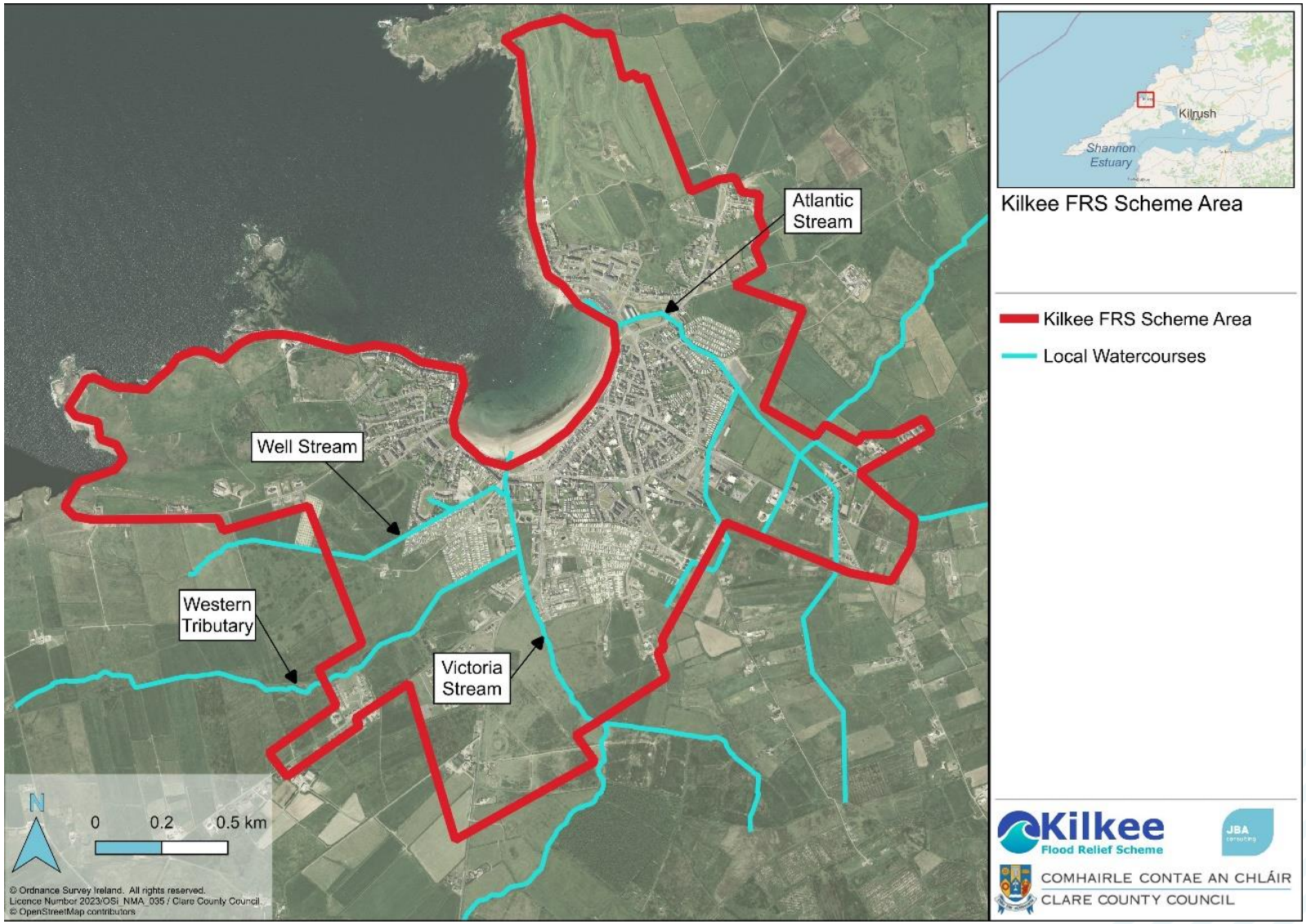

Figure 3-1: Site location and boundary of works.

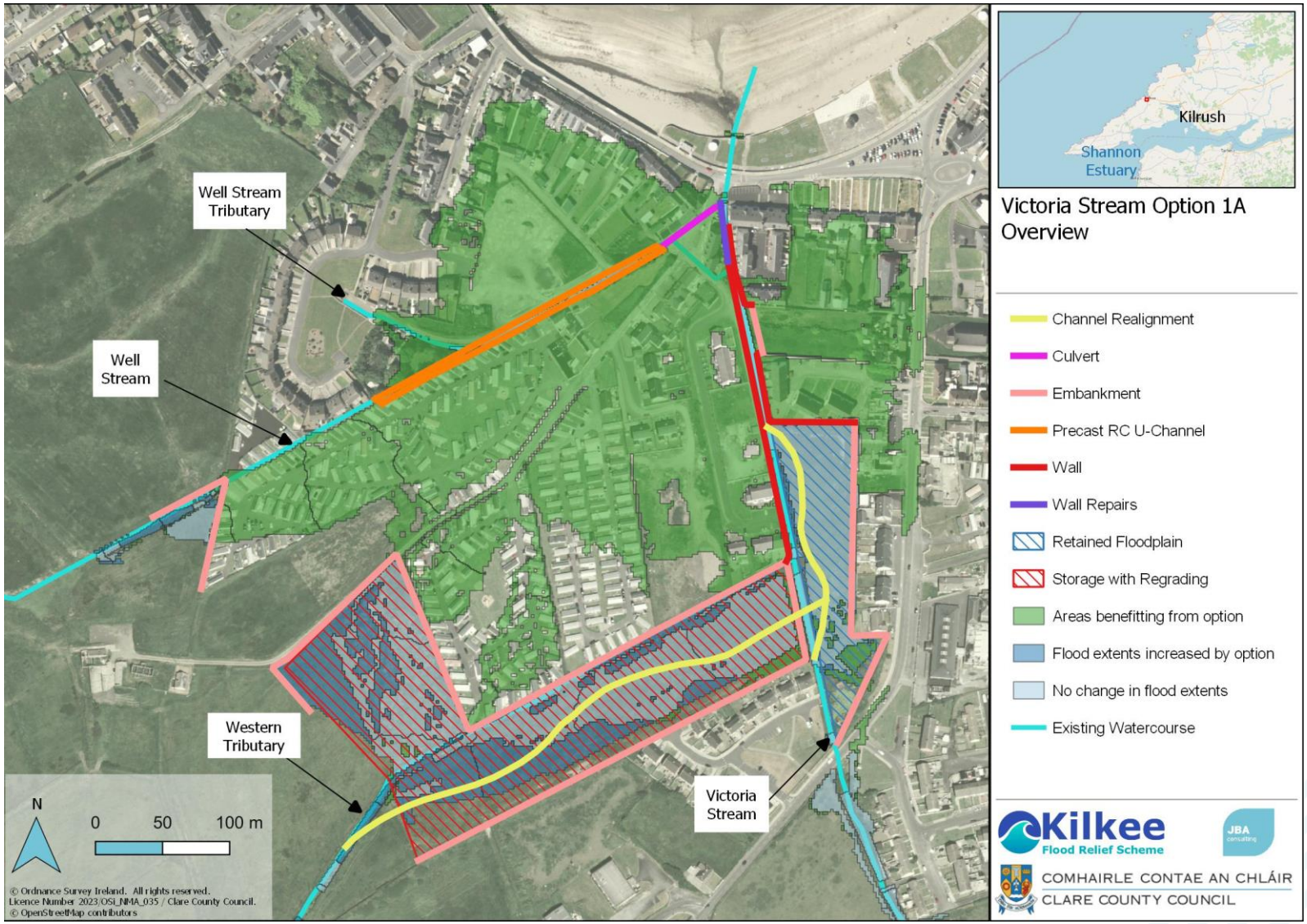

Figure 3-2: Preferred option for Victoria Stream.

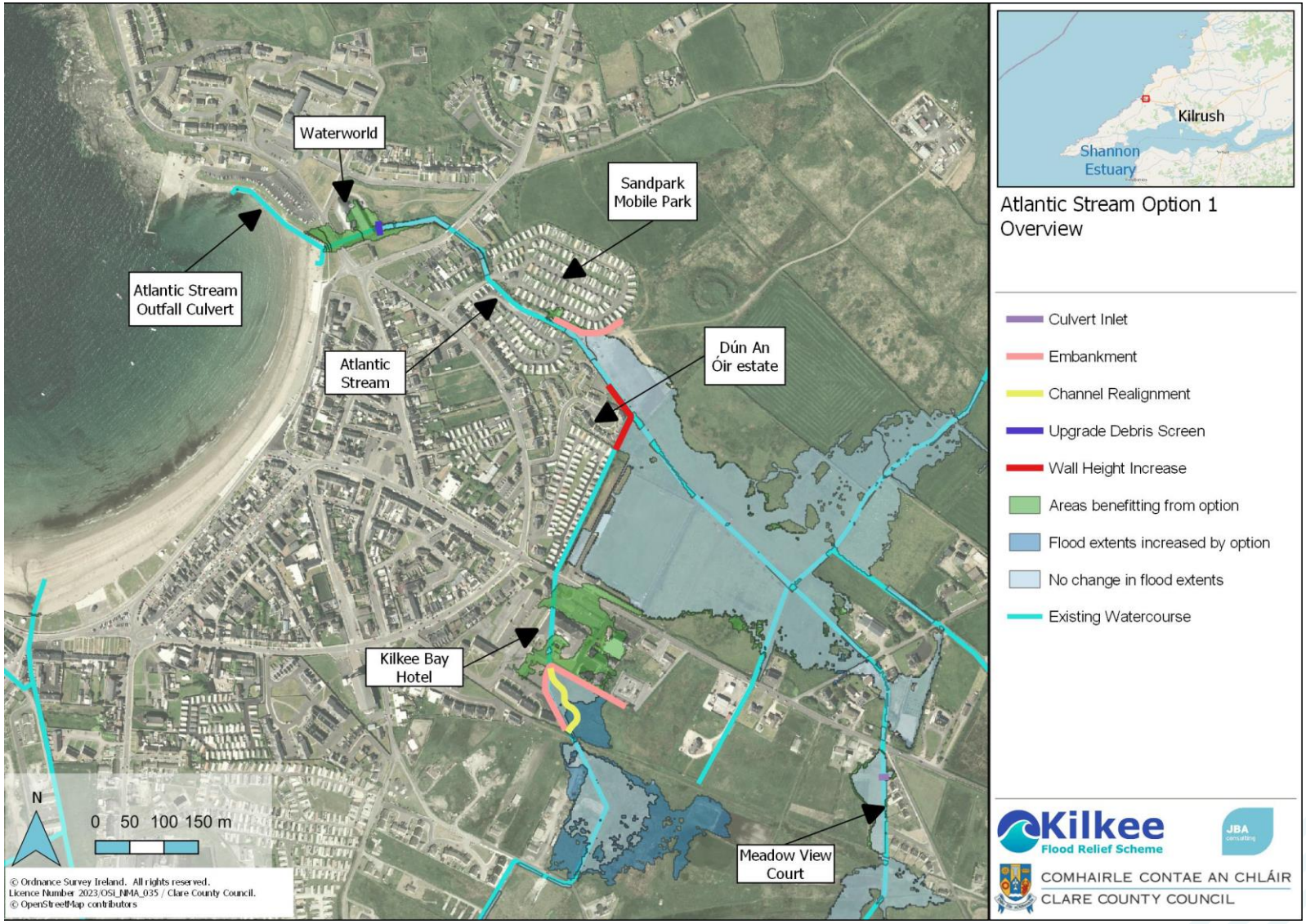

Figure 3-3: Preferred option for Atlantic Stream.

3.3.1 Atlantic Stream

3.3.1.1 Kilkee Bay Hotel Storage

- Construction of c. 200m long embankment c. 1.3-1.6m high.
- Diversion of c. 110m of open channel into centre of floodplain.
- Installation of new headwall and 600mmØ inlet culvert under embankment to link with existing culvert.

Enabling/Construction works for Kilkee Bay Hotel Storage

- Construct access road from site compound to point downstream of Atlantic Stream diversion point and from the site compound to the headwall construction point.
- Excavate Atlantic Stream to stage diversion channel, while retainging flow in existing channel.
- Construct temporary crossing over excavated diversion channel.
- Excavate for new headwall and culvert. Construct new headwall, culvert and debris screen and connect into existing culvert.
- Excavate original open channel to suitable depth and backfill with impermeable engineered material.
- Divert Atlantic Stream immediately downstream of existing 750 mm culvert.
- Construct proposed defence embankment with imported impermeable engineered material as per design.
- Welfare Facilities, Access / haul roads and Temporary crossing over watercourse are required.

3.3.1.2 Dún an Óir Walls

- Increase the height of the existing boundary wall by c. 300mm over c. 103m length.

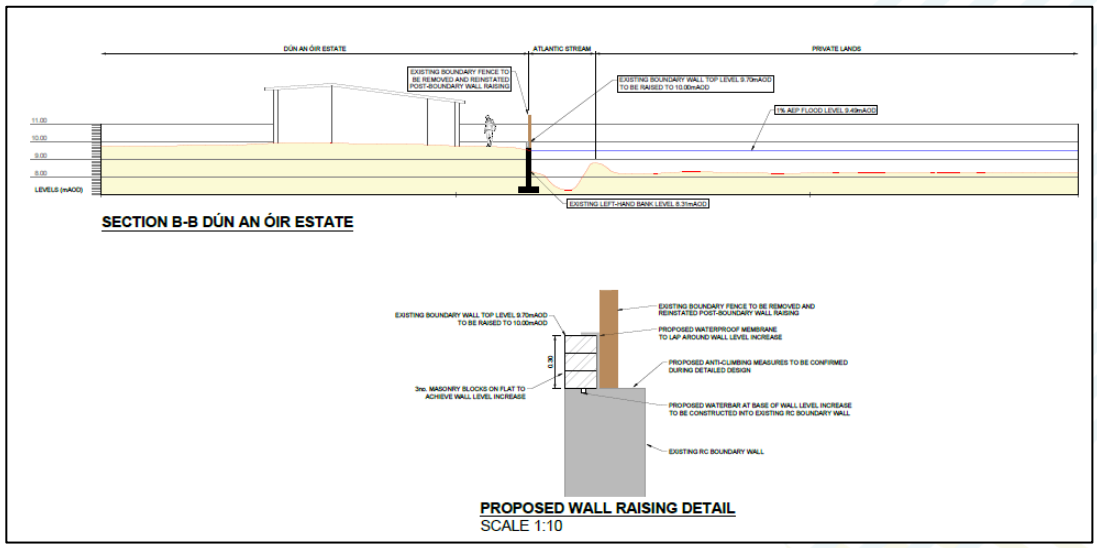

Figure 3-4: Design of the wall along Atlantic Stream. Full details in the Buildability Report.

3.3.1.3 Sandpark Mobile Park

- Construction of c. 110m long embankment c. 700mm high.
- Undertake ground preparation works to accommodate the new embankment.
- Excavate topsoil beneath the footprint of the proposed embankment. The final excavation depth will be dependent on the ground conditions. Construct the embankment by importing and placing impermeable clay.
- This will mean a total volume of 150m³ of material will have to be removed.

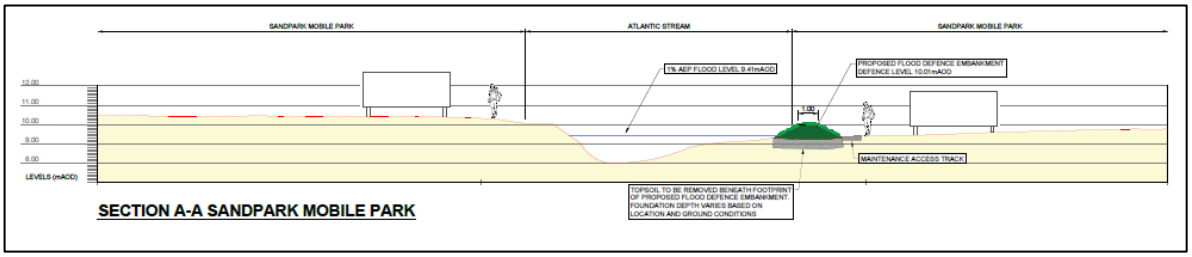

Figure 3-5 Design of the embankment along Atlantic Stream. Full details in the Buildability Report.

3.3.1.4 Waterworld

- Installation of new debris screen at upstream culvert headwall.

Enabling/Construction works for the Atlantic Stream screen at Waterworld.

- A Section 50 will be required for partial damming of watercourse prior to works.
- The temporary lay down area will require a layer of geogrid to be placed on the existing surface. A stone layer as detailed by the temporary works designer will be placed over this.
- The works will require extensive in-stream works. Silt mitigation measures need to be established prior to the excavation within the stream. These details will be set out within the EIAR and NIS.
- Existing gabion baskets are to be removed. Banks and foundations are to be excavated to the extent and depth required, foundations for both wing walls will then be installed. Any in-stream placement of fresh concrete will require mitigation measures, which will be set out in the EIAR.
- Steel elements will be assembled in-situ. Scaffolding will need to be constructed in-stream to allow access to each wall. This access will be required to install the horizontal support beams for the screen and permanent platforms.
- Screen walls will be backfilled, and the handrails established, rebuild of the parapet.
- Hoarding and fencing to secure the site, shuttering for concrete.

3.3.1.5 Atlantic Stream Outfall

The Atlantic Stream outfall consists of a reconstruction of the overflow manhole with a new pressure-releasing chamber cover to allow surcharged flows to be dissipated in a controlled fashion and allow flood waters to run down the promenade terracing and onto the beach. Non-return valves are proposed to the existing main outfall and overflow outfall culverts. The manhole on the main outfall culvert alignment downstream of the upgraded overflow manhole is to be sealed at its existing ground level.

- Upgrade existing overflow chamber with raised cover (c. 2.7m long x 2m wide x 400mm high) with flap valves.
- Reconstruction of outfall manhole and installation of non-return valve on upstream 750mmØ culvert.
- Install non-return valves to existing 750mmØ main outfall and overflow outfall culverts.
- Seal existing cover of manhole downstream of overflow chamber on main outfall culvert at existing ground level (c. 2m long x 0.8m wide x 400mm high RC slab and new sealed lid).

Enabling/Construction works for the Atlantic Stream outfall at the top of the promenade.

- A temporary compound is to be established around the manhole in question using Heras fencing.
- An area 1m x 1m centred on the lid is to be broken out and exposed down to the manhole biscuit. Concrete lintels, openings are to be left in the masonry wall. Additional manhole steps are to be installed as required.
- Lid, bolted fixings, non-return valve to be fixed.

3.3.1.6 Meadow View Court

The works consist of the installation of manholes to an existing culvert.

- Construction of 2 no. 2100mm dia. inlet manholes with grated covers on existing 1200mm dia. culvert.

3.3.2 Victoria and Well Stream Works

3.3.2.1 Well Stream Culvert and Embankment:

The flood relief works for the Well Stream culvert and embankment will consist of:

- Construction of c. 146m long embankment c. 1.1m high upstream of Cunningham's Holiday Park with inclusion of new headwall and 1050mmØ inlet culvert to existing culvert downstream.
- Installation of precast reinforced concrete u-channel along the existing Well Stream alignment c. 240m long and c. 1.6m above the adjacent road level.
- Installation of overflow on the Well Stream Tributary and non-return valve on the Well Stream u-channel left bank wall to maintain connectivity during normal flows and enable overflow to the carrier drain system during flood events.
- Decommissioning of existing Well Stream box culvert and circular overflow culverts at Crescent Place. Installation of new RC box culvert (c. 1.6m wide x 900mm high) c. 55m long under Crescent Place.
- Resurfacing and regrading of Well Road (c. 300m long x 5.5m wide x 300mm high).

Enabling/construction works for the Well stream culvert and embankment.

The construction methodology proposes the following:

- Clearing back of material and removal of the old culvert.
- Installation of temporary access roads

- Hoarding and fencing enclosing the works area from the adjacent caravan parks.
- Temporary lighting as required.
- Access/haul roads to the site from the Carrigaholt Road (R487) to the embankment.
- The volume of material to be excavated for the construction of the embankment is approximately 690m³.

Enabling/construction works for the Well Stream U channel

The construction methodology proposes the following:

- Temporary access road.
- Tree and scrub clearance.
- Temporary fencing and temporary lighting as required.
- Temporary diversion of the Well Stream to allow for working in the dry. The temporary pipe work would need to be installed on the north bank of the Well Stream. This would be removed as part of the reinstatement works post-completion of the channel. The exact methodology will have to be agreed with the proposed contractor and ECoW.
- The installation of the u-channel will involve an initial over-widening and deepening of the existing stream to allow the installation of the sections.
- The construction of the u-channel will require an estimated 476m³ of material to be removed.

3.3.2.2 Crescent Place Culvert

The flood relief works at the Crescent Place Culvert on the Well stream will consist of:

- Construction of a new culvert under Crescent Palace measuring 1.6m wide and be 0.9m high.
- Part of the left-hand bank walls of the Victoria Stream will require demolition and reinstatement to facilitate the installation of the new culvert.
- The existing culvert and overflow pipes will be decommissioned.
- A 250Ø surface water sewer and a 450Ø foul main run over the footprint of the proposed culvert. These will need to be temporarily diverted/incorporated into the works.
- Full reinstatement of the surface carriageway will be undertaken as part of the works.

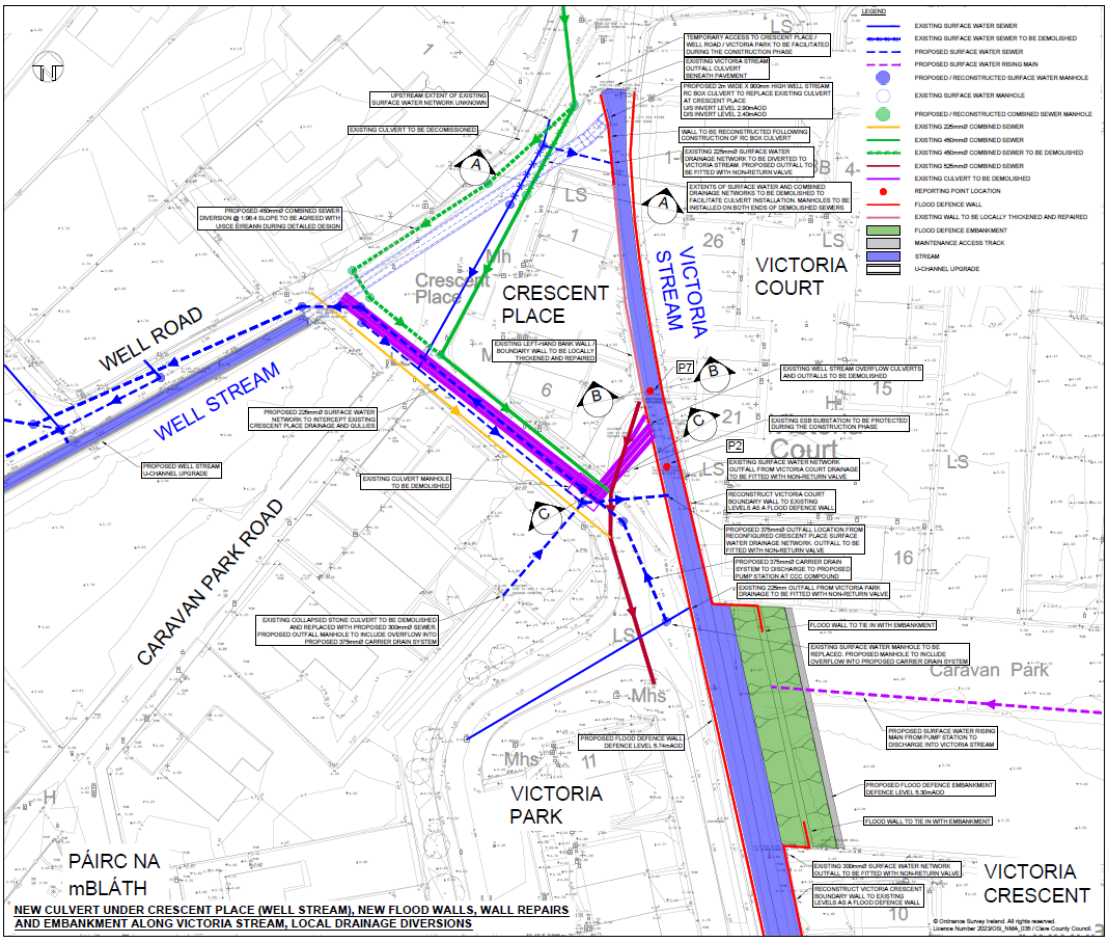

Figure 3-6: Close up of works on the culverting in the vicinity of Crescent Place. Full imagery in Buildability Report.

Enabling/construction works for the Crescent Place culvert:

The construction methodology proposes the following:

- Temporary access road.
- Vibration monitoring from machinery.
- Excavations to expose known services and remove existing culvert.
- Demolition of the wall (left hand bank of the stream). This will require instream work.
- Outlet section installation of the culvert, and reconstruction of the wall. This will involve scaffolding within the Victoria Stream.
- Installation of the *new* culvert sections by 10t excavators.
- Diversion of Well Stream during the decommissioning of the original outlet. The connectivity between the Victoria Stream and the Well Stream will be retained until all sections of the culvert have been installed and the new culvert can be made live.
- Hoarding and fencing, temporary lighting and scaffolding within the stream will be required.

3.3.2.3 Victoria Court Wall Rebuild and Repair

The flood relief works at Victoria Court Wall consists of:

- Reconstruction of the boundary wall from 20 Victoria Court to the boundary of 21 Victoria Court, a section approx. 36m long.

Enabling/construction works:

The construction methodology proposes the following:

- Clear vegetation around the wall.
- Strip back the existing wall down to the top of the old rubble stone wall.
- Install new foundations and rebuild masonry wall, with agreed render.
- Scaffolding in the river for rebuild.
- Identify and agree repair locations and repoint stonework (both above and below the waterline, within the Victoria stream).

3.3.2.4 Victoria Court Embankment

- Construction of a c.37m long embankment, c.800mm high.
- This is to be located between Victoria Court and Victoria Crescent boundaries.
- The embankment ties into both boundary walls to the north and south. This will require additional masonry links to be constructed.
- The pluvial system to the east of this embankment will discharge beneath this embankment, thus pipework for the pumping system will need to be installed as part of this measure.

Enabling/construction works for the Victoria Wall rebuild:

- A segregation zone within this site must first be established identifying the extent of the Japanese knotweed present. An agreed methodology around working in proximity to this is to be agreed with the environmental engineer.
- Install temporary access roads to embankment.
- Install new rising main to Victoria Stream from attenuation tank (storm water, final design will allow stormwater under the embankment).
- The embankment will then be constructed using a suitable clay material as its core, with general fill used to complete its necessary profile. The final embankment will be dressed with excavated topsoil.

3.3.2.5 Victoria Stream Walls

These walls are constructed on the left- and right-hand banks of the Victoria Stream, adjacent to Victoria Park and Victoria Crescent.

- Local repointing and thickening of existing left bank wall behind Crescent Place properties.
- Replacement of c. 3m section of wall to facilitate Well Stream RC box culvert installation at Crescent Place.
- Construction of new flood defence wall c. 230m long along filled-in left hand bank from Victoria Park to Crescent Place c. 1.2-1.8m high above ground level.

- Reconstruction of Victoria Crescent boundary wall c. 130m long.
- Construction of a new flood defence wall on the left-hand bank with stainless steel guard rail. This extends from Victoria Court to the IW pump station.
- Both walls to sit on a reinforced strip foundation 1.2m wide by 300mm deep, min. 300mm below ground level.

Enabling/construction works for the Victoria Wall rebuild:

- Excavate along the proposed flood wall alignment up to the required foundation depth.
- RC foundation is to be poured in-situ. In-situ concrete works adjacent to the Stream need to be carefully considered in the context of the water quality. Working in the dry will be achievable with the diversion of the Victoria to the new channel already in place.
- Construct the reinforced concrete flood walls by means of in-situ concrete casting. The use of precast sections as a construction alternative will be evaluated and considered in the detailed design stage and may be dependent on the Contractor's preferred approach. No in-stream construction anticipated.
- Irish water overflow connection between Victoria Stream and the Irish water pump station will need to be incorporated into the flood wall.

3.3.2.6 Snipe Field / Carrigaholt Road (R487) field

The Carrigaholt Road (R487) field will involve the realignment of the existing Victoria Stream and the introduction of boundary flood retention structures.

- Diversion of c. 170m of open channel to centre of floodplain.
- Existing open channel to be filled in.
- Construction of new flood defence wall along the boundary of Victoria Court.
- Construction of c. 280m long embankment along north and eastern boundary of Carrigaholt Road (R487) c. 1.2-1.4m high above ground level.

Enabling/construction works for the Works in Snipe Field/Carrigaholt Road (R487) field:

- Temporary haul road installation is to double as the foundation of the proposed embankment.
- Embankment core is to be constructed with imported impermeable clay material. The remaining body of the embankment is to be completed using general fill.
- Permanent access ramp to the snipe field will be placed over the embankment beside Garvey's Fuels on the Carrigaholt Road (R487).
- Temporary Bridge over existing Victoria Stream.
- Protective fencing around deep excavations.

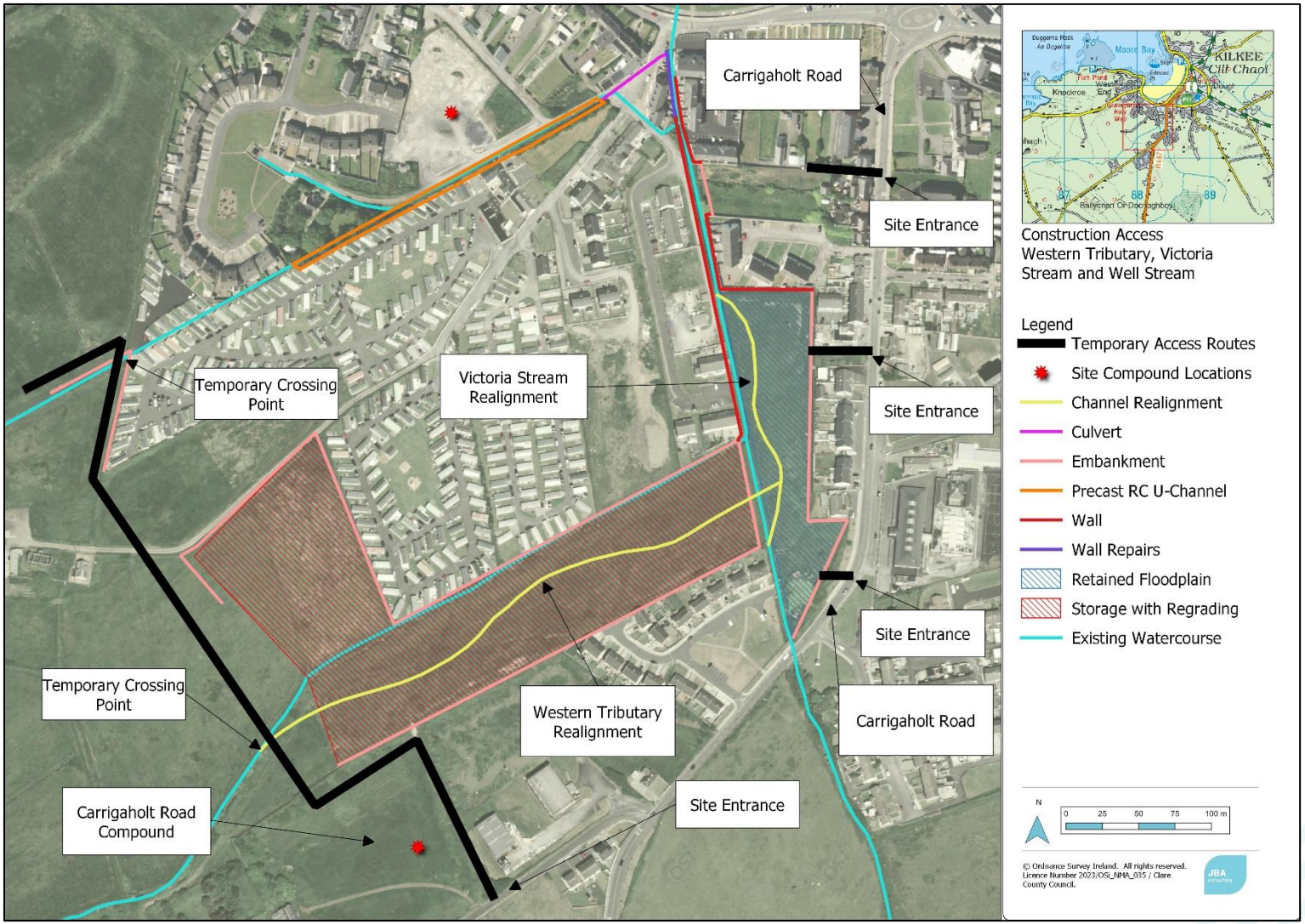

Figure 3-7: Overview of the works in the Carrigaholt Road (R487) Field / Western Tributary Field. Full details are provided in the Buildability Report.

3.3.2.7 Western Tributary (Victoria) Field Storage

- Construction of embankment c. 980m long and c. 1.3-1.8m high around Western Tributary floodplain.
- Diversion of open channel to centre of floodplain and filling in of existing channel.
- Regrading of floodplain in field north of Cluain na Mara estate by c. 700mm max.
- Regrading of floodplain in field west of Cunningham's Holiday Park (north of existing alignment of filled-in Western Tributary) by raising to 6.70mOD for the northern two-thirds section and lowering to 6.40mOD for the southern third section.
- Installation of 900mmØ culvert under Western Tributary embankment to link to diverted Victoria Stream alignment. Inclusion of headwalls on inlet and outlet of culvert.

Enabling/Construction works for Western Tributary (Victoria) Field storage:

- Temporary crossing over Western Tributary and another over the Well Stream located adjacent to the proposed embankment.
- Construct access roads from temporary crossing to culvert construction point parallel to proposed embankments.
- Excavate and construct for new culvert and headwalls.
- Import and place boulders along diversion channel at required positions. Construct leaky dams and scrapes. Divert Western Tributary.
- Excavate original Western Tributary open channel to suitable depth and backfill with imported impermeable engineered material.
- Regrade storage area to design levels and contours.
- Retain wildflower meadow throughout the area and marginal planting on the banks of the newly formed diversion channel.
- Avoid orchid rich areas by keeping work vehicles within the site confines and access roads.
- Welfare Facilities, Access / haul roads and Temporary crossing over Western Tributary and Well Stream are required.

3.4 General Construction Descriptions

3.4.1 Construction Compounds

It is expected that six compound areas will be established during the construction phase (Figure 3-8), for use in the different geographical areas of the scheme. These areas will include site offices and facilities for staff, as well as storage areas for building materials and fuel for the construction vehicles and refuelling stations.

Figure 3-8: Approximate location of the different site compounds within Kilkee.

3.4.2 Construction Traffic Route

Construction vehicles will follow the established road network to and from the sites via the main access road to Kilkee, including the N67, R487, and streets within the town. This includes the Circular Road and Well Road. Further construction traffic details and the associated impacts are described in Chapter 8 Material Assets of the EIAR.

3.4.3 Excavation and Infilling

Excavation and import of soil will be required for construction of the embankments. Excavated materials will total approximately 8700 m^3. Approximately 15 300 m^3 of materials will be delivered for the construction of approximately 1730 linear metres of embankment at different locations throughout the scheme. Access road will require the excavation of approximately 3800 m^3, and the delivery of 4200 m^3 of materials.

3.4.4 Embankment Construction Materials

The materials proposed for the construction of embankments is likely to have a high clay content (small particle size <0.002cm). In the event of slippage into waterways, these particles may have a detrimental effect on the intertidal and rockpool communities in Moore Bay. Mitigation measures on storage of the materials is therefore presented in Section 8 of this NIS.

3.4.5 Surface Water Runoff and Groundwater Pumping

Groundwater pumping will be required where the water table is encountered during excavations. Mitigation has been recommended in Section 8 of this NIS to ensure that groundwater discharged via pumping is not contaminated with suspended solids.

3.4.6 Programme of Works

It is expected that the construction phase will take place over 18 months.

Some indications of timings for selected areas are provided here:

- Well stream upgrade 6-8 weeks including the upstream embankment.
- Atlantic stream over pumping 6-8 weeks.
- Victoria and Western Tributary alignment 8-12 weeks.

3.5 Design Constraints

The presence of the Blue Flag beach during the bathing season is an overall constraint to the design of the FRS, as it results in the closing of the stoplog gate on the Victoria Stream during the bathing season. This has some implications on the connectivity of the surface water pathway to Kilkee Reefs SAC and is resulting in discharge to Intrinsic Bay rather than Moore Bay. Both are part of Kilkee Reefs SAC. Avoidance of work in the proximity to the SAC is preferable, but modelling indicated that work to the manhole cover at the top of the promenade was unavoidable and will allow overspill to the beach during overflow events.

3.6 Design and Operation

Maintenance of the Victoria and Atlantic Streams consists of vegetation clearance and management. There are no official plans or protocols in place for sediment management or dredging.

There is no official maintenance and clearance plan for the trash screen on the Atlantic Stream. It is maintained in an *ad-hoc* manner.

Operation and maintenance regime for the Atlantic Stream will not be finalised until detailed design is complete.

3.7 Decommissioning

No decommissioning is anticipated for this project.

3.8 Embedded mitigation

Storage and natural flood relief measures have been incorporated within the design of the project, particularly along the Victoria Stream. Recovering the sinuosity upstream and slowing down the water will lower flood risk and intensity in the affected areas. This will also allow for improved water quality through natural breakdown of organic materials (including faecal matter) and falling out of suspended solids within the ponds and wetland features. This will overall improve the water quality of the Victoria Stream, within the context of the project.

4 Description of Natura 2000 Sites

The AASR identified the potential for significant effects on one Natura 2000 Site – Kilkee Reefs SAC. The assessment of the risk of adverse impacts and the design of mitigation will be the focus of this report.

4.1 Summary of the Appropriate Assessment Screening Report

Impacts on SPAs initially considered within the ZOI of the project were ruled out due to distance and the scale and nature of the works, as well as the distribution of birds within Moore Bay, based on wintering bird surveys.

In the absence of mitigation, it was considered that there was no potential for significant effects via mobilisation of dust on QI habitats of Kilkee Reefs SAC during the construction phase, due to the scale and nature of the works, and the lack of sensitive receptors.

Groundwater pathways were not considered viable due to the lack of groundwater dependant habitat QIs in proximity to the project.

However, given the instream works in both the Victoria and Atlantic Stream, it was considered necessary to assess the potential for adverse impacts on the SAC at a Stage 2 Appropriate Assessment, and the screening assessment highlighted the following pathway for impact:

- Hydrological pathway

4.2 Kilkee Reefs SAC 002264

Kilkee Reefs SAC was designated under the Habitats Directive as an SAC in 2018 (EEA 2021). The site synopsis (NPWS 2014a) and conservation objectives document (NPWS 2014b) give a detailed description of the SAC, the habitats and the main communities inhabiting them.

Kilkee Reef SAC covers approximately 29km^2 (2877 hectares) along approximately 12 km of the coast of Co. Clare between Ballard Bay and Castle Point, to the North of the Shannon estuary. The site is of conservation importance and is designated for its Annex 1 habitats, Large shallow inlets and bays (1350 ha), Reefs (2391 ha), and Submerged or partially submerged sea caves (29 ha) which host a rich and diverse community of marine and coastal ecosystems along the depth and substrate gradient. The coastal waters are generally shallow (<50 m), with approximately 200m of beach exposed at low tide in Kilkee.

The sandy beach is generally flat, composed of brown poorly sorted material, with a small amount of drift weed on the strandline. The beach hosts a community of sandhopper, with polychaete worms (*Scolelepis foliosa* and *Arenicola marina*) in the mid shore, and an abundant population of polychaete worms (*Nephthys hombergii, Scololepis foliosa* and *Arenicola marina*), and amphipod crustaceans (e.g. *Bathyporeia pelagica*) in the low shore. The Victoria Stream discharges on the west side of the beach and the Atlantic Stream on the east side of the beach.

The rocky shores form extensive platforms with short vertical steps and host a range of communities found on exposed shores, with extensive zones of lichens, Channel Wrack (*Pelvetia canaliculata*) and barnacles.

The upper shore has an extensive community of barnacles and limpets. Cracks and crevices provide a refuge for anemones (e.g. *Actinia equina*), mussels (*Mytilis edulis*) and snails (e.g. *Littorina saxatilis, Nucella lapillus*). The mid shore has an extensive community of *Fucus vesiculosus*, with the barnacles *Chthamalus montagui*, *C. stellatus* and *Semibalanus balanoides*, the limpet *Patella vulgata*. Deep rock pools are characterised by pink encrusting coralline algae and *Corallina officinalis* under a canopy of brown algae (*Laminaria saccharina*, *Himanthalia elongata*, *Bifurcaria bifurcata*, *L. digitata* and *Fucus serratus*).

The lower mid shore is characterised by extensive, dense beds of mussels, mixed with barnacles on higher, less exposed rock and with *Corallina officinalis* in damp, protected areas. This zone may also be very wide (300 m). Shallow pools with pink coralline crusts and the Purple Sea Urchin (*Paracentrotus lividus*) living in pits, are abundant. The subtidal fringe is characterised by a narrow band of Brown algae (*Himanthalia elongata* and *Alaria esculenta*) on exposed vertical faces and *Laminaria hyperborea* and *L. digitata* on horizontal surfaces. The surge gullys host a diverse biota with 86 species recorded, with the walls characterised by a dense faunal turf dominated by hydroid *Tubularia indivisa* and the jewel anemone *Corynactis viridi*. The boulders at the base of the gully support a kelp community with foliose and filamentous red algae, snails and crabs.

The shallow sublittoral reefs are steeply sloping, exposed to wave action, supporting species rich communities. Cliff faces are populated by the jewel anemone *Corynactis viridis*, with Red algae on the ledges, and sponge *Haliclona viscosa* and bryozoans (*Scrupocellaria scruposa* and *Crisia eburnea*) on the overhanging faces. *Laminaria hyperborea* and sand scour tolerant red algae such as *Polyides rotundus* and *Ahnfeltia plicata* characterise the horizontal surfaces in moderately exposed areas of Moore Bay. The kelp species *Laminaria saccharina* and *Saccorhiza polyschides* are also present. As the depth increases the *L. hyperborea* forest thins and the brown alga *Dictyota dichotoma* becomes more common, with kelp not recorded below 24 m. Horizontal surfaces are dominated by red algae (*Delesseria sanguinea, Rhodymenia pseudopalmata, Heterosiphonia plumosa* and *Rhodophilis divaricata*). With a further increase in depth there are fewer algae and sponges (*Polymastia boletiformis* and *Cliona celata*); bryozans become more common on the ledges and the sea fan *Eunicella verrucosa* and sea slug *Crimora papillata* are present. Vertical surfaces are colonized by the sponges *Pachymatisma johnstonia* and *Thymosia guernei*, while the sea cucumber *Aslia lefevrei* occupies the crevices.

4.2.1 Qualifying Interests

The site is a SAC selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Large shallow inlets and bays [1160].
- Reefs [1170].
- Submerged or partially submerged sea caves [8330].

Large shallow inlets and bays and Reefs are connected via a source pathway receptor model to the proposed works (NPWS 2014b) and therefore could be potentially significantly impacted through surface water pathways.

These habitats are mapped in Figure 5-1. The conservation objectives for the sites are detailed in Table 4-1 and Table 4-2 the different habitats (NPWS 2014b).

Table 4-1: Conservation Objectives for large shallow inlets and bays.

Large shallow inlets and bays [1160]		
To maintain the favourable conservation condition of Large shallow inlets and bays in Kilkee Reefs SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.
Habitat distribution	Occurrence	Conserve the following community types in a natural condition: Sediment community complex;

Large shallow inlets and bays [1160]		
		Exposed intertidal reef community complex; Exposed subtidal reef community complex.

Table 4-2: Conservation Objectives for Reefs.

Reefs [1170]		
To maintain the favourable conservation condition of Reefs in Kilkee Reefs SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes.
Habitat distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes.
Community structure	Biological composition	Conserve the following community types in a natural condition: Exposed intertidal reef community complex; Exposed subtidal reef community complex.

4.2.2 Site Vulnerabilities

The site is vulnerable to anthropogenic activities, but no active management plans are in place (EEA 2021). Identified negative threats and pressures on the Kilkee Reefs SAC are listed in Table 4-3.

Table 4-3 Threats and pressures to Kilkee Reefs SAC (NPWS 2019).

Code	Threat or pressure	Ranking and Location
J02.12.01	Sea defence or coast protection works, tidal barrages	H, i
F02.03	Leisure fishing	L, i
G05	Other human intrusions and disturbances	H, i
G05.01	*Trampling, overuse*	
G05.02	*Shallow surface abrasion/mechanical damage to seabed surface (e.g., by contact with scuba divers/snorkelers, incurred by three-dimensional organisms present on reefs)*	
G05.03	*Penetration/disturbance below surface of the seabed (e.g., by anchoring/mooring on reefs, in Posidonia meadows)*	
G05.04	*Vandalism*	
G05.05	*Intensive maintenance of public parks/cleaning of beaches*	
G05.06	*Tree surgery, felling for public safety, removal of roadside trees*	
G05.07	*Missing or wrongly directed conservation measures*	
G05.08	*Closures of caves or galleries*	
G05.09	*Fences, fencing*	

Code	Threat or pressure	Ranking and Location
G05.10	*Overflying with aircrafts (agricultural)*	
G05.11	*Death or injury by collision (e.g., marine mammals)*	
G01.01	Nautical sports	M, i
Location: i = inside, o = outside, b = both Rank: H = high, M = medium, L = low		

Activities, Management	Rank
No threats or pressures	Low

5 Existing Environmental Baseline

The baseline information recorded 14 different habitat types, of which 2 are designated habitats of the Kilkee SAC.

5.1 Habitats Overview

Protected habitats recorded within the study area are listed in Table 5-1, and mapped in relation to the proposed FRS works in Figure 5-1. Full details on each habitat is provided in the AASR, and only Annex Habitats are considered here.

Table 5-1: Habitat types recorded in the study area. Habitats in bold are considered to have correspondence to EU Annex Habitat types.

Habitat Type	Fossitt Code	Considered in	Correspondence to EU Annex Habitat
Buildings and artificial surfaces	BL3	AASR	
Reed and large sedge swamps	FS1	AASR/EIAR	
Depositing/lowland rivers	FW2	AASR/EIAR	
Improved agricultural grassland	GA1	AASR	
Amenity grassland	GA2	AASR	
Marsh	GM1	AASR	
Dry meadows and grassy verges, wet grassland mosaic	GS2, GS4	AASR/EIAR	
Wet grassland	GS4	AASR/EIAR	
Exposed rocky shores	**LR1**	**This report**	**Littoral rock categories may contain examples of the annexed habitat Reefs [1170]**
Sand shores	**LS2**	**This report**	*** Large Shallow Inlets and Bays [1160]**
Sea Inlets and Bays	**MW2**	**This report**	**Large Shallow Inlets and Bays [1160]**
Hedgerows	WL1	AASR	
Scrub	WS1	AASR	
Ornamental/non-native shrub	WS3	AASR	
*Fossitt indicated that LS2 Sand shores may correspond to EU Annex Habitats *Mudflats and sandflats not covered by sea water at low tide [1140]* and *Annual vegetation of drift lines [1210].* However, in Kilkee the seaward parts of the beach have been classified as part of the Sediment Community Complex of Large Shallow Inlets and Bays 1160 (NPWS 2014c).			

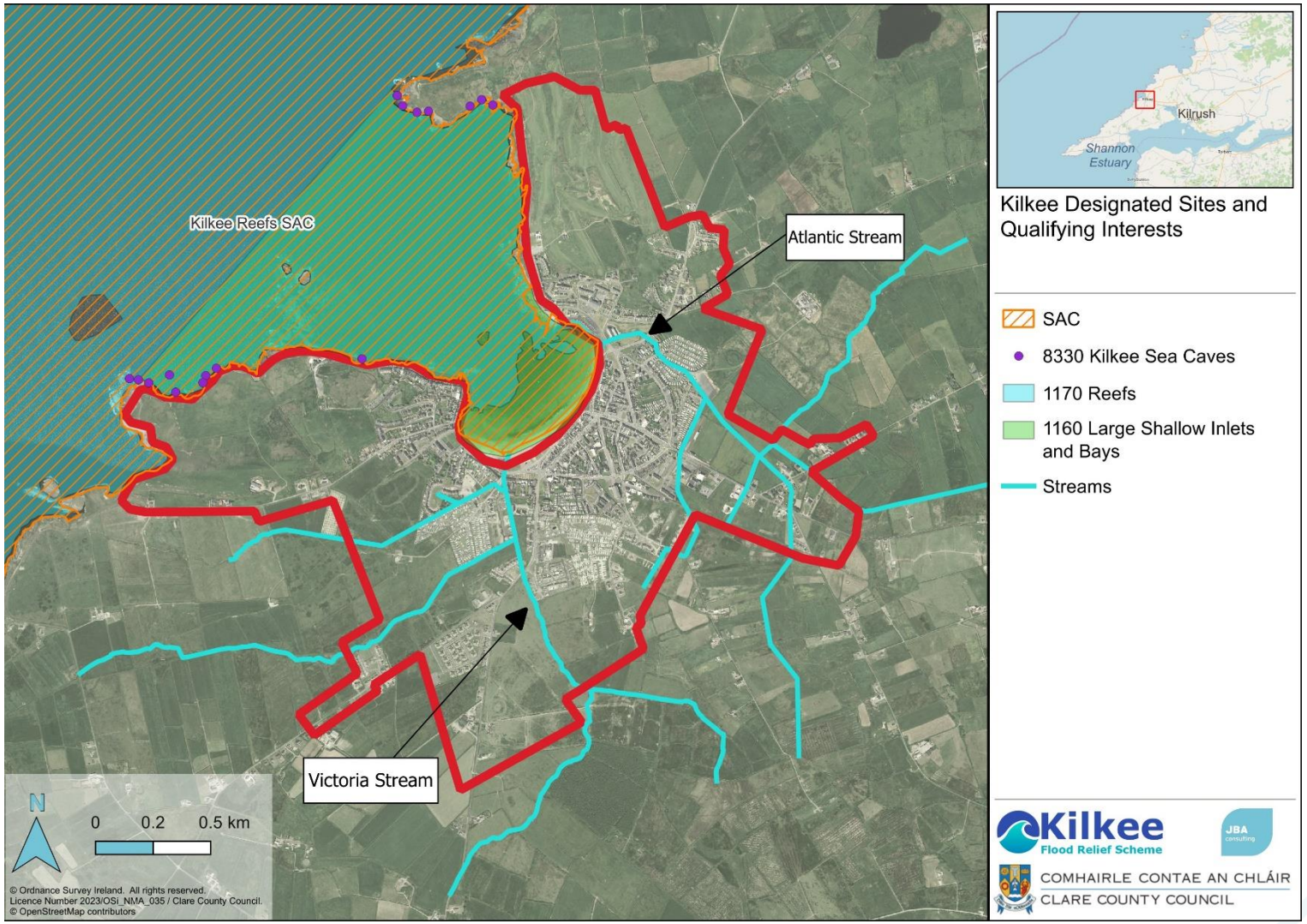

Figure 5-1: Designated habitats with a potential connection to the FRS works.

Figure 5-2: Atlantic Stream culvert main outfall.

Figure: 5-3 Victoria Stream culvert main outfall with stop log and gate in place.

Figure 5-4: Victoria Stream culvert main outfall with stop log in place looking upstream through box culvert.

Figure 5-5: Dry bed of Victoria Stream, leading out to Moore Bay.

The tidal gates of the Victoria Stream are closed during the bathing season, and close from approximately the last week in May to the start of September. The water is kept from overflowing the tidal gates through pumping out to Intrinsic

Bay, along with the wastewater from the Kilkee area. Flow is very slow at this time and water is pooling as can be seen in the above images.

When the gates are open the stream flows into Moore Bay (Figure 5-5).

5.1.1 Exposed Rocky Shores (LR1) / Reefs [1170]

The main outfall for the Atlantic stream culvert flows over the easternmost portion of the exposed rocky shores in Moore Bay. A strong flow from the outfall was observed during field surveys. Green algae *Cladophora rupestris* was recorded growing on top of rocks over which the outfall flows. No other seaweed was recorded growing in this area, but species deposited in the drift line south of the pier include Oar Weed *Laminaria digitata*, Furbelows *Saccorhiza polyschides*, Sugar Kelp *Laminaria saccharina*, Serrated Wrack *Fucus serratus*, Horned Wrack *Fucus ceranoides*, Bladder Wrack *Fucus vesiculosus*, Wrack Siphon Weed *Vertebrata lanosa*, Thongweed *Himanthalia elongata*, Guiry's Bladder Wrack *Fucus macroguiryi, Ulva* spp. and Brown Tuning Fork Weed *Bifurcaria bifurcata*. More loose rock was observed in this area (Figure 5-6).

Bladder Wrack, Serrated Wrack and green algae, with some *Ulva* spp. and Sand Binder *Rhodothamniella floridula* were recorded growing north of the pier and behind the sea wall. (Figure 5-7).

Deposited seaweeds include Sugar Kelp, Landlady's Wig *Desmarestia aculeata*, Guiry's Bladder Wrack, Thongweed and Irish Moss *Chondrus crispus*. Bedrock was intact in this area, with numerous small rock pools. Limpets *Patella* spp., barnacles and Common Periwinkle *Littorina littorea* were recorded on the rocks, with Sandalled Anemone *Actinothoe sphyrodeta*, sea squirts and Common Mussel *Mytilus edulis* recorded in the rock pools.

The exposed rocky shores recorded in Moore Bay correspond to the Annex I habitat 'Reefs' [1170], a QI of the Kilkee Reefs SAC. The reefs and rocky shores in the SAC are described in the site synopsis and conservation objectives supporting documents for the SAC (see Section 4.2.1).

Figure 5-6: Rocky shore south of pier with eroded bedrock and deposited seaweed, with green algae growth from Atlantic stream outfall.

Figure 5-7: Rocky shore behind sea wall with seaweed growth on rocks, intact bedrock with rock pools.

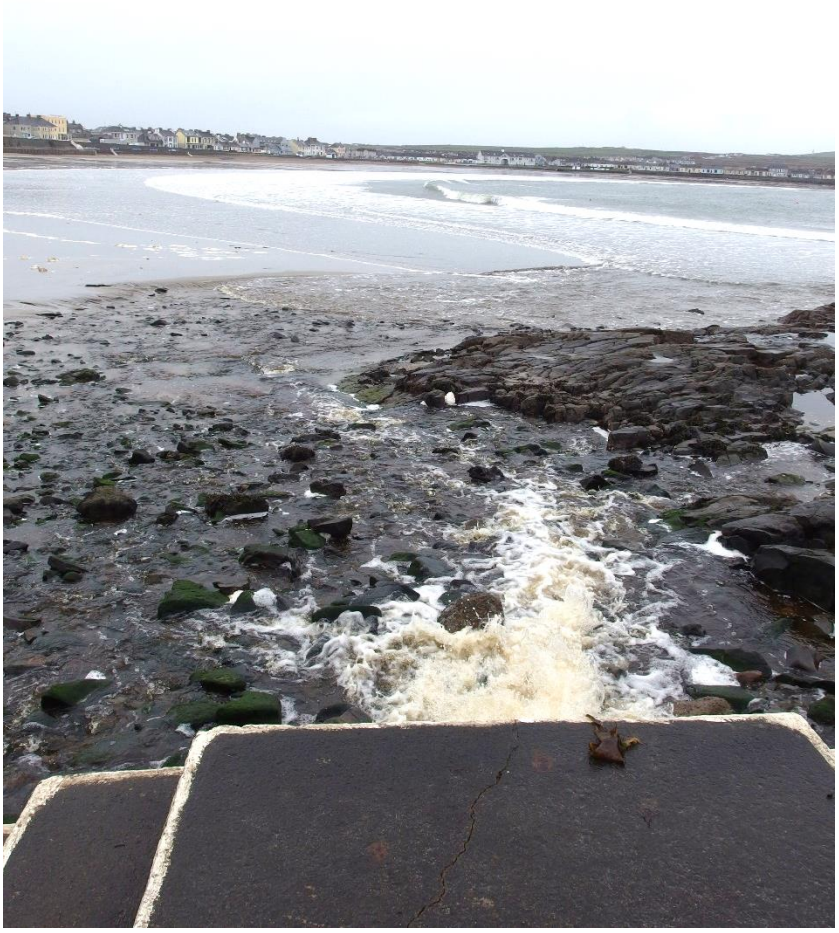

Figure 5-8: The path of the water from the Atlantic outfall is skirting around the more intact reef areas.

5.1.2 Sand Shores (LS2)

No terrestrial vegetation was recorded in the sand shores at Kilkee beach in the vicinity of the Atlantic outfall. Species recorded in the drift line included Oar Weed *Laminaria digitata*, Furbelows *Saccorhiza polyschides*, Sugar Kelp *Laminaria saccharina*, Serrated Wrack *Fucus serratus*, Horned Wrack *Fucus ceranoides*, Bladder Wrack *Fucus vesiculosus*, Wrack Siphon Weed *Vertebrata lanosa*, Thong Weed *Himanthalia elongata*, Guiry's Bladder Wrack *Fucus guiryi, Ulva* spp. and Brown Tuning Fork Weed *Bifurcaria bifurcata*.

Along the beach in Kilkee some vegetation grows at seepage points e.g. *Nasturtium sp*. and in the sand, but the overall vegetation is poor.

The beach at Kilkee is described in the site synopsis and conservation objectives supporting documents for Kilkee Reefs SAC, and site surveys had similar findings and species communities (see Section 4.2).

The seaward areas of LS2 have correspondence with the Sediment Community Complex part of 1160 Habitat (NPWS 2014c).

A dedicated survey of this habitat has not been conducted as part of this report, but a comprehensive survey of Moore Bay was conducted for supporting the mapping on the conservation objectives (NPWS 2014c), and this indicated that most of the beach, and up to 10m deep within the bay, is considered part of the sediment community complex. In the intertidal section this was noted to be fine

grained sands, with a mix of medium and very fine sand also present. On Kilkee beach the amphipod *Gammarus* sp., and a number of polychaetes species are recorded (*Arenicola marina, Nephtys hombergii, Malacoceros fuliginosus, Capitella sp., Scolelepis (Scolelepis) squamata* and S. foliosa and unidentified nemerteans).

5.1.3 Sea Inlets and Bays (MW2) / Large Shallow Inlets and Bays [1160]

The bay in Kilkee corresponds to the Annex I habitat 'Large shallow inlets and bays' [1160], a QI of the Kilkee Reefs SAC.

This habitat is present where the influence of freshwater is generally limited in semi-enclosed coastal waters or indentations of the coast. Large shallow inlets and bays are generally sheltered from wave action and contain a great diversity of sediments and substrates with a well-developed zonation of benthic communities. These communities generally have high biodiversity. (European Commission 2013)

A dedicated survey of this habitat has not been conducted as part of this report, but a comprehensive survey of Moore Bay was conducted for supporting the mapping on the conservation objectives (NPWS 2014c). There is overlap with the reef communities and the sea inlets and bays – See Figure 5-9 and Figure 5-1.

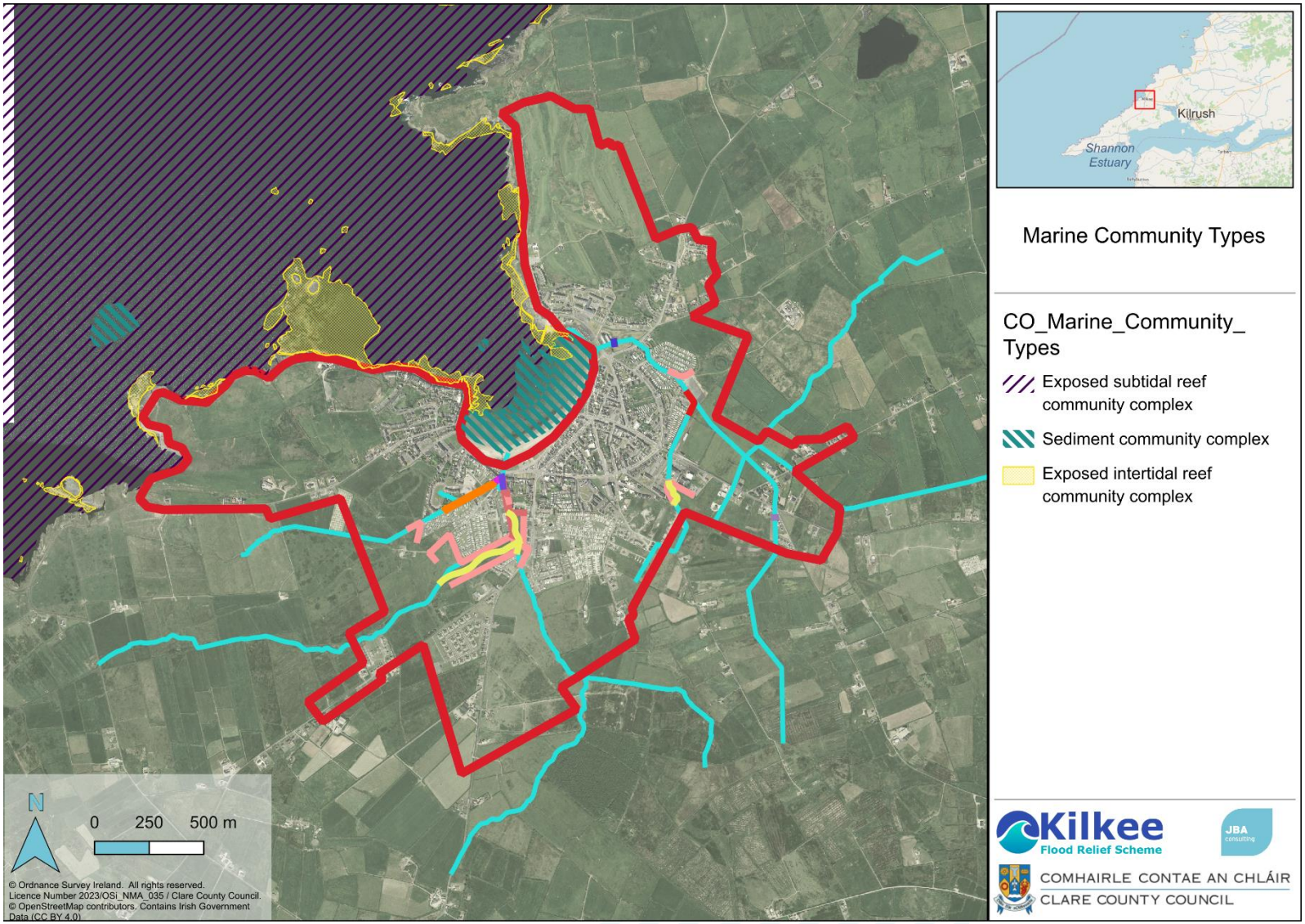

Figure 5-9: Map of the benthic communities in Moore Bay SAC – Data from (NPWS 2014b).

The benthic communities described in the supporting documentation for the Conservation Objective series indicates that the three benthic communities described have different affinities to different Annex I habitats, although overlaps are present.

Table 5-2: Overlaps between the benthic communities recorded in each of the Annex I habitats (from NPWS 2014c).

	Habitats		
	Large shallow inlets and bays (1160)	Reefs (1170)	Submerged or partly submerged sea caves (8830)
Sediment Community Complex	✓		
Exposed intertidal reef community complex	✓	✓	
Exposed subtidal reef community complex	✓	✓	✓

5.2 Invasive Non-native Species

A full list of invasive species recorded in the last ten years within the site with an additional 5km buffer is in Appendix D of the AASR (JBA 2023).

Site surveys recorded Japanese Knotweed *Reynoutria japonica* (Figure 5-10) with a significant stand along the right bank of the Victoria stream (Figure 5-11). This stand is currently being treated by Clare County Council. Three-cornered Garlic *Allium triquetrum* was recorded behind the Cluain na Mara estate.

Other invasive species recorded during site surveys included Cherry Laurel *Prunus laurocerasus*, a high impact invasive species on native woodland and hedgerows.

These invasive species are not expected to present any risk to the marine based SAC or its qualifying interests. However, as a precautionary principle, biosecurity measures are detailed in Section 8 of this document. This will help prevent the spread of invasive species across the site.

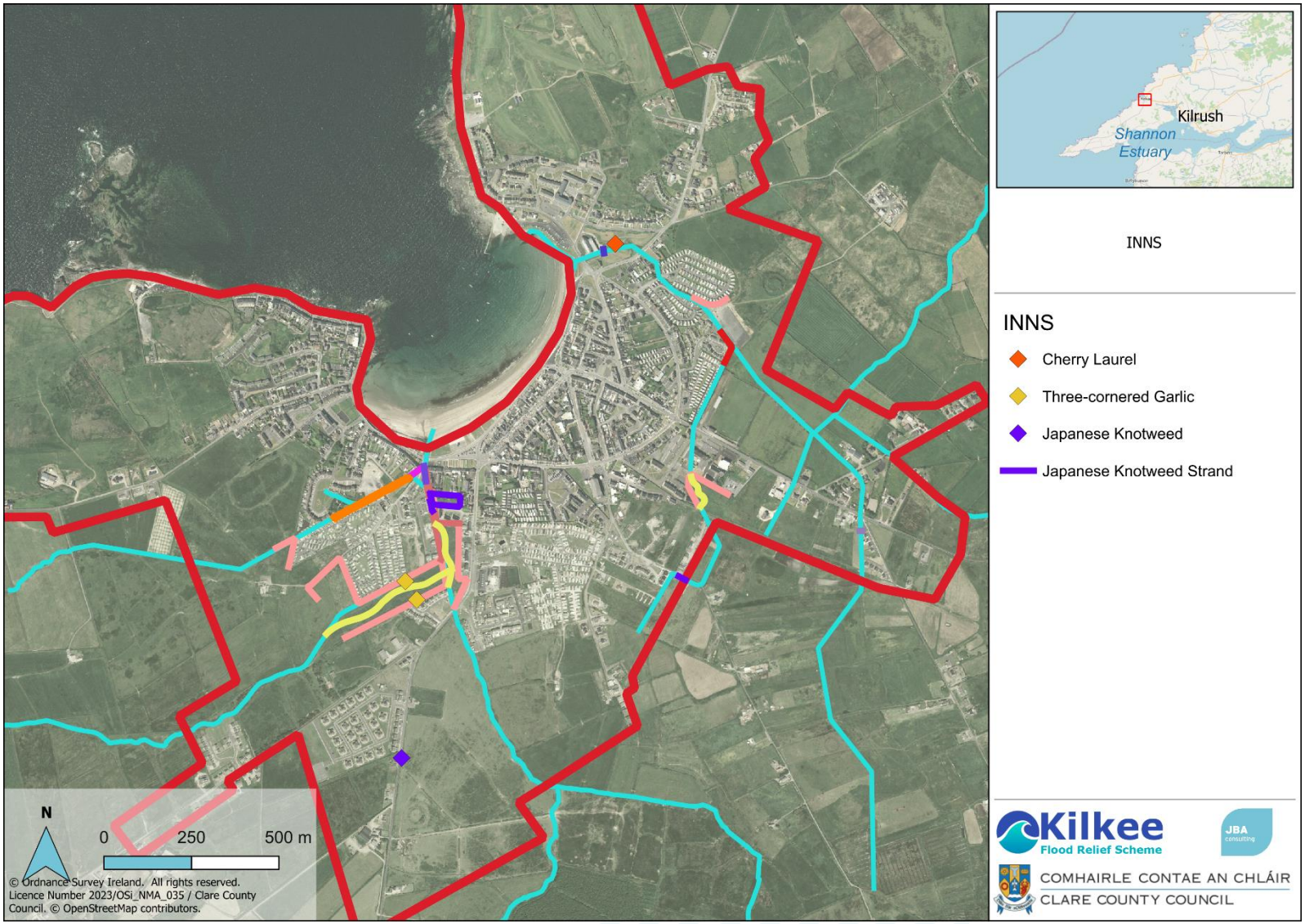

Figure 5-10: Invasive species recorded within the study area.

Figure 5-11: Japanese Knotweed stand recorded along the Victoria Stream banks.

5.3 Surface Waterbodies

The proposed FRS is located within the Kilkee_Lower_010 sub-basin of the Doonah_SC_010 sub-catchment (Figure 5-12). The proposed FRS works will take place along the Victoria (IE_SH_27K650930 (Kilkee Lower)), Well (IE_SH_27K650930) and Atlantic (IE_SH_27K650930) streams, which drain directly into Moore Bay and therefore into the Kilkee Reefs SAC ≤100m downstream of the proposed works. The Kilkee Lower waterbody (IE_SH_27K650930) was last classed as being of 'Moderate' ecological status or potential (based on modelling, not monitoring assessment of the watercourse), and has not been reviewed for its risk of meeting its WFD 2027 targets. It is under significant pressure from agricultural and urban wastewater impacts from an agglomeration of population equivalent of 2,001 to 10,000 (EPA Catchment Science & Management Unit 2021; WFD 2022; EPA 2023a).

5.4 Coastal Waterbodies

The surface waterbodies and the scheme are connected to the Shannon Plume (IE_SH_070_0000) waterbody (Figure 5-13) covering approximately 380km^2, broadly speaking from Loop Head to Black Head. This water body is of High Ecological Status or Potential (EPA 2023b). The waters move in a general South to North direction. Chemistry data from a 2020-2022 testing period, available for the waterbody, indicates that the waters are within the limits set out by S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009.

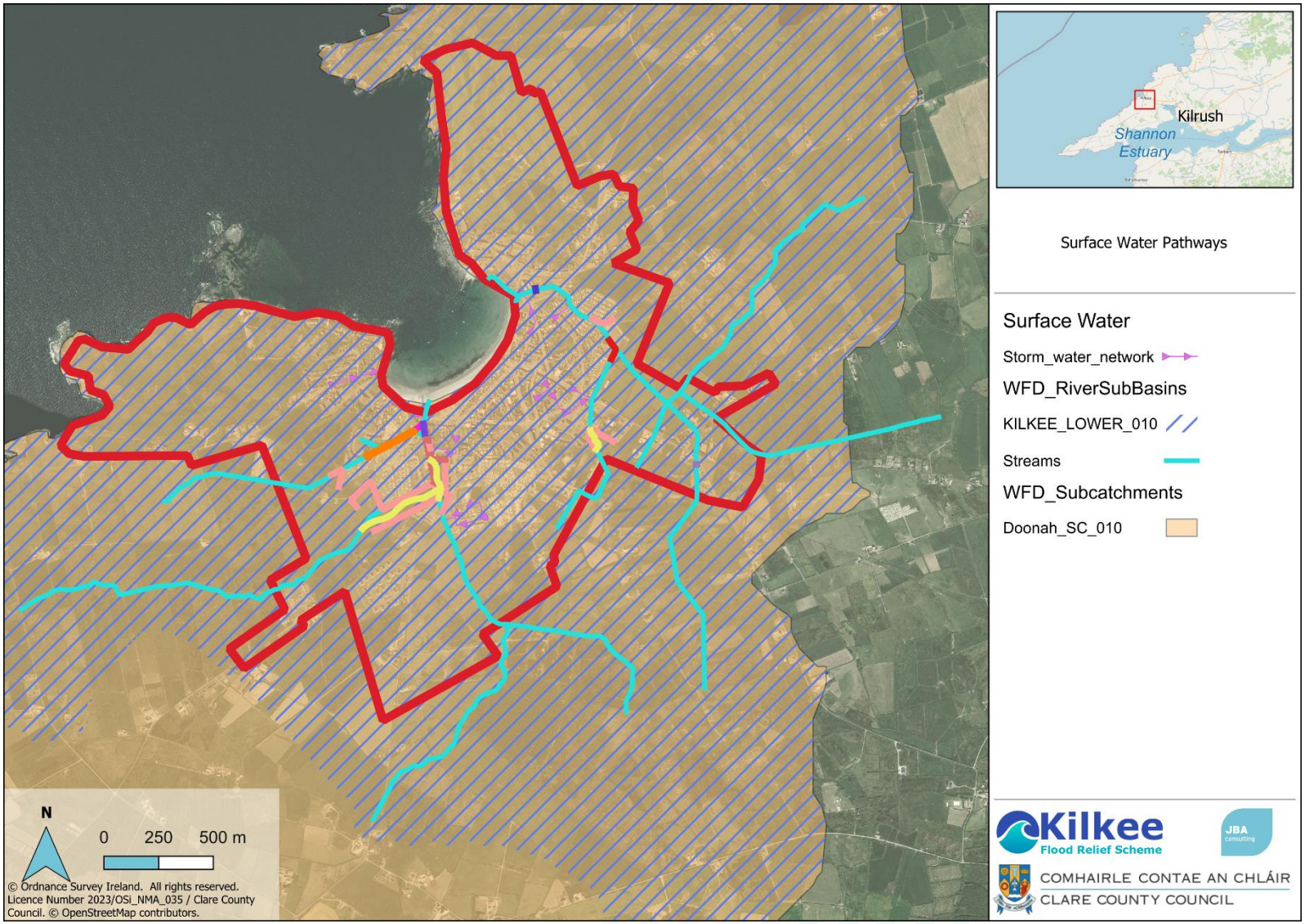

Figure 5-12: Surface waterbodies within the proposed FRS works area.

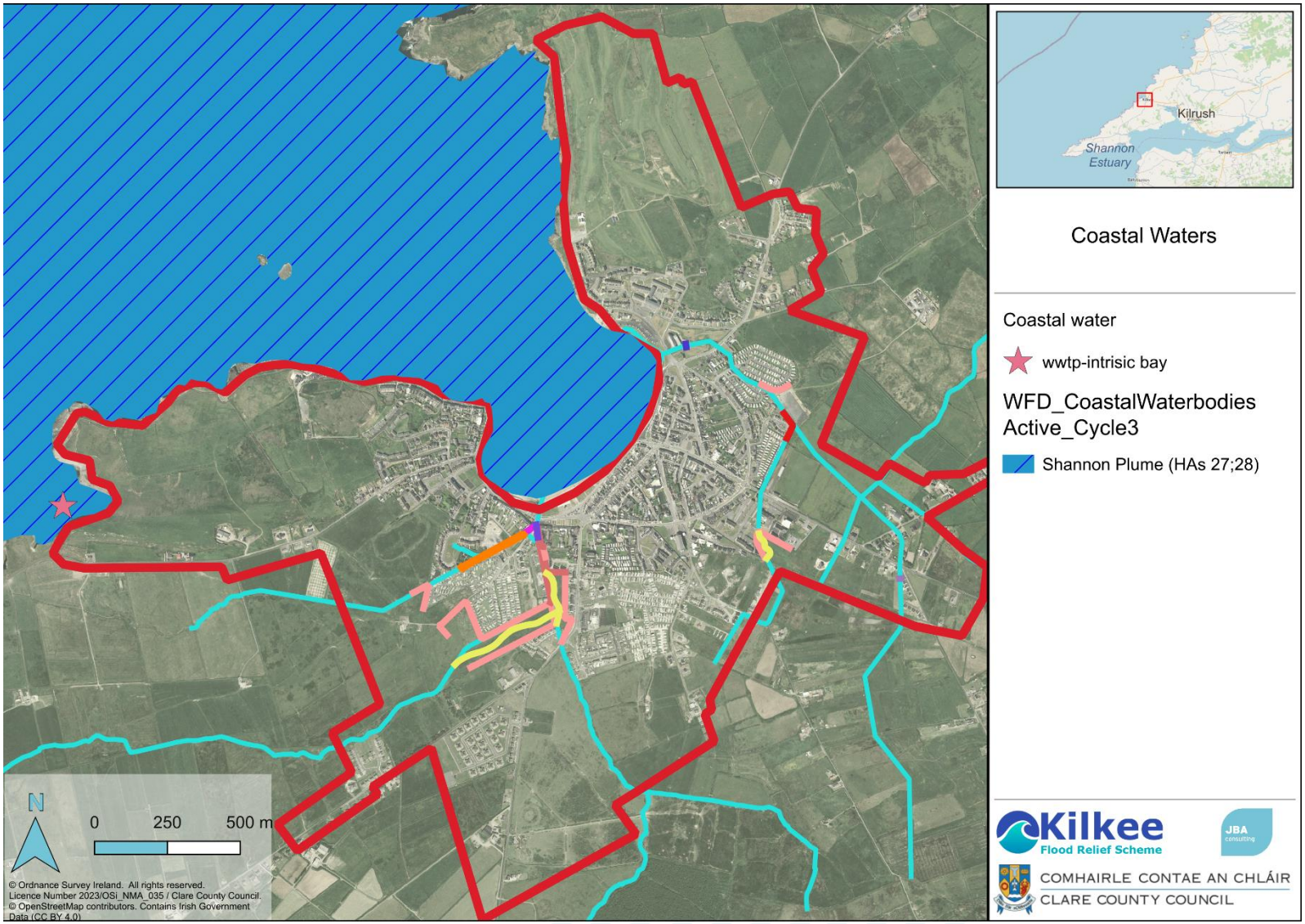

Figure 5-13: Coastal waterbody with location of WWTP outfall in Intrinsic Bay.

6 Other Relevant Plans and Projects

6.1 Kilkee Wastewater Treatment Plant

The existing Kilkee Waste Water Treatment Plant comprises of a combined system that flows by gravity to two storage tanks situated in Victoria Park and is pumped from here to a sea outfall at Intrinsic Bay approximately 2km South (E086367, N159852). The estimated pumped output is 1500 m^3/day (the River Shannon that feeds into the coastal waterbody has an output of approximately 25 million m^3/day). The existing sewerage collection system dates back to the 1970s with some minor modification in 1990s. There is currently no treatment in Kilkee, however there is a manually raked screen at the inlet to the pump sump. Following screening the flow is split into two separate sumps, originally a storm sump and a foul sump. It was designed so that the effluent is pumped from the foul sump to the outfall while the storm sump acts to store the excessive flow.

When the inflow subsides the effluent in the storm sump is allowed to flow back into the foul sump via an outfall weir and an open valve at the bottom and is pumped to the outfall via the foul pumps. When the storm sump cannot hold the excess flow during a storm event the storm pumps kick in and all wastewater is pumped to Intrinsic Bay via both the storm and foul pumps. At present the flow coming into the sumps is split equally between the two and the pumps operate as duty and assist. The storm tank retains flows during rainfall events to prevent flooding in the town (AA Screening Document for Waste Water Discharge Licensing D0078-01, Clare Co Co. 2010).

The AA screening for this document indicated the potential for the following impacts: on the receiving water quality associated with the wastewater treatment plant:

- Organic pollution of the receiving waters with untreated or poorly treated sewage
- Microbial pollution of the receiving waters to the extent that natural marine habitats or populations would suffer direct or indirect effects.
- Pollution of the receiving waters by other pollutants associated with wastewater (organic compounds or heavy metals)

The Appropriate Assessment process for the discharge licence (as completed in 2010) highlighted the following:

Standards are applied in the European Communities Environmental Objectives Surface Water Regulations 2009 for coastal waters for the parameters dissolved oxygen and dissolved inorganic nitrogen (See Table 9 of these Regulations). Samples were taken of the marine waters in the vicinity of the discharge from Kilkee WWTP in July 2008 (See Annex 1 of the application documents). These samples indicate values of Dissolved Inorganic Nitrogen of 0.09 mg/litre (as N). These values support the classification of the waters as "high status", applying the limit values from the European Communities Environmental Objectives Surface Water Regulations 2009 for coastal waters for dissolved inorganic nitrogen (See Table 9 of these Regulations).

There is no industrial component or landfill discharge or other source of organic pollution, or heavy metals in the Kilkee agglomeration.

The assessment concludes that:

The concentration of dissolved inorganic nitrogen (DIN) in samples taken in 2008 indicate levels of DIN which are consistent with "high status" for these waters. On this basis, it is considered that the impact of the discharge, in combination with the other existing discharges in the area is not giving rise to any reduction in the

water quality status and does not compromise the achievement of the conservation objectives of the protected area.

The latest AER (2022) for the Kilkee WWTP for the untreated discharge indicates that levels of nitrogen continue to be acceptable, as do levels of Escherichia coli and intestinal enterococci (Uisce Eireann 2022).

A new WWTP is planned for Kilkee, with construction works planned to go ahead for 2024 and the plant to be operational by 2025. The new WWTP works are not anticipated to overlap with the scheme.

6.2 Platform for Growth

The proposed development is part of a scheme under Fáilte Ireland, Platform for Growth, which aims to support the development of shared water facilities in the Republic of Ireland. Guided by Fáilte Ireland and Clare County Council, the development proposes the construction of a shared facilities structure, along with the development of a treatment plant, to increase the local value and popularity of the area and thus, the attractiveness of the Kilkee area for residents, operators, and visitors alike. The shared facilities structure will contain a number of resources such as indoor and outdoor showers (which are to be heated through solar power), serviced toilets, as well as external and internal seating. The proposed facilities will also include a communications workspace, which will be a multi-functional, multi-media education and learning area for the operators of, and visitors to, the proposed facilities. Additional amenities included in the design plan are lockers for storage and washdown areas (CAAS Ltd 2022a, 2022b).

6.3 Plans

6.3.1 Clare County Development Plan 2023-2029

The Clare County Draft Development plan 2023-2029 sets out five strategic principles including sustainability, by encouraging the integration of economic, environmental, social and cultural considerations into policies and objectives, climate action through the implementation of the National Planning Framework, and resilience to ensure goals are achieved. These strategies are implemented within the legislative and policy context that Ireland has ratified, including the EU birds and habitats directives and the EU biodiversity strategy 2030, but also national and county biodiversity action plans (CCC 2021).

Therefore, provided that any works that may occur as a result of the Plan are assessed for individually, or included in the NIS for the Plan, the Plan should not significantly adversely affect relevant Natura 2000 sites in combination with the proposed project.

6.3.2 River Basin Management Plan for Ireland 2022-2027

The Water Framework Directive (Directive 2000/60/EC 2000) requires that all waters, including surface and groundwater sources, are protected and that measures are put in place to ensure quality of these waters is restored to at least 'good' status or good potential by 2027 at the latest. The directive requires reporting of river basin management plans to assess the water bodies, their pressures, and relevant plans towards achieving good status. In implementing the river basin management plan, the objective is to ensure that natural waters are sustainably managed and that freshwater resources are protected so as to maintain and improve Ireland's water environment (DHLGH 2022). Therefore, any development needs to take into consideration the aims and objectives of the management plan.

6.3.3 Marine Strategy Framework Directive

The Marine Strategy Framework Directive calls for each Member State to prepare and implement a marine strategy for its marine waters, with an overall aim to protect and preserve the marine environment, and prevent and reduce inputs in the marine environment (European Commission 2008). The strategy includes 5 steps:

1) an assessment of the current environmental status of the marine waters and the environmental impact of human activities,
2) a determination of good environmental status for the marine waters,
3) the establishment of a series of environmental targets and associated indicators,
4) the establishment and implementation of a monitoring programme for ongoing assessment and regular updating of targets, and
5) the development of a programme of measures designed to achieve or maintain good environmental status.

The 2020 update identified sewage and wastewater outflows as a potential source of pressure to the marine environment through the input of nutrients and other substances (DHLGH 2020). Therefore, any development needs to ensure that it takes the directive into consideration.

6.4 Other Projects

Planning applications in the vicinity of the Proposed Project which could act in-combination with the maintenance works at the scheme channels were sought on the planning website www.myplan.ie. Only planning applications from the last three years that have been granted permission are considered, with applications for home extensions, internal alterations and retention are not considered.

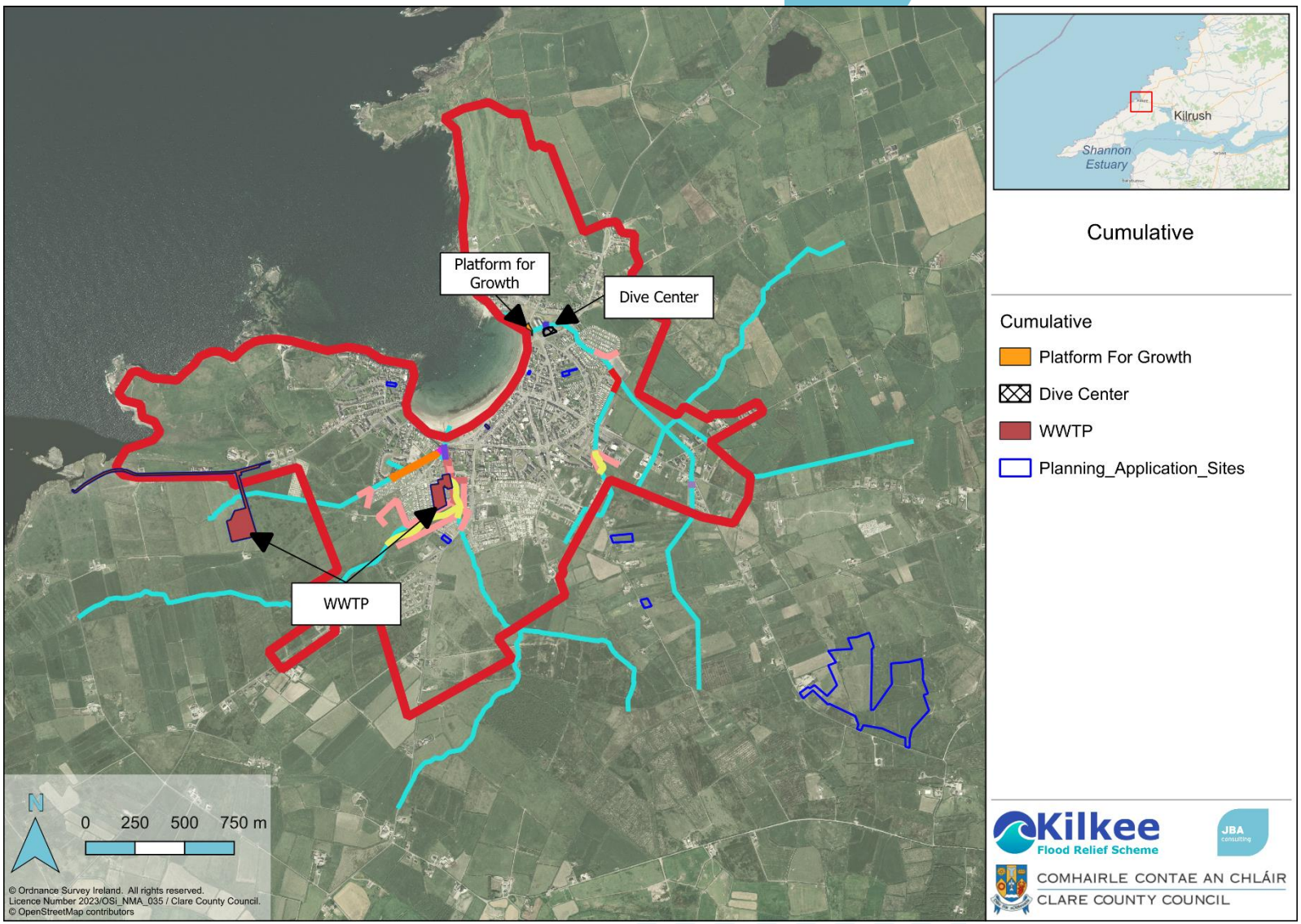

Figure 6-1: Potential for Cumulative Impact.

7 Appropriate Assessment

7.1 Introduction

This section presents a detailed assessment of the potential impact of the proposed FRS on the QIs of the following Natura 2000 site:

- Kilkee Reefs SAC

The screening report identified a surface water pathway that may result in likely significant effects on QIs of the Natura 2000 site.

Section 7.2 assesses the screened-in Natura 2000 site in more detail and examines where potentially adverse impacts may arise from the sources of impact identified (surface water). Where potentially adverse impacts are identified, avoidance and mitigation measures are proposed. These are discussed in Section 8.

7.2 Potential Sources of Impact

The AA screening report produced by (JBA 2023) reported that pathways of impact existed between the proposed site and the relevant Natura 2000 site. This section further examines the source > pathway > receptor chains that could potentially result in significant adverse effects arising within the following Natura 2000 site listed above in sub-section7.1. Habitats and species, and their attributes, likely to be affected are listed in Table 7-1.

7.2.1 Construction Phase - Direct and Indirect Impacts

During the construction phase, three potential avenues of impacts may occur.

Release of suspended solids - this is most likely to occur as a result of sediment being released into the streams during the works. It may come from erosion of exposed areas of embankment, poorly stored excavation material, poorly stored embankment material and bare ground created by vehicle movements. This has the potential to impact fish species and benthic communities that are an integral part of the QI habitats.

Release or changes in nutrient levels – this is most likely to occur as a result of the nutrients currently trapped in sediment being released in the manner described for suspended solids. Any attempt to fertilise the embankment to encourage vegetation establishment would also lead to nutrient release. It can impact on surface water dependent habitats indirectly through eutrophication and reducing water quality. The precise response varies due to a number of factors, in a reasonable worst-case scenario the increase nutrient can significantly alter the conditions of the intertidal zone (Longphuirt et al. 2015).

Release of pollutants – this would be a construction impact due to vehicles and site compound locations creating a local release of polluting material.

Table 7-1: Qualifying Interests and potential impacts arising from the FRS works on Kilkee Reefs SAC.

Qualifying Interest	Attribute	Measure	Potential Impacts
Large shallow inlets and bays [1160]	Habitat area	Hectares	NA
	Habitat distribution	Occurrence	A temporary or permanent reduction in the occurrence of sediment communities and exposed intertidal

Qualifying Interest	Attribute	Measure	Potential Impacts
			and subtidal reef community complexes, as a result of deleterious substances entering the habitat via surface water pathways. Smothering of benthic communities by sediment released from site of works because of the clogging of their filtration apparatus and potential short-term anoxia under the sediment layer.
Reefs [1170]	Habitat area	Hectares	NA
	Habitat distribution	Occurrence	A temporary or permanent reduction in the communities composing the habitat, as a result of deleterious substances entering the habitat via surface water pathways.

7.2.2 Operation Impacts

Surface water impacts may occur during the operation phase through the release of stored water, with a potential for nutrient loading, pollutant introduction, and the resuspension of settled sediments. Coastal ecosystems and communities can utilise nutrients from freshwater ecosystems and have tolerance to sediment. The tide cycle flushes the bay in Kilkee daily minimising the chance for sediment to settle and smother the coastal communities.

Currently some of the waters are pumped to Intrinsic Bay so as not to discharge potentially contaminated waters into the bathing waters during the summer months. The estimated outflow is 1500 m^3/day, which is suitably diluted into the receiving environment. This connection to Intrinsic Bay is in place, and will carry on being used following the installation of the FRS. The FRS is not expected to change the nature of this connection, with no increase in output.

The realignment of the Victoria Stream and the Western Tributary, and the creation of scrapes and water holding features will not have a significant effect on the Kikee Reefs during operation. Once established, these sites are likely to act in a similar way to wetlands and are therefore likely to improve water quality within the Victoria Stream, with a reduction in nutrient outputs when the stream does discharge to Moore Bay (outside the bathing season).

There will be no significant change to the water quality of the Atlantic Stream as a result of this project. A valve outlet will be fitted to the outlet point onto the reefs in front of the Lifeboat station. This will not change the discharge onto the reefs but will stop seawater coming up into the pipes. No significant effect on Kilkee Reefs SAC is anticipated during the operation phase.

The maintenance of the channels will be considered at final design stage. The current maintenance is low impact e.g. vegetation management. It is anticipated that the maintenance on the Victoria stream will lessen, due to the more natural

channel conditions and pond. The Atlantic channel will likely continue to receive low impact vegetation management.

No significant change in the operational maintenance is anticipated, and thus no adverse effects are anticipated from operational maintenance.

7.2.3 Do Nothing Impact

If the proposed project does not go ahead, there will be no impact from construction or operations on the Natura 2000 site.

7.2.4 In-combination Impact

Three projects were identified with the potential for cumulative impact.

The new water sports facility in Kilkee is in close proximity to the works on the Atlantic Stream. The facility will link into the existing water drainage network. There may be an overlap in disturbance between the construction phases of both projects. However, the new water sports facility has screened out impact on birds, as has this project, given the distance to the SPAs and lack of bird activity in the works area. As such, no cumulative impact is anticipated from the two projects.

The WWTP and new pumping station is likely to have positive impact on the local water quality within Kilkee, and a reduction in nutrient output to Kilkee Reefs SAC. Operationally, there is little potential for cumulative impact.

An overlap in the construction works between the new pumping station and the works on the Victoria Stream may result in additional pressure on the Victoria Stream, including where it is pumped out to Intrinsic Bay.

The Platform for Growth development has the potential to produce dust and emissions from earthworks which may impact the surface water; Noise and vibration may also have an impact on marine birds and waders using the beach and reef area. A condition for this development is that the WWTP is up and running to allow for connection of the foul water from the site.

With this in consideration and the fact that that the proposed development will potentially impact the QIs or conservation objectives of Kilkee Reefs SAC, it can be stated that in the absence of mitigation for this proposed development, there is some potential for cumulative impacts to occur with other local projects.

8 Mitigation

The mitigation for the Well and Victoria Stream incorporates measures for both the pluvial and fluvial works.

8.1 Construction Phase Mitigations

8.1.1 Standard Environmental Best Practice

The activities required for the proposed development's construction phase shall remain within the boundary of the proposed site, bar select compound areas, which will be located in adjacent lands for mitigation control reasons. The CEMP will also strictly adhere to best practice environmental guidance including but not limited to the following:

- CIRIA (C512): Environmental Handbook for Building and Civil Engineering Projects.
- CIRIA (C532): Control of water pollution from construction sites. Guidance for consultants and contractors.
- CIRIA (C648): Control of water pollution from linear construction projects: Technical guidance.
- CIRIA (C649): Control of water pollution from linear construction projects: Site guide.
- CIRIA (C741): Environmental good practice on site guide.
- CIRIA (C750D): Groundwater control: design and practice.
- CIRIA (C753): The SUDS Manual.
- Inland Fisheries Ireland: Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI, 2016);
- Inland Fisheries Ireland: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI, 2020)
- Brew & Gilligan (2019) Environmental Guidance: Drainage Maintenance and Construction

8.1.2 Environmental Management of Site Compounds

The principal contractor will be required to ensure good environmental management within the site compounds. The below list of measures will be incorporated into site compound environmental management:

- Site compounds will use existing hard-standing areas as a priority to reduce the level of ground disturbance.
- Site compounds, spoil heaps and welfare facilities will not be within Flood Zones A or B, where possible within the constraints of the site, in accordance with OPW Planning System and Flood Risk Management Guidelines (OPW 2009). If within a flood zone, assessment of the risk of flooding will be untaken for the main site compound and spoil storage locations, which will include likelihood of flooding, predicted depths and velocities of flood waters to ensure mobilisation of sediment does not occur. An emergency response plan will be drawn for implementation in the event of a predicted storm or weather event with the potential to cause flooding. A figure of site compounds is presented in Figure 3-8.

- Storage of hazardous materials will be outside of Flood Zone A or B lands in accordance with OPW guidelines.
- Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location.
- Site establishment by the Contractor will include the following:
  - Site offices.
  - Site facilities (canteen, toilets, drying rooms, etc.).
  - Office for construction management team.
  - Secure compound for the storage of all on-site machinery and materials.
  - Temporary car parking facilities.
  - Temporary fencing.
- Site Security to restrict unauthorized entry.
- All sub-contractors will be given induction toolbox talk so that they are aware of material storage arrangements.
- Construction materials within the compound will be stored in a designated area in an organised manner so as to protect them from accidental damage and deterioration as a result of exposure.
- Bunded storage of fuels and refuelling area. Bunds shall be 110% capacity of the largest vessel contained within the bunded area.
- A chemical storage plan will be in place as required, including spill kits.
- A separate container will be located in the Contractors compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled, and the contents of the container will be disposed of by a licenced waste contractor at a licenced site. Records will be maintained of material taken off site for disposal.
- A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal.
- The site environmental manager will be responsible for maintaining all training records and weekly environmental inspections.
- Drainage collection system for washing area to prevent run-off into surface water system.
- Stockpiling of spoil and spoil-like materials will be appropriately located within the compounds to minimise exposure to prevailing winds and risk of runoff.
- All refuelling of vehicles will be carried out at the fuel stores within the site compounds and only ADR trained personnel will be permitted to operate fuel bowsers.

8.1.3 Protection of Surface Water

In order to protect surface water throughout the proposed development site, the principal contractor will be required to develop and implement a Surface Water Management Plan and Pollution Control Plan. The minimally required list of mitigation measures outlined below will be incorporated into these plans. Other mitigation will be in place to protect air and groundwater quality e.g. dust management and biosecurity will also be implemented, and are covered in more detail in the EIAR. As no effect has been anticipated on the QI of Kilkee Reefs SAC

from invasives or dust or from groundwater contamination, mitigation in relation to these have not been covered in this report.

8.1.3.1 Surface Water Management Plan

In order to safeguard the local surface water network, and in turn the local groundwater network, from surface water-based pollution events, the following must be strictly adhered to:

- The principal contractor will ensure compliance with environmental quality standards specified in the relevant legislation, namely European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments)
- An Ecological/Environmental Clerk of Works will be appointed to oversee the protection of water quality and manage the prescribed mitigation measures.
- Oil booms and oil soakage pads will be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal.
- Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring to ensure compliance with environmental quality standards specified above.
- At no point during the construction phase will treated water be discharged to local surface water network without the water quality meeting the statutory limits as set under the environmental quality standards specified above.
- Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water.
- To prevent the spread of any accidental discharge into the surface water network, oil booms will be on hand when construction activities are located beside aquatic habitats in order to control and minimise the spread of the spill.
- A concrete management plan will be drawn up at the outset of the project to ensure safe management of concrete pours, management of concrete lorries and washing of materials used in concrete construction etc. It should cover at minimum the points below:
    - Washout of concrete plant will occur at a designated impermeable area with waste control facilities.
    - Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete.
    - Concrete control measures to be drawn up e.g. Construction Method Statement for the Atlantic Stream Screen replacement, and the work on the manhole cover on the promenade.

- Wherever reasonably possible, pre-cast concrete features will be utilised to minimise the risk of a concrete-based pollution event.
- Controlled release or pre-washing of installed culverts to ensure the first release of water through culverts does not result in a washing through of concrete (and other built-up debris).

- Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located within the vicinity of watercourses, wetlands, or artificial surface water drainage features.
- Excavated contaminated soils will be segregated and securely stored in a designated area where the possibility of runoff generation or infiltration to ground or surface water drainage has been eliminated through bunding and imperviable geotextile linings. The contaminated soils will then be classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC. Furthermore, the contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the development site.
- Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features. Silt fencing will be placed along haul roads that are near water features, and along the access route used to build the embankment in the Western Tributary storage area. Shallow interceptor trenches will be installed in front of these silt fences where sufficient spaces is available. An Ecological Clerks of Works (ECoW) will be present during the installation of these protective measures to ensure that they are installed to best practice standard and correctly located in their assigned areas. Biodegradable coverings will also be utilised (as necessary) to prevent soil run-off into surface water.
- Silt fences will need to be placed along the banks of the newly constructed watercourse (Victoria and Western Tributary diversions) to protect the new watercourse from run-off from the regraded landscape.
- Vegetation will be preserved during regrading by carefully excavating and reinstating turf.
- Silt fences will be repaired and/or replaced as necessary by the principal contractor as part of the on-going environmental monitoring programme.
- Embankments to be reseeded / covered with saved turf excavated from the field when stream rerouting takes place.

8.1.3.2 Pollution Control Plan

- Spill kits containing absorbent pads, granules and booms will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and all machinery vehicles will carry spill kits at all times.
- Absorbent material will be used with pumps and generators at all times and used material disposed of in accordance with the Waste Management Plan. All used spill materials e.g., Absorbent pads, will be placed in a bunded container in the contractor's compound. The material will be disposed of by a licenced waste contractor at a licenced facility. Records will be maintained by the environmental site manager.

- Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.

In the event of a spill the principal contractor will ensure that the following procedures are in place:

- Emergency response awareness training for all Project personnel on-site works.
- Appropriate and sufficient spill control materials will be installed at strategic locations within the site. Spills kits for immediate use will be kept in the cab of mobile equipment.
- Spill kits must include suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Typical contents of an on-site spill kit will include the following as a minimum:
  - Absorbent granules
  - Absorbent mats/cushions
  - Absorbent booms
  - Track-mats, geotextile material and drain covers.
- All potentially polluting substances such as oils and chemicals used during construction will be stored in containers clearly labelled and stored with suitable precautionary measures such as bunding within the site compound.
- All tank and drum storage areas on the site will, as a minimum, be bunded to a volume not less than the following:
  - 110% of the capacity of the largest tank or drum within the bunded area, or
  - 25% of the total volume of substances which could be stored within the bunded area.
- All hydrocarbons to be utilised during construction are to be appropriately handled, stored, and disposed of in accordance with the TII document 'Guidelines for the crossing of watercourses during the construction of National Road Schemes' (NRA, 2008).
- The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters.
- Designated locations for refuelling are within site compounds.
- Potentially contaminated run off from plant and machinery maintenance areas will be managed within the site compound surface water collection system.
- Damaged or leaking containers will be removed from use and replaced immediately.

8.1.3.3 Biosecurity

Biosecurity measures will be implemented to prevent the spread of invasive species. These are summarised in this document but will be further detailed in the EIAR as they are not directly relevant to the protection of the Kilkee Reefs SAC. These measures will include:

- Toolbox talks on invasive plant species to be provided to all relevant personnel prior to access to site being permitted.

- A 3-metre buffer zone to be erected around the identified infested areas, no unauthorised personnel to be admitted within this buffer.
- All works carried out within the buffer zone will be done by suitably trained personnel.
- All machinery being brought to site must be clean and free from contaminants.
- Any machinery used within the 3-metre buffer zone must be thoroughly cleaned and checked before being removed.
- No vehicles are to be allowed on or off site without being thoroughly inspected and cleaned.
- On completion of the works all machinery must be thoroughly inspected and cleaned down before being removed from site.
- All contaminants and contaminated soils are to be disposed of in an appropriate manner.
- Removed soils need to be disposed of in an appropriate manner to a licenced facility.
- Imported soils must be free from invasive species.

8.2 Project/Site Specific Mitigations Measures for Construction Phase

8.2.1 Stream Realignment

All instream works need to be done in accordance with IFI guidelines, and subject to IFI approval. Stream re alignment works will be overseen by an IFI officer.

- (IFI 2016): Guidelines on protection of fisheries during construction works in and adjacent to waters.

Timing of the instream works should be carried out during the period July-September. At this time the stop log will be in place on the Victoria stream, so discharge to Moore Bay will not be taking place. Instead, water will be pumped to Intrinsic Bay.

Water quality will be monitored during the wetting of the new stream bed, at the lower end of the channel. Wetting will be a gradual process which will reduce the amount of sediment discharged at any one time. Standards will be determined by the IFI in consultation with the ECoW, and take into appropriate water quality standards such as the Surface Water Regulations 2009. This is sufficient to minimise suspended solids and protect the water quality in the SAC. As no salmonid fish habitat is present at the site, this is considered an achievable standard.

8.2.1.1 Victoria Stream and Western Tributary Realignment

The Victoria stream re alignment needs to be carried out in a manner that does not interrupt the flow of the stream.

The following measures will be implemented during the realignment:

- Stream realignment needs to be carried out in a manner that does not interrupt the flow of the stream. To do so, the new stream bed, and associated scrapes need to be prepared and put in place. Vegetation from the banks of the current stream needs to be translocated to the edge of the new site to allow for the rapid reestablishment of the herbaceous riparian community.
- Any clean gravel substrate will be translocated from the current stream and placed in the new channel. If no such substrate is available, imported material may be used. This will be of local provenance/similar

rock type. Consultation with IFI to determine the appropriate materials necessary will need to be carried out.

- The upstream end of the realigned portion needs to be connected to the current stream and let the water flow down the new riverbed gradually with both steams flowing at once for a period of time. Movement of invertebrates can then take place.
- Electrofishing can be carried out and fish moved into the new stream.
- Once water is flowing in the new alignment the upstream end of the old watercourse can be obstructed and left to drain. The riverbed can be searched for remaining invertebrates and small fish/eel, and material moved over.
- The realigned stream will maintain the same gradient that is currently in place, with a similar width to the upstream portion of the stream so as not to reduce the flow below natural conditions.
- All instream works need to be done in accordance with IFI guidelines, and subject to IFI approval. Stream re alignment works will be overseen by an IFI officer.
- Timing of the instream works will be carried out during the period July-September.
- Water quality (suspended solids) will be measured during the wetting of the realigned channel.
- Banks to be vegetated using turves from a nearby location (e.g. from where the haul roads are due to be, or from the excavated bed of the new alignment.
- Silt fencing, coir logs or other biodegradable materials to utilised to limit potential for run-off from the surrounding area.
- Monitoring of the newly aligned stream for erosion during the bedding in period. Monitoring will include stability of banks, revegetation as well as water quality.

These measures will ameliorate the release of sediment during the realignment process, as the new bed will be in place and wetted in a graduation process. The sinuosity and ponds will also allow for the deposition of material. Placement of scrapes may add some sediment, but the receiving environment is not considered sensitive to sediment release.

The translocation of riparian material will also prevent large volumes of sediment release. The shallower sloping banks and scrapes will also limit the potential for sediment release through erosion.

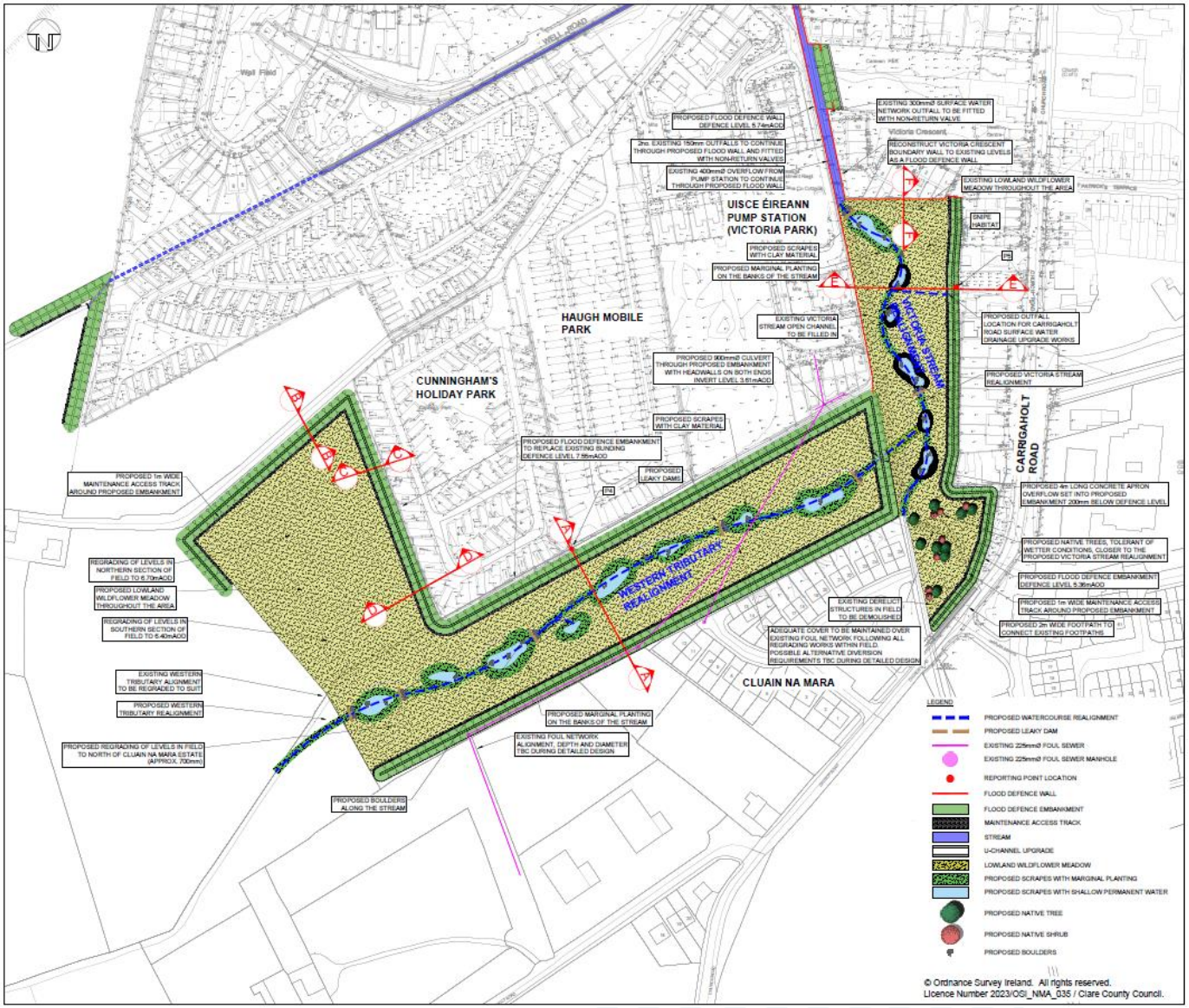

Figure 8-1: Illustration of potential realignment of the Victoria and Western Tributary.

8.2.2 Wall Construction

Whenever possible wall construction must be carried out from the dry side. Materials must be prevented from falling into the stream, with particular care given to concrete. Adherence to the concrete control procedure will be in place.

Work on Walls along the Atlantic Stream will not require any instream works. The demolition of the existing walls adjacent to the stream at Victoria Court will require the creation of a dry zone and water diversion to minimise the risk to the aquatic environment. This will be preferably be done with a partial isolation or coffer dam, which will preserve flow, and prevent sedimentation, but it is likely that full damming will be required due to the narrowness of the channel at Victoria Court. This work will be overseen by an ECoW.

It will be necessary to create a dry bed to construct/repair the wall at Victoria Court and to construct the outfall of the new Well Stream Culvert. These works will take place during the period when the stop logs are in place. Therefore there is no-through flow in the baseline condition. The intention is to move the point of flow restriction upstream of the works area. This doesn't impact on any downstream receptors or the hydraulic regime upstream as it retains the baseline condition of flow restriction. The area will be first isolated with an upstream dam constructed of sandbags. The isolated area will then be electrofished, fish translocated to a suitable habitat e.g. (the newly aligned stream and ponds) and pumped dry.

The works on the walls in areas where the stream is to be diverted into the new channel will be carried out in the dry as the watercourse diversion will have taken place at the outset of the project.

8.2.3 Stormwater Drains

The installation of new stormwater drains has the potential to result in the release of contaminated surface/stormwater release at the tie of tying in the new stormwater drain to the network e.g. new pipes will be contaminated with soil, or where concrete pipes are used, cement dust. Upgrading of stormwater drains could also result in similar release of materials.

8.2.4 Embankments

The following measures will be applied to stored materials for the embankments.

- Materials allocated for reuse will be covered whilst stored to prevent runoff in the event of rain and prevent weeds growing in stored material.
- Materials allocated for reuse will covered during transport to each embankment construction site to prevent dust release.
- Materials will be stored at least 10m away from the nearest water course or drainage ditch.
- Silt barrier or bunding to be constructed around the stockpiled materials to contain any runoff in the event of adverse weather.
- Maintain a vegetated grass strip around the perimeter of the compound to act as filter for any potential runoff not contained within the bunded area.
- Materials should be stored for as short a period as practically possible.
- Slope of stored material will be minimised as much as practically possible within the constraints of the site.

The following measures will be applied to work on establishment of new embankments.

- Embankment sides will be left roughened.
- Turf from excavation works will be saved and strips will be used to cover parts of the embankment where practical.
  - Establishment of turves from the existing banks will be prioritised and utilised.
  - Areas vulnerable to silt/soil run-off will be prioritised e.g. areas in proximity to watercourses; slopes rather than the top of the bank; areas of heavier usage by people or animals; areas in the drip lines of trees or where other run-off is predicted. This will allow for the maintenance of the local seedbank and provide some buffer to prevent the risk of erosion.
  - This will be managed by the ECoW.
- Suitably sourced native species seed, with a grass, rush and herbaceous content of local provenance will be used to revegetate the embankment, if enough turves are not preserved. Hay from the Long Field would be a suitable cheap and locally available source of seed.
- Biodegradable matting to prevent soil erosion/silt run-off maybe used in some locations, and reseeding of appropriate native species will be used in conjunction with this, as above.
- Mulch may be used to prevent erosion and hold seed until establishment of vegetation.
- Silt barriers will be placed along the bottom to hold back materials in the event of heavy rainfall prior to revegetation of the area. Once the vegetation has reestablished silt barriers may be removed, taking care not to dislodge any trapped sediment.
- Fertiliser must not be used on the embankment as runoff could lead to nutrient loading of the water and eutrophication. This will ameliorate negative impacts on water quality from sediment and nutrient run-off.
- Material used for the embankments must be free of contamination, from hydrocarbons and / or Invasive Species, and care must be taken not to spread INNS when moving materials.

8.2.5 Screens and Headwall Installation

The installation of the new screen at the Atlantic Stream, and the new screen and headwall at the back of the Kilkee Bay Hotel, will require a pre-construction method statement to be drawn up. The following measures will be detailed in the construction method statement:

- Concrete control (to ensure no uncontrolled release).
- Blocking of stream and overpumping (Section 50 required for the Atlantic Stream screen installation) e.g. Use of sand bags and a geotextile to allow working in the dry.
- Plan for monitoring water control during over pumping at inlet and outlet.
- Use of precast headwall or other concrete material.
- Filter mesh to be placed on the inlet to pump to prevent small fish (stickleback) and other aquatic life being sucked into the pump to the existing pipework which is still in-situ.

- Back-up pump to be on hand to ensure that in case of pump failure during works an alternative pumping option is in place.
- Original bed of stream to be kept as clean as possible at all times (e.g. no use of hydrocarbons in the bed of the stream while working in the dry).
- Works to be overseen at set-up stage by ECoW and daily water samples to be taken.
- Pre-washed material to be used to bed in the headwall. This is a standard measure to control release of sediment from new gravels and release of concrete. Controlled reconnection/rewetting to prevent sediment release.
- Ensure stability of the existing riverbank at all times.

8.2.6 Well Stream Culvert and Embankment

The new culvert and culvert extension will be constructed offline from the existing system, therefore will be undertaken in dry conditions.

Sediment release will be required for both the installation of the culvert, and the work on the existing channel (upgrade to flood risk potential). The programme of works indicates that the culvert will be the first element of the Well Stream upgrade to be constructed. The flow from the Well Stream will be prevented from entering the new culvert at the connection point via a sandbag dam diverting it into its existing route. No other diversion will be required while this new culvert and headwall are constructed as the current flow route for the Well Stream does not follow this route. It is intended to also have the upstream embankment in place prior to the construction of the Well Stream culvert.

For the construction of the tie-in point, it will be necessary to partly dam the Well Stream and overpump into the existing system. To minimise the flows entering the Well Stream in this instance, the attenuation storage will be utilised to minimise flows conveying through the Well Stream open channel. This will be done in conjunction with the Well Stream U channel installation.

Sediment release from Embankments will be adhered to as outlined in Section 6.3.3 Embankments.

The work will be managed by an ECoW. It is anticipated that diversion will be required at this location for 4-6 weeks.

8.2.7 Well Stream Upgrade

The Well Stream will be constructed offline from the existing system, therefore will be undertaken in dry conditions.

As above, working in the dry will control the release of potentially contaminated water. The top end of the channel will be blocked using sandbags, and the stream piped to the outlet, via the attenuation chamber to the north of the Well Stream, which will allow flood risk to be managed during the construction period.

Standard construction sediment controls should be applied here.

These upgrade works replace the existing stream using a U-shaped channel. A pre-construction method statement to be drawn up for this works, which will take place in the dry (full diversion in place). The construction method statement will provide for the following:

- This work will be monitored by the ECoW, and water quality samples will be taken throughout the process.

- Controlled water release with progressive sandbag removal to minimise sediment discharge.
- Other measures will help to filter and control the release of sediment during the wetting of the new channel:

- Clean gravels and vegetation will be preserved and used to seed the new channel, under supervision of the ECoW and IFI.
  - Coir logs will be used to help form new banks to help control sediment release from any backfill material.

A visualisation of the new channel is provided in Figure 8-2.

Figure 8-2: Sample Visualisation of the new U-channel within the flood walls (Image for illustration purpose from Templemore FRS – (Tobin 2022)).

8.2.8 Atlantic Stream Walls and Embankments

Works in the vicinity of the caravan park will require regrading of the banks and ground preparation to accommodate the new embankment. All works will be in the dry.

Suitable turves will be removed and kept to re-seed the new embankment. Biodegradable matting will be used to prevent erosion of soil (Figure 8-4).

Back fill of vegetation material to be carried out in flat areas.

Works will follow the mitigation outlined in Sections 8.2.2 for Wall Construction and 8.2.4 for Embankments.

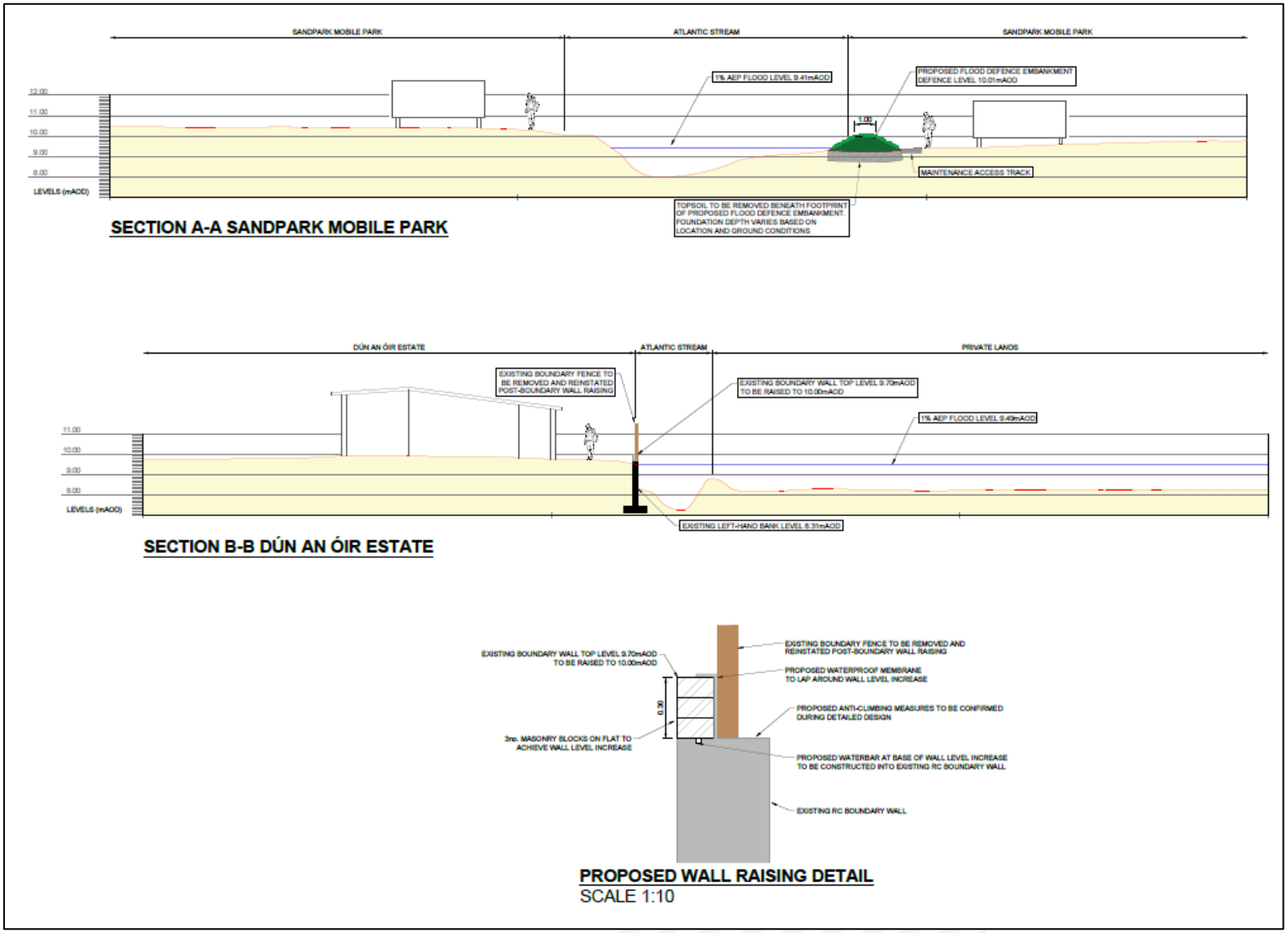

Figure 8-3: Works in the vicinity of the caravan Park (top) and near Dún An Óir Estate (bottom). Full details are provided in the Buildability Report.

Figure 8-4: Use of biodegradable matting can protect sediment release from soil erosion, but allow natural regeneration of vegetation (from SEPA 2009).

All instream works need to be done in accordance with IFI guidelines, and subject to IFI approval (IFI 2016, 2020).

- Stream re alignment works will be overseen by an IFI officer.
- In stream works will be carried out between July and September.
- Suitable gravels will be reinstated.
- Aquatic species will be translocated.

8.2.9 Atlantic Stream Realignment

Works here will follow a similar process to the realignment of the Victoria and Well tributaries. Procedures for installation of the headwall will follow the mitigation measures in Section 8.2.5 for screens and headwalls installation.

The Atlantic Stream re alignment needs to be carried out in a manner that does not interrupt the flow of the stream.

The following measures will be implemented during the realignment:

- New stream bed, and associated scrapes need to be prepared and put in place. Suitable vegetation from the banks of the current stream needs to be translocated to the edge of the new site to allow for the rapid reestablishment of the herbaceous riparian community.
- Any clean gravel substrate will be translocated from the current stream and placed in the new channel. If no such substrate is available, imported material may be used. This will be of local provenance/similar rock type. Consultation with IFI to determine the appropriate materials necessary will need to be carried out.
- The upstream end of the realigned portion needs to be connected to the current stream and let the water flow down the new riverbed gradually with both steams flowing at once for a period of time. Movement of invertebrates can then take place.
- Electrofishing can be carried out and fish moved into the new stream.
- Once water is flowing in the new alignment the upstream end of the old watercourse can be obstructed and left to drain. The riverbed can be searched for remaining invertebrates and small fish/eel, and material moved over.

- The realigned stream will maintain the same gradient that is currently in place, with a similar width to the upstream portion of the stream so as not to reduce the flow below natural conditions.
- All instream works will be done in accordance with IFI guidelines, and subject to IFI approval.
- Stream re alignment works will be overseen by an IFI officer.
- Timing of the instream works will be carried out during the period July-September.
- Water quality (suspended solids) will be measured during the wetting of the realigned channel.
- Banks to be vegetated using turves from a nearby location (e.g. from where the haul roads are due to be, or from the excavated bed of the new alignment.
- Silt fencing, coir logs or other biodegradable materials to utilised to limit potential for run-off from the surrounding area.
- Monitoring of the newly aligned stream for erosion during the bedding in period. Monitoring will include stability of banks, revegetation as well as water quality.
- No fertilisation of the vegetation will take place.

These measures will ameliorate the release of sediment during the realignment process, as the new bed will be in place and wetted in a graduation process. The sinuosity and ponds will also allow for the deposition of material. Placement of scrapes may add some sediment, but the receiving environment is not considered sensitive to sediment release.

The translocation of riparian material will also prevent large volumes of sediment release. The shallower sloping banks and scrapes will also limit the potential for sediment release through erosion.

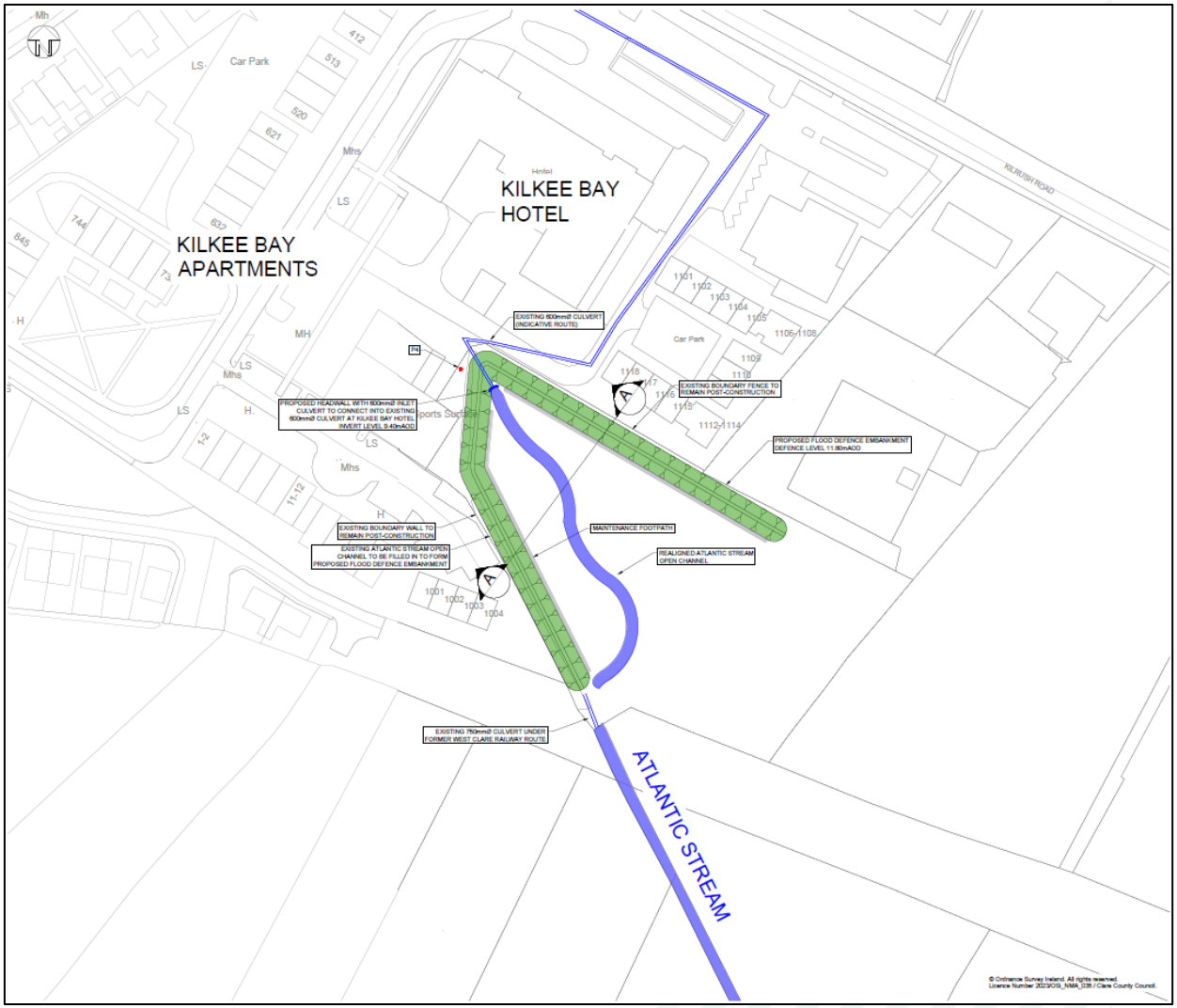

Figure 8-5: Kilkee Bay Hotel stream realignment. Full details are provided in the Buildability Report.

8.2.9.1 Atlantic Stream Manhole Work

There will be two main phases to these works. First demolition of the existing maintenance hole cover which will lead to the production of dust and concrete particles. Then, construction of the new cover will require concrete to be poured.

A Pre-Construction Method Statement will be drawn up for this work (either individually, or as part of the same body of work as the work on the Atlantic Stream Screen, Section 8.2.5). The method statement will include:

- All works along the waterfront will be under supervision of an ECoW.
- Work will be carried out in the dry.
- Washing of pre-cast materials.
- Concrete control to ensure no uncontrolled release.
- No uncured cement to enter the waterways.
- Plan for monitoring water control during over pumping at inlet and outlet.
- Works to be overseen at set-up stage by ECoW and daily water samples to be taken.
- Controlled reconnection/rewetting to prevent sediment release.
- Monitoring of water quality during the re-wetting process, including water quality on the outlet to the reefs.

8.2.9.2 Meadow View Court

The works at Meadow View court involve the installation of manholes into an existing culvert.

There is potential for sediment loading and for unsured concrete to enter the waterways. The distance from the SAC, the small scale of the works, and the downstream closed flood gates make it unlikely for works in this area to have an impact on the SAC. Nevertheless, water pollution prevention measures will be implemented.

The method statement will include:

- Work will be carried out in the dry.
- Plan for monitoring water control during over pumping at inlet and outlet.
- Works to be overseen at set-up stage by ECoW and daily water samples to be taken.
- Concrete control to ensure no uncontrolled release. No uncured cement to enter the waterways.
- Controlled reconnection/rewetting to prevent sediment release
- Use of pre-cast materials as much as possible
- Washing of pre-cast materials.

8.3 Operational Mitigation

Natural flood alleviation zones should be allowed to act as a riparian buffer, providing ecologically important habitat, filtering nutrients and sediment before it enters the waterways.

8.3.1 Operational Attenuation Area

The rerouting of the Western Tributary will include scrapes and capacity for the surrounding fields to flood and hold water, with a connection to the Victoria stream through a culvert. This will provide environmental benefits and mimic natural drainage and encourage its infiltration attenuation and passive treatment.

8.3.2 Controlled Release of Water into Moore Bay

Upstream water storage will provide wetland areas for wildlife, filter sediment, excessive nutrients and any other pollutant that may be in the water, and limit the amount released into the bay. By limiting the sediment load into the bay, the risks to the beach and reef communities are minimised.

9 Project summary and Conclusion

9.1 Construction Phase

9.1.1 Impact on Reefs and Large Shallow Inlets and Bays

9.1.1.1 Atlantic Stream

Reefs in this area refer to exposed intertidal reef community complex. At the outlet of the Atlantic Stream the reefs are eroded from the stream outlet. Signs of enrichment of the reefs is evident from the presence of the green algae in proximity to the outlet, in comparison to the surrounding reefs. This is a minimal area of reef directly adjacent to the outfall. The surrounding exposed intertidal reefs are dominated by their fucoid communities. No adverse impact on the reefs is anticipated from the construction works as the following protective measures will apply:

- Protection of water quality during construction will be provided from the Section 8, specifically Section 8.1.3 Protection of Surface Water, and Section 8.2.8, 8.2.9 for works on the Atlantic Stream.
- Temporary nature of the works
- Embedded protection because of the nature of the receiving environment i.e. twice daily tides reducing the risk of pollutant build up.

9.1.1.2 Victoria Stream and Well and Western Tributaries

Reefs in Intrinsic Bay refer to the Exposed subtidal reef community complex. In the vicinity of the outlet from the Victoria directly to Moore Bay, the Sediment community dominates. No adverse impact on the reefs is anticipated from the construction works as the following protective measures will apply:

- Protection of water quality during construction will be provided from the Section 8, specifically Section 8.1.3 Protection of Surface Water, and Section 8.2.1, 8.2.6, 8.2.7 for works on the Well and Victoria Streams.
- Temporary nature of the works
- Embedded protection because of the dilution rates of the receiving environment i.e. pumping to Intrinsic Bay. Is it estimated that 1500m3/day is discharged from the pumping station. For reference, the River Shannon that feeds into the coastal waterbody has an output of approximately 25 million m3/day, providing a high dilution and movement of water. Ongoing monitoring indicates high status of this coastal water body.

9.1.2 Operational Phase

The proposed development, will not generate any residual impacts as a result of its operation, given the appropriately designed flood alleviation zones featured within the development***. At a local level overall improvement in the water quality of the Victoria Stream is anticipated, but no change in the Kilkee Reefs SAC is anticipated.***

9.2 Impacts on Site Integrity

All impacts on the Kilkee Reefs SAC are predicted to be short-term due to no works being carried out in the SAC, construction best practice and mitigation measures to avoid detrimental effects and confined to the construction period of the project.

No appreciable effect on the Kilkee Reefs SAC via a hydrological pathway are expected, as any release of sedimented water will be highly diluted by the daily tides and the large volume of water into which they are discharged.

Overall, there will be temporary disturbance to water quality during the construction period, but the following mitigation will be applied:

- Full diversion of the Well Stream during construction works.
- Partial isolation or full overpumping during wall works that require instream work
- Work programme allowing for stream realignments in advance of work, ensuring works are at distance from watercourses in many locations.
- Control of sediment release from bare soil through a variety of measures including preserving and re-instating turves and other vegetation.
- Retention of riparian vegetation and use of coir logs to provide a buffer to run-off from the surrounding works.
- Work specific construction method statements which will provide for detail on concrete management and re-wetting of channels.
- Presence of an ECoW to oversee works and manage water quality.

The nature of the project means that impacts will be confined to the construction period and no ongoing operational impact is anticipated.

Embedded protection provided by the large dilution rates (open sea water at Intrinsic Bay; and by the daily tides at the outlet of the Atlantic Stream). Additionally, the habitats are not considered to be highly sensitive to sediment and are subject to sedimentation from ongoing discharges.

With the mitigation in place short-term impacts are predicted, which will be confined to the construction period. No medium or long-term negative effects of the work are predicted. The works are not expected to have any adverse impacts on the QIs of the nearby SAC (

Table 9-1).

This mitigation will ensure that no adverse impacts will occur which could affect the integrity of the Kilkee Reefs SAC.

Similarly, no adverse impacts are predicted against the conservation objectives of the QIs for which the SAC is designated.

Table 9-1: Summary of potential impacts, mitigation measures and post construction effects on Kilkee Reefs SAC.

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Post construction
Large shallow inlets and bays [1160]	Habitat area	Hectares	Erosion/ scour from overflow flaps under flooding conditions.	Outside of SAC. Overflow designed to come out at the top of steps/ sea wall and left to rundown existing feature acting as a spillway. Current beach management in this area of the beach involves removal of seaweed, so the area is actively managed at present. Current beach management plan will not be impacted by the works.	No long-term adverse effects
	Habitat distribution	Occurrence	Impact on intertidal communities through change in nutrient output from streams. Smothering of benthic communities by sediment released from site of works because of the clogging of their filtration apparatus and potential short-term anoxia under the sediment layer.	Adherence to mitigation measures described in, but not exclusive to, this report. This includes runoff management, control of sediment and other pollutant management during construction. Overall, no change in nutrient output is anticipated once mitigation measures are applied.	No adverse effect
Reefs [1170]	Habitat area	Hectares	NA	NA	NA
	Habitat distribution	Occurrence	Smothering of benthic communities by sediment released from site of works because of the clogging of their filtration apparatus and potential short-term anoxia under the sediment layer.	Adherence to mitigation measures described in, but not exclusive to, this report. This includes runoff management, control of sediment and other pollutant management during construction.	No adverse effect
	Community Structure	Biological composition	Smothering of benthic communities by sediment released from site of works because of the clogging of their filtration apparatus and potential short-term anoxia under the sediment	Adherence to mitigation measures described in, but not exclusive to, this report. This includes runoff management, control of sediment and other pollutant management during construction. Overall, no change in nutrient output is	No adverse effect

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Post construction
			layer. Nutrient loading leading to eutrophication and dominance of algal species.	anticipated once mitigation measures are applied.	

9.3 In-combination Assessment

Following mitigation measures described in this NIS, and when applying best construction practices, no significant adverse impact is expected on the Kilkee Reefs SAC from this project. Therefore, no in-combination adverse impacts are anticipated.

9.4 Conclusion

JBA Consulting was commissioned by Clare Co. Co. to undertake a NIS in relation to a proposed FRS in Kilkee Co. Clare. The proposed FRS is located throughout Kilkee along the Well, Victoria and Atlantic streams, which are upstream, and connected to the SAC. The proposed FRS will alleviate flood risk to Kilkee, enhance two streams, creating areas mimicking wetland and providing scrapes for wintering waders and waterbirds.

The following Natura 2000 site was identified as potentially being impacted using a source pathway receptor model:

- Kilkee Reefs SAC

A hydrological pathway for impact was identified during the Appropriate Assessment Screening process, via the discharge of the Atlantic Stream onto the reefs at Moore Bay, onto the beach during flood events. The discharge via the Victoria Stream to both Moore Bay and Intrinsic Bay (via the pumping station) is also assessed.

The QIs within the ZoI and screened into this assessment are:

- Large shallow inlets and bays [1160]
- Reefs [1170]

Mitigation measures have been proposed for the area of the proposed development site, ensuring that the QIs of Natura 2000 sites do not suffer any adverse effects as a result of the development. Mitigation for protection of water quality, and thus the protection of Kilkee Bay SAC via the hydrological pathway includes but is not limited to:

- Full diversion of the Well Stream during construction works.
- Partial isolation (coffering) during wall works.
- Control of sediment release from bare soil through a variety of measures including preserving and re-instating turves and other vegetation.
- Retention of riparian vegetation and use of coir logs to provide a buffer to run-off from the surrounding works.
- Work specific construction method statements which will provide for detail on concrete management and re-wetting of channels.
- Presence of an ECoW to oversee works and manage water quality.

It is therefore concluded that provided that the mitigation measures outlined within this document are strictly adhered to, there will be no adverse impacts from the works involved with the proposed FRS either alone or in-combination with other projects and plans on the following Natura 2000 sites:

- Kilkee Reefs SAC

To confirm this conclusion, a checklist on methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission 2021) has been completed with regards to conservation objectives in Table 9-2.

Table 9-2: Assessing the effects on the integrity of the Natura 2000 site.

Does the plan or project have the potential to:	Yes/No
Hamper or cause delays in progress towards achieving the site's conservation objectives?	No - Following mitigation, no significant adverse impacts have been identified that will prevent achievement of the conservation objectives of the assessed site.
Reduce the area, or quality, of protected habitat types or habitats of protected species present on the site?	No - Potential adverse impacts on the habitats of Kilkee Reefs SAC are not expected given the mitigation measures that have been detailed.
Reduce the population of the protected species significantly present on the site?	No - Potential impacts to key species of Kilkee Reefs SAC are not expected, as impacts can be avoided by implementing the mitigation measures detailed.
Result in disturbance that could affect the population size or density or the balance between species?	No - Potential impacts to key species for which Kilkee Reefs SAC are designated are not expected, as impacts can be avoided by implementing the mitigation measures detailed.
Cause the displacement of protected species significantly present on the site and thus reduce the distribution area of those species in the site?	No - Potential adverse impacts on the species and habitats of Kilkee Reefs SAC are not expected, as impacts can be avoided by implementing the mitigation and avoidance measures detailed in this report.
Result in a fragmentation of Annex I habitats or habitats of species?	No – Potential impacts resulting in fragmentation of species or habitats are not expected as impacts can be avoided by implementing the mitigation measures detailed.
Result in a loss or reduction of key features, natural processes or resources that are essential for the maintenance or restoration of relevant habitats and species in the site (e.g. tree cover, tidal exposure, annual flooding, prey, food resources)?	No - Potential adverse impacts on key features of Kilkee Reefs SAC are not expected, as impacts can be avoided by implementing the mitigation measures detailed.
Disrupt the factors that help maintain the favourable conditions of the site or that are needed to restore these to a favourable condition within the site?	No - Potential adverse impacts via pathways identified during the screening process can be mitigated against.
Interfere with the balance, distribution and density of species that are the indicators of the favourable conditions of the site?	No - Potential impacts to the population size, density or balance of key species are not expected, as impacts can be avoided by implementing the mitigation measures detailed.

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