

ENVIRONMENTAL IMPACT ASSESSMENT SCREENING REPORT

SLOPE REMEDIATION PROJECT AT COGHLANSTOWN

BALLYMORE EUSTACE

KILDARE COUNTY COUNCIL

PROJECT NO. K401

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OCSC

O'CONNOR | SUTTON | CRONIN

Multidisciplinary
Consulting Engineers



EIA Screening Report

Slope Remediation Project at Coghlanstown Ballymore Eustace, Co. Kildare.

For

Kildare County Council.



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NOTICE

This document represents the findings from an Environmental Impact Assessment Screening conducted at the above referenced site. Best practice was followed at all times and within the limitations stated. This document has been produced by O'Connor Sutton Cronin & Associates for its client Kildare County Council.

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1. INTRODUCTION

1.1 Project Contractual Basis & Parties Involved

This report has been prepared by O'Connor Sutton Cronin & Associates Ltd. (OCSC) at the request of their Client Kildare County Council. The site for assessment include lands located on the banks of the River Liffey, approximately 500m to the West of Ballymore Eustace, County Kildare as part of a slope stabilisation/erosion protection project. The Regulating Authority for the site is Kildare County Council.

The report was completed by Ahmed Thamer, Environmental Engineer with OCSC. Assistance was provided by Ross Begg, Graduate Environmental Consultant with OCSC. The report was reviewed and approved by Eleanor Burke who is the OCSC Environmental Division Manager. The Project Director is Brian O'Rourke CEng, Chartered Engineer and Director with OCSC.

1.2 Site Location

The site will encompass both sides of the River Liffey, which flows from East to West at that location. The construction work itself will incorporate the embankment along the northern side of the meander in the River Liffey as seen in Figure 1.1. However, to complete the required works the site boundary will be extended east and south to accommodate two site compounds and a temporary diversion channel for the river while construction work is ongoing. Note, that site compound locations are indicative only. The site is located about 845m to the northwest of the Ballymore Eustace Bridge and about 40m south from the Road L6047. The site consists of the River Liffey water course and the surrounding land use is generally agricultural. The regional site location is illustrated in Figure 1.1.

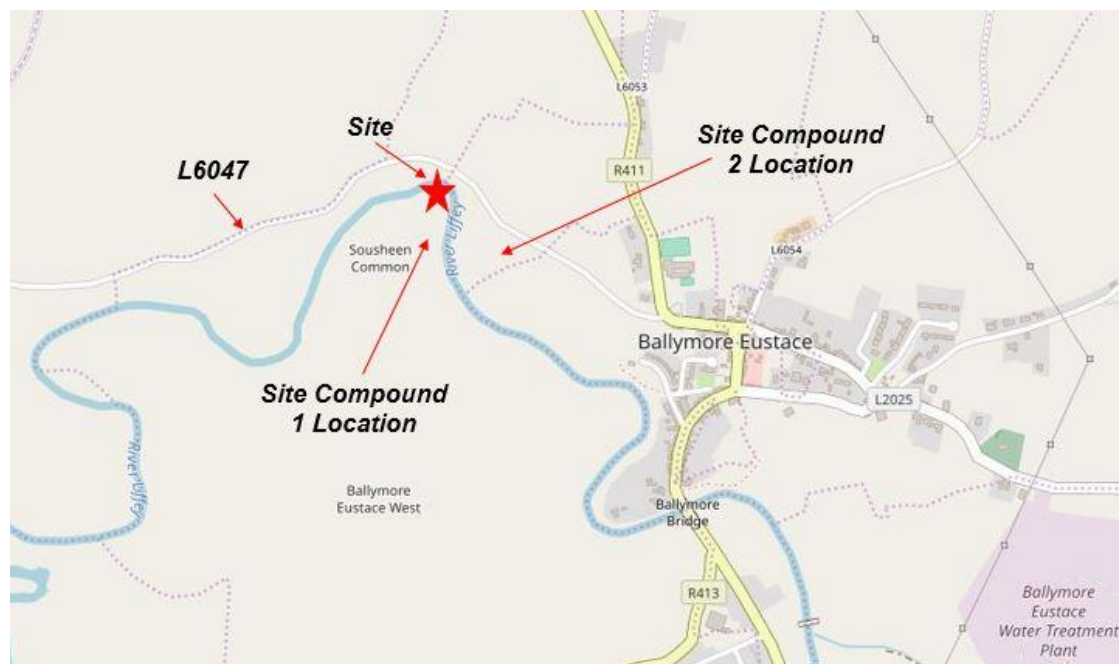


Figure 1.1 Regional Site Location

The site is approximately 0.75 hectares (ha) in area and the Ordnance Survey of Ireland (OSI) Easting Northing coordinates for the site are 692089, 710424.

1.3 Project Description

This EIA Screening report is prepared for the proposed project which is a slope stabilisation exercise along the banks of the River Liffey approximately 500m to the West of Ballymore Eustace, County Kildare. The meander of the River Liffey developed over time due to the natural process of sediment erosion and deposition by the river. This meander is now being subjected to continuous erosion by the fast-flowing river flow and has resulted in multiple slope failures occurring in that particular stretch of the river resulting in an impact of critical infrastructure services within the L6047. An Engineering Options report by O'Connor Sutton Cronin (OCSC) identified a preferred solution to remedy this issue. The location of the subject site is shown in Figure 1. A construction methodology for the diversion of the River Liffey in Ballymore Eustace was developed following an initial meeting with the National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI) on site on the 29th of June 2018. Following the meeting and with the development of the design, further work has gone into the construction methodology which is assumed and the likely sequencing of works. Information is contained in the outline Construction Environmental Management Plan that has been produced and is included as an Appendix to this document.

Documents referred to as part of this assessment include:

- Appropriate Assessment Screening (Draft 04, 31st January 2019) Altemar
- River Liffey Flood Flow Modelling Report (K401-OCSC-XX-XX-RP-C-0014-S2-P02) OCSC
- Outline Construction Environmental Management Plan January 2019 (K401-OCSC-XX-XX-RP-C-0019-S2-P01) – Appended to this report.

The solution proposes to divert the River Liffey during dry weather conditions (July-September) to a straight temporary channel dug to the south of the permanent/natural current channel in the agricultural lands. The slope to the north of the permanent channel will then be sloped more naturally, backfilled with a granular fill (no fines) and with geogrid at 1m centres. To prevent scour from occurring, the slope base will be filled with rock armour. No demolition works are required in order to carry out this project. The overall project duration is expected to be approximately 5 months.



Figure 1.2: Aerial image of the site (Source: Google Earth)

1.4 Project Objectives

The overall project objectives include:

- a description of the physical characteristics of the whole project;
- a description of the location of the project, with particular regard to the environmental sensitivity of geographical areas likely to be affected;
- description of the aspects of the environment likely to be significantly affected by the project; and
- A description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from: a) the expected residues and emissions and the production of waste, where relevant; b) the use of natural resources, in particular soil, land, water and biodiversity.

1.5 Methodology and Approach

The methodology and approach used in the preparation of this report will follow:

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Irish Environmental Protection Agency, Draft Edition, August 2017.
- European Commission (2015) Environmental Impact Assessment – EIA, Over, Legal Context
- European Union EIA Directive (85/337/EEC) and its amendments in 1997, 2003 and 2009;
- Directive 2014/52/eu of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment;
- Planning and Development Act 2000 (as amended);
- Planning and Development Regulations 2001 (as amended);
- Directive 2014/52/EU;
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems – Key Issues Consultation Paper (2017; DoHPCLG);
- Preparation of guidance documents for the implementation of EIA directive (Directive 2011/92/EU as amended by 2014/52/EU) – Annex I to the Final Report (COWI, Milieu; April 2017)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018)
- Environmental Impact Assessment – Guidance for Consent Authorities regarding Sub-threshold Development (2003; DoEHLG)

Using the above documents it has been possible to carry out a desktop EIAR Screening using the best available guidance and operating within the applicable legislation. The methodology employed in this screening exercise updates previous guidance in line with the new Directive 2014/52/EU.

1.6 Scope of Works

To meet the project objectives the following scope of works were completed:

- Present a discussion of the current site status and key environmental influences around the site;
- Undertake and present a historical site and area review, primarily referring to old Ordnance Survey Maps but utilising other sources as appropriate and readily available;
- Present a discussion of the general soil and groundwater conditions within the topographical and area context;
- Present an overview if any significant negative environmental impacts can arise from the proposed project.

1.7 Limitations

This Environmental Impact Assessment Screening Report has been prepared for the sole use of Kildare County Council (“the Client”). No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by OCSC.

This assessment is based on a review of available historical information, environmental records, consultations, relevant guidance information and reports from third parties. All information received has been taken in good faith as being true and representative.

This report has been prepared in line with best industry standards. The methodology adopted and the sources of information used by OCSC in providing its services are outlined in this Report. The assessment undertaken by OCSC and described was undertaken in January 2019 and is based on the information available during that period. The scope of this Report and the services are accordingly factually limited by these circumstances.

OCSC disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to OCSC’s attention after the date of the Report.

The conclusions presented in this report represent OCSC’s best professional judgement based on review of the relevant information available at the time of writing. The opinions and conclusions presented are valid only to the extent that the information provided was accurate and complete.

2. EIA SCREENING PROCESS

2.1 Introduction

This section of the report discusses the legislative basis for screening so as to decide whether or not the proposed project requires an Environmental Impact Assessment Report (EIAR) to be prepared. It also sets out the project in terms of planning context.

2.2 EIA Applicable Legislations

Across the European Union, The Environmental Impact Assessment (EIA) Directive 85/337/EEC is in force since 1985 and applies to a wide range of defined public and private projects, which are defined in Annexes I (Mandatory EIA) and II (Screening-Discretion of Member States) of the directive. The EIA Directive of 1985 has been amended three times, 97/11/EC, 2003/35/EC and 2009/31/EC. These amended directives have been coded and replaced by Directive 2011/92/EU of the European Parliament and Council on the assessment of the effects of certain public and private projects on the environment (and as amended by Directive 2014/52/EU). Directive 2014/52/EU have been transposed recently in 2018 in Irish law under the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI 296 of 2018).

2.3 Mandatory EIAR Review

Annex I of the European Communities (EIA) Directive lists the activities for which a mandatory EIA is required. The proposed project is not listed in Annex I and hence it is not mandatory for an EIA to be carried out.

Annex II of the Directive lists the activities for which each member state is permitted to exercise discretion to decide whether an EIA is necessary. The project is also not listed specifically on Annex II.

Sub-threshold EIS (123A.) 2, of the Planning and Development Regulations 2001 – 2015.

(g) a place or site which has been included by the Minister for Arts, Heritage and the Gaeltacht in a list 151 of proposed Natural Heritage Areas published on the National Parks and Wildlife Service website, the State authority shall, in determining whether the development would or would not be likely to have significant effects on the environment, have regard to the likely significant effects of the development on such site, area, land, place or feature as appropriate.

The proposed works will be carried out in a proposed National Heritage Area (pNHA) - the Liffey Valley Meander Belt (NPWS Reference Number: 000393). Although not formally recognised under statutory basis their ecological value must be recognised by the Planning and Licencing Authorities.

Where a project is listed on Annex II or is a development that is not exempted, the national authorities of the member state have to decide whether an EIA is needed for a proposed project. This is done by the "screening procedure", which determines the effects of projects on the basis of thresholds/criteria or a case by case examination. Annex III of the Directive outlines the specific criteria that must be taken into account when a sub-threshold project is being examined for Environmental Impact Assessment. The screening procedure investigates whether the project has significant negative impact on the environment using different criteria including:

- Characterisation of the proposed development
- Location of proposed development

- Type and Characteristics of the potential impact

The relevant information to be provided Information for the Purposes of Screening Sub-threshold Development for Environmental Impact Assessment

1. A description of the proposed development, including in particular—
 - (a) a description of the physical characteristics of the whole proposed development and, where relevant, of demolition works, and
 - (b) a description of the location of the proposed development, with particular regard to the environmental sensitivity of geographical areas likely to be affected. 120 [296]
2. A description of the aspects of the environment likely to be significantly affected by the proposed development.
3. A description of any likely significant effects, to the extent of the information available on such effects, of the proposed development on the environment resulting from—
 - (a) the expected residues and emissions and the production of waste, where relevant, and
 - (b) the use of natural resources, in particular soil, land, water and biodiversity.
4. The compilation of the information at paragraphs 1 to 3 shall take into account, where relevant, the criteria set out in Schedule 7.”.

3. CHARACTERISTICS OF PROPOSED DEVELOPMENT

Schedule 7 of SI 296 of 2018 requires that the characteristics of proposed development are identified. In particular, it references the following sections:

3.1 Size and Design

The proposed project covers an area of 0.75 hectares. It is a slope stabilisation exercise along the banks of the River Liffey approximately 500m to the West of Ballymore Eustace, Co. Kildare. Details on the design are included in Sections 1.2 and 1.3.

3.2 Cumulation with other existing development/ development the subject of a consent

A review of Kildare County Council planning records for the area was undertaken. Immediately to the north of the site an application for planning permission for the restoration of a sand and gravel pit in the townlands of Kimmeens, Ballymore Eustace West and Coghlanstown East was granted to KTK Sand & Gravel Limited on the 28/01/2005 and has since been restored.

Further to the northwest, permission was granted to John Mulryan on the 25/05/2005 to develop a stable yard.

Kildare County Council refused an application on the 08/10/2007 by Armston Properties Limited for a housing development consisting of 72 units. This site is located to the southeast of the site. An application was lodged by Armston on the same site in 2010 which was withdrawn. Ballymore Ireland Contracting Services lodged an application for the same site in November 2018 to construct 84No. Dwellings, a crèche, gym, medical clinic and a retail unit to serve the dwellings. The dwellings will comprise of a mixture of two storey/single storey detached/semi-detached houses. No decision has been made.

These applications have been further assessed in terms of potential cumulative impacts. Taking into account of the site-specific details it is considered unlikely that any of the proposed developments will result in a cumulative impact (including potential cumulative traffic impacts, surface water quality, etc) with the proposed development which by its very nature is short term. Hence no significant cumulative impacts have been identified to the proposed development (either during the construction or operational phases), arising from committed developments (i.e. those granted permission but have not yet been constructed) in the immediate vicinity.

3.3 The nature of any associated demolition works

There are no demolition works required as part of the proposed project. Please refer to Section 1 for a full description of the works.

3.4 The use of natural resources, in particular land, soil, water and biodiversity

There will be no longterm use of any natural resource as this project by its very nature is of short-term duration and required to open the L6047 public road.

3.5 The production of waste

Any waste generated during the reprofiling will firstly be reused on site where possible e.g. the material excavated to create the diverted channel will be reused to backfill the channel upon completion of the works. In the event that offsite disposal is required for any material it will be managed in accordance with all relevant waste management legislation. At present it is estimated that there will be approximately 1050m³ of material generated during the slope

remediation process. There will be no generation of waste following the completion of the works.

3.6 Pollution and nuisances

There is the potential that there will be a temporary increase in noise during the proposed works. However, they will not exceed levels typical of construction works and are short-term in nature.

There will be a slight increase in traffic overall due to the removal of the generated soil material during slope realignment, however these will be short term in duration.

A small amount of dust will likely be generated during the works, however, this nuisance will be managed in line with best practice.

Surface water pollution via runoff including silt or hydrocarbons to the River Liffey is a potential source and pathway. The River Liffey is a pNHA. However, the appointed contractor will prepare a site-specific Construction Environmental Management Plan (CEMP) which will clearly set out all of the required environmental control measures needed.

It is also proposed that the works will be undertaken during the dry season and the associated construction timeframe will be short thus minimising the impact of sediment. A geotextile membrane will be placed at the base of the temporary channel to also reduce the production of sediment.

It is proposed that a silt curtain will be installed downstream of the temporary channel to capture any minor loss of sediment as the river changes course for the temporary channel and again when opening the permanent channel. This will minimise any potential impacts of sediment that could be generated during the works.

There will be no pollution or nuisance during operations i.e. following the completion of works.

3.7 The risk of major accidents, and/or disasters including those caused by climate change

There is minimal risk of major accidents or disasters including those caused by climate given the small-scale and temporary nature of the construction works. Any risks that are present are associated with typical construction risks including working with machinery. The CEMP will be prepared by the appointed Contractor to ensure all risks are addressed.

There will be no risks following construction.

3.8 Risks to human health – e.g. water contamination or air pollution

Risks to water will be minimised via construction in line with best practice. From a human health perspective, there are no reported source protection zones (SPZs) (groundwater) within a 2km radius of the proposed site. While there are reportedly 3No. wells in close proximity, one shallow one dates back to 1899 and is likely no longer in service. The two other boreholes were drilled to significant depths of 20m and 61.9m respectively which provides an element of protection. The Ballymore Eustace Water Treatment Plant is located at Bishopsland some 1.75km upstream of the site. Irish Water indicate that the area is within the Poulaphouca Regional Water Supply Zone and therefore it is likely that the majority of properties are on mains water.

Air pollution will be limited to typical construction nuisance such as dust given the short term nature of the works and that the works will be conducted in accordance with best practice

guidance. The same best practice guidelines will be applied to noise nuisance. Overall, the risk to human health is low.

4. LOCATION OF THE PROPOSED DEVELOPMENT

4.1 Information Sources

An understanding of the site setting and history was gained by undertaking a review of the following primary sources including:

- A review of available extracts of historical Ordnance Survey of Ireland (OSI) maps;
- National Monuments Service (NMS) viewer;
- A review of information held by the Environmental Protection Agency (EPA) EnVision online Mapping;
- Aerial images available of the site (OSI, Google and Bing);
- The Geological Survey of Ireland (GSI) online map tool;
- University College Dublin's Digital Library map tool;
- The National Parks and Wildlife Service online map tool;
- Appropriate Assessment Screening (Draft 04, 31st January 2019) Altamar
- River Liffey Flood Flow Modelling Report (K401-OCSC-XX-XX-RP-C-0014-S2-P02) OCSC
- Outline Construction Environmental Management Plan January 2019 (K401-OCSC-XX-XX-RP-C-0019-S2-P01) – Appended to this report.
- Factual Ground Investigation Report, Coghlanstown for the on the Slope Remediation, Ground Investigations Ireland, Project No. 7869-06-18, Revision C

4.2 Abundance, availability, quality and regenerative capacity of natural resources.

Limited natural resources will be required to complete the works. It is proposed that material generated during the works is reused on site. The relevant natural resources have been looked at in more detail in the following sections.

4.3 The absorption capacity of the natural environment

In the description of the site, the absorption capacity of the natural environment has, in accordance with Regulations, been screened paying particular attention to:

- (i) wetlands, riparian areas, river mouths;
- (ii) coastal zones and the marine environment;
- (iii) mountain and forest areas;
- (iv) nature reserves and parks;
- (v) areas classified or protected under legislation, including Natura 2000 areas designated pursuant to the Habitats Directive and the Birds Directive and;
- (vi) areas in which there has already been a failure to meet the environmental quality standards laid down in legislation of the European Union and relevant to the project, or in which it is considered that there is such a failure;
- (vii) densely populated areas;
- (viii) landscapes and sites of historical, cultural or archaeological significance.

4.3.1 Surrounding Land Use

As shown on Figure 1.2, the site's surrounding area is generally agricultural in nature with a disused sand and gravel quarry to the north. The site is bordered by the Road L6047 to the north with a restored sand and gravel quarry further north that was subject to Planning Application 041533. Farmland surrounds the remainder of the site to the east, south and west. The adjacent land uses are listed in Table 4.1 below. Refer to Figure 1.2 in Section 1 for an aerial photograph of the site.

Table 4.1 – Adjacent Land Uses

BOUNDARY	LAND USE
North	Road No. L6047 with a restored sand and gravel quarry further north.
South	Farmland to the south encompassing the area of Ballymore Eustace West.
East	Farmland to the east with the town of Ballymore Eustace further east.
West	Further farmland to the west with further meanders of the River Liffey further west.

4.3.2 Site Development

Aerial images of the site from 1995 and 2000 show the site layout as it is today with the only difference being the agricultural land use. Currently, the site consists of a meandering floodplain of the River Liffey with agricultural land surrounding the site to the east, south and west with the Road L6047 to the north with a possible previous sand and gravels extraction pit facility further north.

The 6" historical map (1837-1842) shows the site to be occupied by agricultural lands/pastures (refer to Figure 3.1). The historical path of the River Liffey is evident with the meander now extending north eastwards towards the L6047. A small island formation is evident as a result of this expansion of the meander.



Figure 4.1. Approximate location of the proposed development on 1837-1842 6 inch OS Map (Source: Ordnance Survey Ireland)

Very little change occurred within the proximity of the site throughout the 1800's and it remains very similar in the latest aerial images. Some minor development occurred within the town of Ballymore Eustace to the east during this period from 1842-1913. A lodge remained to the far south of the site during the period. Refer to Figure 3.2.

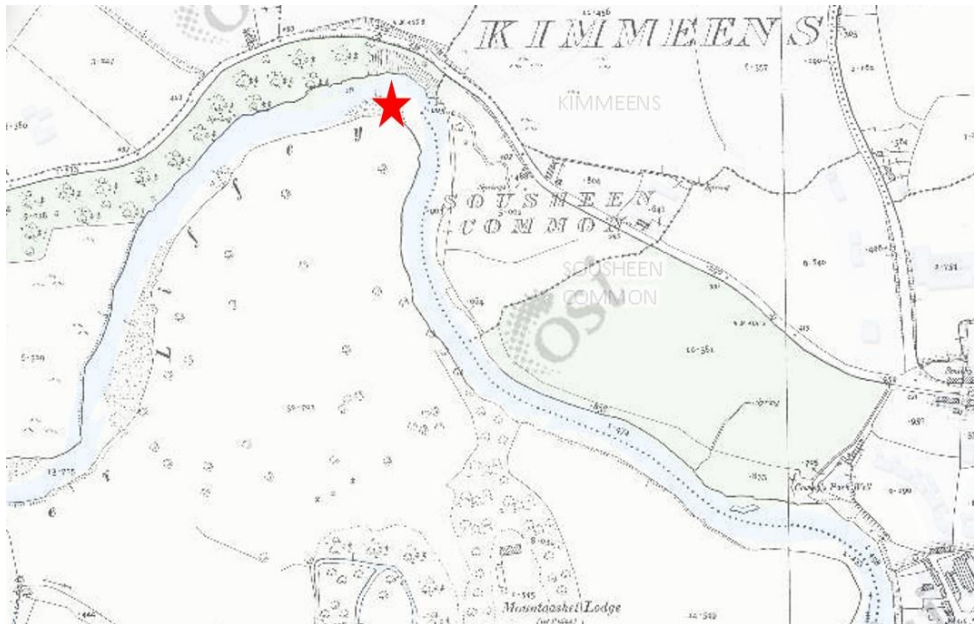


Figure 4.2 Approximate location of the proposed development on 1888-1913 25 Inch OS Map (Source: Ordnance Survey Ireland)

4.3.3 Site Physical Setting

Information regarding the site topography, hydrology, geology, hydrogeology and ecology of the area has been obtained from records held by the Geological Survey of Ireland (GSI), Environmental Protection Agency (EPA) Envision online mapping tool, Ordnance Survey of Ireland (OSI), Water Framework Directive Maps and National Parks and Wildlife Service (NPWS) databases.

4.3.4 Topography

The regional topography of the area is of farmland and generally is quite varied in elevations with the River Liffey carving a small valley through the area via a network of meanders in the river course. There is a steep slope located along the northern side of the river at the meander itself which is a typical feature of a large river.

4.3.5 Biodiversity

No designated sites have been identified adjacent to the site. An Appropriate Assessment Screening Report was prepared by Altemar which concluded *'As outlined in the AA screening the proposed works are not likely to have a significant on any features of interest or conservation objectives of Natura 2000 sites within 15km or the proposed works or Natura 2000 sites with a hydrological link to the proposed works. The proposed works will not impact on the feature of interest of Natura 2000 sites downstream of the works due to the nature of the works, the dilution and settlement of impacts, including silt, prior to reaching the marine 2000 sites in Dublin Bay and the significant instream distance between the proposed project and the SAC. No significant effects on Natura 2000 sites are likely. A Natura Impact Statement is not required.'*

The AA Report also states '*In order to protect local biodiversity features all works will be carried out in full compliance with Inland Fisheries Ireland and will ensure compliance with Water Pollution Acts. In addition all works will comply with Kildare County Council and National Parks and Wildlife Service conditions.*'

In summary, the appropriate assessment screening report attached in Appendix C stated the following:

- No greenfield habitats were present on site.
- No flora or fauna of conservation importance were noted on site.
- No invasive species were noted on or in proximity to the proposed works site.
- No species of conservation importance were observed within the site outline.
- However, a disused outlier badger's sett was noted to the west of the slippage, within the proposed works site. A derogation licence will be required for the removal of any badger sett (active or disused). The slope stabilisation process will result in the removal of the disused sett on site.
- No otters or holtswere noted within the works area, but otters would be expected to frequent the habitat in the vicinity of the watercourse. Atlantic salmon (*Salmo salar*), freshwater eel (*Anguilla anguilla*), brown trout (*Salmo trutta*) would be expected to be present, based on Inland Fisheries Ireland WaterFramework Directive sampling data from Kilcullen. Freshwater crayfish would also be expected in the River Liffey and are noted to be present on site by NBDC data. Several species of conservation importance have been observed within the potential zone of influence by the National Parks and Wildlife Service and the National Biodiversity Data Centre. NPWS Rare and protected data recorded otter on site within fine resolution and within the 1km grid Irish Stoat (*Mustela erminea* subsp. *hibernica*), Common Frog (*Rana temporaria*), Badger (*Meles meles*), Red Deer (*Cervus elaphus*), Sika Deer (*Cervus Nippon*) and flora including Basil Thyme (*Clinopodium acinos*) and Green-Winged Orchid (*Orchis morio*) are noted. Invasive species Canadian Waterweed (*Elodea canadensis*) and American Mink (*Mustela vison*) have been recorded by the NBDC in the vicinity of the proposed works.
- The bat habitat Suitability Index for bats ranged from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The area of the proposed works based on NBDC data gives a rating range of 35 to 43.

The report recommended in order to protect local biodiversity features that all works will be carried out in full compliance with Inland Fisheries Ireland and will ensure compliance with Water Pollution Acts. In addition, all works will comply with Kildare County Council and National Parks and Wildlife Service conditions.

The site is located on the eastern most part of a proposed Natural Heritage Area reference Liffey Valley Meander Belt 000393 where important chironomid communities have been recorded in this area. The site is of scientific interest as ash-woods and marshy areas of this type are rare in Co. Kildare.

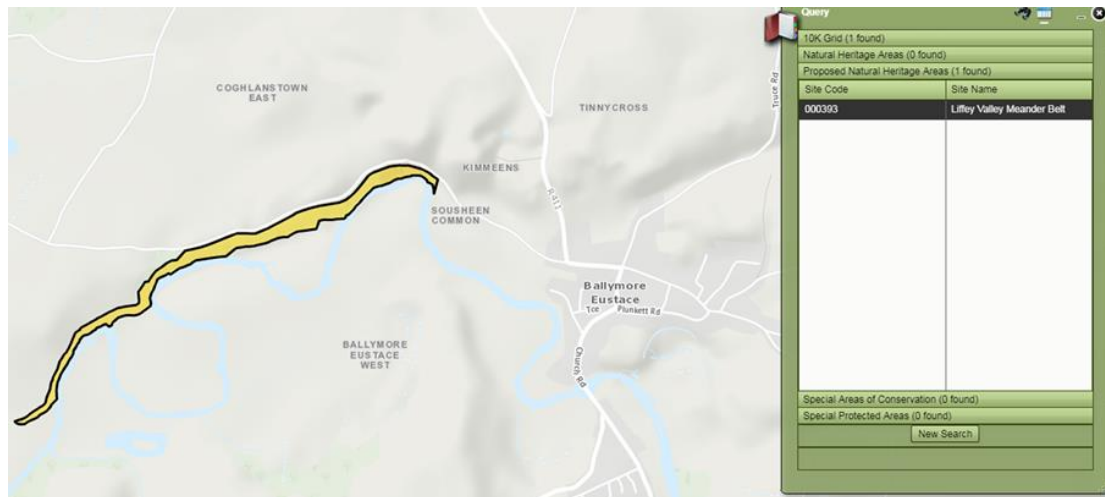


Figure 4.3 pNHA identification (NPWS)

The significant slope failure has occurred at Coghlanstown Ballymore Eustace has resulted in the loss of trees and continued undermining of trees further up the slope with the potential for impact of critical infrastructure services within the L6047 located above the pNHA. This road is now closed due to the risk of further slippage. The proposed works will stabilize the slope.

4.3.6 Area of Geological Interest

The Geological Survey of Ireland (GSI) online mapping service was consulted regarding areas of geological interest in the area of the site. The nearest area of geological heritage are the floodplains and meanders of the River Liffey as shown in Figure 3.3 below. The reason for the listing of the River Liffey as a County Geological Site (CGS) is indicated as 'Geological' with the feature being described as 'Broad floodplains and large-scale meanders of the Liffey Valley of Ballymore Eustace'. The site code is KE014 under theme IGH14.

Further east of the site along the River Liffey's meandering path past Ballymore Eustace town itself, lies an additional area of geological interest named Britonstown. The site is described as two interlocking glacial meltwater channels, formed by water escaping from the glacial Blessington Lake. The site code is WW014 under theme IGH7. The reason for the listing is described as 'A site with good teaching potential on glacial meltwater erosion, as the feature is accessible'.

Geology is recognised as an intrinsic component of natural heritage in three separate pieces of legislation or regulations, which empower and require various branches of Government and statutory agencies to consult and take due regard for conservation of geological heritage features. These are:

- Planning and Development Act 2000 [e.g. Sections 212 (1)f; Part IV, 6; First Schedule Condition 21],
- Planning and Development Regulations 2001,
- Wildlife (Amendment) Act 2000 [enabling Natural Heritage Areas]

The Planning and Development Act 2000 and the Planning Regulations, in particular, place responsibility upon Local Authorities to ensure that geological heritage is protected. The Kildare County Council Development Plan 2017-2023 identified the following:

NH 16:

To maintain the conservation value and seek the sustainable management of the County's geological heritage resource.

Implementation of the Heritage Act 1995, through Heritage Officers and Heritage Plans, and the National Heritage Plan 2002, recognise County Geological Sites and allow them to be integrated into County Development Plans. The overall impact of the proposed project on the floodplains and meanders of the River Liffey will be negligible as works have been solely proposed for a small part of the meanders in order to stabilise the slope on the floodplain of the river in a particular area in order to facilitate the reopening of a critical local infrastructure roadway.

County Geological Sites (CGS) are included in County Development and County Heritage Plans and are protected under their respective county policy. The Geoheritage Programme a GSI have been contacted for comment. Siobhan Power, GSI, pers com. stated that the GSI recognise the works are essential works on a small portion of the CGS which will not significantly impact the current meanders. Written confirmation to be received.

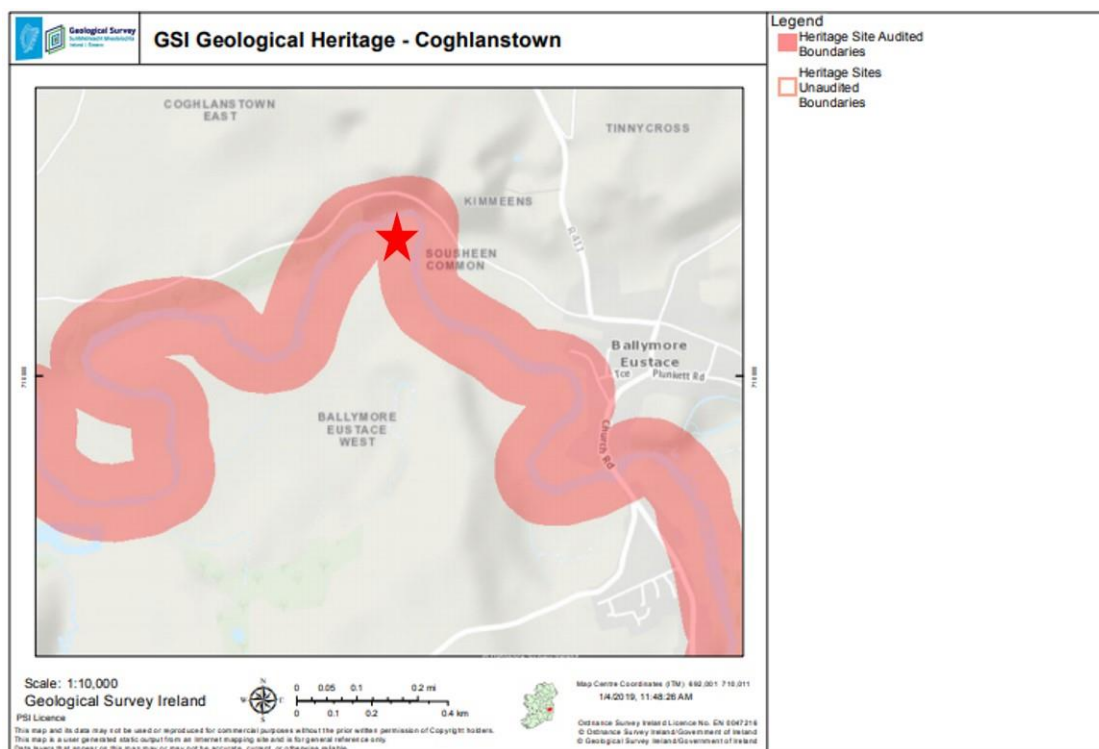


Figure 4.4 Approximate location of the proposed development with nearest area of Geological Heritage

4.3.7 Soils and Subsoils

According to the Teagasc Soil Information System, the topsoil and subsoil beneath the site has been classified into one main category, made Alluvium. This is expected given the nature of the site consisting the floodplain of the River Liffey itself. The topsoil of the surrounding area consists of a number of various soil types with the site located within a convergence zone. Further to the south of the site the soil is described as Till derived chiefly from lower Palaeozoic rocks. Further east within the proximity of the town of Ballymore Eustace the soil is described as Made Ground. To the northwest of the site the soil is indicated as Till derived chiefly from limestone and to the northeast Glaciofluvial sands and gravels. Refer to Figure 4.5 from the GSI online mapping for further information.

The subsoil has been classified as the same as the topsoil. The topsoil and subsoils within this area are expected due to its glacial past. The various tills resulted from glaciations which covered the region during the Pleistocene and Quaternary periods. The grinding action of this ice sheet as it eroded the underlying limestone and shale, together with the loading effect, resulted in the formation of a very dense low-permeability deposit with pockets of coarse gravel (Long et al, 2012). Local withdrawal and recession of the ice sheet led to the formation of fluvioglacial sediments (gravel and sand lenses) and glaciomarine sediments (stiff/firm laminated clays, silts and sands). The glacial deposits can exhibit significant lateral and vertical variations in grain size distribution over short distances. The Gravel deposits in the area are expected to be at least 10m thick and this was proven by the Geotechnical investigation. Further drilling evidence from Kildare suggest the thickness of the deposit varies from 10-30m. Generally, the subsoil of the site consists of gravel deposits either side of the River but are considered as one because it is assumed that they are connected beneath the narrow stretches of alluvium that separate them on the surface.

Site Investigation carried out across the site and attached in Appendix D show that the proposed site is underlain by a layer of Made Ground described as 'Brown Gravelly Sand', 'Brown Sandy Gravel' or in one borehole the top soil layer is described as 'Topsoil'. The Made Ground ranged in thickness from a minimum of 0.15m to a maximum of 1.2mbgl. The investigation also showed the presence of Alluvium, comprised mainly of layers of SAND, GRAVEL and CLAY. The CLAY layer thickness ranged from a minimum of 0.3m to a maximum of 1.4m and was noted to be smaller in thickness than the SAND and GRAVEL layers. This layer of alluvium is commonly encountered near river valleys and deltas as it was laid by the flowing floodwater in comparatively recent geological periods (10,000 years ago to today).

The expected generated residues in the form of soil waste is expected to be minimal/negligible. The soil which will be generated from the digging of the temporary diversion channel will be stockpiled on site and be reused to backfill the excavated channel when the stabilisation works on the main permanent channel is completed.

The surplus soils generated during the stabilisation of the main permanent channel will be used on site as backfill where possible. If offsite disposal is required material will be sent for reuse off-site, sent for recovery in a licensed waste recovery facility or as a last resort disposed in a suitably licenced waste facility (landfill) in accordance with the Waste Management Act. Written confirmation will be obtained from the proposed Receiver (either under an Article 27 Declaration or Waste Permission) in advance of materials being removed from site.

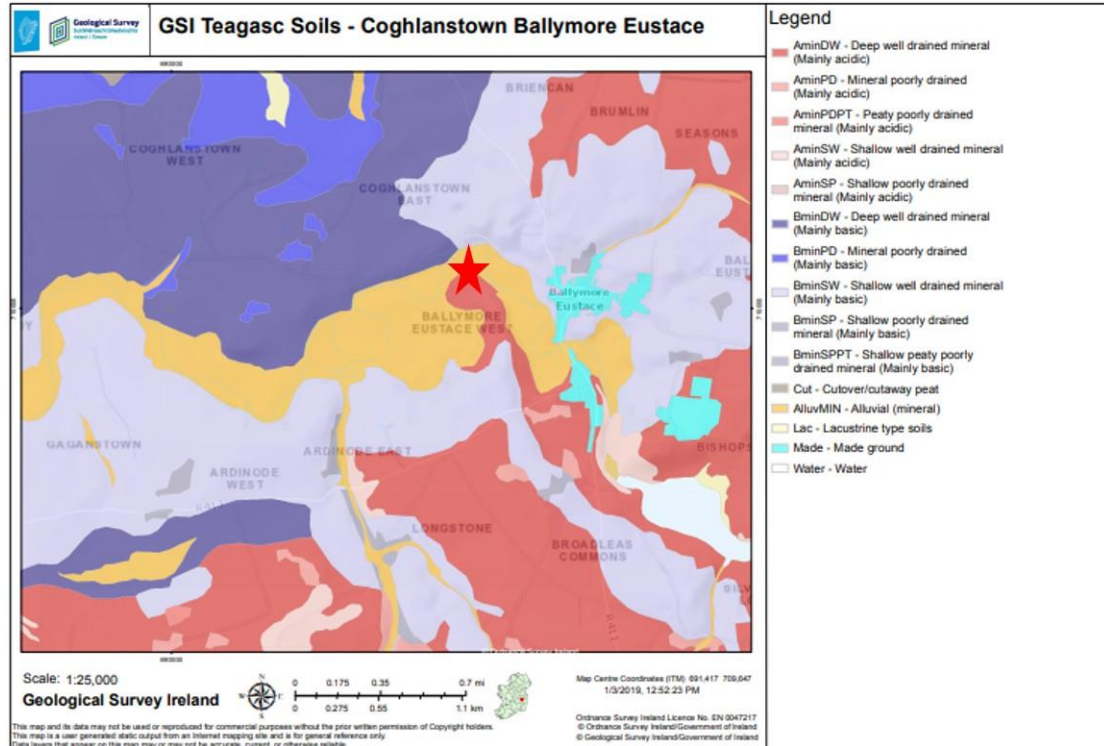


Figure 4.5 Teagasc Topsoils and Subsoils

4.3.8 Geology

The bedrock of the greater Coghlanstown Ballymore Eustace region consists of Llandovery-Ludlow series of Greywacke and Shale. The Greywacke and Shale thickness is unknown but forms part of the Tipperkevin Formation. The Formation consists of medium and fine-grained Greywacke and Shale. The local bedrock geology mapped by the GSI is illustrated in Figure 4.6.

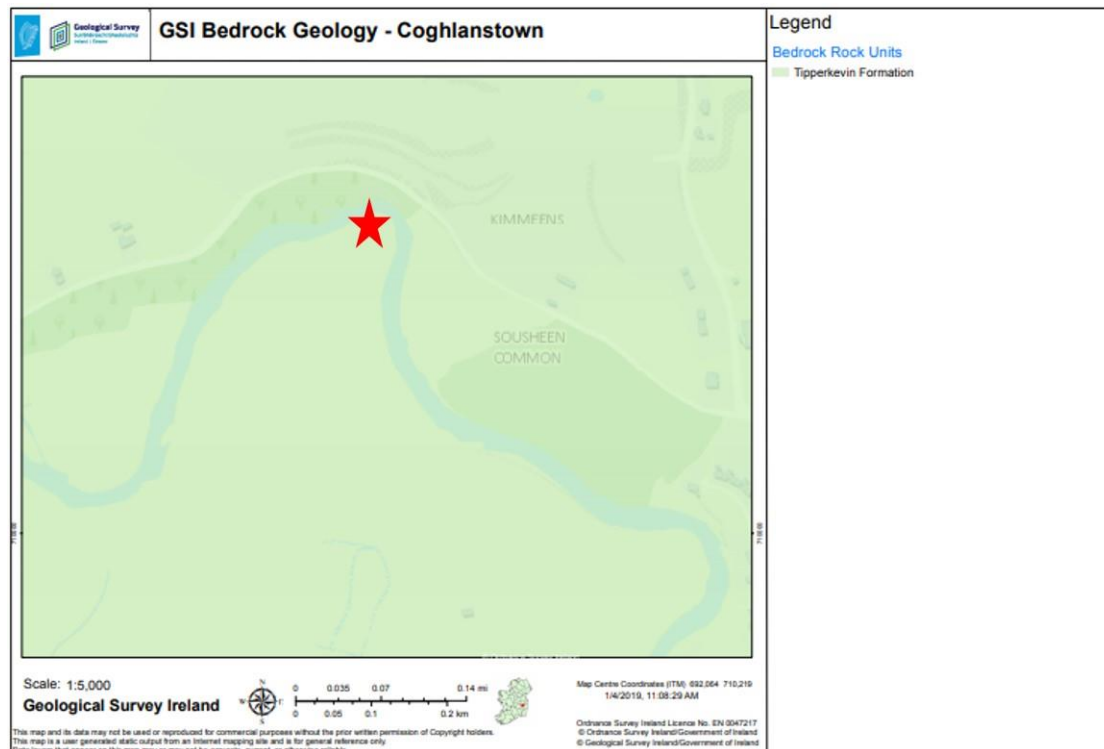


Figure 4.6 Geology

There are no major geological faults mapped in the vicinity of the site.

4.3.9 Aquifers

There are two 2No. groundwater aquifers beneath the site, the shallower Sand and Gravel aquifer and the deeper Tipperkevin formation bedrock aquifer. The primary Groundwater Body (GWB) in the region is the Ballymore Eustace GWB, which is the bedrock aquifer. The bedrock GWB covers some 37.24km² and includes all of the Ballymore Eustace town extending southwest towards the Dunlavin area in two distinct spurs. It has been designated as a poorly productive aquifer being Generally Unproductive except for Local Zones. The Gravel aquifer has been designated as locally important aquifer and covers a small area of some 1.4 km². The bedrock aquifer is a fracture system i.e. it is dominated by secondary (fracture or fissure) flow with very little to no flow within the matrix i.e. the bedrock is largely impermeable.

The GSI provides a methodology for aquifer classification based on resource value (Regionally Important, Locally Important and Poor) and vulnerability (Extreme, High, Moderate or Low). Resource value refers to the scale and production potential of the aquifer whilst vulnerability refers to the ease with which groundwater may be contaminated by human activities (vulnerability classification primarily based on the permeability and thickness of subsoils). The aquifer beneath the site is a bedrock aquifer which is described as a Poor Aquifer (PI) which is generally unproductive except for Local Zones (Refer to Figure 4.7).

Ground Investigation carried out on the proposed site with 4No. boreholes were drilled using a combination of cable percussion and follow on rotary coring. Bedrock was not encountered in any investigation location, the boreholes terminated at depths ranging from a minimum of 6m to a maximum of 26.2m below ground level.

The impact of the proposed project on the aquifers beneath the site will be negligible. Any impact to the gravel aquifer could occur mainly during the stabilisation works however, the

proposed stabilisation works will not alter or impede groundwater flow as the proposed project does not include a permanent structure or a cut-off barrier.

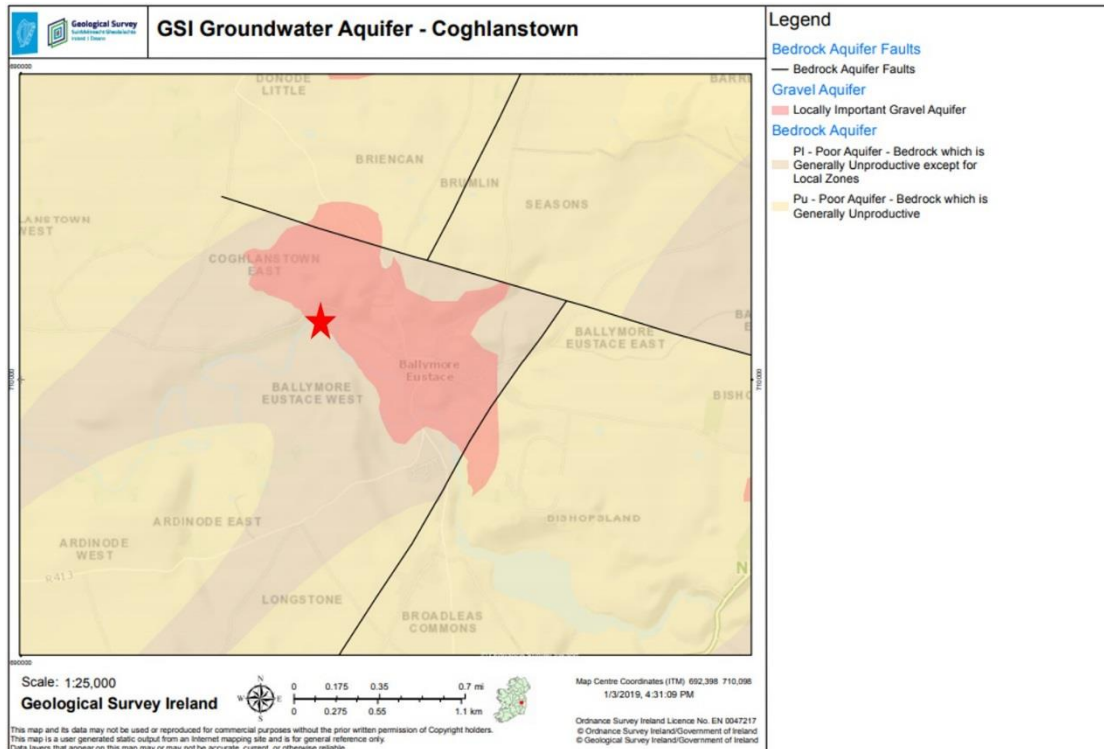


Figure 4.7 Aquifers

4.3.10 Aquifer Vulnerability

The groundwater vulnerability beneath the site is described as Moderate; refer to Figure 4.8 (GSI 2016) which indicate there is a layer of moderate permeability overburden overlain by poorly drained gley soil. Vulnerability ratings are related to a function of overburden thickness and permeability which might offer a degree of protection and/or attenuation to the underlying aquifer from surface activities and pollution. The site is bordered to the north by a 'High' vulnerability rating area. The moderate and high vulnerability is justified given the presence of granular soils encountered during the ground investigations.

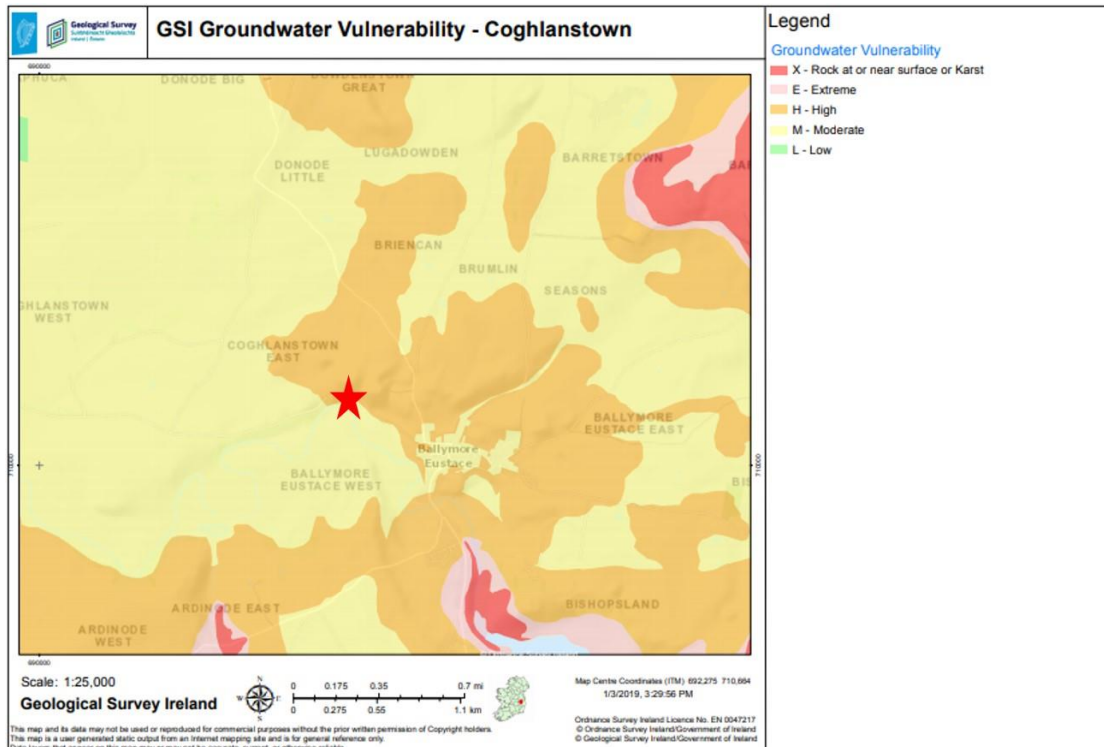


Figure 4.8 Aquifer Vulnerability

There were no karst features identified adjacent to the site.

4.3.11 Groundwater Status

An assessment carried out under the Water Framework Directive (WFD) 2010-2015 groundwater body (EPA, 2018) has concluded that the groundwater within the bedrock aquifer is presently of “Good Status”. The objective is to protect the “Good Status” by recognizing that the quality of groundwater is at risk due to point and diffuse sources of pollution (see Figure 4.9). Note, the green colour within the area on the figure is ‘Good Status’.

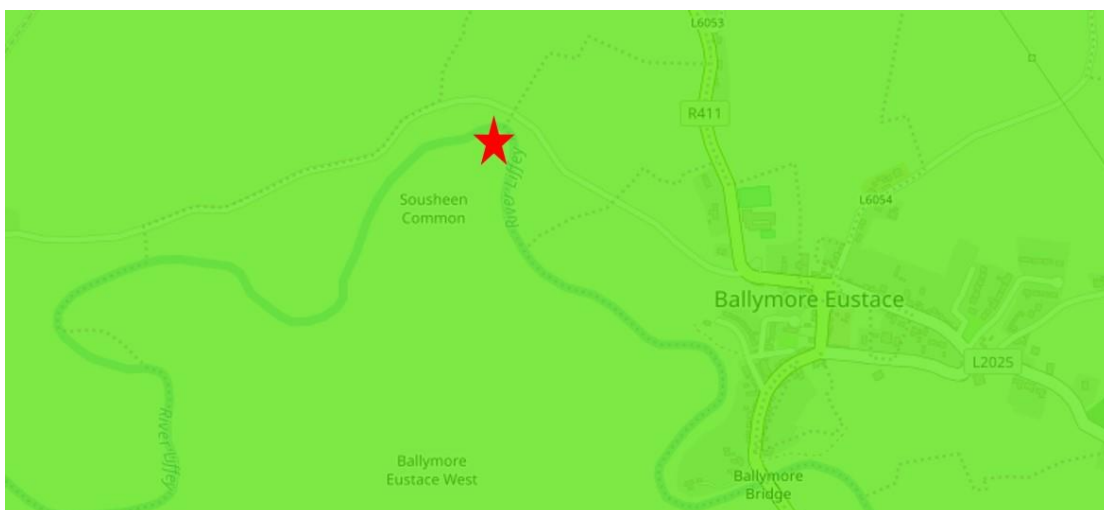


Figure 4.9 WFD Status 2010-2015

As part of this assessment, the risk status of the bedrock aquifer was also assessed. The groundwater bodies risk status is described as 'Not at Risk' for the bedrock aquifer (see Figure 4.10). Note, the green colour within the area on the figure is 'Not at Risk'.

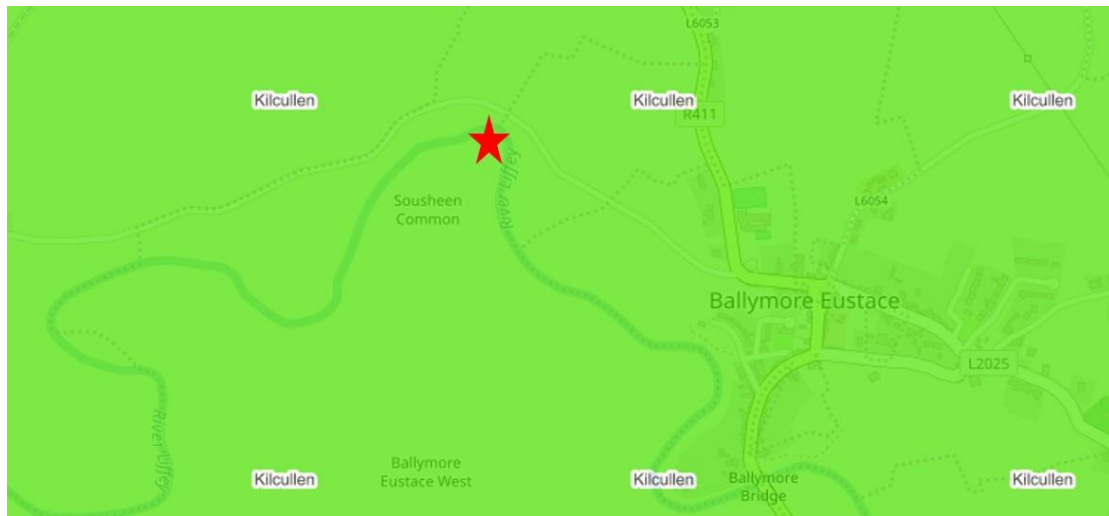


Figure 4.10 Ground Waterbodies Risk Status

4.3.12 Groundwater Recharge

Diffuse recharge generally occurs via rainfall percolating through the subsoil with its rate being higher in areas where the subsoil is thinner and/or more permeable. The proportion of effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil and subsoil, and by the slope. The site in its current state and after the completion of the proposed development will continue to have a significant recharge capability due to the limited area of impermeable surface. The recharge for the re-engineered slope will be slightly reduced due to the installation of a drainage blanket within the slope 10m above the river level which will result in direct discharge of percolating rainfall from the slope therefore ensuring no build-up of water pressures behind the slope. This reduction in recharge is considered insignificant and necessary. The GSI's groundwater recharge model parameters for the site are summarised in Table 4.2. Figure 4.11 contains the drawing from the GSI indicating the recharge rate.

Table 4.2 GSI Groundwater Recharge Parameters

Groundwater Recharge Parameters	
Average Recharge (mm/yr):	104
Hydrogeological Setting:	3.ii
Hydrogeological Setting Description:	Moderate permeability subsoil and overlain by poorly drained gley soil
Soil Drainage:	Wet
Subsoil Type:	Gravels
Subsoil Description:	Alluvium
Subsoil Permeability:	Moderate
Subsoil Permeability Description:	Moderate

Groundwater Recharge Parameters	
GW Vulnerability:	M
GW Vulnerability Description	Moderate
Aquifer Category:	PI
Aquifer Category Description:	Locally Important Sand/Gravel Aquifer
Recharge Coefficient (%):	22.50
Maximum Recharge Capacity (mm/yr):	0
Effective Rainfall (mm/yr):	462

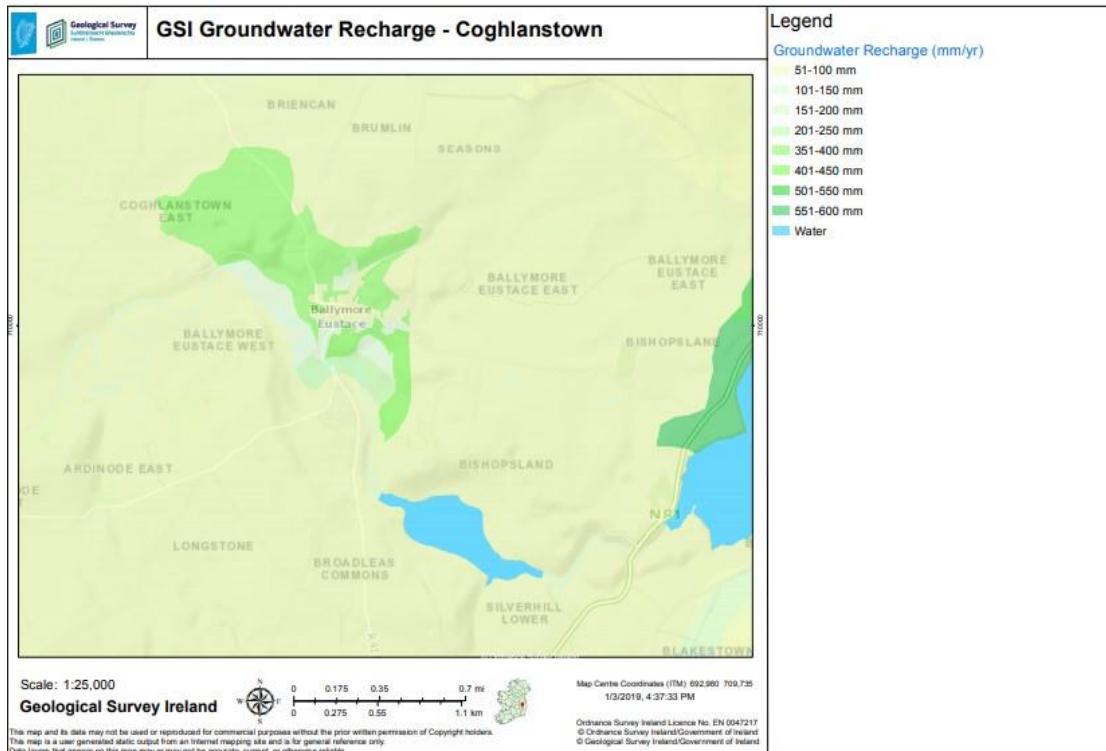


Figure 4.11 Groundwater Recharge

4.3.13 Wells & Springs

A search of the GSI groundwater well database was conducted to identify registered wells in the surrounding area. The three nearest wells as seen in Figure 3.11 and associated well data is outlined in Table 4.3. The well located at a residential property located off the Road L6047 is the closest to the site which was drilled to a relatively shallow depth of 20m with the yield unknown.

Table 4.3 Nearby GSI Groundwater Wells

GSI Name	2921SWW207	2919NWW201	2919NWW204
Distance to site (m)	245	850	996

Well Type	Borehole	Borehole	Borehole
Drill Date	March 12, 2001	November 27, 1990	December 30, 1899
Depth (m)	20	61.9	12.2
Depth to rock confidence	19.6	Unknown	Unknown
Location	Residential Property off L6047	Ballymore Eustace	Ballymore Eustace
Easting	292,330.00	292,740.00	292,880.00
Northing	210,300.00	209,810.00	209,760.00
Well use	Unknown	Unknown	Unknown
Yield class	Unknown	Poor	Poor
Yield m³d	Unknown	32.7	27.3

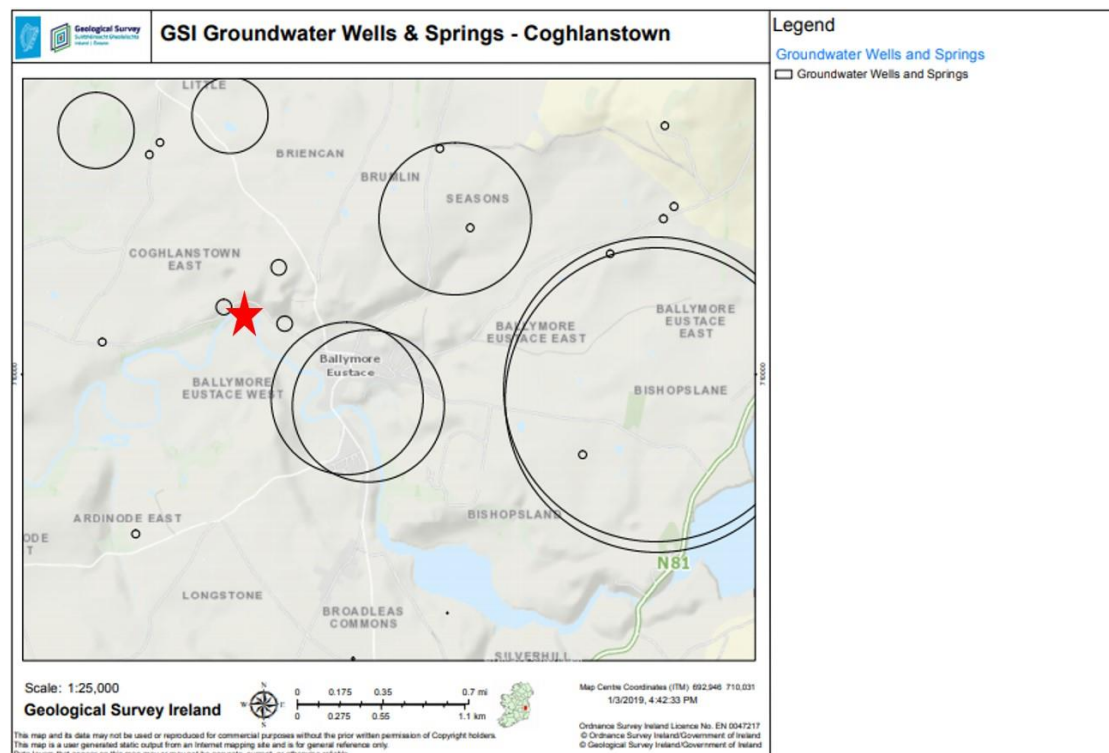


Figure 4.12 Wells and Springs

The GSI (1999) also provides a framework for the protection of groundwater source zones (e.g. areas of contribution to water supply bores). There are no reported source protection zones (SPZs) within a 2km radius of the proposed site.

Based on a review of available information, local groundwater flow is expected to the West/Northwest.

4.3.14 Hydrology

As the nature of the project involves re-engineering the course of the River Liffey itself, the project could pose a moderate potential impact to both its status and risk status during the construction phase and also for a period of time following completion.

The River Liffey originates from a number of small streams in the Liffey Head Bog between Kippure and Tonduff in the Wicklow Mountains before making its way down towards County Kildare. In the locality of the site, the River Liffey is at the end of the middle course river stage entering into the lower course stage with significant meanders in its course around Ballymore Eustace. Based on the most recent water quality information 2010-2015 (EPA 2018) the River Liffey water body is described as Moderate status (refer Figure 4.13). Under the Water Framework Directive it has also been identified as 'at risk of not achieving good Status' under the WFD Risk Score (refer Figure 4.14).

The EPA also operates a water quality station slightly downstream of the site location and another at the Ballymore Bridge.

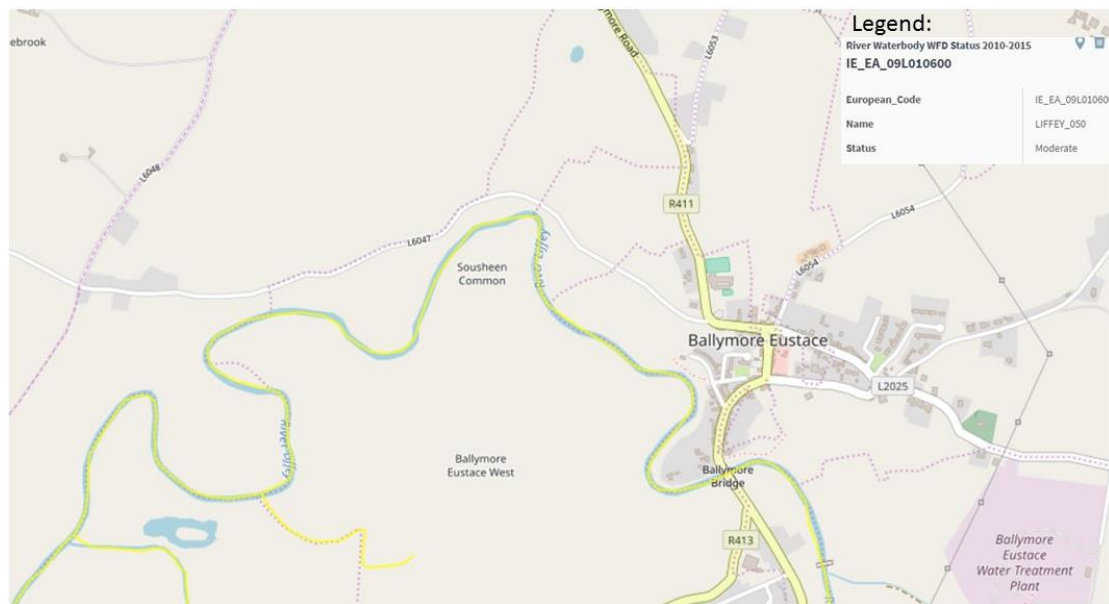


Figure 4.13 WFD Status (EPA 2018)

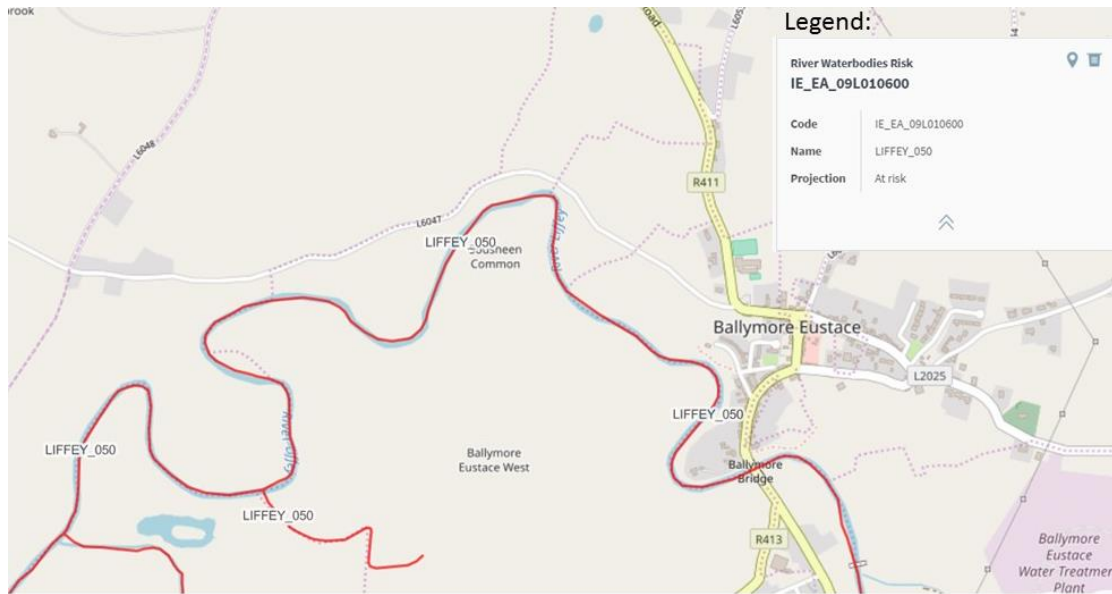


Figure 4.14 WFD Risk Scores (EPA 2018)

There is some nearby strategic infrastructure namely, the Ballymore Eustace Water Treatment Plant which is located at Bishopsland, some 1.75 km to the east (upstream) of the site. Refer to Figure 4.15. Also, the Electricity Supply Board (ESB) which are in charge of operating dams in Ireland, operates the Golden Falls dam for its hydroelectricity plant at Golden Falls, some 1.4 km east to the site (also upstream). According to ESB, the average daily inflow from the River Liffey to the Golden Falls facility averaged over the period 5/11/2018 to 02/01/2019 from a minimum of 2m³/s to a maximum of 20m³/s.



Figure 4.15 Liffey Hydrometric Information (Source: ESB)

The site is located on the floodplains of the River Liffey. The Office of Public Works (OPW) is the national agency responsible for overseeing flood management. Under this remit and in accordance with the requirements of European Union 'Floods' Directive (2007/60/EC), the OPW published the Draft Preliminary Flood Risk Assessment (DPFRA) in 2011 and the National Preliminary Flood Risk Assessment (PFRA) Overview Report in 2012. The objective of the PFRA was to identify areas where the risks associated with flooding might be significant. Further more detailed studies were then undertaken on certain locations referred to as Areas for Further Assessments (AFAs). The more detailed assessments took place through the Catchment Flood Risk Assessment and Management Studies (CFRAM). The location of the site in Ballymore Eustace/Coghlanstown falls under the Eastern CFRAM Study. An extract from the Maps from the CFRAM study is shown in Figure 4.16 below.

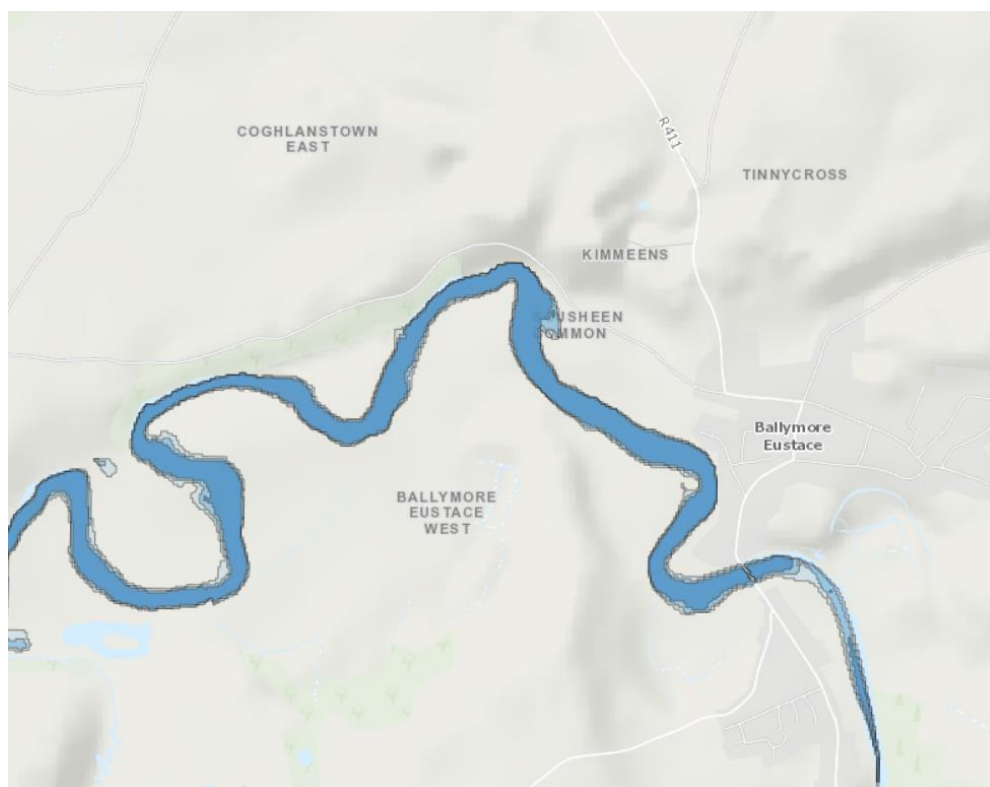


Figure 4.16 Eastern CFRAM fluvial risk mapping (Source: Floodinfo.ie)

The CFRAM maps show that the site is located in a fluvial High Probability flooding area. The High Probability for fluvial flooding events have approximately a 1-in-a-10 chance of occurring or being exceeded in any given year. This is also referred to as an Annual Exceedance Probability (AEP) of 10%. The temporary channel's geometry proposed by OCSC have been designed to cater for a fluvial flood event having an AEP of 10%, the flood modelling report is attached in Appendix B at the end of this report. The impact of the temporary channel on fluvial flood risk is hence considered as no impact/negligible impact.

4.3.15 Protected Structures and Landscape

National Monuments Service (NMS) maps show that there are no protected structures located within and/or surrounding the site and its neighbouring areas as shown in Figure 4.17. The nearest protected structure is located further south from the site in the form of Mount Cashel Lodge but will see no effects due to the distance from the site.

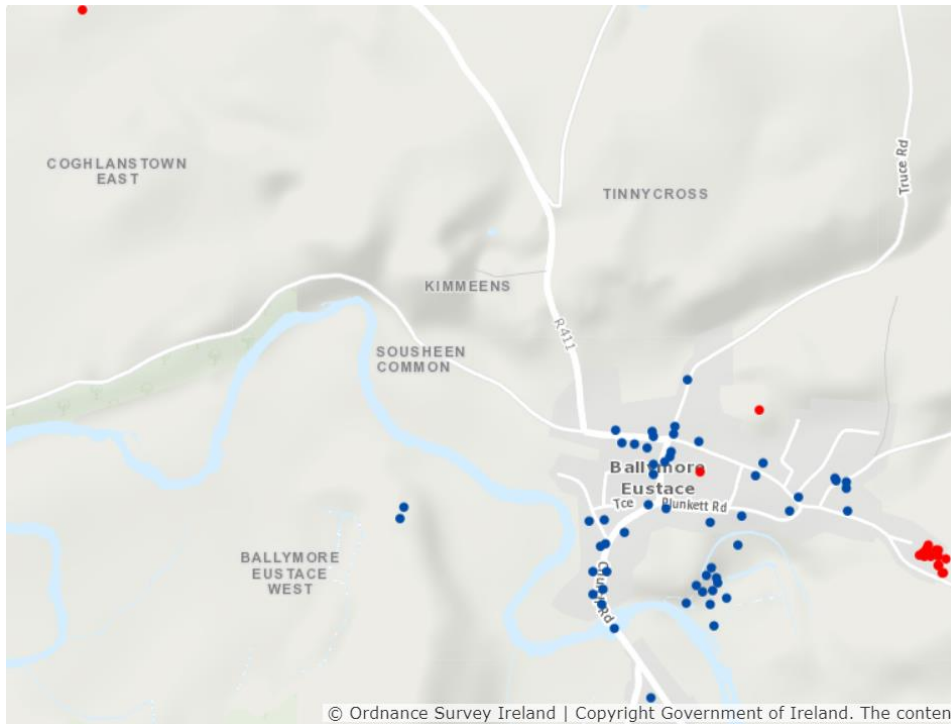


Figure 4.17 Protected structures within and surrounding site's boundary

The Kildare County Development Plan for 2017-2023 was consulted in relation to protected or designated landscapes. No zone of Archaeological potential, protected view/objective, scenic route, tree preservation order, walking route or tree or woodland preservation objectives were noted within the locality of the proposed site. Refer to Figure 4.18 for the relevant map from the development plan with the site location indicated.

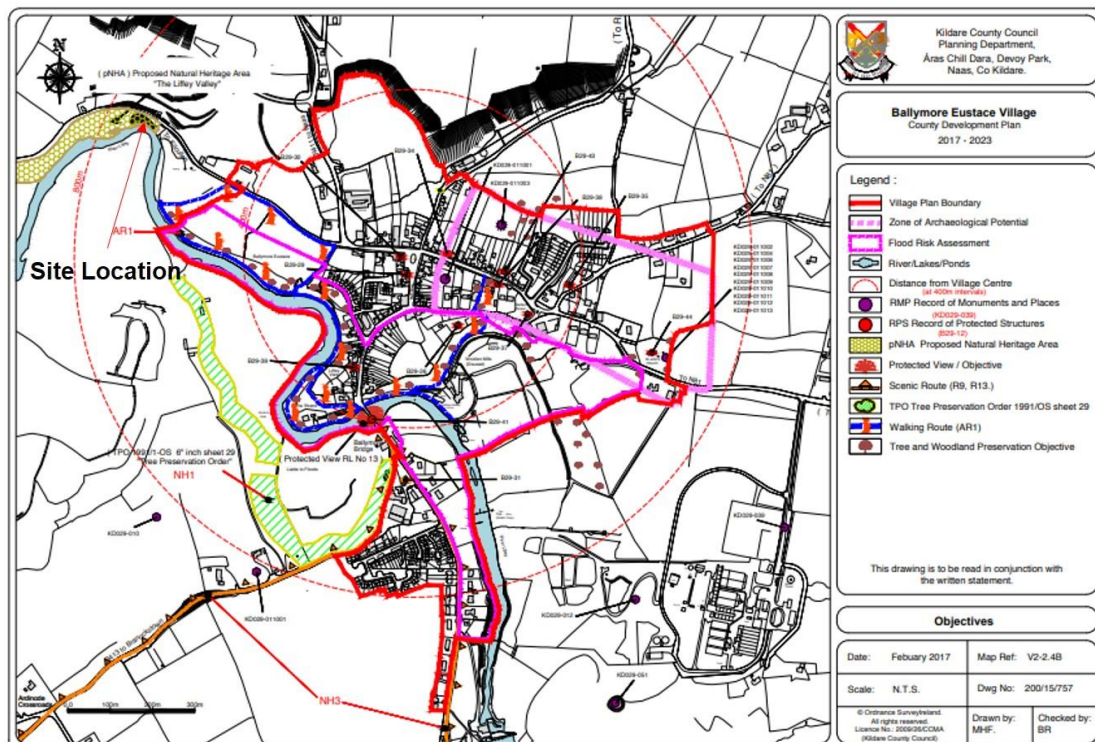


Figure 4.18 Ballymore Eustace Village Development Plan (Source: Kildare County Council)

5. TYPES AND CHARACTERISTICS OF POTENTIAL IMPACTS

The likely significant effects on the environment of proposed development in relation to the following criteria:

5.1 Magnitude and spatial extent of impact

Small area affected which are limited to the slope requiring stabilisation. Any potential impacts are not likely to be significant.

5.2 The nature of the impact

Small area affected which has been limited to the slope requiring stabilization, associated river channel and any site compounds required. Any potential impacts are not likely to be significant.

5.3 The transboundary nature of the impact

There is no potential for transboundary impacts.

5.4 The intensity and complexity of the impact

Small area affected which has been limited to the slope requiring stabilization, associated river channel and any site compounds required. Any potential impacts are not likely to be significant.

5.5 The probability of the impact

Small area affected which has been limited to the slope requiring stabilization, associated river channel and any site compounds required. The probability of impacts is low taking into account the following considerations:

- A project specific CEMP will be prepared by the appointed contractor – an outline is contained in Section 6.
- Design measures have incorporated into the design to ensure that there is minimal risk specifically to surface water. IFI were consulted in relation to their requirements.
- The receiving environment is not considered significantly sensitive albeit the site is located on the eastern edge of a pNHA. However, the slope destabilization has already impacted on the slope and health of some trees.

5.6 The expect onset, duration, frequency and reversibility of the impact

Small area affected which has been limited to the slope requiring stabilization, associated river channel and any site compounds required. Duration ca. 5 months. Required in order to prevent further slope destabilization and facilitate the reopening of the local road.

5.7 The cumulation of the impact with the impact of other existing and/or development

Small area affected which has been limited to the slope requiring stabilization, associated river channel and any site compounds required. As previous detailed there are no cumulative impacts arising from this or existing/proposed projects.

5.8 The possibility of effectively reducing the impact

Small area affected which has been limited to the slope requiring stabilization, associated river channel and any site compounds required. The CEMP which will be prepared taking into account all of the site details will take account of all required mitigation measures.

It is expected that this proposal will have a slight positive impact on human beings, population and human health by providing employment opportunities during the works and facilitating the reopening of L6047.

Potential exists, particularly at the construction stage for an amount of nuisance associated with localised traffic disruption and construction noise and dust. However, for the most part construction works related to this project are likely to be 'low-key' and temporary and mitigation measures including silt curtains during the opening of the temporary and permanent channels will ensure that there is no impact to surface water from sediments (suspended solids).

5.9 Screening Decision

Having regard to the above, and in particular to the nature, scale and location of the proposed project, by itself and in combination with other plans and projects, it is considered that the overall impact on the receiving environment is considered low.

Therefore, it is not considered that an EIA is required at this time. Please refer to the completed Screening Checklist identified in European Commission publication Environmental Impact Assessment of Projects, Guidance on Screening (2017).

Checklist	Response
Will there be a large change in environmental conditions?	No
Will new features be out-of-scale with the existing environment?	No
Will the impact be unusual in the area or particularly complex?	No
Will the impact extend over a large area?	No
Will there be any potential for transboundary impact?	No
Will many people be affected?	Minor temporary impacts. Overall positive impact in reinstating access.
Will many receptors of other types (fauna and flora, businesses, facilities) be affected?	No (refer to AA screening and outline CEMP)
Will valuable or scarce features or resources be affected?	No (refer to AA screening and outline CEMP)
Is there a risk that environmental standards will be breached?	No (refer to AA screening and outline CEMP)
Is there a risk that protected sites, areas, features will be affected?	No (refer to AA screening and outline CEMP)

Is there a high probability of the effect occurring?	No
Will the impact continue for a long time?	Temporary short term.
Will the effect be permanent rather than temporary?	No (refer to AA screening and outline CEMP)
Will the impact be continuous rather than intermittent?	Temporary short term during construction. No impact following.
If it is intermittent will it be frequent rather than rare?	-
Will the impact be irreversible?	-
Will it be difficult to avoid, or reduce or repair or compensate for the effect?	-

Respectfully submitted

On behalf of OCSC Multidisciplinary Consulting Engineers



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MSc (Env. Eng), MIEI

ENVIRONMENTAL ENGINEER



Appendix

Construction Environmental Management Plan

**SLOPE REMEDIATION PROJECT AT
COGHLANSTOWN, BALLYMORE EUSTACE
OUTLINE CONSTRUCTION ENVIRONMENTAL
MANAGEMENT PLAN**

PROJECT NO. K401

JANUARY 2019



OCSC

O'CONNOR | SUTTON | CRONIN

Multidisciplinary
Consulting Engineers



SLOPE REMEDIATION PROJECT AT COGHLANSTOWN, BALLYMORE EUSTACE

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

KILDARE COUNTY COUNCIL

PROJECT NO. K401

JANUARY 2019

**OUTLINE CONSTRUCTION
ENVIRONMENTAL MANAGEMENT PLAN**

FOR

**SLOPE REMEDIATION PROJECT AT
COGHLANSTOWN, BALLYMORE EUSTACE**



OCSC

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DOCUMENT CONTROL & HISTORY

OCSC Job No.: K401	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
	K401	OCSC	XX	XX	RP	C	0019	S2	P01
Rev.	Status	Authors	Checked	Authorised	Issue Date				
P01	Report	P. O'Neill	B. Heron	B.O'Rourke	31/01/19				

**OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR
SLOPE REMEDIATION PROJECT AT COGHLANSTOWN, BALLYMORE
EUSTACE**

JANUARY 2019

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APPENDICES

APPENDIX A. ACCESS TO SITE

APPENDIX B. POTENTIAL SITE COMPOUND LOCATIONS

APPENDIX C. PHASE A AND PHASE B SLOPE CLEARANCE

APPENDIX D. TEMPORARY CHANNEL

APPENDIX E. TYPICAL CROSS SECTIONS

1 INTRODUCTION

1.1 Introduction

This outline Construction Environmental Management Plan (CEMP) defines the project specific environmental measures that are to be put in place and procedures to be followed for the scope of construction works, both permanent and temporary for the Slope Remediation Project at Coghlanstown, Ballymore Eustace.

This outline CEMP is produced as part of a Part 8 planning application. It is intended that this document will be updated to include more site specific information following the appointment of the Contractor for the works. The conditions outlined in this document must be fully integrated into the works method statement and briefed to all staff. Any further conditions placed on the works by a statutory body must be adhered to and implemented on site. This includes Kildare County Council, Inland Fisheries Ireland (IFI), National Parks & Wildlife Services (NPWS) or others.

The purpose of the outline Environmental Management Plan is:

- To provide the Contractor with work practices and methodology which will minimise environmental risk and take into account the environmental considerations as outlined by the IFI and NPWS;
- Ensure compliance with relevant legislation; and

Identify key environmental aspects of the site and provide appropriate control measures.

1.2 Proposed Development

Slope failure occurred along the north bank of the River Liffey, west of Ballymore Eustace in August 2016. As a result, the local road (L6047) was closed to the public. In order to re-open the road to the public the proposed works include the following;

- The permanent realignment of the existing River Liffey. This is required to facilitate the slope re-stabilisation works. The slope will be re-built at a natural angle of repose;
- Road maintenance work to the L6047 covering a length of 300m; and
- A temporary realignment of the River Liffey will be constructed so that works on the permanent alignment and the slope re-stabilisation can take place in dry conditions.

2 INDICATIVE CONSTRUCTION PROGRAMME

It is proposed that construction will commence once planning permission is received (circa. June 2019). The proposed construction programme is 6 months. An indicative construction sequence is described below, it should be noted that this construction sequence is just an overview and the actual sequence will be confirmed following the appointment of the Contractor. The methodology and approach to construction is also assumed. This will be confirmed following the appointment of the Contractor. All elements and stages of the proposed River Liffey diversion and slope stabilisation will be carried out in full consultation and in compliance with IFI and NPWS. This section covers:

- Hours of Working;
- Site Access;
- Potential Site Compound Locations;
- Preliminary Construction Works – Phase A;
- Main Construction Works – Phase B and
- Plant and Equipment.

2.1 Hours of Working

Normal working hours during the construction phase will be as follows:

Start	Finish	
0700	1800	Monday to Friday
0800	1400	Saturday

Table 1 – Working Hours

It may be necessary to work outside of these hours during certain activities and stages of development.

2.2 Site Access

There are potentially two routes to access the site. Access to the southern end of the site would be from the R413. Access to the northern end of the site would be from the L6047. This is shown in Appendix A. Temporary road widening works may be required on the road off the R413 to access the southern site. This is via a private road.

2.3 Potential Site Compound Locations

A work site would likely be required on both sides of the River Liffey. Two potential site compound locations have been identified and are shown in Appendix B. Lands identified will likely be used to accommodate the site compound(s) and will include accommodation buildings, site offices and a storage area for all plant, equipment and materials. The land will be topsoil stripped with the topsoil mounded and retained for re-use. The topsoil stripped will be used for the reinstatement of land upon completion of the works, to return to the relevant land owners. Ultimately, any compound locations will need to be agreed between the Contractor and respective land owners. Therefore, the locations shown in this report are indicative only. Adequate warning signs will be on display to illustrate the require PPE and risks associated with entering the compounds and the construction site.

2.4 Preliminary Construction Works - Phase A

The works related to Phase A are outlined as follows:

- Site Clearance for set up of Potential Construction Compound No.1: The first step would be to clear the site for Potential Site Compound No.1 as indicated in Appendix B. The land will be topsoil stripped with the topsoil mounded and retained for re-use and reinstatement of the land upon

completion of the works. The site compound area will be stoned with Clause 804 material and a terram layer beneath. A bunded area will be provided for a generator. Establish site accommodation, including offices, welfare facilities, storage sheds and general storage area. Environmental control measures will be in place.

- Excavate Temporary Channel: The temporary channel works will be excavated in advance of the instream works period (July -September) and carried out in consultation with IFI. The excavated material removed from the channel will be re-used to increase the height of the banks for the temporary channel at a slope of 2horizontal:1vertical. An indicative temporary channel is shown in Appendix D. The extent of the depth and width of the temporary channel will be decided and agreed with the IFI by the Contractor. A terram layer will be laid along the channel to ensure that silt is not lifted from the bed and carried downstream. The temporary channel will allow works on the permanent channel and slope re-stabilisation to take place in dry conditions.
- Site Clearance for Potential Construction Compound No.2 Setup: Clear the site marked for Potential Construction Compound No.2 as shown on in Appendix B. The land will be topsoil stripped with the topsoil mounded and retained for re-use and reinstatement of the land upon completion of the works. The site compound area will be stoned with Clause 804 material and a terram layer beneath. A bunded area will be provided for a generator. Establish site accommodation, including offices, welfare facilities, storage sheds and general storage area.

- Site Clearance for Slope Reinstatement Works: A section of slope will be cleared of trees and planting as shown in Appendix C will be cleared of trees and planting.
- Open Temporary Channel: Divert flow from the existing course of the River Liffey through the temporary channel and block any flow from entering the existing channel to allow works to begin in the channel. A floating silt curtain will be installed downstream of the temporary channel to capture any minor loss of sediment as the river changes course.

2.5 Main Construction Works - Phase B

The works related to Phase B are outlined as follows:

- Work on Permanent Channel: Excavation works to take place on the permanent channel diversion. This work will be done in dry conditions once the river has been diverted to the temporary channel.
- Clearance of Slope: The remaining section of slope to be cleared of existing trees and planting as shown in Appendix C.
- Slope Re-Stabilisation Works: Reinstatement of slope works to take place with layers of triaxial geogrid and drainage paths provided within slope to prevent the build-up of any hydrostatic pressure within the slope which might cause another collapse
- Scour Protection of Permanent Channel: Rock armour to be installed along northern slope face to prevent scouring occurring.
- Close Temporary Channel and Open Permanent Channel: Block off the temporary channel and open the permanent channel to along the River Liffey to run along its' new course in consultation with IFI. A floating silt

curtain will be installed to capture any minor loss of sediment when the river changes course.

- Reinstate Lands: Filling in of temporary channel to take place and the reinstatement of the farmer's lands in both construction site locations using the topsoil material stockpiled at the commencement of works.

2.6 Plant and Equipment

The following plant and equipment are anticipated to be used during the works:

- Tracked 360 Excavators;
- Mini-diggers; and
- Articulated dumper.

3 CONSTRUCTION WORKS ELEMENTS

As part of the Phase A and B Works, there are two main elements in relation to the slope; Clearance of Slope and Slope Re-Stabilisation Works. A typical section showing the slope requirements for the re-stabilisation works is shown in Appendix E on drawing no.001 and no.002.

3.1 Slope Clearance

As part of the Clearance of Slope the following will need to take place:

- All vegetation will need to be removed from the section of slope to be re-profiled as shown in Appendix C (both Phase A and Phase B).
- Existing slope to be benched with a maximum bench height of 1m

3.2 Slope Reinstatement

The following will take place as part of the Slope Re-Stabilisation Works:

- Slope to be backfilled using Class 1 general fill. The backfill material will be placed and compacted as per the requirements of TII Specification for Roadworks, Series 600.
- Geogrid reinforcement will be laid at 1m intervals to provide additional support to the slope in the short to medium term. This will comprise of layers of Tensar Triax 130 or similar. Geogrid reinforcement should extend from the face of the new slope back to the original slope.
- A drainage blanket of Class 6C material will be placed at 10m above the river level to provide drainage out of the slope and to prevent the build-up of water pressures behind the slope.

- The toe of the slope will be protected using rock armour. This will extend to a level 1m above the anticipated 1:100 year flood level. Details of this are provided in Appendix E.
- The rock armour solution will comprise two layers, an underlayer comprising materials meeting the requirements of LMA10/60 and an armour layer comprising material meeting the requirements of LMA40/200 in accordance with IS EN 13383.
- Revegetation of the slope will be carried out as per NPWS requirements. However, it is expected that a natural succession of vegetation will take place following the works. However, key tree species may need to be planted as per NPWS requirements.

4 PROJECT ROLES AND RESPONSIBILITIES

To ensure that the construction phase of the proposed development meets environmental best practice and regulatory compliance, the Contractor will be required to demonstrate, to the satisfaction of the Client and their representatives, their project resources in terms of competent personnel assigned to key roles in the environmental management of the works. The Contractor shall ensure that the personnel assigned to the project with specific roles under the Environmental Management Plan have sufficient training, experience, and resources, to implement the plan.

The Contractor shall identify key personnel with specific and defined roles relating to the implementation of the Environmental Management Plan; for example:

- Project Director;
- Construction Manager;
- Environmental Manager and Officer;
- Health & Safety Manager and Officer; and
- Waste Manager and Officer.

Interactions with, subcontractors, the Client, and project stakeholders, shall be defined in the Environmental Management plan (e.g. in a Communications Procedure). The Contractor shall review and update the Environmental Management Plan and all associated Procedures and Method Statements on the back of any comment or requirement from the Client, it's representatives,

or in light of any statutory requirement. The Contractor will be required to engage with an ecologist.

4.1 Contractor Staff

The Contractor shall ensure that all staff are competent to carry out their defined tasks in the context of the Environmental Management Plan. The duties shall include:

- Adhere to the legislative requirements, codes of practice, guidance, and good environmental practice, relevant to their work;
- Comply with the environmental policies, procedures, and rules, established for the site;
- Define and implement, good environmental methods of working, and systems to identify and manage environmental hazards;
- Develop and maintain appropriate, procedures, and method statements to avoid and minimise environmental risk;
- Carry out their work to the required, standards, procedures, and method statements, to avoid and minimise risk to the environment;
- Ensure that all operatives are properly instructed and are competent to carry out their tasks;
- Ensure that all plant and equipment is suitable for use; and that all operatives who operate and/or maintain equipment are competent to do so;
- Carry out regular environmental monitoring, audits, and inspections as per a documented and agreed procedure;
- Maintain the appropriate environmental and waste records and provide reports if required;

- Ensure environmental incidents and near misses are reported to the relevant member of management and third party stakeholders (e.g. KCC, Inland Fisheries) if required;
- Carry out incident investigations/root cause analysis following environmental incidents in accordance with a documented and agreed procedure; and
- Implement any corrective actions identified during audits, inspections or investigations.

4.2 Pollution Prevention & Risk Assessment

Assessments of the environmental risks associated with a construction activity shall be carried out in advance of commencement. The assessment shall be included in the Contractor's Method Statement and shall identify; the risks, potential impacts, and controls to be implemented to minimise the impact on the environment. If storage of chemicals (fuel, cement, etc.) occur on site, these chemicals should be stored in bunded area as far as possible from watercourses. The Contractor's Method Statements shall be submitted to the Client or its representatives for review prior to the commencement of a construction activity.

4.3 Environmental Incidents

The Contractor's Environmental Management Plan shall include a documented procedure to be agreed in advance with the Client for notification, management and communication of environmental incidents that occur at the site during the works. The criteria which are used to determine how an environmental incident shall be classified shall take into consideration;

- Breach of any environmental limits, trigger level or reference criteria which may be prescribed to the project by any Regulation or best practice guidance;
- Effect on water and/or land quality;
- Potential for damage to an ecosystem (e.g. water quality downstream);
- Potential reduction of amenity value;
- Remedial action required;
- Likely timescale of any impact and consequences (e.g. short term to long term); and
- Any injury or human health impact caused.

An example of a tiered classification system as well as guidance and context is contained in the EPA's Guidance on the Notification Management and Communication of Environmental Incidents (EPA, 2010).

4.4 Environmental Inspection, Auditing & Monitoring

The Contractor's Environmental Management Plan shall include a documented procedure(s) to be agreed in advance with the Client for environmental inspections, audits and monitoring. These procedure(s) shall also accommodate any requirements from the Regulating Authority or Statutory Bodies to inspect, audit or monitor the site. These procedures are to include any specific requirements (e.g. noise limit), as well as any best practice guidance (e.g. dust limit), or statutory requirements.

A procedure shall also be established for inspecting, auditing and monitoring of documentation relating to the export off site and subsequent

recovery/disposal/treatment of any spoil generated through the works. The results of all monitoring shall be incorporated into the overall document management system for the project and shall be forwarded to the Client as required.

The frequency and scope of inspections and monitoring will be agreed in advance with the Client and will be dependent on the nature of the work being carried out at the site through the development phases.

4.5 Corrective Action Procedure

A Corrective Action Procedure shall be implemented by the Contractor to address any environmental incident, observation, or non-conformance with the requirements of the Environmental Management Plan. Corrective actions may arise out of: Audits; Inspections; Monitoring; Incidents; or Complaints. Corrective Actions may also be identified by the Client, their representatives, or by a Statutory Body.

Any corrective actions identified shall have a corresponding remedial measure, defined timeframe for implementation in a prompt manner, assign responsibility, and close-out action. The Contractor shall issue a Corrective Action Form (or equivalent) which provides all relevant details for the action. A register of Corrective Action Forms shall be maintained.

5 POTENTIAL CONSTRUCTION PHASE ENVIRONMENTAL EFFECTS AND CONTROL MEASURES

The construction activities will have a range of effects. This section describes the likely consequences of the works, and outlines the proposed control measures that will minimise negative environmental impacts. The potential construction phase impacts include emissions to air such as dust, noise and vibration, construction traffic, and poorly controlled construction waste. Surface water run-off from the site during periods of heavy rainfall, and leaks or spills from construction plant and equipment, have the potential to impact on the quality of soils, surface water and groundwater.

5.1 Noise Generating Activities and Control Measures

During the construction phase, the potential noise and vibration impacts are associated with site preparation works, foundation construction activities, construction activities and construction vehicle movements. Similar to any large construction site, there is potential for noise generation associated with site clearance and construction activities. Currently, there are no noisy works foreseen outside of normal working hours.

Principal sources of noise will include:

- Earthworks plant and equipment;
- Construction plant and equipment; and
- Construction traffic.

With regard to construction activities, reference will be made to BS5228: Noise Control on Construction and Open Sites, which offers detailed guidance on the

control of noise and vibration from demolition and construction activities. In particular, it is proposed that various practices be adopted during construction, including:

- Hours will be limited during which noisy site activities are permitted;
- Channels of communication will be established between the Contractor/Developer, Local Authority and residents;
- A Site Representative will be appointed responsible for matters relating to noise;
- Typical levels of noise will be monitored during critical periods and at sensitive locations;
- Plant will be selected with low inherent potential for the generation of noise;
- Barriers will be erected as necessary around items such as generators;
- Noisy plant will be sited as far away from sensitive properties as permitted by site constraints;
- Engines, vehicles and equipment will be switched off when not in use;
- Significant sources of noise will be enclosed;
- Plant will be used and serviced regularly in accordance with manufacturer's instructions;
- Machinery having rotating parts will be serviced according to supplier recommendations to prevent friction induced sound;
- Materials should be lowered, not dropped, insofar as practicable and safe; and
- All personnel must be made aware that noisy construction activities resulting in significant noise levels must be minimised and made aware of the above control measures.

5.2 Dust Generating Activities and Control Measures

Construction activities have the potential to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with ambient conditions, including rainfall, wind speed and the distance to potentially sensitive locations. There is potential for dust emissions from construction activities. A dust minimisation plan will be prepared and implemented by the Contractor during the construction phase of the project. Construction activities are likely to generate some dust emissions, particularly during the site clearance and excavation stages. The following avoidance, remedial or reductive measures will be implemented as part of the dust minimisation plan:

- During very dry periods when dust generation is likely, construction areas will be sprayed with water;
- Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor through regular servicing of machinery;
- Vehicle speeds will be limited in the construction site;
- Surrounding roads used by trucks to access to and egress from the site will be cleaned regularly using an approved mechanical road sweeper. Roads will be cleaned subject to local authority requirements. Site roads will be cleaned on a daily basis, or more regularly, as required;
- Wheel-wash facilities will be provided with rumble grids to remove excess mud from wheels. These facilities will be located at the exit from the site and away from sensitive receptors, where possible;

- The technique adopted for all works shall minimise the release of dust into the atmosphere; and
- Daily visual inspections will be carried out at locations around the site boundary as required. These inspections will monitor the effectiveness of dust mitigation measures.

5.3 Litter or Mud on Public Roads and Relevant Control Measures

The following are some of the measures that will be taken to ensure that the site and surroundings are maintained to a high standard of cleanliness:

- Daily inspections will be undertaken to monitor tidiness;
- A regular program of site housekeeping will be established to ensure a safe and orderly site;
- Food waste will be strictly controlled on all parts of the site and source separated;
- Wheel wash facilities will be provided for vehicles exiting the project site;
- Wheel wash run off will be stored in an onsite storage tank and will be disposed of by licenced waste haulage company and disposed of off-site at a licenced facility;
- In the event that mud is carried over from the project site to the public roads, they will be cleaned regularly as required and will not be allowed to accumulate;
- Loaded lorries and skips will be covered as required;
- Surrounding roads used by trucks for access to and egress from the site will be inspected regularly and cleaned, using an approved mechanical road sweeper, when required; and

- In the event of any fugitive solid waste escaping the site, it will be collected immediately and removed to storage on site, and subsequently disposed of in the normal manner.



APPENDIX A. ACCESS TO SITE



Project Name:
Slope Remediation Project at
Coghlanstown, Ballymore Eustace

Project Number:
K401

Content:
Drawing to show access to the
potential site compounds on both
sides of the River Liffey

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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	30.10.18	SUITABLE FOR INFORMATION	PON	BH
P02	27.11.18	Text Updated	PO	BH
P03	17.01.18	Updated Text	PO	BH
P04	30.01.19	Updated Title	PO	BH

Rev No.	Date	Revision Note	Drn by	Chkd by



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Client: Kildare County Council
Project: Slope Remediation Works
at Coghlanstown, Ballymore Eustace

Title: Construction Site Access

Code | Originator | Zone | Level | Type | Role | Number | Status | Revision
K401 - OCSC - XX - XX - DR - C - 0142 - S2 - P04

Date: 30.01.19 Scale: NTS @ A1 Drn by: PON Chkd by: BH Aprvd by: BOR



APPENDIX B. POTENTIAL SITE COMPOUND LOCATIONS



Project Name:
Slope Remediation Project at
Coghlanstown, Ballymore Eustace

Project Number:
K401

Content:
Drawing showing locations of potential
site compounds

Site compound extents have not yet
determined. Those shown are only
approximate extents and will change
when the Contractor determines how
to proceed with the Works.

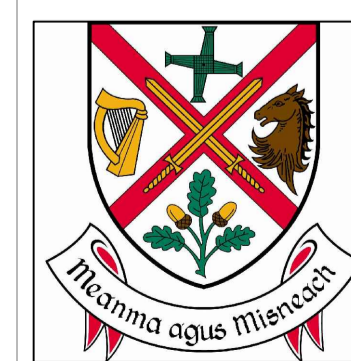
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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	30.10.18	SUITABLE FOR INFORMATION	PON	BH
P02	28.11.18	Showing site compound locations only	PO	BH
P03	17.01.19	Updated Information for Potential Locations	PO	BH
P04	30.01.19	Updated Title	PO	BH

Rev No.	Date	Revision Note	Drn by	Chkd by



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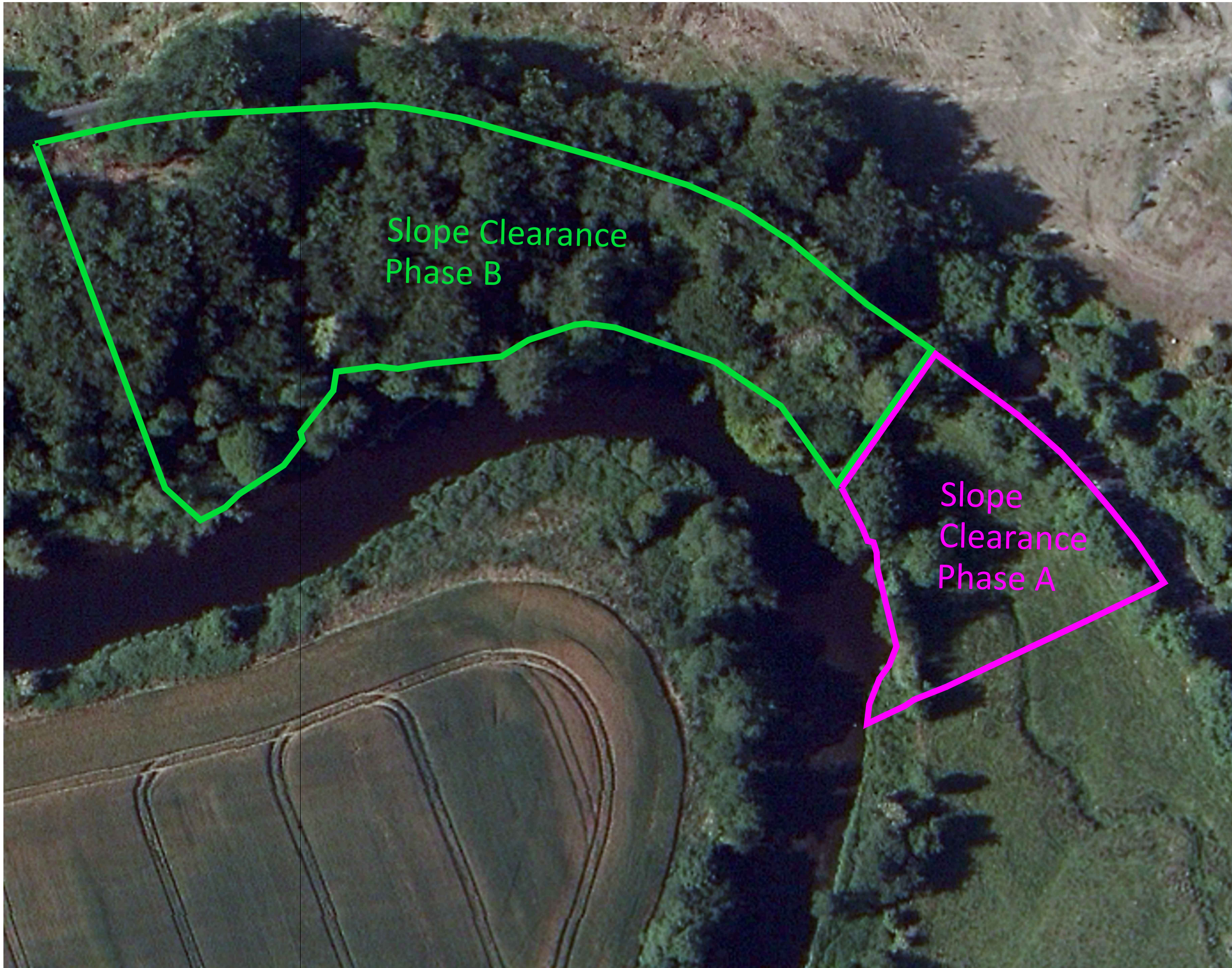
Client: Kildare County Council
Project: Slope Remediation Project
at Coghlanstown, Ballymore Eustace

Title: Potential Site Compound Locations

Code [Originator] Zone | Level | Type | Role | Number | Status | Revision
K401 · OCSC · XX · XX · DR · C · 0143 · S2 · P04
Date: 30.01.19 Scale: N/A @ A1 Drn by: PON Chkd by: BH Aprvd by: BOR



APPENDIX C. PHASE A AND PHASE B SLOPE CLEARANCE



Slope Clearance
Phase B

Slope Clearance
Phase A

Project Name:
Slope Remediation Project at Coghlanstown,
Ballymore Eustace

Project Number:
K401

Content:
Drawing showing the potential extent of the
slope clearance during Phase A and Phase B of
the works

INFORMATION ONLY

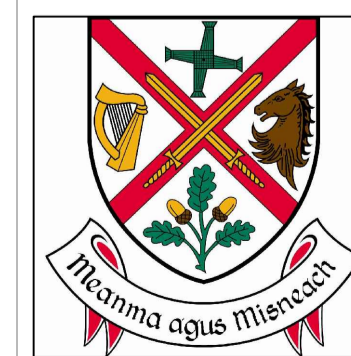
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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	30.10.18	SUITABLE FOR INFORMATION	PON	BH
P02	27.11.18	Updated Text	PO	BH
P03	17/01/19	Updated to show only Slope Clearance work	PO	BH
P04	30.01.19	Updated Text	PO	BH

Rev No.	Date	Revision Note	Drn by	Chkd by



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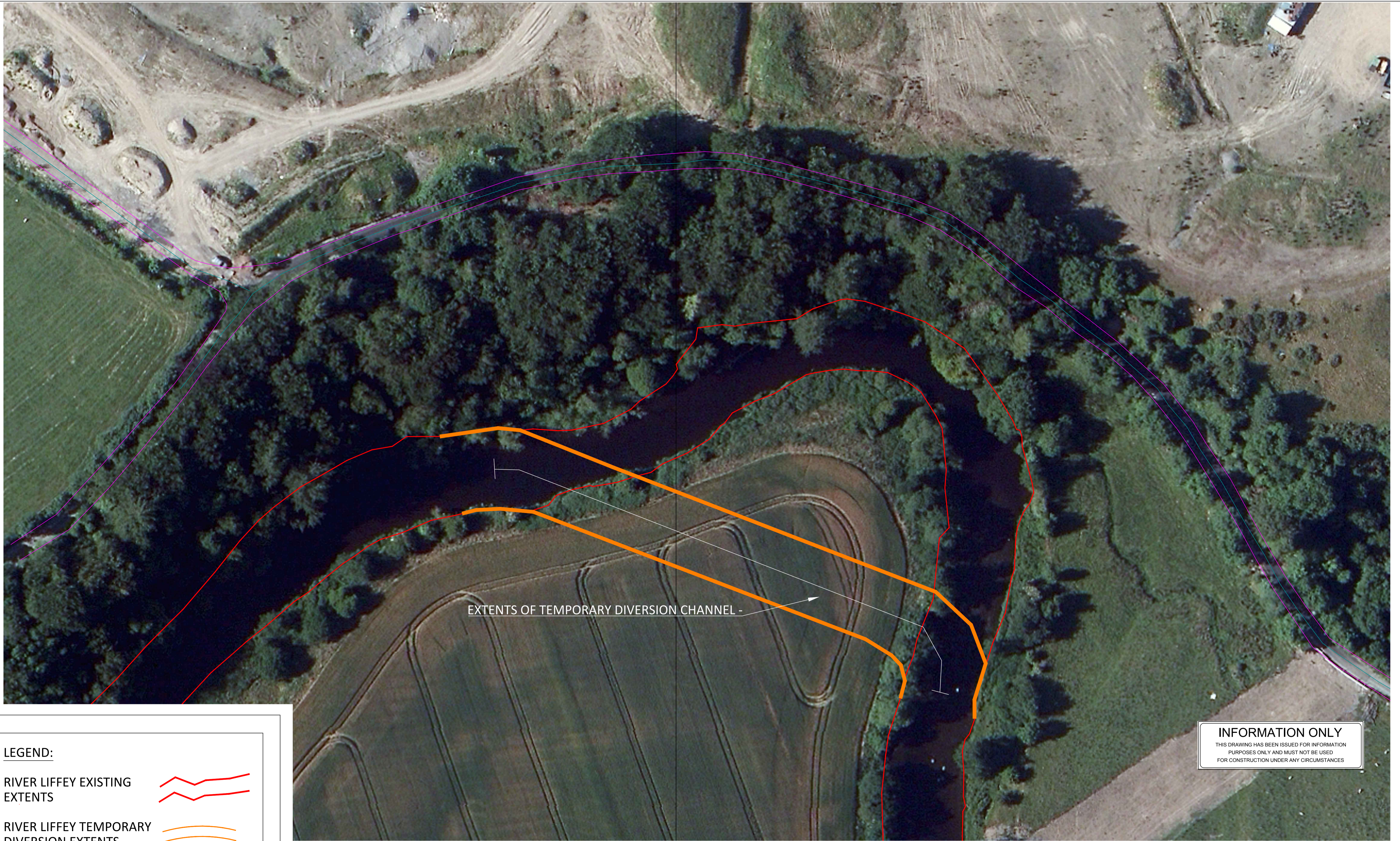


Client: Kildare County Council
Project: Slope Remediation Project
at Coghlanstown, Ballymore Eustace

Title: Phase A and Phase B - Slope Clearance

Code | Originator | Zone | Level | Type | Role | Number | Status | Revision
K401 - OCSC - XX - XX - DR - C - 0144 - S2 - P04
Date: 30.01.19 Scale: NTS @ A1 Drn by: PON Chkd by: BH Aprvd by: BOR

APPENDIX D. TEMPORARY CHANNEL

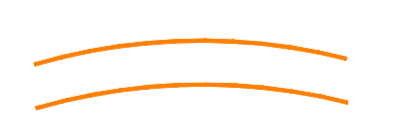


LEGEND:

RIVER LIFFEY EXISTING EXTENTS



RIVER LIFFEY TEMPORARY DIVERSION EXTENTS



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Rev No.	Date	Revision Note	Drn by	Chkd by
P01	28.11.18	Temporary diversion of River Liffey	PON	BH
P02	30.01.19	Title Update	PON	BH

Rev No.	Date	Revision Note	Drn by	Chkd by



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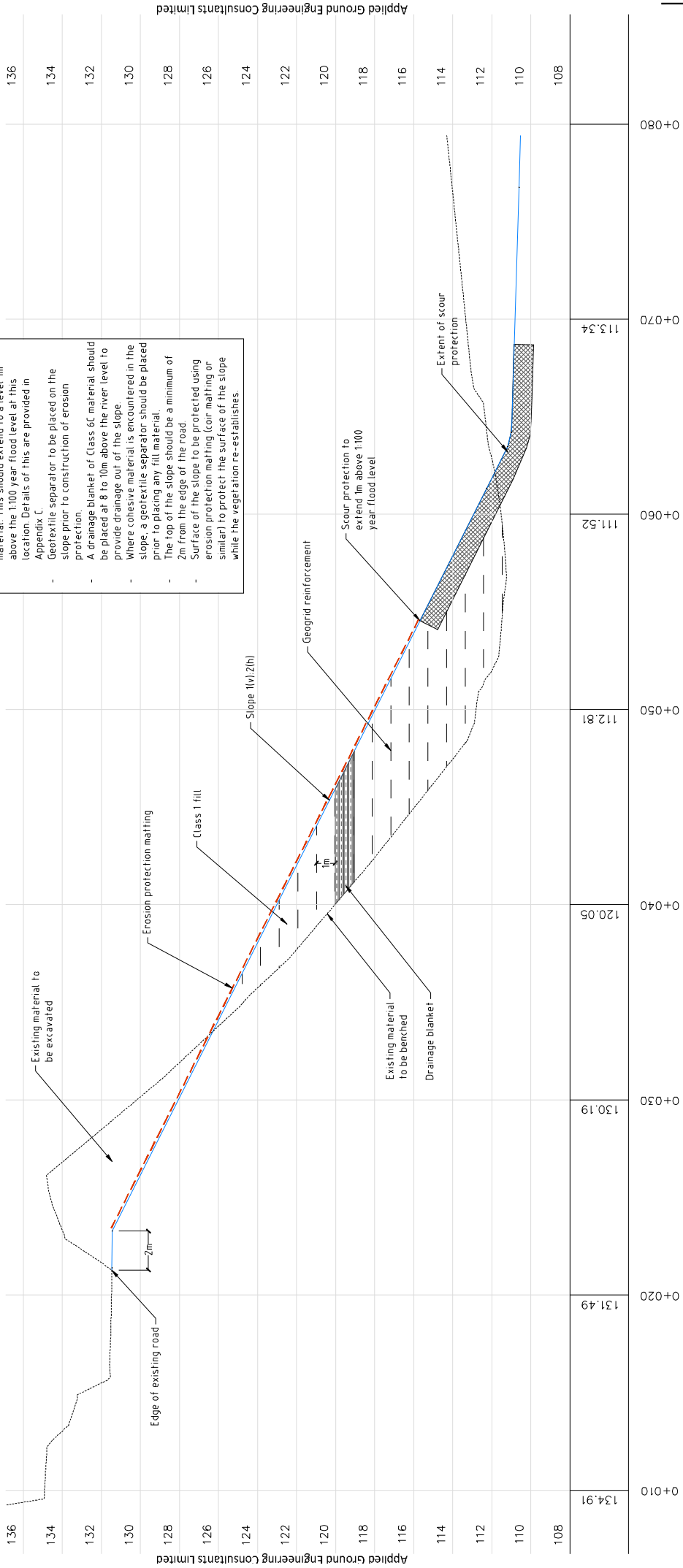
Client:	Kildare County Council											
Project:	Slope Remediation Project at Coghlanstown, Ballymore Eustace											
Title:	Temporary River Liffey Diversion											
Code	Originator	Zone	Level	Type	Role	Number	Status	Revision				
K401	OCSC	XX	XX	DR	C	0150	S2	P02				
Date:	30.01.19		Scale:	NTS		@ A1	Drn by:	PON	Chkd by:	BH	Aprvd by:	BOR

APPENDIX E. TYPICAL CROSS SECTIONS

Notes:

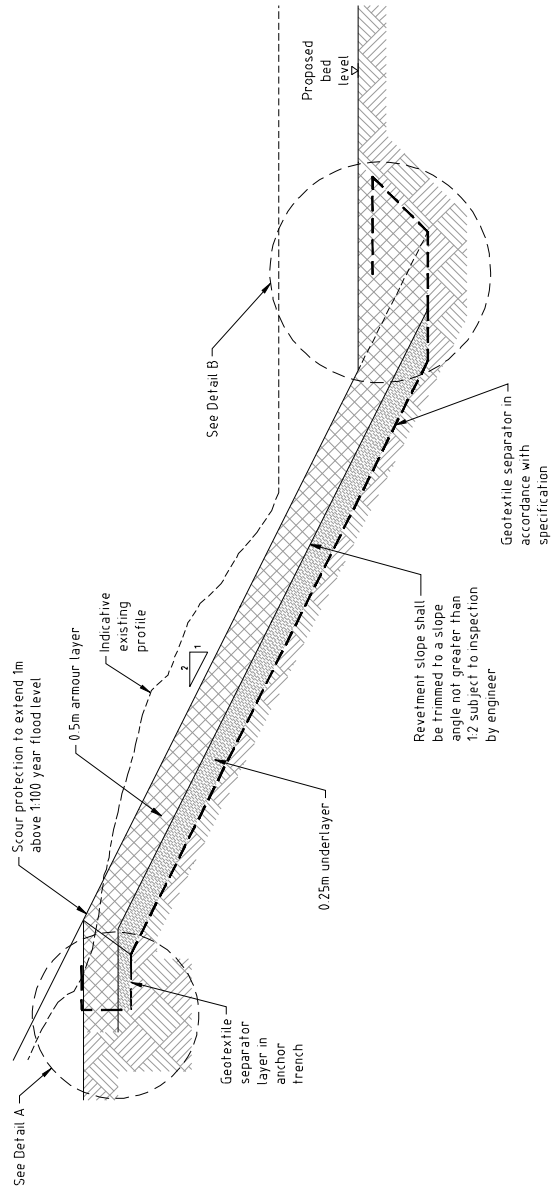
- All vegetation to be removed from the section of slope to be reprofiled
- Existing slope to be benched with a maximum bench height of 1m
- Backfill material to comprise Class 1 general fill and should be placed and compacted as per the requirements of TII Specification for Roadworks, Series 600. Class 1 material shall have 0% fines.
- The toe of the new slope will require erosion protection. A rock armour solution is proposed to provide adequate protection to the placed material. This should extend to a level 1m above the 1,100 year flood level at this location. Details of this are provided in Appendix C.
- Geotextile separator to be placed on the slope prior to construction of erosion protection.
- A drainage blanket of Class 6f material should be placed at 8 to 10m above the river level to provide drainage out of the slope
- Where cohesive material is encountered in the slope, a geotextile separator should be placed prior to placing any fill material.
- The top of the slope should be a minimum of 2m from the edge of the road.
- Surface of the slope to be protected using erosion protection matting (coir matting or similar) to protect the surface of the slope while the vegetation re-establishes.

- Notes cont'd:
- All Geogrid reinforcement to be Tensar Triax 130 or similar.
 - Geogrid to extend back from slope face to original ground.
 - Geogrid to be installed at 1m vertical intervals.

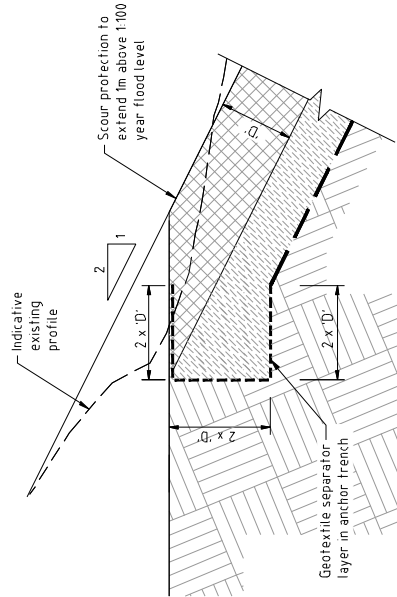


Section Through Approx. Centre of Failure Area

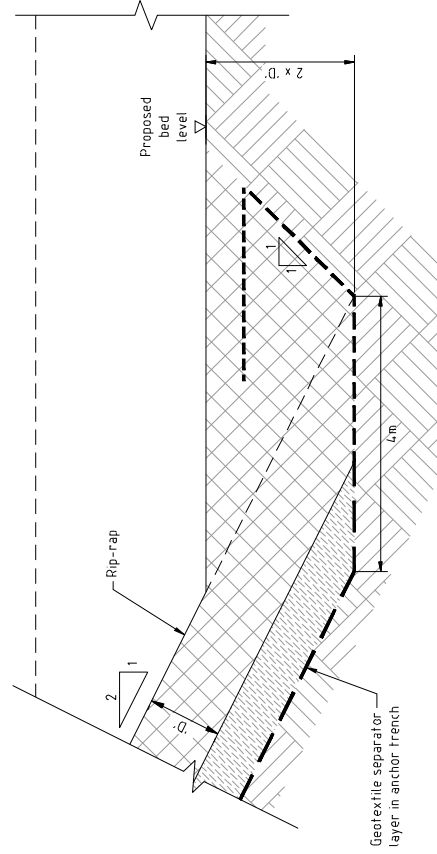
Scale - 1:200 @ A3



Scour Protection Typical Section
 Scale - N.I.S.



Detail A - Anchor Trench for Geotextile Separator
 Scale - N.I.S.



Detail B - Toe Protection
 Scale - N.I.S.



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