ALTEMAR
Marine & Environmental Consultancy

Outline Construction Environmental Management Plan (CEMP) for a proposed residential development at Kildalkey Road, Trim, Co. Meath.

16th June 2026

Prepared by: Bryan Deegan (MCIEEM) of Altemar Ltd.
On behalf of: Loughglynn Developments Ltd

Altemar Ltd., 50 Templecarrig Upper, Delgany, Co. Wicklow. 00-353-1-2010713. info@altemar.ie
Directors: Bryan Deegan and Sara Corcoran
Company No.427560 VAT No. 9649832U
www.altemar.ie

Document Control Sheet			
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Project	Outline Construction Environmental Management Plan (CEMP) for a proposed housing development at Kildalkey Road, Trim, Co. Meath		
Report	Outline Construction Environmental Management Plan (CEMP)		
Date	16th June 2026		
Version	Author	Reviewed	Date
Planning	Gayle O'Farrell	Bryan Deegan	16th June 2026

Contents

Executive Summary

This outline Construction Environmental Management Plan (CEMP) has been developed to detail the commitments and mitigation measures to be implemented by Loughglynn Developments and its appointed contractors during the construction of a proposed housing development at Kildalkey Road, Trim, Co. Meath. This CEMP is being submitted in tandem and should be read in conjunction with the Natura Impact Statement (NIS), Ecological Impact Assessment (EcIA) and Invasive Species Management Plan for the proposed development.

The purpose of the CEMP is to provide details of waste recovery and/or disposal, proposals for noise reduction, proposals for dust reduction, phasing of the project, and details on how the proposed project intends to use a comprehensive and integrated approach to protecting the River Boyne and other sensitive environmental receptors, including biodiversity, and designated conservation sites with a direct pathway (River Boyne and Blackwater SAC/SPA).

This CEMP also outlines the potential impacts of the development, details the sensitive receptors, environmental controls, and the mitigation measures that will be implemented to minimise any potential impacts. The sensitive receptors include the River Boyne, on-site streams, and the River Boyne and Blackwater SAC/SPA, which are located within the proposed development site. It is also proposed to conduct drilling works beneath the River Boyne to support the proposed drainage strategy. No in-stream works are proposed for the development, but there is a risk of fracking via the directional drilling beneath the River Boyne. The CEMP also details the specific requirements that need to be addressed during project stages and also includes the related roles and responsibilities of individuals involved in the project.

1. Introduction

Outline of CEMP

Altemar Ltd. has been commissioned Loughglynn Developments to prepare an outline Construction Environmental Management Plan (CEMP) for a strategic housing development at Kildalkey Road, Trim, Co. Meath.

The purpose of the CEMP is to provide details of waste recovery and/or disposal, proposals for noise reduction, proposals for dust reduction, phasing of the project, and details on how the proposed project intends to use a comprehensive and integrated approach to protecting the River Boyne and other sensitive environmental receptors. The following CEMP outlines the potential impacts of the development, details the sensitive receptors, environmental controls, and the mitigation measures that will be implemented to minimise any potential impacts. The CEMP also details the specific requirements that need to be addressed during project stages, and also includes the related roles and responsibilities of individuals involved in the project.

This CEMP is subject to planning permission being granted for the development as per the drawings submitted. The CEMP is a live document subject to change based on the following:

1. comments from An Coimisiún Pleanála
2. final planning permission granted and conditions
3. compliance requirements Meath County Council
4. requirements by other bodies, including Inland Fisheries Ireland
5. concerns raised by residents affected by the works

The final CEMP prepared for the development will be submitted prior to commencement of the relevant phase on site and will be subject to periodic review as part of the management of the construction process.

Structure of the CEMP

This CEMP is based on measures to ensure legal compliance and established good management practice on-site and includes the following sections:

1. *Introduction*
2. *Project Description:* Details of the proposed development project and sensitive receptors)
3. *Analysis of the Potential Impacts*
4. *Site Information (Roles & responsibilities etc.)*
5. *Construction Management Information:* a description of the works based on the information available to date, anticipated construction programme, construction in riparian corridor, mitigation measures, waste management, noise and dust monitoring, proposed working hours, equipment to be used, etc.;
6. *Sensitive Receptors:* potential environmental issues related to the construction works, details of the site inspection and audit programme, methods for managing environmental risks and reducing impacts.
7. *Emergency Procedures*
8. Invasive Species
9. Relevant legislation
10. Monitoring of Watercourses
11. Conclusions

2. Project Description

Project Outline and Site Context

The proposed development comprises a Large-Scale Residential Development (LRD) on lands at Crowpark (1st Division), Kildalkey Road, Trim, Co. Meath.

The scheme provides a total of 183 residential units, comprising 127 houses and 56 apartments. The housing mix includes 19 no. detached 4-bedroom houses, 9 no. semi-detached/end-terrace 4-bedroom houses, 4 no. detached 3-bedroom houses, 43 no. semi-detached/end-terrace 3-bedroom houses, and 52 no. mid-terrace 3-bedroom houses, with building heights from 2 to 2 ½ storeys. The apartment element comprises 56 no. units in two blocks of up to four stores, including 16 no. one-bedroom and 40 no. two-bedroom units.

The development also includes a crèche facility, new vehicular and pedestrian accesses from Kildalkey Road.

The proposal provides for associated infrastructure and site works, including landscaping, public and communal open space, internal streets and footpaths, car and bicycle parking, bin stores, private open space, boundary treatments, plant and waste management areas, utility infrastructure and a foul sewer connection to the existing network adjoining the OPW offices on Jonathan Swift Street, to be delivered beneath the River Boyne and Trim Pitch & Putt.

The proposed site location, layout, elevations and sections are demonstrated in Figures 1-7.

Landscape

The landscape plan for the proposed development has been prepared by Jane McCorkell Design. The landscape plan is shown in Figure 8.

Arborist

An Arboricultural Report has been prepared by Charles McCorkell Arboricultural Consultancy for the proposed development. It outlines the following tree impacts and mitigation:

'Arboricultural Impacts

6.1 ***Loss of trees –*** *The proposed development will require the removal of 2 trees and the partial removal of 1 hedgerow of moderate quality and value (B Category), 5 trees, 4 hedgerows, 2 shrub groups and 1 tree group, and the partial removal of 1 hedgerow, of low quality and value (C Category), and 2 trees of poor quality (U Category).'*

'6.3 The proposed development has been carefully designed to retain and incorporate the majority of trees and hedgerows located around the perimeter of the site. The retention of these trees and hedgerows will add an element of maturity to the new landscape and have a positive impact on the character and appearance of the new development.'

'6.6 There is only a small section of the moderate quality native hedgerow (H17) located along the western boundary to be removed. This is to facilitate a future possible connection with the neighbouring field. Its removal will have an insignificant impact on the surrounding local area.'

'6.16 ***Drainage and services*** *– The main drainage proposal has been designed to avoid the RPAs of retained trees. No special methods of construction are therefore required; however, it will be necessary to ensure that site operations do not impact trees or the soil environment upon which they rely. Details of the measures to be taken to protect trees are included in the Tree Protection Plans at Appendix B.'*

'6.19 ***Tree protection measures –*** *All retained trees and hedgerows can be successfully protected during the proposed development works by using robust fencing measures which comply with the recommendations outlined within BS 5837:2012. The location of tree protection measures is highlighted in the Tree Protection Plans at Appendix B.'*

'6.20 ***Landscape operations -*** *Landscaping operations will typically take place at the end of the construction period. These works will normally require the removal of protective fencing to facilitate access for works. There is a risk that machinery may damage soil structure where tree roots are growing. These risks can be managed by maintaining good professional standards of work and working to a method statement. The principle of avoiding soil disturbance or changes in levels within the RPAs of retained trees should be followed unless arboricultural advice has been sought.'*

'Arboricultural Mitigation

6.21 A detailed landscape plan has been designed and will form part of the planning application for the development proposal. This design includes the planting of a large number of new high-quality trees and hedgerows.

6.22 The proposed new planting will mitigate the loss of hedgerows and trees required to facilitate the development and will enhance the tree cover throughout the site and within the local area. This will have a positive impact on the local canopy cover and the character and appearance of development, and the surrounding landscape.'

The tree survey and constraints, removals and protection plans are shown in Figures 9-14.

Lighting

The lighting strategy for the proposed development has been prepared by ORS. The site lighting report outlines the following:

'Site Lighting Design

It is proposed to install new luminaires throughout the scheme:

- *49 x Metro Streetlight 27w LED 2700K (38 x Street Optic R03 and 11 x Forward Throw A Optic) mounted on 6m columns with no tilt.*
- *19 x Metro Streetlight 14w LED 2700K Street Optic R01 (9 no. with integrated external shield along the southern boundary) mounted on 6m columns with no tilt.*

The design also includes 8 x 36w Streetlights LED 4000K mounted on 6m columns as an estimated representation of the existing lighting along Kildalkey Road.

1.1 Proposed Lighting Fittings

The lighting design is based on the following light fittings:

Veelite Metro Streetlight 27w LED Street Optic R03		
	Led:	No. 38 x 27w 12 LED / 2700K G4
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours. (at 25°C).
	Height:	Mounted on 6m columns with no tilt.

Veelite Metro Streetlight 27w LED Forward Throw A Optic		
	Led:	No. 11 x 27w 12 LED / 2700K G4
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours (at 25°C)
	Height:	Mounted on 6m columns with no tilt.

Veelite Metro Streetlight 14w LED Street optic R01		
	Led:	No. 19 x 14w 8 LED / 2700K G4 (of which 9 no. with integrated external shield along the southern boundary)
	Construction:	Die-cast aluminium. IP66. IK09 as standard. Driver and LED Modules are accessible for maintenance or replacement.
	Finish:	Grey RAL 9006 as standard. Other RAL colours on request.
	Life:	L90 B10 >100,000 hours (at 25°C)
	Height:	Mounted on 6m columns with no tilt.

In relation to ecological impact design considerations, this report notes the following:

'Optics/ shields/ cowls shall be installed where necessary, in consideration of wildlife (e.g. bats) and to prevent unnecessary up lighting or illumination of nearby trees, buildings etc.

The site lighting design will be developed further during the detailed design stage, taking on board any further recommendations from the Ecologist or Meath County Council.'

The proposed site lighting layout is shown in Figure 15.

Drainage

An Engineering Assessment Report has been prepared by Waterman Moylan Consulting Engineers Limited to accompany this planning application. The report outlines the following:

Surface Water Drainage

In relation to surface water drainage, the report states:

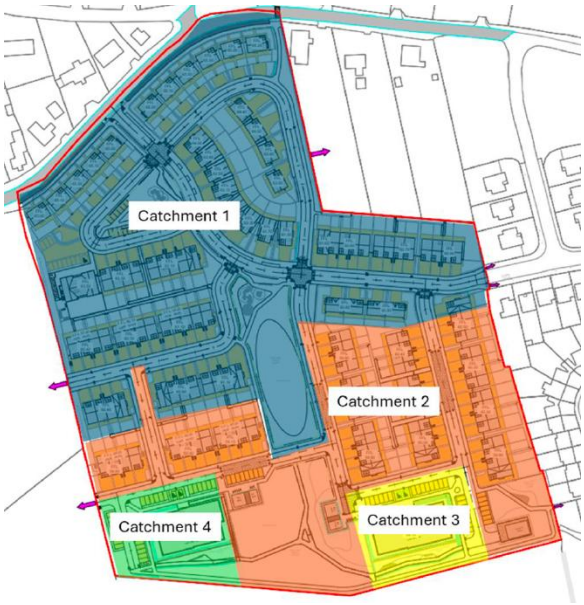
Surface water drainage introduction:

'The surface water drainage for the development has been designed with individual soakaways for each house unit and surface water from the public areas will be divided into four catchments, each discharging via gravity into separate underground soakaways. The proposed houses in the north will drain into the soakaway located at the centre of the site. Part of the proposed houses in the centre will drain into the soakaway to the south. The apartment block in the southwest will drain into the southwest soakaway, and the apartment block in the southeast will drain into the southeast soakaway.

The proposed houses in the north will drain into the surface water network and outfall onto a soakaway located at the centre of the site.'

Proposed surface water drainage strategy:

'*The surface water network for the proposed development has been divided into four separate catchments as shown in the following figure... It is proposed that surface water will drain by a network of gravity surface water pipes to the soakaway in each catchment*.



… During site investigations, Petrifying Tufa springs, which constitute a protected habitat associated with the adjoining SAC, were identified within the wider study area. The presence of these features was identified through ecological assessment undertaken by Dr. Joanne Denyer.

Following identification of the Tufa springs, the proposed surface water drainage strategy was developed in consultation with Dr. Joanne Denyer and Dr. Robbie Meehan (Hydrologist) to ensure that the existing hydrological regime across the site and adjoining SAC is maintained.

The proposed drainage design has therefore been carefully developed to avoid any alteration to existing groundwater flows, seepage patterns, or hydrological conditions which could adversely impact the Petrifying Tufa habitat.

Accordingly, the proposed development is not expected to result in any hydrological impacts on the identified Tufa springs or the adjoining SAC. Please refer to Appendix H for the Petrifying Tufa Springs Walk-Over Survey prepared by Dr. Joanne Denyer.

Catchment 1

Catchment 1 is located to the north area of the site and covers a catchment area of c. 2.20 hectares. The total impermeable area is c. 1.05 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.

Catchment 2

Catchment 2 is located at the central and south area of the site and covers a catchment area of c. 1.28 hectares. The impermeable area is approximately 0.52 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.

Catchment 3

Catchment 3 is located at the southeast area of the site and covers a catchment area of c. 0.34 hectares. The impermeable area is approximately 0.22 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.

Catchment 4

Catchment 4 is located at the southwest area of the site and covers a catchment area of c. 0.36 hectares. The impermeable area is approximately 0.23 hectares. The excess surface water for the 1 in 100-year storm + 20% climate change will outfall onto soakaway.'

Foul Drainage

As outlined in the Engineering Assessment Report, prepared by Waterman Moylan Consulting Engineers Limited, the proposed foul drainage is as follows:

Introduction

'The site will be served with a new foul sewer system, which will drain by gravity sewers to a proposed pump station located at the southeast of the site and will pump to the outfall into existing 225mm diameter foul sewer on Jonathan Swift Street.

The proposed pumping station is confirmed to comply with Uisce Éireann's Wastewater Infrastructure Standard Details, connection application will be issued to Uisce Éireann for approval with pumping station included.'

Foul water -general

'Foul water sewers within the proposed development will be laid to comply with the requirements of the Building Regulations, and in accordance with the recommendations contained in the Technical Guidance Documents, Section H.

Foul water sewers which will be taken into charge will be laid strictly in accordance with Uisce Éireann's requirements for taking in charge.

In accordance with the Uisce Éireann "Code of Practice for Wastewater Infrastructure", 150mm nominal internal diameter sewers have been proposed for carrying wastewater from 20 properties or less; whilst 225mm nominal internal diameter have been proposed for carrying wastewater from more than 20 properties. Furthermore, where there are at least ten dwelling units connected, the 150mm diameter pipes are laid at a minimum gradient of 1:60 for up to nine connected dwelling units.

The pumping station has been located with a 20m separation distance from the nearest dwelling. This complies with Section 5.5 of the Uisce Éireann "Code of Practice for Wastewater Supply", which states that a Type 3 pumping station require a minimum buffer zone of 15m.'

As outlined in the accompanying Preliminary Construction & Environmental Management Plan:

'In order to facilitate a wastewater discharge from the subject site it is proposed to install a HDPE foul water rising main under the river Boyne. This rising main will be installed by directional drilling.'

The proposed surface water and foul wastewater drainage plan, as well as the SuDS/soakaway details, rising main details, and overland flood route, are demonstrated in Figures 16-21.

Site-Specific Flood Risk Assessment

The Site-Specific Flood Risk Assessment, has been prepared by JBA. In relation to the flood risk of the development area, the report outlines the following:

'The design of the proposed development has ensured that none of the proposed building structures to be constructed on the site will be located inside an NIFM flood zone. The only work that will traverse the NIFM flood zone is the horizontal directional drilling beneath the River Boyne associated with the installation of the 125 mm rising main beneath the river. The Method Statement for this directional drilling has been completed by Dunnes Drilling Limited of Clonmore, Togher, County Louth, and has been included with this application…'

Project: Trim Housing Development
Location: Trim, Co. Meath
Date: 14th April 2026
Drawn By: Bryan Deegan (Altemar)

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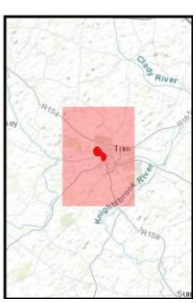


***Figure 1**. Proposed site location*

Figure 2. *Proposed Site Outline*

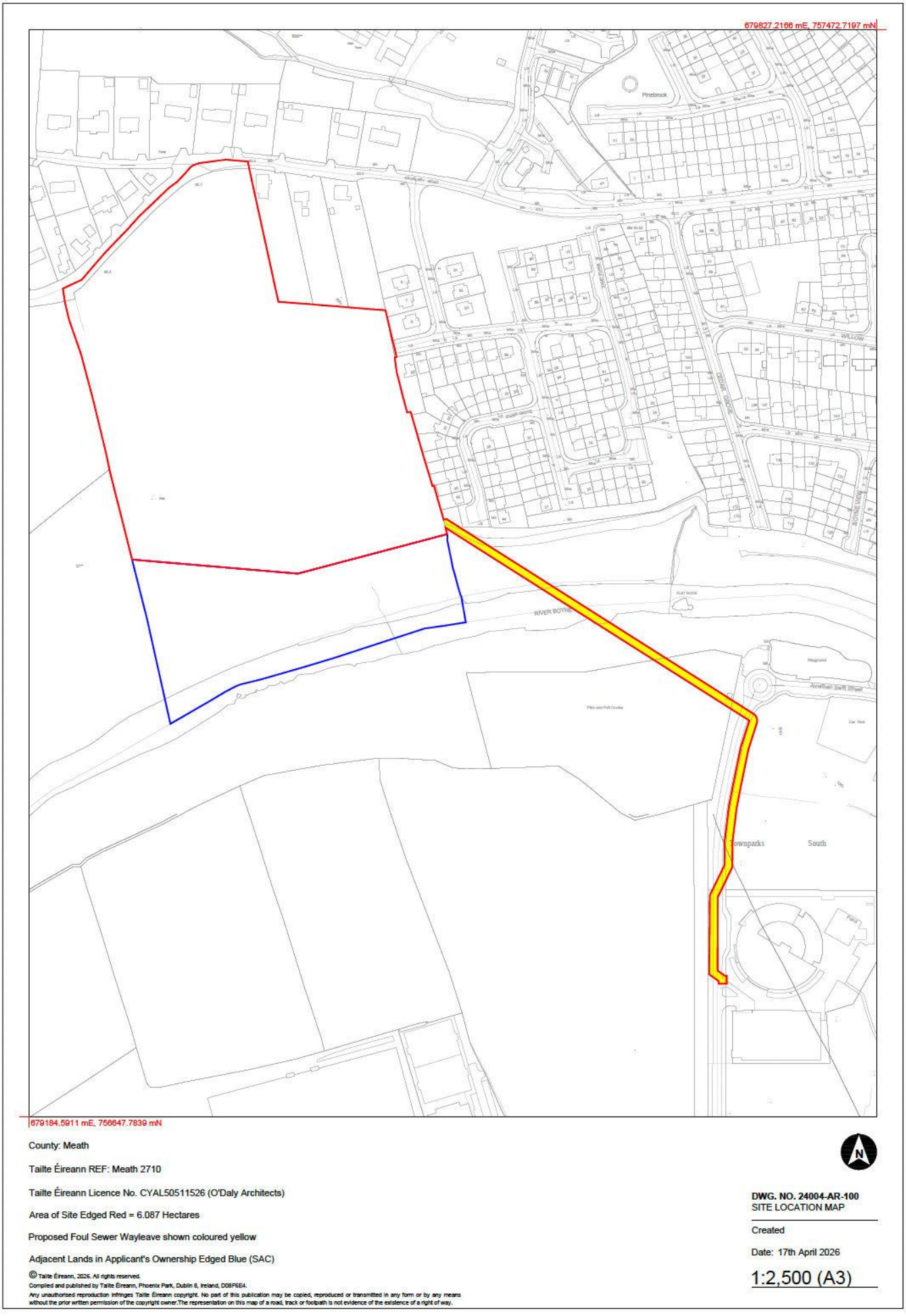


Figure 3. *Proposed Site Location*

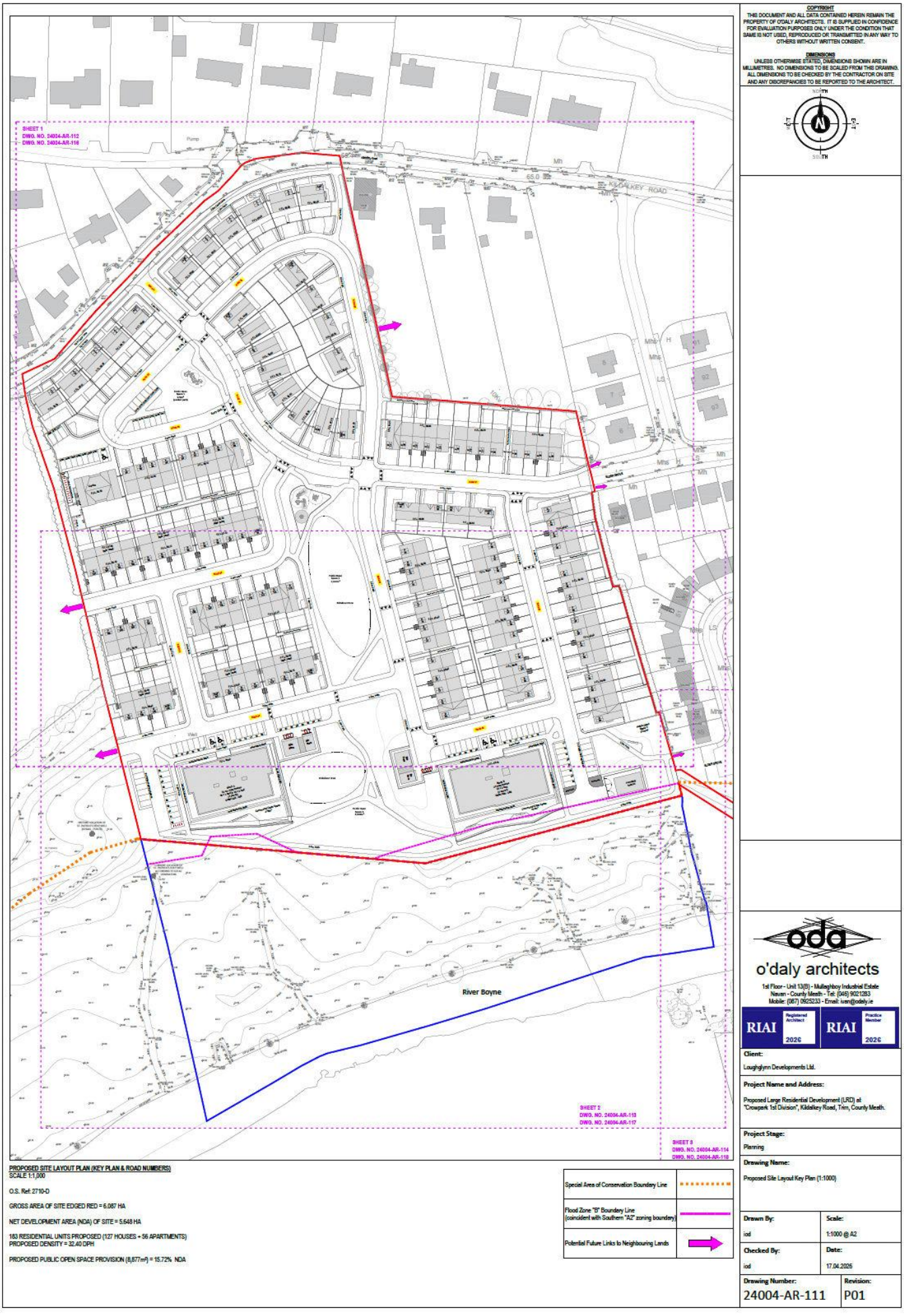


Figure 4. *Proposed Site layout*

Figure 5. *Proposed contiguous elevations 1-6*

***Figure 6**. Proposed contiguous elevations 7-12*

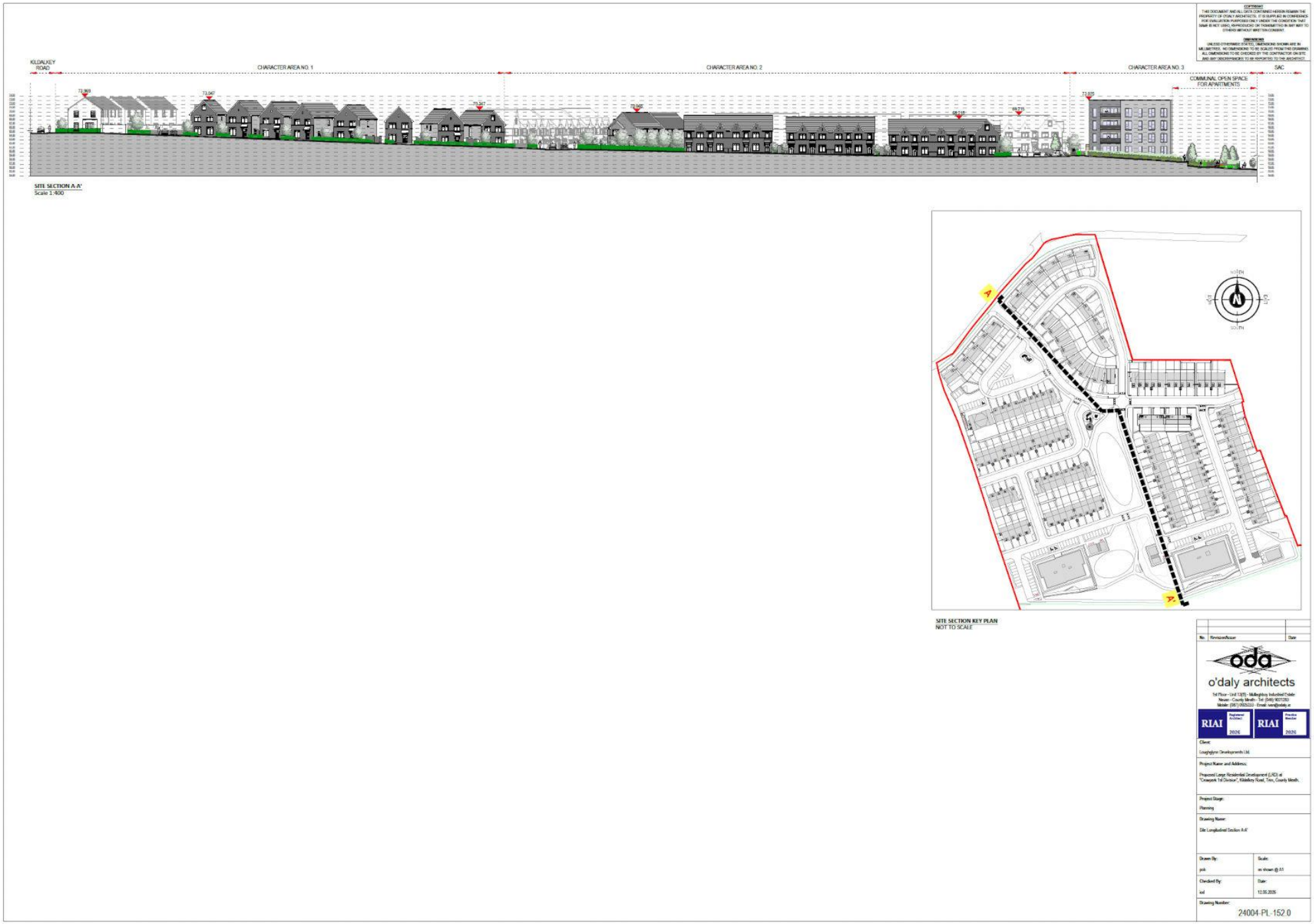


Figure 7. *Proposed Longitudinal Section A-*

Figure 8. *Proposed Landscape Plan*

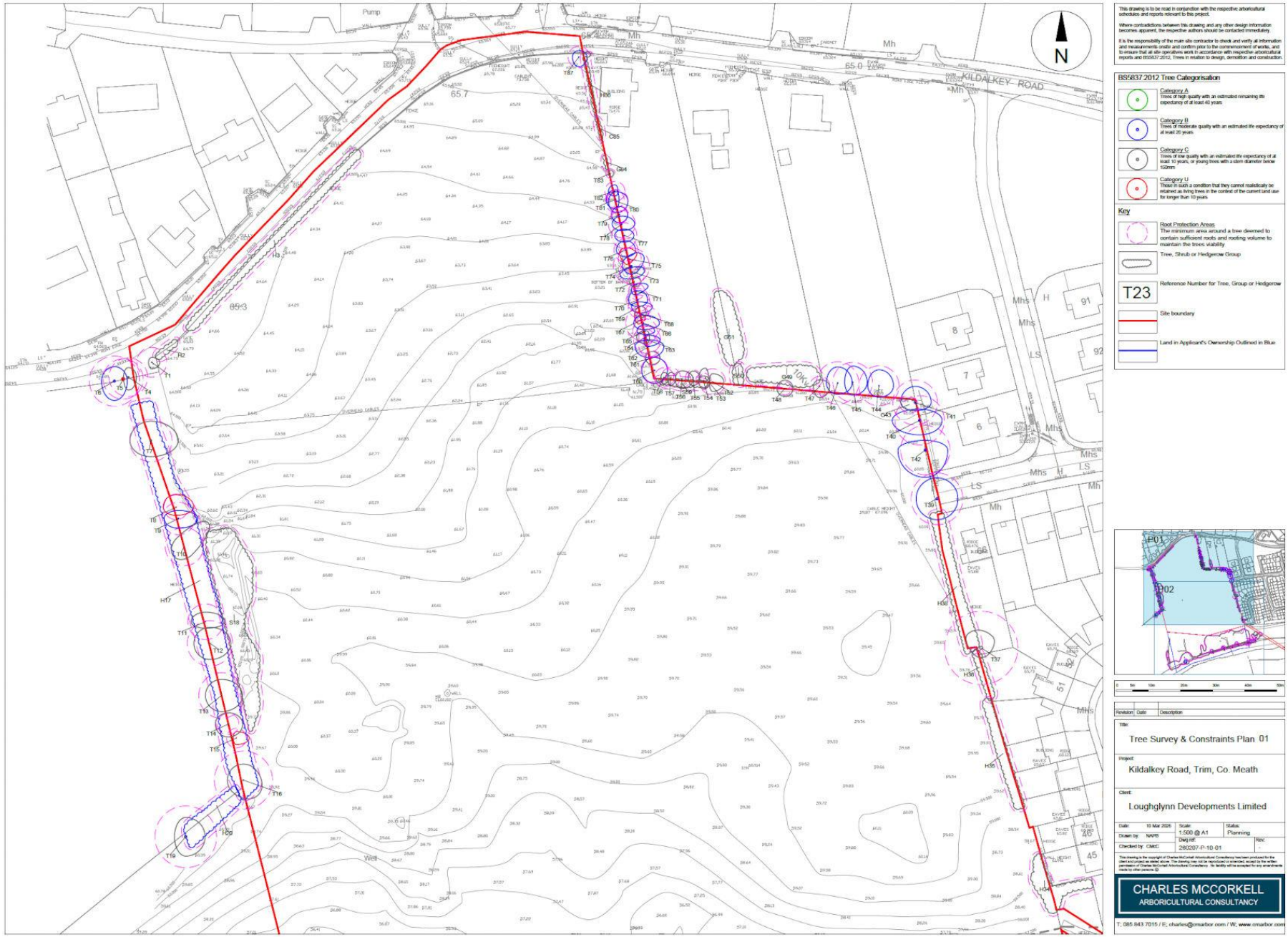


***Figure 9**. Tree survey and constraints plan (1/2)*

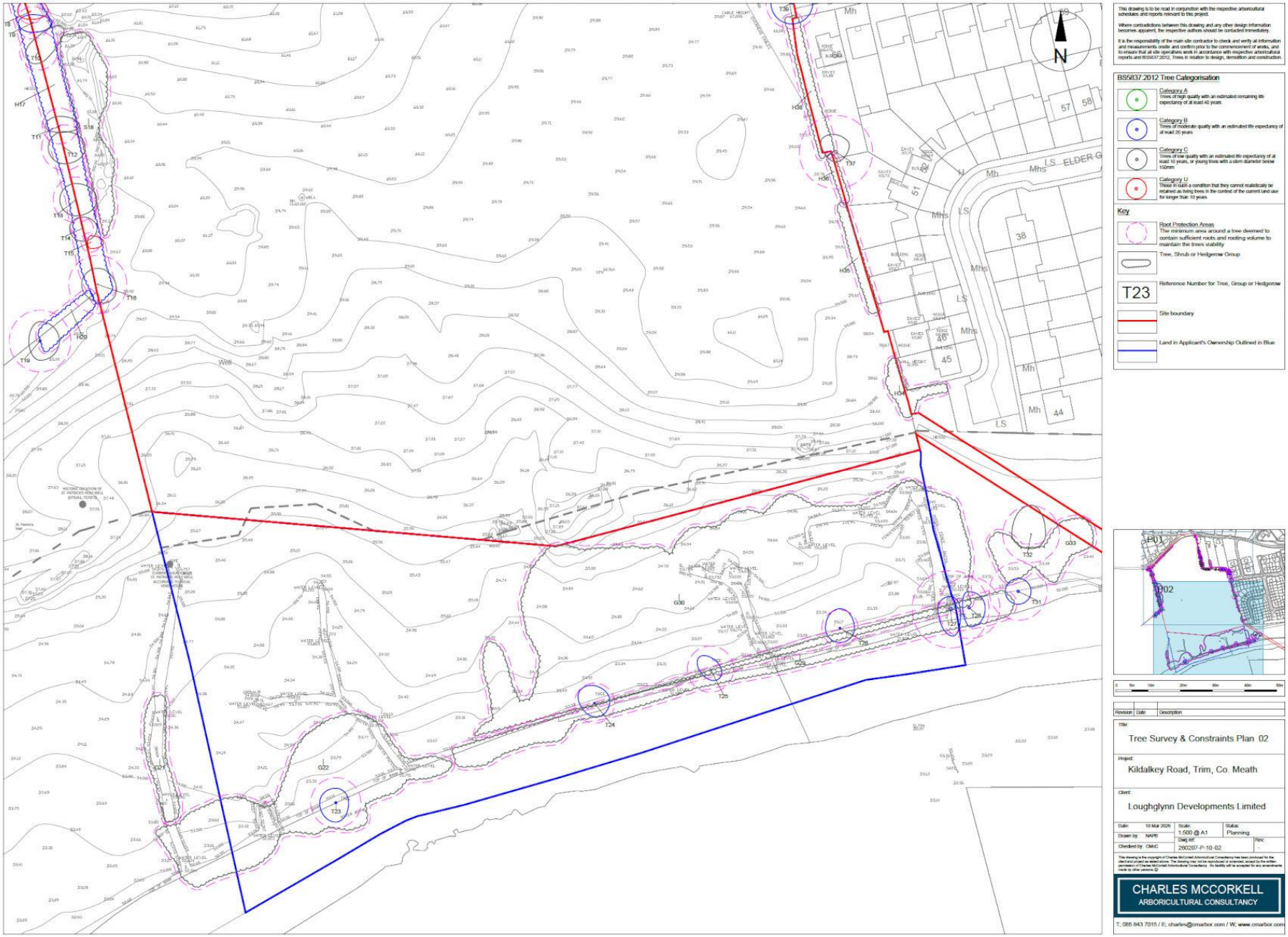


***Figure 10**. Tree survey and constraints plan (2/2)*

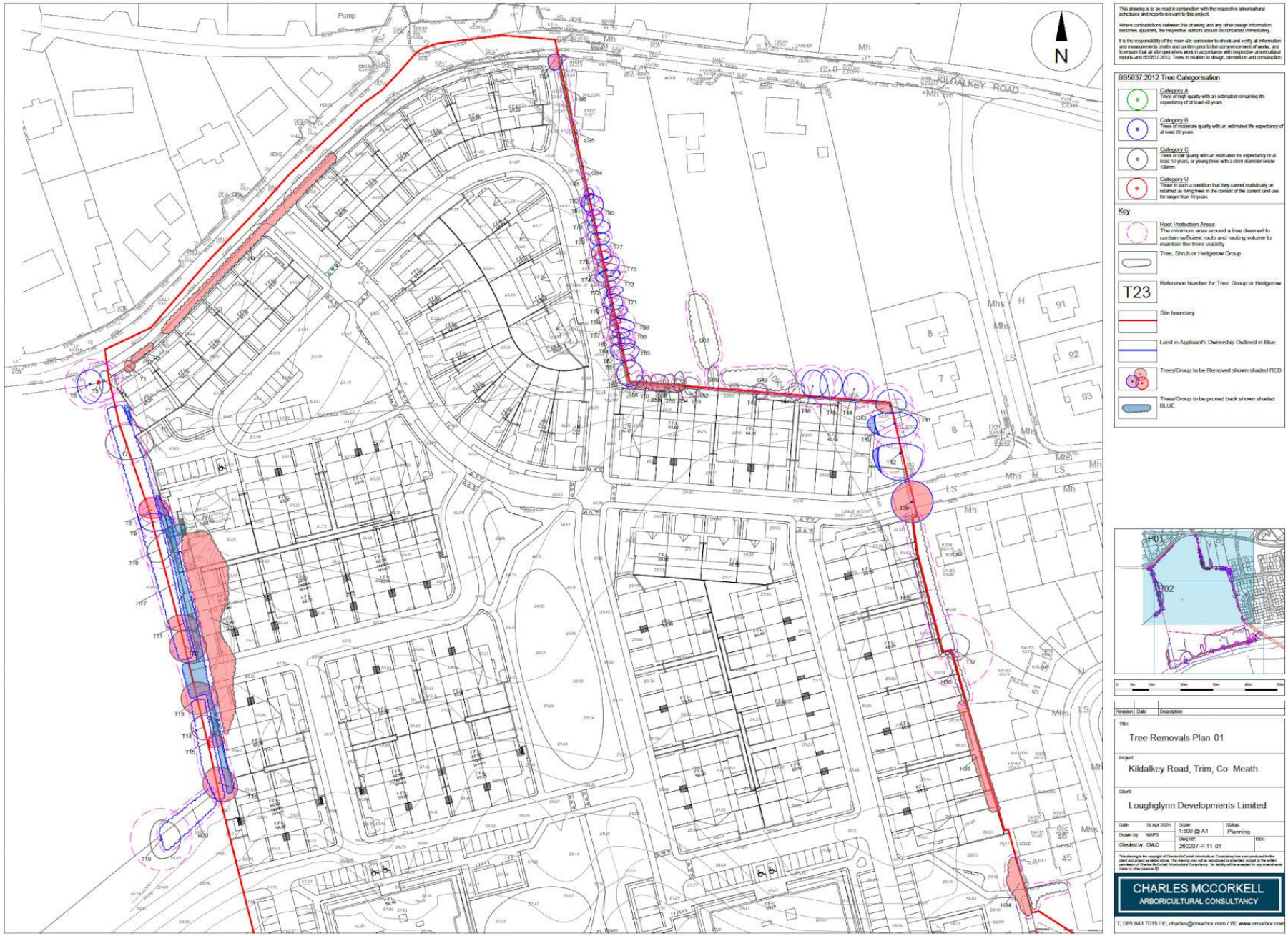


***Figure 11**. Tree removals plan (1/2)*

***Figure 12**. Tree removals plan (2/2)*

***Figure 13**. Tree protection plan (1/2)*

***Figure 14**. Tree protection plan (2/2)*

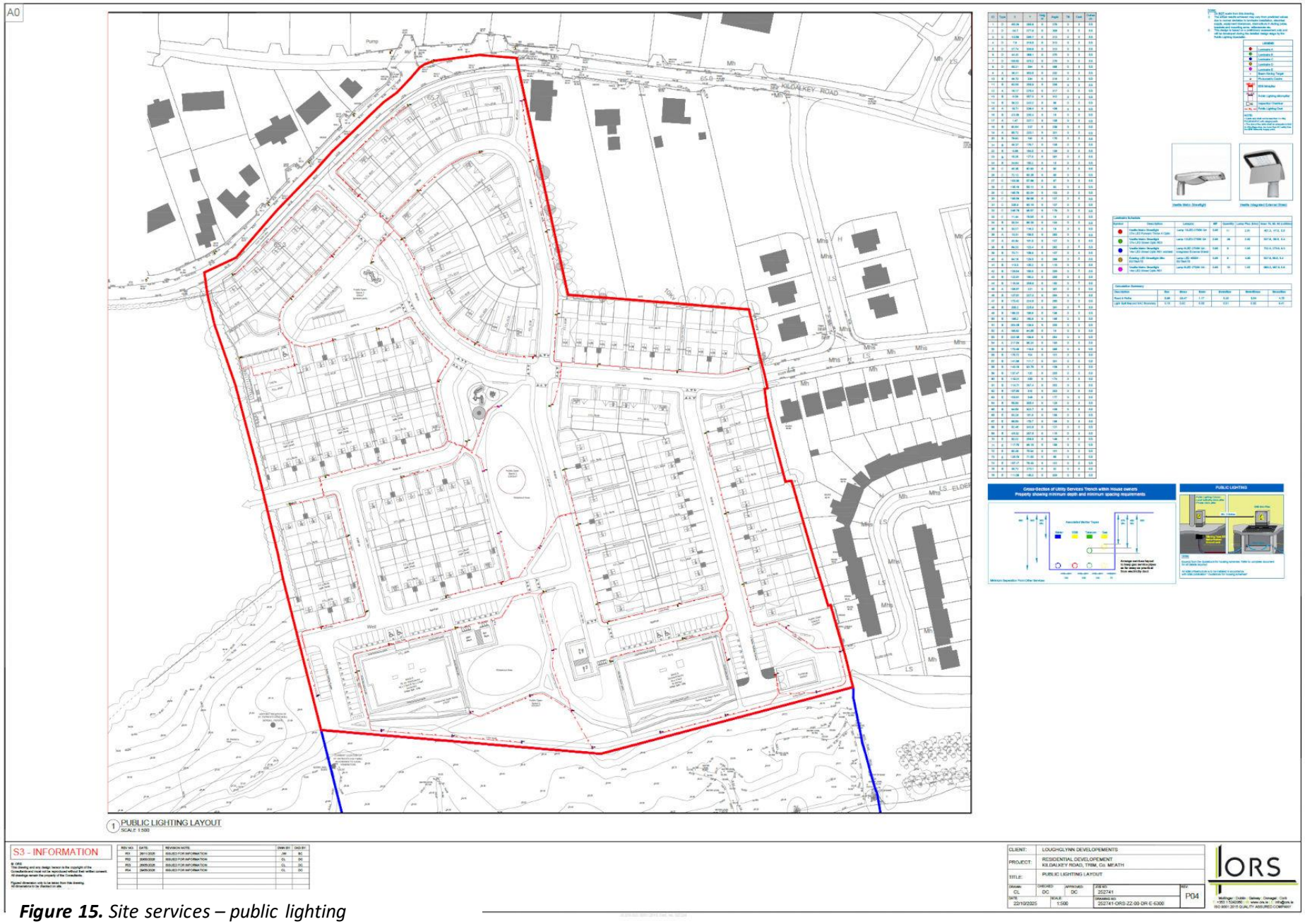


Figure 15. *Site services – public lighting*

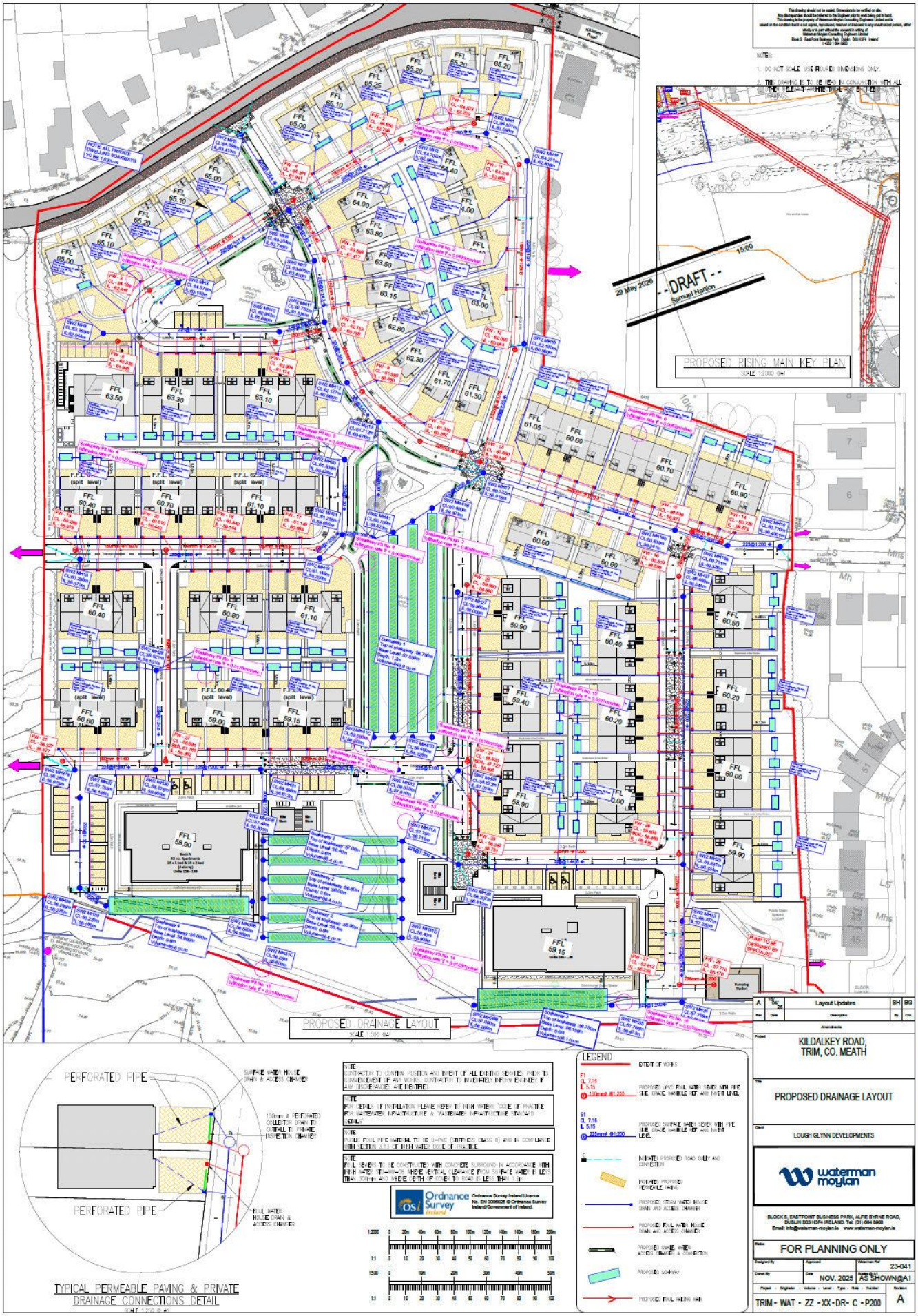


Figure 16. *Proposed drainage layout*

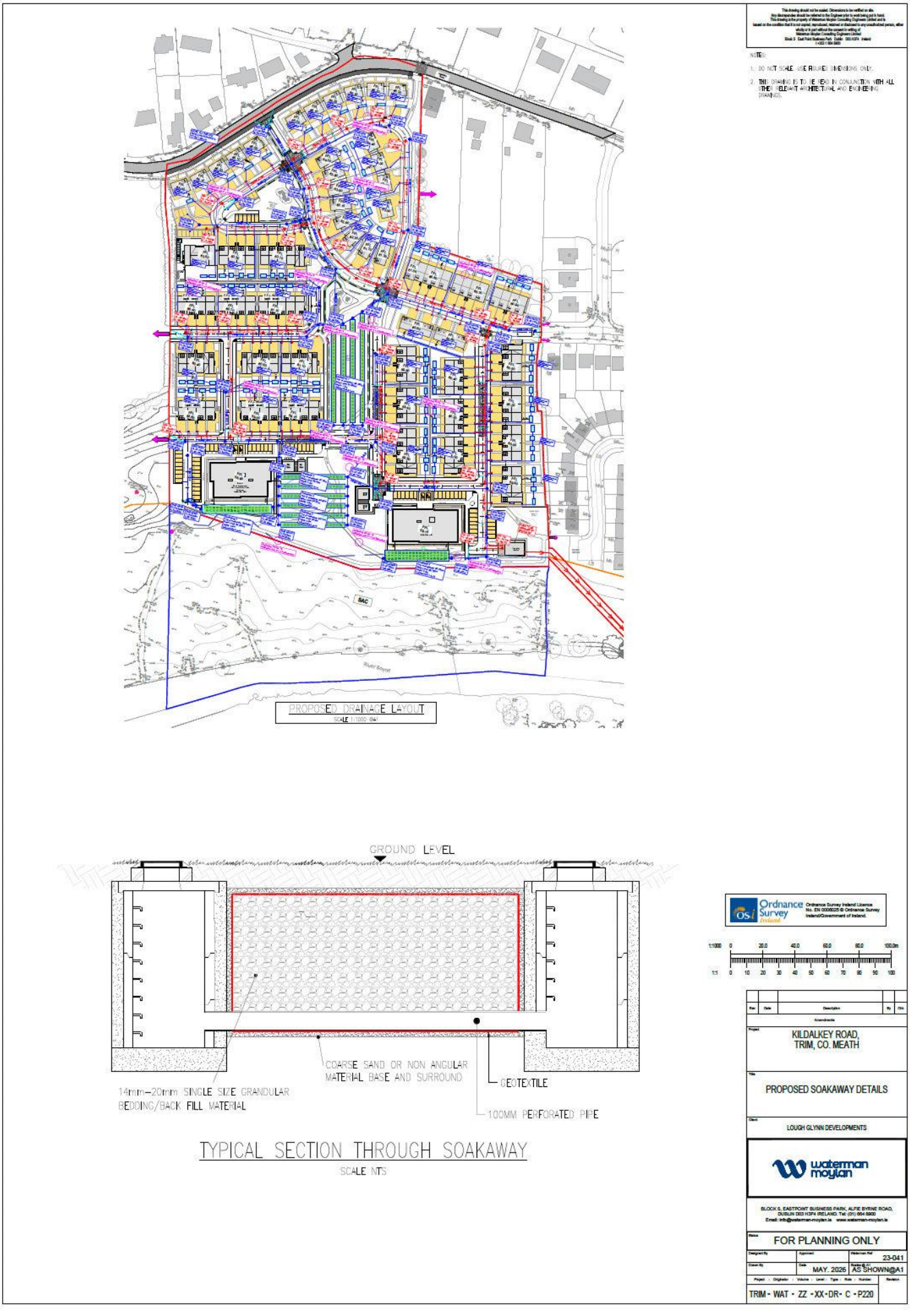


Figure 17. *Proposed soakaway details*

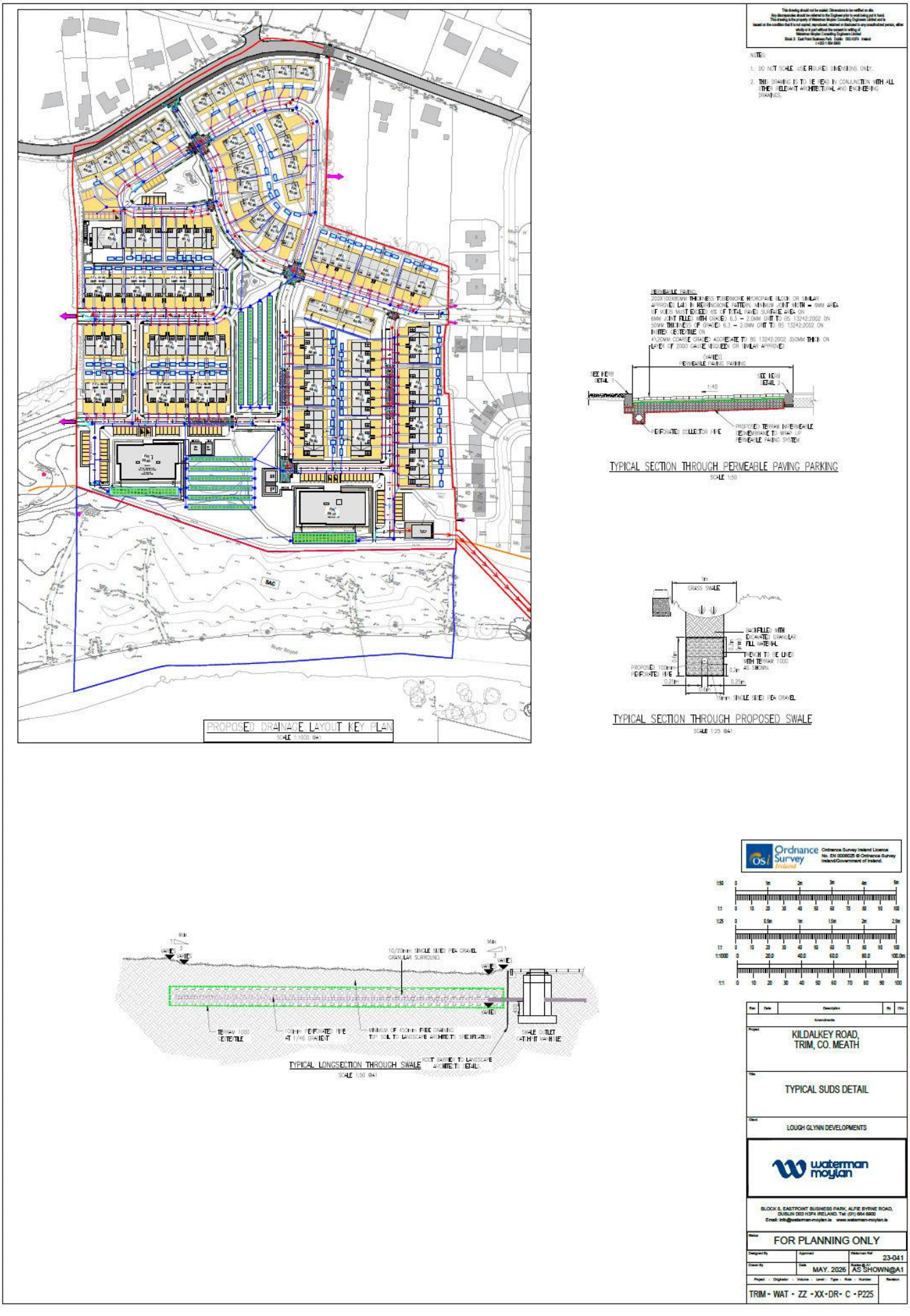


Figure 18. *Typical SuDS layout*

Figure 19. *Proposed rising main general arrangement plan*

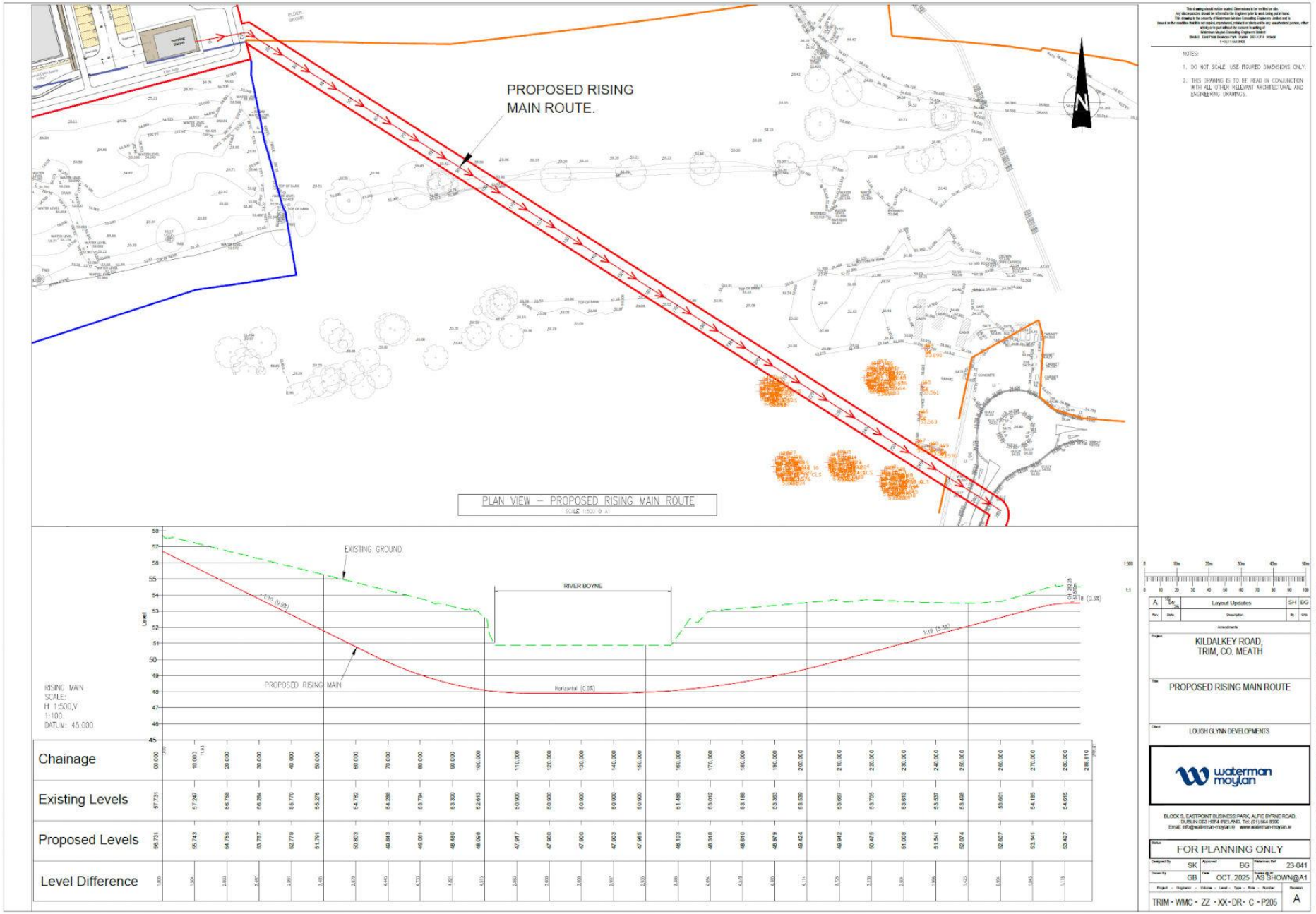


Figure 20. *Proposed rising main route*

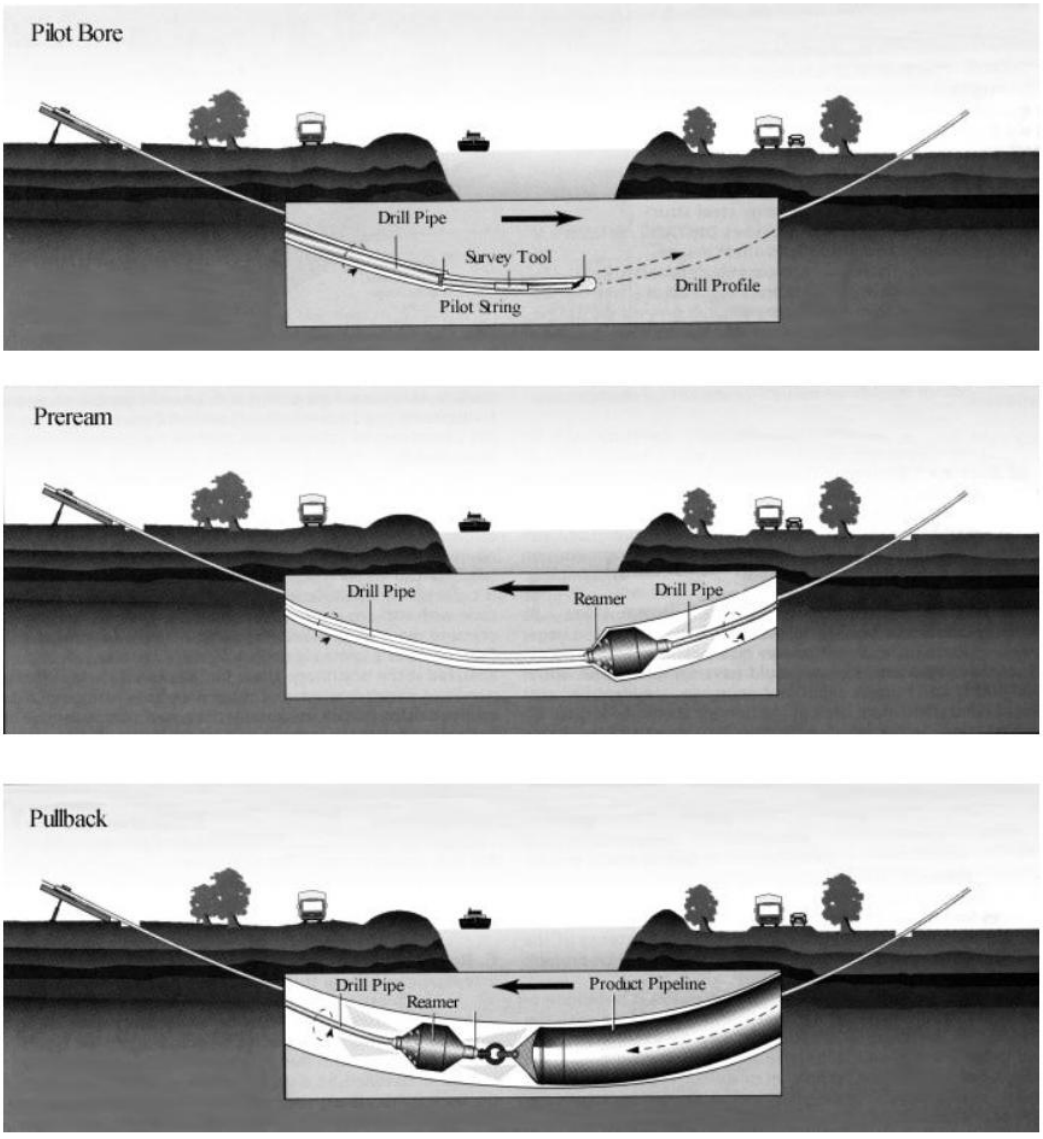
Figure 21. *Overland flood route*

Proposed Construction Phasing

A Construction Management Plan has been prepared by Waterman Moylan Consulting Engineers Limited to accompany this planning application. The proposed construction phasing is outlined in Figure 22.

Directional Drilling Method Statement

The figure below, sourced from the accompanying Method Statement from Dunnes Drilling Services Ltd., details the phases in relation to the directional drilling beneath the River Boyne.



In relation to the proposed directional drilling methodology, the Method Statement outlines the following:
'The equipment will travel along the designated route as briefed in the induction or included in the associated plans.
Plant shall be delivered via the hall road to the pre-constructed working pad. These items shall be delivered by a lorry low loader. All securing and release connections shall be made from ground level only. When the driver or plant operator traverses on to the flat bed to mount the plant he shall do so by ensuring he has either three points of contact at all times or crash mats shall be placed along his / her path.
Launch and reception pits shall be excavated as per pre-defined plans where provided otherwise decided on site to suit services and route. When lifting and excavating operations are being undertaken, exclusion zones will be established. These shall be outside of the slew on excavators at full reach and three meters from dumpers, telehandlers and site based transporting machines.

The rig is positioned at the agreed entry point and the remaining equipment located around the rig to suit site conditions and connected in accordance with the manufacturer's requirements ensuring field earths are fitted via the use of the stabilising augers.

Once set up is established the drilling machine will undertake a full function test which shall be completed before operations commence. Suitable escape prevention measures shall be applied to prevent drill fluid movement towards any watercourse. This shall be covered on the site- specific risk assessment.

The mixing of the drilling fluid is required, this shall be completed with the use of a mixing tank on the recycling system, positioned to suit site circumstances on level ground. These will be connected to the drilling rig using the 6 bar hoses.
Clean fresh water will be provided by the client.

The proposed drilling works will not be allowed to impact on any members of the public, the work area will be contained by fencing and access through the works will be restricted. Attention will be given to ensuring a safe site, including safe access and egress for all persons who may be affected by the works, including: Employees, Workers, Visitors, and Emergency Services.

NO MECHANICAL EXCAVATION IS TO TAKE PLACE WITHOUT A PERMIT.

The directional drill will maintain agreed clearances below all obstacles and services. Design profiles will be available to the drill operator and the profile will be used to establish the line and level of the drill. The client or shall where possible, mark the drill out on site every 10m along the line with wooden pegs or flags.

Once the machine has been secured in position the beacon or "sonde" transmitter is then checked for both battery life, calibration and inspection checks in accordance with the manufacturer's instructions and recorded on Form "H_D_D_ _Quality Assurance Check". Once checked the "sonde" transmitter is then located at the front of the drill head. A visual check is carried out on the drilling rods prior to use.

A pilot bore is drilled through from the launch pit to the reception pit.

As the drilling proceeds the drill head is continually monitored using a signal from the "sonde" transmitter to the hand-held receiver allowing the drill head to be correctly steered. The information received by the tracking unit indicates the line of the bore, as well as depth and pitch angle. As the piloting head progressively moves forward the tracking operator walks slowly over the line of the bore enabling any steering adjustments to be made to achieve the line and level of the bore planned. All steering information is automatically relayed back to the drill operator on his steering console. The tracking operator records drill head details every drill rod in the drillers log.

The location equipment transmits information in real time as the drill progresses so steering adjustments can be made quickly to put the drill on the correct course. The drill position is constantly monitored for deviation from the intended path and adjusted as required.

Where it is unsafe or the trajectory is unobtainable on foot then tracking shall be undertaken by utilising the target steering method. The Target Steering locating method allows the receiver to be placed ahead of the drill head and used as a steering target. The Target Steering procedure requires correct placement of the receiver in front of the transmitter, on the bore path, with its back end (where the battery pack is inserted) facing the drill. Setting a target depth on the receiver activates target steering, and the Locate screen on the receiver now displays horizontal distance from transmitter to receiver. The remote display on the drill automatically changes to Target Steering mode. This method shall be adopted on the stream crossing.

Drilling compounds may be brought to site when required as a dry powder in 25 kg sacks loaded in to the back of the mixing system. The powder is stored on the purpose-built mixing lorry which has roof covering to ensure weatherproofing at all times. Additional materials may be stored in the compound to be brought to site as and when is required. This powder is then mixed slowly into a tank filled with fresh (non-saline) water via the mixing systems venture hopper. The Mud Engineer oversees the operation and takes periodic measurements of the drill fluid to ensure its suitability. The formation formula is as per manufactures instructions or the ground conditions.

Intermittently the water is tested with PH strips to test for the PH value. Soda Ash is added and the water tested again. Soda ash is added until a neutral PH is achieved. Record quantity of soda ash added and repeat for each tank fill. Retest PH weekly or if the water source has changed.

The drill fluid performs several functions:

- *The drill fluid provides lubrication and cooling for drill head and string.*
- *The drill fluid fills and effectively seals small voids within the material being cut.*
- *The drill fluid suspends cuttings of the material being cut.*
- *The drill fluid carries the cuttings out of the hole.*
- *In soft soils, the drill fluid provides a hydrostatic pressure to the side walls of the hole.*

The use of Bentonite / Easy Mud borehole stabiliser on the drill means that the ground formation will be held open and kept stable if sands, silts or gravels are encountered. If the mud engineer records a reduction of fluid returns, works shall cease and control measures as shall me implemented as per the "Lost Fluid Procedure" stated below;

- *Stop drilling*
- *Stop all pumps and mud flows down the drill string.*
- *Carry out site survey for signs of a frac-out (drilling fluid to the surface).*
- *Check water courses in the immediate vicinity for signs of drilling fluid.*
- *Lift drain covers and manhole lids and check for drilling fluid increase.*

If the loss of fluid is not noted in any of the above.

- *Reverse the drill string until fluid flows return then recommence the bore whilst continuing to monitor the fluid returns.*

If fluid loss occurs and no signs of loss to the surface or drainage systems.

- *Add a fluid loss drilling additive to the drilling mud.*

Once good flows are achieved again continue drilling monitoring fluid returns.

On completion of the pilot bore the drilling head will then be removed from the drill string and replaced by an appropriately sized back reamer. Any lifting of the drilling head and reamer will be by using the onsite excavator with exclusion zones established to prevent unauthorised access during operation. The newly installed pilot hole will then be incrementally increased in diameter using a rotational reaming system as per specifications. A second Selwood pump will be set up at the exit pit and connected to the mud return line to the launch pit. The mud return line will be laid overground by pulling into place by winch.

Hole opening operations are carried out to enlarge the pilot hole to a size suitable for accepting the product string. Ground conditions and fluid flows will dictate the reaming process. Inspections shall be carried out on reamers to monitor excessive wear.

Throughout reaming operations, drilling fluid is pumped through the drill string. The fluids exit through nozzles in the reamer as this process directs the flow against the cutting face and flushes cuttings away. The drilling fluid and cuttings then flow through the annulus between the drill pipes and the borehole wall until reaching the surface.

The drill fluid is monitored in the recycling system for viscosity and bentonite added if required. It is also tested for sand content to ensure proper cleaning of bentonites. Change screens if sand content rises. Mud Density is also tested to ensure there is still carrying capacity in the bentonites. If mud density rises, dump mud and mix new batch.

The reaming operations are controlled by the driller. He liaises by radiophone with the pipe side coordinator. As with the pilot hole drilling, there will be continuous monitoring of the carriage loads, hydraulic pressures, mud pressures, mud mix, pump rate and drill progress.

Following completion of the hole-opening operations and prior to the pullback of the pipe, a cleaning run is conducted to flush any remaining debris from the drilled hole. The cleaning assembly consists of a barrel reamer which is threaded and attached to the drill string at the pipe site. This assembly is then pulled through the hole while rotating and pumping drill fluid through the string. The rate at which the tool is pulled through the hole is governed by the amount of resistance that is detected as it passes through the ground. Once the bore is opened to the required size the preparation for pulling the required ducting can be made.

The pulling head is connected to the drill string via a swivel connection which allows the drill string and barrel reamer to be rotated throughout the pullback without rotating the duct being towed through the hole. The pullback operation is controlled by the rig operator. The maximum pulling tonnage will be recorded on the HDD Quality Assurance and must not exceed the manufactures specifications.

Bentonite slurry will be dried and removed from site by The Client.'

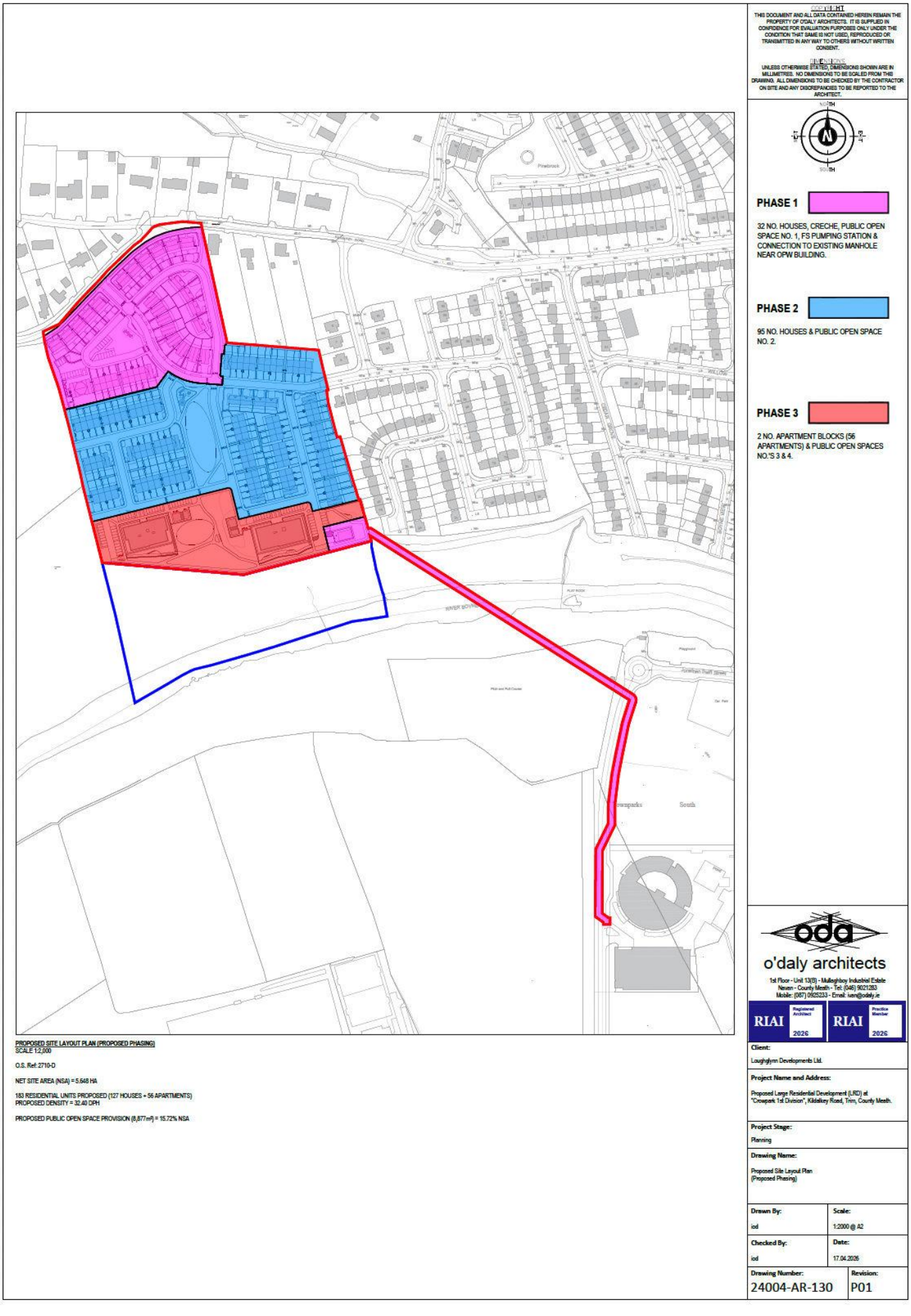


Figure 22. *Proposed phasing*

Sensitive Receptors

The sensitive receptors in the vicinity of the proposed development are summarised, and the potential impact/mitigation are seen in Table 1. Satellite imagery of the site is seen in Figure 1.

Table 1. Sensitive Receptors and Potential Impact.

Sensitive Receptor	Location / Potential Impact
Watercourses	On-site streams and the River Boyne
Designate Conservation sites with hydrological Pathway.	Mitigation measures should be put in place to avoid impacts on the watercourses and biodiversity corridor that runs through the site. The River Boyne and River Blackwater SAC/SPA are both located within the site boundary. Trim pNHA is located 3.5km downstream. Drilling works beneath the River Boyne, to support the proposed drainage, are proposed. Onsite works will involve demolition, ground clearance, re-profiling, groundworks, and construction, with potential for runoff, dust and light impacts that could impact on the biodiversity and/or water quality of the streams/the River Boyne with potential for downstream impacts.
Residents	In proximity of the proposed development As seen in Figure 1 the proposed development is proximal to residential areas and that would be sensitive to noise, dust and lighting impacts. Mitigation measures should be put in place to avoid impacting the residents proximal to the proposed development during the demolition and construction phase of the project.
Terrestrial Fauna and flora	On-site Fauna and flora of conservation importance No terrestrial species of conservation importance have been recorded on site (NBDC records) or were observed within the proposed development site during the site survey. However, two badger setts are located 150m and 180m southwest of the proposed development. Otter is a qualifying interest of the adjacent SPA, however, was not observed during the otter survey. Petrifying springs with tufa formation are located directly adjacent to the southern site boundary The onsite works will involve ground clearance, re-profiling, groundworks and construction with potential for runoff, dust and light impacts. Mitigation measures will be implemented to protect the badger setts, local otter populations and petrifying springs with tufa formation during construction.
Birds	Clearance of the site, particularly removal of trees and hedgerows will result in the loss of nesting habitat. Subsequent planting should be supplemented with the inclusion of bird boxes on site.
Bats	Bat surveys was carried out and foraging was noted. Mitigation measures should include a pre-construction bat inspect on of trees to be felled and measures to protect bats during construction particularly in relation to lighting.

3. Analysis of the Potential Impacts

Summary of Ecological Importance

This section of the biodiversity chapter provides a description of the potential impacts that the proposed development may have on biodiversity in the absence of mitigation The proposed development will involve the removal of terrestrial habitats on site, re-profiling, excavations, directional drilling beneath the River Boyne and the construction of roads, dwellings and associated services.

Construction Phase

In the absence of mitigation, the construction of the proposed development would potentially impact on the existing ecology of the site and the surrounding area. These potential construction impacts would include impacts that may arise during the site clearance, re-profiling of the site, drilling works and the building phases of the proposed development. Construction phase mitigation measures are required on site, particularly as reprofiling of the site and drilling works are proposed, which could lead to silt-laden and contaminated runoff entering the watercourses and drainage networks. In addition, four streams are located on-site, which outfall to the River Boyne to the south of the site. Drilling works are also proposed in relation to the drainage network, which are to be carried out beneath the River Boyne. There is potential for silt-laden runoff and contamination to enter these watercourses, with potential for downstream impacts.

Designated Conservation sites within 15km

The main proposed development site area is located proximate to the River Boyne and Blackwater SAC and SPA. It should be noted that the proposed development site could potentially impact on the River Boyne or one of the four on-site streams, leading to silt and pollution entering the River Boyne. Construction phase mitigation measures are required on site, particularly in relation to the protection of the pollution, silt entering the watercourses. There is potential for silt-laden runoff and contamination to enter the watercourses, with potential for downstream impacts on the River Boyne and Blackwater SAC & SPA and Trim pNHA. Other potential impacts relate to dust and groundwater. Additionally, a Source-Pathway Receptor (SPR) risk assessment was undertaken for the construction phase by EurGeol. Dr. Robert T. Meehan, PGeo. within the a Hydrogeological Assessment for the proposed development. It is concluded that in the absence of mitigation, significant effects are likely on the River Boyne and Blackwater SAC & SPA. Mitigation measures are proposed as outlined in Table 2.

Habitats

The impact of the development during the construction phase will be a loss of existing habitats and species on-site. It would be expected that the flora and fauna associated with these habitats would also be displaced. Petrifying springs with tufa formation (Annex I habitat) is present proximate to the southern and western site boundary. The main potential impacts during construction on the springs is through direct disturbance and hydrogeological impacts. However, no construction works will occur in the vicinity of the springs and as outlined in the Petrifying Spring Survey and Assessment (Appendix V (Denyer, 2025)), *'There are no predicted significant hydrogeological impacts to the Annex I priority petrifying springs from the proposed development (Section 4.2). This is because no works will be undertaken in the vicinity of the springs, the depths of the groundwater across the site are well below the level of any of the construction activities and the proposed rising main borehole will not pump or dewater the area within and around it (Meehan, 2025). Required hydrogeological mitigation and avoidance measures are detailed in the Hydrogeological assessment (Meehan, 2025).'*

Terrestrial Mammal Species

No protected terrestrial mammals were noted within the site boundary. Two badger setts were noted west of the site outline. Both setts are reasonably distant from the redline (approximately 180m and 150m respectively). Mitigation will be required in order to protect these setts from disturbance during construction. No machinery will be present within 150m of the setts for the full duration of construction works.

No otter holts or signs of otters were noted within the site outline or within 150m of the site. Loss of habitat and habitat fragmentation may affect badgers foraging or transiting through the site. Noise and vibration during construction may impact on otters utilising the adjacent River Boyne.

Impacts: Low adverse / site / Negative Impact / Not significant / short term. Mitigation measures are proposed as outlined in Table 2.

Flora

No protected flora was noted on site. Site clearance will remove the flora species on-site. The Third Schedule invasive Sea buckthorn was recorded within the proposed development site. The removal of soil from the site has the potential to spread sea buckthorn. An Invasive Species Management Plan has been prepared (Appendix IV) to accompany this EcIA.

Potential Impacts in the absence of mitigation: Low adverse / site / Negative Impact / Not Significant / Short term. Mitigation measures are proposed to prevent the spread of invasive species as outlined in Table 2.

Bat Fauna

No confirmed bat roosts will be lost. The development is likely to displace bats from foraging at the site during construction and operation due to increased lighting on-site. The site is adjacent to the River Boyne, which is a bat foraging corridor used by multiple common species. No trees of bat roosting potential are to be removed as part of the proposal.

Impacts: Minor adverse/ Local / Not significant / short term. Mitigation is needed in the form of a pre-construction bat survey and the control of light spill during construction as outlined in Table 2.

Aquatic Biodiversity

The River Boyne is located south of the development site. On-site streams outfall into the River Boyne. During construction and operation, there is the potential for a hydrological connection to this watercourse via surface water runoff. In the absence of mitigation, there is the potential for silt and contaminated surface water runoff to enter the on-site watercourses and outfall to the River Boyne. Silt and pollution could potentially impact on downstream biodiversity.

Impacts in the absence of mitigation: Moderate adverse / local / Negative Impact /significant effects/ short term. Mitigation is needed in the form of control of silt and petrochemical and dust during construction as outlined in Table 2.

Bird Fauna

Site clearance including the removal of hedgerows and trees could impact on bird nesting. Noise during construction may impact bird species utilising the adjacent River Boyne, including Kingfisher which is a qualifying interest of the River Boyne and Blackwater SPA.

Impacts: Low adverse / Local / Negative Impact / Not significant / short term. Mitigation is needed in the form pre-construction surveys, ecological supervision and measures relating to noise during construction as outlined in Table 2.

Petrifying Springs

The potential impacts on these habitats are outlined by Dr Denyer as follows:

'Petrifying springs can be damaged by direct habitat loss (removal or disturbance of springs) and changes to water quality (e.g. pH, mineral composition and nutrient levels) and quantity (e.g. flow rate). Changes to land-use in the recharge area of the petrifying springs (for instance from creation of hardstanding areas and changes in groundwater flow and direction resulting from landscaping and excavation) can reduce water flow. In addition, surface water run-off into the recharge area can potentially negatively impact petrifying spring water quality. Potential impacts and recommended mitigation measures and monitoring are summarised below.

Direct disturbance

- *The spring/ seepages should be **protected** from any **direct disturbance**. There should be no construction works in the petrifying spring/ seepage zones within the SAC as shown on Figure 3.1.*
- *The spring/ seepages should be **protected from recreational disturbance**/ pressure resulting from the proposed development. Public access is required to the western spring ('St Patrick's Well'). This should be limited to the well only and access to the riverbank from this location prevented/ discouraged as this would cause damage to the petrifying spring and adjacent hydrophilous tall-herb vegetation.'*

Impacts: Low adverse / Local / Negative Impact / Not significant / short term. Mitigation is needed in the form ecological supervision and confining works to site outline as outlined in Table 2.

Operational Phase

Once developed, the site would be seen as a stable ecological environment. Appropriate measures should be taken to prevent contaminated surface water run-off and silt from entering adjacent habitats. The construction of new

drainage networks will have to comply with SUDS and County Council requirements and, as a result, would have a negligible impact on habitats and species surrounding the proposed development site.

Designated Conservation sites within 15km

Once the proposed development is complete and in the operational phase, surface water runoff will discharge to the soakaways located within each of the four catchments on-site, and foul water from the site will be discharged to the public network via the proposed pumping station and connection beneath the River Boyne. In the absence of mitigation, it is considered that significant impacts on designated conservation sites would be unlikely.

The proposed development includes a sustainable drainage strategy. No mitigation is required to prevent significant effects on designated sites. The development will comply with MCC requirements and the Water Pollution Acts, and standard measures will be in place to prevent downstream impacts.

Impacts: Negligible / International / Neutral Impact / Not significant / Long-term Mitigation measures are proposed as outlined in Table 2.

Habitats

The biodiversity value of the habitats on site will improve as landscaping matures. As identified in the Petrifying Spring Survey and Assessment (Denyer, 2025), potential impacts on petrifying springs during operation include recreational disturbance/pressure during the operational phase. As outlined in Appendix V, '*Public access is required to the western spring ('St Patrick's Well'). This should be limited to the well only and access to the riverbank from this location prevented/ discouraged as this would cause damage to the petrifying spring and adjacent hydrophilous tall-herb vegetation.'* (Denyer, 2025). Mitigation measures are proposed as outlined in Table 2.

Terrestrial mammal species

No protected terrestrial mammals were noted within the site boundary. Two badger setts were noted west of the site outline. Post-construction, badger foraging is expected to persist. Loss of habitat and habitat fragmentation may affect some common mammalian species. Potential impacts relating to increased human presence in the vicinity of the River Boyne may impact on Otter inhabiting the River Boyne.

Impacts: Low adverse / site / Negative Impact / Not significant / short term. Mitigation measures are proposed as outlined in Table 2.

Flora

No protected flora was noted on site. Landscaping will increase flora diversity and remove invasive species on site.
Potential Impacts in the absence of mitigation: Neutral / site / Not significant / long-term

Bat Fauna

Lighting in the centre/southern portion of the site is within bat lighting guidelines (2700^{o}K). Bat foraging (post-construction) would be expected to continue on site. Light spill will be contained to the site along the southern, western and eastern boundaries ensuring the dark riparian corridor adjacent to the site remains suitable for bat foraging and open areas will remain unlit. Ensuring lighting is done sensitively, and in line with the proposed lighting plan and outlined mitigation measures, the proposed development is not deemed to have any significant effect on local bat populations. The potential for collision risk and impact on flight paths in relation to bats is considered low due to the limited level of bat activity on site, and the buildings would be deemed to be clearly visible to bats. Bat foraging would be expected to continue on-site, albeit at a lower level, until landscaping matures.

Effects: Low adverse / International / Negative Impact / Not significant / long term. Mitigation is required in relation to the provision of ecological supervision during the landscaping stage to ensure bat foraging corridors are developed and that lighting installed is as per the proposed lighting strategy. Mitigation measures are proposed as outlined in Table 2.

Aquatic Biodiversity

There are watercourses located within the subject site, which outfall to the proximate River Boyne. In the absence of mitigation, there is the potential for silt and contaminated surface water runoff from the subject site to enter the watercourses and the River Boyne during operation. Silt and pollution could potentially impact on downstream biodiversity.

Impacts in the absence of mitigation: Minor adverse / local / Negative Impact /significant effects/ short term. Mitigation is needed in the form of control of silt and petrochemicals in line with standard measures. Mitigation measures are proposed as outlined in Table 2.

Bird Fauna

The proposed development will change the local environment as new structures are to be erected. The buildings are comprised of solid materials, consisting of a solid material on the exterior, which includes sections of concrete and glass. These buildings would be clearly visible to bird species and would not pose a significant collision risk. However, the presence of buildings on site and landscaping may provide additional nesting and foraging potential for garden bird species.

Impacts: Low adverse / site / Negative Impact / Not significant / long term. Mitigation measures are proposed as outlined in Table 2.

Petrifying Springs

An assessment of potential hydrogeological impacts on petrifying springs within the site from the proposed LRD and required design and mitigation features to avoid impacts are detailed in Meehan (2025) '*Hydrogeological assessment for proposed Large Scale Residential Development (LRD), by Loughglynn Developments Limited, at a site on the Kildalkey road, Trim, County Meath –Land, soils, geology, hydrology and hydrogeology*.'

This states that no works will be undertaken in the vicinity of the springs, that the depths of the groundwater across the site are well below the level of any of the construction activities (e.g. foundations and other excavations into the subsurface on the site) and the proposed rising main borehole will not pump or dewater the area within and around it (Section 9.2 of the Hydrogeological assessment). Required mitigation and avoidance measures are detailed.

The hydrogeological assessment concludes:

'*Due to the nature of proposed LRD developments being near-surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The design of the proposed LRD Project has maintained the existing hydrological and hydrogeological regime on the site in as much as possible.*

This means that all SUDS measures will discharge as diffusely as possible and at as shallow a depth as possible, using individual shallow soakaways for each house individually and wide, expansive, shallow soakaways for the road network.

This will mean no significant effects on groundwater levels and / or flows, and / or surface water, will occur as a result of the proposed LRD Project.'

Mitigation measures are proposed to ensure no significant effects are likely on the Petrifying springs with tufa formation (Cratoneurion) [7220] habitat.

Impacts: Low adverse / site / Negative Impact / Not significant / long term. Mitigation measures are proposed as outlined in Table 2.

4. Mitigation Measures & Monitoring

Standard construction and operational controls will be incorporated into the proposed development project to minimise the potential negative impacts on the ecology within the Zone of Influence (ZoI), including the watercourses and downstream designated sites. These are outlined in Table 2.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
Surface water drainage network On-site Streams River Boyne River Boyne and River Blackwater SAC & SPA Downstream pNHAs (Trim)	• Habitat degradation • Dust deposition • Pollution • Silt ingress from site runoff • Downstream impacts • Negative impacts on aquatic and bird fauna. • Disturbance.	**<u>Construction Phase</u>** **Construction Management Plan** Waterman Moylan Consulting Engineers have prepared a CMP for the proposed development. The following measures designed to limit hydrological impacts on the River Boyne are outlined in this document, which will be implemented: ***'Site Specific Environmental Risk – River Boyne*** *Construction runoff is heavily laden with silt especially when topsoil has been stripped and heavy rainfall occurs. The River Boyne and ditches within the site are particularly susceptible to pollution from surface water runoff with high silt content. Works within or adjacent to the watercourse/ditches will also give rise to risk of pollution. In this regard it is not intended to carry out any works within the SAC or adjacent/in the River Boyne* *Sediment control plans will be implemented on site to mitigate against the risks of working in proximity of the River Boyne or ditches which provide a flow path to the river.* *Sediment basins and interception drains/traps will be installed before any major site grading takes place. Silt fences will be installed along the southern boundary of the site and adjacent ditches that ultimately drain to the river in order to keep sediment contained on site at appropriate locations to be determined on site by the Project Ecologist prior to any works commencing.* *The main run-off interception drains/traps with outlet protection measures together with silt fencing will be installed prior to the works commencing and will be used to convey stormwater run-off through the development site and to protect existing watercourses in the event of a breach.* *During periods of heavy rainfall or other extreme weather events, additional inspections of sediment control measures, silt fencing, diversion drains, settlement ponds and drainage infrastructure will be undertaken by the Contractor. Any damaged or ineffective measures will be repaired or replaced immediately to ensure continued protection of the River Boyne, adjoining watercourses and surrounding environmental receptors from sediment-laden runoff and potential pollution* *Sediment control measures which will be implemented on site are set out below. The type and location of the measures to be implemented will be determined on site by the Project Ecologist prior to the works commencing.* ***Sediment Control Measures*** • *Straw Bales* *Straw bales will be placed at the base of a slope to act as a sediment barrier. Straw bales are temporary in nature and may perform for only a period of weeks or months. Proper installation and maintenance are necessary to ensure their performance.* • *Silt Fencing*

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		A silt fence is made of a woven synthetic material, geotextile and acts to filter run-off. Silt fencing will be placed as a temporary barrier along the contour at the base of a disturbed area. The material is durable and will last for more than one season if properly installed and maintained. Silt fencing is not intended to be used as a perimeter fence or in area of concentrated flow. If concentrated flow conditions exist, a more robust filter will be considered. • *Diversion Drains* *Diversion drains are simple linear ditches, often with an earth bund, for channelling water to a desired location. They can have straw bales inserted along the ditch to reduce flow and assist in removing sediment. If the drains are being eroded, they can be lined with geotextile fabric or large stones or boulders.* • *Silt Traps/Settlement Ponds* *Silt Traps will be placed at the lower parts of the site and prior to discharge to the natural outfalls from the site. These are generally bunded areas with a high-level outlet which create a pond behind the barrier. Sediment settles within the pond to reduce the silt in the runoff. Silt traps area deemed temporary and proper installation and regular maintenance is needed to ensure their performance.* ***Site Specific Environmental Risk - Groundwater Protection*** *The excavations for the proposed foundations, percolation areas, drainage pipes, pumping station, water supply, and utilities may impact the ground water in the site.* *The site investigation did not identify the presence of a high-water table. It is therefore anticipated that there should be little or no impact upon the groundwater. However, in the event that a high-water table is encountered then an appropriate dewatering scheme to keep the excavations free from water will be implemented. Specialist contractors in dewatering will provide expert advice on the dewatering and treatment in order to ensure the quality of water leaving site is high.* *Typically improvements to the quality of the discharge of surface water from deep excavations are achieved through the provision of settlement ponds/tanks. Settlement ponds/tanks will be maintained and regularly monitored visually for hydrocarbon sheen and suspended solids.* *Periodic laboratory testing of discharge water samples will be carried out in accordance with the requirements of Meath County Council before discharge back to the surrounding surface water drainage system.'* **Altemar Ltd have produced a CEMP which outlines additional measures as follows:** <u>Contamination of watercourses</u> • Appointment of an ecologist to oversee enabling works and the implementation of mitigation measures outlined. • Staging of project to reduce risks to watercourses from contamination

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. • Any discharges to the surface water system during construction must be discussed with the ecologist, undergo desilting and petrochemical interception and have twice daily turbidity monitoring. • Local watercourses and drains will be protected from dust, silt and contaminated surface water throughout the works. • Local silt traps established throughout site as discussed with the ecologist. • Mitigation measures on site include dust control, stockpiling away from watercourse and drains • Stockpiling of loose materials will be kept to a minimum of 20m from watercourses and drains. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. • Fuel, oil and chemical storage will be sited within a bunded area. The bund will be at least 50m away from drains, ditches or watercourses, excavations and other locations where it may cause pollution. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. Any water-filled excavations, including the attenuation tank during construction, that require pumping will not directly discharge to the streams. Prior to discharge of water from excavations adequate filtration will be provided to ensure no deterioration of water quality. • Stockpiles and runoff areas following clearance will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. • Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. • During the construction works silt traps will be put in place in the vicinity of all runoff channels the streams to prevent sediment entering the surface water drainage network. • Planting in the vicinity of the stream crossings should be put in place as soon as possible to allow biodiversity corridors to establish. • On-site inspections will be carried out by project ecologist during enabling works and until drainage connection is complete. • Maintenance of any drainage structures (e.g. de-silting operations) must not result in the release of contaminated water to the surface water network. • No entry of solids or concrete to the associated drainage network during the connection of pipework • The program for the felling of trees will be carried out in consultation with the project ecologist and arborist. The ecologist will be present for the felling of trees within 10m of watercourses. <u>Aquatic Biodiversity</u>

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Environmental risks due to construction and operation of the proposed development do potentially occur, particularly in relation runoff from steep site and/or drains that could lead to the watercourses. This could not only result in negative impacts on instream biodiversity, also with the watercourses acting as a vector, carry pollutants and impact beyond the site boundary and into the River Boyne. The following mitigation measures are to be implemented during construction: • Given the proximity to the River Boyne, a robust silt barrier fence would be placed along the streams within the redline. This would passively remove silt from the runoff. • As back up to the barrier, there would be a sump pump with a float switch at the lowest point of the fence. The sump would be in a 60cm diameter vertical pipe placed uphill of the fence, the top of the pipe would be 40 cm above the ground level at the silt curtain. Water would only enter it in extreme weather if water is building up behind the silt fence. The outlet of the pump leads to a large silt bag that would need to be downstream of the curtain and maintained. • Inspection of the integrity of the silt fence will be a requirement of the daily on site checklist and twice daily during periods of heavy rain. Repairs if required are to be made as a matter of urgency. Spare fencing is to be retained on site in a location that is easily accessible. • IFI are to be notified immediately of breaches in the silt fence that have resulted in silt laden runoff entering the watercourses. • Water from trenches and excavations will not flow directly into drains or watercourses without settlement interception. Vigilance will be required due to the proximity of the stream. Any petrochemical spills are to be cleaned up immediately. • All pavement construction within 20m of watercourses is required to take place during dry weather. This minimises the risk to watercourses and contamination of runoff. All associated plant to be cleaned and washed down in a controlled environment and at a designated location greater than 30m from a watercourse/drain leading to a watercourse. • Drip trays placed below all small plant. Spill kits will be present on all working sites to clean up spillages. A record of all spillages will be kept and monitored. Generators and small plant not be used within 10m of watercourses. • All mobile plant to be refuelled in a central refuelling area in the contractor's compound where a spillage containment sump will be constructed within the refuelling area. All collected fuel will be disposed offsite under license. A record of all spillages will be kept and monitored. • On roads and car park areas and saw cutting, coring and grooving operations will be supported by the use of suction sweepers/cleaning equipment to immediately collect any detritus generated by these works. The silt barrier is to remain in place during all construction works. • Stockpiling of loose materials will be kept to a minimum of 40m from watercourses and drains. In the event that stockpiles are required, they will have suitable barriers to prevent runoff of fines into the drainage system and

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		watercourses. Damping down of stockpiles will take pace in dry windy weather to prevent wind blown movement of fines. • Fuel, oil and chemical storage will be sited within a bunded area. The bund must be able to take the volume of the largest container plus 10% and be located at least 10m away from drains, ditches, excavations and other locations where it may cause pollution. Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. • No foul water will be discharged on site, unless through nominated and secure sewer connection. It will not be discharged to drains or watercourses. **Dunnes Drilling (the contractor assigned to carry out the HDD works under the River Boyne) have prepared a Method Statement which outlines the mitigation that will be in place during the drilling works as follows:** ***'ENVIRONMENTAL*** ***ASSESSMENTS AND CONTROLS*** *All personnel shall be briefed of the environmental procedure requirements as per The Client's information received which includes constraints associated with the works. All works shall be conducted in accordance with Dunnes Drilling management systems, associated plans and guidance information.* *An SPA shall be completed by the site supervisor, this will include environmental considerations. The findings of the assessment shall be brought to the attention of all personnel who may be affected by the operational processes.* *Any mud, dirt or construction materials associated with Dunnes Drilling activities shall be cleaned up from the area at the earliest opportunity and the area returned to its previous condition.* *If there is any suspect that the ground may be contaminated, then the work should cease immediately. The area shall be cordoned off and reported immediately to The Client.* *Segregation techniques shall be established so material may either be recycled or removed to a licensed waste treatment facility.* *Copies of waste carrier licenses shall be obtained, and consignment / transfer notes collected when waste materials are removed from the project area. The consignment / transfer notes shall be retained for designated timescales as per legislative requirements.* *Spill kits to be positioned at the workface. All stationary plant will be bunded.* *During the works, any nearby watercourse will be monitored for any changes in colour or signs of bentonite frack out. Should any pollution of any nature be identified the works will be stopped immediately and The Client will be notified.* ***FAILURE MODES AND FRAC OUT*** ***INTRODUCTION***

Table 2. Construction Phase Mitigation Measures.		
Sensitive Receptors	Potential Impacts	Mitigation Measures
		The purpose of this section is to establish procedures for addressing potential impacts associated with a "frac out" of drilling fluid during the horizontal directional drill (HDD) process. The term "frac out" is used to describe an inadvertent release of drilling fluid resulting from the fluid escaping from an underground HDD borehole and rising to the surface. *The HDD installation technique is susceptible to difficulties caused by subsurface ground conditions. This document establishes the criteria by which Dunnes Drilling will determine when a proposed HDD is unsuccessful.* *Dunnes Drilling will provide on-site inspection during the HDD process to monitor the progress on the drill and to maintain daily progress reports.* ***HDD PROCESS*** *The HDD process generally includes three distinct phases beginning with the drilling of a pilot hole from the entry point on one side of the HDD along a designed profile to an exit point at the surface on the other side of the HDD. The second phase entails the reaming of the pilot hole to a diameter large enough to accept the cable ducts to be installed. Finally, the cable ducts are pulled into place within the enlarged hole.* ***DRILLING FLUID*** *The HDD process involves use of a drilling fluid (also referred to as drilling mud) made up primarily of water and bentonite (if required), with pH values between 8 and 10. Bentonite is a naturally occurring, non-toxic, inert substance and is frequently used for drilling potable water wells. Therefore, the environmental impacts of an inadvertent release of drilling fluid in a watercourse is a temporary increase in local turbidity until the drilling fluid dissipates with the current or is settled.* *The primary purpose of drilling fluid is to remove the cuttings from the borehole, stabilize the borehole and act as a coolant and lubricant during the drilling process. The water and clay drilling fluid consists of 1 to 5 percent active clays and from 0 to 40 percent inert solids with the rest being water. The primary active clay component is bentonite. The drilling fluid is first* *prepared in the mixing tank with both new and clean recycled drilling fluid. The fluid is pumped at 40 to 100 gallon per minute rates through the center of the drill pipe to the cutters. Return flow is through the annulus created between the wall of the boring and the drill pipe.* *The cuttings are then carried to either the entry or exit pit, depending on a combination of elevation difference and drilling/hole opening direction. A reduction or loss of drilling fluid returns does not necessarily indicate that these fluids are being released to the environment through fractures. The loss of returns may occur because of lower pressures and volumes, thereby allowing gravity and friction to overcome the ability of the fluid to return to the bore site. As previously described, drilling fluid will likely be absorbed by the formation or drawn down into fractures within the formation.* *Within the boundaries of the worksites drill fluid would be controlled through the use of pits at the crossing entry and exit points and typical fluid handling equipment such as Selwood pumps. Drill fluid is released regularly on the drill rigs as part*

Table 2. Construction Phase Mitigation Measures.		
Sensitive Receptors	Potential Impacts	Mitigation Measures
		of normal operations when sections of drill pipe are separated. The worksite will be graded such that fluid released on the rig will flow into the fluid pit in front of the rig. *….* ***FRAC OUT PREVENTION*** *The risk of a frac out in a sensitive area can be mitigated through profile design and through implementation of specific measures throughout the installation process. Dunnes Drilling operatives are responsible for execution of the HDD operation, including actions for detecting and controlling drilling fluid seepage. Dunnes Drilling will closely supervise the progress of the HDD with onsite inspections.* ***PROFILE DESIGN*** *The HDD profile is designed to minimize the potential for the release of drilling fluid in sensitive areas. The type of subsurface material and the depth of cover material are factors considered in developing the profile of an HDD crossing. Cohesive soils, such as clays, dense sands, and competent rock are considered ideal materials for containment of drill fluid.* *In the vicinity of the entry and exit points of the crossing the depth of cover will be minimal. It is probable and expected that frac outs will occur in these segments of the crossing. The crossings are designed such that these segments will be in upland areas.* ***PREVENTATIVE MEASURES IMPLEMENTED DURING INSTALLATION*** *Key preventative measures implemented during installation are geared toward keeping the drill fluid contained in the borehole and preventing its escape to surrounding ground formations. This is accomplished through monitoring and management of drill fluid pressures and drill fluid volumes.* *DRILL FLUID PRESSURE MONITORING AND MANAGEMENT* *Drill fluid pressures are affected by several factors. A description of some of these factors and how they can be managed follows.* • *Drill fluid density. Greater drill fluid densities result in greater downhole pressures. A large component of drill fluid density is the concentration of cuttings in the fluid. By controlling drilling and hole opening penetration rates and maximising the effectiveness of drill fluid recycling equipment drill fluid densities can be kept below acceptable limits.* • *Drill fluid viscosity. Greater drill fluid viscosities result in greater downhole pressures. However, greater viscosities also help seal off fissures and other escape paths into the surrounding formation from the HDD borehole. Similarly increased viscosity improves the cuttings carrying capability of the drill fluid. Drill fluid viscosity must be carefully managed to obtain a balance between these conflicting requirements.*

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• *Borehole cleanliness. Cuttings tend to settle out of the flow of drill fluid in the annular space around the drill pipe string. Accumulations of cuttings or cutting beds restrict the flow of drill fluid through the annular space. This results in an increase in the pressure required to maintain flow. Careful management of drill fluid properties and the regular use of borehole swabbing techniques will keep the borehole free of cuttings beds and their associated pressure increases.* • *The drill fluid pressures in the borehole will vary throughout the installation processes. They will change with the depth of cover, the distance drilled, and the borehole diameter. However, changes in pressure should be gradual and can to a large extent be predicted. Rapid or unexpected changes in pressure are indicators of potential problems downhole. It is critical that drill fluid pressures be monitored and throughout the pilot hole process, when pressures are the highest.* • *Measured pressure approximately equal to predicted pressure. This is an indication that conditions are normal and the driller will be allowed to proceed with the pilot hole drilling.* • *Measured pressure greater than predicted pressure. This is an indication that the annular space behind the drill bit is becoming plugged with cuttings or that the concentration of cuttings in the drill fluid returns is too high resulting in excess drill fluid density. The driller will be required to implement measures to clean the annular space and or reduce the concentration of cuttings. This typically involves "swabbing" the borehole by slowly retracting the drilling assembly while pumping clean drill fluid into the bore to flush out cuttings and replace the cuttings laden fluid with clean, less dense fluid. The composition of the drill fluid pumped into the bore may also be modified to improve its cuttings carrying capacity.* • *Measured pressure less than predicted pressure. If the measured pressure is significantly less than the predicted pressure this is normally an indication that some of the drill fluid is escaping from the borehole. It is extremely important to note that having fluid escape from the borehole is not necessarily an indication that a frac out has occurred or is about to occur. It is quite normal to have a significant amount of fluid lost to the surrounding formation without a frac out occurring. Nevertheless, if the measured pressure is less than the predicted pressure, and in particular if this is the result of a sudden drop in pressure, Eco Drill will implement measures to reduce or eliminate the loss of drill fluid from the borehole. One measure that may be implemented is the use of Lost Circulation Materials (LCM) to plug a fissure in the formation. The use of additives to improve the sealing properties of the drill fluid is another measure.* ***FRAC OUT MANAGEMENT***

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Management of frac outs is key to minimizing the environmental impact of the HDD crossings and ensuring their successful completion. Managing frac outs requires that appropriate equipment is available, that the frac outs are detected in a timely manner, and that appropriate procedures are used to minimize the volume of fluid released and its environmental impact. ***RESPONSE EQUIPMENT*** *Equipment for containing, controlling and cleaning up any drill fluid released during a frac out will be kept on site throughout the installation process. Heavy equipment not specifically designated for control and clean-up of drill fluid such as excavators and Vac Tanker will also be available on site.* *Frac out containment machinery and equipment to be provided by client. The following list identifies some materials and equipment that will be maintained at the HDD site in sufficient quantities to help ensure containment of frac outs of drilling fluid:* • *Excavator* • *Shovels, brushes and buckets* • *Silt fencing* • *On-Call vacuum tanker and skips with an approved waste disposal site* ***MONITORING AND DETECTION*** *An obvious key to the timely detection of a frac out is monitoring of the surface above the HDD crossing for drill fluid. Dunnes Drilling will employ an operative to visually monitor the ground above the HDD crossing for frac outs. He will be supplemented by information from the rig operator as described above, namely pressure monitoring and volume monitoring.* *The monitoring operative will survey the site along the HDD centreline. The monitor will be in constant radio contact with the rig operator who will keep them informed of the position of the downhole tool.* *The rig operator will also keep the monitor informed of the drill fluid pressures and mud volume balance and will provide his professional opinion of level of risk of a frac out occurring at any given time. Armed with this information the monitor will be able to decide if monitoring a difficult area, such as a water course is warranted. It will also allow them to allocate their resources in the most effective manner.* *The identification of a potential frac out prior to it occurring is dependent upon the skill and experience of the people involved. Similarly, the operatives who will supervise monitoring and mitigation efforts will also be experienced in this type of work.* ***CORRECTIVE ACTION FOR FRAC OUTS***

Table 2. Construction Phase Mitigation Measures.		
Sensitive Receptors	Potential Impacts	Mitigation Measures
		If a frac out occurs, The Client will be immediately notified. Dunnes Drilling will suspend forward progress of the drilling operations if excessive loss of mud circulation is noted and conduct a detailed examination of the drill path and surrounding area for evidence of a release to the surface. *The HDD equipment may continue to operate during this period. It is important to initially maintain operations since soils such as sands, gravels, and some clays do not have the frictional characteristics necessary to maintain a void or hole from a drill. The weight or load from the soils has enough downward pressure to cause the hole to collapse. Shutting down the drilling operation further jeopardizes the success of the drill and it may not be possible to regain circulation. The weight of the settled soils may impede removal of the drill stem. The necessary torque to start the drill head rotating again, in the collapsed soils, may be more than the stress of the pipe can bear; in which case the drill stem and head will twist apart. The pieces may have to be abandoned in place and the process started again, without an assurance that the second attempt will have greater success. Once the clean-up response has started, the drilling activities will immediately resume. After the drilling fluid seepage has been contained. Dunnes Drilling will make every effort to determine why the seepage occurred. Once the cause of the seepage has been determined, measures will be enacted to control the factors causing the seepage and to minimize the chance of recurrence.* ***MINIMIZATION OF VOLUME RELEASED*** *The first action required when a frac out is detected is to minimize the volume of drill fluid that is released. This will be done by immediately halting pumping of drill fluid downhole. Pumping will not resume until the situation is assessed and, if possible, the fluid release is contained and controlled. As it is probable that the frac out will resume as soon as fluid pumping starts again containment and control measures will have to be able to contend with a further release of fluid. Normally the frac out stops of its own accord when the drilling assembly progresses a short distance ahead of the release point.* *The risk of failure of the HDD installation increases dramatically as the duration over which pumping is halted increases. Hence, actions will be taken quickly in order that pumping may resume as quickly as possible.* ***CONTAINMENT AND CONTROL OF DRILL FLUID RELEASED*** *The types of measures implemented to contain the fluid released will depend on the type of area in which the release occurs.* *Surface release* *If an inadvertent release of drilling fluid is observed aboveground, the following measures will be implemented:* • *Immediately notify The Client.* • *Attempt to regain returns. Trip drill pipe and downhole tools back toward the direction of flow until returns through the drilled hole return to the entry/exit pit. Correct the bentonite properties, if necessary, and start drilling back in the same hole to see if the seepage continues. By swabbing the tool through the hole, this may*

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		remove any build-up of cuttings that created the inadvertent release. If the fracture is mitigated and controlled, resume HDD activities. • *Evaluate the release to determine if containment structures are necessary. If containment structures are necessary. If the volume of the release is too small for containment measures to be practical, the area will be allowed to dry. This applies to surface releases only. The containment structures i.e. local excavation, subject to permit, will be made around the affected area to prevent flow of the drilling fluid.* • *If there is a threat to a sensitive resource or to public health and safety, HDD activities will be suspended immediately.* ***WATERCOURSE*** *The HDD profile is designed in order to minimize the potential for an inadvertent release into a watercourse. Frac outs in watercourses are rare due to the provision of adequate depth of cover. However, if an inadvertent release is observed in a watercourse, the following measures will be implemented* *Temporarily suspend forward progress and immediately notify The Client. Dunnes Drilling operatives will monitor the extent of the drilling fluid plume and observe if the release results in distressed or dying fish.* *Water samples may be required to be collected at both upstream and downstream locations from any plume associated with an inadvertent release of drilling fluid for any further* *Attempt to regain returns. Trip drill pipe and downhole tools back toward the direction of flow until returns through the drilled hole return to the entry/exit pit. Correct the bentonite properties, if necessary, and start drilling back in the same hole to see if the seepage continues. By swabbing the tool through the hole, this may remove any build-up of cuttings that may have contributed to creating the inadvertent release. If the fracture is mitigated and controlled, resume HDD activities.* *Implementation of containment and control measures is most difficult in watercourses.* *The effectiveness of the measures implemented to limit the release of drill fluid will be closely monitored. If the measures are not effective and if the environmental impact of the release is deemed unacceptable the HDD installation will be abandoned. Another attempt using a modified profile or at an alternate location may be made.* ***ADDITIONAL CONTROL MEASURES*** *A determination will be made of the cause of the frac out. If it is determined that downhole pressures are excessive then measures to reduce them will be implemented. These measures are described above and include swabbing the hole and or modifying the drill fluid properties.* *DRILL FLUID CLEAN UP* *Measures to clean up drill fluid released by a frac out will be by use of suction tankers.'*

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Additionally, the following mitigation has been outlined in the associated Hydrogeological Assessment by Dr. Robert T. Meehan (2025): **Impact:** Contamination of Soil, Subsoil and Bedrock by Leakages and Spillages of Hydrocarbons or Chemicals in the proposed LRD Site Construction **Mitigation:** • On-site re-fuelling will be undertaken using a double skinned bowser with spill kits kept on site for accidental leakages or spillages; • Only designated trained operatives will be authorised to refuel plant on-site; • Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; • All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; • Fuel, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage; • The electrical control building will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; • The plant used during construction will be regularly inspected for leaks and fitness for purpose; • Safety data sheets for all chemicals used will be kept on-site; and, • An emergency response plan for the construction phase to deal with accidental spillages is contained within the Construction and Environmental Management Plan. **Impact:** Earthworks (Removal of Vegetation Cover, Excavations and 'Cut-and-Fill') Resulting in Suspended Solids Entrainment in Surface Waters (Proposed Project) **Mitigation by avoidance:** • Avoid physical damage to watercourses, and associated release of sediment; • Avoid excavations within close proximity to surface water courses; • Avoid the entry of suspended sediment from earthworks into watercourses; and, • Avoid the entry of suspended sediment from the construction phase surface system into watercourses, achieved in part by utilising sediment control systems such as straw bales and silt fences, and not implementing any alteration to the infiltration regime by avoiding the use of settlement ponds and drainage channels, and allowing percolation across the entire site towards the vegetation of the buffer zone. **Mitigation by Design:** • Source controls:

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• Straw bales and silt fences / barriers, erosion and velocity control measures such as use of sand bags, filter fabrics, and other similar/equivalent or appropriate systems. • Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures. • In-Line controls: • Erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, non-channel baffles, silt bags, silt fences, sedimats, filter fabrics, sediment traps, or other similar/equivalent or appropriate systems. Full avoidance of treatment systems such as temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems. • Monitoring: • An inspection and maintenance plan for the on-site construction sediment control system will be prepared in advance of commencement of any works. Regular inspections of all installed structures will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. • Any excess build-up of silt levels at dams, or any other sediment control features that may decrease the effectiveness of the feature, will be removed. Checks will be carried out on a daily basis. • During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for the River Boyne and the springs / streamlets on the site, and specifically following heavy rainfall events (as per the CEMP included with this LRD application). **Impact:** Potential Release of Hydrocarbons During Construction and Storage (Proposed Project) **Mitigation:** • On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site, and will be towed around the site by a 4 x 4 jeep to where machinery is located. The 4 x 4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; • Onsite refuelling will be carried out by trained personnel only; • A permit to fuel system will be put in place; • Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm control system and an appropriate oil interceptor; • The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• An emergency plan for the construction phase to deal with accidental spillages will be included within the Construction and Environmental Management Plan. Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area. **Impact:** Groundwater and Surface Water Contamination from Waste Water Disposal (Proposed Project) **Mitigation:** It is proposed to manage waste water from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all waste water being tankered off site by permitted waste collector to waste water treatment plants. It is not proposed to treat waste water onsite. **Impact:** Potential Hydrological Effects on Designated Sites (Proposed Project) **Mitigation:** • The proposed mitigation measures which will include 25 m buffer zones for avoidance of sensitive hydrological features (streams and rivers); • Pre-construction drainage control measures; • Robust sediment control measures will ensure that the quality of runoff from the proposed LRD Project area will be very high; and, • Best practice measures with regard use of oils, fuels (as outlined above) **Impact:** Effects of Construction Works on the WFD Status of Downstream Waterbodies (Proposed Project) **Mitigation:** Comprehensive surface water mitigation and sediment controls are outlined above. Hydrocarbons from vehicles within the site confines will pass through the site interceptor system which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network. These mitigation measures are considered sufficient to eliminate potential risks to ground/soils and subsoils, and groundwater and surface water quality, and will ensure the protection of surface water quality and flows in all downstream receiving watercourses. **Habitat loss and fragmentation (on the River Boyne and River Blackwater SAC/SPA)** HDD works and associated construction activity will take place within the River Boyne and River Blackwater SAC/SPA. The following measures will be in place to reduce the potential for significant effects via habitat loss and fragmentation: **Footprint Loss & Habitat Destruction** • **Micro-Siting Pits:** Place the HDD launch and reception compounds entirely outside the most sensitive areas. Set them back behind existing hedgerows or fields to minimize direct clearing within the SAC/SPA.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• **Physical Demarcation:** Install structural claddings or exclusionary fencing along the precise edge of the working footprint before work begins. This stops construction vehicles from straying into unpermitted parts of the SAC/SPA. • **Soil Segregation:** Strip, separate, and store the topsoil and subsoil from the compound footprint locally. Cover and protect these bunds to retain the native seed bank. • **Progressive Re-seeding:** Reinstate the launch and reception pits immediately after drilling finishes. Use locally sourced, native river-bank seed mixes and tree species (like Alder and Willow) to restore the habitat buffer. **Ecological & Structural Fragmentation** Fragmentation along a river corridor involves creating physical, visual, and behavioural barriers that cut off species movement. • **Dark Movement Corridors:** Establish strict "No-Light Zones" directed at the river and riparian strip. Use directional, baffled LED lights on the housing site facing away from the SAC/SPA to allow Otters and Kingfishers to commute safely at night. • **Retaining Safe Stepping Stones:** If a hedgerow or treeline must be cut to allow machinery access, bridge the gap at night using temporary artificial trellises or brushwood bundles to maintain visual and physical connectivity for bats and birds. • **Acoustic Hoarding:** Erect temporary acoustic barriers (like specialized acoustic quilts or dense timber hoarding) around the HDD rig. This stops loud machinery noises from creating a "behavioural wall" that blocks Otters from moving up or down the river. • **Seasonal Working Windows**: Do not create a barrier during high-traffic ecological seasons. Stop all drilling during the Atlantic Salmon migration and spawning run (October to April) and peak Kingfisher nesting periods to avoid disrupting population links. **Sub-Surface Fragmentation & Hydrogeology** The borehole itself can create a pathway for groundwater loss, which fragments wetland habitats by lowering the water table. The below measures will be implemented in addition to the full suite of measures as outlined in the Method Statement by Dunnes Drilling: • **Bentonite Grouting:** Seal the outer annular space of the installed pipe using specialized grout to prevent the borehole from acting as a permanent land drain that diverts groundwater away from the river. • **Clay Bund Interceptors:** Install low-permeability clay plugs along the pipeline trench within the housing site boundaries. This stops water from tracking along the newly dug pipe path and dry-draining local wet soils.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Disturbance and displacement impacts via lighting, noise, vibration and human presence (on the River Boyne and River Blackwater SAC/SPA) **Otter – River Boyne and River Blackwater SAC** **Appointment of Ecological Clerk of Works** A suitably qualified Ecological Clerk of Works (ECoW) will be appointed at the outset of the construction works to ensure that all environmental and ecological commitments are adhered to throughout the project. The ECoW will be specifically responsible for overseeing the correct implementation of all protective measures for European sites as detailed in this Natura Impact Statement (NIS). The ECoW will provide guidance on the required mitigations to the Project Team, and in particular the Site Manager. The Site Manager shall ensure that all personnel working on-site are trained and aware of the mitigation measures detailed below. While the Ecological Clerk of Works (ECoW) oversees ecological and environmental compliance, they are not solely responsible. All project staff, including the appointed contractor(s) environmental personnel, share the responsibility for ensuring that environmental best practices are adhered to. The appointed contractor(s) staff must work together to maintain high environmental standards and mitigate impacts, thereby ensuring the success of the project's environmental commitments. The EcoW will be in place on site for the full duration of the HDD works including HDD setup. The EcoW will have supervision experience of at least 5 HDD drills. The ECoW will monitor works practices with targeted efforts and attendance at site at project start up to ensure mitigation measures and best practice measures are in place. The ECoW will also be present onsite to monitor excavation and dewatering operations during the project construction phase. The frequency of the ECoW's attendance on site will be dictated by the nature of the works. It is recommended that a weekly site visit be completed during the construction visit, but this may need to be more frequent during specific works practices such as deep excavations or dewatering. The ECoW will be fully appraised of all of the mitigation measures included in the project EcIA and NIS. The appointed ECoW will be a member of the Chartered Institute of Ecology and Environmental Management (CIEEM), or equivalent, and will have at least 5 years consultancy experience, with commensurate experience in the role of ECoW for work on similar construction projects. The appointed Ecologist or environmental scientist will have the authority to stop works or temporarily halt or delay ongoing works where further consideration or on-site improvements of mitigation may be necessary. **Surveys for the Presence of Otters** • Preconstruction surveys for otters will be carried out along the River Boyne in the area to the south of the site given the time between the original surveys and site clearance and construction works commencing on site.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• If otters or evidence of otters is found during pre-construction surveys, an otter management plan will be developed by the appointed ecologist. No works will commence until this plan is developed and further mitigation is implemented to ensure no impacts on otters. • The construction corridor will be marked out prior to the commencement of construction. • All mitigation measures as outlined within the accompanying CEMP and elsewhere within the EcIA and NIS in relation to protection of surface waters will be implemented in full. **<u>Kingfisher – River Boyne and River Blackwater SPA</u>** **In addition to the appointment of an EcOW, the following measures will be in place for the protection of Kingfisher:** **Visual & Acoustic Buffers (The 100m Zone)** • **Establish a Disturbance Buffer:** Ensure that heavy drilling machinery, generators, and the primary HDD launch/reception pits are physically set back as far as possible—ideally more than 100m from identified nesting banks. • **Acoustic Screen Hoarding:** Erect 3-metre-high, high-density timber or acoustic blanket hoarding around the HDD drilling rig. This physical barrier blocks the line-of-sight and absorbs engine noise, preventing the birds from abandoning nearby territories. • **Muffled Generators:** Use only ultra-silent, enclosed, and baffled generators for the continuous pumping operations required during the HDD pull-back phase. **Seasonal Restrictions & Pre-Construction Surveys** • **The Breeding Window Blackout:** Ban all high-vibration HDD drilling and heavy excavation within the SPA boundaries during the peak Kingfisher breeding season, which runs from **March 1st to August 31st**. • **Pre-Construction Checks:** Retain an experienced project ornithologist to conduct specialized Kingfisher surveys along a 300m stretch upstream and downstream of the HDD crossing point 2–3 weeks before any work begins. If an active nesting burrow is found, works must halt until the chicks have fully fledged. **Protecting Foraging Clarity & Prey Dynamics** • **Zero-Turbidity Controls:** Implement the highest standard of surface water protection. Runoff from the housing development site must pass through a multi-stage settlement system (e.g., silt traps, flocculant pods, or hydrocarbon interceptors) before any clean water is discharged. Turbid, muddy runoff prevents Kingfishers from hunting.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• **Frac-Out Interception:** If a bentonite blowout occurs, it will instantly cloud the river and coat fish spawning gravels. Your Frac-Out Contingency Plan must include immediate automated pressure shut-offs to prevent visibility loss in the Kingfisher's hunting territory. **Preserving and Reinstating Hunting Perches** • **Perch Preservation:** Kingfishers rely on low-hanging branches over the water to hunt. Map and fence off all overhanging riparian trees within your site boundary using strict root protection zones. • **Temporary/Artificial Perches:** If minor bankside tree trimming is unavoidable to safely complete the HDD setup, install temporary wooden posts or branches over the river nearby to serve as substitute hunting perches during the construction window. **Light Pollution Control** Kingfishers are strictly diurnal (daytime) hunters and rely on specific light cycles. Artificial light spilling onto the river disrupts their behaviour and exposes sleeping birds to nocturnal predators. • **Zero-Spill LED Lighting:** All construction and security lighting on the housing site must use highly directional, baffled LED luminaires. • **Asymmetric Beam Angles:** Light fixtures must be tilted downwards and fitted with cowls or shields to ensure 0 lux spill onto the SPA river channel and riparian banks. • **Night-Time Blackout:** No artificial lighting is permitted within the SPA boundary between dusk and dawn. This ensures the natural dark corridor of the River Boyne is fully preserved. **Construction Noise Reduction** Sudden or sustained loud noises from the HDD rig, excavators, and generators will disrupt Kingfisher communication and territory defence. • **Strict Decibel Limits:** Ambient noise levels at the edge of the active SPA boundary must not exceed **55 dB** during daytime hours. • **No-Honk Policy:** Heavy machinery and delivery trucks must be fitted with broadband "white noise" reversing alarms instead of high-pitched beepers. General vehicle horn blowing must be strictly prohibited on-site. • **Acoustic Enclosures:** The HDD power pack and mud-mixing pumps must sit inside localized acoustic booths or wraps to dull low-frequency engine drone. **Sub-Surface Vibration Mitigation**

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Heavy vibrations travel efficiently through water and riverbanks, which can cause soft, sandy Kingfisher nesting burrows to collapse structurally. • **Continuous Vibration Monitoring:** Install seismic monitoring geophones on the riverbanks adjacent to the HDD route. • **Peak Particle Velocity (PPV) Thresholds:** Ground vibrations must be kept below 2.0 mm/s PPV at the riverbank to guarantee nest burrow stability. If a threshold is breached, an automated SMS alert must instantly trigger a stop-work order until drilling pressures or methods are adjusted. • **No Impact Piling:** If trench sheet shoring is required for the launch and reception pits, it must be installed using silent, hydraulic "press-in" methods rather than drop-hammer or vibratory piling hammer methods. **Human Presence & Visual Disturbance** The physical movement of workers, high-visibility jackets, and vehicles can easily scare a Kingfisher away from its hunting perch or nest. • **Visual Screening Fencing:** Install a continuous, 2.4-metre-high solid timber hoarding fence along the entire landward edge of the SPA boundary before any ground is broken. This completely cuts off the line-of-sight between human activity on the housing site and the river corridor. • **Restricted Access Zones:** The riparian zone outside the immediate, fenced HDD corridor must be designated an **Ecological Exclusion Zone**. No workers, personal vehicles, or material storage are allowed inside this zone. • **Eco-Induction (Toolbox Talks):** Every contractor and site worker must undergo a mandatory ecological induction before entering the site. This training covers the legal protection of the Kingfisher, boundary restrictions, and the strict penalties for entering exclusion zones. **Habitat degradation as a result of air quality impacts (on the River Boyne and River Blackwater SAC/SPA)** **As outlined in the CEMP by Waterman Moylan, the following measures will be in place:** • The use of hardcore access route to work front; • A regime of 'wet' road sweeping can be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers. • Footpaths immediately around the site can be cleaned by hand regularly, with damping as necessary. • High level walkways and surfaces such as scaffolding can be cleaned regularly using safe 'wet' methods, as opposed to dry methods.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• Vehicle waiting areas or hard standings can be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary. • Vehicle and wheel washing facilities can be provided at site exit(s) where practicable. If necessary vehicles can be washed down before exiting the site. • Netting can be provided to enclose scaffolding in order to mitigate escape of air borne dust from the demolition. • Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up. • Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation. • Servicing of vehicles and plant should be carried out regularly, rather than just following breakdowns. • Internal combustion plant should not be left running unnecessarily. • Exhaust direction and heights should be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions. • Where possible fixed plant such as generators should be located away from residential areas. • The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily. • The transport of dusty materials and aggregates should be carried out using covered / sheeted lorries. • Material handling areas should be clean, tidy and free from dust. • Vehicle loading should be dampened down and drop heights for material to be kept to a minimum. • Drop heights for chutes / skips should be kept to a minimum. • Dust dispersal over the site boundary should be minimised using static sprinklers or other watering methods as necessary. • Stockpiles of materials should be kept to a minimum and if necessary, they should be kept away from sensitive receptors such as residential areas etc. • Stockpiles were necessary, should be sheeted or watered down. • Methods and equipment should be in place for immediate clean-up of spillages of dusty material. • No burning of materials will be permitted on site. • Earthworks excavations should be kept damp where necessary and where reasonably practicable. • Cutting on site should be avoided where possible by using pre-fabrication methods to facilitate any temporary works that may be required to enable the demolition. • Equipment and techniques for cutting / grinding / drilling / sawing etc, which minimise dust emissions and which have the best available dust suppression measures, should be employed. • Prior to commencement, the main contractor should identify the demolition operations which are likely to generate dust and to draw up action plans to minimise emissions, utilising the methods highlighted above.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		Furthermore, the main contractor should prepare environmental risk assessments for all dust generating processes, which are envisaged. • The main contractor should allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled. • Demolition works to incorporate water spray to reduce dust. Habitat degradation as a result of the introduction and/or spread of invasive species (River Boyne and River Blackwater SAC/SPA) **Biosecurity and Invasive Species Management** General Procedures for Construction Biosecurity of both plant and animal species will be employed pre and post works and will form part of the Appointed Contractor's CEMP. The biosecurity protocols will include: • Implement Check–Clean–Dry procedures for all plant, equipment and PPE before entering and leaving site. • Restrict machinery movement and use designated access routes to protect the riparian zones. • Identify and demarcate any invasive species areas to prevent disturbance. • Inspect, segregate and appropriately manage excavated soils to avoid spread of invasive plant material. • Follow IFI field work protocol for field survey work (2010) aquatic biosecurity protocols for all works near watercourses • Deliver toolbox talks to all personnel on invasive species awareness and biosecurity requirements. • Maintain ongoing environmental supervision to ensure compliance and address issues promptly. Specific Procedures for Construction • All existing areas containing Japanese knotweed & Sea Buckthorn will be marked with tape/fenced to create a 7m exclusion zone. • No machinery/personnel will be permitted to enter the invasives exclusion zone without prior consultation and supervision by a qualified ecologist or invasive species specialist. • All measures outlined in the Invasive Species Management Plan (Appendix IV) will be adhered to. • A pre-construction assessment for invasive species will be carried out prior to construction and an updated Invasive Species Management Plan provided. Protection of Petrifying Springs with Tufa formation (*cratoneurion*) [7220]

Table 2. Construction Phase Mitigation Measures.		
Sensitive Receptors	Potential Impacts	Mitigation Measures
		Petrifying springs with tufa formation (*Cratoneurion*) [7220] are an EC Habitats Directive Annex I priority habitat and are present on site. While it is not a qualifying interest of any European site within the ZOI of the proposed development, potential impacts on this habitat were considered in the Appropriate Assessment Screening & Natura Impact Statement, but effects on this habitat are not considered relevant to the assessment of adverse effects on the integrity of the European site, as the River Boyne and River Blackwater SAC & SPA conservation objectives do not relate to this species. Considering this, the following measures will be in place as outlined in Dr Joanne Denyer's Petrifying Spring Survey and Assessment: ***'Direct disturbance*** • *The spring/ seepages should be* ***protected*** *from any* ***direct disturbance****. There should be no construction works in the petrifying spring/ seepage zones within the SAC.* • *The spring/ seepages should be* ***protected from recreational disturbance****/ pressure resulting from the proposed development. Public access is required to the western spring ('St Patrick's Well'). This should be limited to the well only and access to the riverbank from this location prevented/ discouraged as this would cause damage to the petrifying spring and adjacent hydrophilous tall-herb vegetation.'* **Hydrogeological Impacts** An assessment of potential hydrogeological impacts on petrifying springs within the site from the proposed LRD and required design and mitigation features to avoid impacts are detailed in Meehan (2025) '*Hydrogeological assessment for proposed Large Scale Residential Development (LRD), by Loughglynn Developments Limited, at a site on the Kildalkey road, Trim, County Meath –Land, soils, geology, hydrology and hydrogeology*.' This states that no works will be undertaken in the vicinity of the springs, that the depths of the groundwater across the site are well below the level of any of the construction activities (e.g. foundations and other excavations into the subsurface on the site) and the proposed rising main borehole will not pump or dewater the area within and around it (Section 9.2 of the Hydrogeological assessment). Required mitigation and avoidance measures are detailed (as outlined above). The hydrogeological assessment concludes: *'Due to the nature of proposed LRD developments being near-surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The*

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		design of the proposed LRD Project has maintained the existing hydrological and hydrogeological regime on the site in as much as possible. *This means that all SUDS measures will discharge as diffusely as possible and at as shallow a depth as possible, using individual shallow soakaways for each house individually and wide, expansive, shallow soakaways for the road network.* *This will mean no significant effects on groundwater levels and / or flows, and / or surface water, will occur as a result of the proposed LRD Project.'* **Monitoring** • All survey and monitoring of the petrifying springs (pre- during and post-construction) must be undertaken by an **experienced petrifying spring ecologist.** • The petrifying springs must be surveyed **pre-construction** to provide an updated baseline from the 2025 surveys. As the vegetation was disturbed in 2024/ 2025 the petrifying spring vegetation is recovering and is likely to change in the next 1-2 years. The pre-construction surveys must be undertaken within 12 months of construction works starting. • The petrifying springs must be monitored annually **during construction**. This will include a repeat of the detailed baseline plots at least once and annual walk-over surveys. • The petrifying springs must be monitored **post construction**, once the site is operational) to assess any impact from recreational access. This should be undertaken one year after operation commences and then every two years for a minimum of five years in total. If there is any disturbance to the petrifying springs, then access to the petrifying springs must be reviewed. Therefore, it was concluded that '*There are no predicted significant hydrogeological impacts to the Annex I priority petrifying springs from the proposed development. This is because no works will be undertaken in the vicinity of the springs, the depths of the groundwater across the site are well below the level of any of the construction activities and the proposed rising main borehole will not pump or dewater the area within and around it (Meehan, 2025).'* **Operational Phase** • Hydrocarbons from vehicles within the site confines will pass through the Sustainable Drainage System's hydrocarbon interceptors which will clean water and expose potential hydrocarbons to sunlight, to allow the breakdown of same, within the proposed surface water drainage network. These mitigation measures are considered sufficient to eliminate potential risks to ground/soils and subsoils, and groundwater and surface water quality. All drainage systems will be inspected to ensure compliance with Water Pollution Acts.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• A project ecologist will be appointed to oversee completion of all landscape and drainage works. • Monitoring and post-construction surveys of petrifying springs habitat. Impacts on the River Boyne and River Blackwater which may arise from increased human presence during operation can be limited as follows: • **Eco-Defensive Planting:** Install a wide (3–5 metre), continuous buffer zone along the lower edge of the housing estate. Plant this densely with native, thorny species like Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), and Holly (*Ilex aquifolium*). This forms an impassable natural barrier to humans and dogs. • **Anti-Climb Boundary Fencing:** Erect a high-quality, 2-metre-high weld-mesh or timber palisade fence on the development side of the thorny buffer. This must be a permanent structure maintained by the estate management company to block the creation of informal "desire lines" or trails down to the water. • **Educational Interpretation Boards:** Install high-quality, weather-resistant signs at key open space viewpoints overlooking the valley. These boards should highlight the ecological importance of the River Boyne's Kingfishers and Otters, explaining that keeping a distance preserves their habitats. • **Homeowner Welcome Packs:** Work with the developer to include an "Ecological Awareness Leaflet" in the welcome pack for every new homeowner. This booklet details the sensitivity of the adjacent SAC/SPA, rules on pet management, and the ban on dumping garden waste over the boundary fence. • **Buffer Zones as "No-Go" Areas:** Designate the slope between the houses and the SAC/SPA boundary as a low-intervention biodiversity zone with no footpaths, lighting, or benches. • A line of native canopy trees will act as a permanent visual screen, ensuring that human movement and vehicle headlights on the high ground do not startle birds or otters below (as shown in the landscape plan).
Aquatic biodiversity	• Death/injury • Disturbance	Environmental risks due to construction and operation of the proposed development do potentially occur, particularly in relation runoff from steep site and/or drains that could lead to the watercourses. This could not only result in negative impacts on instream biodiversity, also with the watercourses acting as a vector, carry pollutants and impact beyond the site boundary and into the River Boyne. The following mitigation measures are to be implemented during construction: 1) Given the proximity to the River Boyne, a robust silt barrier fence would be placed along the streams within the redline. This would passively remove silt from the runoff. 2) As back up to the barrier, there would be a sump pump with a float switch at the lowest point of the fence. The sump would be in a 60cm diameter vertical pipe placed uphill of the fence, the top of the pipe would be 40 cm above the ground level at the silt curtain. Water would only enter it in extreme weather if water is building up behind the silt fence. The outlet of the pump leads to a large silt bag that would need to be downstream of the curtain and maintained.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		3) Inspection of the integrity of the silt fence will be a requirement of the daily on site checklist and twice daily during periods of heavy rain. Repairs if required are to be made as a matter of urgency. Spare fencing is to be retained on site in a location that is easily accessible. 4) IFI are to be notified immediately of breaches in the silt fence that have resulted in silt laden runoff entering the watercourses. 5) Water from trenches and excavations will not flow directly into drains or watercourses without settlement interception. Vigilance will be required due to the proximity of the stream. Any petrochemical spills are to be cleaned up immediately. 6) All pavement construction within 20m of watercourses is required to take place during dry weather. This minimises the risk to watercourses and contamination of runoff. All associated plant to be cleaned and washed down in a controlled environment and at a designated location greater than 30m from a watercourse/drain leading to a watercourse. 7) Drip trays placed below all small plant. Spill kits will be present on all working sites to clean up spillages. A record of all spillages will be kept and monitored. Generators and small plant not be used within 10m of watercourses. 8) All mobile plant to be refuelled in a central refuelling area in the contractor's compound where a spillage containment sump will be constructed within the refuelling area. All collected fuel will be disposed offsite under license. A record of all spillages will be kept and monitored. 9) On roads and car park areas and saw cutting, coring and grooving operations will be supported by the use of suction sweepers/cleaning equipment to immediately collect any detritus generated by these works. The silt barrier is to remain in place during all construction works. 10) Stockpiling of loose materials will be kept to a minimum of 40m from watercourses and drains. In the event that stockpiles are required, they will have suitable barriers to prevent runoff of fines into the drainage system and watercourses. Damping down of stockpiles will take pace in dry windy weather to prevent wind blown movement of fines. 11) Fuel, oil and chemical storage will be sited within a bunded area. The bund must be able to take the volume of the largest container plus 10% and be located at least 10m away from drains, ditches, excavations and other locations where it may cause pollution. Bunds will be kept clean and spills within the bund area will be cleaned immediately to prevent groundwater contamination. 12) No foul water will be discharged on site, unless through nominated and secure sewer connection. It will not be discharged to drains or watercourses.
Birds (National Protection)	• Destruction and/or	• Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) Should this not be possible, a pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent. This would include nesting gulls on buildings if present. • Site clearance will take place outside of bird nesting season (March-August).

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
	disturbance to nests.	• 10 bird boxes will be placed on site in consultation with the project ecologist. • No kingfisher were found proximate to the site. A pre-construction survey of Kingfisher will be carried out. If kingfisher are found to be nesting within 50m of the works NPWS will be contacted and appropriate mitigation put in place. • During the construction phase, lights should be incorporated onto cranes illuminating their entirety on a 24/7 basis to reduce collision risk to birds from cranes and other relevant equipment/structures. • The construction corridor will be marked out prior to the commencement of construction. • All construction work will be confined strictly to the construction corridor. Any construction works required outside the construction corridor will require prior approval from the ER. • Lighting during construction should not spill outside the proposed development. • An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation, including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity in neighbouring areas, including birds will not be impacted.
Bats (international Protection)	• Removal roosting/foraging habitat. • Lighting Impacts	As outlined in Appendix III of the accompanying EcIA, the following mitigation measures will be implemented to protect local bat population as a result of the installation of artificial lighting associated with the construction and are based on guidelines from Bat Conservation Ireland's "Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers" : • Lighting at all construction stages should be done sensitively on site with no direct lighting of hedgerows and treelines. • A post-construction bat survey and light spill assessment will be carried out to ensure compliance with the lighting plan. • A pre-construction bat roosting inspection will be carried out onsite, prior to the commencement of works. A derogation license will be applied for from NPWS if bats are found during the future inspection. All works will be carried out in compliance with NPWS conditions if bats or bat roosts are found during pre-commencement inspections. The proposed lighting in the centre of the site is within bat lighting guidelines (2700°K). As outlined in the proposed lighting strategy: '*Optics/ shields/ cowls shall be installed where necessary, in consideration of wildlife (e.g. bats) and to prevent unnecessary up lighting or illumination of nearby trees, buildings, etc*'.
Mammals	• Injury/death • Disturbance	• A pre-construction survey will be carried out for terrestrial mammals of conservation importance. If terrestrial mammals of conservation importance are noted on site NPWS will be consulted in relation to removal and the appropriate permissions obtained. • Lighting at all stages will be done sensitively on site in compliance with the lighting plan and with no direct lighting of treelines/hedgerows, southern/south-western fields, or the River Boyne.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		• A post construction light spill assessment will be carried out to ensure compliance with the lighting plan. In relation to badgers, of which a two setts have been noted in the fields adjacent to the south-west of the site, the following mitigation measures will be followed: **Badger Mitigation Measures for the Development** 1. **Badger-proof Fencing** ○ Erect 2 m high badger proof dug in, chain-link fencing around sensitive areas, including the south western boundary of the site, as well as along the southern site boundary, which runs along the River Boyne and Blackwater SAC and SPA, to prevent human disturbance while allowing badger access via gates or openings. 2. **Habitat Connectivity / Corridors** ○ Create and maintain a corridor through the south-west of the site to allow badgers free movement between the setts and the southern fields/riparian area of the River Boyne for foraging. 3. **Sensitive Lighting** 4. Avoid artificial lighting near setts and along movement corridors. Use low-level, directional lighting where necessary to minimise disturbance to nocturnal activity. 5. **Pre-Commencement Mammal Surveys** 6. Conduct updated mammal surveys immediately prior to any construction works to confirm sett usage, detect new setts, and inform final mitigation measures. 7. **Site Supervision and Controls** ○ All works near setts should be supervised by a licensed ecologist. Implement working buffers around setts and restrict heavy machinery to designated areas. ○ Provide contractor training on badger protection and site working protocols. 8. **Habitat Retention and Enhancement** ○ Retain existing treelines and hedgerows where feasible. Enhance habitat around the badger foraging corridor with appropriate shrub planting. ○ Ensure foraging areas remain accessible from the setts. 9. **Monitoring** ○ Monitor the setts with trail cameras and field inspections during the construction phase and for a period after works to confirm ongoing badger use and welfare. **Badger Corridor – Specification and Fencing Requirements** 1. Provide a continuous badger corridor connecting the fields to the south west of the site to the riparian area of the River Boyne to the south of the site, ensuring an unobstructed movement route. 2. The entrance/gap at either end of the corridor must be a minimum of 600 mm wide to allow badger passage.

Table 2. Construction Phase Mitigation Measures.

Sensitive Receptors	Potential Impacts	Mitigation Measures
		3. Install TII-standard badger-proof fencing along both sides of the corridor to guide animals safely and prevent access to construction areas. 4. Fencing to consist of 1.8 m high plastic-coated chain-link mesh, 50 mm × 50 mm mesh size, gauge 2.43/3.15, to IS EN 10223. 5. Mesh height above ground to be 1300 mm, mounted on 2100 mm × 150 mm × 75 mm posts. 6. Mesh to be buried (ESH) to a minimum depth of 200 mm, then bent outward at 90° to run 300 mm away from the fence line to prevent burrowing beneath. 7. Bottom of posts set in 475 mm × 200 mm ST2 concrete, with concrete extending 75 mm below the post base and terminating 300 mm from ground surface. 8. Fix one line wire to the field side of posts as close to ground level as possible, compliant with I.S. 435 Part 1, Clause 4.4.4. 9. Secure chain-link mesh to rails with 4 staples per linear metre on the top rail and 1 staple per metre on lower rails (galvanised 30 mm × 3.75 mm). 10. Tie mesh to line wire using 2 mm galvanised tying wire or approved galvanised hog rings at 4 ties per metre, compliant with BS 1722. 11. All fencing to comply with I.S. 435 and erection to follow Clause 2.5 unless otherwise specified. 12. Each fence run (including branches/spurs) must start and end with a post, with additional posts at junctions and corners. 13. Where rock prevents full excavation depth, posts may be set minimum 500 mm deep in ST2 concrete, subject to engineer approval. 14. Timber preservation to follow TII categories: ○ Type A: CCA treated (IS 435 / EN 599-1/2) ○ Type B: Creosote treated (IS 435) 15. Maintain corridor ground conditions free of obstacles (no stockpiling, materials, or machinery). 16. Avoid lighting within the corridor; where unavoidable, use low-lux, fully shielded lighting to prevent disturbance. 17. The corridor to be monitored by a qualified ecologist during construction to ensure functionality. **Surveys for the Presence of Otters** • Preconstruction surveys for otters will be carried out along the River Boyne in the area to the south of the site given the time between the original surveys and site clearance and construction works commencing on site. • If otters or evidence of otters is found during pre-construction surveys, an otter management plan will be developed by the appointed ecologist. No works will commence until this plan is developed and further mitigation is implemented to ensure no impacts on otters. • The construction corridor will be marked out prior to the commencement of construction.

Table 2. Construction Phase Mitigation Measures.		
Sensitive Receptors	Potential Impacts	Mitigation Measures
		• All mitigation measures as outlined within the accompanying CEMP and elsewhere within the EcIA and NIS in relation to protection of surface waters will be implemented in full. **Noise & Vibration** The measures addressing noise and vibration outlined above and, in this CEMP, will be followed to minimise disturbance on the badger setts, local badger population and otters utilising the adjacent River Boyne.

5. Site Information

a) Roles and Responsibilities

The roles and responsibilities of the personnel involved in the construction works are outlined in Table 4. However, it will be necessary that all personnel involved in the project are responsible for ensuring the requirements of the CEMP are followed.

Table 4. Roles and responsibilities of the personnel involved in the development project

Role	Roles and responsibilities
Applicant	Loughglynn Developments will have overall responsibility for the compliance with the CEMP. They will appoint staff and contractors to deliver the various elements of the development and oversee works carried out on site.
Contractor	Contractors will be hired to carry out all works on site. Works carried out will be overseen by Loughglynn Developments and on a day to day basis by the site manager. All contractors on site are required to comply with all elements of the CEMP.
Site Manager	The Site Manager will be responsible for the day to day management of the site including compliance of all personnel with the CEMP, in addition to Health and Safety, Environmental and Quality elements. The Site Manager is responsible for ensuring that all people on-site are provided with relevant information concerning environmental protection. The Site Manager will be responsible for overseeing any environmental monitoring programmes, carrying out site environmental inspections and audits as necessary, and will co-ordinate the environmental monitoring programme. All records of incidents and environmental issues will be collated and maintained by the site manager. The Site Manager will also be responsible for reviewing all risk assessment method statements and ensuring an appropriate programme of tool box talks are developed and effectively communicated. The site manager will be responsible for overall waste management issues arising from the project. These would include: Implementation and monitoring of waste minimisation, segregation and safe disposal measures, Dissemination of waste reduction, and waste management procedures to all relevant personnel on site.
Monitoring	Noise and Dust specialists will be appointed to oversee mitigation measures on site and to act as liaison with the County Council.
All Staff and Subcontractors	All staff and subcontractors have the responsibility to comply with the CEMP including environmental procedures on site to minimise environmental impacts, avoid pollution on-site, including noise and dust, and to respond quickly and effectively to an incident to avoid or limit environmental impacts. All incidents must be reported to the Site Manager immediately.

b) Training and Raising Awareness

As part of site induction for all personnel, a copy of the CEMP will be provided to and discussed with all onsite staff. This would include discussing the elements outlined in the CEMP, including sensitive receptors on site and measures in place to mitigate impacts on these receptors.

As part of toolbox talks, relevant elements of the CEMP should be discussed, particularly when working in areas with sensitive receptors, e.g. near the watercourses, or where there is potential to impact sensitive receptors on site. Training records of all personnel on site should be reviewed and copies held centrally. This is particularly important for those operating excavators, other heavy machinery and with environmental certification to deal with incidents on site.

c) Reporting

The Site Manager / Project Manager is responsible for collating and maintaining all reporting. This would include all environmental and compliance documentation.

d) Environmental Targets and Objectives

Targets

- Zero pollution incidents;
- Segregation of site waste to include timber, general waste and other materials;
- Completion of environmental checklists as required;
- Fuel spill kit to be present on each site at all times;
- Maintain all waste licences and waste transfer notes for all waste movements, including contractors;

Reporting Specific Objectives

- Environmental incidents to be reported to the Site Manager without delay;
- The following documentation will be reported to Loughglynn Developments on a 4-weekly basis:
    - Environmental incidents and nonconformities raised, including nature, status, corrective and preventive actions and potential for statutory intervention;
    - Key environmental issues raised by others;
    - Significant environmental incidents;
    - Complaints and the current status of those complaints;
    - Actions or interventions undertaken by enforcement organisations;

Site Specific Objectives

- Reduce waste, water and energy use on the project, including within all of the site offices;
- Ensure that everyone complies with the environmental requirements in the contract;
- Seek ways to incorporate environmental opportunities within the design;
- Seek ways to reduce the carbon footprint of the contract;
- Reduce the amount of construction waste and excavated material generated, which goes to landfill;
- Zero pollution incidents onsite;
- Recycle construction waste where possible;
- Maximise beneficial reuse of the materials: and
- Ensure that all waste documentation (waste transfer dockets, permits, etc.) is available for inspection at the site office / in the head office.

To ensure the CEMP remains 'fit for purpose' for the duration of the project, it should be reviewed prior to commencement of the relevant phase of development and, if necessary, updated during the life of the project to ensure that it remains suitable to facilitate efficient and effective delivery of the project environmental commitments. The environmental review would consider past performance from inspections, audit reports, and monitoring data, plan actions required to mitigate forthcoming risks and disseminate best practices.

e) Environmental Complaints and Incidents

The site manager will develop and implement an appropriate queries/complaints procedure. Records will include full details of the concerns expressed and ensure that a formal assessment is commenced of the reported concern. The site manager will also discuss complaints with Loughglynn Developments and oversee an initial response to the person who has submitted the complaint/concern, confirming its receipt.

An investigation to assess the issue of concern will be carried out and decisions made to see what corrective and/or preventive action, or further investigation is necessary. With overall responsibility for complaints, the site manager will respond within a reasonable timescale and maintain records of all correspondence. If significant corrective action and external stakeholder involvement are required, the site manager/project manager will oversee all elements of the process.

Complaints that may be received will be logged, assessed and appropriate action taken as soon as practical. The construction company will be actively seeking liaison with all parties throughout the construction period. It will be critical to the success of the project that key issues are properly addressed from the outset to create a good working relationship and an integrated team approach to resolving potential issues before they arise.

In the event of spillages or other incidents, steps will be taken to prevent environmental pollution, for example, through protection of drains by use of drain covers or booms, use of absorbent granules following an oil/chemical spill, and the turning off equipment or other sources of noise or dust.

Once the situation has been rectified, full details about the incident and remedial actions undertaken will be provided to the corporation and relevant authorities and recorded in the site environmental register.

6. Construction Management

a) Hours of Working (Hours of Site Operation)

The proposed hours of work on site will be 08:00 hrs to 19:00 hrs Monday to Friday and 08:00 hrs to14:00 hrs Saturday unless otherwise specified by planning conditions. Certain tasks may need to be undertaken outside of these hours. All outside of hours work will first be agreed in writing with the Local Authority.

b) Employment

Construction employment numbers will vary depending on the construction stage of the project and the actual approach adopted by the Contractor. However, it is anticipated that at the peak of construction, there may be a workforce of approximately 300 people employed (maximum).

c) Site Storage

At no given time during the project will materials or other items be placed outside the hoarding line, unless otherwise agreed with Meath County Council.

d) Noise, Dust, and Vibration Control

As outlined by Waterman Moylan Consulting Engineers Limited in the Construction Management Plan:

'12.3 Construction Vibration Management
In the absence of any statutory Irish guidance relating to the maximum permissible vibration level that may be generated during the construction phase of a project, it is proposed that the construction works will incorporate:

- *Selection of quiet plant with low vibration emissions;*
- *Provision of anti-vibration mounts on reciprocating plant;*
- *Limitation of vibration from construction activities to the levels recommended in BS 5228;*
- *Materials to be lowered rather than dropped; and*
- *Resilient materials to be provided on surfaces onto which materials are being lowered.'*

'13.3 Site Specific Environmental Risk - Dirt and Dust
Nuisance dust emissions from construction activities are a common and well recognised problem. Fine particles from these sources are recognised as a potential significant cause of pollution. The main contractor will be required to demonstrate that both nuisance dust and fine particle emissions from the site are adequately controlled and are within the acceptable limits.
Once particles become airborne it is very difficult to prevent them from dispersing inro the surrounding area, thus the main consideration will be to combat dirt and dust at source. The objective will be to contain any dirt or dust within the site, which is large enough for comprehensive control measures.
The main problems, which may arise during the early part of construction, will be controlled by the measures described above and by the following measures:

- *The use of hardcore access route to work front;*
- *A regime of 'wet' road sweeping can be set up to ensure the roads around the immediate site are as clean and free from dirt / dust arising from the site, as is reasonably practicable. This cleaning will be carried out by approved mechanical sweepers.*

- *Footpaths immediately around the site can be cleaned by hand regularly, with damping as necessary.*
- *High level walkways and surfaces such as scaffolding can be cleaned regularly using safe 'wet' methods, as opposed to dry methods.*
- *Vehicle waiting areas or hard standings can be regularly inspected and kept clean by brushing or vacuum sweeping and will be regularly sprayed to keep moist, if necessary.*
- *Vehicle and wheel washing facilities can be provided at site exit(s) where practicable. If necessary vehicles can be washed down before exiting the site.*
- *Netting can be provided to enclose scaffolding in order to mitigate escape of air borne dust from the demolition.*
- *Vehicles and equipment shall not emit black smoke from exhaust system, except during ignition at start up.*
- *Engines and exhaust systems should be maintained so that exhaust emissions do not breach stationary emission limits set for the vehicle / equipment type and mode of operation.*
- *Servicing of vehicles and plant should be carried out regularly, rather than just following breakdowns.*
- *Internal combustion plant should not be left running unnecessarily.*
- *Exhaust direction and heights should be such as not to disturb dust on the ground and to ensure adequate local dispersal of emissions.*
- *Where possible fixed plant such as generators should be located away from residential areas.*
- *The number of handling operations for materials will be kept to a minimum in order to ensure that dusty material is not moved or handled unnecessarily.*
- *The transport of dusty materials and aggregates should be carried out using covered / sheeted lorries.*
- *Material handling areas should be clean, tidy and free from dust.*
- *Vehicle loading should be dampened down and drop heights for material to be kept to a minimum.*
- *Drop heights for chutes / skips should be kept to a minimum.*
- *Dust dispersal over the site boundary should be minimised using static sprinklers or other watering methods as necessary.*
- *Stockpiles of materials should be kept to a minimum and if necessary, they should be kept away from sensitive receptors such as residential areas etc.*
- *Stockpiles were necessary, should be sheeted or watered down.*
- *Methods and equipment should be in place for immediate clean-up of spillages of dusty material.*
- *No burning of materials will be permitted on site.*
- *Earthworks excavations should be kept damp where necessary and where reasonably practicable.*
- *Cutting on site should be avoided where possible by using pre-fabrication methods to facilitate any temporary works that may be required to enable the demolition.*
- *Equipment and techniques for cutting / grinding / drilling / sawing etc, which minimise dust emissions and which have the best available dust suppression measures, should be employed.*
- *Prior to commencement, the main contractor should identify the demolition operations which are likely to generate dust and to draw up action plans to minimise emissions, utilising the methods highlighted above. Furthermore, the main contractor should prepare environmental risk assessments for all dust generating processes, which are envisaged.*
- *The main contractor should allocate suitably qualified personnel to be responsible for ensuring the generation of dust is minimised and effectively controlled.*
- *Demolition works to incorporate water spray to reduce dust.'*

'13.6 Site Specific Environmental Risk - Noise – Risk to Site Operatives

Section 12 of this report deals with the general control of Noise to limit impacts upon the nearby residents. This section deals with noise control to reduce impact on general construction operatives who will be working on the site.

The main contractor will deal with the immediate dangers to hearing etc. associated with high noise levels and the impact of same on construction operatives, by means of risk assessment and mitigation / precautionary measures and equipment, all pursuant to the current health and safety legislation.
The main contractor will carry out a noise assessment in relation to the proposed works at construction stage. This noise assessment will be carried out by a competent person (or specialist firm) with specialist training in this area.
The noise assessment should include the following steps:-

- *Identify and list all construction work activities where there is likely to be a significant noise hazard.*
- *Determine the hazards / nuisance.*
- *Identify all third parties likely to be exposed to the nuisance.*
- *Measuring the risk: The level of noise in dBs*
- *Considering and Implementing Control Measures.*
- *Control exposure to noise.*
- *Record the findings of the noise assessment.*
- *Review and revise.'*

Dust Management Plan Overview
The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors, including the on-site streams, the River Boyne, and the River Boyne and River Blackwater SAC/SPA. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA.

Effective site management regarding dust emissions will be ensured by the formulation of a dust management plan (DMP) for the site.

The key features of the DMP are:

- The specification of a site policy on dust;
- The identification of the site management responsibilities for dust;
- The development of documented systems for managing site practices and implementing management controls; and
- The development of means by which the performance of the dust management plan can be assessed.

Site Management
The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies. At the planning stage, the siting of construction activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions to minimise the potential for significant dust nuisance. In addition, good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or using effective control measures quickly before the potential for nuisance occurs:

- During working hours, technical staff shall be on site and available to monitor dust control methods as appropriate;
- Complaint registers will be kept on site detailing all telephone calls and letters of complaint received about construction activities, together with details of any remedial actions carried out;
- It is the responsibility of the contractor always to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed; and
- Operations resulting in significant dust generation are not envisaged, but where necessary, the work areas will be sheeted off to control the spread of dust.

The dust minimisation measures shall be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust using best practise and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are highlighted below.

Dust Control – During Demolition and Drilling

Demolition and drilling works on site will generate dust and potential for negative impacts on sensitive receptors in the vicinity of the proposed works. A range of dust mitigation strategies must be put in place to help prevent dust emissions not only during the actual demolition and drilling processes themselves, but also during stockpiling and the loading and transport of waste material. The aim of these measures, e.g. hoarding with netting extensions, restriction of works to light wind conditions, damping down of surfaces on site, covering trucks with tarpaulins, should be to contain airborne material created by the demolition and drilling processes within the construction site. Given the nature of the works and the proximity of sensitive receptors, strict monitoring of sensitive receptors will also be carried out.

Dust Control – Site Roads

Site roads (particularly unpaved and during groundworks) can be a significant source of fugitive dust from construction sites if control measures are not in place. However, effective control measures can easily be enforced. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80%.

- Due to the compact nature of the site, vehicle speeds are expected to be very slow. A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles;
- Damping down of the site will be carried out during periods of dry weather throughout the construction period. Research has found that the effect of watering is to reduce dust emissions by 50%. The bowser will operate during dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use. Damping down will be carried out at a level not to cause runoff to proximate watercourses; and
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface, while any unsurfaced roads shall be restricted to essential site traffic only.

Dust Control - Land Clearing / Earth Moving

Land clearing / earth-moving during periods of high winds and dry weather conditions can be a significant source of dust:

- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust.

Dust Control – Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions. It is expected that there will be minimal storage of soil on site:

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust.
- The regular watering of stockpiles has been found to have an 80% control efficiency.

Dust Control – Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering material with potential for dust emissions to an off-site location shall be enclosed or covered with tarpaulin always to restrict the escape of dust;
- Public roads outside the site shall be regularly inspected for cleanliness, at a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.

Dust Management Summary

The proactive control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the achievement of no dust nuisance occurring during the construction phase. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be monitored and assessed; and
- The specification of the measures to be taken to control dust emissions before they occur, and effective measures to deal with any complaints received.

e) Liaison

Meath County Council's relevant departments will be contacted and liaised with prior to the commencement. Where necessary, Road Opening Licence applications will be submitted for approval from Meath County Council. The construction company acknowledge that many parties will have an interest in this project throughout the duration of the contract. The construction phase will have a direct impact on the local environment, particularly concerning the following:

- Local residents and land owners
- Tenants and Residents Associations
- Planning Authority
- Other Statutory Authorities
- Building Control
- Environmental Health
- Utilities Providers

The project manager will be responsible for project strategic liaison, whilst the construction manager will be responsible for day-to-day liaison and logistics for all the construction-related activities.

Both will be permanently based on site with the construction manager as the first point of contact for all concerns, issues and complaints. A display Board will be erected outside the site, which, as a minimum, will identify key personnel contact addresses and telephone numbers.

Liaison meetings, progress photos, and organised site visits are all methods by which the construction company are able to communicate how they intend to carry out the works and keep people informed.

f) Complaints

Complaints that may be received will be logged, assessed and appropriate action taken as soon as practical. The construction company will be actively seeking liaison with all relevant parties throughout the construction period. It will be critical to the success of the project that key issues are properly addressed from the outset to create a good working relationship and an integrated team approach to resolving potential issues before they arise.

g) Material Storage and Delivery System

The key to efficient material/plant deliveries will be the effective management and coordination/timing of all deliveries. Deliveries will be coordinated to prevent queuing of vehicles adversely affecting traffic flow and to minimise disruption to local traffic. They will be timed and coordinated to avoid conflict with the collection of waste, other deliveries and rush hour traffic. Large deliveries will be scheduled outside peak hours to minimise disruption. The construction company will consider out-of-hours deliveries and collections to facilitate the smooth continuation of works and minimise disruption. During the project procurement phase, the construction company will produce a schedule of deliveries, adopting a 'just in time' approach to avoid potential conflicts and unnecessary storage and handling.
As outlined by Waterman Moylan Consulting Engineers Limited in the Preliminary Construction and Environmental Management Plan:

'A site compound(s) including offices and welfare facilities (canteen, drying room, toilets, lockers and first aid) will be set up by the main contractor in locations to be decided within the subject site.
The main contractor will be required to schedule delivery of materials daily. The main contractor will be required to provide a suitable area within the site compound for the secure storage of materials.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and surrounding watercourses from oil and petrol leakages and significant siltation. Integrally bunded oil and storage tanks will be used or alternatively a suitable bunded area will be installed for oil and petrol storage tanks in order to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills that may accidentally occur on site.'

'Deliveries and access to the construction site will be as per Figure 4 above. Materials will be ordered and delivered to site on an 'as needed' basis to prevent over supply to site. Deliveries will be managed upon arrival to the site and systems will be provided to avoid any queuing of delivery vehicles.
In the event that large concrete pours are required which may result in congestion at the entrance to the site, the deliveries will be organised such that concrete trucks will queue at a pre-determined staging point and will then be called in by radio as appropriate to the site, via a pre-determined route and to the required access gate.
Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.
All delivery vehicles will be co-ordinated as required by a flagman on duty at the relevant access point.
The main contractor will be required to schedule delivery of materials on a daily basis. If necessary, the main contractor will be required to provide a secure material staging compound on the site.'

h) Delivery of Materials

All deliveries will take place inside the site boundary.

i) Emergency Work

In the event of spillages or other incident, steps will be taken to prevent environmental pollution, for example through protection of drains by use of drain covers or booms, use absorbent granules following and oil / chemical spill and turning off equipment or other sources of noise or dust. Once the situation has been rectified, full details about the incident and remedial actions undertaken will be provided to the corporation and relevant authorities and recorded in the site environmental register.

j) Site Access and Construction Traffic Routes

As outlined by Waterman Moylan Consulting Engineers Limited in the Preliminary Construction and Environmental Management Plan:

'*Construction access to the site will be through the existing access off the Kildalkey road. Due regard will be paid to minimising any impacts by construction vehicles on the existing developments in the area. Should an issue arise in respect of construction traffic, then the position will be reviewed by the Project Team and changes made.*

Particular emphasis will be placed on;

- *The issue of instructions and maps on getting to site to each supplier sub-contractor to avoid 'lost' construction traffic travelling on unapproved routes;*
- *Ongoing assessment of the most appropriate routes for construction traffic to and from the site;*
- *Interface with operation of local traffic;*
- *Use of banksman and / or traffic lights to control exit of construction vehicles; and*
- *No construction traffic waiting on the public roads.*

The contractor will be responsible for implementing preventative measures to avoid traffic congestion due to construction traffic as outlined above and to avoid any nuisance/debris on public roads arising from construction traffic movements into/out of the site. The main issue will be to prevent mud and dust.'

k) Traffic Management Plan

As outlined by Waterman Moylan Consulting Engineers Limited in the Preliminary Construction and Environmental Management Plan:

'Prior to construction commencing on site, a detailed Construction Traffic Management Plan will be prepared and submitted by the appointed contractor to MCC.

The traffic management plan will identify staging areas, delivery of materials, strategy for large concrete pours, construction, traffic routes, parking for construction staff, etc.'

l) Site Security and Hoarding Lines

As outlined by Waterman Moylan Consulting Engineers Limited in the Preliminary Construction and Environmental Management Plan:

'*Hoarding lines and site security will be set up within the development site as required.*

Hoarding and security fencing will be required at the interface with the public roads during the construction works.

A dedicated site security team/firm will be employed to oversee site security. The security team will have 24 hour access to the construction site and will have a contact with the local Garda Station. Access control will be provided at the site entrance, which will be manned by a security guard / flagman who will manage incoming / outgoing vehicles / pedestrians and general traffic as necessary.

Prior to construction commencing on site, a detailed Construction Traffic Management Plan will be prepared and submitted by the appointed contractor to MCC.

The traffic management plan will identify staging areas, delivery of materials, strategy for large concrete pours, construction, traffic routes, parking for construction staff, etc. Proposed construction traffic routes are set out in Section 6 of this report.

Safe pedestrian routes will be established on site which will separate vehicular/construction traffic from pedestrians. Clear designated crossing points will be provided where pedestrian and vehicular routes cross.'

m) Directional Drilling Working Area and Methodology

As outlined by Dunnes Drilling Services in the Method Statement for the proposed directional drilling works:

'*The Site Manager will receive a permit to work from The Client which will also include any environmental considerations associated with the HDD location. This shall be issued to the Driller who will compile a point of work assessment with the finding's and control measures being brought to the attention of all parties and personnel who may be affected by Dunnes Drilling activities. This method is used for hazard awareness and it also considers variables which may not be identified within the contents of this document.*
Stipulations established by 3rd party asset owners and The Client including environmental and ecological licenses and stipulations shall also be briefed. All documentation must be adhered to and understood.
All working areas will be demarcated using fencing/reflective boards, barriers and warning signs. Access to the working area will be restricted by placing Herras fencing and signage across the spread.
The proposed drilling works will not be allowed to impact on any members of the public, the work area will be contained by fencing and access through the works will be restricted. Attention will be given to ensuring a safe site, including safe access and egress for all persons who may be affected by the works, including: Employees, Workers, Visitors, and Emergency Services.
Particular attention to be paid to utility service records, CAT locating apparatus will be used to determine the position of underground services prior to any digging taking place. A site survey will take place prior to any drilling activities by The Client. Trial holes are to be hand dug directly above any known services in the area and all services must be located & recorded before ANY drilling takes place.
Location and recording of existing services will be untaken and provided by The Client.
Upon receipt of a permit to dig a trial holes may be required to prove any services have been correctly identified in depth and position.'

n) Road Safety

The project team will organise the construction site so that vehicles and pedestrians are kept separate. Gatemen will ensure that the interface between deliveries and road traffic will be controlled at delivery gates.

The key message is: *construction site vehicle incidents can and should be prevented by the effective management of transport operations throughout the construction process.*

By creating a crane off-loading area within the site boundary, all offloading will be possible within the site boundary, which will minimise any risk to the public. The gate man will then assist in the entry and exit from the site.

Key issues in dealing with traffic management on site are:

- Keeping pedestrians and vehicles apart
- Minimising vehicle movements
- People on site
- Turning vehicles
- Visibility
- Signs and instructions

Accidents occur from groundwork to finishing works, and managers, workers, visitors to sites and members of the public can all be at risk. Inadequate planning and control are the root cause of many construction vehicle accidents.

Keeping pedestrians and vehicles apart.
Most construction transport accidents result from the inadequate separation of pedestrians and vehicles. This will be avoided by careful planning, particularly at the design stage, and by controlling vehicle operations during construction work.

The following actions will help to keep pedestrians and vehicles apart:

- Entrances and exits - The construction company will provide separate entry and exit gateways for pedestrians and vehicles with a gate man in attendance to interface with the traffic and public to facilitate safe access and egress of vehicles.
- Walkways - firm, level, well-drained pedestrian walkways will be provided.
- Crossings - where walkways cross roadways. The construction company will provide a clearly signed and lit crossing point where drivers and pedestrians can see each other clearly;
- Visibility - The construction company will make sure drivers driving out onto public roads can see both ways along the footway before they move on to it;
- Obstructions - The construction company will not block walkways so that pedestrians must step onto the vehicle
- Route and Barriers - The construction company will install a barrier between the roadway and walkway.
- People on site - The construction company will take steps to make sure that all workers are fit and competent to operate the vehicles, machines and attachments they use on site by, for example:
    - Checks when recruiting drivers/operators or hiring contractors;
    - Training drivers and operators;
    - Managing the activities of visiting drivers.
    - People who direct vehicle movements will be trained and authorised to do so. Accidents can also occur when untrained or inexperienced workers drive construction vehicles without authority. Access to vehicles will be managed, and people alerted to the risk.

The construction company will provide:

- Aids for drivers - Mirrors, CCTV cameras or reversing alarms will be provided that can help drivers see movement all around the vehicle;
- Gatemen will be appointed to control manoeuvres and who are trained in the task;
- Lighting - Site will be properly lit so that drivers and pedestrians on shared routes can see each other easily. Lighting may be needed after sunset or in bad weather;

- Clothing - Pedestrians on site will wear high-visibility clothing.
- Signs and instructions
- The construction company will make sure that all drivers and pedestrians know and understand the routes and traffic rules on site. Use standard road signs where appropriate.
- The construction company will provide induction training for drivers, workers and visitors and send instructions out to visitors before their visit. The construction company will make sure that all the drivers and our supply chain personnel are competent and have relevant training and certification appropriate for their job.

o) Waste Management

This section of the CEMP sets out a basic structure for a Site Waste Management Plan and how the construction company will best use it to improve and manage our operations at all stages of site activity. Loughglynn Developments is committed to maintaining the highest environmental standards.

All waste will be source-separated into recyclable and general non-recyclable waste. In addition to general waste bins and recycling bins, there will also be bins provided for the storage of glass, batteries, and printer cartridges. General waste and recycling waste shall be stored in secure, designated external waste storage areas, located a short distance away from each of the buildings.

The waste management areas are to be located on flat ground and will allow flexibility for change in the future. These areas will allow for the correct and legally compliant segregation, storage, movement, handling, processing and off-site disposal of waste. Sufficient access and egress will be allowed to facilitate the movement of bins to the collection point.

The waste storage area will be adequately vented to prevent odours. The waste bins will be secure and subject to fire safety regulations and, where possible, lockable. Clearance of a minimum of 300mm will be provided around each bin to allow movement of the bins within the storage area.

The construction company will achieve this by following the Good Practice on Site.

As outlined by Traynor Environmental Ltd. in the Resource & Waste Management Plan (RWMP):

'***5.2 Proposed Resource and Waste Management Options***

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain waste types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the MCC Region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be reused, recycled, recovered, or disposed of at a facility holding the appropriate registration, permit, or licence, as required. Written records will be maintained by the contractor(s) detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR/permit or licence for the receiving waste facility for all waste removed off site for appropriate reuse, recycling, recovery and/or disposal Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required. The management of the main waste streams is outlined as follows:

Soil, Stone, Gravel & Clay

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase.

When material is removed off-site it could be reused as a by-product (and not as a waste). If this is done, it will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011, which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received. The potential to reuse material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material.

The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27. Article 27 will be investigated to see if the material can be imported onto this site for beneficial reuse instead of using virgin materials.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 as amended, the Waste Management (Collection Permit) Regulations 2007 as amended and the Waste Management (Facility Permit & Registration) Regulations 2007 as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on site. Any excavated rock is expected to be removed off- site for appropriate reuse, recovery and / or disposal. If bedrock is to be crushed on- site, the appropriate mobile waste facility permit will be obtained from MCC.

Silt & Sludge

During the construction phase, silt and petrochemical interception will be carried out on runoff and pumped water from site works, where required. Sludge and Silt will then be collected by a suitably licensed contractor and removed offsite.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles, and ceramics generated as part of the construction works are expected to be clean, inert material and will be recycled, where possible. Any excess concrete will be transported by GFH Farrelly LTD and will be properly disposed of by Panda Waste Management and Recycling Services

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The site manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes such as cardboard and soft plastic are generated, these will be segregated at source into dedicated skips and removed off-site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 9.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

5.3 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project Waste Manager (see Section 9.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the Waste Management Acts 1996 - 2011, Waste Management (Collection Permit) Regulations 2007 as amended and Waste Management (Facility Permit & Registration) Regulations 2007 and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project waste manager (see Section 10.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IE Licence for that site will be provided to the nominated project waste manager (see Section 10.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from the National TFS Office in Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on site.'

Construction Waste Generation.

It should be noted that until final materials and methods of construction have been decided, it is not possible to predict with a high level of accuracy the construction waste that will be generated. This CEMP

is a live document, and quantities will be added when a contractor has been appointed prior to commencing work on site.

Proposed Waste Management Options

Waste materials generated will be segregated on-site where it is practical. Where the on-site segregation of certain waste types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source. The appointed waste contractor will collect and transfer the waste as receptacles are filled. There are numerous waste contractors in Meath that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit and will be transferred to a facility holding the appropriate certificate of registration, permit or licence, as required. Written records will be maintained by the contractor(s) detailing the waste arising throughout the construction and demolition phases, the classification of each waste type, the contact details and waste collection permit number of all waste contractors who collect waste from the site and the end destination and waste facility permit or licence number for all waste removed and disposed of off-site. Dedicated bunded storage containers will be provided for hazardous wastes such as batteries, paints, oils, chemicals, etc., if required.

The management of the main waste streams is detailed as follows:

- The Waste Management Hierarchy states that the most preferred option for waste management is prevention and minimisation of waste, followed by reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction, so the preferred option (prevention and minimisation) cannot be accommodated for the bulk excavation phase. The next option (beneficial reuse) may be possible for some and potentially all the inert natural material (Category A1). This material could be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use (e.g. in respect of sulphate content, pyrites, etc.).
- Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. Article 27 requires that certain conditions be met and that by-product decisions be made to the EPA via their online notification form.
- If the material is deemed to be a waste, removal and reuse/recycling/ recovery/disposal of the material will be carried out in accordance with the Waste Management Acts 1996 - 2008, the Waste Management (Collection Permit) Regulations 2007 and Amendments and the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments. The volume of waste removed will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility.
- Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27.
- Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered. The option of disposal of inert natural material to landfill will only be considered once all available reuse options have been explored, and where void capacity cannot be secured at appropriately permitted/licensed facilities for recycling or recovery purposes.

- Any soil/subsoil that is deemed to be contaminated will be stored separately from the clean and inert soil/subsoil. The material will be appropriately tested and classified as either non-hazardous or hazardous in accordance with the EPA publication 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application (or similar approved classification method). The material will then need to classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC.

Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by a weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the Contractor.

p) Waste Auditing

As outlined by Traynor Environmental Ltd. in the Resource & Waste Management Plan (RWMP):

'11.1 Responsibility for Waste Audit

The appointed RM will be responsible for conducting a waste audit at the site during the C&D phase of the proposed Project. Contact details for the nominated RM will be provided to the MCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from site.

11.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site should be undertaken mid-way through the construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this will be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery / reuse / recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development.'

7. Emergency Procedures

The risk of spilling fuel is at its greatest during refuelling of plant. All refuelling of major plant and equipment will take place on an impermeable surface within a designated area of the site compound, greater than 10m away from any drains. The vehicles and equipment will not be left unattended during refuelling. Spill kits and hydrocarbon absorbent packs will be stored in this area, and operators will be fully trained in the use of this equipment.

Diesel pumps and similar equipment will be placed on drip trays to collect minor spillages or leaks. All equipment must be checked regularly.

Fuel, oil, and chemical storage will be sited within a bund of adequate capacity. The bund must be located at least 10 metres away from drains, ditches, excavations and other locations where it may cause pollution.

All materials will be stored in accordance with the manufacturer's instructions. Epoxy mortars and chemical-based materials/sealants will be stored in secure containers with relevant warnings shown on the storage unit. Spill kits will be located adjacent to storage areas and used in the event of spillages.

8. Relevant Legislation

The key legislation which will be adhered to during the proposed project are defined as follows:

- Water Framework Directive (2000/60/EC);
- Local Government (Water Pollution) Act, 1977–1990;
- Water Quality (Dangerous Substances) Regulations, 2000;
- Arterial Drainage Act, 1945;
- S.I. No. 41 of 1999 Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249 of 1989 Quality of Surface Water Intended for Abstraction (Drinking Water),resulting from EU Directive 75/440/EEC concerning the quality required of surface water HES Report No.: P1293 FINAL - Rev 0 Report Date: 31st August 2015 intended forthe abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
  S.I. No. 439 of 2000 Quality of Water intended for Human Consumption Regulations and S.I. No. 278 of 2007 European Communities (Drinking Water No. 2) Regulations, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the Drinking Water Directive) and WFD 2000/60/EC (the Water Framework Directive); S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations; and, S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010.
- The Fisheries Consolidation Act 1959 (as amended).
- The Fisheries (Amendment) Act 1997.
- The Inland Fisheries Act 2010.
- Council Directive 78/659/EEC on the Quality of Freshwaters Needing Protection or Improvement in Order to Support Fish Life.
- The European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. 293 of 1988).
- The Wildlife Act 1976.
- The Wildlife (Amendment) Act 2000.
- The Local Government (Water Pollution) Act 1977.
- The Local Government (Water Pollution) Amendment) Act 1990.
- The Habitats Directive (92/43/EEC).
- The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011).
- The Water Framework Directive (2000/60/EC).
- The European Communities (Water Policy Regulations 2003 (S.I. 722 of 2003).
- The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009).
- The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations(2009) (S.I. 296 of 2009).

9. Monitoring of Watercourses

A project Ecologist will be appointed to oversee the project and mitigation measures, prior to the commencement of works on site. An assessment of existing drains entering the on-site streams or the River Boyne should be carried out prior to site clearance. During the construction and drilling works, there will be ongoing monitoring of the on-site streams and the River Boyne for any visible signs of pollution (suspended solids, silt, hydrocarbon sheen and or other products). If any evidence of pollution is observed, then immediate corrective action will be taken to eliminate the source of the pollution. The project ecologist will be consulted to oversee the installation of mitigation for the works and consultation with Inland Fisheries Ireland and Meath County Council in relation to environmental matters. Twice daily checks of turbidity will be made on site from the commencement of site works to the completion of enabling works, and the data will be sent to IFI if requested.

10. Conclusions

This CEMP has been submitted to show Loughglynn Developments commitment to Environmental Management of the proposed project. This CEMP has outlined the environmental principles that will be adopted to ensure that potential environmental impacts and health and safety issues associated with the construction processes are effectively managed, minimised and/or eliminated. The plan details the roles and responsibilities of the applicant, the site manager, project manager and site workers and how these controls are to be implemented. The CEMP will require regular updating and monitoring throughout the construction period to ensure potential risks are adequately managed throughout the construction works.