

**Cuckoo's Nest
Tallaght**

**Water Services and Flood Risk
Assessment**

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21816

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1 Introduction

1.1 General

This report addresses the foul and surface water drainage, water supply and flood risk for the proposed development of a pre-developed site into a Public House, Grocery Shop, and 11no. apartments at Cuckoo's Nest, Greenhills Road, Kilnamanagh, Dublin 24.

The site is currently occupied by a partially demolished Public House. The original Pub is to be retained, with previous extensions to be demolished.

It is proposed to develop the existing site with the redevelopment and extension of the Pub, and a shop at Ground Floor level, with 11no. apartments across 1st, 2nd, and 3rd Floor levels, along with associated vehicular access, parking, and site works.

1.2 Proposed Drainage Scheme

In order to comply with the Greater Dublin Drainage Strategy requirements, it is proposed to drain the foul and surface water generated from the property using completely separate systems. The site is served with private foul and storm sewers within the adjacent Temple Woods development, with the foul connecting to the public foul sewer running along the south of the site, and the storm connecting to the public storm sewer on Greenhills Road.

The roof of the new building shall be a mix of extensive green roof, intensive green roof, and impermeable finishes as per the Architectural drawings, with run-off directed to the ground level where permeable paving and soft landscaping shall be used. Below ground water treatment systems comprising of Wavin Aquacell shall act to store water during heavy rainfall events and improve water quality by incorporating catchpits before slowly discharging to the ground where possible and to the public sewers at a limit of 2.0l/s.

The foul sewage generated will be discharged via the foul drainage network and discharge to the public sewer via a new 150mm diameter connection to the site.

1.3 Reference Publications used in the production of this Report

Greater Dublin Strategic Drainage Study – Volumes 1 to 6.
Greater Dublin Regional Code of Practice for Drainage Works – Version 6.0.
Technical Guidance Documents – Part C and H.
OPW National Flood Hazard Mapping.
Irish Water Codes of Practice for Wastewater.
Irish Water Codes of Practice for Water services.
Dublin City Development Plan 2016-2022 – Volume 7 Strategic Flood Risk Assessment.
EPA - Code of Practice - Domestic Waste Water Treatment Systems (2021).
SDCC Sustainable Drainage Explanatory, Design and Evaluation Guide 2022.

2 Foul Waste Discharge

The total foul discharge from the site is calculated using the Irish Water Codes of Practice for Waste Water based on the proposed use of the development.

The development comprises of a gastro pub with an allowance for 10no. staff, 100no. customers, a shop with 5no. staff, 3no. One-Bed Apartments (4pax/apt.), 6no. Two-Bed Apartments (4pax/apt.) and 1no. Three-Bed Apartments (5pax/apt.). A peak wastewater discharge is calculated at 0.594 l/s.

A pre-connection enquiry has been submitted to Irish Water. A Confirmation of Feasibility letter has been issued in response by Irish Water. See Appendix C.

3 Surface Water Discharge

3.1 Proposed Drainage System

It is proposed to collect storm water via a fully separated storm water drainage system which shall outfall to the existing combined sewer at the North-eastern corner of the site. A dead leg shall be provided in the event of a separate storm water sewer being developed at a later date.

The storm water incident on the site will be managed by the incorporation of, as much as is reasonably practicable, Sustainable Drainage Systems (SuDS). SuDS aim to control the flow, volume and frequency of water leaving a development area, prevent pollution by intercepting silt and cleaning runoff from hard surface, provide attractive surroundings for the community & create opportunities for wildlife.

The SuDS systems proposed to be incorporated into this project are Green Roofs (both Extensive and Intensive), Permeable Paving, Tree Pits and Soft Landscaping. The extent of each SuDS system proposed has been maximised to provide the most effective storm water run-off reduction. Further SuDS measures (such as detention basins, filter drains, swales etc.) are not possible due to lack of available area.

The site is approximately 2041m² overall and covered by intensive (178.8m²) and extensive (218.5m²) green roofs, impermeable roofs (431m²), permeable paving (548m²), non-permeable paving (512m²), and a small area of soft landscaping (152.7m²). The equivalent impermeable area is calculated to be 1431.5m². The current site is noted to be pitched roofs (94.8m²), flat roofs (451.7m²) and paved areas (1494m²); the equivalent impermeable area is calculated to be 1782.2m².

The reduction in effective impermeable area will give a concomitant reduction in storm water runoff, i.e., the provision of green roofs, landscaping, including tree pits, and permeable paving will reduce the runoff from the site by about 20%. For an allowable site runoff rate of 2L/s the attenuation is volume calculated to be 84m³.

The ground level landscaping features are in some instances adjacent to existing boundary walls and the proposed building; these areas are not considered suitable receptors for rainwater runoff. A number of tree pits are proposed along the boundary with Greenhills Road which may be suitable to receive runoff.

The tree pits cover an area of 118.1m², adjacent permeable paving will be about 115.1m² and adjacent impermeable paving will be about 5.0m²; taking the allowable site runoff as 2L/s and the allowable runoff for the 231.9m² as a proportion of the overall 2041m² site area the allowable runoff is about 0.23L/s and the maximum attenuation volume is estimated to be about 4m³. Taking for a 118.1m² area of tree pits, with an attenuation volume of up to 47m³ available, the approximately 4m³ of attenuation storage required for this area may be provided by the tree pits and may be omitted from the main attenuate volume. Collector drains shall be provided to the root balls of each tree outflowing to an overflow drain which shall link to the main surface water drainage via a catch-pit manhole to avoid drowning of the roots and build-up of wash down contaminants.

The ground level shall have a combination of soft landscaping, permeable paving and non-permeable surfacing which shall also act as a treatment stage for surface water on the site.

Residual surface water run-off from the roofs and surrounding ground level shall be discharged to the public sewers with the provision of an off-line attenuation tank of min. 95m³ storage capacity with the outflow (via. rising main) from the attenuation system to be limited to a minimum of 2L/s – i.e. 2L/s/ha for a 0.2ha site with a minimum of 2L/s. The attenuation tank shall be constructed of Wavin Aquacell Plus-R units or equivalent, which allow for inspection and maintenance and are sufficiently robust for use under traffic areas. The attenuation system will be wrapped in a permeable membrane to allow infiltration to ground insofar as is possible; infiltration rates are typically marginal in this area though this approach will provide a concomitant marginal decrease in site runoff and increase in treatment. A surface water rising main will be provided with an outflow restriction of 2L/s directed to a final outfall manhole before falling by gravity into the existing drainage network.

It is noted that an Arched type attenuation system is not deemed suitable for use on the site given the excavation depth that would be required to install such a system within the confinements of the site. This has been assessed as over 3m deep, based on 300mm stone fill below attenuation unit + 760mm high units + 2000mm stone fill above to achieve the required storage capacity of c.95m³, not including the road construction build-up or any potential additional cover requirements to ensure an adequate load carrying capacity of any such arched unit type of attenuation system use under roadways subject to loading from fire tenderers.

Overall, the combined treatment train works to reduce and slow the run-off rate and improve water quality run-off from the site. Any run-off shall be limited to 2 l/s with the attenuation volume designed for a 1 in 100 year storm with a 20% allowance for climate change.

3.2 Maintenance of Proposed Surface Water Drainage and SuDS

The wash out of fines in the area of the tree pits and the settlement of sediments in the attenuation tank may lead to silting up of the drainage system if unaddressed. It is proposed to include catchpit manholes at the outfall of the tree pit drain down line and at the inlet of the attenuation tank.

It is proposed that inspection and maintenance, including cleaning, of the catchpits shall be included as part of the maintenance schedule for the development.

Gullies, hoppers, collector drains, etc., serving the intensive and extensive areas of green roofs and planters shall be inspected and maintained on the same schedule.

The maintenance schedule shall include trimming, replanting, etc., of the various plants to ensure design runoff coefficients and treatment are maintained.

3.2.1 Suggested SuDS & Surface Water System Maintenance Plan

Given that the surface water drainage system and incorporated SuDS elements work in conjunction with one another, it is essential that an adequate associated maintenance plan for the site is appropriately assessed, recorded, acted upon and updated where necessary. As the appointed Civil & Structural Engineers for this project, CORA note the below suggested maintenance plan – refer to table 1. We also note that further input should be sought from the Architect and Landscape Architect to allow for the provision of all necessary maintenance measures to be included in a suitable maintenance plan for the proposed development.

Table 1 - Suggested SuDS & Surface Water System Maintenance Plan (Non-Exhaustive List)

Type	Activity	Frequency
Regular Maintenance		
Litter	Pick up all litter in SUDS Landscape areas along with remainder of the site – remove from site.	- Monthly
Grass	Mow all grass verges, paths and amenity grass at 35-50mm with 75mm max. Leaving cuttings in situ.	- As required / monthly
Inlets and Outlets	Inspect monthly, remove silt from slab aprons and debris. Strim 1m round for access.	- Monthly
Permeable Paving	Sweep all paving regularly to keep surface tidy.	- As required / Annually
Occasional Tasks		
Permeable Paving	Brush / Vacuum / Jet wash the surface as necessary to remove silt / sand / vegetation, etc. when ponding occurs.	- As required (estimate 10-15 year intervals)
Green Roofs	Inspect and replace planting as necessary to ensure efficient water absorption rates are maintained.	- As required / Annually
Native Planting / Landscaping / Tree Pits	Remove lower branches where necessary to ensure good ground cover to protect soil profile from erosion. Inspect and maintain or replace planting / vegetation as necessary to ensure efficient water absorption rates are maintained.	- As required / Annually
Soakaway / Attenuation System	CCTV inspection & cleaning if necessary, as per manufacturer's requirements.	- After every Major Storm - Annually
Silt Management	Inspection & removal of silts from source controls.	- Annually
Catch Pits	Inspection & removal of silts, solids and debris when necessary.	- After every Major Storm - Annually

Remedial Work		
General SuDS	Inspect SuDS system to check for damage or failure when carrying out other tasks. Undertake remedial work as required.	- As required / Monthly

4 Water Supply

The proposed water supply will be taken from the public network via an existing connection.

4445 litres of water storage shall be provided on the site in accordance with Irish Water codes of practice.

Fire hydrants & fire fighting strategy shall be covered by the project fire consultant as part of the fire certificate application for the development, however new fire hydrants can be provided within the site boundary to ensure the recommended 46m distance to serve the site.

A pre-connection enquiry has been submitted to Irish Water. A Confirmation of Feasibility letter has been issued in response by Irish Water. See Appendix C.

5 Flood Risk Assessment

5.1 Objectives

The objectives of this section are to inform the planning authority regarding flood risk for the potential development of the lands. The report will assess the site and development proposals in accordance the requirements of "*The Planning System and Flood Risk Management Guidelines for Planning Authorities*".

The report will provide the following:

- The site's flood zone category.
- Information to allow an informed decision of the planning application in the context of flood risk.
- Appropriate flood risk mitigation and management measures for any residual flood risk.

5.2 Flood Risk Assessment Scope

This SSFRA relates only to the proposed development site in the vicinity of Cuckoo's Nest, Greenhills Road, Kilnamanagh, Dublin 24 and its immediate surroundings. This report uses information obtained from various sources, together with an assessment of flood risk for the existing land and proposed development. The report follows the requirements of '*The Planning System & Flood Risk Management – Guidelines for Planning Authorities*', (referred to as the

Guidelines for the remainder of this report) and the South Dublin County Council Development Plan 2016-2022 Strategic Flood Risk Assessment (SFRA).

5.3 Existing Site

The proposed site is located at Cuckoo's Nest, Greenhills Road, Kilnamanagh, Dublin 24.

Generally, the site is flat with a ground level of +70.4m AOD.

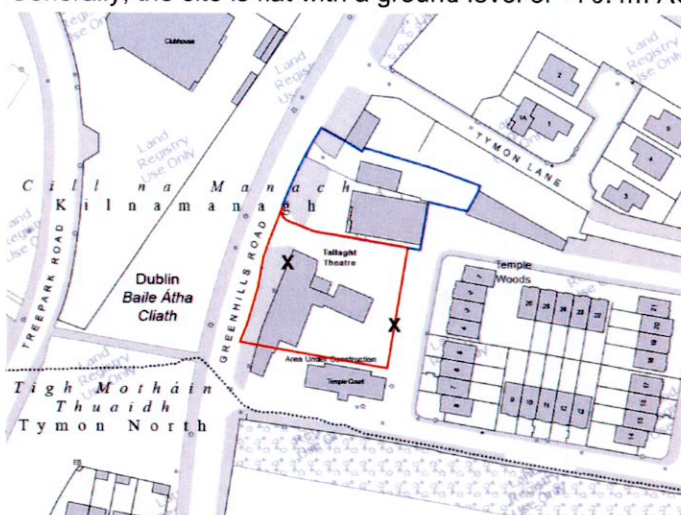


Figure 5.1 - Site Location

5.4 Proposed Development

It is proposed to develop the existing site with the redevelopment and extension of the Pub, and a shop at Ground Floor level, with 10no. apartments across 1st, 2nd, and 3rd Floor levels, along with associated vehicular access, parking, and site works.

6 Planning Guidelines and Flood Risk Assessment

6.1 The planning System and Flood Risk Management, Guidelines for Planning Authorities

The FRM Guidelines provide “mechanisms for the incorporation of flood risk identification, assessment and management into the planning process....” They ensure a consistent approach throughout the country requiring identification of flood risk and flood risk assessment to be key considerations when preparing development plans, local area plans and planned development.

“The core objectives of The FRM Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;

- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure the requirements of EU and national law in relation to the natural environment and nature conservation are complied with for flood risk management."

The key principles of The FRM Guidelines are to apply the Sequential Approach to the planning process i.e.:

- "Avoid the risk, where possible,
- Substitute less vulnerable uses, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible."

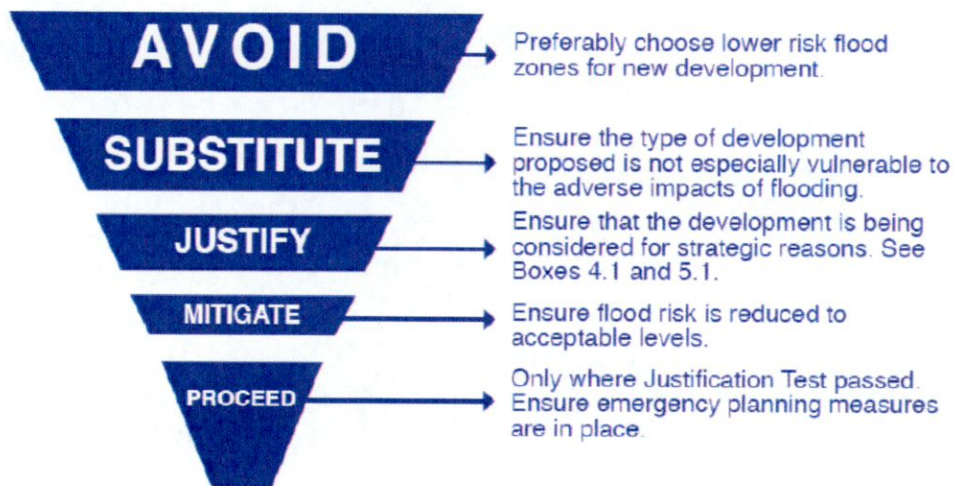


Figure 6.1 - Sequential Approach Principles in Flood Risk Management

Where the *Sequential Test's* **avoid** and **substitute** principals are not appropriate then the FRM Guidelines propose that a *Justification Test* be applied to assess the appropriateness, or otherwise, of particular developments that are being considered in areas of moderate or high flood risk.

6.1.1 Flood Risk Assessment

The assessment of flood risk requires an understanding of where water comes from (the source), how and where it flows (the pathways), and the people and assets affected by it (the receptors).

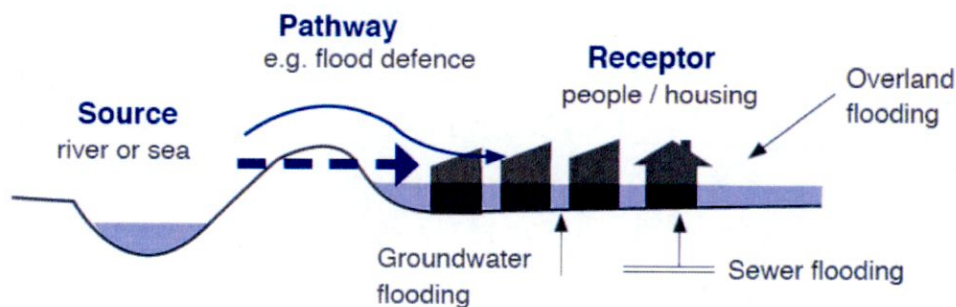


Figure 6.2 - Source - Pathway - Receptor Model

The principal sources are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. The receptors can include people, their property and the environment. All three elements are examined as part of the flood risk assessment including the vulnerability and exposure of receptors to determine potential consequences. Mitigation measures typically used in development management can reduce the impact of flooding on people and communities, e.g., by blocking or impeding pathways. The planning process is primarily concerned with the location of receptors and potential sources and pathways that might put those receptors at risk.

Risks to people, property and the environment should be assessed over the full range of probabilities, including extreme events. Flood risk assessment should cover all sources of flooding, including effects of run-off from a development locally and beyond the development site.

6.2 Flood Risk Assessment Stages

The FRM Guidelines outline that a staged approach should be adopted when carrying out a flood risk appraisal or assessment. "These stages are:

- *Stage 1 Flood risk identification*
- *Stage 2 Initial flood risk assessment*
- *Stage 3 Detailed flood risk assessment*

The FRA Guidelines require a SSFRA be undertaken to assess flood risk for individual planning applications. This SSFRA comprises Stages 1, 2 and 3 involving both identification and more detailed assessment of flood risks and surface water management related to the planned development site.

6.3 Flood Zones

The FRM Guidelines use flood zones to determine the likelihood of flooding and for flood risk management within the planning process. The three flood zones levels are:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% AEP (Annual Exceedance Probability) or 1 in 100 for river flooding);
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1000 and 1% AEP or 1 in 100 for river flooding); and
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas outside zones A and B.

The FRM Guidelines categorises all types of development as either:

- Highly Vulnerable, e.g., dwellings, hospitals, fire stations, essential infrastructure,

- Less Vulnerable, e.g., retail, commercial or industrial buildings, local transport infrastructure.
- Water Compatible, e.g., flood infrastructure, docks, amenity open space.

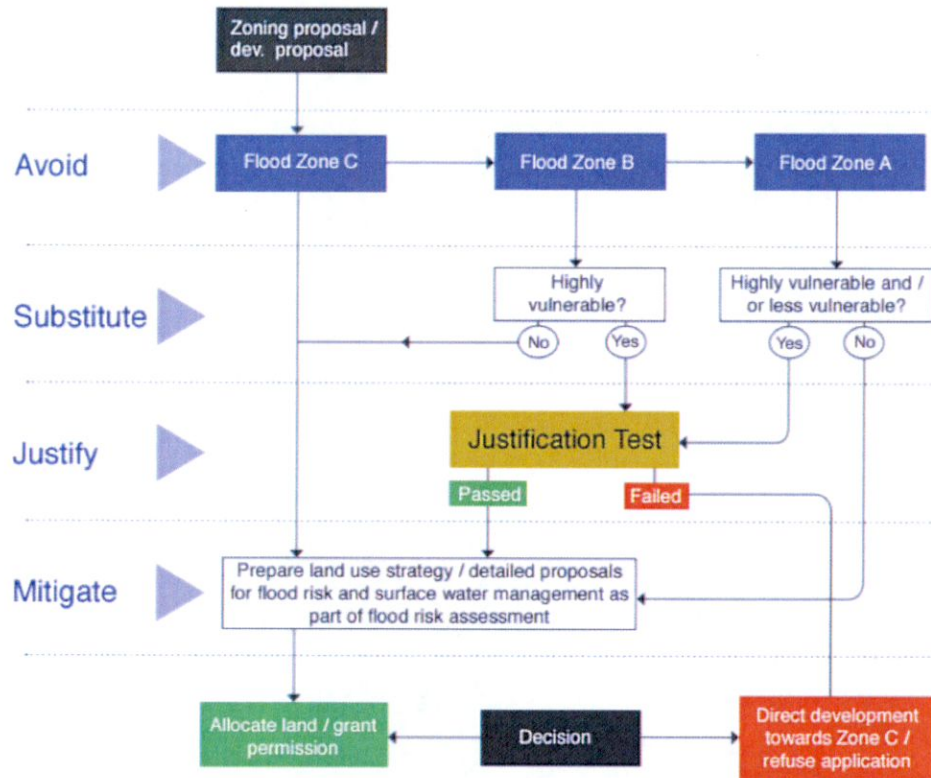


Figure 6.3 - Sequential Approach Mechanism in the Planning Process

The Sequential Approach restricts development types to occur within the flood zone appropriate to their vulnerability class, see Table 2.1.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Figure 6.4 - Table 3.2 from the FRA guidelines - Matrix of Vulnerability versus Flood Zone to illustrate appropriate development and that required to meet the Justification Test

6.4 Proposed Development's Vulnerability

The proposed type of development for this site is to be residential. Enterprise and commercial are categorised by the Guidelines as **less vulnerable developments** and appropriate to be located within Flood Zone B and C. Residential developments are categorised as **highly vulnerable** and

appropriate to be located just within Flood Zone C. To provide highly vulnerable and less vulnerable type development within Flood Zone A requires a **Justification Test** to be completed to justify development in this flood risk area.

6.5 Site Specific Flood Risk Assessment for Development.

The FRM Guidelines require a SSFRA to “gather relevant information sufficient to identify and assess all sources of flood risk and the impact of drainage from the proposal”. It should “quantify the risks and the effects of any necessary mitigation, together with the measures needed or proposed to manage residual risks”. It considers the nature of flood hazard, taking account of the presence of any flood risk management measures such as flood protection schemes and how development will reduce the flood risk to acceptable levels. A detailed assessment for a development application should conclude that core flood risk elements of the Justification Test are passed and that residual risks can be successfully managed with no unacceptable impacts on adjacent lands.

6.6 SSFRA Key Outputs

Key outputs of an SSFRA are:

- Plans showing the site and development proposals including its relationship with watercourses and structures which may influence local hydraulics;
- Surveys of site levels and comparison of development levels relative to sources of flooding and likely flood water levels;
- Assessments of:
 - Potential sources of flood risk;
 - Existing flood alleviation measures;
 - Potential impact of flooding on the site.
- How the layout and form of the development can reduce those impacts, including arrangements for safe access and egress.
- Proposals for surface water management and sustainable drainage.
- The effectiveness and impact of any mitigation measures.
- The residual risks to the site after the construction of any necessary measures and the means of managing those risks; and
- How flood risks are managed for occupants / employees of the site and its infrastructure.

7 Stage 1 Flood Risk Identification

7.1 Available Flood Risk Information

The initial flood risk identification stage uses existing information to identify and confirm whether there may be flooding or surface water management issues for the lands in question that may warrant further investigation.

To initially identify potential flood risks for the existing Site and surrounding area a number of available data sources were consulted, these are listed in Table 8.1 below.

	Information Source	Coverage	Quality	Confidence	Identified Flood Risks	Flood Risk
Primary Data Source and Modelled Data	OPW ECFRAM – Fluvial https://www.floodinfo.ie/map/floodmaps/	Regional	High	High	Flood maps indicate that the development is not at risk of Fluvial Flooding	N
	OPW ECFRAM – Tidal https://www.floodinfo.ie/map/floodmaps/	Regional	High	High	Tidal flood maps indicate that the subject site is outside the 0.1% AEP.	N
	SDCC Development Plan SFRA	Local	High	High	Development is located within Flood Zone C.	N
Secondary Data Source	Walkover Survey	Local	Varies	Varies	Level site throughout.	N
	OPW Historic Flood Records	Nationwide	Varies	Varies	No records of site flooding.	N
	Historic OSI Maps	Nationwide	Moderate	Low	Developed site in a suburban area. Existing pub is over 250 years old.	N
	Drainage Records	Nationwide	Moderate	Moderate	Existing public sewers on adjacent public roads are below the lowest floor level of the proposed development.	N
	Geological Survey Ireland Maps	County	Moderate	Low	Made ground, on till derived from limestone, on bedrock.	N
	Topographic Surveys	Local	High	High	Suburban site with ground level at +70.4m AOD.	N

Table 8-1 - Review of Available Information

7.2 Identified Flood Risks/ Flood Sources

7.2.1 OPW Predictive, Historic & Benefitting Land Maps and Flood Risk Information

From consultation of flood information from the OPW's floodinfo.ie website the site has not suffered from flooding in the past nor have flood events occurred near the site.

Fluvial Flood Risk

The OPW's Eastern CFRAM study produced flood risk maps and the assessment of fluvial flood plains over the eastern region of Ireland. The OPW have consolidated this information onto <https://www.floodinfo.ie/map/floodmaps/> website. The figures below show that the site is outside calculated flood extent for the 0.1% AEP, 1.0% AEP and 10% AEP fluvial flood events.

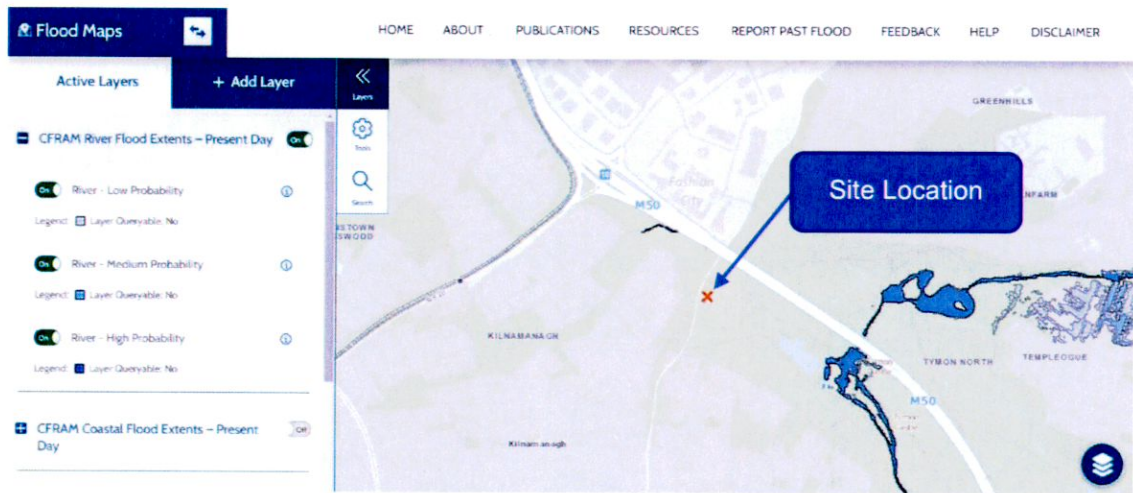


Figure 7.1 - Fluvial Flooding (0.1%, 1.0% and 10% AEP)

Tidal Flood Risk

The OPW ECFRAM coastal flood risk analysis for 10%, 0.5% and 0.1% AEP return periods show the site is outside the extents of the 0.1% AEP coastal flood event as seen in fig 8.2. The site is located around 30km from the tidal effects of the Irish Sea.

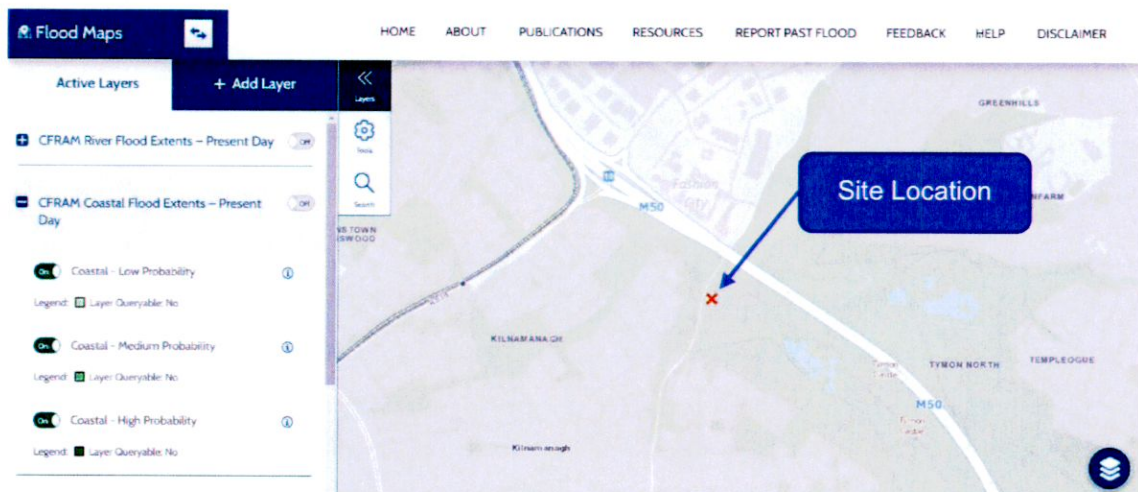


Figure 7.2 - Tidal Flooding (0.1%, 1.0% and 10% AEP)

Pluvial Flood Risk

The risk to the building from pluvial flooding will be low due to the proposed ground floor level being approx. 150mm above external ground level. Any pluvial flooding on the site outside the building will be dealt with by the surface water drainage system.

7.2.2 South Dublin County Council Strategic Flood Risk Assessment

SDCC County Development Plan 2016-2022 contains the Strategic Flood Risk Assessment (SFRA) which uses the draft ECFRAM mapping as its basis for identifying areas at flood risk. The site is located in Flood Zone C where the proposed development is permitted.



Figure 8.5 - Extract from SDCC Strategic Flood Risk Assessment, Development Plan 2016-2022, Estimated Flood Events

7.2.3 Topographical Survey

A Topographical survey is yet to be completed; however, the ground floor level of the proposed building is to be approx. 150mm above the existing ground level outside.

7.2.4 Walkover Survey

From a walkover of the site, it is as expected and ties in with the desk study.

7.2.5 Other Sources

Other information sources were consulted to determine if there was any additional flood risk to the subject site, these included:

- Soil data from GSI – The entire site consists of made ground, on till derived from limestone, on bedrock.
- Groundwater information from GSI – There is no record of evidence of groundwater flooding for the proposed site.
- Existing Local Authority Drainage Records – The surrounding area uses separate drainage networks.

- Historic Maps - The Cuckoo's Nest Pub has been located on this site for over 250 years.

7.3 Source-Pathway-Receptor Model

A Source-Pathway-Receptor model was produced to summarise the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals), see Table 8.2. It provides the probability and magnitude of the sources, the performance and response of pathways and the consequences to the receptors in the context of the mixed-use development proposal. These sources, pathways and receptors will be assessed further in the initial flood risk assessment stage.

Source	Pathway	Receptor	Likelihood	Impact	Risk
Tidal	Subject Site is outside the Tidal Flood Zone	Ground Floor	Very unlikely	Medium	Low
Fluvial	Proposed development site outside fluvial flood zone	-	Very unlikely	Medium	Low
Surface Water Drainage (Pluvial)	Invert levels of local drainage is well below the site levels and adequate capacity is known to exist. There is no record of surcharged surface water drainage causing flooding in this location.	Ground Floor	Very Unlikely	Medium	Low
Groundwater Flooding	Ground water levels are known to be well below the proposed ground floor level and no basement is proposed.	Ground Floor	Very unlikely	Medium	Low
Infrastructural – Human or Mechanical Error	Blockage of new drainage network	Ground Floor	Possible	Low	Low

Table 8-2 - Source-Pathway-Receptor Analysis

The following paragraph provides a summary of the results of this Source-Pathway-Receptor flooding model for the subject site.

7.4 Source-Pathway-Receptor Model Results

As it can be seen in the above flooding analysis, the proposed development site is not at risk of tidal or fluvial flooding.

The risk to the site from pluvial flooding is low due to the proposed ground floor level being approx. 150mm above external ground level. Any pluvial flooding on the site outside the building will be dealt with by the surface water drainage system.

Consequently, an initial flood risk assessment will follow to provide further detail on the causes, effects and possible mitigation measures for the sources of flood risk identified above.

8 Stage 2 – Initial Flood Risk Assessment

From Stage 1, no flood risks were identified and so the site is not considered at risk of flooding from any source.

9 Conclusion

This Flood Risk Assessment concludes the following:

- The site is not subject to tidal or fluvial flooding given the topography and location of the site.
- Pluvial flooding from localised spots can be mitigated by creating local ramps at the site entry and to ground level thresholds. Furthermore, the proposed ground level is above the localised ground level of the street kerb channels where any water may accumulate for the short term following a storm.

Appendix A – Foul Drainage Calculations

Apartments

3no. One-Bed Apartments (4 Pax.), 6no. Two-Bed Apartments (4 Pax.), 1no. Three-Bed Apartments (5 Pax.),

Consumption = 41 persons x 150litres/person/day = **6150 litres/day**

Shop

5 members of Staff

Consumption = 60litres/person/day = **300 litres/day**

Gastro Pub

10 members of Staff

Consumption = 60litres/person/day = **600 litres/day**

100 Customers

Consumption = 15litres/person/day = **1500 litres/day**

Overall Consumption = 8550 litres/day

Hourly water requirement = 357 l/Hr.

Average flow rate = 0.099 l/s.

Peak = 6 x 0.099 = 0.594 l/s.

Job Title Cuckoo's Nest
Job No. 21816
Drawing Title Proposed Foul
Date 23-Jan-23
Designed By JM

JOB TITLE Cuckoo's Nest
DRAWING Proposed Foul
DATE 23-Jan-23 **REF:** 21816
DESIGN BY JM

CALCULATIONS BASED ON :-

UNITS/ HOUSE - UNITS *MODIFIED WALLINGFORD METHOD*
Ks FOR FOUL 1.5 MM *FOUL Ks=1.5mm*
PAGE No. 1

FOUL MANHOLE SCHEDULE

CALCULATIONS BASED ON MODIFIED WALLINGFORD METHOD FOUL SEWER CALCULATIONS

FLOW RATES TAKEN FROM FIGURE 2 BS 8301 CONVERSION OF DISCHARGE UNITS TO FLOW RATES

MANHOLES	COVER L.	INVERT L.	COVER	RISE	LENGTH	SLOPE	CHECK	PIPE	MANHOLES	PIPE	GRAD	VEL	CAPAC	No. OF UNITS	No. OF Dischrg UNITS	ACTUAL FLOW	QP/Q PROP FLOW	ACTUAL VEL	VP/V PROP VEL	CHECK
	m	m	m	m	m			m		mm	1 IN	M/SEC	M3/SEC			M3/SEC		M/SEC		
Cuckoo's Nest																				
FSMH 03	70.000	69.030	0.820						FSMH 03											
FSMH 02	70.000	68.860	0.990	0.170	17.300	102	OK	0.150	FSMH 02	150	102	1.0096	0.0171	1	1534.9	0.0065	0.38	0.7572	0.75	OK
FSMH 02	70.000	68.860	0.990						FSMH 02											
FSMH 01	70.000	68.730	1.120	0.130	13.400	103	OK	0.150	FSMH 01	150	103	1.0032	0.0170	1	1534.9	0.0065	0.38	0.7524	0.75	OK
FSMH 01	70.000	68.730	1.120						FSMH 01											
EXFSMH	70.580	68.570	1.860	0.160	16.400	102	OK	0.150	EXFSMH	150	102	1.0060	0.0170	1	1534.9	0.0065	0.38	0.7545	0.75	OK

Appendix B – Surface Water Drainage Calculations

Job Title Cuckoo's Nest
Job No. 21816
Drawing Title Proposed SW Drainage Layout
Date 23/01/2023
Designed By JM

Surface water manhole schedule

MANHOLES	COVER L.	INVERT L.	COVER	RISE	LENGTH	SLOPE	PIPE
	m	m	m	m	m		m
SWAJ 01	70.000	69.450	0.550				
SWMH 02	70.000	69.333	0.667	0.117	17.500	149.573	0.150
SWMH 02	70.000	69.333	0.667				
SWMH 03	70.000	69.116	0.884	0.217	32.600	150.230	0.150
SWMH 03	70.000	69.116	0.884				
SWMH 04	70.000	69.077	0.923	0.039	5.850	150.000	0.150
SWMH 04	70.000	69.077	0.923				
EX.SWMH	70.000	69.000	1.000	0.077	8.100	105.195	0.150
SWMH 05	71.000	69.539	1.461				
SWMH 06	71.000	69.430	1.570	0.109	16.400	150.459	0.150
SWMH 06	71.000	69.430	1.570				
SWMH 07	71.000	69.300	1.700	0.13	19.500	150.000	0.150
SWMH 07	71.000	69.300	1.700				
SWMH 03	70.000	69.116	0.884	0.184	27.600	150.000	0.150
SWMH 03	70.000	69.116	0.884				
SWMH 04	70.000	69.077	0.923	0.039	5.850	150.000	0.150
SWMH 04	70.000	69.077	0.923				
EX.SWMH	70.000	69.000	1.000	0.077	8.100	105.195	0.150
SWMH 08	70.000	69.040	0.960				
EX.SWMH	70.000	69.000	1.000	0.04	3.800	95.000	0.150
SWMH 09	71.000	69.530	1.470				
SWMH 10	71.000	69.428	1.572	0.102	15.400	150.980	0.150
SWMH 10	71.000	69.428	1.572				
SWMH 11	71.000	69.337	1.663	0.091	13.600	149.451	0.150
SWMH 11	71.000	69.337	1.663				
SWMH 07	71.000	69.300	1.700	0.037	5.600	151.351	0.150
SWMH 07	71.000	69.300	1.700				
SWMH 03	70.000	69.116	0.884	0.184	27.600	150.000	0.150
SWMH 03	70.000	69.116	0.884				
SWMH 04	70.000	69.077	0.923	0.039	5.850	150.000	0.150
SWMH 04	70.000	69.077	0.923				
EX.SWMH	70.000	69.000	1.000	0.077	8.100	105.195	0.150

Job Title Cuckoo's Nest
Job No. 21816
Drawing Title Proposed SW Drainage Layout
Date 23/01/2023
Designed By JM

Surface water manhole schedule

SWMH	AREA	Qp	Cumilative	Pipe Size	Velocity	Velocity	CHECK	CHECK
	Hectares	L/s	L/s	mm	m/min	m/sec		
SWAJ 01								
SWMH 02	0.2041	24.032	24.032	150	48.214	0.80	OK	OK
SWMH 02								
SWMH 03	0.2041	24.032	24.032	150	48.108	0.80	OK	OK
SWMH 03								
SWMH 04	0.2041	24.032	24.032	150	48.145	0.80	OK	OK
SWMH 04								
EX.SWMH	0.2041	24.032	24.032	150	57.491	0.96	OK	OK
SWMH 05								
SWMH 06	0.2041	24.032	24.032	150	48.072	0.80	OK	OK
SWMH 06								
SWMH 07	0.2041	24.032	24.032	150	48.145	0.80	OK	OK
SWMH 07								
SWMH 03	0.2041	24.032	24.032	150	48.145	0.80	OK	OK
SWMH 03								
SWMH 04	0.2041	24.032	24.032	150	48.145	0.80	OK	OK
SWMH 04								
EX.SWMH	0.2041	24.032	24.032	150	57.491	0.96	OK	OK
SWMH 08								
EX.SWMH	0.2041	24.032	24.032	150	60.498	1.01	OK	OK
SWMH 09								
SWMH 10	0.2041	24.032	24.032	150	47.989	0.80	OK	OK
SWMH 10								
SWMH 11	0.2041	24.032	24.032	150	48.234	0.80	OK	OK
SWMH 11								
SWMH 07	0.2041	24.032	24.032	150	47.930	0.80	OK	OK
SWMH 07								
SWMH 03	0.2041	24.032	24.032	150	48.145	0.80	OK	OK
SWMH 03								
SWMH 04	0.2041	24.032	24.032	150	48.145	0.80	OK	OK
SWMH 04								
EX.SWMH	0.2041	24.032	24.032	150	57.491	0.96	OK	OK



CORR Consulting Engineers

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10 Mount St Lower, Dublin 2, Ireland
t: 01-6611100 e: info@cora.ie

Project: Cuckoos Nest - Attenuation required for existing layout

Job No: 21816

Page No: 1

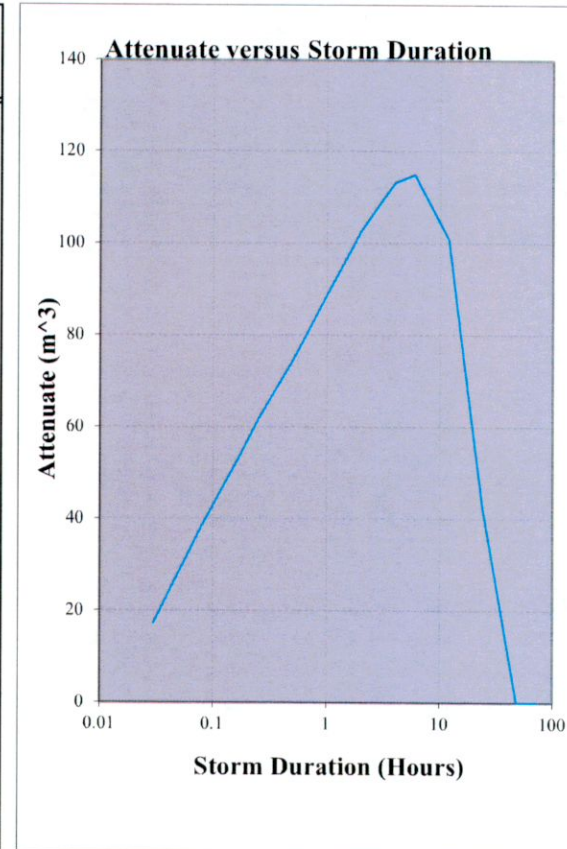
Date: 24/10/2022 Calc'd by: J. Ó Brien

Checked by: J McMenamin

Intensive Green Roof Area: 0 m ²	Flat Roof Area: 451.7 m ²	Imp. Roof Area: 94.8 m ²	Total Area: 2040.97 m ²	Attenuated Flow Rate: 2 l/s
I. Factor: 0.50	I. Factor: 0.80	I. Factor: 0.8		
Paving 1494 m ²	Perm. Paving 0 m ²	Landscaping 0 m ²	Equivalent Impermeable Area: 1782.223 m ²	
I. Factor: 0.90	I. Factor: 0.70	I. Factor: 0		

Factors: Climate Change: 1.2 Simplification of Head/Discharge Relationship: 1.25 Hydrobreak

Storm Duration (Hours)	Rainfall (mm)	Total Surface Water (m ³)	Allowable Discharge (m ³)	Attenuate (m ³)
0.03	7.80	13.90	0.216	17.11
0.08	17.52	31.22	0.576	38.31
0.166	24.36	43.41	1.1952	52.77
0.25	28.68	51.11	1.8	61.64
0.50	35.40	63.09	3.6	74.36
1.00	43.80	78.06	7.2	88.58
2.00	54.12	96.45	14.4	102.57
4.00	66.96	119.34	28.8	113.17
6.00	75.84	135.16	43.2	114.95
12.00	93.72	167.03	86.4	100.79
24.00	115.92	206.60	172.8	42.24
48.00	129.12	230.12	345.6	0.00
72.00	133.20	237.39	518.4	0.00



Note: This spreadsheet calculates the Volume of Attenuate based on a Return Period of: 100 years.



CORR Consulting Engineers

Behan House
10 Mount St Lower, Dublin 2, Ireland
t: 01-6611100 e: info@cora.ie

Project: Cuckoos Nest

Job No: 21816

Page No: 1

Date: 11/10/2022 Calc'd by: J. Ó Brien

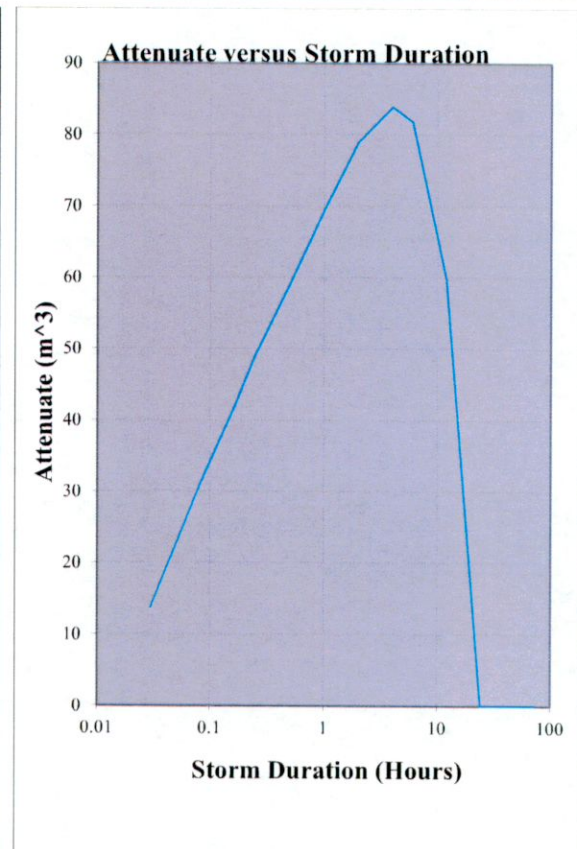
Checked by: J McMenamin

Intensive Green Roof Area: 178.8 m² Extensive Green Roof Area: 218.5 m² Imp. Roof Area: 431 m² Total Area: 2040.97 m² Attenuated Flow Rate: 2 l/s
I. Factor: 0.50 I. Factor: 0.70 I. Factor: 0.8

Paving 512 m² Perm. Paving 548 m² Landscaping 152.68 m² Equivalent Impermeable Area: 1431.547 m²
I. Factor: 0.90 I. Factor: 0.70 I. Factor: 0

Factors: Climate Change: 1.2 Simplification of Head/Discharge Relationship: 1.25 Hydrobreak

Storm Duration (Hours)	Rainfall (mm)	Total Surface Water (m ³)	Allowable Discharge (m ³)	Attenuate (m ³)
0.03	7.80	11.17	0.216	13.69
0.08	17.52	25.08	0.576	30.63
0.166	24.36	34.87	1.1952	42.10
0.25	28.68	41.06	1.8	49.07
0.50	35.40	50.68	3.6	58.85
1.00	43.80	62.70	7.2	69.38
2.00	54.12	77.48	14.4	78.84
4.00	66.96	95.86	28.8	83.82
6.00	75.84	108.57	43.2	81.71
12.00	93.72	134.16	86.4	59.71
24.00	115.92	165.94	172.8	0.00
48.00	129.12	184.84	345.6	0.00
72.00	133.20	190.68	518.4	0.00



Note: This spreadsheet calculates the Volume of Attenuate based on a Return Period of: 100 years.

Appendix C – Irish Water Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Cian Glennon
Cora Engineers
Behan House
10 Lower Street
Dublin 2
D02 HT71

29 September 2022

Uisce Éireann
Bosca OP 448
Oifig Sheachadta r
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Our Ref: CDS22006899 Pre-Connection Enquiry
Cuckoos Nest, 24 Greenhills Road, Dublin 24, Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Multi/Mixed Use Development of 12 unit(s) at Cuckoos Nest, 24 Greenhills Road, Dublin 24, Dublin, (the **Development**).

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible without infrastructure upgrade by Irish Water
- **Wastewater Connection** - Feasible without infrastructure upgrade by Irish Water

The proposed Development indicates that Irish Water assets are present on the site. The Developer has to demonstrate that proposed structures and works will not inhibit access for maintenance or endanger structural or functional integrity of the assets during and after the works. Drawings (showing clearance distances, changing to ground levels) and Method Statements should be included in the Detailed Design of the Development. A wayleave in favour of Irish Water will be required over the assets that are not located within the Public Space. For design submissions and queries related to diversion/build near or over, please contact IW Diversion Team via email address diversions@water.ie

The easement/wayleave strip should be in accordance with the minimum separation distances which can be found in the tables here:

<https://www.water.ie/connections/developer-services/diversion-and-build-over/>

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

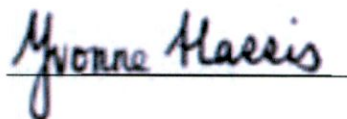
Where can you find more information?

- **Section A** - What is important to know?
- **Section B** - Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit www.water.ie/connections, email newconnections@water.ie or contact 1800 278 278.

Yours sincerely,



Yvonne Harris
Head of Customer Operations

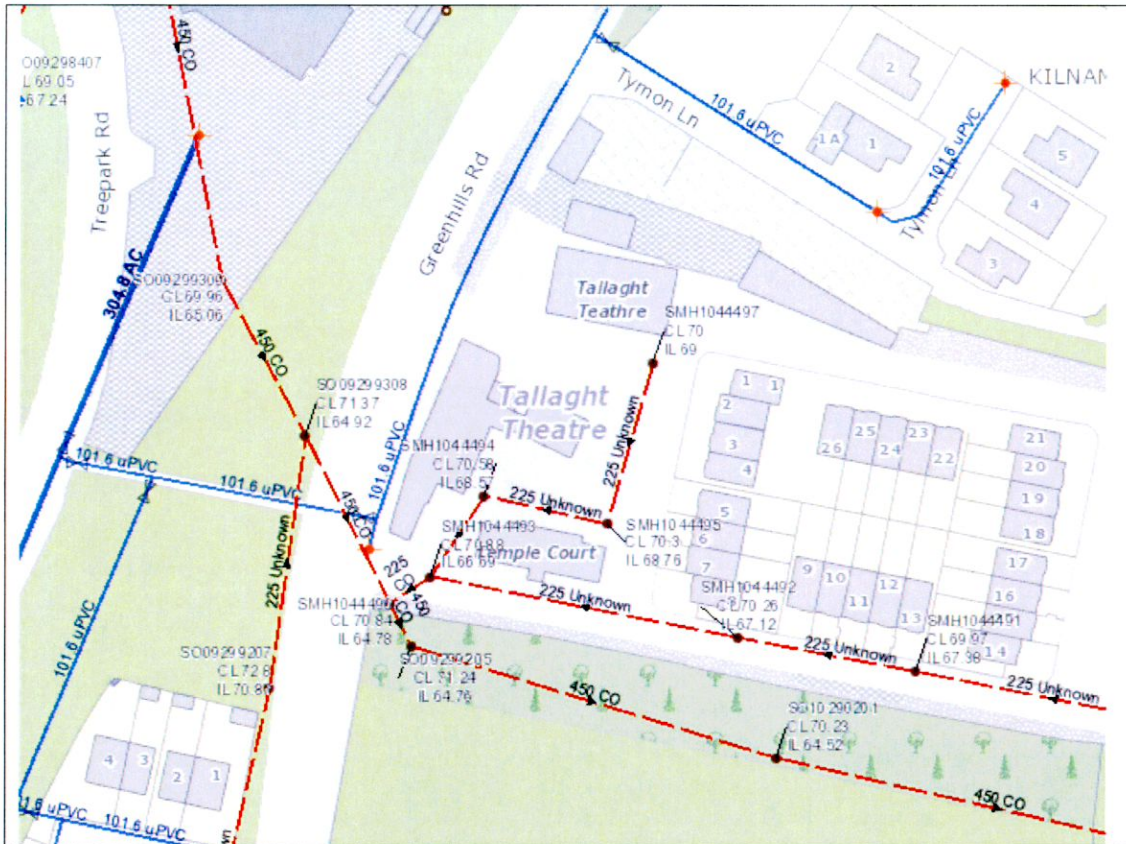
Section A - What is important to know?

What is important to know?	Why is this important?
<p>Do you need a contract to connect?</p>	<ul style="list-style-type: none"> • Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Irish Water.
<p>When should I submit a Connection Application?</p>	<ul style="list-style-type: none"> • A connection application should only be submitted after planning permission has been granted.
<p>Where can I find information on connection charges?</p>	<ul style="list-style-type: none"> • Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
<p>Who will carry out the connection work?</p>	<ul style="list-style-type: none"> • All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. <p>*Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works</p>
<p>Fire flow Requirements</p>	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • What to do? - Contact the relevant Local Fire Authority
<p>Plan for disposal of storm water</p>	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • What to do? - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
<p>Where do I find details of Irish Water's network(s)?</p>	<ul style="list-style-type: none"> • Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

<p>What are the design requirements for the connection(s)?</p>	<ul style="list-style-type: none"> The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with <i>the Irish Water Connections and Developer Services Standard Details and Codes of Practice</i>, available at www.water.ie/connections
<p>Trade Effluent Licensing</p>	<ul style="list-style-type: none"> Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ <p>**trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)</p>

Section B – Details of Irish Water’s Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Note: The information provided on the included maps as to the position of Irish Water’s underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water’s network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water’s underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water’s underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.