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SITE SPECIFIC FLOOD RISK ASSESSMENT

Omni Plaza SHD

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CONTENTS:

1.0 INTRODUCTION

This report forms part of a planning application by Serendale Limited for development at OMNI Plaza SHD, Omni Park, Swords Road, Santry, Dublin 9.

The proposed development comprises:

Permission for a 7-year duration is sought by Serendale Limited for a Strategic Housing Development which comprises the demolition of the existing industrial / warehouse buildings northwest of Omni Park Shopping Centre, Santry, Dublin 9 and the construction of 457 no. apartments across 4 no. blocks, ranging in height from 4-12 storeys (over basement). The proposal includes 2 no. retail/café/restaurant units, 1 no. community building, 1 no. childcare facility, 1no. residential amenity space and 5 no. ESB substations.

The development also provides for a basement carpark of 213 no. spaces and 7 no. motorcycle spaces with 7 no. creche drop-off parking spaces and 6 no. carshare parking spaces located in newly reconfigured surface carpark. The proposal provides for 768 no. bicycle parking spaces.

The proposal includes the provision of a new public open space plaza, with consequential revisions to existing commercial car parking areas, to integrate the proposals with the wider District Centre.

The proposal includes the provision of pedestrian and cycle connections and improvements through Omni Park Shopping Centre, including a plaza and cycle/pedestrian link substantially in the form permitted as part of the Omni Living Strategic Housing Development (Ref. ABP-307011-20).

Access to the proposed 213 no. basement car parking spaces is via the existing Omni Park Shopping Centre. A secondary servicing and emergency access is via the existing service road to the rear of existing retail premises at Omni Park Shopping Centre and accessed from the Swords Road.

The development provides for all associated and ancillary site development, demolition and clearance works, hoarding during construction, revisions to car parking within the Omni Park Shopping Centre, soft and hard landscaping, public realm works, public lighting and signage, ancillary spaces, plant including photovoltaic panels, water infrastructure, utilities and services.

The application is accompanied by an Environmental Impact Assessment Report.

A full description of the development is contained within the public notices, architectural drawings and accompanying application documents.

This report provides an assessment of the subject site for the fluvial, coastal, pluvial, groundwater and public sewer flood risk for the proposed development.

The layout of the proposed development is detailed in the series of planning drawings by JFA architects submitted with this application.

This report should be read in conjunction with EirEng Consulting Engineers drawings.

2.0 SITE LAYOUT LOCATION

The location of the proposed development is identified in red in Figure 1 below.

Figure 1 - Site Location

The existing site is located in Santry, Dublin. The lands primarily comprise the former Molloy & Sherry Warehouse premises and lands generally to the north west corner of the Omni Park Shopping Centre including existing carpark. The site is located west of Lidl and to the north and east of the IMC Cinema within the Omni Park Shopping Centre and east of Shanliss Avenue.

The application site includes lands within the existing Omni Park Shopping Centre and the primary access is proposed from same. Service access will be from the Swords Road along the access road south of AIB, Swords Road, Santry. User access to the site will be via a new ramp into the underground car park from the Omni Park Shopping Centre development.

Fire tender access to the site will be via the existing private industrial road located directly east of the site & from the OMNI shopping centre carpark, both of which connect to the Swords Road.

3.0 SITE GEOLOGY

Geological Survey Ireland was consulted to determine the geological conditions of the site and the surrounding area.

The sub-soil on the site is identified as “Made Ground” which would be typical for an urban environment. The underlying bedrock on the site is identified as dark limestone and shale and part of the Lucan Formation. The formation comprises of dark-grey to black, fine-grained, micritic limestones with interbedded dark-grey calcar.

The groundwater vulnerability for the site is classified as low and no karst features are identified within the surrounding area.

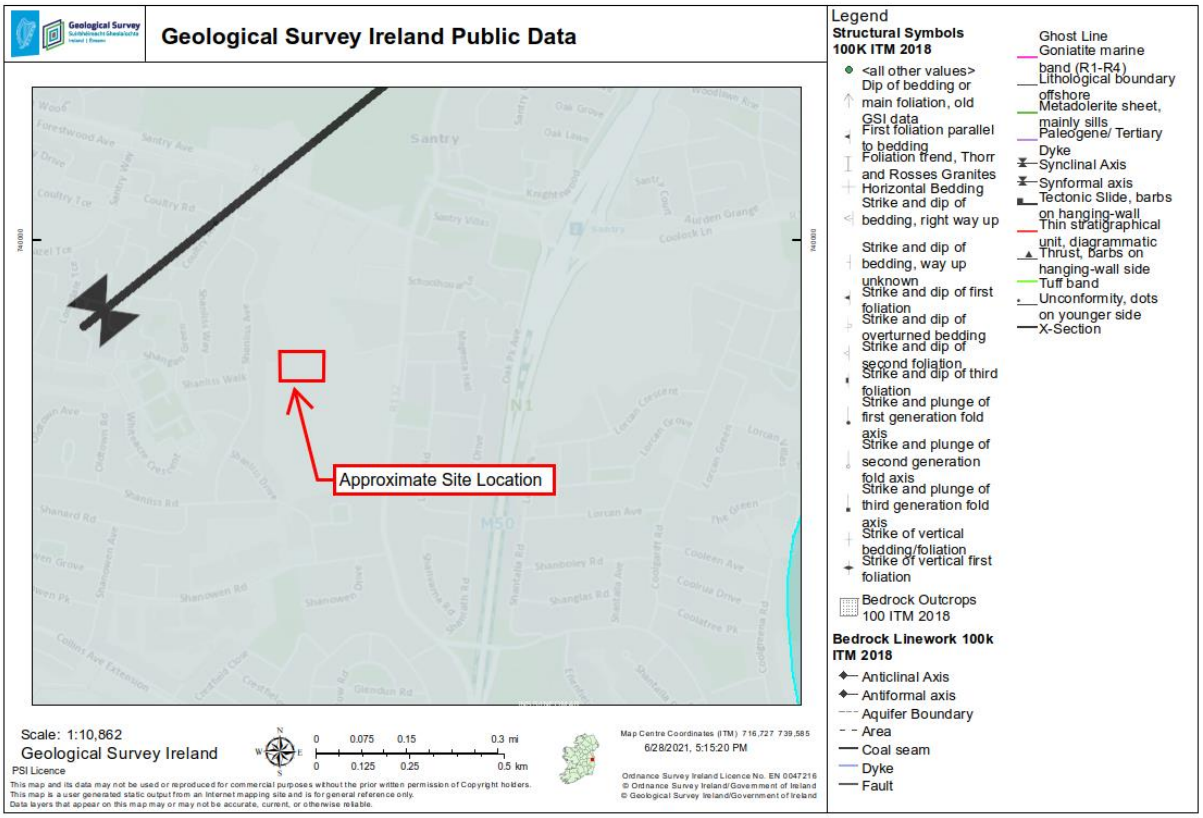


Figure 2 - Local Geological Conditions

4.0 FLOOD RISK IDENTIFICATION

An assessment of flood risk for the site has been undertaken in accordance with the Planning System and Flood Risk Management (PSFMR) Guidelines.

The objectives are to:

- Identify potential sources of flood risk
- Confirm the level of flood risk and identify key hydraulic features
- Assess the impact the proposed development has on flood risk
- Develop appropriate flood risk mitigation and management measures which will allow for the long-term development of the site.

The relevant components to be considered in the identification and assessment of flood risk are as per Table A1 of the PSFRM Guidelines:

- Coastal – flooding from high sea levels
- Fluvial – flooding from water courses
- Pluvial – flooding from rainfall / surface water
- Ground Water – flooding from springs / raised ground water
- Public Sewer – flooding from public sewers

Each component will be investigated and an assessment of the likelihood of a flood occurring will be undertaken as well as the possible consequences of a flood event.

The Greater Dublin Strategic Drainage Study (GDSDS) and PSFRM set out the best practice standards for flood risk in Ireland. These are summarised in Table 1 - Summary Level of Service, below:

Flooding Source	Drainage	River	Tidal/Coastal
Residential	1% AEP	0.1% AEP	0.1% AEP
Commercial	1% AEP	1% AEP	0.5% AEP
Water-compatible	–	>1% AEP	>0.5% AEP

Table 1 - Summary Level of Service

4.1 Available Flood Studies and Information

The area surrounding the site has been subject to several indicative flood mapping and modelling studies. The studies examined as part of this flood risk assessment are detailed below:

- Historical Flooding – Floodinfo.ie
- Catchment Flood Risk Assessment and Management Study (CFRAM) (2016)
- Dublin City Development Plan 2016-2022 PFRA (2016)

- FloodResilienCity Project (2012)
- FloodResilienCity Report October 2011 (2012)
- OPW Preliminary Flood Risk Assessment (2011)
- GDSDS Sewer Flood Maps (2015)

4.2 Historical Flooding (Floodmaps.ie)

Floodinfo.ie (formerly floodmaps.ie) was consulted to identify historical flooding events within the vicinity of the site. A flood event identification node is located adjacent to the site but relates to a flood event of the river Wad in 1965. This event occurred approximately 550m south of the site at the point where the river is culverted underneath the Swords Road.

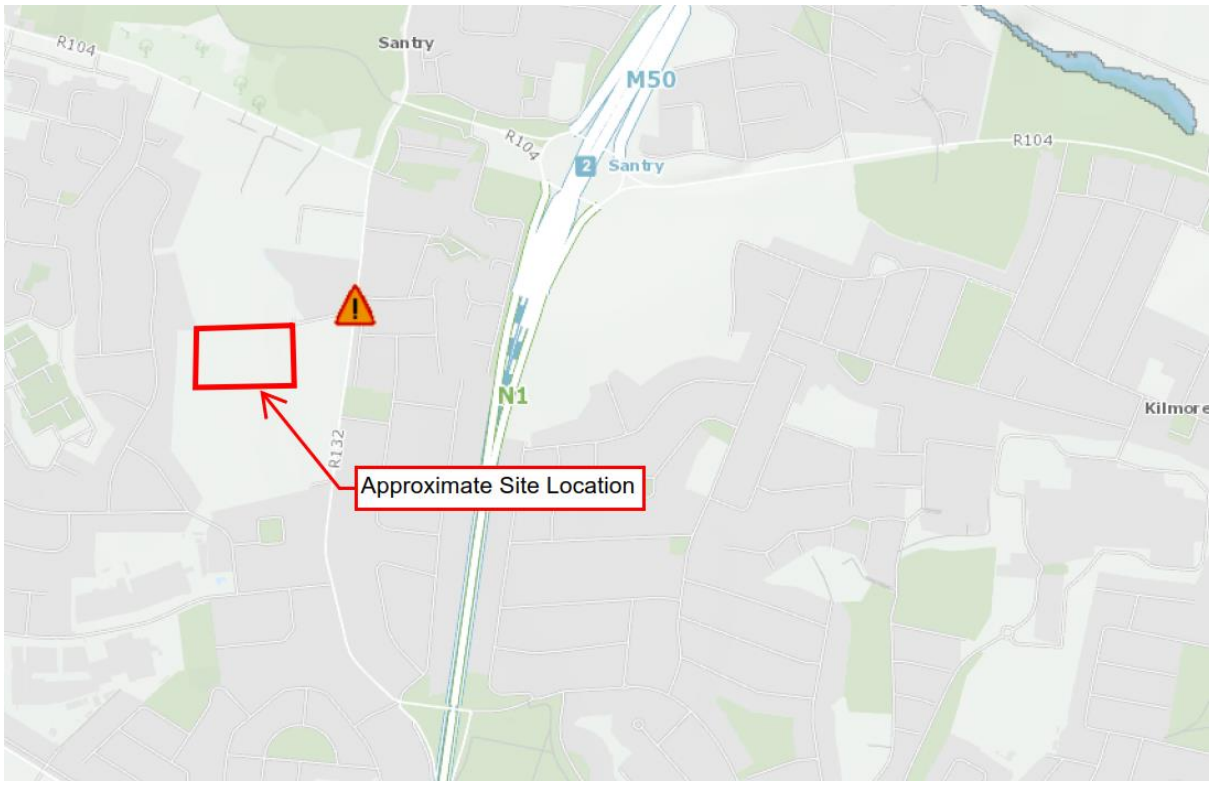


Figure 3 Floodmaps.ie Record Flood Events

The historical flood report is included in Appendix A.

4.3 Catchment Flood Risk Assessment and Management Study (CFRAM) (2016)

The National CFRAM study involved detailed hydraulic modelling of river bodies and coastal areas and is the most detailed flood mapping undertaken in the Dublin region. The project commenced in June 2011 with final flood maps issued during 2016.

The CFRAM flood maps do not cover the area of the site and as such do not identify any flood risk for the site. The nearest available map is located approximately 1km from the site, where limited fluvial and no coastal flooding is indicated.

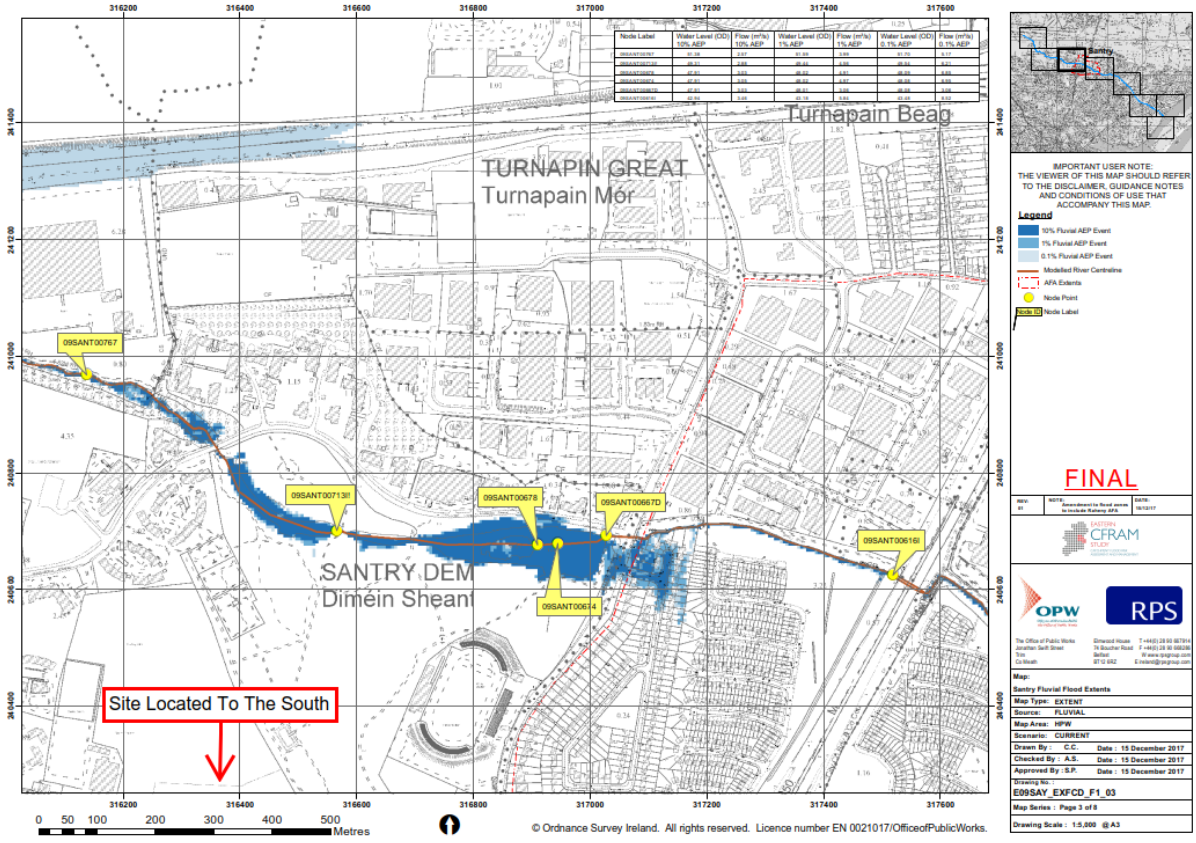


Figure 4 Santry CFRAMS Flood Mapping (2016)

4.4 Dublin City Development Plan 2016-2022 Strategic Flood Risk Assessment (2016)

The Dublin City Development Plan 2016-2022 Strategic Flood Risk Assessment (SFRA) was prepared to provide an area-wide assessment of all types of significant flood risk to inform strategic land use planning decisions. As part of the SFRA a number of predictive flood maps as well as historical flooding information was analysed to create a composite flood map.

The SFRA flood maps do not cover the area of the site and as such do not identify any flood risk for the site. The nearest available map is located approximately 1km from the site where limited fluvial and no coastal flooding, pluvial or groundwater flooding is indicated.

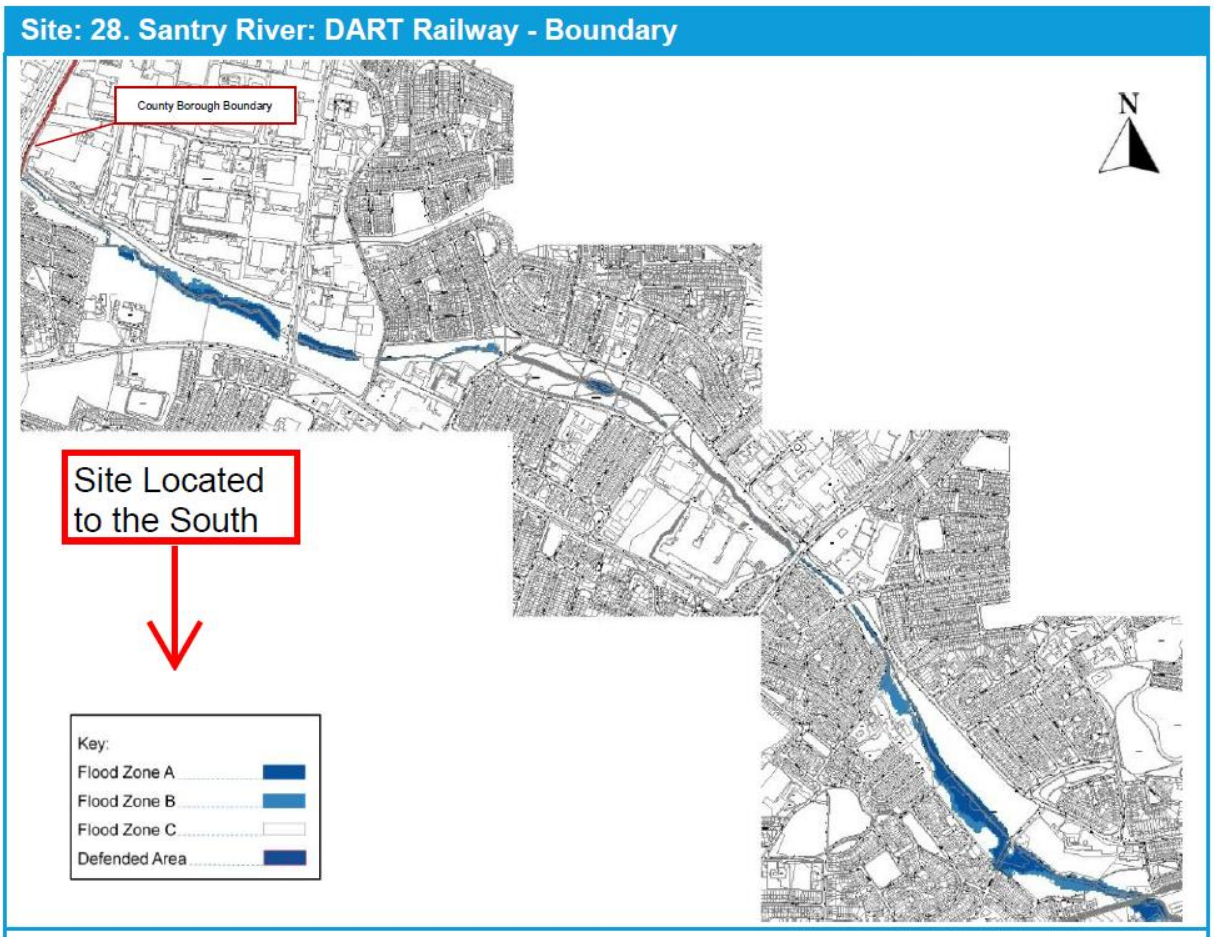


Figure 5 Dublin City Development Plan 2016-2022 PFRA (2016)

4.5 FloodResilienCity Project (2012)

As part of a European wide programme, Dublin city was included in a collaboration with other EU authorities to share knowledge and experience in relation to flood risk.

The main output of the project was a citywide pluvial flood risk map which was developed from a detailed hydraulic model based on the 180mm (1% AEP) event.

As can be seen in Figure 6 below a portion of the site is identified as having a risk of pluvial flooding.

Figure 6 FloodResilienCity Pluvial Flood Maps (2012)

4.6 FloodResilienCity Interim Review October 2011 (2012)

Following on from the FloodResilienCity study a report was commissioned to analyse the fluvial and pluvial flooding events which occurred across Dublin city due to an extreme rainfall event on the 23rd and 24th October 2011. These extreme rainfall events have been estimated to be between a 1 in 50 and 1 in 100 year event across the majority of Dublin.

As part of the report a series of detailed maps identifying areas that flooded and their cause was created. As can be seen in Figure 7 below there was no pluvial or fluvial flooding recorded on or adjacent to the site during the October 2011 event.

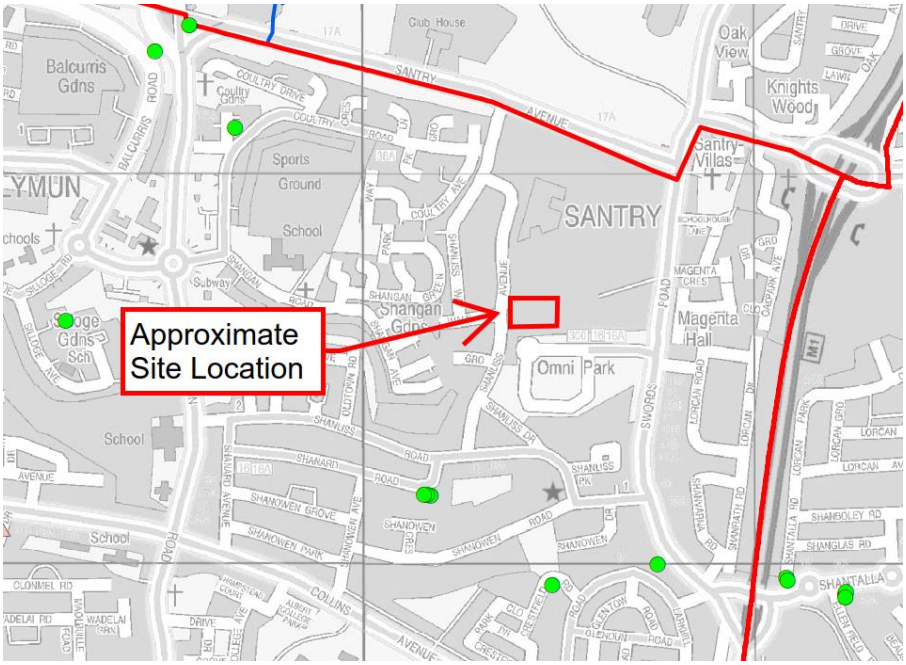


Figure 7 FloodResilientCity Interim Review October 2011 (2012)

4.7 OPW Preliminary Flood Risk Assessment (2011)

The OPW Preliminary Flood Risk Assessment (PRFA) was a national screening study which identified areas that may be at a significant risk associated with flooding. As such it was not a detailed assessment of flood risk but rather an indicative study with the majority of the fluvial and coastal information contained within the report since being superseded by the national CFRAM study.

However, the PFRA also contains useful pluvial and groundwater flooding information which was reviewed as part of this FRA. As can be seen in Figure 8 below there is no pluvial or groundwater flooding identified on or adjacent to the proposed site.

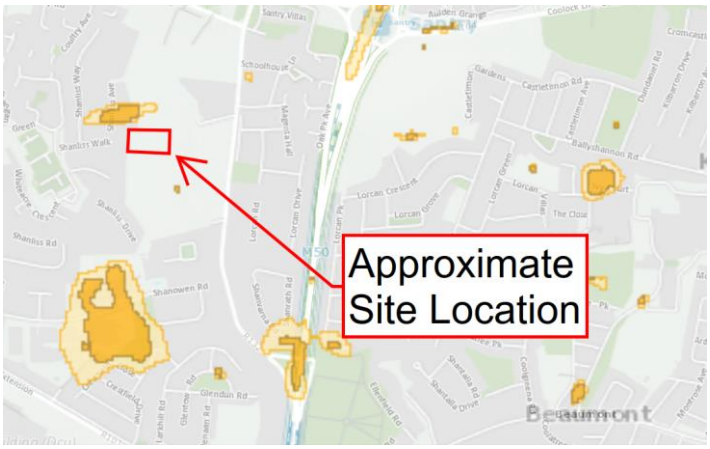


Figure 8 OPW PFRA (2011)

4.8 GDSDS Mapping (2005)

The Greater Dublin Strategic Drainage Strategy (GDSDS) was completed in 2005 and involved the mapping and modelling of major sewer lines in the greater Dublin area. From the recommendations of the report policies were implemented to ensure a consistent approach to drainage infrastructure, planning, design, construction and operation. As part of the study maps were produced for the future 2031 scenario showing sewer lines at risk of surcharging and flooding.

As can be seen in Figure 9 below the public surface water sewers located in the Swords Road adjacent to the site were not modelled as part of the study. The nearest public surface water sewers identified on the GDSDS flood maps are located in the adjacent Magenta Hall housing estate and approximately 200m south of the site in the Swords Road. Both public surface water sewers are identified as flooding less than $5m^3$ volume for the 5-year return period event, while the downstream 225mm sewer is identified as flooding for a 30-year return period or less.

Record drainage mapping information is included in Appendix B.

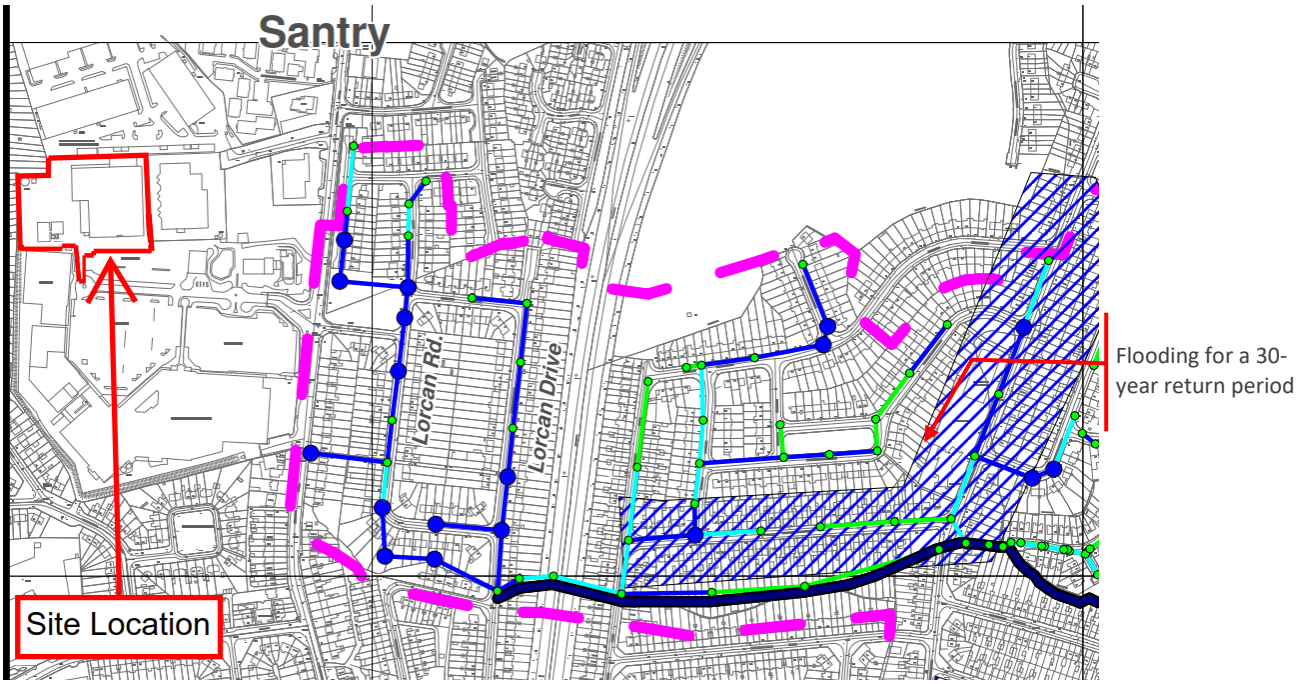


Figure 9 GDSDS Sewer Flooding Maps (2005)

5.0 FLOOD RISK ASSESSMENT AND MITIGATION MEASURES

5.1 Coastal

As detailed previously in the Section 4.3, the national CFRAM study did not identify any coastal flood risk for the site. The nearest available map is approximately 1km from the site and identifies no coastal flooding.

Floodinfo.ie was also checked to identify any past coastal flooding events within the vicinity of the site and none were found.

Based on the above information and given that the Irish Sea lies approximately 6km from the subject site, and the site level is 56m above sea level the site is considered to be at low risk of coastal flooding.

5.2 Fluvial

The Santry River lies approximately 1km north of the site and the River Wad lies approximately 550m south of the site.

As detailed previously in the Section 4.3, the national CFRAM study did not identify any fluvial flood risk for the site. The nearest available map is approximately 1km from the site and identifies limited fluvial flooding from the Santry River.

As the Santry River is a significant distance from the site and as the site is approximately 10m higher than the Santry River, it is not considered to pose a flood risk to the site.

Floodinfo.ie was also checked to identify any past fluvial flooding events within the vicinity of the site. A flood event identification node was found to be located adjacent to the site which related to an event that occurred in 1965 from the River Wad, as shown on Figure 3.

The event occurred approximately 550m south of the site at the point where the river is culverted underneath the Swords Road. As the event occurred a significant distance from the site and as the site is approximately 10m higher than the River Wad, it is not considered to pose a flood risk to the site.

As detailed previously in the Section 4.4, the Dublin City Development Plan SFRA flood maps did not identify any flood risk for the site. The nearest available map is approximately 1km from the site and identifies limited fluvial flooding.

The FloodResilienCity Interim Review October 2011 mapping did not identify any fluvial flooding on the site.

Based on the above information the site is considered to be at low risk of fluvial flooding.

5.3 Pluvial

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter a watercourse or sewer. It is usually associated with high intensity rainfall and typically occurs in the summer months.

As detailed previously in the Section 4.5, the FloodResilienCity pluvial flood maps have identified a portion of the site at risk of pluvial flooding.

It is worth noting that the modelling for the pluvial flood map was based on a relatively broadscale digital terrain model which did not include small scale (less than $2m^2$) features, walls or other barriers to flow and is intended to indicate the potential for pluvial risk.

The FloodResilienCity Interim Review October 2011 mapping did not identify any pluvial flooding on the site.

Basement construction on site will reduce the ground levels while under construction. Collected rainwater and minor inflows may need to be removed from the basement excavations by pumping to existing sewer in agreement as per normal construction practices.

Floodinfo.ie was also checked to identify any past coastal flooding events within the vicinity of the site and none were found. There is also no anecdotal evidence of any historic pluvial flooding within the site.

Based on the above information, and primarily on the FloodResilienCity flood maps, the site is considered to be at risk of pluvial flooding.

5.4 Groundwater

As detailed previously in the Section 4.7, the OPW PRFA flood maps do not identify any groundwater flood risk for the site.

The GSI groundwater vulnerability classification for the site is low and there are no karst features located in the area surrounding the site.

Floodinfo.ie was also checked to identify any past coastal flooding events within the vicinity of the site and none were found.

Groundwater flood risk from the proposed basement construction have been assessed under a Basement Impact Assessment (BIA) undertaken by AWN Consulting submitted as part of this application. The BIA concluded that there will be no long-term impact on water levels in the overburden or underlying aquifer, no impact on the current water body status and no impact on groundwater flow patterns in the local area. The BIA also concluded that the bedrock water table will not be affected by the excavation works.

5.5 Public Sewer

As detailed previously GDSDS sewer flood mapping for the area does not cover the public surface water sewer located in the Swords Road adjacent to the site.

The nearest public surface water sewers identified on the GDSDS flood maps are located in the adjacent Magenta Hall housing estate and approximately 200m south of the site in the Swords Road. Both public surface water sewers are identified as flooding less than $5m^3$ volume for the 5-year return period event, while the downstream 225mm sewer is identified as flooding for a 30 year return period or less.

The public surface water sewer in the Swords Road mapped as part of the GDSDS is located approximately 200m south of the site and at a ground level approximately 4.5m lower than the subject site.

Given the height difference between the existing public surface water sewers and the proposed development, and the overland flow paths leading away from the site, the site is considered to be at low risk of public sewer flooding.

5.6 Flood Risk Summary

The PSFRM Guidelines adopt a sequential approach to managing flood risk by reducing exposure to flooding through land-use planning. The approach adopted by the PSFRM Guidelines establishes three zones (PSFRM Guidelines paragraph 2.23) on a sliding scale of flood risk – refer to Table 2 - Flood Risk Zones, below.

Zone A	**High Probability of Flooding** Where the annual probability of flooding is: greater than 1% for fluvial flooding or greater than 0.5% for coastal flooding
Zone B	**Moderate Probability of Flooding** Where the annual probability of flooding is: between 0.1% and 1% for fluvial flooding or between 0.1% and 0.5% for coastal flooding
Zone C	**Low Probability of Flooding** Where the annual probability of flooding is: less than 0.1% for fluvial flooding and less than 0.1% for coastal flooding

Table 2 - Flood Risk Zones

Flood risk zones are determined on the basis of the probability of river and coastal flooding only (PSFRM Guidelines paragraph 2.24). Other sources of flooding (such as groundwater, infrastructure and pluvial) do not affect the delineation of flood risk zones. These other sources of flooding should be considered and mitigated in design. Flood risk zones are determined on the basis of the current flood risk, i.e. without the inclusion of climate change factors (PSFRM Guidelines paragraph 2.24).

Based on the information detailed above, the site is considered to be at low risk of flooding from coastal, fluvial, groundwater and public sewer sources.

The site is considered to be at risk of flooding from pluvial sources.

In accordance with the Department of Environment, Heritage and Local Government and the Office of Public Work's jointly published Guidance Document for Planning Authorities - The Planning System and Flood Risk Management – the site is located within **Flood Zone C**.

The PSFRM Guidelines classify potential development in terms of its vulnerability to flooding. The types of development falling within each vulnerability class are described in Table 3.1 of the PSFRM Guidelines, which is reproduced in Table 3 - Development Vulnerability Class, below:

Vulnerability Class	Land uses and types of development which include:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; ***Dwelling houses***, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

Table 3 - Development Vulnerability Class

The majority of the proposed development is considered to be **a Highly Vulnerable Development**, while a portion of the scheme is retail/ commercial including a portion of the ground floor and is considered to be **Less Vulnerable Development.**

The PSFRM Guidelines define the zones in which each class of development is appropriate – this is summarised in Table 4 - "Appropriateness" Matrix (PSFRM Guidelines paragraph 3.6), below. In order to allow consideration of such development, the PSFRM Guidelines provide a Justification Test, which establishes the criteria under which desirable development of a site in a floodplain may be warranted (PSFRM Guidelines paragraph 3.7).

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	Justification Test	Justification Test	**Appropriate**
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water-compatible Development	Appropriate	Appropriate	Appropriate

Table 4 - "Appropriateness" Matrix

As such the proposed development for the site is **appropriate** for the level of flood risk subject to mitigation measures being implemented to account for the pluvial flooding risk. The proposed mitigations measures are detailed in the following section.

5.7 Proposed Flood Mitigations Measures

As detailed previously the site is considered to be at low risk of pluvial flooding based on the FloodResilienCity pluvial flooding maps. The following section details flood risk management strategies which will be implemented to mitigate the risk of pluvial flooding for the proposed development.

Localised ramping (in accordance with Building Regulations Part M) will provide a threshold of at least 50mm at the entrance to all ground floor doorways to provide passive protection during extreme rainfall events.

Overland flow routes will also be incorporated into the development with any overland flows directed towards the central landscaping areas located between each apartment block and with a flow pathway provided through the external hardstanding areas of the site. A sketch detailing the overland flow routes, including existing overland flow routes, is included in Appendix C.

Collected rainwater and minor inflows may need to be removed from the basement excavations during construction by over pumping to existing sewers in accordance with nominal construction practices During the construction phase, mitigation measures are incorporated into the project-specific Construction & Environmental Management Plan (CEMP) and the project specific Resource Waste Management Plan

(RWMP). These specific measures will provide protection to the receiving soil and water environments during the construction phase. The CEMP and RWMP provide for work practices that are industry best practice measures that will be applied during the construction phase, and they are in no way included to avoid or reduce potential harmful effects (if any) to European sites(if any), which is a matter that is the subject of separate assessment.

A surface water drainage system with SUDS features will be incorporated into the development to positively drain the entire site and to manage surface water run-off from the site. Significant green sedum roof extents as well as podium attenuation, planting and landscaping at surface level will capture the first flush of intense rainfall events. All surface water flows will be conveyed to a storm water attenuation tank. The attenuation tank is designed to accommodate the 1 in 100 year flood event plus an additional 20% for climate change. The outflow from the attenuation tank will be limited to 2 l/s/ha. A maintenance schedule will be established by the management company for the development to ensure the surface water drainage network undergoes regular maintenance. The surface water drainage network will also be inspected after extreme weather events to check for damage and blockages. The proposed surface water drainage network and SUDS features are detailed on EirEng drawings 201121-ECE-ZZ-XX-DR-C-0002 & 201121-ECE-ZZ-XX-DR-C-0006 included in Appendix D.

Access to the development is to be provided from a new basement ramp located on the southern boundary on the site connecting into the existing Omni Park Shopping Centre development. A localised shallow ramp at the connection point into the existing Omni Centre development will provide a passive threshold of 100mm to protect the basement from potential overland flow routes in the vicinity.

The combination of localised ramping at ground floor entrance doorways to provide a threshold, overland flow routes directed away from the buildings and a surface water drainage network including attenuation storage designed to best practice guidelines is considered to be sufficient mitigation measures to provide protection to the development from the potential pluvial flooding risk.

6.0 FLOOD RISK ASSESSMENT AND MITIGATION

Having reviewed the available information the site is considered to be at low risk of coastal and fluvial flooding and therefore in accordance with the Department of Environment, Heritage and Local Government and the Office of Public Work's jointly published Guidance Document for Planning Authorities - The Planning System and Flood Risk Management.

The majority of the proposed development is classed as Highly Vulnerable with a portion of the scheme considered to be Less Vulnerable (residential comprises only a portion of the ground floor) in accordance with Table 3.1 of the PSFRM Guidelines. The information presented within the following chapters indicate that the proposed site is located within 'Flood Zone C' and is therefore considered **Appropriate**, for a residential development.

The site is also considered to be at low risk of ground water and public sewer flooding.

The site is considered to be at risk of pluvial flooding based on the FloodResilienCity mapping. Several mitigation measures including localised ramping at ground floor entrance doorways to provide a threshold, overland flow routes directed away from the buildings and a surface water drainage network including attenuation storage designed to best practice guidelines is considered to be sufficient mitigation measures to provide protection to the development from the potential pluvial flooding risk.

As the site will be positively drained, with the proposed SUDS measures reducing the outflow from the site to 2 l/s/ha, and as the existing overland flow routes are within the Omni Park Shopping Centre development falling away from the site, the proposed development will have no measurable increase on the flood risk to neighbouring lands.

Groundwater flood risk from the proposed basement construction have been assessed under a Basement Impact Assessment (BIA) undertaken by AWN Consulting submitted as part of this application. The BIA concluded that there will be no long-term impact on water levels in the shallow or bedrock aquifer, no impact on the current water body status and no impact on groundwater flow patterns in the local area. The BIA also concluded that the bedrock water table will not be affected by the excavation works.

As a result of the analysis, design and mitigation measures the proposed development is considered to be in line with the core principles of the Planning Guidelines and Objective outlined in the Dublin City Development Plan 2016-2022.

Under the Planning Guidelines the site is therefore considered suitable for development of commercial and residential land uses.

APPENDIX A - FLOODINFO.IE HISTORICAL FLOODING REPORT

CITY ENGINEER'S DEPARTMENT.

24th April, 1958.

Report to: City Engineer.

Re: Wad River.

Enclosures: Design Criteria, Design Sheets, Drainage Areas
6" Plan S.M.D. 638. 12" Plan S.M.D. 639.
Longitudinal Section S.M.D. 640.

The attached 6" Plan S.M.D. 638 shows the catchment of the Wad River which has an approximate area of 1824 acres. The catchment is bounded on the North by the Santry and Nanniken catchments, on the West by the Finglas and in the South by the Claremont and Tolka River catchments.

The peak run-offs shown on the design sheets have been calculated by the Lloyd-Davies method. The catchment area of approximately 3 sq. miles comes within the limiting 5 sq. miles size recommended by Rouse for treatment by the Lloyd-Davies method (see Design Criteria). Furthermore the usual objection to this method on account of the retardations due to storage in the watercourse do not have any serious effect on the accuracy of the calculations as the catchment is highly developed. The major portion of the catchment within the City boundary is zoned for housing and the agricultural land in the upper reaches, outside the City, could possibly be developed in the future.

The time of concentration for various points in the river have been calculated on the assumption that the entire river upstream has been culverted. An impervious factor of 30% (fully developed area, on the partially separate system) has been used throughout to determine the peak run offs. This factor is considered safe both for present and future conditions of development in the catchment area. The attached report recommends that a 40% factor should be adopted when calculating peak run off from open agricultural land. The run off produced however, by this factor is accommodated in part by the considerable flood storage usually available in open ditches and streams and the velocity of flow in the main watercourse is lower than that which results from proper culverting.

Since 584 acres of the catchment upstream of the Wad Bridge on Ballymun Road is at present mainly composed of farmland a check was made on the peak run-off by using the open stream Kirpich formula with an impervious factor of 40%. The calculated peak run off amounts to 12 cumins per acre. This rate agrees with the result got from the Lloyd-Davies calculation for culverting, using a 30% factor. Hence the effect of building up an area and culverting the stream reduces the time of peak but this is compensated for by a reduction in the impervious factor from 40% to 30%.

Rainfall intensities have been derived from Ministry of Health curves. Pipe culvert sizes have been calculated from the Crimp & Bruges formula and box culverts using the Chezy formula with a constant C = 100 and considering invert, sides and roof as wetted perimeter.

The available gradients shown on the longitudinal section S.M.D. 640 have been taken along the course of the existing river except between points E and F where the proposed culvert is shown crossing Ballymun Road and following the line of the proposed Collins Avenue Extension.

The river is culverted at the following points:

(i) Alongside Ballyman Road - short length of 36" dia. concrete pipes.

(ii) Wad Bridge, Ballyman Road - 3'9" x 4'6" high stone arch.

(iii) Albert Agricultural College to Swords Road 4'0" x 3'6" concrete box culvert.

(iv) Swords Road to Beaumont Road 4'0" x 4'0" concrete box culvert.

(v) Under Beaumont Road 6'5" x 4'2" stone arch.

(vi) Malahide Road to Clontarf Golf Club. 4'0" x 4'0" concrete box culvert and 48" dia.concrete pipes.

(vii) Under G.N.R. 5' x 2'6" stone arch.

(viii) Under North Road twin 36"dian.concrete pipes, 4'6" x 6'0" and 5' x 12' high stone arches.

(ix) Under Clontarf Road twin 4' x 3'6" high box culvert.

Provision has been made in the North Dublin Drainage Scheme for culverting this river from the storm water overflow in the Clontarf Golf Club to Clontarf Road.

The culvert sizes and gradients indicated for various sections of the river should not be finally fixed until such time as a detail survey of the road, house and drain levels in the surrounding area is carefully made. This survey is of particular importance between Doyle's Bridge on Beaumont Road and Malahide Road. The River between these points provides considerable flood storage during storms and the adjacent low lying Celtic Park area suffers from occasional flooding.

Any culverting proposal for the river should make provision for the construction of suitable wiring walls and a properly designed grid at the inlet. Serious blockages have taken place at River grids in the past. Finally, measures should be adopted to connect up all surface water drains and ground water which flows to the existing river and as constructed details of these connections should be recorded and produced on a large scale drawing.

SEN.ENGINEER I/C SEWERS AND MAIN DRAINAGE DEPARTMENT

Encls.
AS/MD

6
be
Bal
Ext

SEWERS AND MAIN DRAINAGE DEPARTMENT

22nd November, 1955.

REPORT TO/
CITY ENGINEER

re: Drainage of Ballymun Road

Arising out of flooding of Ballymun Road on the 8/12/1954 and, to a minor extent, on subsequent occasions, a surface water drainage examination of the area has been carried out. The original flooding of 1954 was due to (1) chokage of the Wad bridge at point B, which caused the Wad River to flow down Ballymun Road with subsequent flooding at G on the Claremont Stream, and (2) insufficient capacity of the surface water drainage system of Ballymun Road itself. Remedial proposals in respect of these items are set out below. The attached plan, to scale 12" = 1 mile, elaborates the points made.

(1) Wad Bridge

The catchment area draining to Wad Bridge at B is 626 acres, mainly composed of grasslands, for which a capacity of 6,260 cumins being 10 cumins per acre should be provided. This would keep it generally uniform with the downstream culvert capacities which are known to behave adequately. At present the Wad is piped from A to B in a 36-in. pipe of capacity 2,500 cumins. This pipe was choked but has now been cleaned and a grid placed at A. Wad Bridge itself (B) is a large culvert 3'9" wide by 4'8" high (arched) but is obstructed by a gas main and E.S.B. cables. The watermain in this road was carried under the culvert. The obstruction by the gas main is only minor, but the E.S.B. cables diminish the area of flow to 3'9" wide by 1'10" high. It has been found possible to deepen the culvert so as to give an area of flow of 3'9" by 2'8" high under the cables; this gives a capacity approximating to 6,000 cumins. As a temporary expedient this is adequate but due to the probability of silting-up would not be satisfactory as a permanent arrangement. It is proposed therefore that when plans are made in respect of the Collins Avenue Extension, in which I understand Messrs. Wates are interested, the Wad should be culverted along the line AD, thus by-passing the tortuous course ABCD. The section BCD would require to be piped in a small size. The proposed realignment would be obstructed by a watermain, a gas main and two lines of E.S.B. oil filled cables at A; these will require alteration, and it will be noted from the attached letter of the 24/9/1955 from the E.S.B. that the latter are prepared to undertake the cable alterations free of cost to the Corporation. They also offer a contribution of £20 towards cleaning of the culvert which is reasonable, having regard to the fact that the cables were carried through the culvert, to the best of my knowledge, with the approval of Dublin County Council, the responsible local authority previous to 1953. It is recommended that the E.S.B. proposals as set out in theirs of the 24/9/1955 be accepted and that they be informed to that effect.

The Gas Company, by letter of the 3/10/1955, have indicated their willingness to alter their main in the culvert when required; they should be requested to transfer this offer to cover alterations at A when the Collins Avenue Extension becomes more real.

In addition to the above, at the lowest road point between A and B, ree 9-inch outlets have been made from the road channel through the east k of Ballymun Road to permit copious road drainage to the Wad River stream of the culvert at B.

over/ ....

To/ (2) 22.11.1955
City Engineer

(2) Ballymun Road

The surface water drainage of Ballymun Road is non-uniform, consisting, in part, of a stone built drain equal in capacity to a 12-inch pipe, and for the remainder of a 9-inch pipe. There are insufficient manholes and gullies, the drainage of the east channel between B and F consists only of gripes out into the roadside ditch. The drainage area involved is estimated at 59 acres to the point G and pipe sizes of 15" - 18" would be required to deal with this as the present system is inadequate. Due to the fall southwards to the Claremont at G, surplus drainage accumulates at G with resultant flooding; temporary provision for this will be made by installing a number of arterial gullies.

The Special Works Department have at present road improvement proposals in respect of Ballymun Road before them. Provision for adequate drainage of the road should be included in the scheme prepared; this has been indicated verbally to who appears in agreement. The area of 59 acres to be provided for is shown coloured "orange" on attached plan.

At the point G, the road valley at the Claremont Stream, there are seven gullies which are readily choked with leaves. It is proposed therefore as a safeguard to lift four of these gullies and replace them with arterial gullies, three of which can be sited to give direct access to the Claremont Stream. This will give vastly improved outlet capacity and provide drainage less liable to chokage. This work can be carried out by this department to the Paving Department's order, who have verbally agreed with the proposal.

To summarise the points made above:-

(a) The E.S.B. and Gas Company proposals should be agreed to as set out above;

(b) Provision in the Collins Avenue Extension should be made for straightening the Wad River;

(c) The Ballymun Road improvement scheme being prepared by Special Works Department should provide an adequate road drainage system;

(d) The Paving Department should be instructed to issue an order to this department to install four arterial gullies at the Claremont Stream at Ballymun Road.

JHC/CG

Encl:

.....
A/SENIOR ENGINEER I/C SEWERS
AND MAIN DRAINAGE DEPARTMENT

NB It will be necessary to provide in the S.W. drainage of Ballymun Rd sufficient capacity to take overflows from the "feeder" Sewer to N.D.B.S. at ~~Clarmont~~ Griffith Rd

9/3/60

CITY ENGINEER'S DEPARTMENT

JHR/MJ

29th January, 1965.

Report to City Engineer.

Re: Council Question No.29.

wishes "to ask the City Manager to state the cause of the recent flooding at Santry, and if he could indicate what remedial measures he proposes to prevent flooding recurring at this point. Further to state if the gullies were in working order in the neighbourhood, and if there is any provision to compensate persons who have suffered losses by flooding."

The cause of the flooding was due to the partial chokage of the protecting grids at the south east corner of Buckley's Sports Field in the Albert College Grounds. Upstream of these grids, the Wad River is in open cut and runs along adjacent to the rear of a number of industrial sites. Hedges cut at the rear of these industrial sites, together with factory refuse, large tins, plastic bags, etc. were embedded in the grid, and caused the chokage. While it is probable that the grids were clear prior to the flood, as they are cleared by our routemen at least once a fortnight, and more frequently in inclement weather, the flood water would carry debris from the open banks of the river down to the grids in a very short time. As this river is in private lands, the Corporation have not control of the catchment.

The cause of the flooding on the roadway at Santry arose because the water, being unable to enter the culvert, re-routed itself overground and flowed to the lowest part on the roadway and was impounded there. The gullies on the roadway could be expected to deal with road drainage, and were overpowered by this excess flow. There are seven gullies in the vicinity of the hollow, and it is probable that some of these choked during the flood as considerable silt and papers would be carried to them.

These gullies were cleaned on the following dates, the 7th, 8th, 14th, 17th, 18th and 20th December, 1964.

Following this flooding, it is proposed to alter the layout of the gullies in the roadway so that similar type of flooding would be carried by the gullies more swiftly. In view of the development at Ballymun Housing Project, and the consequent increase in run-off from the upper catchment, it will be necessary to carry out major improvements to the culverting of the Wad River by diversion of the upper reaches to either the Tolka River or to the Claremont Stream. This investigation will be put in hands within the next six months, and should be completed within two years.

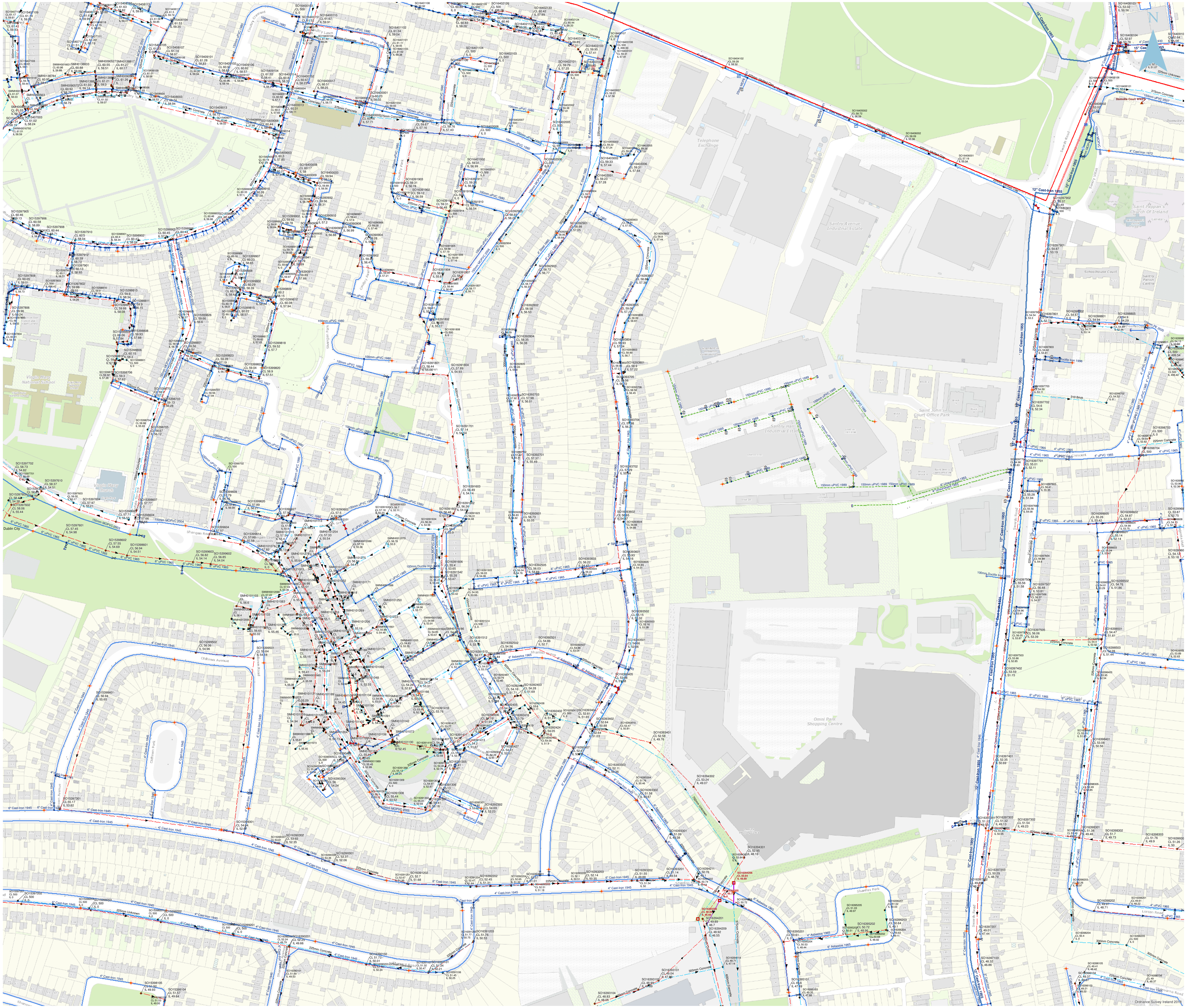
There is no provision for compensation for those who suffered losses by flooding.

Flooding on 20th Jan. '65.

Vico Lounge – Swords Rd. ÷ carpet damaged. (243 Swords Rd. Santry)
{Comet Bar} 20 Houses in neighbourhood, ÷ gardens & ground floors flooded. (3ft" water)
÷ ground floor flooded.
Collins Ave. Est. ÷ 10 gardens flooded.
Clogh Rd 200 yds Belfast Rd., flooded by 2' water. (Santry River)
Merrion Gates ÷ Tide caused road flooding
Churchtown
Milltown
Dundrum
Ballyhack
} flooding caused traffic diversions.
~~Water. Road~~
Naas Rd. at Messrs. Volkswagen. floods made road impassable to light traffic for several hrs. (Camac River).
Whitechurch – Rathfarnham ÷ road flooding caused by overflowing of Dodder tributary.
Blackhall St., one house flooded.

Above summary taken from "Irish Independent" 21st Jan. '65.

APPENDIX B - RECORD DRAINAGE MAPPING



UISCE ÉIREANN : IRISH WATER

Legend

- Boundary Meter
- Bulk Meter
- Unknown Meter ; Other Meter
- Non-Return
- Sluice Valve Open
- Sluice Valve Closed
- Sluice Valve Open
- Sluice Valve Closed
- Double Air Control Valve

Water Hydrants

Hydrant Function

- Fire Hydrant
- Water Pump Stations
- Water Kiosk
- Cap
- Other Fittings
- Tap

Water Distribution Mains

Owned By

- Irish Water
- Private
- Irish Water
- Irish Water

Sewer Manholes

Manhole Type

- Standard
- Other; Unknown
- Waste Water Pump station

Sewer Inlets

Inlet Type

- Catchpit
- Sewer Chambers
- Gravity - Foul
- Gravity - Overflow
- Pumping - Foul
- Surface Gravity Mains

Storm Manholes

Manhole Type

- Standard
- Catchpit
- Other; Unknown

Storm Discharge Points

Discharge Type

- Overflow

Storm Inlets

Inlet Type

- Gully

1:1,250 at A0

Last edited: 07/05/2021

Metres

012.525 50

2. Whilst every care has been taken in its compilation, Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water.
Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions.This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network 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.

APPENDIX C - OVERLAND FLOW ROUTES

NO DIMENSION SHALL BE SCALED FROM THIS DRAWING. ALL DIMENSIONS SHALL BE SITE CHECKED. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES BEFORE WORK PROCEEDS

Notes :-

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2. All dimensions are in (m) unless otherwise noted.
3. All levels are in meters above datum unless otherwise noted.
4. This drawing is to be read in conjunction with all the relevant Engineers', Services Engineers, Manufacturers & Architects drawings and specifications.

LEGEND:

DENOTES EXISTING OVERLAND FLOW ROUTES

DENOTES PROPOSED OVERLAND FLOW ROUTES

Rev	Description	Date	Drn	Apr
PL1	PLANNING ISSUE	10.08.22	LL	ED

Project Stage
Planning

Client
Serendale Limited

Architect
JSA Architects

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Project
OMNI PLAZA SHD

Drawing Title
EXISTING AND PROPOSED SURFACE WATER OVERLAND FLOW ROUTES

Job No. (Eir Eng)	Drg Status	Scale @ A1
201121		1:250 @ A1

Drawn By	Checked By	Approved By	Checked Date
L Lonergan	T Byrne	E Deasy	25.06.2021

Drawing Number: 201121-ECE-ZZ-XX-DR-C-SK100
Revision: PL1

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LICENCE NO. EN0073622©
ORDNANCE SURVEY IRELAND

COLOUR DRAWING

APPENDIX D - PROPOSED SURFACE WATER DRAINAGE NETWORK

NOTE:
IT IS NOT PROPOSED THAT ANY OF THE PROPOSED SURFACE WATER DRAINAGE NETWORK WILL BE TAKEN IN CHARGE BY THE LOCAL AUTHORITY

NOTE:
ALL SURFACE WATER DRAINAGE WITHIN THE BASEMENT EXTENTS WILL BE SLUNG AND CONNECT INTO THE PROPOSED EXTERNAL SURFACE WATER NETWORK

SMH6.1
CL 56.850
IL 55.750

BASEMENT OUTLINE

PROPOSED PODIUM AREAS ACROSS BASEMENT SLAB EXTENTS TO PROVIDE AN ATTENAUTION STORAGE VOLUME OF APPROXIMATELY 187m³

SMH1
CL 56.850
IL 56.050

FFL 56.900 (Ⓐ)
FFL 56.900 (Ⓒ)
FFL 56.900 (Ⓓ)
FFL 56.900 (Ⓑ)
FFL 56.900

LIDL

MARKS AND SPENCER

SMH14
Silt Trap
CL 56.850
IL 55.425

PROPOSED GEOCELLULAR ATTENUATION SYSTEM. WAVIN AQUACELL OR SIMILAR APPROVED. EFFECTIVE STORAGE VOLUME 393m3

225Ø@1:150

SMH9
CL 56.850
IL 54.427
FLOW CONTROL MANHOLE TO LIMIT OUTFALL FLOW RATE TO 3.1l/s

SMH8
Silt Trap
CL 56.850
IL 54.475

450Ø @ 1:200
150Ø @ 1:200

300Ø @ 1:175 SLUNG
300Ø @ 1:240 SLUNG
300Ø @ 1:270
300Ø @ 1:268
300Ø @ 1:125
300Ø @ 1:265

SMH2
CL 56.850
IL 55.796

SMH3
CL 56.850
IL 55.780

SMH4
CL 56.300
IL 55.716

SMH5
CL 56.850
IL 55.358

375Ø @ 1:284.6

SMH6
CL 56.850
IL 55.127

450Ø @ 1:120

SMH6a
CL 56.850
IL 54.771

225Ø

450Ø @ 1:85

SMH7
CL 56.850
IL 54.604

SMH10
CL 56.850
IL 54.268

PROPOSED PLAZA AREA TO DRAIN TO LANDSCAPING AND TREE PITS AS REQUIRED.

EXISTING DRAINAGE STRATEGY TO BE RETAINED

SURFACE WATER LEAVES SITE TO TRAVERSE SOUTH BEFORE TYING INTO EXISTING SURFACE WATER CULVERT WITHIN THE APPLICANTS LANDS

CINEMA

PROPOSED CHANNEL DRAIN TO TOP OF BASEMENT RAMP TO CONNECT TO EXISTING DRAINAGE NETWORK

FIRESTOP TYRE

EXISTING DRAINAGE TO CAR PARK TO BE RETAINED

EX. SWMH
CL 55.92
IL 54.27
225Ø

EX. SWMH
CL 54.98
IL 53.82

SWORDS RO.

1500 @ 1:50

SMH11
CL 54.000
IL 52.548

150Ø @ 1:50

SMH12
CL 54.000
IL 52.324

1500 @ 1:100

SHOPPING CENTRE

SMH13
CL 53.400
IL 51.726

ExFMH
CL52.58
IL49.76

300Ø

750Ø

150Ø @ 1:100

SADDLE CONNECTION 13
CL 53.350
IL 51.647 (IN)
IL 50.700 (OUT)

PROPOSED CONNECTION INTO EXISTING 750mm PUBLIC SURFACE WATER SEWER

300Ø

PROPOSED SURFACE WATER OUTFALL ROUTE SCALE: 1 : 500@ A1

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ORDNANCE SURVEY IRELAND
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ORDNANCE SURVEY IRELAND

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Notes :-

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DRAINAGE NOTES

1/ ALL DIMENSIONS ARE IN (mm.) UNLESS OTHERWISE NOTED. CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING OUT JUNCTION BOXES, CHAMBERS, MANHOLES, GULLIES TO ENSURE NO CLASHES WITH SERVICE DUCTS AND PIPES.

2/ ALL LEVELS ARE IN METRES ABOVE DATUM UNLESS OTHERWISE NOTED.

3/ THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S, ENGINEER'S AND MANUFACTURERS' DRAWINGS AND SPECIFICATIONS.

4/ ALL PIPE DIAMETERS ARE NOMINAL.

5/ THE CONTRACTOR MUST CONTACT THE RELEVANT AUTHORITIES PRIOR TO CONSTRUCTION WORK, AND SATISFY HIMSELF IN RESPECT TO THE LOCATION OF ALL EXISTING SERVICES.

6/ ALL STORMWATER PIPES TO BE POLYPIPE RIGIDRAIN OR SIMILAR APPROVED. ALL FOUL PIPE TO BE UPVC PIPES BY WAVIN OR SIMILAR APPROVED TO WIS 4-35-01 and IS EN 13476.

7/ ALL ROAD GULLY DRAINS ARE 150mm.

8/ 600mm MAX. LENGTH ROCKER PIPES ARE TO BE PROVIDED ON SEWERS WHERE:
(A). A PIPE ENTERS A MANHOLE OR PUMPING STATION.
(B). A PIPE LEAVES A MANHOLE.
(C). A PIPE ENTERS CONCRETE ENCASEMENT.
(D). A PIPE LEAVES CONCRETE ENCASEMENT.
(E). ANY OTHER LOCATION AS DIRECTED BY THE ENGINEER.

9/ ALL SEWER ROCKER PIPES ARE TO BE FORMED BY CUTTING AND TRIMMING A LENGTH OF SPIGOT & SOCKET PIPE TO FORM A SPIGOT AT THE CUT END, THEREBY FORMING SPIGOT & SOCKET JOINTS AT BOTH ENDS OF THE ROCKER PIPE.

10/ ALL ROCKER PIPES SHALL BE NO MORE THAN 150mm FROM THEIR ASSOCIATED MANHOLE, PUMPING STATION, CONCRETE ENCASED SECTION OR VALVE CONNECTION.

11/ WHERE SEWER PIPES, RISING MAINS OR ROAD GULLY DRAINS CROSS EXISTING ROADS, THE CONTRACTOR IS REQUIRED TO:
(A). CONTACT THE RELEVANT AUTHORITIES PRIOR TO COMMENCING WORK.
(B). MAKE GOOD THE EXISTING ROAD TO ITS ORIGINAL SPECIFICATION AS APPROVED BY THE ENGINEER.
(C). UNDERTAKE WORK TO THE STANDARDS OF THE RELEVANT LOCAL AUTHORITY SPECIFICATION.

12/ ALL EXISTING FOUL & SURFACE WATER RUNS SERVING THE BUILDING THAT BECOMES REDUNDANT DUE TO THE NEW DEVELOPMENT TO BE BROKEN OUT AND TRENCH/MANHOLES TO BE BACKFILLED WITH CL16/20 LEAN MIX CONCRETE

13/ WHERE PIPES PASS UNDER FOUNDATIONS PIPE TRENCH TO BE BACKFILLED TO FORMATION LEVEL WITH CL16/20 CONCRETE.

14/ WHERE PIPES ARE LOCATED WITHIN 3m OF PAD FOUNDATIONS CONCRETE SURROUND CL16/20 REQUIRED TO A LEVEL ABOVE THE PAD FOUNDATIONS. WHERE PIPES PASS UNDER FLOOR SLABS, PIPES TO BE SURROUND WITH 150mm CONCRETE +50mm COMPRESSIBLE FILL BOARD/SAND SHOULD DIVIDE UNDERSIDE OF SLAB & TOP OF CONCRETE SURROUND (DETAIL TO BE AGREED WITH STRUCTURAL ENGINEER)

15/ ALL EXISTING MAIN SEWER RUNS TO BE JETTED TO REMOVE BLOCKAGES/DEBRIS, ALL EXISTING DRAINAGE RUNS & MANHOLES TO BE CLEARED OF DEBRIS, CLEANED, JETTED AND CCTV CARRIED OUT. INTERPRETIVE REPORT, DVD & DRAWINGS TO BE INCLUDED & ISSUED TO DESIGN ENGINEER PRIOR TO CONSTRUCTION.

16/ CCTV SURVEY TO BE CARRIED OUT ON ALL NEW DRAINAGE RUNS & CCTV SURVEY INTERPRETIVE REPORT & DRAWINGS TO BE ISSUED TO ENGINEERS WITH 3No ADDITIONAL COPIES FOR THE LOCAL AUTHORITY & SAFETY FILE.

17/ ALL COVERS OF EXISTING MANHOLES TO BE BUILT TO FINAL FINISHED PAVEMENT OR DRAINAGE LEVELS.

18/ COVER LEVELS DETAILED ARE INDICATIVE. COVER LEVELS TO TIE IN FLUSH WIT PROPOSED PAVEMENT & LANDSCAPING LEVELS.

19/ INTERNAL DRAINAGE TO ARCHITECT & M&E DETAILS DESIGN

20/ GULLY LAYOUT TO BE CONFIRMED WITH ARCHITECT PRIOR TO DETAILED

21/ RODDING EYES REQUIRED ON ALL SUSPENDED DRAINAGE RUNS AT MAX 22m INTERVALS AND AT ALL JUNCTIONS OR CHANGES IN PIPE DIRECTIONS.

22/ LEVELS ON ALL EXISTING DRAINAGE TO BE CONFIRMED ONSITE.

23/ ALL EXISTING DRAINS TO BE INVESTIGATED FOR LIVE CONNECTIONS PRIOR TO CONSTRUCTION. LIVE CONNECTIONS TO BE MAINTAINED TO SEWERS

24/ ALL SURFACE WATER MANHOLE COVER TO BE SQUARE IN SHAPE. ALL FOUL WATER MANHOLES TO BE CIRCULAR IN SHAPE.

25/ CONTRACTOR TO COORDINATE ALL ROOF DRAINAGE AND DOWNPIPES LOCATIONS TO BE AGREED WITH THE ENGINEER AND ARCHITECT.

26/ CONTRACTOR TO PROVIDE IL, PIPE DIAMETER AND DIRECTION OF FLOW IN EXISTING MANHOLE ON COMMENCEMENT OF THE WORKS TO DESIGN ENGINEER

27/ PUMPED RISING MAIN TO BE DUCTILE IRON PIPE WORK AND FITTINGS TO BE IN ACCORDANCE WITH IS EN 598

28/ FOUL SEWER MANHOLES TO BE PRE-CAST, ALL SURFACE WATER AND COMBINED MANHOLES TO BE BLOCKWORK AS PER GDSDS V6.0

29/ ALL MANHOLE COVERS LOCATED IN PAVING AREAS TO BE RECESSED TYPE WITH GALVINISED STEEL TRIMMING ALLOWING FOR PAVING INSERTS TO LANDSCAPE ARCHITECTS DETAIL. MANHOLE COVER LOADINGS TO COMPLY WITH RELEVANT MANHOLE BUILDUP.

30/ ALL DRAINAGE PIPEWORK & MANHOLE CONSTRUCTION TO BE WATERTIGHT AND ALL MANHOLE LIDS TO BE DOUBLE SEALED. ALL PIPEWORK MUST BE TESTED TO THE APPROPRIATE AIR TIGHTNESS TEST AND TEST RESULTS SUBMITTED TO ENGINEER FOR APPROVAL.

LEGEND:

- EXISTING BUILDING
- PROPOSED BUILDING
- PROPOSED SURFACE WATER SEWER
- PROPOSED SURFACE WATER MANHOLE MANHOLE
- EXISTING SURFACE WATER SEWER
- EXISTING SURFACE WATER MANHOLE
- PROPOSED BASEMENT OUTLINE
- PROPOSED SEDUM ROOF EXTENTS
- PROPOSED PERMAVOID PODIUM ATTENUATION AREAS

Rev	Description	Date	Drn	Apr
PL2	PLANNING ISSUE	12.08.22	LL	ED
PL1	PLANNING ISSUE	05.11.21	LL	ED

Project Stage: Planning

Client: Serendale Limited

Architect: JSA Architects

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Project: OMNI PLAZA SHD

Drawing Title: PROPOSED SURFACE WATER DRAINAGE LAYOUT

Job No. (Eir Eng)	Drg Status	Scale @ A1
201121		1:500 @ A1

Drawn By	Checked By	Approved By	Checked Date
L Lonergan	T Byrne	E Deasy	25.06.2021

Drawing Number: 201121-ECE-ZZ-XX-DR-C-0002
Revision: PL2

 COLOUR DRAWING

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LEGEND:

- PROPOSED SEDUM ROOF EXTENTS
- PROPOSED PERMAVOID PODIUM ATTENUATION AREAS
- PROPOSED INDICATIVE PV ARRAYS SEE M&E DRAWINGS FOR DETAILS
- PROPOSED LANDSCAPED AREA
- PROPOSED PERMEABLE PAVING AREA (DESIGN FOR FIRE ACCESS WHERE REQUIRED)
- PROPOSED BUILDING
- PROPOSED BASEMENT OUTLINE

Rev	Description	Date	Drn	Apr
PL2	PLANNING ISSUE	12.08.22	LL	ED
PL1	PLANNING ISSUE	05.11.21	LL	ED

Project Stage: Planning

Client: Serendale Limited

Architect: JSA Architects

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UNITED KINGDOM - Cambridge House South, Henry Street, Bath, BA1 1BT ■ +44 1225 618222
info@eireng.com
eireng.com

Project: OMNI PLAZA SHD

Drawing Title: PROPOSED SUDS MASTER PLAN LAYOUT

Job No. (Eir Eng)	Drg Status	Scale @ A1
201121		1:250 @ A1

Drawn By	Checked By	Approved By	Checked Date
L Lonergan	T Byrne	E Deasy	25.06.2021

Drawing Number: 201121-ECE-ZZ-XX-DR-C-0006

Revision: PL2

COLOUR DRAWING

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CONSULTING ENGINEERS

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