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Report on the Proposed
Surface Water & Foul Water Drainage

And

Watermain Layout

For

Ballyburke Neighbourhood Centre
& Social Housing Scheme
At

Ballyburke, Galway

for

Galway City Council

December 2023

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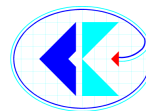
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Civil Engineering

Structural Engineering

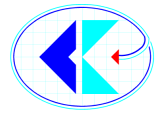
Project Management





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1. Introduction

Coyle Kennedy Consulting Engineers were commissioned by Galway City Council to undertake a civil engineering infrastructure design report and drawings to form part of an overall submission for Ballyburke Neighbourhood Centre and Social Housing Scheme at Ballyburke, Galway. Many surveys of the site were carried out, including a topographical survey, a site investigation (boreholes, trial holes, percolation testing, soil, and rock sampling) and a hydrology assessment by other specialists. The findings of such surveys have been relied upon to determine the drainage strategy for this site. This report including Coyle Kennedy Consulting Engineers drawings will outline the proposed surface water, watermain and foul sewer drainage network including the Sustainable Urban Drainage System (SUDS) and surface water attenuation strategy for the proposed development.

2. Design Information

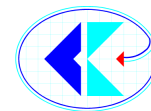
Design and Drawing information prepared as part of the planning documentation is included in the appendices of this report. Drawings numbers P-300 – P-307 & P-315 along with calculations are to be read and referenced to convey the overall design intent. Reference should also be made to the Architects and other design team member's documentation that outlines all other project drawing and design intent.

3. Site Location

Currently the existing site is largely undeveloped with only a single dwelling at the East End of the property. It is intended to demolish the single dwelling and construct a number of multi storey Apartment Blocks and Dwellings including community facilities and all associated site works and ancillary services. New connections will be made to adjacent infrastructure e.g., roads, car-parking, drains, sewers, watermain, paths etc. as part of the overall development.



Figure 1 Site Location - Extract from Bing Maps



4. Existing Site Considerations and Ground Water Runoff

Several site visits, site investigations, hydrology assessments and downstream drainage assessments were carried out by various parties to determine the existing site constraints.

Ground investigation was carried out in the form of trial holes and boreholes to establish the depth and type of overburden soil including the rock type. It was found that the depth of overburden soil above the granite rock was shallow and varied in depth circa 0-1.9m in places. Predominantly, the overburden soil depth was shallow <1m. Ground water was noted in many trial holes generally close to the soil/rock interface. Infiltration testing was proposed at two locations but had to be abandoned due to the stratification at both locations that comprised of topsoil and peaty clay with refusals on possible rock at respective depths of 0.4-0.7meters. Following the site investigation, it was concluded that soakaways (or shallow attenuation/soakaway zones at source) were not a suitable means of disposal of surface water runoff at this site and controlled discharge to a public surface water network was ultimately necessary. Furthermore, local or shallow attenuation zones were omitted due to the angulated dense nature of the granite rock being close to the ground surface that would result in draining the ground water into the public drainage network.

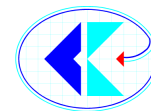
4.1 Identification of Surface Water Discharge Manhole and Attenuation Zone

Following a site survey, two open-ended pipes were located midway along the Northern boundary retaining wall that discharges water into part of the proposed site from lands to the North. This water combines with some surface water runoff from the proposed site and mixes with shallow clayey/peaty overburden soils making them very soft in places. The ground contours and the low-lying area within the site appears to act as a natural attenuation zone for this water that eventually discharges through a land drain culvert that exists midway along the southern boundary into the drainage network of the Leas Na Mara Housing Estate to the South.

Consideration was given to establish if the existing drainage network within the Leas Na Mara and Sli Burca housing estates directly to the South of the proposed site would be sufficient to accommodate flow from the proposed development as initially it seemed like an obvious discharge point.

A CCTV survey of the existing drainage network within the Leas Na Mara and Sli Burca housing estate was carried out and while it was found that the existing drainage network appears to be satisfactory in most places, some restrictions and reduced pipe sizes were encountered before the water eventually discharged to the Public Sewer along the Ballymoneen Road. Considering the restrictions and limitations of the capacity of the existing downstream surface water drainage network (directly South of the site) it was concluded that the Leas Na Mara / Sli Burca drainage network should not be used to drain the surface water runoff from the proposed development.

Arising from the findings of CCTV survey and in consultation with Galway City Council, it was decided to discharge the surface water runoff from the proposed development to an existing Manhole located to the Southwest of the proposed site close to the New Colaiste Na Coirbe school campus as the local authority (GCC) was confident of the downstream drainage pipe conditions. A controlled and limited surface water discharge from the entire development of 5l/s was agreed and a surface water underground attenuation zone to the South of Block 3 was identified as the preferred location to attenuate peak surface water flows from the development. This proposal allowed the existing wet land to remain available as a natural area for upstream surface water discharge.



5. Climate Change

Surface water attenuation calculations for the proposed development are based on regional rainfall data and are increased by a factor of 20% to take account of climate change.

6. Site Characteristics and Rainfall for Storm Water Assessment

For the Galway area, the SAAR can be taken as approximately 1252mm and based on the site investigation including the Soil type factor as noted in the Flood Studies Report a soil type having a factor of 0.4 is appropriate for this site. The site area is approximately 1.8 hectares, of which approximately 0.98 hectares is impermeable.

7. Proposed Storm Water Management SUDS Strategy

Sustainable Urban Drainage system (SUDS) has been incorporated into the landscape proposals to reduce surface water runoff volume and improve water quality. Sustainable Urban Drainage Systems SUDS are a collection of simple techniques which can help reduce runoff and improve water quality. SUDs manage surface water by attenuation and filtration with the aim of replicating, as closely as possible, the natural drainage from a site.

The provision of the various SUDS techniques applicable to this site is to control discharge and improve water quality. The proposed development comprises of the following drainage systems, Bioretention Pond, Rain Garden, Gravel Path, Attenuation Zone including Flow Control, Silt trap gullies, Surface water pipes, access junctions, inspection chambers & manholes.

Most of the proposed hard surfacing comprises of roofs, paths, roads and carparking and all surface water from these areas is collected into a drainage network, attenuated, and allowed to gradually discharge into the existing drainage network.

Surface water runoff will also be generated from the landscape green areas and rock outcrop surfaces. The site investigation (trial holes) has confirmed the presence of Granite Rock below a shallow depth of overburden soil. The granite has little or no percolation value for collected surface water and equally implies that pre-development runoff is effectively high compared to sites that would contain deep layers of gravelly soils etc. The presence of granite rock indicates that the site is not suitable for water percolation as noted in the Site Investigation report.

Post development, the surface water runoff from the green areas will be similar to the pre-development runoff. It will percolate through the shallow overburden soils and flow between the rock and soil interface as evident during the site investigation. It is expected that the green field runoff will transverse on-top of the rock (rock-soil interface) and some of it will discharge within the existing marsh/wet area of the site. The development proposals is to enhance and landscape this wet area into a bioretention pond for the Green field runoff.

The specific surface water drainage network details can be found in the Coyle Kennedy Surface Water Drainage Drawings P-300, P-304, P-306, P-307 & P-315.

7.1 SUDS – Bio-Retention Pond

Bio Retention Ponds provide many benefits as a sustainable urban drainage system. They slow the rate of discharge, improve water quality, enhance biodiversity, and provide green space and recreational opportunities for the community. The existing naturally wet depression within the site will be enhanced and landscaped in this natural landscape. Post Development it will function more as a natural wetland providing filtration through a layer of vegetation and soil thus improving water quality.

Surface water runoff will be generated from the green areas. The runoff from the green areas is similar to the pre-development runoff whereby it will percolate through the shallow overburden soils and flow between the rock and soil interface as evident during the site investigation.

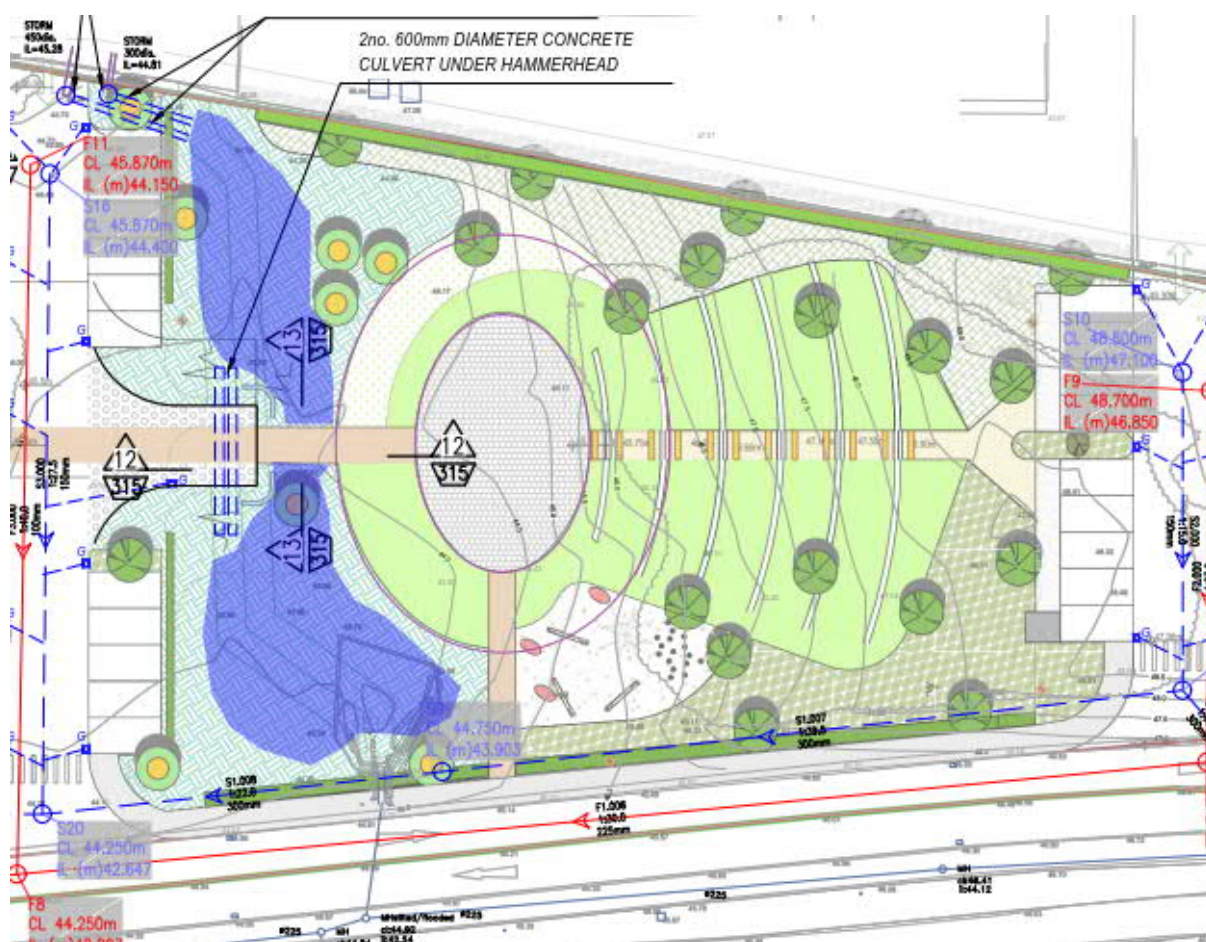
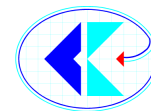


Figure 2 Extract from Drainage Layout Drawing showing the Enhanced Landscape Bio-Retention Pond

It is expected that a significant portion of the green filed runoff will transverse on top of the soil/rock interface and discharge within the existing marsh/wet area of the site. The development proposals are to enhance and landscape this wet area into a bio-retention pond while retaining and providing an enhanced natural attenuation volume for the Green field runoff.



7.2 SUDS – Silt Trap Gullies

Silt trap gullies are an effective and common method to initially screen and treat surface water runoff. The gully grate helps to filter out large debris that would otherwise enter the drainage network. This helps to ensure that only water and smaller sediment enters the gully. The gullies contain a sediment trap and sump at the bottom, which captures stones and sediment that would otherwise enter the drainage network.

7.3 SUDS – Permeable Paving and Permeable Self Binding Gravel Surface

The paving and gravel paths that are proposed in this development are indicated on the planning drawings. A Permeable self-binding gravel surface Path and Permeable Block Paving is proposed adjacent to the Bioretention pond as a surface finish. The proposed Permeable surface is a source control Sustainable urban Drainage system. This allows water to flow through rather than run-off the surface. Normally, it can be used as source control measure for small roads, pavements and carparking areas.

The permeable paving simply allows water to pass through the gaps between the concrete paving blocks into the underlying permeable sub-base material where it can be stored and discharged gradually into the bio-retention pond. Microbial bacteria withing the subgrade material bio-degrades pollutants and improves water quality.

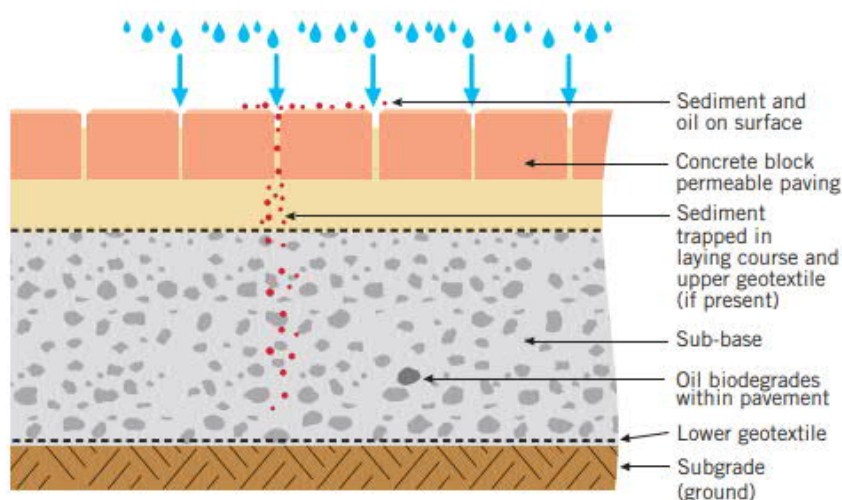
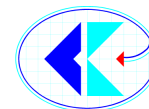


Figure 3 Extract from Paving.org Uniclass L534:L217 Edition 5

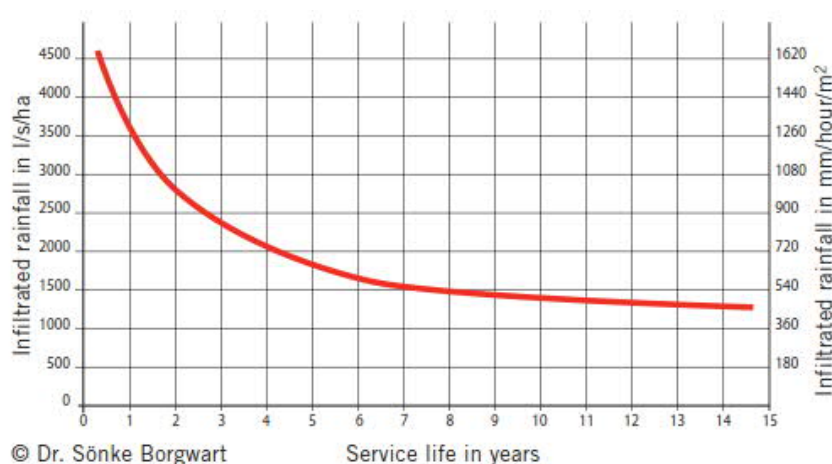
Many publications (Pollution Prevention Guidelines 2006, CIRIA C609-2004 & C697-2007) states the benefits of 'techniques that control pollution close to the source, such as permeable surfaces which can offer a suitable means of treatment for run-off from low risk areas such as roofs, carparks, and non-operational areas'.



Percentage Removal of Pollutants	
Total suspended solids	60-95%
Hydrocarbons	70-90%
Total phosphorus	50-80%
Total nitrogen	65-80%
Heavy metals	60-95%
(source: CIRIA C609, 2004)	
Water Quality Treatment Potential	
Removal of total suspended solids	High
Removal of heavy metals	High
Removal of nutrients (phosphorus, nitrogen)	High
Removal of bacteria	High
Treatment of suspended sediments & dissolved pollutants	High
(source: CIRIA C697, 2007)	

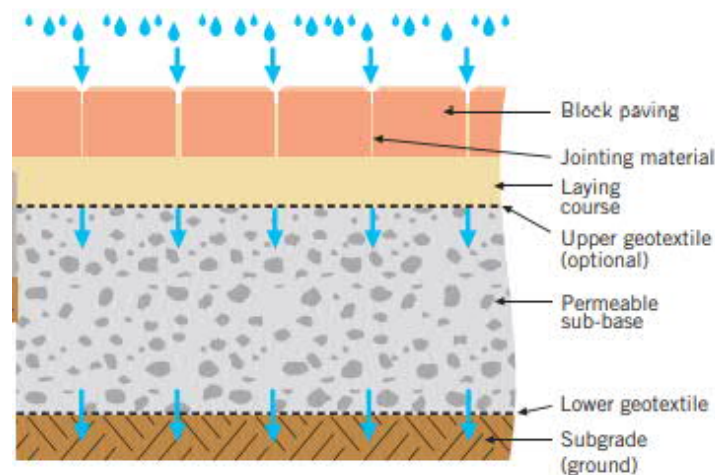
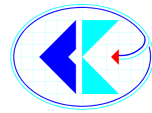
7.4 Service Life and Maintenance of Permeable Surface

One issue that the Block Paving Industry now well understands is the performance of permeable block paved surface over time. The infiltration rate of CBPP will decrease due to build-up of material in the jointing material. International best practice (USA, Germany) recommends that the design infiltration rate through the surface should be 10% of the initial rate, to take account of the effect of clogging over a 20-year design life without maintenance.



Initially, CBPP has an infiltration in the order of 1440mm/hour/m², and allowing for clogging, studies have shown that long -term infiltration capability of permeable paving will normally substantially exceed UK & IRE hydrological requirements.

At circa 90% blockage the permeable paving is still capable of circa 140mm/hour/m² which is much greater than the highest recorded rainfall event of circa 52mm/hour in Ireland even allowing for climate change. Nevertheless, it is also important to note that some maintenance will be required however, any problems with CBPP will become apparent on the surface from visual inspection.



For this development it is proposed to use full Infiltration system where the permeable paving is located with percolation through the sub-base material that gradually flows to the bio-retention pond. The above illustration demonstrates the proposed SUDS detail.

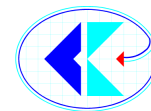
7.5 SUD- Attenuation tank and Flow Control Device

Surface water attenuation and flow control devices are two components of a Sustainable Urban Drainage system that help to manage stormwater runoff and improve water quality. The proposed attenuation system is a large underground zone designed to hold excess stormwater runoff during heavy rainfall events. The attenuation tank is placed underground and can be made from various materials. The slowly released water from the attenuation tank into the drainage network reduce the peak flow of stormwater runoff. A flow control device e.g. Hydro-brake or similar is used to regulate the rate of water flow from the attenuation tank back into the drainage network.

The Q_{bar} for the site calculated using the IH 124 method is 6.12l/s giving an attenuation volume requirement of 531m³. Calculations are based on a 1:100 rainfall event with an allowance for climate change. The proposed attenuation tank has a volume of 641m³ based on a limited discharge of circa 5l/s for this site.

Both the attenuation tank and the flow control device are designed to work together to manage stormwater runoff in a sustainable and environmentally friendly manner. By controlling the rate of water flow, they reduce the impact of heavy rainfall events on the public drainage networks, the local environment, protect water quality and enhance urban resilience to climate change. A shallow attenuation tank for the site is proposed to be constructed beneath the Plaza area to the South of Block 3. The detail for same is included in the attached drawings P-300, P-306 & P-315.

As noted in Codes of Practice, Published Documents and in accordance with Policy WW8 of the Galway County Development Plan a number of rainfall simulation events have been modelled and assessed. In accordance with such publication and as good engineering practice, a 1:30 and 1:100-year return period rainfall events plus 20% for climate change have been modelled for this site with no onsite flooding and no property or adjoining urban area flooding occurring.



8. Foul Water Drainage

A new foul water connection to the public drainage network is required for this development. The foul water discharge has been calculated with reference to EPA and Irish Water Guidelines for such services. At the Draft Plan Layout stage, it was decided to prepare a Pre-Connection enquiry and submit same to Irish Water as it can take up to 16 weeks to get a reply.

A Pre-connection enquiry was prepared and submitted to Irish Water with what is now an overestimation of the foul water discharge from the proposed Development i.e., for 95 Residential Units, Community Facilities, Creche and Retail unit. The foul water discharge volume submitted in the Pre-Connection enquiry to Irish Water had a Population Equivalent PE 413. The current design foul water discharge is c. PE 402.

Nevertheless, A satisfactory confirmation letter from Irish Water (for a PE 413) was received from Irish Water that a connection for the development can be facilitated. A copy of the Irish Water letter is included in Appendix 2.

The proposed foul water network is shown on Coyle Kennedy drawing P-300.

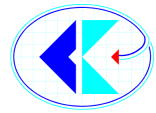
It has been estimated that a foul water flow rate from the proposed development is in the range of 4-5 litres per second and circa 3.5l/s allowance for misconnection/infiltration as per IW requirements given a total of 7-8l/s.

A 150mm diameter foul water pipe is adequate to accommodate the total design flow. Irish Water is likely to apply a per unit connection charge to this development and in such instance a 225mm diameter pipe should not cause a connection price increase. Along the public road to the South of the site a 225mm dia pipe is proposed which will facilitate future connections and act as public infrastructure.

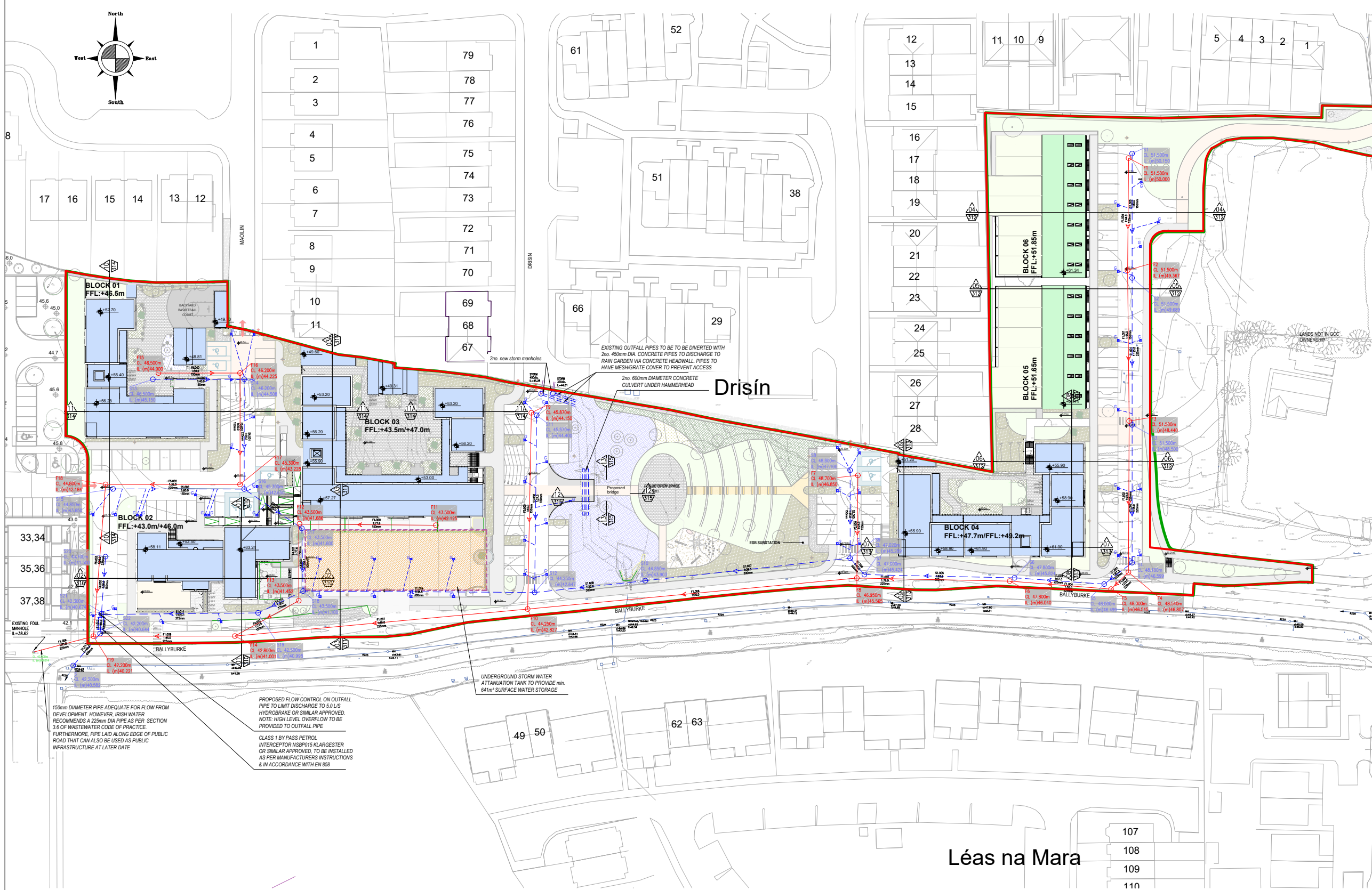
9. Water Supply

The watermain Layout is shown on Coyle Kennedy Consulting Engineers drawing P-301.

A pre-connection enquiry was submitted to Irish Water and a satisfactory confirmation letter was received that a connection to the water network can be facilitated. A copy of the Irish Water letter is included in Appendix 2.



Appendix 1 Drawings & Calculations



- NOTES**
- GENERAL NOTES :**
1. ALL COYLE KENNEDY DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTS DRAWINGS AND ALL OTHER RELEVANT DRAWINGS.
 2. ALL SETTING OUT, INSULATION, DPC, SCREED AND RADON PROTECTION DETAILS BY ARCHITECT.
 3. DETAILED SPECIFICATIONS (IF NOT ISSUED) ARE AVAILABLE AT ENGINEERS OFFICE FOR INSPECTION BY CONTRACTORS, BY APPOINTMENT.
 4. DETAILS OF SUBSTRUCTURE GAS/WATER PROOFING MEMBRANES TO BE BY A REPUTABLE, COMPETENT SUPPLIER.
 5. ALL SITE DEVELOPMENT WORKS SHOULD COMPLY WITH THE "RECOMMENDATIONS FOR SITE DEVELOPMENT WORKS FOR HOUSING AREAS" PUBLISHED BY THE DEPARTMENT OF THE ENVIRONMENT.
 6. THE CONTRACTOR SHALL BE DEEMED TO HAVE ALLOWED FOR, WITHIN HIS TENDER, EMPLOYING A CHARTERED STRUCTURAL ENGINEER WITH ADEQUATE PROFESSIONAL INDEMNITY INSURANCE TO ASSESS, DESIGN AND DETAIL SUCH TEMPORARY WORKS AS ARE NECESSARY TO OFFER SUPPORT TO EXISTING AND/OR CONSTRUCTED ELEMENTS DURING THE CONSTRUCTION PERIOD. THIS APPLIES TO ELEMENTS WITHIN THE SITE AND NEIGHBOURING THE SITE.
 7. THE CONTRACTOR IS DEEMED TO HAVE VISITED THE SITE AND CONSULTED WITH RELEVANT AUTHORITIES AND BE SATISFIED IN RELATION TO THE SITES SURROUNDINGS, EXISTING SERVICES, LEVELS, BOUNDARIES, GROUND CHARACTERISTICS AND ANY OTHER SITE CONSTRAINTS.
 8. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BUILDING REGULATIONS.
 9. WHERE LEAKAGE IS SPECIFIED ALL LEAKAGE TO BE GRADE GEN 3, UNLESS NOTED OTHERWISE.
 10. ALL LEVELS ARE STRUCTURAL LEVELS (U.N.O.).
 11. ALL COLUMNS CENTERED ON GRIDS (U.N.O.).
 12. DO NOT SCALE FROM DRAWINGS, USE FIGURED DIMENSIONS ONLY.

- DRAINAGE NOTES :**
1. CONTRACTOR TO MAKE ALL NECESSARY ENQUIRIES REGARDING LOCATION OF EXISTING SEWERS, ELECTRICAL AND OTHER SERVICES ON SITE.
 2. FOR DRAINAGE WORK LOCAL TO BUILDINGS, REFER TO ARCHITECT'S DRAWINGS. ALL LOCAL STORM DRAINAGE TO BE MIN. 100mm DIA. & LAID AT MIN. 1:100 FALLS.
 3. WASTEWATER INFRASTRUCTURE WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH IRISH WATER CODE OF PRACTICE AND STANDARD DETAILS.
 4. TRENCH BACKFILL AND BEDDING TO BE IN ACCORDANCE WITH STANDARD DETAIL STD-W-07.
 5. PVC-U PIPE MATERIAL SPECIFICATION SHOULD BE IN ACCORDANCE WITH SECTION 3.13 OF THE WASTEWATER CODE OF PRACTICE.
 6. ALL MANHOLE COVERS LOCATED IN GRASS AREAS TO BE SURROUNDED BY A CONCRETE PLINTH, 200mm ALL ROUND AND 100mm DEEP FORMED WITH C20/25 CONCRETE.
 7. ALL NEW TREES/SHRUBS PLANTING ADJACENT TO FOUL SEWER TO COMPLY WITH PLANTING DISTANCES SHOWN ON STANDARD DETAIL STD-W-06A.

SERVICES LEGEND:

- PROPOSED STORM SEWER
- PROPOSED FOUL SEWER (225mm Dia. UNO) AT 1:150 FALLS
- PROPOSED STORM MANHOLE
- PROPOSED FOUL MANHOLE
- PROPOSED ROAD GULLY
- EXISTING STORM SEWER
- EXISTING FOUL SEWER
- ATTENUATION AREA

1. ALL MAIN DRAINAGE PIPES TO BE UPVC TO IS EN 1401 & AGREEMENT CERTIFIED

2. ALL LOCAL STORM PIPES AROUND HOUSES TO BE MIN. 100mm DIA. LAID AT MIN. 1:100 FALLS

3. ALL LOCAL FOUL PIPES AROUND HOUSES TO BE MIN. 100mm DIA. LAID AT MIN. 1:150 FALLS

4. ALL INTERNAL CONNECTIONS TO LOCAL EXTERNAL DRAINAGE TO BE 1:40 FALLS

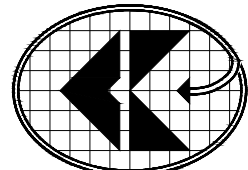
5. ALL INSPECTION CHAMBERS TO BE IN COMPLIANCE WITH STANDARD DETAIL STD-W-13

6. ALL INTERNAL DRAINAGE IN HOUSES TO ARCHITECTS DETAILS

7. ALL SLOTTED DRAINAGE CHANNELS AROUND HOUSES/APARTMENTS TO ARCHITECTS/LANDSCAPE ARCHITECTS DETAILS

F _o - 8/1		
B	SITE LAYOUT REVISED IN ACCORDANCE WITH REVISED ARCHITECTS DRAWINGS	05/12/2023
A	LAYOUT REVISED IN ACCORDANCE WITH REVISED ARCHITECTS DRAWINGS	28/02/2023
Rev.	Revision	Date

DRAWING STATUS		
P PRELIMINARY	A APPROVAL	T TENDER
C CONSTRUCTION	R RECORD	I INFORMATION



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PROJECT BALLYBURKE NEIGHBOURHOOD CENTRE AND SOCIAL HOUSING SCHEME

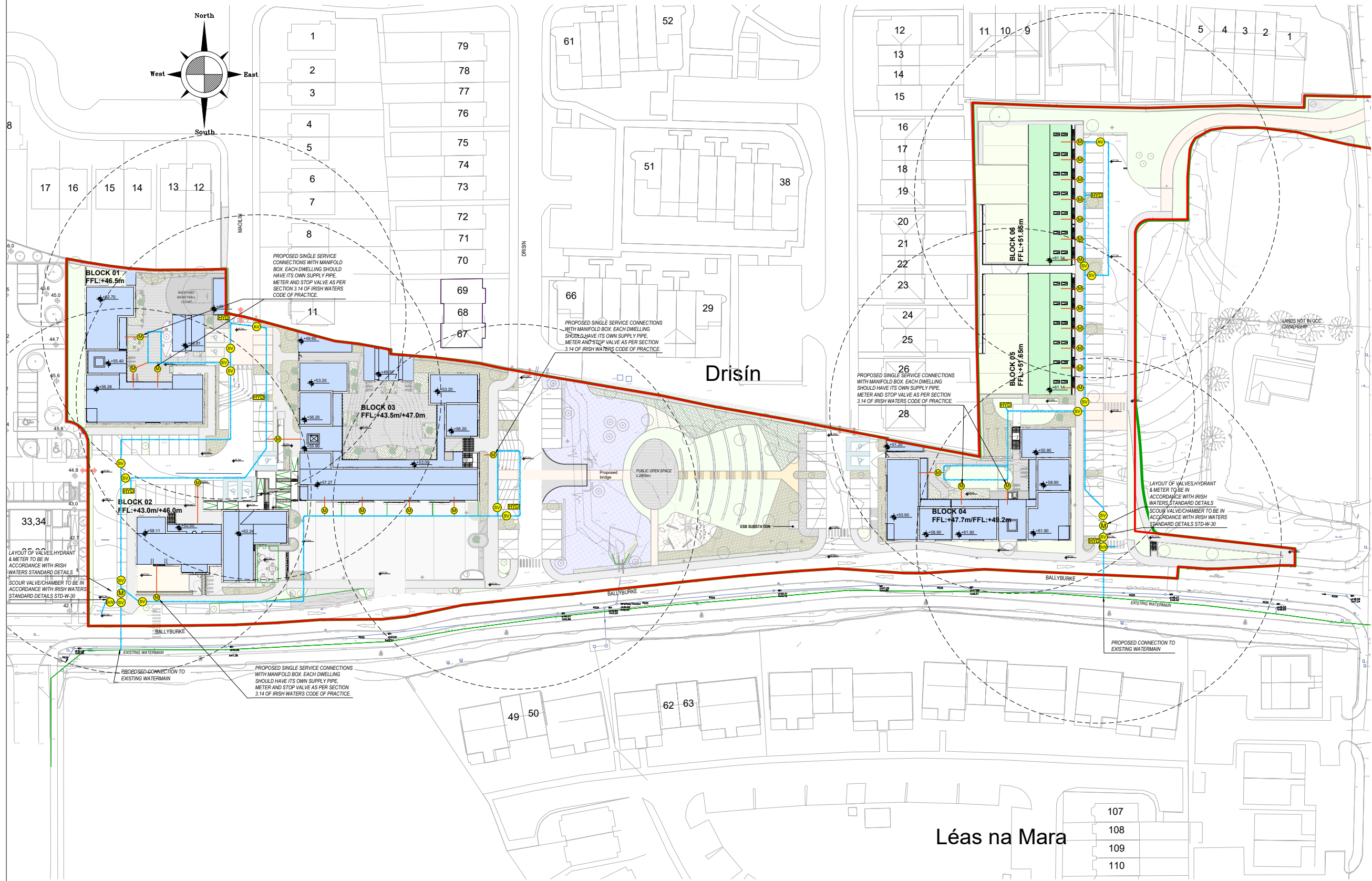
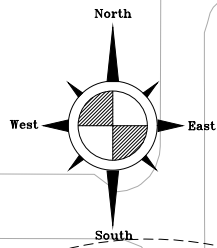
CLIENT GALWAY CITY COUNCIL

TITLE DRAINAGE LAYOUT

PROJECT No.	21-150	STATUS - DRAWING No.	P-300
DATE	FEBRUARY 2023	DRAWING REV.	B
SCALE	1:500 @ A1 1:1000 @ A3	BY AC	CHECKED BC

REFER TO CK DRAWINGS
304 & 305 FOR DRAINAGE
NETWORK SECTIONS

REFER TO CK DRAWINGS
306 & 307 FOR TYPICAL
DETAILS



NOTES

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SERVICES LEGEND:

- EXISTING WATERMAIN
- PROPOSED WATERMAIN 150mm DIA.
- DOMESTIC WATERMAIN FEED
- AV AIR VALVE
- SV SLUICE VALVE
- SCV SCOUR VALVE
- FV FIRE HYDRANT
- W WATER METER
- BM BULK METER

ACCEPTABLE WATERMAIN PIPE TYPES:
- PIPE OF TYPE PE-100 & HAVE AN SDR-17 RATING.
- PIPE OF TYPE PE-80 & HAVE AN SDR-11 RATING.
NOTE:
- SLUICE VALVE COMPLYING WITH THE REQUIREMENTS OF BS 5143.
- DEPTH OF SLUICE VALVE OPENSIDE CAP SHOULD NOT EXCEED 300mm.
THE QUANTITY, PRESSURE & DURATION OF WATER SUPPLY REQUIREMENTS IN THE CASE OF AN EMERGENCY TO BE DETERMINED & AGREED WITH FIRE OFFICER & LOCAL AUTHORITY.
ALL METERS TO BE INSTALLED AS PER IRISH WATER REQUIREMENTS.

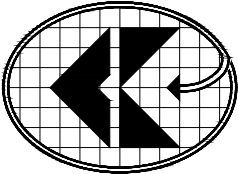
REFER TO CK DRAWING
303 FOR SECTION &
TYPICAL DETAILS

F_o - 8/1

B	SITE LAYOUT REVISED IN ACCORDANCE WITH REVISED ARCHITECTS DRAWINGS	05/12/2023
A	LAYOUT REVISED IN ACCORDANCE WITH REVISED ARCHITECTS DRAWINGS	28/02/2023
Rev.	Revision	Date

DRAWING STATUS

P	PRELIMINARY	A	APPROVAL	T	TENDER
C	CONSTRUCTION	R	RECORD	I	INFORMATION



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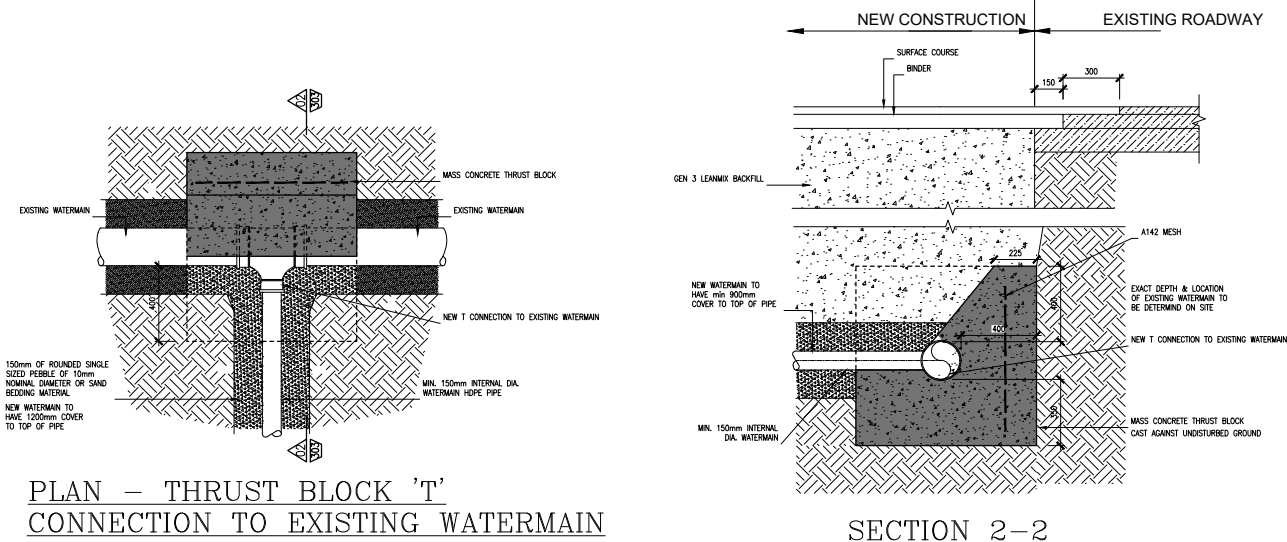
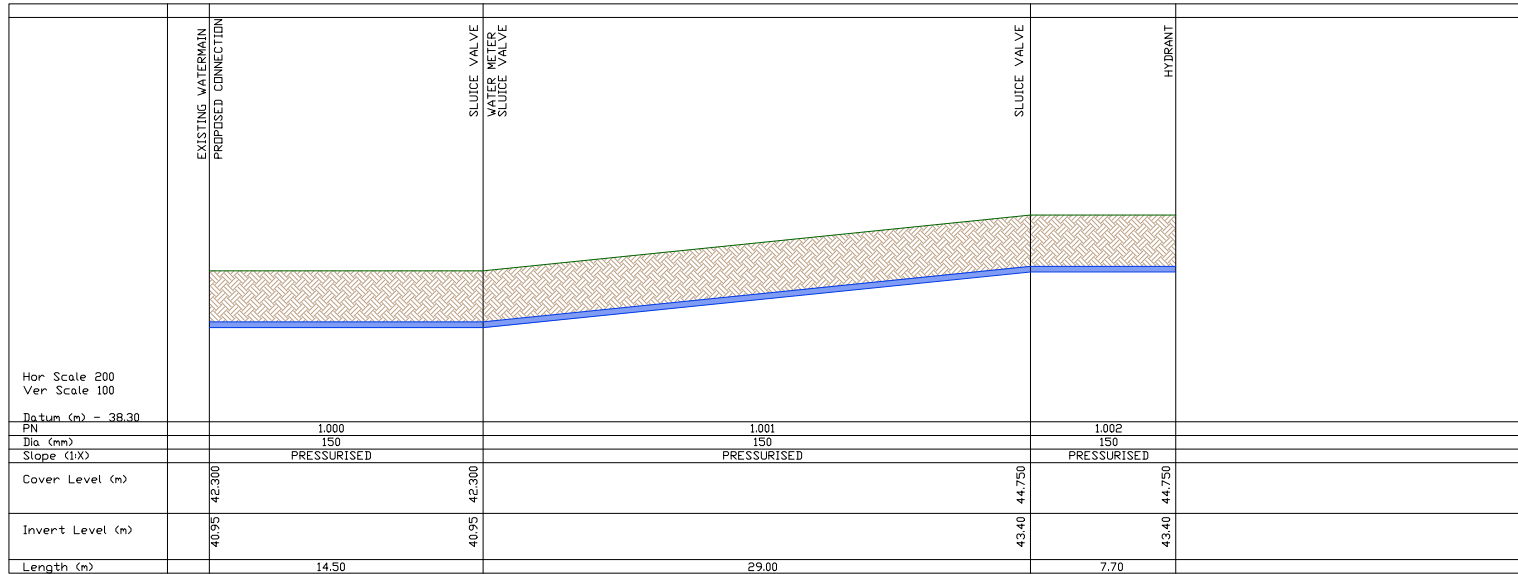
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PROJECT BALLYBURKE NEIGHBOURHOOD CENTRE AND SOCIAL HOUSING SCHEME

CLIENT GALWAY CITY COUNCIL

TITLE WATERMAIN LAYOUT

PROJECT No.	21-150	STATUS - DRAWING No.	P-301
DATE	FEBRUARY 2023	DRAWING REV.	B
SCALE	1:500 @ A1 1:1000 @ A3	BY	AC
CHECKED	BC		



WATERMAIN SECTION - at SOUTH WEST ENTRANCE

SCALE = AS NOTED ABOVE

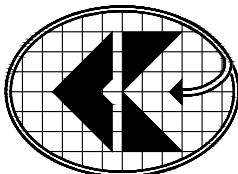
SECTION 2-2

WATERMAIN NOTES :

1. WATER MAINS SHOULD HAVE A MINIMUM NOMINAL PRESSURE CLASSIFICATION OF 9 BAR. THE FOLLOWING PIPES MAY BE USED:
(A) PIPE TYPE AND MATERIAL SPECIFICATION SHOULD BE IN ACCORDANCE WITH SECTION 3.9 OF THE WATER CODE OF PRACTICE.
(B) DUCTILE IRON PIPES TYPE AND MATERIAL SPECIFICATION SHOULD BE IN ACCORDANCE WITH SECTION 3.9.2 AND 3.9.3 OF THE WATER CODE OF PRACTICE.
(C) POLYETHYLENE PIPES TYPE AND MATERIAL SPECIFICATION SHOULD BE IN ACCORDANCE WITH SECTION 3.9.2 AND 3.9.3 OF THE WATER CODE OF PRACTICE.
2. SERVICE PIPES SHOULD HAVE AN INTERNAL DIAMETER OF 25mm and SHOULD COMPLY WITH WATER CODE OF PRACTICE 3.9 AND STANDARD DETAIL STD-W-03.
3. CLASS OF PIPE TO IRISH WATER CODE OF PRACTICE.
4. CONCRETE ANCHOR BLOCKS TO COMPLY WITH STANDARD DETAIL STD-W-28.
5. THE DEPTH OF THE SLUISE VALVE SPIGOT CAST BELOW FINISHED GROUND LEVEL SHOULD NOT EXCEED 300mm.
6. DEPTH OF HYDRANT FROM FINISHED GROUND LEVEL SHOULD BE A MAXIMUM OF 250mm. HYDRANTS TO COMPLY WITH STANDARD DETAILS STD-W-16 TO STD-W-18.
7. JAR VALVES TO BE IN COMPLIANCE WITH THE REQUIREMENTS LISTED IN STANDARD DETAIL STD-W-21.
8. THE BOUNDARY BOX IS TO COMPLY WITH STANDARD DETAIL STD-W-03.
9. ALL FITTINGS, INCLUDING SLUISE VALVES, BUTTERFLY VALVES, SCOUR VALVES, HYDRANTS, AIR VALVES AND METERS TO COMPLY WITH MANUFACTURER'S SPECIFICATIONS.
10. AND PIPE, CABLE, CONDUIT OR OTHER SERVICE PIPE SHOULD BE LAD LONGITUDINALLY OVER THE LINE OF A WATERMAIN.
11. TRENCH BACKFILL AND BEDDING TO COMPLY WITH STANDARD DETAIL STD-W-13.
12. ALL NEW TREES/SHRUBS PLANTING ADJACENT TO WATER MAINS TO COMPLY WITH STANDARD DETAIL STD-W-12A.

REFER TO DRAWING 301 FOR PLAN LAYOUT

F _s - 8/1		
A	SECTIONS UPDATED IN ACCORDANCE WITH REVISED SITE LAYOUT	28/02/2023
Rev.	Revision	Date



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PROJECT BALLYBURKE NEIGHBOURHOOD CENTRE AND SOCIAL HOUSING SCHEME

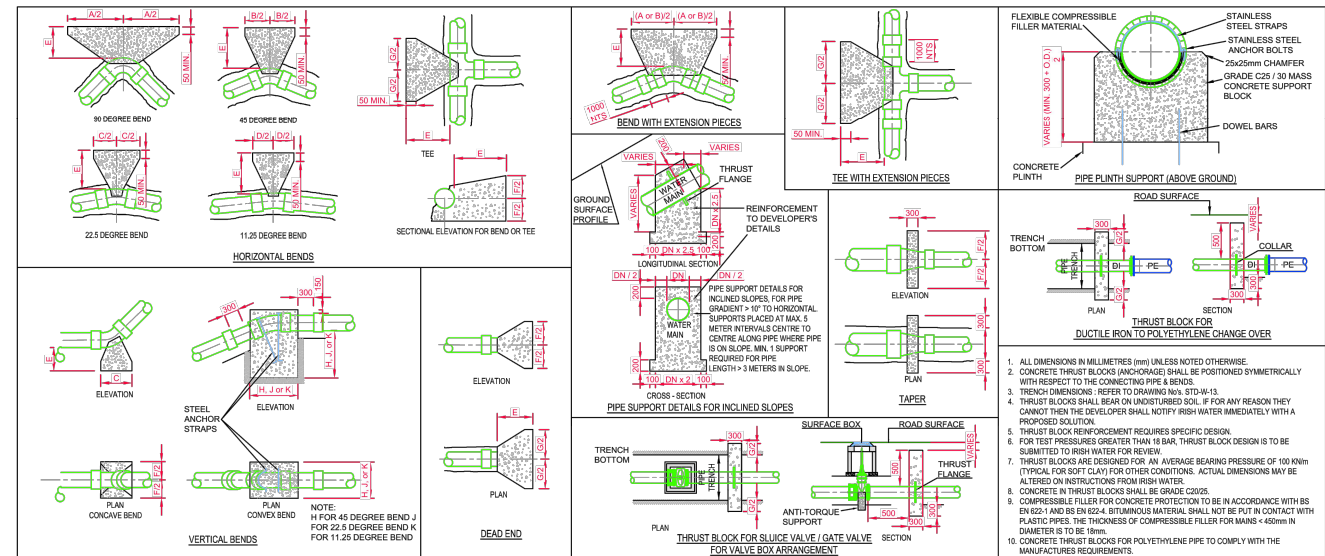
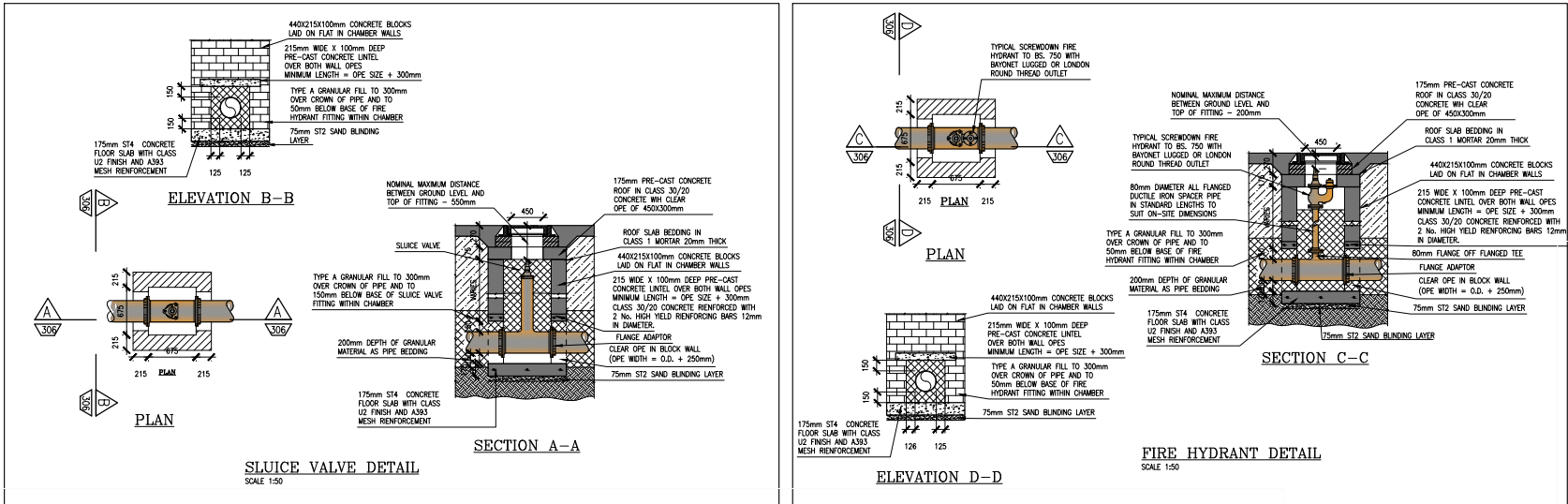
CLIENT GALWAY CITY COUNCIL

TITLE WATERMAIN SECTIONS & TYPICAL DETAILS

PROJECT No.	21-150	STATUS - DRAWING No.	P-303
DATE	NOVEMBER 2022	DRAWING REV.	

SCALE	1:200, 1:100, 1:50 & 1:20 @ A1	BY	AC	CHECKED	BC
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< 12 BAR TEST PRESSURE												
NOM. DIA. (mm)	A	B	C	D	E	F	G	H	J	K		
100	800	330	180	80	200	350	380	700	600	400		
150	900	510	260	130	225	450	680	900	750	600		
200	1150	600	310	160	300	650	790	1000	800	700		
250	1350	750	380	200	300	800	970	1200	1000	750		
300	1580	850	450	220	320	950	1110	1300	1100	850		
350	1750	1150	510	260	400	1050	1450	1550	1200	900		
400	2050	1400	750	350	500	1050	1600	1700	1250	1000		
450	2300	1650	820	420	570	1200	2110	1850	1500	1150		
500	2550	1950	940	470	600	1300	2330	2000	1600	1250		
550	2850	2210	1130	570	1000	1400	2680	2200	1750	1350		
600	3100	2710	1380	700	1000	1500	3050	2350	1900	1500		

12 BAR TO 15 BAR TEST PRESSURE												
NOM. DIA. (mm)	A	B	C	D	E	F	G	H	J	K		
100	700	300	190	100	200	350	310	750	600	400		
150	1130	620	320	160	225	450	760	950	750	600		
200	1450	680	360	190	300	650	860	1100	850	700		
250	1730	840	480	240	320	800	1210	1350	1050	850		
300	2090	1130	560	300	360	950	1480	1550	1200	950		
350	2400	1410	720	360	400	1050	1640	1700	1350	1050		
400	2680	1610	820	420	470	1200	2110	1850	1500	1150		
450	3040	1840	940	470	500	1300	2330	2000	1600	1250		
500	3400	2210	1130	570	1000	1400	2680	2200	1750	1350		
550	3710	2710	1380	700	1000	1500	3050	2350	1900	1500		

15 BAR TO 18 BAR TEST PRESSURE												
NOM. DIA. (mm)	A	B	C	D	E	F	G	H	J	K		
100	750	420	205	120	220	400	330	800	650	400		
150	1250	700	350	160	250	500	800	1000	850	600		
200	1650	850	450	230	320	750	1170	1250	1000	800		
250	1980	1050	540	270	350	900	1370	1450	1150	900		
300	2300	1250	640	320	400	1100	1630	1650	1300	1050		
350	2600	1560	800	410	450	1200	2070	1950	1550	1150		
400	2910	1820	970	470	500	1300	2350	2200	1800	1250		
450	3210	2070	1150	550	1000	1350	2670	2150	1700	1350		
500	3540	2380	1210	610	1000	1400	3000	2250	1750	1400		
550	3870	2840	1470	850	1000	1500	3400	2400	2050	1650		

TABLE OF DIMENSIONS FOR STEEPLY INCLINED PIPELINES

GRADIENT	SPACING
1 IN 2 & STEEPER	5.5m
BELOW 1 IN 2 TO 1 IN 4	11.0m
1 IN 4 TO 1 IN 5	16.5m
1 IN 5 TO 1 IN 8	22.0m

REFER TO INDEX SHEET FOR NOTES REGARDING DESIGN RESPONSIBILITY & RISK ASSESSMENT

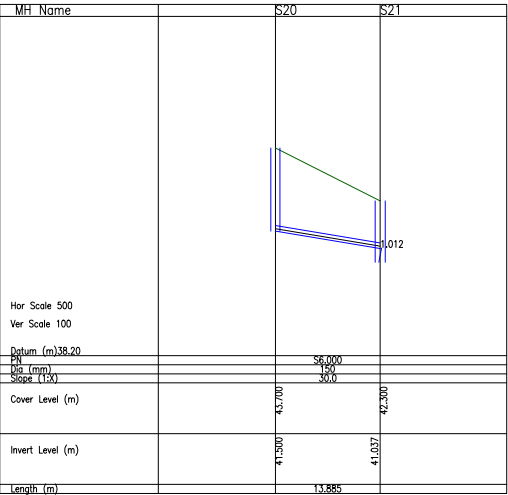
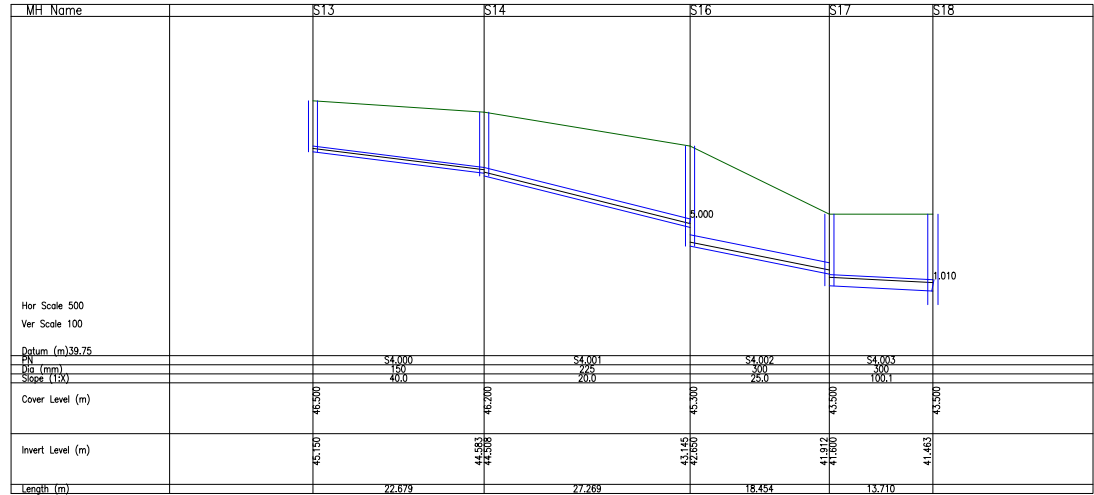
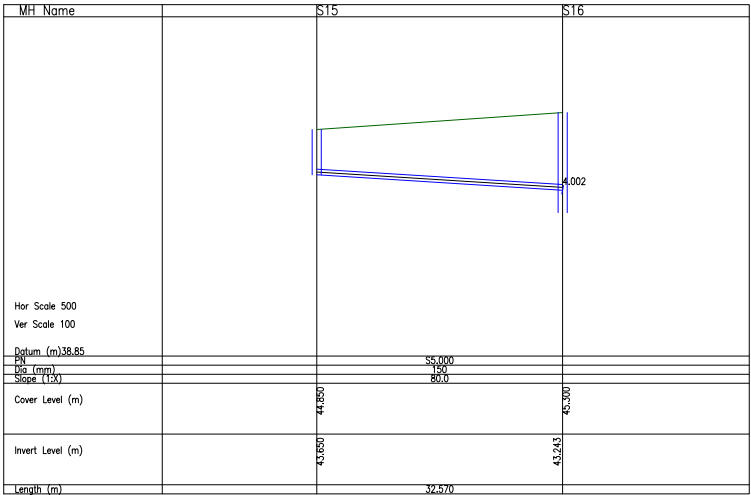
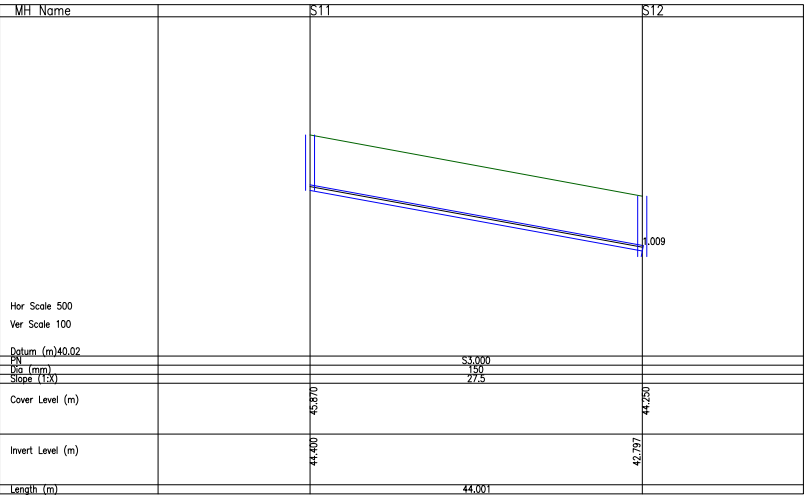
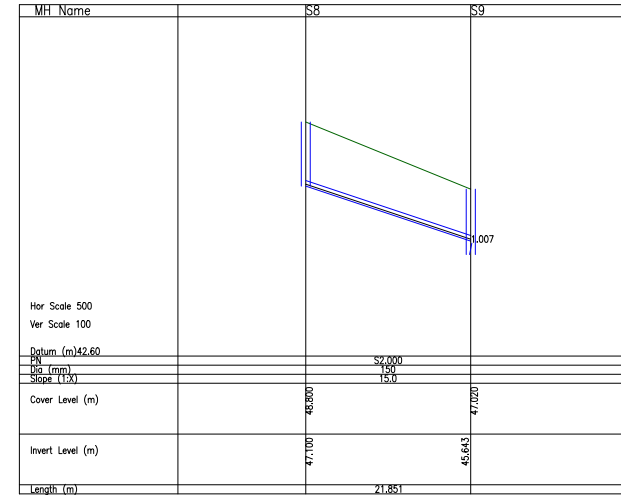
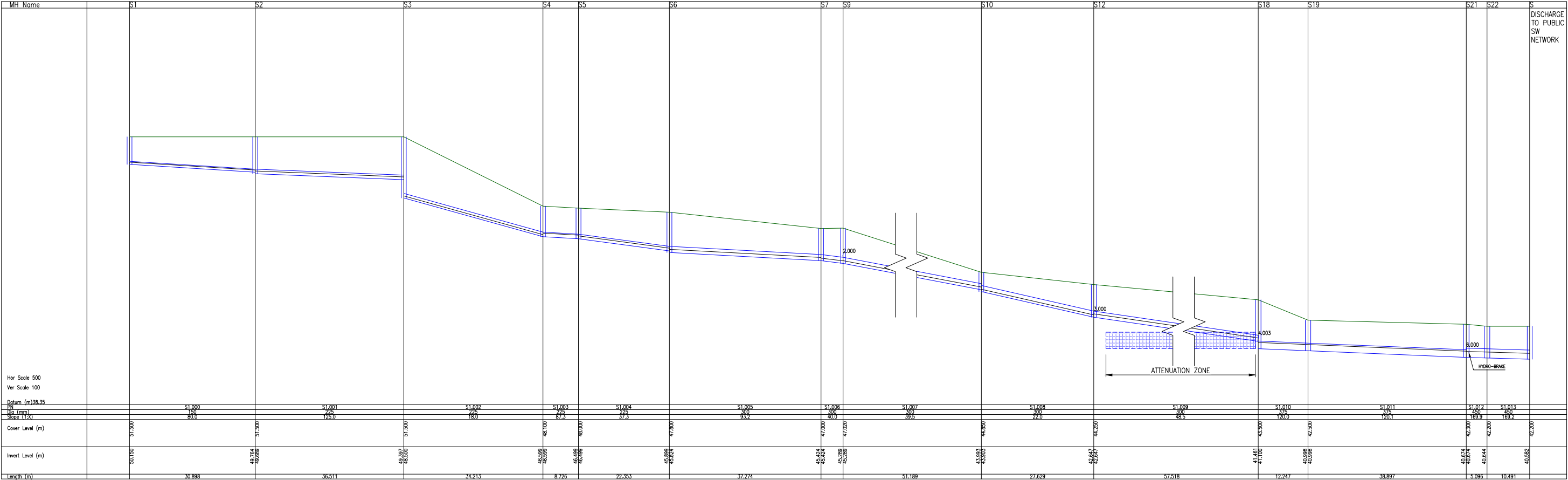
STANDARD DETAILS - WATER												
WATER MAIN THRUST AND SUPPORT BLOCKS												
1	11/11/11	JM/TCC	Anti-torque support block & thrust flange added & notes updated	MOD								
0	09/11/11	JM/TCC	Initial Issue	SL								
No.	Date	Des	Chk	Description	App							

SCALE	NOT TO SCALE	DATE	SEPT. 2015
DRAWING No.	STD-W-28	REV	1

REFER TO INDEX SHEET FOR NOTES REGARDING DESIGN RESPONSIBILITY & RISK ASSESSMENT

STANDARD DETAILS - WATER												
TRENCH BACKFILL / BEDDING & REDUCED COVER PROTECTION SLAB DETAIL												
2	07/20/20	TOC	Minor all is ok & Prescribed note added	MOD								
1	11/11/11	JM/TCC	Added & updated notes	MOD								
0	09/11/11	JM/TCC	Initial Issue	SL								
No.	Date	Des	Chk	Description	App							

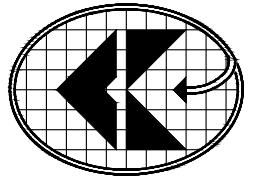
SCALE	NOT TO SCALE	DATE	SEPT. 2015
DRAWING No.	STD-W-13	REV	2



REFER TO DRAWING 300 FOR
PLAN LAYOUT OF SEWERS

F. - 8/1		
A	NETWORK UPDATED IN ACCORDANCE WITH REVISED SITE LAYOUT	28/02/2023
Rev.	Revision	Date

DRAWING STATUS		
P PRELIMINARY	A APPROVAL	T TENDER
C CONSTRUCTION	R RECORD	I INFORMATION



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PROJECT BALLYBURKE NEIGHBOURHOOD CENTRE
AND SOCIAL HOUSING SCHEME

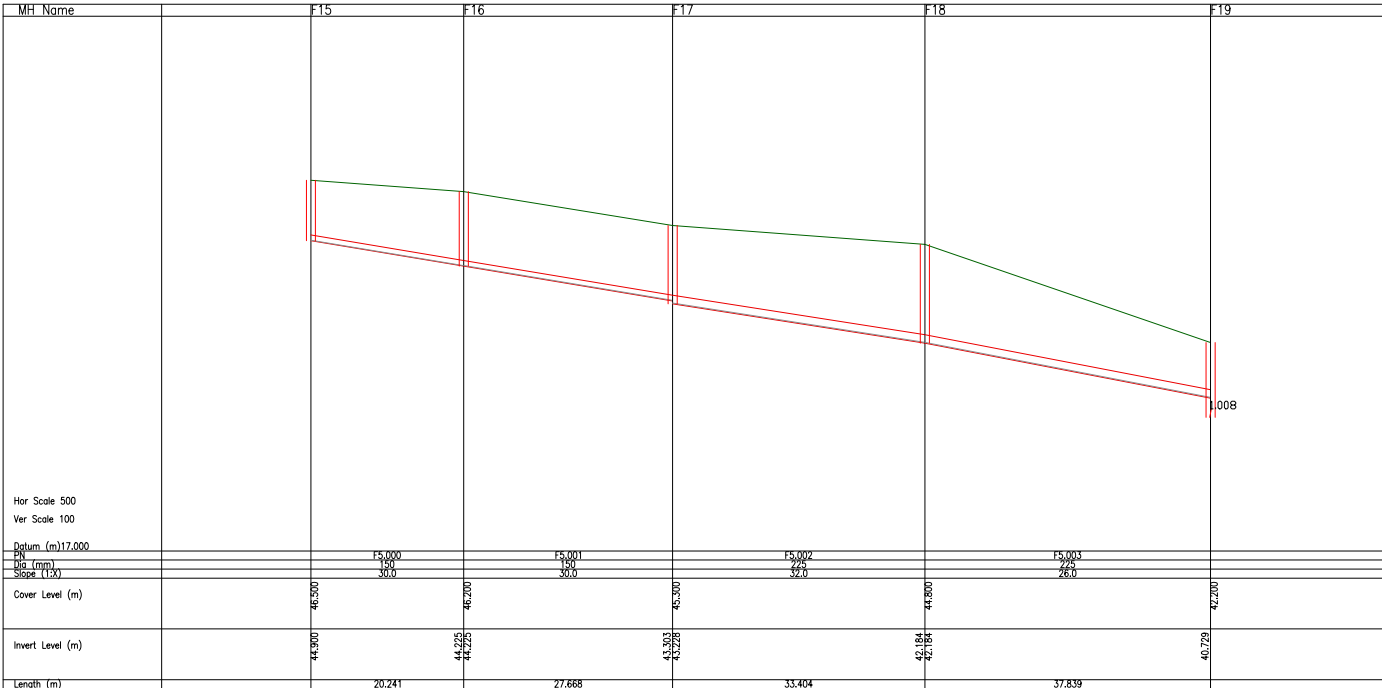
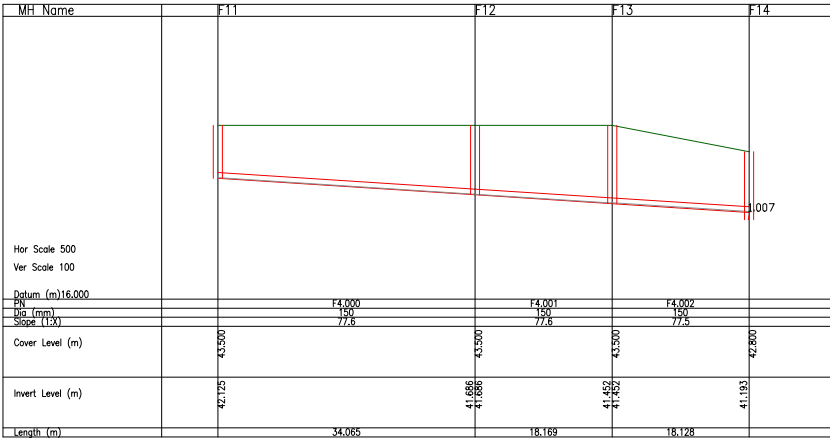
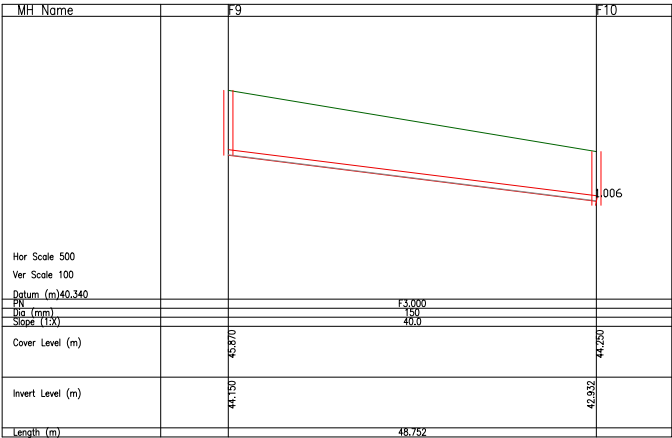
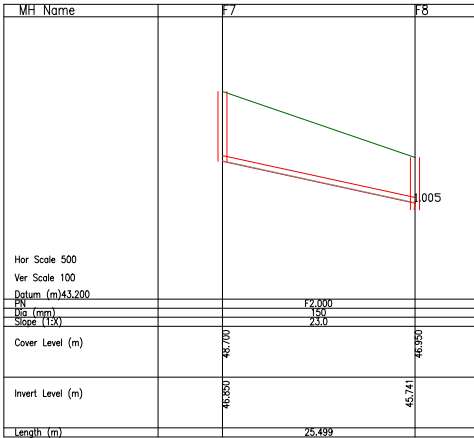
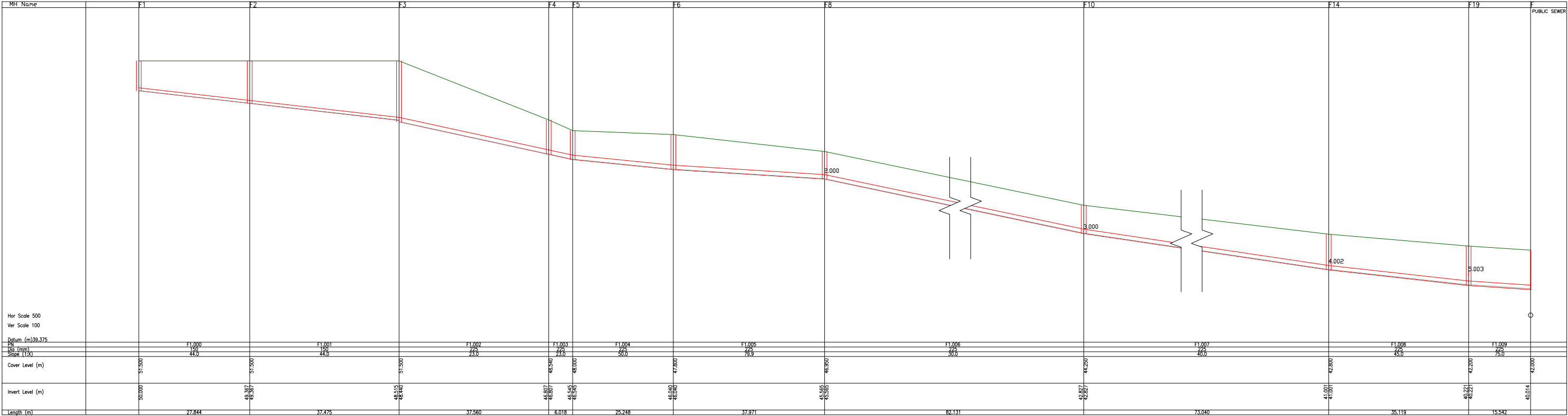
CLIENT GALWAY CITY COUNCIL

TITLE STORM DRAINAGE NETWORK SECTIONS

PROJECT No. 21-150 STATUS - DRAWING No. P-304

DATE FEBRUARY 2023 DRAWING REV.

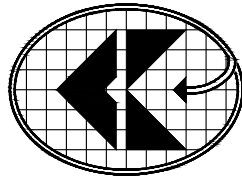
SCALE 1:500, 100 @ A1 1:1000, 200 @ A3 BY AC CHECKED BC



REFER TO DRAWING 300 FOR
PLAN LAYOUT OF SEWERS

F _s - 8/1		
A	NETWORK UPDATED IN ACCORDANCE WITH REVISED SITE LAYOUT	28/02/2023
Rev.	Revision	Date

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P PRELIMINARY	A APPROVAL	T TENDER
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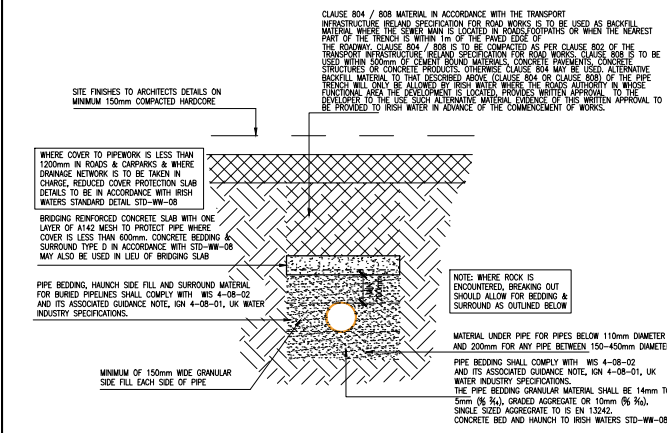
Website: www.coylekennedy.com
email: mail@coylekennedy.com

PROJECT BALLYBURKE NEIGHBOURHOOD CENTRE
AND SOCIAL HOUSING SCHEME

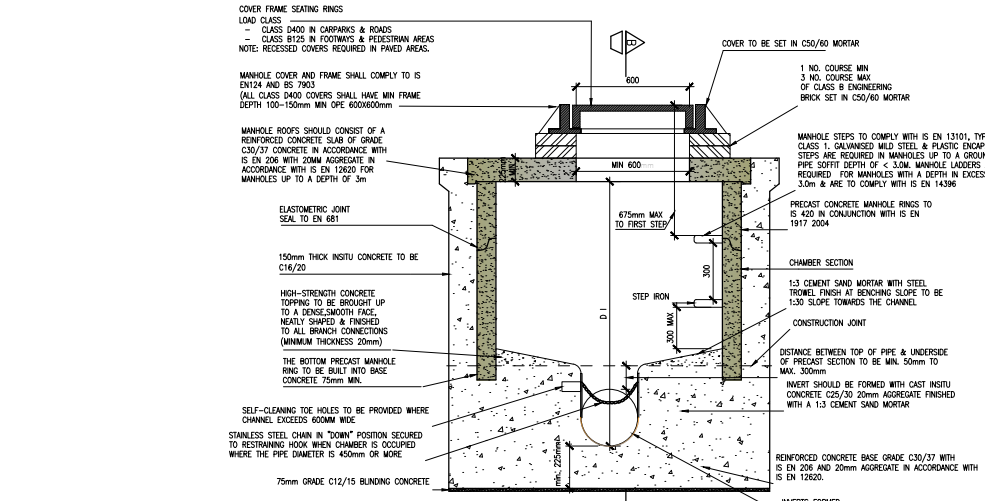
CLIENT GALWAY CITY COUNCIL

TITLE FOUL DRAINAGE NETWORK SECTIONS

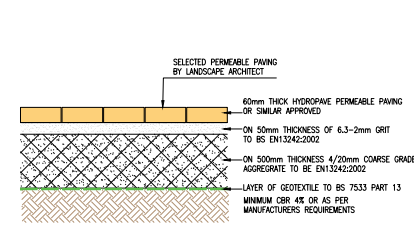
PROJECT No.	21-150	STATUS - DRAWING No.	P-305
DATE	FEBRUARY 2023	DRAWING REV.	A
SCALE	1:500, 100 @ A1 1:1000, 200 @ A3	BY	AC
		CHECKED	BC



02 TYPICAL SECTION TROUGH PIPE
SCALE 1:20



03 SECTION A-A TYPICAL PRE-CAST MANHOLE
SCALE 1:20



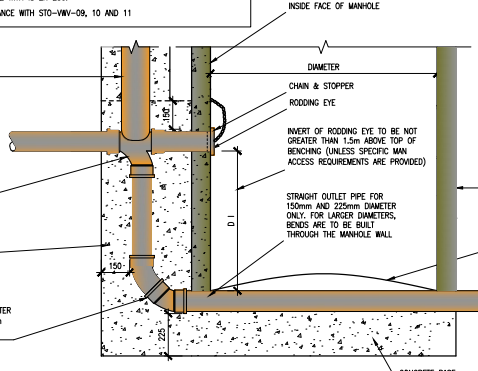
10 PERMEABLE PAVING FOR PEDESTRIAN/LANDSCAPED AREAS NON TRAFFICKED AREAS

MINIMUM SIZE OF CAPPING SLABS		
PIPE SIZE (mm)	WIDTH (mm)	DEPTH (mm)
100	500	100
225	500	100
300	600	100
375	750	200
450	900	200
600	1200	300

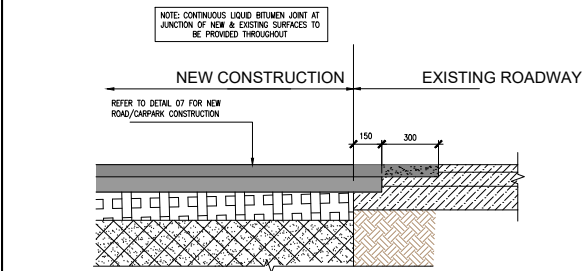
MINIMUM INTERNAL DIMENSIONS OF MANHOLES	
DIAMETER OF LARGEST PIPE IN MANHOLE (mm)	INTERNAL DIAMETER OF MANHOLE (mm)
LESS THEN 375mm	1200
375mm TO 450mm	1350
450mm TO 750mm	1500

BACKDROP MANHOLE NOTES

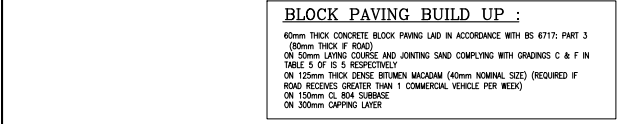
- ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS NOTED OTHERWISE.
- RODDING EYE CHAMBER SHALL BE COVERED WITH APPROVED HEAVY DUTY METAL COVERS TO IS 261 AND BS 854. COVER AND FRAME SHALL BE SUITABLE FOR ROAD AND TRAFFIC CONDITIONS SUBJECT TO APPROVAL FROM IRISH WATER.
- ALL CHAMBERS TO BE CHECKED FOR UPLIFT BY THE DEVELOPER BASED ON GROUND CONDITIONS WITHIN THE SITE. SHOULD ANY FLotation MEASURES BE REQUIRED THEY SHALL BE SUBJECT TO APPROVAL FROM IRISH WATER.
- ALL CONCRETE TO BE IN ACCORDANCE WITH IS EN 206.
- MANHOLE DETAILS TO BE IN ACCORDANCE WITH STD-WH-09, 10 AND 11



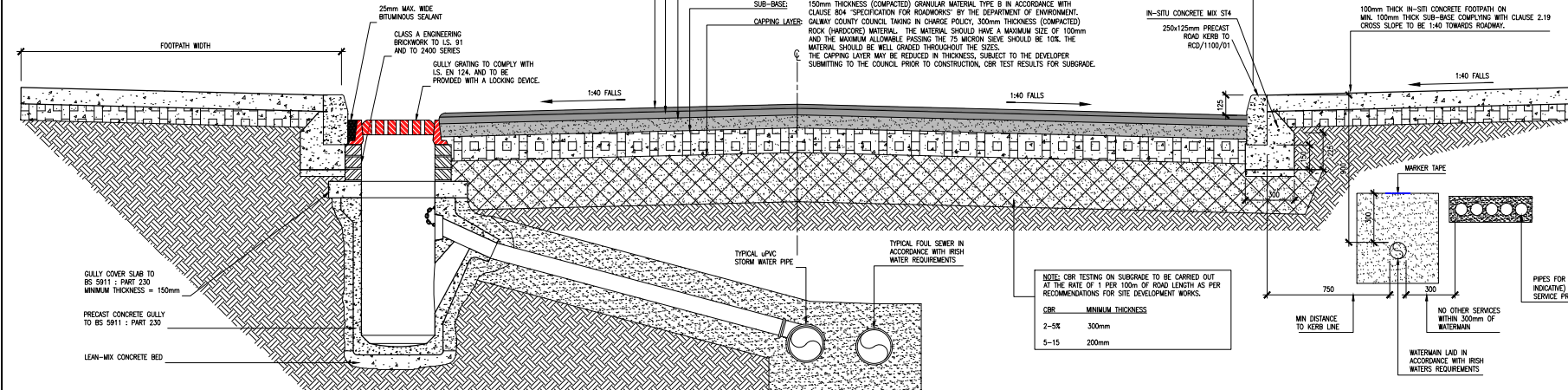
05 TYPICAL EXTERNAL VERTICAL BACKDROP TYPE NO.1
SCALE 1:20



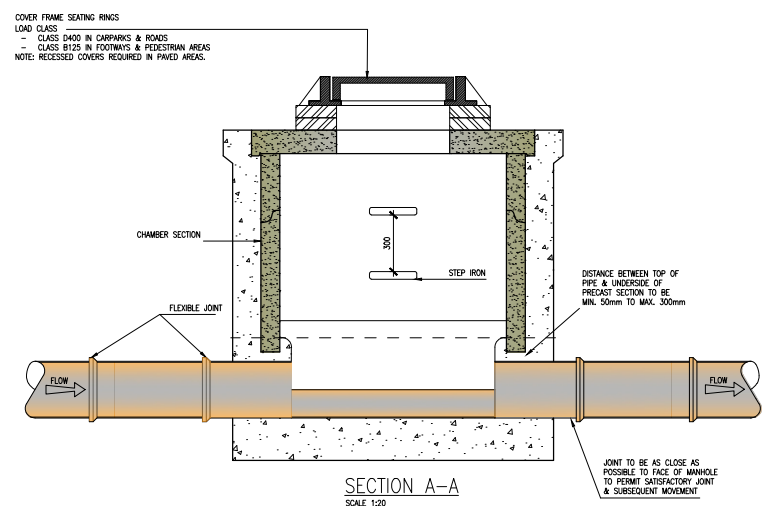
06 MEDIUM INSPECTION CHAMBER DETAIL 0.6m-1.0m FOR PAVED/LANDSCAPED AREAS
SCALE 1:20



08 TYPICAL ROAD/CARPARKING TIE-IN DETAIL
SCALE 1:20



07 TYPICAL ROAD SECTION AT GULLY
SCALE 1:20



04 TYPICAL PRE-CAST MANHOLE PLAN
SCALE 1:20

EXCAVATION AND FILL NOTES :

- THE RESPONSIBLE AUTHORITIES SHOULD BE CONSULTED REGARDING THE GROUND TO BE EXCAVATED WITH REGARD TO THE POSITION AND TYPE OF UNDERGROUND SERVICES THAT ARE LIKELY TO BE ENCOUNTERED DURING EXCAVATION AND ANY POSSIBLE UNDERSOILS REQUIRED.
- THE BEARING STRATA TO BE APPROVED AND AGREED BY THE CONSULTING ENGINEER.
- TEMPORARY FILL OVER BEARING STRATA TO BE PROVIDED TO PROTECT THE AGREED BEARING STRATA AND REMOVED FROM SITE BEFORE BEGINNING PERMANENT CONSTRUCTION.
- EXCAVATE TO THE DIMENSIONS, LEVELS, LINES AND PROFILES SHOWN ON THE RELEVANT DRAWINGS. LEVEL AND GRADE TO FALLS AND REMOVE ALL LOOSE MATERIAL. OBTAIN APPROVAL BEFORE ANY CONCRETING OR FILL WORK IS CARRIED OUT. IF ROCK OR OTHER MATERIAL STRATA IS ENCOUNTERED NOTIFY THE ARCHITECT AND ENGINEER AND OBTAIN INSTRUCTIONS BEFORE EXCAVATION. BACK FILL UNAUTHORISED OR EXCESS EXCAVATIONS WITH APPROVED FILLING AT NO EXPENSE TO THE CLIENT.
- WHEN ARCHAEOLOGICAL OBJECTS ARE DISCOVERED DURING EXCAVATION, STOP WORK IN THE IMMEDIATE VICINITY OF THE FIND AND INFORM THE ARCHITECT AND ENGINEER AT ONCE. THE OWNER OF MINERALS, SAND, GRAVEL OR ARCHAEOLOGICAL OBJECTS AND THE LIKE DISCOVERED IN THE COURSE OF THE EXCAVATIONS SHALL BE DEEMED TO BE THE PROPERTY OF THE CLIENT.
- EXCAVATIONS IN POSITIONS ADJACENT TO EXISTING BUILDINGS, PATHWAYS OR THE LIKE SHALL BE CARRIED OUT IN SUCH A MANNER THAT SUCH EXISTING BUILDINGS, PATHWAYS OR THE LIKE ARE NOT ENDANGERED.
- KEEP EXCAVATIONS FREE FROM WATER, AND KEEP WATER FROM EXCAVATIONS CLEAR OF OTHER CONSTRUCTION WORK. THE WATER LEVEL MAY BE SEASONAL AND/OR TIDAL, WHERE TEMPORARY SHIMPS ARE REQUIRED CONSTRUCT THEM CLEAR OF EXCAVATIONS FOR PERMANENT WORK AND FILL THEM WITH SUITABLE FILLING WHEN NO LONGER REQUIRED.
- DISPOSAL AREA FOR EXCAVATED MATERIAL TO BE AGREED WITH CLIENT AND OTHER RELEVANT AUTHORITIES.
- UNLESS OTHERWISE AGREED ALL FILL MATERIAL SHOULD BE "GRANULAR FILL S.R. 21 '2014 ANNEX E' COMPACTED IN 200mm LAYERS USING 10 NUMBER PHASES OF A 3000kg PER METAL WORTH VIBRATING ROLLER. SEE COMPACTION SPECIFICATION TABLE.
- FILL MATERIAL MUST BE PROVIDED OVER THE FULL EXTENT OF THE ROADS AND EXTEND AT LEAST 300mm BEYOND KERB LINE. IT MUST THEN TAPER 45DEG DOWN TO BEARING STRATA.

Compaction Specification			
Type of Compaction Plant	Category	Number of Passes for Layers not exceeding the following compacted thickness	110mm
Smooth-sheathed Roller (or vibratory roller operating without vibration)	Mass per metre width of roll: Over 2200 Kg to 3400Kg	16	unavailable
	Over 3400 Kg	18	unavailable
Pneumatic-tyred Roller	Mass per metre width of vibrating roll: Over 6000 Kg up to 8000 Kg	12	unavailable
	Over 8000 Kg up to 12000 Kg	10	unavailable
	Over 12000 Kg	8	unavailable
	Over 12000 Kg	6	unavailable
Vibratory Roller	Mass per metre width of vibrating roll: Over 700 Kg up to 1200 Kg	16	unavailable
	Over 1200 Kg up to 1800 Kg	4	6
	Over 1800 Kg up to 2300 Kg	3	5
	Over 2300 Kg up to 2800 Kg	3	5
	Over 2800 Kg up to 3600 Kg	3	5
	Over 3600 Kg up to 4300 Kg	2	4
Vibrating-plate Compactor	Mass: Over 50 Kg up to 65 Kg	4	8
	Over 65 Kg up to 75 Kg	3	6
Vibro-tamper	Mass: Over 75 Kg	2	4
	Over 75 Kg	2	4
Power Rammer	Mass: 100 Kg - 500 Kg	5	8
	Over 500 Kg	5	12

NOTES

GENERAL NOTES :

- ALL COYLE KENNEDY DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTS DRAWINGS AND ALL OTHER RELEVANT DRAWINGS.
- ALL SETTING OUT, INSULATION, DPC, TANKING / WATERPROOFING, SCAFFOLD AND RADON PROTECTION DETAILS BY ARCHITECT & SPECIALIST.
- DETAILED SPECIFICATIONS (IF NOT ISSUED) ARE AVAILABLE AT ENGINEERS OFFICE FOR INSPECTION BY CONTRACTORS, BY APPOINTMENT.
- REFER TO ARCHITECT FOR DAMP PROOF, TANKING AND GAS PROOFING MEMBRANE REQUIREMENTS. REQUIREMENTS OF SUBSTRUCTURE GAS/WATER PROOFING MEMBRANES TO BE BY A REPUTABLE, COMPETENT SPECIALIST WITH ADEQUATE PL.
- THE CONTRACTOR SHALL BE DEEMED TO HAVE ALLOWED FOR, WITHIN HIS TENDER, EMPLOYING A CHARITISED STRUCTURAL ENGINEER WITH ADEQUATE PROFESSIONAL INDEMNITY INSURANCE TO ASSESS, DESIGN AND DETAIL SUCH TEMPORARY WORKS AS ARE NECESSARY TO OBTAIN SUPPORT TO EXISTING AND/OR CONSTRUCTED ELEMENTS DURING THE CONSTRUCTION PERIOD. THIS APPLIES TO ELEMENTS WITHIN THE SITE AND NEIGHBOURING THE SITE.
- THE CONTRACTOR IS DEEMED TO HAVE VISITED THE SITE AND CONSULTED WITH RELEVANT AUTHORITIES AND BE SATISFIED IN RELATION TO THE SITES SURROUNDINGS, EXISTING SERVICES, LEVELS, BOUNDARIES, GROUND CHARACTERISTICS AND ANY OTHER SITE CONSTRAINTS, INCLUDING DIVISION OF SERVICES AS NECESSARY.
- ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BUILDING REGULATIONS.
- WHERE LEANEX IS SPECIFIED ALL LEANEX TO BE GRADE C16/20 (ION 3), UNLESS NOTED OTHERWISE.
- ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (A.D.N.) INDICATING STRUCTURAL LEVEL (SSL).
- DO NOT SCALE FROM DRAWINGS. USE FIGURED DIMENSIONS ONLY. ANY DISCREPANCIES TO BE REPORTED TO THE STRUCTURAL ENGINEER PRIOR TO COMMENCEMENT OF WORKS.
- ALL WORKS SHALL BE CARRIED OUT IN A SAFE MANNER AND IN ACCORDANCE WITH THE HEALTH AND SAFETY REGULATIONS. METHOD STATEMENTS (WHERE REQUIRED) SHALL BE SUBMITTED TO THE ENGINEER OR OTHER APPOINTED PERSON(S).
- THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AUTHORITY REQUIREMENTS INCLUDING PLANNING CONDITIONS, FIRE SAFETY CERTIFICATE CONDITIONS, LOCAL AUTHORITY DRAINAGE REQUIREMENTS ETC.
- PROJECT DRAWINGS AND SPECIFICATIONS REFERENCE TO BUILDING REGULATIONS, BRITISH, IRISH OR OTHER NATIONAL STANDARD OR CODES OF PRACTICE DO NOT GIVE THE YEAR OF ISSUE OR DATES OF AMENDMENTS. THE LATEST RELEVANT PUBLISHED VERSION INCLUDING ANY RELEVANT AMENDMENTS AND ADD END AT THE DATE OF INVIATION TO TENDER SHALL APPLY. WHERE A STANDARD OR CODE OF PRACTICE HAS BEEN SUPERSEDED, THE LATEST EDITION OF THE SUPERSEDING PUBLICATION SHALL APPLY.
- ANY DISCREPANCIES DISCOVERED BETWEEN DESIGN TEAM DRAWINGS TO BE REPORTED IMMEDIATELY AND CLARIFICATION SOUGHT AND DISCREPANCY CORRECTED PRIOR TO CONSTRUCTION COMMENCING

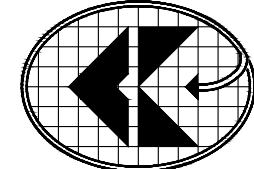
DRAINAGE NOTES :

- CONTRACTOR TO MAKE ALL NECESSARY ENQUIRIES REGARDING LOCATION OF EXISTING SEWERS, ELECTRICAL AND OTHER SERVICES ON SITE.
- FOR DRAINAGE WORK LOCAL TO BUILDINGS, REFER TO ARCHITECT'S DRAWINGS.
- ALL DRAINAGE WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT SPECIFICATION, PART II, BUILDING REGULATIONS AND DEPT. OF ENVIRONMENT DOCUMENT 'RECOMMENDATIONS FOR SITE DEVELOPMENT WORKS FOR HOUSING AREAS', & WIR: 'SEWERS FOR ADOPTION' 6th EDITION A DESIGN & CONSTRUCTION GUIDE FOR DEVELOPERS.
- BEDDING MATERIAL TO BE 10mm SINGLE SIZED AGGREGATE COMPLYING WITH THE REQUIREMENTS OF AGGREGATES FOR CONCRETE'. FOR RIGID PIPES THE GRANULAR MATERIAL SHOULD CONFORM TO BS EN 1610 ANNEX B TABLE 8 AND SHOULD BE SINGLE SIZE MATERIAL OR GRADED MATERIAL FROM 5mm TO 10mm for 150mm PIPES, 14mm for 150mm PIPES, 20mm for 150mm - 600mm DIAMETER AND 40mm FOR PIPES MORE THAN 600mm DIAMETER.
- THE MINIMUM THICKNESS OF BEDDING MATERIAL UNDER THE BARREL OF THE PIPE SHOULD BE 100mm OF THE TRENCH AND LAB TO THE CORRECT GRADIENT.
- IMPORTED BEDDING MATERIAL AND BACKFILL USING 'AS DUG MATERIAL' MUST BE APPROVED BY ENGINEER.
- ALL PVC-U PIPES AND FITTINGS USED FOR DRAIN AND SEWER MUST COMPLY WITH IS 424 " UNPLASTICISED POLYVINYL CHLORIDE (PVC-U) PIPES AND FITTINGS FOR BURIED DRAINAGE AND SEWAGE SYSTEMS "

REFER TO DRAWING 300 FOR PLAN LAYOUT OF SEWERS

F _n - 8/1		
Rev.	Revision	Date
A	SECTIONS UPDATED IN ACCORDANCE WITH REVISED SITE LAYOUT	28/02/2023

DRAWING STATUS		
P PRELIMINARY	A APPROVAL	T TENDER
C CONSTRUCTION	R RECORD	I INFORMATION



COYLE KENNEDY
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Galway.

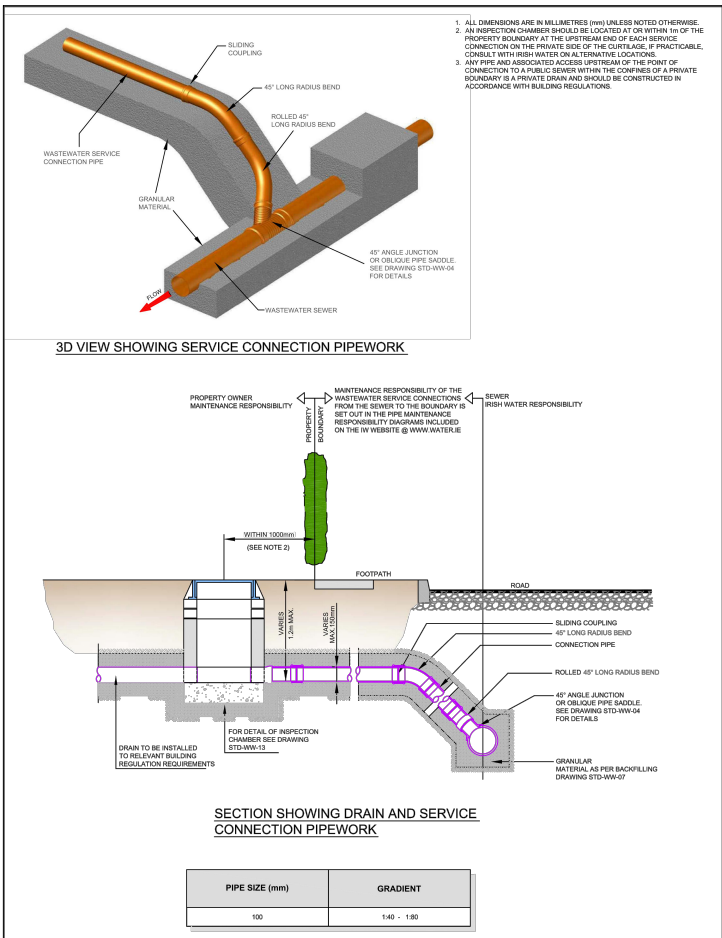
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Website: www.coylekennedy.com
email: mail@coylekennedy.com

PROJECT BALLYBURKE NEIGHBOURHOOD CENTRE AND SOCIAL HOUSING SCHEME

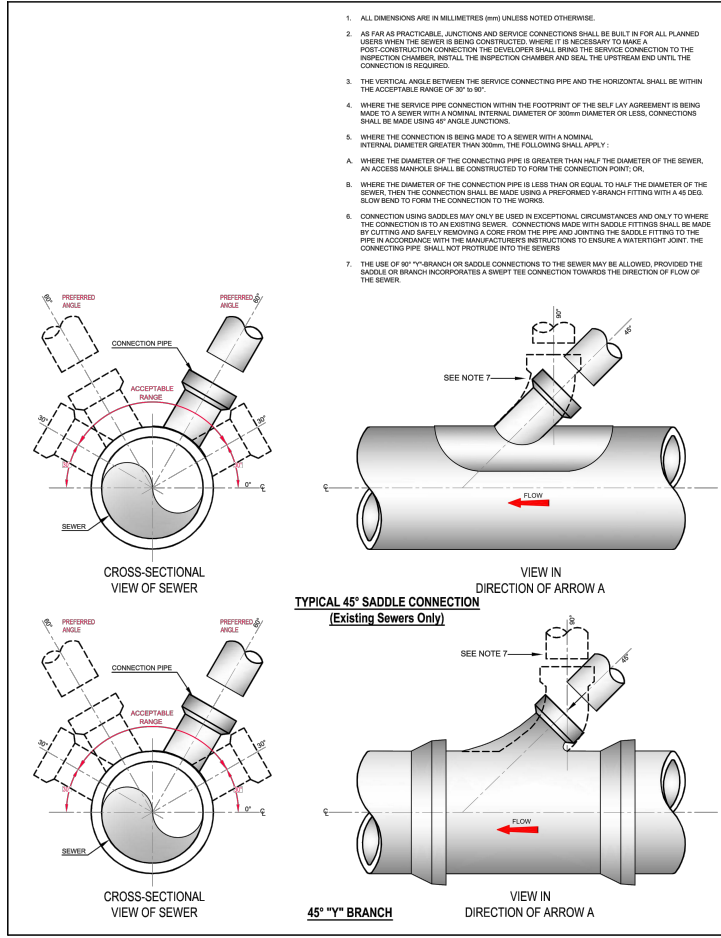
CLIENT GALWAY CITY COUNCIL

TITLE TYPICAL DRAINAGE/CIVILS DETAILS -SHEET 1

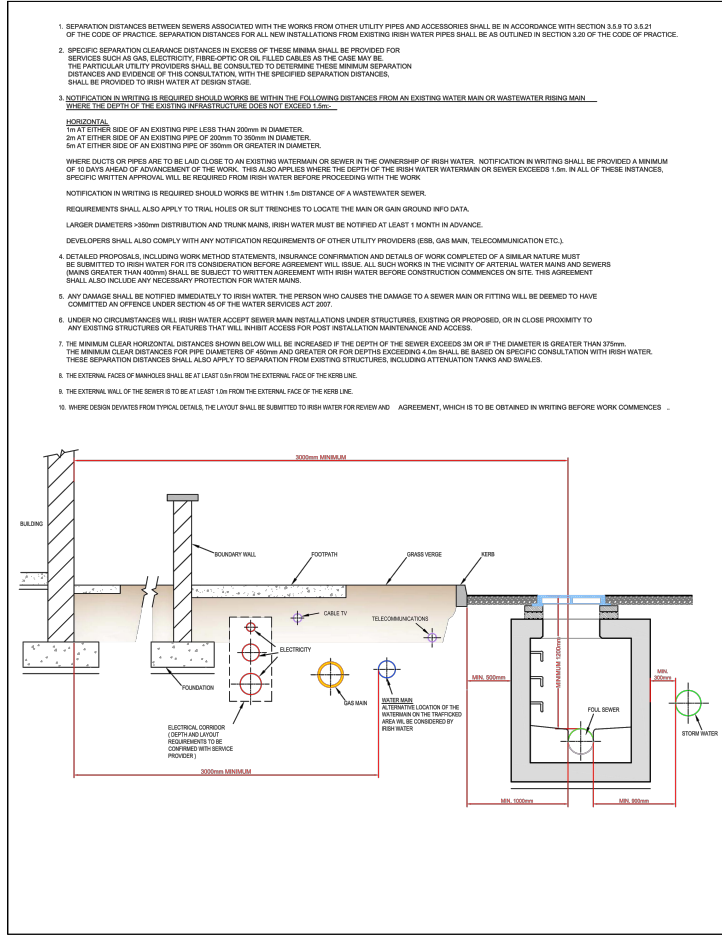
PROJECT No.	21-150	STATUS - DRAWING No.	P-306
DATE	FEBRUARY 2023	DRAWING REV.	A
SCALE	1:50, 1:20 @ A1	BY	AC
		CHECKED	BC



DRAIN & SERVICE CONNECTION PIPEWORK
EXTRACT FROM IRISH WATERS
STD-WW-03



TYPICAL SEWER/SERVICE PIPE CONNECTION
EXTRACT FROM IRISH WATERS
STD-WW-04

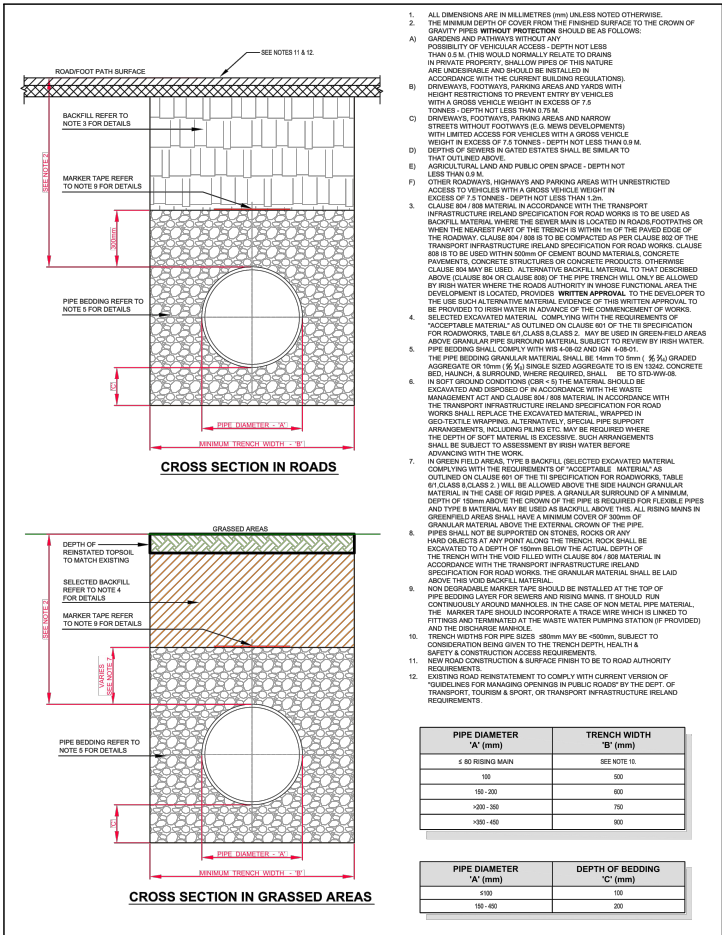


TYPICAL SERVICE LAYOUT INDICATING SEPARATION DISTANCES
EXTRACT FROM IRISH WATERS
STD-WW-05

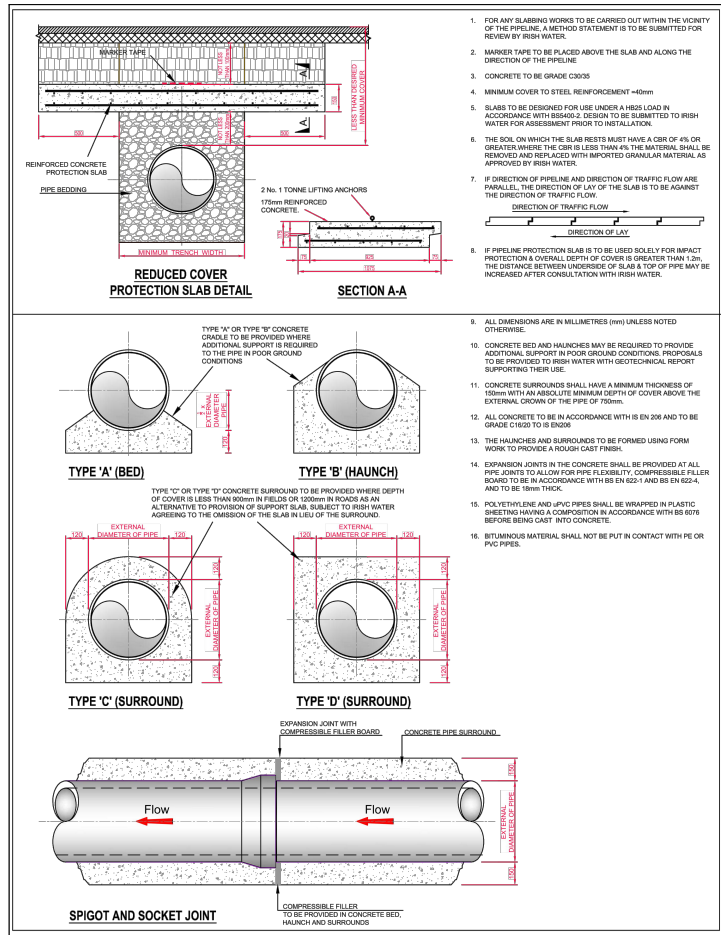
NOTES

GENERAL NOTES :

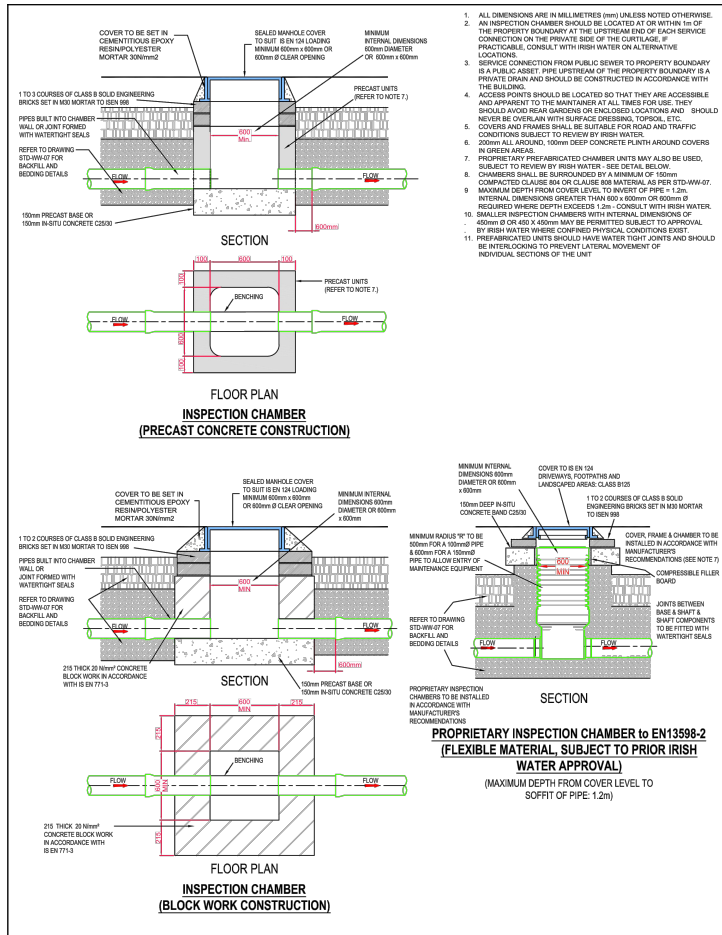
1. ALL COYLE KENNEDY DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTS DRAWINGS AND ALL OTHER RELEVANT DRAWINGS.
2. ALL SETTING OUT, INSULATION, DPC, TANKING / WATERPROOFING, SCREED AND RAISON PROTECTION DETAILS BY ARCHITECT & SPECIALIST.
3. DETAILED SPECIFICATIONS (IF NOT ISSUED) ARE AVAILABLE AT ENGINEERS OFFICE FOR INSPECTION BY CONTRACTORS, BY APPOINTMENT.
4. REFER TO ARCHITECT FOR DAMP PROOF, TANKING AND GAS PROOFING MEMBRANE REQUIREMENTS. REQUIREMENTS OF SUBSTRUCTURE GAS/WATER PROOFING MEMBRANES TO BE BY A REPUTABLE, COMPETENT SPECIALIST WITH ADEQUATE PL.
5. THE CONTRACTOR SHALL BE DEEMED TO HAVE ALLOWED FOR, WITHIN HIS TENDER, EMPLOYING A CHARITISED STRUCTURAL ENGINEER WITH ADEQUATE PROFESSIONAL INDEMNITY INSURANCE TO ASSESS, DESIGN AND DETAIL SUCH TEMPORARY WORKS AS ARE NECESSARY TO OBTAIN SUPPORT TO EXISTING AND/OR CONSTRUCTED ELEMENTS DURING THE CONSTRUCTION PERIOD. THIS APPLIES TO ELEMENTS WITHIN THE SITE AND NEIGHBOURING THE SITE.
6. THE CONTRACTOR IS DEEMED TO HAVE VISITED THE SITE AND CONSULTED WITH RELEVANT AUTHORITIES AND BE SATISFIED IN RELATION TO THE SITES SURROUNDINGS, EXISTING SERVICES, LEVELS, BOUNDARIES, GROUND CHARACTERISTICS AND ANY OTHER SITE CONSTRAINTS, INCLUDING DISPOSITION OF SERVICES AS NECESSARY.
7. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BUILDING REGULATIONS.
8. WHERE LEANWY IS SPECIFIED ALL LEANWY TO BE GRADE C16/20 (EN 3), UNLESS NOTED OTHERWISE.
9. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (A.D.N.) INDICATING STRUCTURAL LEVEL (S.S.).
10. DO NOT SCALE FROM DRAWINGS. USE FIGURED DIMENSIONS ONLY. ANY DISCREPANCIES TO BE REPORTED TO THE STRUCTURAL ENGINEER PRIOR TO COMMENCEMENT OF WORKS.
11. ALL WORKS SHALL BE CARRIED OUT IN A SAFE MANNER AND IN ACCORDANCE WITH THE HEALTH AND SAFETY REGULATIONS. METHOD STATEMENTS (WHERE REQUIRED) SHALL BE SUBMITTED TO THE ENGINEER OR OTHER APPOINTED PERSON(S).
12. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AUTHORITY REQUIREMENTS INCLUDING PLANNING CONDITIONS, FIRE SAFETY CERTIFICATE CONDITIONS, LOCAL AUTHORITY (DRAINAGE) REQUIREMENTS AND AGREEMENT, WHICH IS TO BE OBTAINED IN WRITING BEFORE WORK COMMENCES.
13. PROJECT DRAWINGS AND SPECIFICATIONS REFERENCE TO BUILDING REGULATIONS, BRITISH, IRISH OR OTHER NATIONAL STANDARD OR CODES OF PRACTICE DO NOT OWE THE YEAR OF ISSUE OR DATES OF AMENDMENTS. THE LATEST RELEVANT PUBLISHED VERSION INCLUDING ANY RELEVANT AMENDMENTS AND ADD END AT THE DATE OF INVIATION TO TENDER SHALL APPLY. WHERE A STANDARD OR CODE OF PRACTICE HAS BEEN SUPERSEDED, THE LATEST EDITION OF THE SUPERSEDING PUBLICATION SHALL APPLY.
14. ANY DISCREPANCIES DISCOVERED BETWEEN DESIGN TEAM DRAWINGS TO BE REPORTED IMMEDIATELY AND CLARIFICATION SOUGHT AND DISCREPANCY CORRECTED PRIOR TO CONSTRUCTION COMMENCING.



TRENCH BACKFILL & BEDDING
EXTRACT FROM IRISH WATERS
STD-WW-07



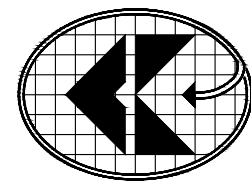
CONCRETE PROTECTION SLAB, BED, HAUNCH AND SURROUND TO PIPES
EXTRACT FROM IRISH WATERS
STD-WW-08



PRIVATE SIDE INSPECTION CHAMBER
EXTRACT FROM IRISH WATERS
STD-WW-05

REFER TO DRAWING 300 FOR
PLAN LAYOUT OF SEWERS

F _n - 8/1		TITLEBLOCK UPDATED		28/02/2023
Rev.		Revision		Date
DRAWING STATUS				
P	PRELIMINARY	A	APPROVAL	T TENDER
C	CONSTRUCTION	R	RECORD	I INFORMATION



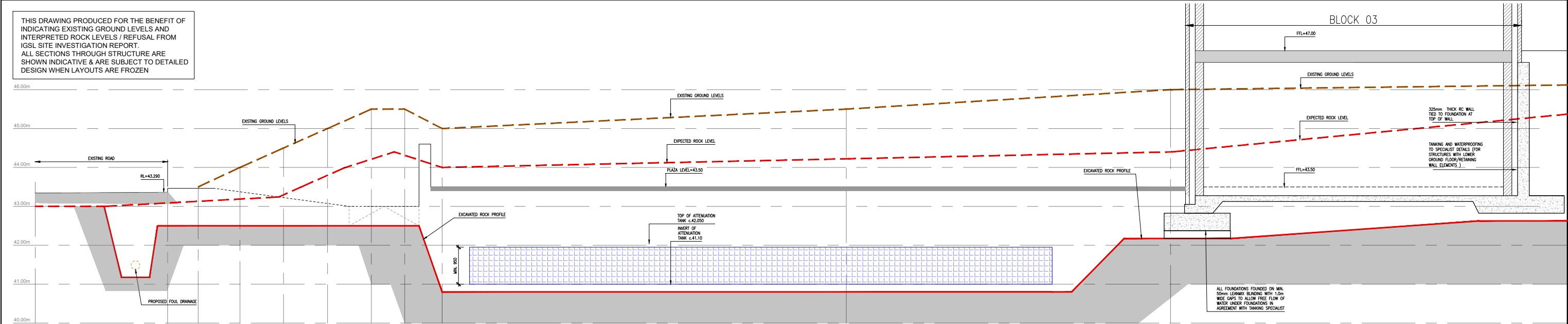
Coyle Kennedy
Consulting Engineers

GFSC,
Moneenageisha Rd,
Galway.

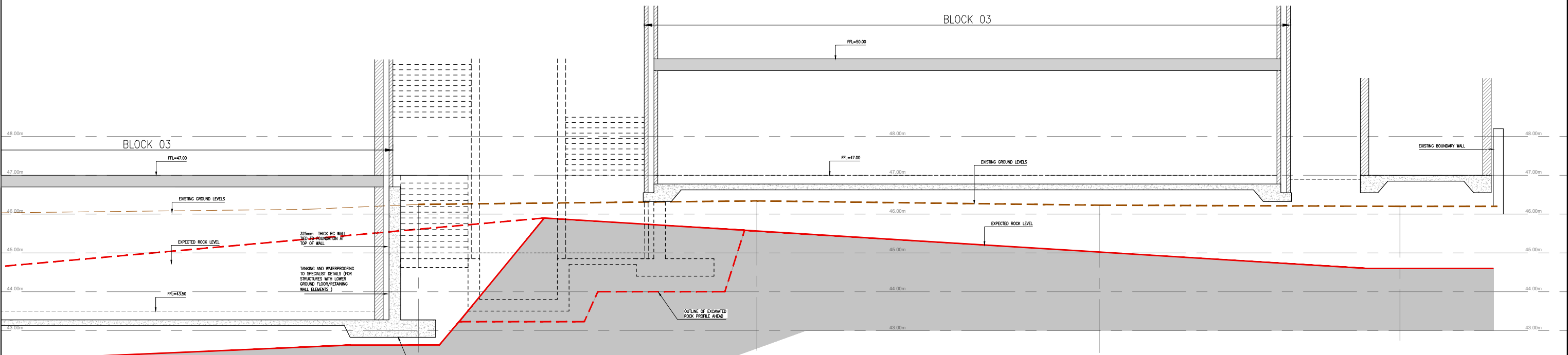
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Website: www.coylekennedy.com
email: mail@coylekennedy.com

PROJECT	BALLYBURKE NEIGHBOURHOOD CENTRE AND SOCIAL HOUSING SCHEME		
CLIENT	GALWAY CITY COUNCIL		
TITLE	TYPICAL DRAINAGE/CIVILS DETAILS - SHEET 2		
PROJECT No.	21-150	STATUS - DRAWING No.	
DATE	NOVEMBER 2022	P-307	
SCALE	1:50, 1:20 @ A1	BY	AC
		CHECKED	BC
		DRAWING REV.	
		A	

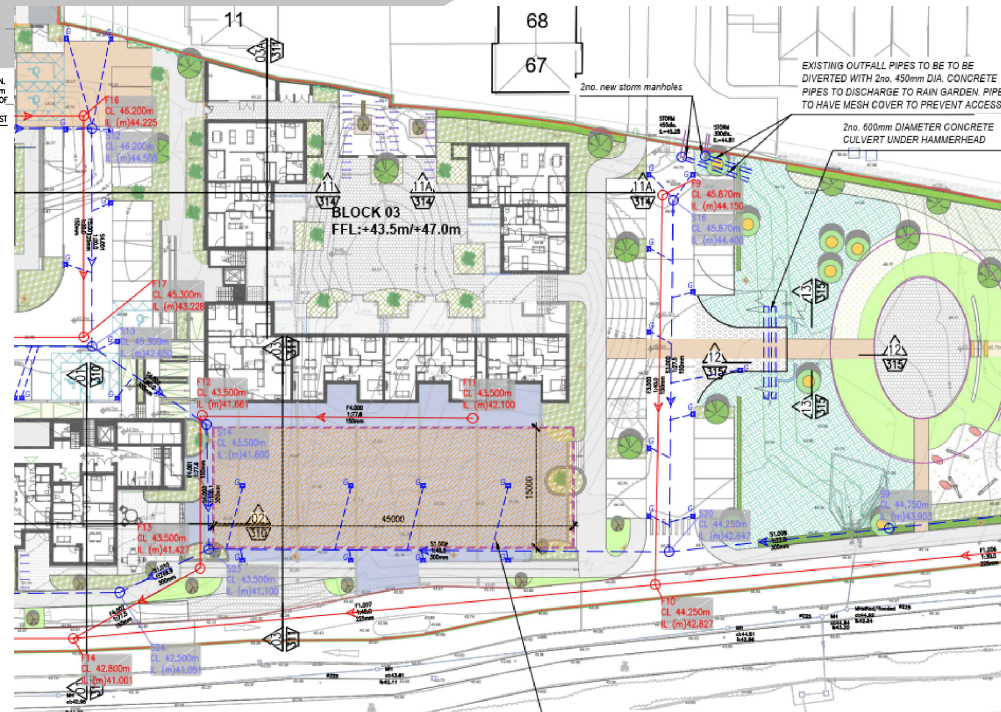
THIS DRAWING PRODUCED FOR THE BENEFIT OF INDICATING EXISTING GROUND LEVELS AND INTERPRETED ROCK LEVELS / REFUSAL FROM IGSL SITE INVESTIGATION REPORT. ALL SECTIONS THROUGH STRUCTURE ARE SHOWN INDICATIVE & ARE SUBJECT TO DETAILED DESIGN WHEN LAYOUTS ARE FROZEN



03 SECTION 3-3 INDICATIVE SECTION THROUGH BLOCK 03, PLAZA & ROAD SCALE 1:50



03A SECTION 3A-3A INDICATIVE SECTION THROUGH BLOCK 03, PLAZA & ROAD SCALE 1:50

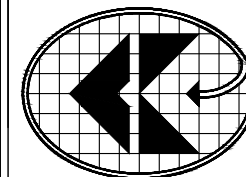


PARTIAL KEY PLAN BLOCK 3 ENTRANCE

GENERAL NOTES :

1. ALL COYLE KENNEDY DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTS DRAWINGS AND ALL OTHER RELEVANT DRAWINGS.
2. ALL SETTING OUT, INSULATION, DPC, TANKING / WATERPROOFING, SCREED AND RADON PROTECTION DETAILS BY ARCHITECT & SPECIALIST.
3. DETAILED SPECIFICATIONS (IF NOT ISSUED) ARE AVAILABLE AT ENGINEERS OFFICE FOR INSPECTION BY CONTRACTORS, BY APPOINTMENT.
4. REFER TO ARCHITECT FOR DAMP PROOF, TANKING AND GAS PROOFING MEMBRANE REQUIREMENTS. REQUIREMENTS OF SUBSTRUCTURE GAS/WATER PROOFING MEMBRANES TO BE BY A REPUTABLE, COMPETENT SPECIALIST WITH ADEQUATE PI.
5. THE CONTRACTOR SHALL BE DEEMED TO HAVE ALLOWED FOR, WITHIN HIS TENDER, EMPLOYING A CHARTERED STRUCTURAL ENGINEER WITH ADEQUATE PROFESSIONAL INDEMNITY INSURANCE, TO ASSESS, DESIGN AND DETAIL SUCH TEMPORARY WORKS AS ARE NECESSARY TO OFFER SUPPORT TO EXISTING AND/OR CONSTRUCTED ELEMENTS DURING THE CONSTRUCTION PERIOD. THIS APPLIES TO ELEMENTS WITHIN THE SITE AND NEIGHBOURING THE SITE.
6. THE CONTRACTOR IS DEEMED TO HAVE VISITED THE SITE AND CONSULTED WITH RELEVANT AUTHORITIES AND BE SATISFIED IN RELATION TO THE SITES SURROUNDINGS, EXISTING SERVICES, LEVELS, BOUNDARIES, GROUND CHARACTERISTICS AND ANY OTHER SITE CONSTRAINTS, INCLUDING DIVERSION OF SERVICES AS NECESSARY.
7. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BUILDING REGULATIONS.
8. WHERE LEANMAX IS SPECIFIED ALL LEANMAX TO BE GRADE C16/20 (GEN 3), UNLESS NOTED OTHERWISE.
9. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM (A.M.S.L.) INDICATING STRUCTURAL LEVEL (SSL).
10. DO NOT SCALE FROM DRAWINGS. USE FIGURED DIMENSIONS ONLY. ANY DISCREPANCIES TO BE REPORTED TO THE STRUCTURAL ENGINEER PRIOR TO COMMENCEMENT OF WORKS.
11. FOR PARTITION RESTRAINTS & FIXING DETAILS SEE ARCHITECTS DRAWINGS.
12. ALL WORKS SHALL BE CARRIED OUT IN A SAFE MANNER AND IN ACCORDANCE WITH THE HEALTH AND SAFETY REGULATIONS. METHOD STATEMENTS (WHERE REQUIRED) SHALL BE SUBMITTED TO THE ENGINEER OR OTHER APPOINTED PERSONS).

13. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AUTHORITY REQUIREMENTS INCLUDING PLANNING CONDITIONS, FIRE SAFETY CERTIFICATE CONDITIONS, LOCAL AUTHORITY DRAINAGE REQUIREMENTS etc.
14. PROJECT DRAWINGS AND SPECIFICATIONS REFERENCE TO BUILDING REGULATIONS, BRITISH, IRISH OR OTHER NATIONAL STANDARD OR CODES OF PRACTICE DO NOT GIVE THE YEAR OF ISSUE OR DATES OF AMENDMENTS. THE LATEST RELEVANT PUBLISHED VERSION INCLUDING ANY RELEVANT AMENDMENTS AND ADD END AT THE DATE OF INVITATION TO TENDER SHALL APPLY, WHERE A STANDARD OR CODE OF PRACTICE HAS BEEN SUPERSEDED, THE LATEST EDITION OF THE SUPERSEDING PUBLICATION SHALL APPLY.
15. ANY DISCREPANCIES DISCOVERED BETWEEN DESIGN TEAM DRAWINGS TO BE REPORTED IMMEDIATELY AND CLARIFICATION SOUGHT AND DISCREPANCY CORRECTED PRIOR TO CONSTRUCTION COMMENCING.
16. REFER TO ARCHITECTS DRAWINGS FOR RESTRAINT OF NON-LOADBEARING PARTITIONS. NON-LOADBEARING PARTITIONS SHOULD NOT BE BUILT UP DIRECTLY TO THE UNDERSIDE OF THE LOAD CARRYING STRUCTURE. ALLOW A MINIMUM OF 25mm DEFLECTION UNLESS NOTED OTHERWISE.
17. ALL WORKS TO BE CARRIED IN A PROPER AND SAFE MANNER AND IN ACCORDANCE WITH HEALTH AND SAFETY REGULATIONS.
18. FIRE RATINGS AND FIRE PROTECTION DETAILS TO STRUCTURAL STEEL, TIMBER, COMPOSITE SLAB (METAL DECK) ETC SHALL BE AS DEFINED AND DETAILED BY THE ARCHITECT / FIRE OFFICER REQUIREMENTS AND REGULATIONS.
19. ONLY BUILDING WORKS OPENINGS SHOWN AT THE LOCATIONS ON COYLE KENNEDY LTD STRUCTURAL ENGINEERS DRAWINGS ARE ALLOWED TO BE CONSTRUCTED. ADDITIONAL OPENINGS WILL REQUIRE DESIGN CHECK AND CONSENT FROM COYLE KENNEDY LTD PRIOR TO CONSTRUCTION. HOLES OR OPENINGS OTHER THAN THEM SHOWN ON THE STRUCTURAL ENGINEERS DRAWINGS MUST NOT BE CONSTRUCTED WITHOUT CONSENT.
20. MINIMUM CONCRETE STRENGTH L14.0 C30/37 - REFER TO 000 NOTES DRAWING



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Rev.	Revision	Date
B	SECTIONS UPDATED IN ACCORDANCE WITH REVISED SITE LAYOUT	06/12/2023
A	SECTIONS UPDATED IN ACCORDANCE WITH REVISED SITE LAYOUT	28/02/2023

DRAWING STATUS		
P PRELIMINARY	A APPROVAL	T TENDER
C CONSTRUCTION	R RECORD	I INFORMATION

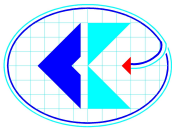
PROJECT	BALLYBURKE NEIGHBOURHOOD CENTRE AND SOCIAL HOUSING SCHEME
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CLIENT	GALWAY CITY COUNCIL
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TITLE	SITE SECTIONS SHEET 2
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PROJECT No.	21-150	STATUS - DRAWING No.	P-311
DATE	FEBRUARY 2023	DRAWING REV.	B
SCALE	1:50, @ A1	BY	AC
		CHECKED	BC

Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Junctions Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		

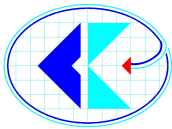


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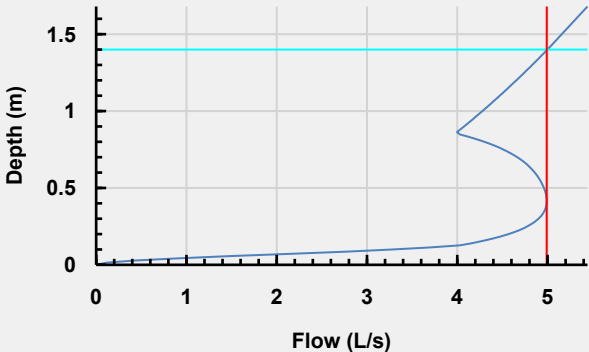
Name	Junction Type	Easting (m)	Northing (m)	Cover Elevation (m)	Depth (m)	Invert Elevation (m)	Chamber Shape	Diameter (m)
1	Manhole	314.148	872.500	51.500	1.350	50.150	Circular	1.200
2	Manhole	314.148	841.602	51.500	1.811	49.689	Circular	1.200
3	Manhole	314.147	805.092	51.500	3.000	48.500	Circular	1.200
4	Manhole	314.138	770.878	48.100	1.501	46.599	Circular	1.200
5	Manhole	307.222	765.558	48.000	1.501	46.499	Circular	1.200
6	Manhole	284.922	767.107	47.800	1.976	45.824	Circular	1.200
7	Manhole	247.657	767.910	47.000	1.576	45.424	Circular	1.200
9	Manhole	244.101	771.990	47.020	1.731	45.289	Circular	1.200
8	Manhole	244.101	793.841	48.800	1.700	47.100	Circular	1.200
10	Manhole	193.218	766.403	44.850	0.947	43.903	Circular	1.200
12	Manhole	165.744	763.477	44.250	1.603	42.647	Circular	1.200
11	Manhole	166.255	807.475	45.870	1.470	44.400	Circular	1.200
13	Manhole	70.923	816.431	46.500	1.350	45.150	Circular	1.200
14	Manhole	93.602	816.431	46.200	1.692	44.508	Circular	1.200
16	Manhole	93.602	789.162	45.300	2.650	42.650	Circular	1.200
15	Manhole	61.033	789.208	44.850	1.200	43.650	Circular	1.200
17	Manhole	107.925	777.526	43.500	1.900	41.600	Circular	1.200
19	Manhole	97.066	758.779	42.500	1.502	40.998	Circular	1.350
21 Flow Control	Manhole	58.170	758.512	42.300	1.626	40.674	Circular	1.500
20	Manhole	59.155	772.362	43.700	2.200	41.500	Circular	1.200
22	Manhole	57.818	753.429	42.200	1.556	40.644	Circular	1.350
Outfall	Manhole	51.159	745.322	42.200	1.618	40.582	Circular	1.200

Name	Access Required	Intersection Easting (m)	Intersection Northing (m)	Lock
1	☒	314.148	872.500	None
2	☒	314.148	841.602	None
3	☒	314.147	805.092	None
4	☒	314.138	770.878	None
5	☒	307.222	765.558	None
6	☒	284.922	767.107	None
7	☒	247.657	767.910	None
9	☒	244.101	771.990	None
8	☒	244.101	793.841	None
10	☒	193.218	766.403	None
12	☒	165.744	763.477	None
11	☒	166.255	807.475	None
13	☒	70.923	816.431	None
14	☒	93.602	816.431	None
16	☒	93.602	789.162	None
15	☒	61.033	789.208	None
17	☒	107.925	777.526	None
19	☒	97.066	758.779	None
21 Flow Control	☐			None
20	☒	59.155	772.362	None
22	☒	57.818	753.429	None
Outfall	☐			All

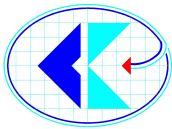
Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Junctions Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		


COYLE KENNEDY
 Consulting Engineers

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
1	Outlet	S1.000	Free Discharge
2	Outlet	S1.001	Free Discharge
3	Outlet	S1.002	Free Discharge
4	Outlet	S1.003	Free Discharge
5	Outlet	S1.004	Free Discharge
6	Outlet	S1.005	Free Discharge
7	Outlet	S1.006	Free Discharge
9	Outlet	S1.007	Free Discharge
8	Outlet	S2.000	Free Discharge
10	Outlet	S1.008	Free Discharge
12	Outlet	S1.009	Free Discharge
11	Outlet	S3.000	Free Discharge
13	Outlet	S4.000	Free Discharge
14	Outlet	S4.001	Free Discharge
16	Outlet	S4.002	Free Discharge
15	Outlet	S5.000	Free Discharge
17	Outlet	S4.003	Free Discharge
19	Outlet	S1.011	Free Discharge
21 Flow Control	Outlet	S1.012	Hydro-Brake®
	Invert Elevation (m)	40.674	
	Design Depth (m)	1.400	
	Design Flow (L/s)	5.0	
	Objective	Minimize Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0100-5000-1400-5000	
			
20	Outlet	S6.000	Free Discharge
22	Outlet	S1.013	Free Discharge

Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		


COYLE KENNEDY
 Consulting Engineers



Tank

Type : Tank

Dimensions

Exceedance Elevation (m)	43.500
Depth (m)	2.400
Base Elevation (m)	41.100
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	0.00
Total Volume (m³)	642.700

Depth (m)	Area (m²)	Volume (m³)
0.000	675.00	0.000
0.950	675.00	641.250

Inlets

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	S4.003
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (4)

Inlet Type	Point Inflow
Incoming Item(s)	S1.009
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

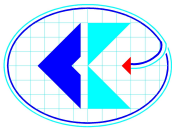
Outlet

Outgoing Connection	S1.010
Outlet Type	Free Discharge

Advanced

Perimeter	Rectangular
Length (m)	45.000

Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		


COYLE KENNEDY
 Consulting Engineers

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Sim Criteria FSR

Type: FSR

Return Period (years)	100.0
Region	Scotland and Ireland
M5-60 (mm)	17.2
Ratio R	0.300

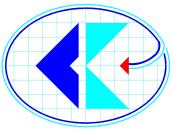
Pipe Options

Lock Slope Options	None
Design Options	Minimize Excavation
Design Level	Level Crowns
Min. Slope (1:x)	1000.00
Max. Slope (1:x)	40.00
Use Flow Restriction	☒
Reduce Channel Depths	☒

Manhole Options

Apply Offset	☐
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Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		

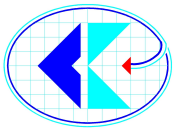


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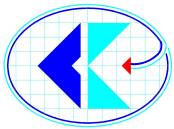
Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevat ion (m)	Invert Elevat ion (m)	Max. Elevati on (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
1	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	51.50 0	50.15 0	51.138	0.988	40.3	1.118	0.000	30.9	17.476	Surcharged
2	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	51.50 0	49.68 9	50.207	0.518	67.8	0.586	0.000	62.4	33.481	Surcharged
3	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	51.50 0	48.50 0	48.914	0.414	113.9	0.468	0.000	98.1	55.807	Surcharged
4	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	48.10 0	46.59 9	47.583	0.984	99.8	1.112	0.000	94.3	56.571	Surcharged
5	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	48.00 0	46.49 9	47.178	0.679	107.9	0.768	0.000	104.6	62.460	Surcharged
6	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	47.80 0	45.82 4	46.087	0.263	111.9	0.297	0.000	109.2	65.649	OK
7	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	47.00 0	45.42 4	45.657	0.233	114.6	0.264	0.000	111.7	67.922	OK
9	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	47.02 0	45.28 9	45.498	0.209	139.8	0.236	0.000	132.9	80.269	OK
8	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	48.80 0	47.10 0	47.189	0.089	28.9	0.101	0.000	28.2	12.529	OK
10	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	44.85 0	43.90 3	44.064	0.161	132.9	0.182	0.000	131.7	80.290	OK
12	Sim Criteria FSR: 100 years: +20 %: 30 mins: Summer	44.25 0	42.64 7	43.284	0.637	177.2	0.720	0.000	175.0	154.215	Surcharged
11	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	45.87 0	44.40 0	44.548	0.148	76.2	0.167	0.000	74.3	32.495	OK
13	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	46.50 0	45.15 0	45.768	0.618	42.9	0.699	0.000	36.6	18.639	Surcharged
14	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	46.20 0	44.50 8	44.702	0.194	111.3	0.219	0.000	107.5	51.058	OK
16	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	45.30 0	42.65 0	42.822	0.172	138.1	0.195	0.000	137.3	66.271	OK
15	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	44.85 0	43.65 0	43.876	0.226	25.8	0.255	0.000	21.3	11.211	Surcharged
17	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	43.50 0	41.60 0	42.495	0.895	224.9	1.012	0.000	219.9	104.276	Surcharged
19	Sim Criteria FSR: 100 years: +20 %: 960 mins: Winter	42.50 0	40.99 8	42.049	1.051	6.5	1.504	0.000	5.4	465.826	Surcharged
21 Flow Control	Sim Criteria FSR: 100 years: +20 %: 960 mins: Winter	42.30 0	40.67 4	42.048	1.374	5.8	2.429	0.000	5.0	506.345	Surcharged

Ballyburke: Neighbourhood Centre & Social Housing Scheme		Date: 06/12/2023			 COYLE KENNEDY Consulting Engineers
		Designed by: AC	Checked by: BC	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Storm		Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway			

20	Sim Criteria FSR: 100 years: +20 %: 960 mins: Winter	43.70 0	41.50 0	42.048	0.548	2.0	0.620	0.000	1.9	45.272	Surcharged
22	Sim Criteria FSR: 30 years: +20 %: 240 mins: Summer	42.20 0	40.64 4	40.689	0.045	5.0	0.065	0.000	5.0	114.893	OK
Outfall	Sim Criteria FSR: 100 years: +20 %: 480 mins: Summer	42.20 0	40.58 2	40.626	0.044	5.0	0.000	0.000	5.0	254.702	OK

Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		



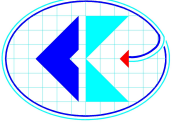
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Consulting Engineers



Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Elevation (m)	Max. DS Elevation (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Tank	Sim Criteria FSR: 100 years: +20 %: 960 mins: Winter	42.049	42.049	0.949	0.949	37.3	640.511	0.000	0.000	6.5	469.388	1224	0.341

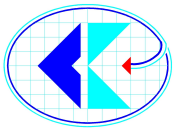
Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		


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Status

OK

Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Connections Summary Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		

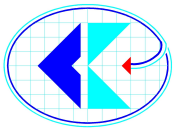


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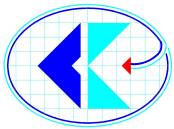
Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Elevation (m)	Max. US Water Elevation (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	1	2	51.500	51.138	0.150	17.476	1.7	1.55	30.9	Surcharged
S1.001	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	2	3	51.500	50.207	0.225	33.481	1.6	1.34	62.4	Surcharged
S1.002	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	3	4	51.500	48.914	0.225	55.807	2.5	0.8	98.1	Surcharged
S1.003	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	4	5	48.100	47.583	0.225	56.571	2.4	1.69	94.3	Surcharged
S1.004	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	5	6	48.000	47.178	0.225	62.460	2.6	1.22	104.6	Surcharged
S1.005	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	6	7	47.800	46.087	0.248	65.649	1.7	0.95	109.2	OK
S1.006	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	7	9	47.000	45.657	0.221	67.922	2.0	0.63	111.7	OK
S2.000	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	8	9	48.800	47.189	0.087	12.529	2.7	0.61	28.2	OK
S1.007	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	9	10	47.020	45.498	0.201	80.269	2.6	0.75	132.9	OK
S1.008	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	10	12	44.850	44.064	0.300	80.290	1.9	0.55	131.7	OK
S3.000	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	11	12	45.870	44.548	0.225	32.495	1.9	0.75	74.3	OK

Ballyburke: Neighbourhood Centre & Social Housing Scheme				Date: 06/12/2023			 COYLE KENNEDY Consulting Engineers		
				Designed by: AC	Checked by: BC	Approved By:			
Report Details: Type: Connections Summary Storm Phase: Storm				Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway					

S4.000	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	13	14	46.500	45.768	0.150	18.639	2.1	1.3	36.6	Surcharged
S4.001	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	14	16	46.200	44.702	0.182	51.058	3.1	0.92	107.5	OK
S5.000	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	15	16	44.850	43.876	0.150	11.211	1.2	1.07	21.3	Surcharged
S4.002	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	16	17	45.300	42.822	0.300	66.271	2.4	0.62	137.3	OK
S1.011	Sim Criteria FSR: 100 years: +20 %: 60 mins: Winter	Pipe	19	21 Flow Control	42.500	41.653	0.375	12.441	0.2	0.05	8.8	Surcharged
S6.000	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	20	21 Flow Control	43.700	41.607	0.150	11.621	1.5	0.8	26.2	OK
S1.012	Sim Criteria FSR: 30 years: +20 %: 2160 mins: Winter	Pipe	21 Flow Control	22	42.300	41.761	0.046	904.022	0.6	0.02	5.0	Surcharged
S1.013	Sim Criteria FSR: 100 years: +20 %: 480 mins: Summer	Pipe	22	Outfall	42.200	40.689	0.044	254.702	0.6	0.02	5.0	OK
S4.003	Sim Criteria FSR: 100 years: +20 %: 15 mins: Summer	Pipe	17	Tank	43.500	42.495	0.300	104.276	3.1	1.91	219.9	Surcharged
S1.009	Sim Criteria FSR: 100 years: +20 %: 30 mins: Summer	Pipe	12	Tank	44.250	43.284	0.300	154.215	2.5	1.1	175.0	Surcharged
S1.010	Sim Criteria FSR: 30 years: +20 %: 60 mins: Winter	Pipe	Tank	19	43.500	41.520	0.375	20.578	0.8	0.11	19.3	Surcharged

Ballyburke: Neighbourhood Centre & Social Housing Scheme	Date: 06/12/2023		
	Designed by: AC	Checked by: BC	Approved By:
Report Details: Type: Phase Management Storm Phase: Storm	Coyle Kennedy Consulting Engineers: GFSC Moneenageisha Road Galway		


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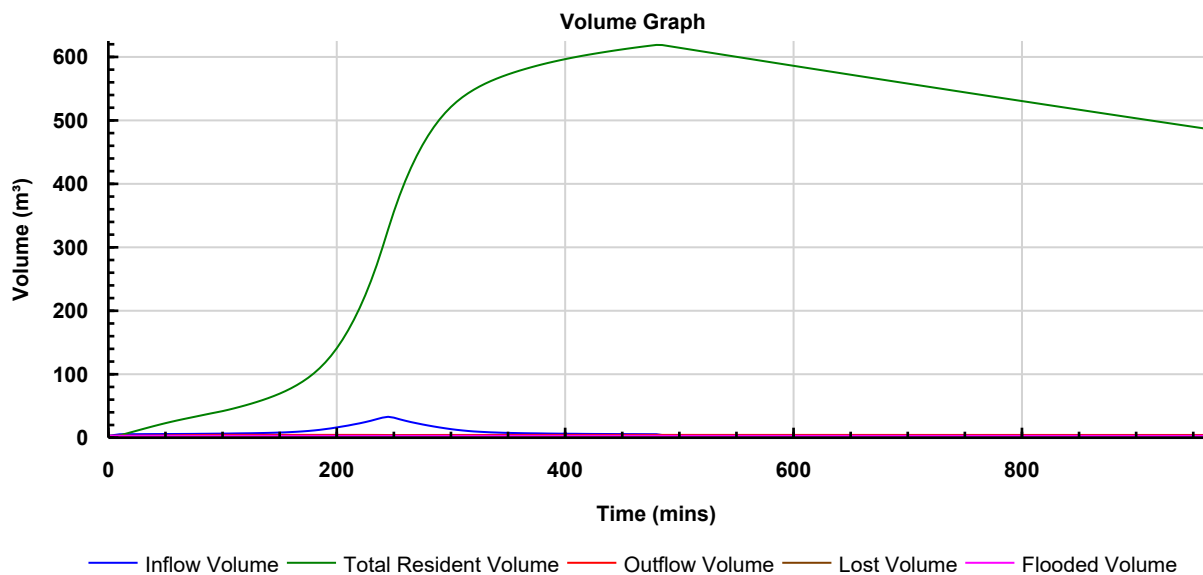
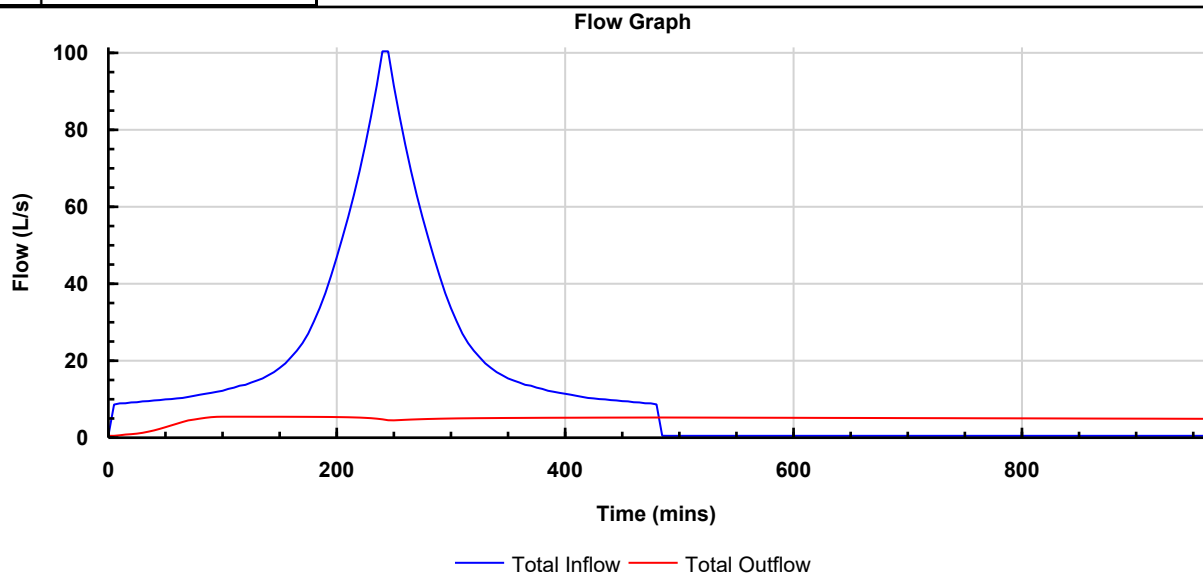


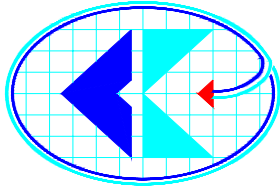
Storm
Sim Criteria FSR: 100 years: Increase Rainfall (%): +20: 480 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Outfall			5.0	254.702
TOTAL	100.4	739.956	5.0	254.702

Graphs



F_d -11/0

COYLE KENNEDY

Consulting Engineers

GFSC, Moneenageisha Road, Galway

Tel: +353 (0)91 752000

Fax: +353 (0)91 753000

website: www.coylekennedy.com

email: mail@coylekennedy.com

Date	06-Dec-23	Project No.	Sheet No.
Eng.	AC	21-150	1 of 1
Checked	BC		

CONTRACT

**Ballyburke Neighbourhood Centre
& Social Housing Scheme**

Flood Studies Method based on Institute of Hydrology Report No. 124

Attenuation Zone 1

Discharge Limit < = 5 l/s

Greenfield Site Area 1.8 Hectares

Road/Roof/Paved Area 1.12 Hectares

Catchment Data

SAAR 1252 mm

Soil 0.3

Tot Area 0.0180 km²Paved Area 0.0112 km²

r 0.3

R5_48H 63.3 mm

R5_1H 15.8 mm

Q_{bar} 0.00500 m³/s

Climate Change 20%

T year Peak Runoff Rate

Return Period	G Factor	Q _{return}
2	0.95	0.00475
5	1.2	0.006
10	1.37	0.00685
25	1.6	0.008
30	1.64	0.0082
50	1.77	0.00885
100	1.88	0.0094

100,30 & 20 Year Rainfall Depth of Different Durations

Duration (hrs)	Rd	D_R5 (mm)	G20	D_R20 (mm)	G30	D_R30 (mm)	G100	D_R100 (mm)
0.5	0.24	12.50	1.39	17.38	1.493	18.66	1.78	25.60
1.0	0.30	16.10	1.38	22.22	1.487	23.94	1.73	27.80
3.0	0.44	23.80	1.37	32.61	1.463	34.82	1.66	39.60
6.0	0.52	30.60	1.36	41.62	1.447	44.28	1.62	49.50
12.0	0.67	39.20	1.35	52.92	1.427	55.94	1.58	63.50
18.0	0.75	45.40	1.34	60.84	1.417	64.33	1.55	70.50
24.0	0.85	50.30	1.33	66.90	1.397	70.27	1.54	77.50
36.0	0.94	56.20	1.32	74.18	1.387	77.95	1.54	58.70
48.0	1.00	62.10	1.31	81.35	1.377	85.51	1.51	93.90

Storage Volumes based on Institute of Hydrology Report No. 124 for a 100 Year Return Period

Duration (hrs)	Vol In (m ³)	Vol out (m ³)	Storage (m ³)
0.5	344.06	9.00	335.06
1	373.63	18.00	355.63
3	532.22	54.00	478.22
6	665.28	108.00	557.28
12	853.44	216.00	637.44
18	947.52	324.00	623.52
24	1041.60	432.00	609.60
36	788.93	648.00	140.93
48	1262.02	864.00	398.02

All rainfall data taken from
Met Eireann Rainfall Model

Coyle Kennedy Consulting Engineers		Page 1
GFSC Moneenageisha Road Galway H91 P48P Ireland	Ballyburke Neighbourhood Centre & Social Housing Scheme	
Date 28/02/2023 File 21-150-March 2023_cdf_c...	Designed by AC Checked by BC	
Innovyze	Network 2020.1.3	

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	180

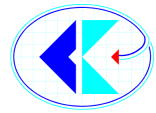
Designed with Level Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
F1.000	27.844	0.633	44.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F1.001	37.475	0.852	44.0	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
F1.002	37.560	1.633	23.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
F1.003	6.018	0.262	23.0	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
F1.004	25.248	0.505	50.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F1.005	37.971	0.475	79.9	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
F2.000	25.499	1.109	23.0	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
F1.006	82.131	2.738	30.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
F3.000	48.752	1.218	40.0	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
F1.007	73.040	1.826	40.0	0.000	0	0.0	1.500	o	225	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	E Area (ha)	E Base Flow (l/s)	E Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
F1.000	50.000	0.000	0.0	6	0.0	10	0.38	1.32	23.4	0.2
F1.001	49.367	0.000	0.0	13	0.0	14	0.49	1.32	23.4	0.4
F1.002	48.440	0.000	0.0	21	0.0	14	0.67	2.40	95.4	0.7
F1.003	46.807	0.000	0.0	29	0.0	16	0.74	2.40	95.5	0.9
F1.004	46.545	0.000	0.0	29	0.0	19	0.57	1.63	64.6	0.9
F1.005	46.040	0.000	0.0	37	0.0	24	0.52	1.28	51.1	1.2
F2.000	46.850	0.000	0.0	6	0.0	9	0.47	1.83	32.4	0.2
F1.006	45.565	0.000	0.0	43	0.0	20	0.77	2.10	83.5	1.3
F3.000	44.150	0.000	0.0	12	0.0	13	0.49	1.39	24.5	0.4
F1.007	42.827	0.000	0.0	55	0.0	24	0.75	1.82	72.3	1.7



Appendix 2 Irish Water Letter - Satisfactory Response

CONFIRMATION OF FEASIBILITY

Alan Clancy

GFSC

Moneenageisha Road

Co. Galway

H91P48

16 November 2022

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

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

www.water.ie

**Our Ref: CDS22006947 Pre-Connection Enquiry
Ballyburke, Galway, Galway**

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 92 unit(s) at Ballyburke, Galway, Galway, (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

The Development can connect as proposed to the existing 180mm main on Bóthar Bhaile na mBúrcach.

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

The Development can connect as proposed to the existing 225mm sewer on Bóthar Bhaile na mBúrcach west of the site. The connection to this sewer must be in compliance with requirements of Irish Water Code of Practice and Standard Details, including the minimum size requirements.

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/

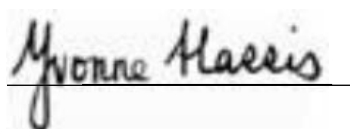
Where can you find more information?

- **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,

A handwritten signature in black ink, reading 'Yvonne Harris', written over a horizontal line.

Yvonne Harris
Head of Customer Operations

Section A - What is important to know?

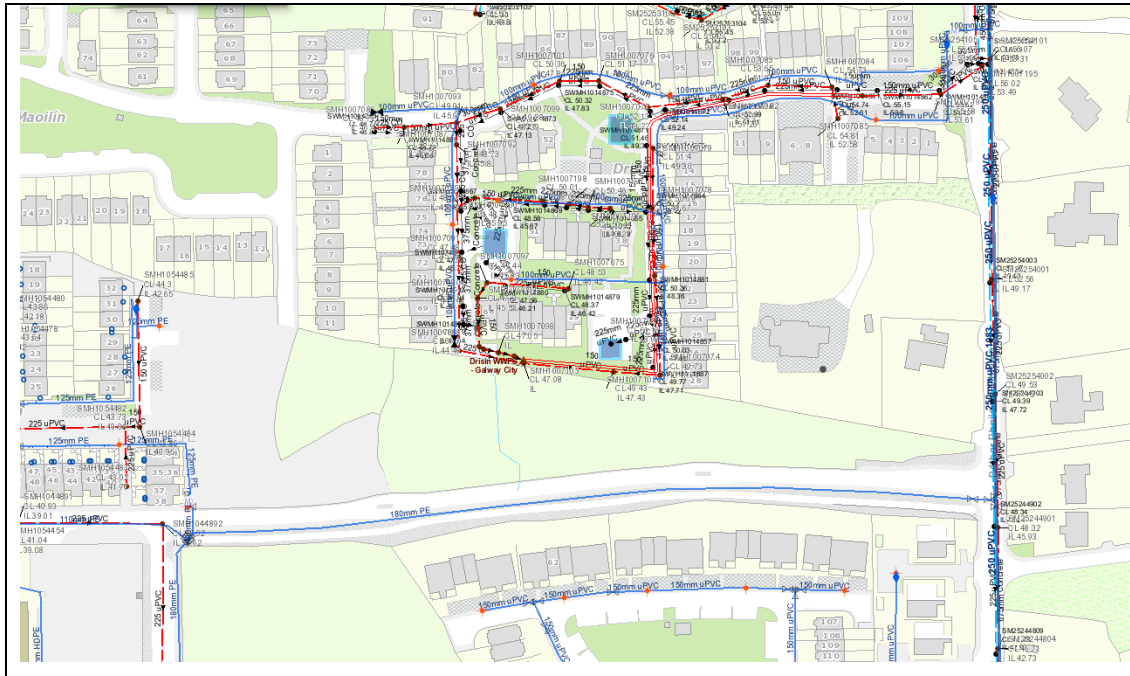
What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Irish Water.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *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
Fire flow Requirements	• 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
Plan for disposal of storm water	• 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.
Where do I find details of Irish Water's network(s)?	• Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• 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
Trade Effluent Licensing	• 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/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

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



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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.

