KILKENNY COUNTY COUNCIL
Refurbishment & Extension at Mayfair, Kilkenny
Water Infrastructure Design Report (WIDR01)

November 2014

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DOCUMENT CONTROL SHEET

	Client	Kilkenny County Council
	Project Title	Proposed Refurbishment & Extension at Mayfair,Kilkenny.
	Project Ref.	141114
	Document Title	Water Infrastructure Design Report
	Document No.	141114-WIDR01

This Document Comprises	DCS	TOC	Text	LOT	LOG	LOF	LOD	Appendices
	1	1	6	-	-	-	-	2
Check								

Revision	Status	Author	Reviewed By	Approved By	Issues Date
D01	Draft	LMJ	MJP	MJP	13-11-14
F01	**Final**	**LMJ**	**MJP**	**MJP**	**17-11-14**

Contents:

APPENDICES:

1.0   INTRODUCTION

1.1   General

1.1.1   This report which has been prepared by MPA Consulting Engineers and contains information on the design of foul drainage system, storm water drainage system and watermain to be constructed for the proposed development at Mayfair, Kilkenny.

1.1.2   The application relates to a site of approximately 0.2 hectares. All designs have been carried out to take account of all development proposed on site.

1.1.3   The design of the systems has been carried out to take account of the requirements of the Building Regulations, BS8301: Code of Practice for Building Drainage and the requirements of Kilkenny County Council. The foul sewer has been designed in accordance with the Colebrook-White formulas, B.S. 752: 2008, Drain & Sewer Systems and the current Building Regulations. Calculations of design flows were carried out using the Discharge Units Method in accordance with BS EN 12056-2:2000.

1.1.4   The existing building is currently served by mains foul by means of a gravity sewer, the site is currently served by the existing storm drainage within the site which discharges to the Breagagh River. The site is also served by public mains water served from the adjoining site.

1.1.1   The proposed foul system is a gravity feed system which conveys the effluent to the existing public main which crosses the former Brewery site.

1.1.2   The storm water system proposed for the development is a gravity system which conveys storm water to the existing storm drainage network within the adjoining site. This storm water network discharges under licence to the adjacent Breagagh River, after passing through an existing petrol/oil interceptor.

1.1.3   The proposed watermain will connect to the public supply on WaterGate Street.

2.0   FOUL DRAINAGE SYSTEM

2.1   General

2.1.1   There is an existing foul sewer network servicing the existing building on the propsoed site. This network is connected to the public mains which passes through the St Francis Brewery site and exists onto Horse Barack Lane. Due to the nature of the extension & refurbishment works to be carried out it is necessary to provide a new foul sewer network.

2.1.2   The foul sewer has been designed in accordance with the Colebrook-White formulas, BS EN 752:2008 – Drain & Sewer Systems Outside Buildings and the current Building Regulations. Calculations of design flows were carried out using the Discharge Units Method in accordance with BS EN 12056-2:2000 Gravity Drainage Systems.

2.1.3   The drawings included with this submission show the proposed Foul Sewer Layout (Drawing No. 141114/PL/003) and Sewer Longitudinal Sections (Drawing No. 141114/PL/020).

2.1.4   The proposed system consists of gravity sewers on the site which convey all the effluent from the proposed development to a Local Authority foul sewer which crosses the lands adjacent to the proposed site.

2.2   Gravity System

2.2.1   The pipes for the foul sewerage system consist of 100mm diameter uPVC pipes, at gradients varying from 1:55 to 1:80. The foul system has been designed to take account of all foul drainage requirements on the proposed site.

2.2.2   The foul sewer design sheet is shown in Appendix A, it can be seen here that the maximum peak flow is 4.5 l/s. This figure was determined by using the discharge units set out in BS EN 12056-2:2000, based on the layout of the proposed building.

2.2.3   The proportional velocities have been extrapolated from the Wavinsewer Systems Design Manual for uPVC pipes based on the proportional capacity, and from this the partial velocity / design velocity has been calculated.

2.2.4   It can be seen in Appendix A that all pipes have been designed with adequate capacity and the partial velocities for all pipes are 0.70 m/s or greater as per BS EN 752:2008 – Drain & Sewer Systems Outside Buildings, thereby ensuring adequate self-cleansing velocities for the entire system.

3.0   STORM

3.1   General

3.1.1   There is an existing storm water network servicing the existing site. The existing site is comprised of buildings, covered areas and hard standing areas, therefore all storm water falling on the site is collected via the existing network. This network is connected into the overall drainage network of the St Francis Brewery site which discharges to the Breagagh River.

3.1.2   The proposed development shall generate no additional storm water runoff, however due to the proposed extension a new storm water network will be provided.

3.1.3   It is proposed to provide a new gravity storm water network on the site, connecting to the existing storm water network which is located on the adjoining lands. This existing storm sewer discharges to the Breagagh River via an existing petrol/oil interceptor.

3.1.4   The gravity storm sewer system has been designed in accordance with the Colebrook-White formulas and the Modified Rational Method, where:

$Q_p = CiA$

and

$Q_p = $ Peak Flow (l/s)

$C = C_v \times C_r$ ($C_v = 0.75$ & $C_r = 1.3$)

$i = $ Rainfall intensity (mm/hr)

3.1.5   A storm sewer layout has been included with this submission (Drawing No. 141114/PL/003), and Sewer Longitudinal Sections (Drawing No. 141114/PL/020)

3.2   Gravity System

3.2.1   The pipe network serving the development has been designed in accordance with the Modified Rational Method, utilising rainfall data for the Kilkenny area from Met Eireann. The rational design sheet has been included in Appendix B of this report.

3.2.2   As can be seen from these tables the storm frequency proposed is 1 in 2 years, thereby ensuring an appropriate level of service for the storm drainage system. The time of entry has been taken to be 4 minutes in accordance with Recommendations for Site Development Works. Appropriate pipe roughness coefficients have been taken from the pipe manufacturer's literature.

3.2.3   The pipes required to drain the proposed development are 100mm & 150mm in diameter, all at falls of not less than 1/80.

3.2.4   It can be seen in Appendix B that all pipes have been designed with adequate capacity and the partial velocities for all pipes are above 0.70 m/s, as per BS EN 752:2008 – Drain & Sewer Systems Outside Buildings, thereby ensuring adequate self-cleansing velocities for the entire system.

4.0   WATERMAIN

4.1   General

4.1.1   The water main will be laid out as per Drawing No. 141114/PL/004 - Proposed Watermain Layout. Watermain Details (Drawing No. 141114/PL/031) have also been included in this submission.

4.1.2   A 100mm diameter cPVC watermain will serve the development. This will be served by connecting to the existing public supply water main fronting the site on WaterGate Street.

4.2   Design Data

4.2.1   A water meter, air valves, scour valves, stop cocks and sluice valves as required, will be provided around the site as shown on the Watermain Layout Drawing No. 141114/PL/004.

4.2.2   Screw down type fire hydrants complying with B.S. 750: 1984 will be provided as shown, as can be seen hydrants are not located in roadways or parking spaces, and no building is more than 46m from a hydrant. Hydrant outlets will be no more than 300mm below finished ground level.

4.2.3   A looped water main layout is to be adopted to ensure no dead ends and provide balanced pressure throughout.

5.0   SUMMARY AND CONCLUSIONS

5.1   Summary

5.1.1   This report which has been prepared by MPA Consulting Engineers and contains information on the design of the foul drainage, storm water drainage and watermain to be constructed for the proposed refurbishment & extension of the development at Mayfair, Kilkenny.

5.1.2   All pipes in the proposed foul gravity system have been set up so as to ensure adequate capacity and self-cleansing velocities are obtained. These velocities are designed to be a minimum of 0.70 m/s in the foul line which conveys the effluent to a local authority sewer which runs through the former Brewery site.

5.1.3   The storm drainage strategy caters for all storm water collected within the site. The proposed storm drainage shall be connected into the existing storm sewer located on the adjacent site, as shown on Storm Drainage Drawing No. 141114/PL/003

5.1.4   A connection to a potable water supply can be made easily via an existing watermain on WaterGate Street fronting the site.

5.2   Conclusions

5.2.1   The report has shown that the foul drainage proposed for the site has sufficient capacity and a connection to an appropriate public mains can be established without difficulty, thus ensuring adequate drainage for the proposed development.

5.2.2   As can be seen from the preceding information, the new storm system on the site has sufficient capacity, and connection to an appropriate outfall can be established without difficulty, thus ensuring adequate drainage for the proposed development.

Appendix A

Foul Sewer Design Sheets

(Design in accordance with BS8301:1985 CODE OF PRACTICE FOR BUILDING DRAINAGE)

1	Kinematic Viscosity	1.12	mm/s(2)

2	Effective roughness	0.6	mm

Sewer Ref.		US/CL m	US/IL m	DS/IL m	Length m	Grad 1 in	Dia mm	Cover to US Soffit m	Vel m/s	Discharge Units Per Run	Cum	Freqency Factor K	Peak Flow l/s	Capacity l/s	Proportional Capacity	Proportional Velocity	Design Velocity m/s
F1.0	F1.1	45.890	44.174	44.080	7.5	80	100	1.616	0.86	15	15	0.7	2.7	6.72	0.403	0.936	0.80
F1.1	F1.2	44.880	44.080	43.850	18.4	80	100	0.700	0.85	0	15	0.7	2.7	6.71	0.404	0.937	0.80
F1.2	F1.3	44.780	43.850	43.756	7.5	80	100	0.830	0.85	0	15	0.7	2.7	6.72	0.404	0.936	0.80
F2.0	F2.1	45.900	45.470	45.304	9.1	55	100	0.330	1.03	2	2	0.7	1.0	8.10	0.122	0.685	0.71
F2.1	F2.2	45.910	45.304	45.049	14	55	100	0.506	1.03	0	2	0.7	1.0	8.10	0.122	0.685	0.71
F2.2	F2.3	45.910	44.049	43.827	12.2	55	100	1.761	1.03	0	2	0.7	1.0	8.09	0.122	0.685	0.71
F2.3	F2.4	44.654	43.827	43.655	13.8	80	100	0.727	0.85	3	5	0.7	1.6	6.71	0.233	0.814	0.70
F2.4	F2.5	44.720	43.655	43.454	16.1	80	100	0.965	0.85	0	5	0.7	1.6	6.71	0.233	0.814	0.70
F2.5	F2.6	44.740	43.454	43.334	9.6	80	100	1.186	0.85	0	5	0.7	1.6	6.71	0.233	0.814	0.70
F2.6	F1.3	44.750	43.334	43.244	7.2	80	100	1.316	0.85	21	26	0.7	3.6	6.71	0.532	1.030	0.88
F1.3	EXT	44.760	43.244	43.130	9.1	80	100	1.416	0.85	15	41	0.7	4.5	6.71	0.668	1.071	0.92

Appendix B

Storm Sewer Design Sheets

Surface Water Sewer Network Schedule

Design Data: Station Name -   Kilkenny

M5-2min   3.1   Design return period   2

Ks =   0.06 uPVC   Ks =   0.60 Concrete

US MH Ref:		US MH CL [mod]	US MH IL [mod]	DS MH IL [mod]	Length [m]	Gradient [1 in…]	Pipe Diameter [mm]	Cover to US Soffit [m]	Velocity [m/s]	Time of Flow [min]	Time of Conc. [min]	Rate of Rainfall [mm/hr]	Total Area [m2]	% Imperv.	Imperv. Area [m2]	Cumul. Imperv. Area [m2]	Actual Rate of Flow [m3/s]	Allow. Rate of Flow [m3/s]	Proportional Capacity	Proportional Velocity	Design Velocity [m/s]	Note
S1.0	S1.1	45.900	45.350	45.239	11.1	100	100	0.450	0.96	0.192	4.192	57.02	146	100	146	146	0.002	0.008	0.30	0.855	0.82	
S1.1	S1.2	45.910	45.239	45.089	15	100	100	0.571	0.96	0.260	4.452	55.75	0	100	0	146	0.002	0.008	0.29	0.851	0.82	
S1.2	S1.3	45.910	44.126	43.904	22.2	100	150	1.634	1.26	0.295	4.746	54.40	669	100	669	815	0.012	0.022	0.54	1.034	1.30	
S1.3	S1.4	44.654	43.904	43.434	47	100	150	0.600	1.26	0.624	5.370	51.87	316	100	316	1131	0.016	0.022	0.72	1.076	1.35	
S1.4	S1.5	44.760	43.434	43.340	9.4	100	150	1.176	1.26	0.125	5.495	51.41	0	100	0	1131	0.016	0.022	0.71	1.075	1.35	
S1.5	S1.6	44.800	43.340	42.970	37	100	150	1.310	1.26	0.491	5.986	49.71	383	100	383	1514	0.020	0.022	0.92	1.138	1.43	
S2.0	S2.1	45.890	45.240	45.179	6.1	100	100	0.550	0.96	0.106	4.106	57.47	90	100	90	90	0.001	0.008	0.19	0.777	0.75	
S2.1	S2.2	45.890	44.305	44.180	12.5	100	100	1.485	0.96	0.216	4.322	56.37	172	100	172	262	0.004	0.008	0.53	1.028	0.99	
S2.2	S1.5	44.880	44.180	44.080	10	100	100	0.600	0.96	0.173	4.495	55.54	121	100	121	383	0.006	0.008	0.76	1.083	1.04	
S2.4	S1.2	44.900	44.240	44.126	9.1	80	100	0.560	1.09	0.140	4.140	57.29	265	100	265	265	0.004	0.009	0.48	0.998	1.08	