

# MMOS

MURPHY · MATSON · O'SULLIVAN

CONSULTING CIVIL & STRUCTURAL ENGINEERS

## Engineering Services Report

Rev. 04

Residential Development at 348  
Harold's Cross Road,

Dublin 6W

Prepared by: DO'S

Murphy Matson O'Sullivan

Consulting Civil & Structural Engineers

51 Bracken Road, Sandyford Business Park, Dublin 18

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Project Reference 18\_322

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<b>Revision</b>	<b>Date</b>	<b>Issue</b>	<b>Author</b>	<b>Checked By</b>
0	26.09.19	Issue for Planning Review	DOS	MM
1	04.10.19	Issue for Planning review	DOS	MM
2	26.05.20	Issue for Planning review	DOS	MM
3	15.06.20	Issue for Planning review	DOS	MM
4	26.06.20	Issue for Planning	DOS	MM

## **1.0 Introduction**

This Civil Engineering report is to be read in conjunction with the Civil Engineering planning drawings and relevant architects' drawings. MMOS Consulting Engineers were requested to undertake this report on behalf of AAI Kenilworth Ltd. for the proposed development.

## **2.0 Site Location and Description of Proposal**

The site is located on Harold's Cross Road, Dublin 6W and is circa 3 Km south of Dublin City Centre. The site area is approx. 0.23 ha, including some adjoining lands in the control of DCC incorporated to allow for improvements to the adjoining public realm. The Applicant's landholding, which currently accommodates a car showroom and maintenance garage, measures c. 0.216 Ha and is accessed directly off Harold's Cross Road. See fig. 1 for location. The site for the proposed scheme has an existing Car Dealership (part single, part double storey) with large sheds, associated small outbuildings and existing hardstanding and yard areas to the rear, surrounded by a circa 2m - 3m ht. boundary wall. The existing buildings are to be demolished for the construction of a Shared Living building. This building is to consist of 201 bed spaces set out over 174no. bedrooms with shared kitchen/living facilities, communal facilities, a gym, and supporting uses. The development is set out in 1 main building 'L' shaped in plan, with plant, laundry and storage rooms at basement level and communal facilities at the split-level Ground Floor. There are bedrooms and associated kitchen facilities to the front (east) end of Ground Floor level. This building is proposed to be 2 to 5-storeys over basement (with the top-level penthouse over with setbacks). The development has no car parking proposed and is to be serviced by bus route and will accommodate 210no. bike spaces.

Refer to Shipsey Barry Architects drawings for general layouts, sections and elevations.



**Figure 1 – Site Location**

The existing site levels vary from +35.50m AOD at the western (rear) end of the site to +33.20m AOD at the eastern end (front, Harold's Cross Road side). The site topography generally falls west to east, circa 2m.

### **3.0 Surface Water Discharge**

Storm water from the upper roof areas will drain, via RW outlets, gullies, downpipes and suspended SW drainage pipework, to a gravity network of below ground surface water sewers on the southern and northern sides of the proposed building. These drains will also collect run-off from rear hardstanding and will drain by gravity to an onsite attenuation facility proposed at Basement level (near central location on site and located at the western end of the proposed basement). Attenuation capacity is designed for a 1 in 100 year storm event + 20% allowance for climate change. Attenuation will be provided by a 72m<sup>3</sup> below ground storage facility. Surface water outfall from the attenuation tank is to be restricted by a hydrobrake. The applicant's landholding (C. 0216ha) is used to calculate the theoretical greenfield run off rate of 2l/s and this was used to calculate the required attenuation storage (the adjoining lands in the control of DCC, which are incorporated into the Application site to allow improvements to the public realm, are already drained to the existing public system).

The peak stormwater discharge is therefore to be restricted to 2.0 l/s and is to outfall from site by gravity to the existing 450mm diam. combined sewer on the west side of Harold's Cross Road, adjacent to the eastern end of the site. This compares favourably with the existing peak run-off rate from site of circa 35 l/s, giving a much-reduced site discharge to the existing SW system should the site be developed.

**SUDS** measures such as a Green Roof over 70% of new roof area, below ground rainwater harvesting tank and, as previously noted, a below ground attenuation storage facility, are to be used within the site. These measures will reduce peak storm water run-off and promote polishing and improve quality of surface water and increase urban biodiversity within the site. The proposed rainwater harvesting tank will provide grey water, from roof/down pipe collection of rainwater run-off, to be used for general washdown purposes and for watering of planted areas. This will reduce the overall water demand of the proposed development. Petrol interceptors are not required as there is no car park hardstanding proposed within the site.

A Green Roof is to be provided on the flat roof of the building. The system proposed for majority of green roof area will incorporate a Sedum type Blanket over a Bauder DSE40 water retention/drainage and protection layer green roof system (or similar approved). This is an Extensive type of green roof which provides a water storage capacity of 13.5 Litres/m<sup>2</sup> and will provide interception storage for the first 5-10mm of rainfall. As well as improving water quality by providing surface water interception and infiltration, green roofs improve biodiversity by providing habitat for wildlife, all in accordance with SuDS guidelines.

Refer to MMOS Engineers drawings 18322-MMS-ZZ-ST-DR-C-10000, 10001 & 10002 for full details of proposed SW drainage system (Proposed Services Plan, Basement & Ground Floor Level GA's and Longitudinal Sections thru' Drain runs), and architects Roof plan for extent of Green roof areas.

## **Surface Water Drainage Design – Pipe Sizing**

Site is split with SW drain runs on south and north side of building running to the near central attenuation tank, each run taking circa 1/4 of site area

### **Conservatively check outfall pipe for circa 1/2 of site area**

*Contributing Area = 750m<sup>2</sup> roof + 300m<sup>2</sup> hardstanding max.*

$$Q = ((0.075 \times 75) + (0.03 \times 50)) \times 2.78 = 20 \text{ l/s}$$

*Add 20% for climate change, Q = 24 l/s*

*For 225mm diam. @ 1/150, Ks = 0.6mm*

*Capacity = 42 l/s; Velocity = 1.05m/s => 225mm diam. pipe OK*

*For attenuation design and sizing refer to Micro Drainage calcs 01-04 incl.*

## **4.0 Foul Water Discharge**

There is an existing 150mm diam. foul sewer in Laundry Lane and a 450mm combined sewer in Harold's Cross Road. It is intended to collect all Foul drainage in a gravity sewer network running along the northern and eastern ends of the site and outfall 100 % of foul drainage to the sewer in Harold's Cross Road. Refer to MMOS drawing 18323-MMS-ZZ-ST-DR-C-10000 & 10001 Proposed Services Plans, Basement and Ground Floor GA's and drawing 10002 for Longitudinal section details thru' Drain runs.

Total Foul Water outfall

(201max. occupants) x 180 l/day = 36,180 l/day

DWF =  $36,180 / 24 \times 60 \times 60 = 0.419$  litres/sec

Peak Flow = 6 x DWF = 2.513 litres/sec

### **Foul Sewer Pipe Sizing**

Peak flow =  $2.625 / 2 = 1.3125$  l/s

By inspection 150mm diam. pipe at 1/150 min. fall

Capacity = 11.5 l/s => Pipe okay by inspection

Use 225mm diam. as required by Irish Water where necessary.

## **5.0 Water Supply**

There is a 150mm diam. public watermain in Harold's Cross Road & a 125mm diam. public watermain in Laundry Lane. It is intended to take a 150mm branch connection from the existing 150mm diam. branch connection to serve the development. The connection will be metered and fire fighting requirements for the site will be subject to detailed design and agreement with the local authority.

Refer to section 4.0 above for total water demand. The proposed development will require 36.18m<sup>3</sup>/day. An onsite water storage tank will be provided to satisfy the 24hr water storage requirement.

Refer to MMOS Engineers drawings 18323-MMS-ZZ-ST-DR-C-10000 & 10001 accompanying this submission for full details of proposed water supply system (Proposed Services Plan, Basement & Ground Floor Levels).

## **6.0 Irish Water**

A Pre-connection enquiry form was submitted to Irish Water and a letter was received from Irish Water on 18<sup>th</sup> July 2019 (Connection Ref. no. CDS19002908) which stated;

"Irish Water has reviewed your pre-connection enquiry in relation to a water connection at Former Harolds Cross Motor, Harolds Cross Road, Dublin 6. Based upon the details you have provided with your pre-connection enquiry and on the capacity currently available as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network can be facilitated."

Further detailed drawings were issued to Irish Water Connections & Development Services for information/agreement and a Statement of Design Acceptance was received from Irish Water on 17<sup>th</sup> June 2020 (Connection Ref. no. CDS19002908) which stated;

"We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposal."

Both Irish Water letters outlined as above are attached to this report.



Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 313 minutes.


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	10.636	0.636	0.0	1.8	1.8	30.2	O K
30 min Summer	10.856	0.856	0.0	1.8	1.8	40.6	O K
60 min Summer	11.052	1.052	0.0	1.9	1.9	50.0	O K
120 min Summer	11.216	1.216	0.0	2.0	2.0	57.8	O K
180 min Summer	11.278	1.278	0.0	2.1	2.1	60.7	O K
240 min Summer	11.297	1.297	0.0	2.1	2.1	61.6	O K
360 min Summer	11.302	1.302	0.0	2.1	2.1	61.8	O K
480 min Summer	11.290	1.290	0.0	2.1	2.1	61.3	O K
600 min Summer	11.272	1.272	0.0	2.1	2.1	60.4	O K
720 min Summer	11.250	1.250	0.0	2.0	2.0	59.4	O K
960 min Summer	11.202	1.202	0.0	2.0	2.0	57.1	O K
1440 min Summer	11.102	1.102	0.0	1.9	1.9	52.3	O K
2160 min Summer	10.953	0.953	0.0	1.8	1.8	45.3	O K
2880 min Summer	10.814	0.814	0.0	1.8	1.8	38.7	O K
4320 min Summer	10.507	0.507	0.0	1.8	1.8	24.1	O K
5760 min Summer	10.288	0.288	0.0	1.8	1.8	13.7	O K
7200 min Summer	10.184	0.184	0.0	1.7	1.7	8.7	O K
8640 min Summer	10.129	0.129	0.0	1.6	1.6	6.1	O K
10080 min Summer	10.098	0.098	0.0	1.5	1.5	4.7	O K
15 min Winter	10.717	0.717	0.0	1.8	1.8	34.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	91.990	0.0	32.0	26
30 min Summer	62.658	0.0	43.6	40
60 min Summer	39.995	0.0	55.8	68
120 min Summer	24.904	0.0	69.5	124
180 min Summer	18.717	0.0	78.3	182
240 min Summer	15.262	0.0	85.1	232
360 min Summer	11.412	0.0	95.5	290
480 min Summer	9.274	0.0	103.5	356
600 min Summer	7.890	0.0	110.0	424
720 min Summer	6.913	0.0	115.7	494
960 min Summer	5.608	0.0	125.1	634
1440 min Summer	4.175	0.0	139.7	912
2160 min Summer	3.107	0.0	156.0	1320
2880 min Summer	2.518	0.0	168.6	1712
4320 min Summer	1.870	0.0	187.7	2468
5760 min Summer	1.512	0.0	202.5	3072
7200 min Summer	1.283	0.0	214.7	3752
8640 min Summer	1.121	0.0	225.1	4416
10080 min Summer	1.000	0.0	234.3	5144
15 min Winter	91.990	0.0	35.9	25

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	10.964	0.964	0.0	1.8	1.8	45.8	O K
60 min Winter	11.190	1.190	0.0	2.0	2.0	56.5	O K
120 min Winter	11.389	1.389	0.0	2.1	2.1	66.0	O K
180 min Winter	11.470	1.470	0.0	2.2	2.2	69.8	O K
240 min Winter	11.505	1.505	0.0	2.2	2.2	71.5	O K
<b>360 min Winter</b>	<b>11.507</b>	<b>1.507</b>	<b>0.0</b>	<b>2.2</b>	<b>2.2</b>	<b>71.6</b>	<b>O K</b>
480 min Winter	11.493	1.493	0.0	2.2	2.2	70.9	O K
600 min Winter	11.466	1.466	0.0	2.2	2.2	69.6	O K
720 min Winter	11.431	1.431	0.0	2.2	2.2	68.0	O K
960 min Winter	11.353	1.353	0.0	2.1	2.1	64.3	O K
1440 min Winter	11.190	1.190	0.0	2.0	2.0	56.5	O K
2160 min Winter	10.960	0.960	0.0	1.8	1.8	45.6	O K
2880 min Winter	10.745	0.745	0.0	1.8	1.8	35.4	O K
4320 min Winter	10.274	0.274	0.0	1.8	1.8	13.0	O K
5760 min Winter	10.130	0.130	0.0	1.6	1.6	6.2	O K
7200 min Winter	10.086	0.086	0.0	1.4	1.4	4.1	O K
8640 min Winter	10.074	0.074	0.0	1.2	1.2	3.5	O K
10080 min Winter	10.065	0.065	0.0	1.1	1.1	3.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	62.658	0.0	48.9	39
60 min Winter	39.995	0.0	62.5	68
120 min Winter	24.904	0.0	77.8	122
180 min Winter	18.717	0.0	87.7	178
240 min Winter	15.262	0.0	95.3	234
<b>360 min Winter</b>	<b>11.412</b>	<b>0.0</b>	<b>106.9</b>	<b>308</b>
480 min Winter	9.274	0.0	115.9	376
600 min Winter	7.890	0.0	123.2	454
720 min Winter	6.913	0.0	129.6	532
960 min Winter	5.608	0.0	140.1	684
1440 min Winter	4.175	0.0	156.5	982
2160 min Winter	3.107	0.0	174.8	1408
2880 min Winter	2.518	0.0	188.8	1844
4320 min Winter	1.870	0.0	210.3	2428
5760 min Winter	1.512	0.0	226.8	3056
7200 min Winter	1.283	0.0	240.5	3672
8640 min Winter	1.121	0.0	252.2	4400
10080 min Winter	1.000	0.0	262.5	5088

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Lane Business Park Monahan Road Cork Ireland		
Date 25/03/2019 13:42 File	Designed by sodonoghue Checked by	
XP Solutions		Source Control 2018.1.1


Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	17.000	Shortest Storm (mins)	15
Ratio R	0.300	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.186

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.062	4	8	0.062	8	12	0.062

MMOS Engineers		Page 4
Lane Business Park Monahan Road Cork Ireland		
Date 25/03/2019 13:42 File	Designed by sodonoghue Checked by	
XP Solutions		Source Control 2018.1.1

Model Details

Storage is Online Cover Level (m) 12.000

Cellular Storage Structure

Invert Level (m) 10.000 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	50.0	0.0	1.200	50.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0064-2000-1200-2000  
 Design Head (m) 1.200  
 Design Flow (l/s) 2.0  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 64  
 Invert Level (m) 10.000  
 Minimum Outlet Pipe Diameter (mm) 100  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.0
Flush-Flo™	0.282	1.8
Kick-Flo®	0.573	1.4
Mean Flow over Head Range	-	1.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.5	1.200	2.0	3.000	3.0	7.000	4.5
0.200	1.7	1.400	2.1	3.500	3.3	7.500	4.7
0.300	1.8	1.600	2.3	4.000	3.5	8.000	4.8
0.400	1.7	1.800	2.4	4.500	3.7	8.500	5.0
0.500	1.6	2.000	2.5	5.000	3.9	9.000	5.1
0.600	1.5	2.200	2.6	5.500	4.0	9.500	5.2
0.800	1.7	2.400	2.7	6.000	4.2		
1.000	1.8	2.600	2.8	6.500	4.4		



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Éire

Irish Water  
PO Box 6000  
Dublin 1  
Ireland

T: +353 1 89 25000  
F: +353 1 89 25001  
[www.water.ie](http://www.water.ie)

Denis O' Sullivan

18 July 2019

Dear Denis O' Sullivan,

**Re: Connection Reference No CDS19002908 pre-connection enquiry - Subject to contract | Contract denied**

**Connection for Housing Development of 250 units at Former Harolds Cross Motors, Harolds Cross road, Dublin 6.**

Irish Water has reviewed your pre-connection enquiry in relation to a water connection at Former Harolds Cross Motors, Harolds Cross road, Dublin 6. Based upon the details you have provided with your pre-connection enquiry and on the capacity currently available as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network can be facilitated.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **[www.water.ie/connections](http://www.water.ie/connections)**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact us on **1850 278 278** or **+353 1 707 2828, 8.00am-4.30pm, Mon-Fri** or email **[newconnections@water.ie](mailto:newconnections@water.ie)**. For further information, visit **[www.water.ie/connections](http://www.water.ie/connections)**.

Yours sincerely,

**Maria O'Dwyer**

**Connections and Developer Services**

**Stiúthóirí / Directors:** Mike Quinn (Chairman), Eamon Gallen, Cathal Marley, Brendan Murphy, Michael G. O'Sullivan

**Oifig Chláraithe / Registered Office:** Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1, D01 NP86

Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.

**Uimhir Chláraithe in Éirinn / Registered in Ireland No.:** 530363

Denis O' Sullivan  
The Chapel,  
Blackrock House,  
Blackrock Road,  
Co. Cork  
T12KRK7

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

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

17 June 2020

**Re: Design Submission for Former Harolds Cross Motors, Harolds Cross road, Dublin 6 (the “Development”)  
(the “Design Submission”) / Connection Reference No: CDS19002908**

Dear Denis O' Sullivan,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at [www.water.ie/connections](http://www.water.ie/connections). Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU) ([https://www.cru.ie/document\\_group/irish-waters-water-charges-plan-2018/](https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/)).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the “**Self-Lay Works**”), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:

Name: Marina Zivanovic Byrne

Phone: 01 89 25991

Email: [mzbyrne@water.ie](mailto:mzbyrne@water.ie)

Yours sincerely,



**Maria O'Dwyer**  
**Connections and Developer Services**

## Appendix A

### Document Title & Revision

- [Proposed Foul Sewer & Surface Water Longitudinal Sections] DR-C-10002 Rev P03 (updated)
- [Proposed Services Plan Ground Floor Level] DR-C-10001 Rev P08

For further information, visit [www.water.ie/connections](http://www.water.ie/connections)

*Notwithstanding any matters listed above, the Customer (including any appointed designers/contractors, etc.) is entirely responsible for the design and construction of the Self-Lay Works. Acceptance of the Design Submission by Irish Water will not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.*