PROJECT Civic Offices SUBJECT Surface Wate	er Calculations - Permissible Site Discharge - Catcl	hment 1A	_		JOB REF. 220084 Calc. Sheet No. 2.1		FL	_
Drawing ref. 220084-RY-0	5-Z00-XXX-SK-DBFL-CE-1301	Calculations by KMM	Checked by JPC		Date 08/02/2023			
PERMISSIE	BLE SURFACE WATER DISCHARGE CALC	ULATIONS						
Site Area								
What is the o	verall site area?		0.20	Hectares (ha)	Site is Less than 5	0 Hectares		
Pre-Developm	nent Catchment Soil Characteristics							
Are there diffe	erent soil types present on the pre-developed site?	?	No					
	Catchment This refers to the e	entire site area	1A	T		SOIL	SOIL Value	SPR
	Area			Hectares (ha)		1	0.15	0.10
	Area Drainage Group		2	Hectares (ha) Class		1 2	0.15 0.30	0.10 0.30
	Area Drainage Group Depth to Impermeable Layers		2 2 2	Hectares (ha) Class Class		1 2 3	0.15 0.30 0.40	0.10 0.30 0.37
	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers		2 2 3	Hectares (ha) Class Class Class		1 2 3 4	0.15 0.30 0.40 0.45	0.10 0.30 0.37 0.47
	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(o)</sup>		2 2 3 1	Hectares (ha) Class Class Class Class		1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(0)</sup> SOIL Type <sup>1</sup> SOIL Index		2 2 3 1 3 0,40	Hectares (ha) Class Class Class Class From FSR Table		1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(0)</sup> SOIL Type <sup>1</sup> SOIL Index		2 2 3 1 3 0.40	Hectares (ha) Class Class Class Class From FSR Table		1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(0)</sup> SOIL Type <sup>1</sup> SOIL Index Value		2 2 3 1 0.40 0.40	Hectares (ha) Class Class Class Class From FSR Table		1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(0)</sup> SOIL Type <sup>1</sup> SOIL Index dex Value ue		2 2 3 1 0.40 0.40 0.37	Hectares (ha) Class Class Class Class From FSR Table		1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind Site SPR Val <u>Post-Develo</u>	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(0)</sup> SOIL Type <sup>1</sup> SOIL Index dex Value ue pment Catchment Characteristics		2 2 3 1 0.40 0.40 0.37	Hectares (ha) Class Class Class Class From FSR Table		1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind Site SPR Val Post-Develor Is the develop	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(0)</sup> SOIL Type <sup>1</sup> SOIL Index dex Value ue pment Catchment Characteristics pment divided into sub-catchments?		2 2 3 1 0.40 0.40 0.37	Hectares (ha) Class Class Class Class From FSR Table	,	1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind Site SPR Val Post-Develor Is the develop What is the o	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(0)</sup> SOIL Type <sup>1</sup> SOIL Index dex Value ue pment Catchment Characteristics pment divided into sub-catchments? everall site area for Catchment 1?		2 2 3 1 0.40 0.40 0.37 Yes 0.20	Hectares (ha) Class Class Class From FSR Table		1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind Site SPR Val Post-Develo Is the develop What is the o	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(in)</sup> SOLL Type <sup>1</sup> SOIL Index dex Value ue pment Catchment Characteristics pment divided into sub-catchments? everall site area for Catchment 1? Catchment 1		2 2 3 1 3 0.40 0.40 0.40 0.37 Yes 0.20 Area (m <sup>2</sup> )	Hectares (ha) Class Class Class Class From FSR Table	, Effective Area (m <sup>2</sup> )	1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind Site SPR Val Post-Develo Is the develop What is the o	Area Drainage Group Depth to Impermeable Layers Permeability Group above Impermeable Layers Slope <sup>(in)</sup> SOIL Type <sup>1</sup> SOIL Index dex Value ue pment Catchment Characteristics pment divided into sub-catchments? everall site area for Catchment 1? Catchment 1 Roads and Footpaths - Type 1 (Draining to gullies)		2 2 3 1 0.40 0.40 0.37 Yes 0.20 Area (m <sup>2</sup> ) 1902	Hectares (ha) Class Class Class Class From FSR Table Hectares (ha) Runoff Coeff.	Effective Area (m <sup>2</sup> ) 1806.9	1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53
Site SOIL Ind Site SPR Val Post-Develop Is the develop What is the o	Area         Drainage Group         Depth to Impermeable Layers         Permeability Group above Impermeable Layers         Slope <sup>(in)</sup> SOLL Type <sup>1</sup> SOIL Index         dex Value         ue         pment Catchment Characteristics         pment divided into sub-catchments?         overall site area for Catchment 1?         Catchment 1         Roads and Footpaths - Type 1 (Draining to gullies)         Roads and Footpaths - Type 2 (Draining to Suds featu	ires)	2 2 3 1 0.40 0.40 0.40 0.37 Yes 0.20 Area (m <sup>2</sup> ) 1902 0	Hectares (ha) Class Class Class From FSR Table Hectares (ha) Runoff Coeff. 0.95 0.70	Effective Area (m <sup>2</sup> ) 1806.9 0.0	1 2 3 4 5	0.15 0.30 0.40 0.45 0.50	0.10 0.30 0.37 0.47 0.53

	0.31	
Catchment 1 - Effective Catchment Runoff Coefficient	0.91	
Catchment 1 - Effective Catchment Area	1857.0 m <sup>2</sup>	
Include Public Open Space in Effective Catchment Area 1?	No	Assumed open space area does not drain to surface water network

Is long-term Storage provided?	Yes
Permissible Site Discharge	
What is the Standard Average Annual Rainfall (SAAR)?	987.0 mm From Met Eireann, Co-ordinates 327000, 217000
Is the overall site area less than 50 hectares?	Yes
$^5\mathrm{QBAR}_\mathrm{Rural}$ calculated for 50 ha and linearly interpolated for area of site	1.0 Litres/sec
<sup>7</sup> Site Discharge =	2.0     Litres/sec       9.78     //s/ha

### Notes and Formulae

1. SOIL index value calculated from Flood Studies Report - The Classification of Soils from Winter Rainfall Acceptance Rate (Table 4.5).

2. SPR value calculated from GDSDS - Table 6.7.

3. Rainfall depth for 100 year return period, 6 hour duration with additional 10% for climate change.

 $\text{4. Long-term storage Vol}_{\text{ss}} \ (\text{m}^3) = \text{Rainfall}. \\ \text{Area.10.} [(\text{PIMP}/100)(0.8.\alpha) + (1-\text{PIMP}/100)(\beta.\text{SPR}) - \text{SPR}]. \ (\text{GDSDS Section 6.7.3}).$ 

Where long-term storage cannot be provided on-site due to ground conditions, Total Permissible Outflow is to be kept to QBAR (Ruma). 5. Total Permissible Outflow - QBAR (Ruma), calculated in accordance with GDSDS - Regional Drainage Policies

(Volume 2 - Chapter 6), i.e. QBAR(m3/s)=0.00108x(Area)<sup>0.89</sup>(SAAR)<sup>1.17</sup>(SOIL)<sup>2.17</sup> - For catchments greater than 50 hectares in area. Flow rates are linearly interpolated for areas samiler than 50 hectares.

6. Where Total Permissible Outflow is less than 2.0l/s and not achievable, use 2.0 l/s or closest value possible.

PROJECT Civic Offices SUBJECT Surface Water C	alculations - Permissible Site Discharg	e - Catchment 1B		JOB REF. 220084 Caic. Sheet N 1.1	lo.	Εĩ	-
Drawing ref. 220084-RY-05-Z	00-XXX-SK-DBFL-CE-1001	Calculations by	Checked by	Date 08/02/2023			
			0.0	00,02,2020	_		
PERMISSIBLE	SURFACE WATER DISCHARGE	CALCULATIONS					
Site Area							
What is the over	all site area?		0.64	Hectares (ha) Site is Less th	an 50 Hectares		
Pre-Development	Catchment Soil Characteristics						
Are there differen	nt soil types present on the pre-develop	ped site?	No	]			
	Catchment This re	fers to the entire site area	1B	T	SOIL	SOIL Value	SPR
	Area			Hectares (ha)	1	0.15	0.10
	Drainage Group		2	Class	2	0.30	0.30
	Depth to Impermeable Layers		3	Class	3	0.40	0.37
	Permeability Group above Impermeable La	ayers	3	Class	4	0.45	0.47
	Slope (*)		2	Class	5	0.50	0.53
	SOIL Type		4	From FSR Table			
	SOIL Index		0.45	<u>_</u>			
Site SOIL Index	Value		0.45	]			
Site SPR Value			0.47	]			
Post-Developm	ent Catchment Characteristics						
Is the developme	ent divided into sub-catchments?		Yes	1			

is the development divided into sub-catchments?	res		
What is the overall site area for Catchment 1?	0.64	Hectares (ha)	
Catchment 1	Area (m <sup>2</sup> )	Runoff Coeff.	Effective Area (m <sup>2</sup> )
Roads and Footpaths - Type 1 (Draining to gullies)	373	0.95	354.4
Roads and Footpaths - Type 2 (Draining to Suds features)	4128	0.70	2889.6
Grassed Areas	1892.00	0.35	662.2

Include Public Open Space in E	ffective Catchment Area 1?	No	Assumed open space area does not drain to surface water network
Catchment 1 - Effective Catchn	nent Area	<b>3906.2</b> m <sup>2</sup>	
Catchment 1 - Effective Catchn	nent Runoff Coefficient	0.61	

#### Long-Term Storage Is long-term Storage provided? Yes Permissible Site Discharge What is the Standard Average Annual Rainfall (SAAR)? 987.0 mm From Met Eireann, Co-ordinates 327000, 217000 Is the overall site area less than 50 hectares? Yes $^5 \mathrm{QBAR}_\mathrm{Rural}\,$ calculated for 50 ha and linearly interpolated for area of site 4.2 Litres/sec <sup>7</sup>Site Discharge = 4.2 Litres/sec 6.57 l/s/ha

# Notes and Formulae

1. SOIL index value calculated from Flood Studies Report - The Classification of Soils from Winter Rainfall Acceptance Rate (Table 4.5).

2. SPR value calculated from GDSDS - Table 6.7.

3. Rainfall depth for 100 year return period, 6 hour duration with additional 10% for climate change.

4. Long-term storage Vol<sub>xs</sub> (m<sup>3</sup>) = Rainfall.Area.10.[(PIMP/100)(0.8. $\alpha$ )+(1-PIMP/100)( $\beta$ .SPR)-SPR]. (GDSDS Section 6.7.3).

Where long-term storage cannot be provided on-site due to ground conditions, Total Permissible Outflow is to be kept to QBAR (Rural)-

5. Total Permissible Outflow - QBAR (Rual) calculated in accordance with GDSDS - Regional Drainage Policies (Volume 2 - Chapter 6), i.e. QBAR(m3/s)=0.00108x(Area)<sup>0.89</sup>(SAAR)<sup>1.17</sup>(SOIL)<sup>2.17</sup> - For catchments greater than 50 hectares in area. Flow rates are linearly interpolated for areas samiler than 50hectares.

6. Where Total Permissible Outflow is less than 2.0l/s and not achievable, use 2.0 l/s or closest value possible.

SUBJECT Surface Water C	alculations - Permissible Site Discharge	- Catchment 1C			JOB REF. 220084 Calc. Sheet No. 3.1	C	FL	_
Drawing ref.	00-XXX-SK-DBEL-CE-1301	Calculations by	Checked by		Date			
220004-111-00-2		KIVIIVI	51.0		00/02/2023			
PERMISSIBLE	E SURFACE WATER DISCHARGE	CALCULATIONS						
Site Area								
What is the over	all site area?		0.07	Hectares (ha)	Site is Less than 5	0 Hectares		
Pre-Development	t Catchment Soil Characteristics							
Are there differer	nt soil types present on the pre-develope	ed site?	No	_				
				-		r		
	Catchment This refe	ers to the entire site area	1C			SOIL	SOIL Value	SPR
	Area			Hectares (ha)		1	0.15	0.10
	Drainage Group		2	Class		2	0.30	0.30
	Depth to impermeable Layers	vore	3	Class		3	0.40	0.37
	Slope <sup>(0)</sup>	yeis	2	Class		4 5	0.45	0.47
	SOIL Type		4	From ESR Table		Ū	0.00	0.00
	<sup>1</sup> SOIL Index		0.45					
Site SOIL Index	Value		0.45					
Sile SOIL IIIdex	value		0.45					
Site SPR Value			0.47					
Post-Developm	ent Catchment Characteristics							
Is the developme	ent divided into sub-catchments?		No	1				
What is the over	all site area for catchment?		0.070	Hectares (ha)				
	Catchment		Area (m <sup>2</sup> )	Runoff Coeff.	Effective Area (m <sup>2</sup> )	1		
	Roads and Footpaths - Type 2 (Draining to Int	filtration Trench)	490	0.40	196.0	1		

	<u> </u>	

Is long-term Storage provided?	Yes
Permissible Site Discharge	
What is the Standard Average Annual Rainfall (SAAR)?	987.0 mm From Met Eireann, Co-ordinates 327000, 217000
Is the overall site area less than 50 hectares?	Yes
$^5 \text{QBAR}_{\text{Rural}}$ calculated for 50 ha and linearly interpolated for area of site	0.5 Litres/sec
<sup>7</sup> Site Discharge =	2.0Litres/sec28.57/s/ha

## Notes and Formulae

1. SOIL index value calculated from Flood Studies Report - The Classification of Soils from Winter Rainfall Acceptance Rate (Table 4.5).

2. SPR value calculated from GDSDS - Table 6.7.

3. Rainfall depth for 100 year return period, 6 hour duration with additional 10% for climate change.

4. Long-term storage Vol<sub>xs</sub> (m<sup>3</sup>) = Rainfall.Area.10.[(PIMP/100)(0.8. $\alpha$ )+(1-PIMP/100)( $\beta$ .SPR)-SPR]. (GDSDS Section 6.7.3).

Where long-term storage cannot be provided on-site due to ground conditions, Total Permissible Outflow is to be kept to QBAR (Rural)-

5. Total Permissible Outflow - QBAR (Rural) calculated in accordance with GDSDS - Regional Drainage Policies (Volume 2 - Chapter 6), i.e. QBAR(m3/s)=0.00108x(Area)<sup>0.as</sup>(SAAR)<sup>1.17</sup>(SOIL)<sup>2.17</sup> - For catchments greater than 50 hectares in area. Flow rates are linearly interpolated for areas samiler than 50 hectares.

6. Where Total Permissible Outflow is less than 2.0l/s and not achievable, use 2.0 l/s or closest value possible.

PROJECT Civic Offices SUBJECT Surface Water (	Calculations - Permissible Site Discharg	je - Catchment 2			JOB REF. 220084 Calc. Sheet No. 3.1	٦	FL	_
Drawing ref.	700-XXX-SK-DBEL-CE-1301	Calculations by	Checked by		Date 08/02/2023			
22000+1(1-00-2			010		00/02/2023			
PERMISSIBL	E SURFACE WATER DISCHARGE	CALCULATIONS						
Site Area								
What is the ove	rall site area?		3.82	Hectares (ha)	Site is Less than 50	Hectares		
Pre-Developmen	nt Catchment Soil Characteristics							
				1				
Are there differe	ent soil types present on the pre-develop	ped site?	No					
	Catchment This re	efers to the entire site area	2	]		SOIL	SOIL Value	SPR
	Area			Hectares (ha)		1	0.15	0.10
	Drainage Group		2	Class		2	0.30	0.30
	Permeability Group above Impermeable I	avers	3	Class		4	0.40	0.37
	Slope <sup>(o)</sup>	ayoro	2	Class		5	0.50	0.53
	SOIL Type		4	From FSR Table				
	<sup>1</sup> SOIL Index		0.45					
Site SOIL Index	, Value		0.45	1				
Sile SOIL IIIdex	value		0.45	]				
Site SPR Value			0.47					
Post-Developm	nent Catchment Characteristics							
Is the developm	nent divided into sub-catchments?		No	]				
What is the ove	rall site area for catchment?		3.818	Hectares (ha)				
	Catchmont 1		$Aron (m^2)$	Rupoff Coeff	Effective Area (m <sup>2</sup> )			
	Developed Area (Site assumed as 70% impe	rmeable)	Area (III )		26728 1			
	Include Public Open Space in Effectiv Effective Catchment Area Effective Catchment Runoff Coefficier	re Catchment Area?	No 26728.1 0.70	] ]m <sup>2</sup>	Assumed open space are	a does not drai	n to surface water n	etwork
Long-Term Sto			0.70	J				

Permissible Site Discharge

 What is the Standard Average Annual Rainfall (SAAR)?
 987.0 mm
 From Met Eireann, Co-ordinates 327000, 217000

 Is the overall site area less than 50 hectares?
 Yes

 <sup>5</sup>QBAR<sub>Rural</sub> calculated for 50 ha and linearly interpolated for area of site
 25.1 Litres/sec

 <sup>7</sup>Site Discharge =
 25.1 Litres/sec

 6.57 V/s/ha

# Notes and Formulae

1. SOIL index value calculated from Flood Studies Report - The Classification of Soils from Winter Rainfall Acceptance Rate (Table 4.5).

2. SPR value calculated from GDSDS - Table 6.7.

3. Rainfall depth for 100 year return period, 6 hour duration with additional 10% for climate change.

 $\text{4. Long-term storage Vol}_{\text{xs}} \ (\text{m}^3) = \text{Rainfall}. \\ \text{Area.10.} \ (\text{PIMP}/100)(0.8.\alpha) + (1-\text{PIMP}/100)(\beta.\text{SPR}) - \text{SPR}. \ (\text{GDSDS Section 6.7.3}).$ 

Where long-term storage cannot be provided on-site due to ground conditions, Total Permissible Outflow is to be kept to QBAR (Runal) 5. Total Permissible Outflow - QBAR (Runal) calculated in accordance with GDSDS - Regional Drainage Policies

(Volume 2 - Chapter 6), i.e. QBAR(m3/s)=0.00108x(Area)<sup>0.89</sup>(SAAR)<sup>1.17</sup>(SOIL)<sup>2.17</sup> - For catchments greater than 50 hectares in area. Flow rates are linearly interpolated for areas samller than 50 hectares.

6. Where Total Permissible Outflow is less than 2.0l/s and not achievable, use 2.0 l/s or closest value possible.



Drainage	Depth	Slope classes								
GHOUD	impermeable		<u></u>			2 · 8°			>8°	
-	tayer (cm)			Permea	bility rate	s above in	ipermeabl	e layers		
		(1) Rapid	(2) Medium	Slow (3)	(1) Rapid	(2) Medium	(3) Slow	(1) Rapid	(2) Medium	Slow (3)
	>80		1.		1		t di kan di Ka Li sa kan di kana di kana di kan di kan Li sa kan di	1	2	3
1	40 80					2		3		4
	<40		[ ]					10.00 	<u></u>	
	>80	2			>			<u></u>		
2	40 - 80	L			2		4	,	-	
	<40	3			an a	- Maria Maria da Maria da	-		[	•
$\frown$	>80							in <u>an an</u> Raise na sa		la de 18 De 190
(3)	40 - 80	elline ogi Line og				5				
	<40		43	in de Konstrants					•	

1. Soil index (SPR) value calculated from Flood Studies Report - The Classification of Soils from Winter Rainfall Acceptance Rate (Table 4.5).

799 0 0