

APPENDIX C – XP-RAFTS IFD & ARR DATA HUB SUMMARY

IFD Design Rainfall Depth (mm)

Issued:

9-Nov-21

Location Label:

Requested coordinate:

Latitude

-33.8177 Longitude

150.678

Nearest grid cell:

Latitude

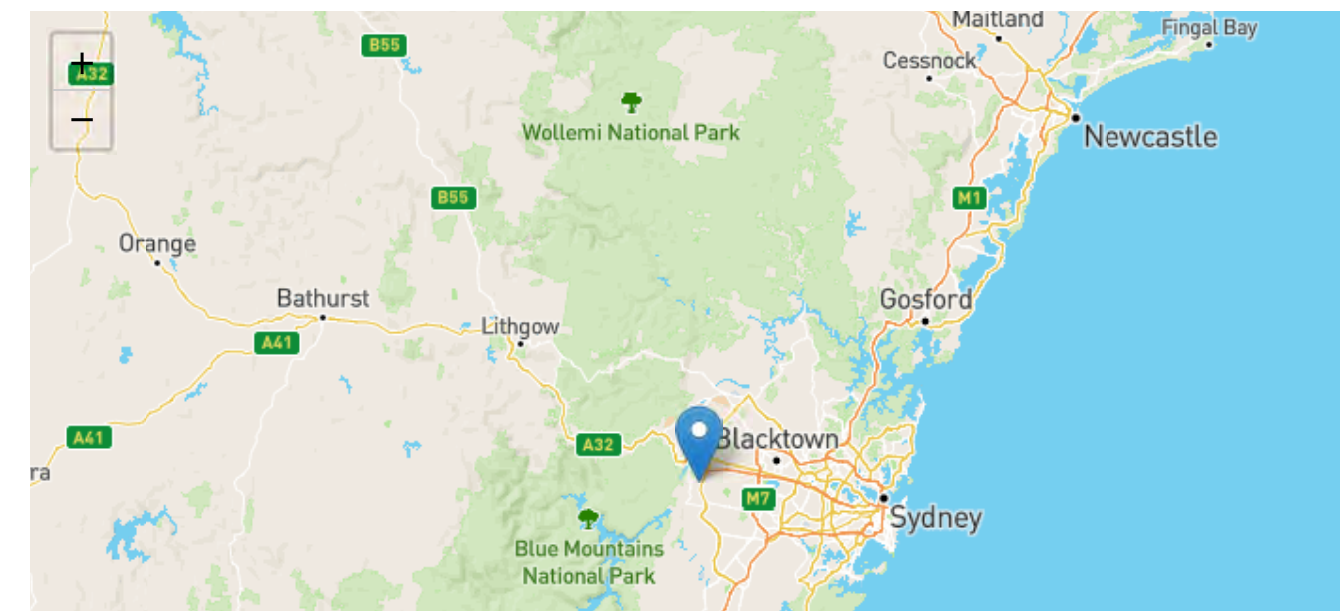
33.8125 (S) Longitude 150.6875 (E)

Duration	Duration in min	Annual Exceedance Probability (AEP)						
		63.20%	50%	20%	10%	5%	2%	1%
1 min	1	1.98	2.27	3.21	3.87	4.53	5.43	6.15
2 min	2	3.22	3.65	5.06	6.06	7.07	8.46	9.61
3 min	3	4.48	5.09	7.08	8.49	9.92	11.9	13.5
4 min	4	5.64	6.43	8.99	10.8	12.6	15.1	17.1
5 min	5	6.69	7.65	10.7	12.9	15.1	18.1	20.5
10 min	10	10.6	12.2	17.4	21	24.6	29.5	33.3
15 min	15	13.3	15.3	21.7	26.3	30.8	36.9	41.7
20 min	20	15.2	17.5	24.9	30	35.2	42.2	47.7
25 min	25	16.7	19.2	27.2	32.9	38.5	46.2	52.2
30 min	30	17.9	20.6	29.2	35.2	41.2	49.4	55.9
45 min	45	20.8	23.7	33.4	40.1	47	56.3	63.8
1 hour	60	22.9	26	36.4	43.7	51.1	61.3	69.4
1.5 hour	90	26.1	29.6	40.9	49	57.3	68.7	77.9
2 hour	120	28.7	32.4	44.6	53.3	62.2	74.6	84.7
3 hour	180	33	37.1	50.7	60.6	70.7	84.8	96.2
4.5 hour	270	38.3	43	58.7	70	81.7	98	111
6 hour	360	42.8	48.2	65.7	78.5	91.6	110	125
9 hour	540	50.6	57.1	78.3	93.6	109	131	149
12 hour	720	57.2	64.7	89.4	107	125	150	170
18 hour	1080	68	77.5	108	131	153	184	207
24 hour	1440	76.7	88	124	150	176	211	239
30 hour	1800	83.9	96.7	138	167	196	235	265
36 hour	2160	90	104	150	181	214	256	288
48 hour	2880	99.7	116	168	205	241	289	325
72 hour	4320	113	132	193	236	278	332	374
96 hour	5760	121	141	207	253	299	357	401
120 hour	7200	126	147	215	262	310	370	414
144 hour	8640	129	151	219	267	315	375	420
168 hour	10080	132	153	220	267	315	376	420

Australian Rainfall & Runoff Data Hub - Results

Input Data

Longitude	150.678
Latitude	-33.818
Selected Regions (clear)	
River Region	show
ARF Parameters	show
Storm Losses	show
Temporal Patterns	show
Areal Temporal Patterns	show
BOM IFDs	show
Median Preburst Depths and Ratios	show
10% Preburst Depths	show
25% Preburst Depths	show
75% Preburst Depths	show
90% Preburst Depths	show
Interim Climate Change Factors	show
Probability Neutral Burst Initial Loss (./nsw_specific)	show





Data

River Region

Division	South East Coast (NSW)
River Number	12
River Name	Hawkesbury River

Layer Info

Time Accessed	09 November 2021 02:06PM
Version	2016_v1

ARF Parameters

$$ARF = Min \left\{ 1, \left[1 - a \left(Area^b - c \log_{10} Duration \right) Duration^{-d} \right. \right. \\ \left. \left. + e Area^f Duration^g (0.3 + \log_{10} AEP) \right. \right. \\ \left. \left. + h 10^{i Area \frac{Duration}{1440}} (0.3 + \log_{10} AEP) \right] \right\}$$

Zone	a	b	c	d	e	f	g	h	i
SE Coast	0.06	0.361	0.0	0.317	8.11e-05	0.651	0.0	0.0	0.0

Short Duration ARF

$$ARF = Min \left[1, 1 - 0.287 \left(Area^{0.265} - 0.439 \log_{10}(Duration) \right) . Duration^{-0.36} \right. \\ \left. + 2.26 \times 10^{-3} \times Area^{0.226} . Duration^{0.125} (0.3 + \log_{10}(AEP)) \right. \\ \left. + 0.0141 \times Area^{0.213} \times 10^{-0.021 \frac{(Duration-180)^2}{1440}} (0.3 + \log_{10}(AEP)) \right]$$

Layer Info

Time Accessed	09 November 2021 02:06PM
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Version	2016_v1
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Storm Losses

Note: Burst Loss = Storm Loss - Preburst

Note: These losses are only for rural use and are **NOT FOR DIRECT USE** in urban areas

Note: As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (.nsw_specific) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. The continuing storm loss information from the ARR Datahub provided below should only be used where relevant under the loss hierarchy (level 5) and where used is to be multiplied by the factor of 0.4.

ID	21179.0
Storm Initial Losses (mm)	46.0
Storm Continuing Losses (mm/h)	3.4

Layer Info

Time Accessed	09 November 2021 02:06PM
Version	2016_v1

Temporal Patterns | Download (.zip) (static/temporal_patterns/TP/ECsouth.zip)

code	ECsouth
Label	East Coast South

Layer Info

Time Accessed	09 November 2021 02:06PM
Version	2016_v2

Areal Temporal Patterns | Download (.zip) (./static/temporal_patterns/Areal/Areal_ECsouth.zip)

code	ECsouth
arealabel	East Coast South

Layer Info

Time Accessed	09 November 2021 02:06PM
Version	2016_v2

BOM IFDs

Click here (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016&coordinate_type=dd&latitude=-33.8177&longitude=150.678&sdmin=true&sdhr=true&sdday=true&user_label=) to obtain the IFD depths for catchment centroid from the BoM website

Layer Info

Time Accessed

09 November 2021 02:06PM

Median Preburst Depths and Ratios

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	1.7 (0.066)	1.4 (0.038)	1.2 (0.026)	0.9 (0.018)	2.6 (0.043)	3.9 (0.056)
90 (1.5)	0.6 (0.019)	1.0 (0.023)	1.2 (0.025)	1.5 (0.026)	1.1 (0.016)	0.9 (0.011)
120 (2.0)	0.0 (0.000)	0.2 (0.004)	0.3 (0.006)	0.4 (0.007)	1.2 (0.017)	1.9 (0.022)
180 (3.0)	1.7 (0.046)	3.2 (0.062)	4.1 (0.068)	5.0 (0.071)	3.6 (0.042)	2.5 (0.026)
360 (6.0)	3.8 (0.080)	10.9 (0.166)	15.6 (0.199)	20.1 (0.219)	17.5 (0.159)	15.5 (0.125)
720 (12.0)	1.5 (0.023)	5.8 (0.065)	8.6 (0.080)	11.3 (0.090)	16.8 (0.112)	21.0 (0.123)
1080 (18.0)	1.4 (0.018)	6.3 (0.058)	9.5 (0.073)	12.6 (0.082)	15.9 (0.087)	18.4 (0.089)
1440 (24.0)	0.0 (0.000)	4.1 (0.033)	6.8 (0.045)	9.4 (0.053)	11.4 (0.054)	13.0 (0.054)
2160 (36.0)	0.0 (0.000)	2.1 (0.014)	3.5 (0.020)	4.9 (0.023)	5.7 (0.022)	6.3 (0.022)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.5 (0.002)	0.8 (0.003)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time

09 November 2021 02:06PM

Accessed

Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

10% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	09 November 2021 02:06PM
Version	2018_v1

Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
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25% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	09 November 2021 02:06PM
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Version	2018_v1
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Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
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75% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	16.8 (0.646)	16.9 (0.464)	16.9 (0.388)	17.0 (0.332)	21.4 (0.349)	24.7 (0.356)
90 (1.5)	12.8 (0.434)	16.2 (0.395)	18.4 (0.374)	20.5 (0.357)	19.4 (0.282)	18.5 (0.238)
120 (2.0)	9.3 (0.288)	20.3 (0.455)	27.5 (0.516)	34.4 (0.553)	30.8 (0.413)	28.1 (0.331)
180 (3.0)	27.4 (0.738)	36.4 (0.718)	42.5 (0.701)	48.2 (0.682)	44.4 (0.523)	41.5 (0.431)
360 (6.0)	21.4 (0.444)	40.4 (0.614)	53.0 (0.675)	65.0 (0.710)	76.0 (0.691)	84.2 (0.675)
720 (12.0)	30.1 (0.465)	36.1 (0.404)	40.1 (0.374)	43.9 (0.350)	56.5 (0.376)	66.0 (0.387)
1080 (18.0)	22.4 (0.289)	33.8 (0.312)	41.4 (0.317)	48.6 (0.318)	55.0 (0.299)	59.7 (0.288)
1440 (24.0)	14.4 (0.164)	25.0 (0.201)	32.0 (0.213)	38.8 (0.220)	41.1 (0.194)	42.8 (0.179)
2160 (36.0)	11.5 (0.111)	17.7 (0.119)	21.9 (0.120)	25.8 (0.121)	34.8 (0.136)	41.5 (0.144)
2880 (48.0)	3.7 (0.032)	5.4 (0.032)	6.5 (0.032)	7.6 (0.031)	12.4 (0.043)	16.0 (0.049)
4320 (72.0)	0.0 (0.000)	0.4 (0.002)	0.7 (0.003)	1.0 (0.004)	7.9 (0.024)	13.1 (0.035)

Layer Info

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Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

90% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	42.3 (1.622)	47.2 (1.297)	50.4 (1.154)	53.6 (1.048)	80.4 (1.313)	100.5 (1.448)
90 (1.5)	36.6 (1.240)	56.2 (1.373)	69.1 (1.410)	81.5 (1.423)	72.6 (1.057)	65.9 (0.846)
120 (2.0)	54.1 (1.672)	91.9 (2.063)	117.0 (2.194)	141.0 (2.265)	127.7 (1.711)	117.7 (1.390)
180 (3.0)	54.0 (1.455)	85.1 (1.678)	105.8 (1.746)	125.6 (1.776)	116.7 (1.376)	110.0 (1.143)
360 (6.0)	51.5 (1.070)	82.5 (1.255)	103.0 (1.313)	122.7 (1.340)	134.4 (1.223)	143.2 (1.149)
720 (12.0)	52.0 (0.803)	75.2 (0.842)	90.7 (0.846)	105.4 (0.841)	119.2 (0.792)	129.6 (0.761)
1080 (18.0)	47.1 (0.607)	64.9 (0.599)	76.8 (0.588)	88.1 (0.576)	104.1 (0.567)	116.1 (0.560)
1440 (24.0)	31.0 (0.352)	44.2 (0.356)	53.0 (0.353)	61.5 (0.348)	75.5 (0.357)	86.1 (0.361)
2160 (36.0)	38.1 (0.366)	44.6 (0.298)	48.9 (0.270)	53.0 (0.248)	72.7 (0.284)	87.4 (0.303)
2880 (48.0)	23.1 (0.199)	22.2 (0.132)	21.6 (0.105)	21.0 (0.087)	50.7 (0.176)	73.0 (0.224)
4320 (72.0)	6.0 (0.045)	19.3 (0.100)	28.2 (0.120)	36.7 (0.132)	38.5 (0.116)	39.9 (0.107)

Layer Info

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Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

Interim Climate Change Factors

	RCP 4.5	RCP6	RCP 8.5
2030	0.869 (4.3%)	0.783 (3.9%)	0.983 (4.9%)
2040	1.057 (5.3%)	1.014 (5.1%)	1.349 (6.8%)
2050	1.272 (6.4%)	1.236 (6.2%)	1.773 (9.0%)
2060	1.488 (7.5%)	1.458 (7.4%)	2.237 (11.5%)
2070	1.676 (8.5%)	1.691 (8.6%)	2.722 (14.2%)
2080	1.810 (9.2%)	1.944 (9.9%)	3.209 (16.9%)
2090	1.862 (9.5%)	2.227 (11.5%)	3.679 (19.7%)

Layer Info

Time Accessed	09 November 2021 02:06PM
Version	2019_v1
Note	ARR recommends the use of RCP4.5 and RCP 8.5 values. These have been updated to the values that can be found on the climate change in Australia website.

Probability Neutral Burst Initial Loss

min (h)\AEP(%)	50.0	20.0	10.0	5.0	2.0	1.0
60 (1.0)	26.3	18.4	16.6	16.7	15.3	12.2
90 (1.5)	29.8	20.2	17.2	16.7	15.5	15.0
120 (2.0)	32.6	17.6	15.4	14.7	13.3	12.7
180 (3.0)	31.6	16.6	14.4	14.3	13.5	10.1
360 (6.0)	31.0	17.7	15.0	13.5	11.5	7.0
720 (12.0)	31.5	21.8	20.4	19.0	16.9	9.3
1080 (18.0)	33.7	24.5	23.0	21.5	18.6	11.4
1440 (24.0)	38.3	29.9	28.0	27.6	24.7	15.8
2160 (36.0)	39.3	32.7	31.7	32.4	27.9	13.6
2880 (48.0)	44.4	38.9	38.9	42.9	34.4	17.1
4320 (72.0)	48.3	42.1	40.8	45.4	37.8	25.5

Layer Info

Time Accessed 09 November 2021 02:06PM

Version 2018_v1

Note As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (./nsw_specific) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. Probability neutral burst initial loss values for NSW are to be used in place of the standard initial loss and pre-burst as per the losses hierarchy.

[Download TXT \(downloads/411f8dd7-0fb5-43e5-a4ba-647ce25bd86a.txt\)](#)

[Download JSON \(downloads/1870b270-e655-4c73-8e40-d9e1d7284fdc.json\)](#)

[Generating PDF... \(downloads/3cfd15-bfcc-4f5d-8d48-caeb9c147519.pdf\)](#)

APPENDIX D – MUSIC PARAMETERS, RESULTS & MUSIC-LINK REPORT

110474 - MUSIC MODELLING WORKSHEET
Mulgoa GP3

Catchment	Total Catchment Area (ha)	Catchment Division						Node Inputs						Commercial (ha)				
		School	Passive Openspace	Active Openspace	Riparian Corridor	Local centre	Road	R2 Lot Area	R2 Lot Area with RWT %	R2 Lot Area with no RWT	R3 Lot Area	Road (ha)	Standard (Normal)		Roof to Tank (ha)	Roof Bypass (ha)	Urban Impervious (ha)	Urban Pervious (ha)
Cat 1	4.36	0	0	0			1.18	3.18	100%	3.18	0.00	0	1.18	0.95	0.95	0.48	0.80	0.00
Cat 2	4.27	0.00	0.00	0.00			1.08	3.19	100%	3.19	0.00	0.00	1.08	0.96	0.96	0.48	0.80	0.00
Cat 3	16.46	0.00	0.00	0.55			4.60	11.31	100%	11.31	0.00	0.00	4.60	3.39	3.39	1.97	3.10	0.00
Cat 4	3.94	0.00	0.00	0.00			1.20	2.66	100%	2.66	0.00	0.08	1.20	0.80	0.86	0.41	0.68	0.00
Cat 5	7.91	0.00	0.00	0.00			1.20	6.71	100%	6.71	0.00	0.00	1.20	2.01	2.01	1.01	1.68	0.00
Cat 6	2.58	0.00	0.00	0.00			1.07	0.68	100%	0.68	0.00	0.83	1.07	0.20	0.83	0.19	0.29	0.00
Cat 7	4.77	0.00	0.00	0.00			1.89	2.25	100%	2.25	0.00	0.63	1.89	0.67	1.14	0.40	0.66	0.00
Cat 8	1.58	0.00	0.00	0.00			0.69	0.00	100%	0.00	0.00	0.89	0.69	0.00	0.67	0.09	0.13	0.00
Cat 9	28.73	0.00	0.89	1.74			7.78	16.45	100%	16.45	0.00	1.88	7.78	4.93	6.34	3.62	6.07	0.00
Cat 10	9.74	0.00	0.19	0.00			2.85	4.46	100%	4.46	0.00	2.24	2.85	1.34	3.02	0.91	1.62	0.00
Cat 11	3.22	0.00	0.00	0.00			1.10	1.81	100%	1.81	0.00	0.31	1.10	0.54	0.78	0.30	0.50	0.00
Cat 12	3.40	0.00	0.00	0.00			1.28	1.68	100%	1.68	0.00	0.43	1.28	0.50	0.83	0.30	0.48	0.00
Cat 13	0.47	0.00	0.00	0.00			0.14	0.34	100%	0.34	0.00	0.00	0.14	0.10	0.10	0.05	0.08	0.00
Cat 14	3.23	0.00	0.00	0.00			1.16	2.06	100%	2.06	0.00	0.00	1.16	0.62	0.62	0.31	0.52	0.00
Cat 15	2.51	0.00	0.00	0.00			1.14	0.93	100%	0.93	0.00	0.45	1.14	0.28	0.61	0.18	0.30	0.00
Cat 16	2.84	0.00	0.00	0.00			0.96	1.88	100%	1.88	0.00	0.00	0.96	0.56	0.56	0.28	0.47	0.00
Cat 17	5.65	0.00	0.00	0.00			1.58	1.45	100%	1.45	0.00	2.63	1.58	0.43	2.41	0.48	0.76	0.00
Cat 18	4.88	0.00	1.67	0.00		1.90	0.52	0.00	100%	0.00	0.00	0.79	0.52	0.00	0.59	0.25	1.62	1.90
Cat 19	8.93	2.00	0.15	5.03			1.19	0.55	100%	0.55	0.00	0.00	1.19	0.17	0.17	4.11	3.29	0.00
Cat 20	2.53	0.00	0.00	2.53			0.00	0.00	100%	0.00	0.00	0.00	0.00	0.00	0.00	1.27	1.00	0.00
Cat 21	2.77	0.00	0.00	2.77			0.00	0.00	100%	0.00	0.00	0.00	0.00	0.00	0.00	1.38	1.38	0.00
Cat 22	9.74	0.00	0.00	0.00	9.74		0.00	0.00	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.49	9.25	0.00
Cat 23	20.31	0.00	0.00	0.00			5.52	14.79	100%	14.79	0.00	0.00	5.52	4.44	4.44	2.22	3.70	0.00
Cat 24	3.92	0.00	0.00	0.00			0.89	3.03	100%	3.03	0.00	0.00	0.89	0.91	0.91	0.45	0.76	0.00
Cat 25	1.39	0.00	0.00	0.00			0.35	1.04	100%	1.04	0.00	0.00	0.35	0.31	0.31	0.16	0.26	0.00
Cat 26	3.36	0.00	0.00	0.00			1.28	2.07	100%	2.07	0.00	0.00	1.28	0.62	0.62	0.31	0.52	0.00
Cat 27	15.31	0.00	1.02	0.00			4.27	10.02	100%	10.02	0.00	0.00	4.27	3.01	3.01	1.61	3.43	0.00
Ext Cat 1	24.77	0.00	0.00	0.00			0.00	0.00	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ext Cat 2	5.45	0.00	0.00	0.00			0.00	0.00	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	209.02						0.00	0.00	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MUSIC Rainwater Tank Inputs

RAINWATER TANK										
Catchment	Lots	Equivalent Pipe Area (m ²)	Equivalent Pipe radius (m)	Total Area of Roof to Tank (ha)	High Flow By-pass 1yr flow on roof (m ³ /s)	Total Tank Volume (m ³)	Tank Surface Area (m ²)	Overflow Pipe Dia (mm)	PET - RAIN Annual Demand (kL/yr)	Daily Demand (kL/day)
Cat 1	80	0.156	0.223	0.95	0.20	191	149	446	3979	8.0
Cat 2	80	0.157	0.223	0.96	0.20	192	150	447	3990	8.0
Cat 3	283	0.555	0.420	3.39	0.71	679	530	841	14137	28.3
Cat 4	66	0.130	0.204	0.80	0.17	159	125	408	3323	6.6
Cat 5	168	0.329	0.324	2.01	0.42	403	315	648	8394	16.8
Cat 6	17	0.033	0.103	0.20	0.04	41	32	206	848	1.7
Cat 7	56	0.110	0.187	0.67	0.14	135	105	375	2809	5.6
Cat 8	0	0.000	0.000	0.00	0.00	0	0	0	0	0.0
Cat 9	411	0.807	0.507	4.93	1.03	987	771	1014	20556	41.1
Cat 10	111	0.219	0.264	1.34	0.28	267	209	528	5571	11.1
Cat 11	45	0.089	0.168	0.54	0.11	109	85	336	2262	4.5
Cat 12	42	0.082	0.162	0.50	0.10	101	79	324	2098	4.2
Cat 13	8	0.016	0.072	0.10	0.02	20	16	145	420	0.8
Cat 14	52	0.101	0.180	0.62	0.13	124	97	359	2580	5.2
Cat 15	23	0.045	0.120	0.28	0.06	56	43	240	1156	2.3
Cat 16	47	0.092	0.171	0.56	0.12	113	88	343	2348	4.7
Cat 17	36	0.071	0.150	0.43	0.09	87	68	301	1810	3.6
Cat 18	0	0.000	0.000	0.00	0.00	0	0	0	0	0.0
Cat 19	14	0.027	0.093	0.17	0.03	33	26	186	694	1.4
Cat 20	0	0.000	0.000	0.00	0.00	0	0	0	0	0.0
Cat 21	0	0.000	0.000	0.00	0.00	0	0	0	0	0.0
Cat 22	0	0.000	0.000	0.00	0.00	0	0	0	0	0.0
Cat 23	370	0.726	0.481	4.44	0.92	888	693	962	18492	37.0
Cat 24	76	0.149	0.218	0.91	0.19	182	142	435	3791	7.6
Cat 25	26	0.051	0.128	0.31	0.07	62	49	255	1301	2.6
Cat 26	52	0.102	0.180	0.62	0.13	124	97	360	2593	5.2
Cat 27	251	0.492	0.396	3.01	0.63	601	470	791	12526	25.1

PET - Rain for landscape area 50 kL/year/dwelling
 Assumed Daily Demand 100 L/day
 Adopted Tank Size 3 kL
 Assumed 80% is useable (w/o topups) 80 %
 Useable tank 2.4 kL
 Assumed Tank height 1.6 m
 15min/1yr 75 mm/hr

MUSIC Modelling Parameters

The MUSIC Modelling has used a series of default Penrith Council MUSIC-Link assumptions and parameters. Details are provided below.

Table D1 – Rainfall-Runoff Parameters for Penrith

Impervious Area Parameters	
Rainfall threshold (mm)	1.4
Pervious Area Parameters	
Soil Storage Capacity (mm)	105
Initial Storage (% of capacity)	30
Field Capacity (mm)	70
Infiltration Capacity Coefficient - a	150
Infiltration Capacity Coefficient - b	3.5
Groundwater Properties	
Initial Depth (mm)	10
Daily Recharge Rate (%)	25
Daily Baseflow Rate (%)	10
Daily Deep Seepage Rate (%)	0

Table D2 – Source Node Parameters

Surface Type	TSS		TP		TN	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Storm Flow						
Roof	1.3	0.32	-0.89	0.25	0.3	0.19
Road	2.43	0.32	-0.3	0.25	0.34	0.19
Impervious	2.15	0.32	-0.6	0.25	0.3	0.19
Pervious	2.15	0.32	-0.6	0.25	0.3	0.19
Base Flow						
Roof	-	-	-	-	-	-
All Surfaces	1.2	0.17	-0.85	0.19	0.11	0.12

MUSIC Modelling Results

A series of MUSIC reporting locations have been used to ensure that the development is achieving pollutant reduction targets at each receiving creek. The results at each location are reported below. Details of the reporting locations can be seen in Figure 7-1.

Table D3 – Report 1 – Summary of MUSIC Results

Pollutant	Total Developed Source Loads	Total Reduction Required	Total Source Loads	Total Residual Load from Site	Total Reduction Achieved	Target Reduction Required	Total Reduction Achieved
	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)	(%)	(%)
TSS	3320	2822	7780	3430	4350	85.0%	131.0%
TP	7	4	15	9	6	60.0%	90.2%
TN	49	22	111	84	27	45.0%	55.1%
Gross Pollutants	585	527	891	0	891	90.0%	152.3%

Note that reporting location 1 includes external existing catchments which are not required to be treated by the proposed device in this location (pond MB1). Therefore, a load-based calculation has been used to isolate the load reduction that is required for the developed catchment and ensure that the treatment train achieves this reduction.

Table D4 – Report 2 – Summary of MUSIC Results

Pollutant	Total Developed Source Loads	Total Residual Load from Site	Total Reduction Achieved	Target Reduction Required	Total Reduction Achieved
	(kg/yr)	(kg/yr)	(kg/yr)	(%)	(%)
TSS	23200	3360	19840	85.0%	85.5%
TP	48	15.3	33	60.0%	68.3%
TN	359	152	207	45.0%	57.7%
Gross Pollutants	4330	126	4204	90.0%	97.1%

Table D5 – Report 3 – Summary of MUSIC Results

Pollutant	Total Developed Source Loads	Total Residual Load from Site	Total Reduction Achieved	Target Reduction Required	Total Reduction Achieved
	(kg/yr)	(kg/yr)	(kg/yr)	(%)	(%)
TSS	74300	10800	63500	85.0%	85.5%
TP	143	46.0	97	60.0%	67.8%
TN	984	466	518	45.0%	52.6%
Gross Pollutants	11600	11	11589	90.0%	99.9%

Table D6 – Report 4 – Summary of MUSIC Results

Pollutant	Total Developed Source Loads	Total Residual Load from Site	Total Reduction Achieved	Target Reduction Required	Total Reduction Achieved
	(kg/yr)	(kg/yr)	(kg/yr)	(%)	(%)
TSS	22000	2580	19420	85.0%	88.3%
TP	45	13.4	31	60.0%	70.0%
TN	321	158	163	45.0%	50.8%
Gross Pollutants	3900	14	3886	90.0%	99.6%

Table D7 – Report 5 – Summary of MUSIC Results

Pollutant	Total Developed Source Loads	Total Residual Load from Site	Total Reduction Achieved	Target Reduction Required	Total Reduction Achieved
	(kg/yr)	(kg/yr)	(kg/yr)	(%)	(%)
TSS	11800	1720	10080	85.0%	85.4%
TP	23	7.0	16	60.0%	70.2%
TN	164	68	96	45.0%	58.4%
Gross Pollutants	1950	57	1893	90.0%	97.1%

MUSIC-*link* Report

Project Details		Company Details	
Project:	Glenmore Park Stage 3 MU02	Company:	J. Wyndham Prince
Report Export Date:	12/04/2022	Contact:	David Crompton
Catchment Name:	110474-02-MU02	Address:	77 Union Road, Penrith NSW
Catchment Area:	28.74ha	Phone:	47203340
Impervious Area*:	77.48%	Email:	DCrompton@jwprince.com.au
Rainfall Station:	67113 PENRITH		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1999 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	691mm		
Evapotranspiration:	1158mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.34		
Study Area:	Penrith		
Scenario:	Penrith Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Junction	Reduction	Node Type	Number	Node Type	Number
Flow	10.6%	Pond Node	4	Urban Source Node	132
TSS	2.12%	Rain Water Tank Node	23		
TP	5.37%	Bio Retention Node	9		
TN	10.6%	Generic Node	13		
GP	21.8%	GPT Node	21		

Comments

80% rainwater tank reuse rates will be achieved under BASIX requirements for residential lots.

Failing results are in the pre development node and therefore should be ignored.

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	Copy of Bioretention	PET Scaling Factor	2.1	2.1	2.1
Bio	RG C	PET Scaling Factor	2.1	2.1	2.1
Bio	RG D	PET Scaling Factor	2.1	2.1	2.1
Bio	RG E	PET Scaling Factor	2.1	2.1	2.1
GPT	Cat 1 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.196
GPT	Cat 10 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.383
GPT	Cat 11 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.412
GPT	Cat 12 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.301
GPT	Cat 14 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.188
GPT	Cat 15 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.131
GPT	Cat 18 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.198
GPT	Cat 19 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.311
GPT	Cat 2 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.192
GPT	Cat 23 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.686
GPT	Cat 24 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.182
GPT	Cat 25 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.076
GPT	Cat 26 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.159
GPT	Cat 27 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.583
GPT	Cat 3 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.58
GPT	Cat 4 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.184
GPT	Cat 5 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.32
GPT	Cat 6 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.135
GPT	Cat 7 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.22
GPT	Cat 8 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	0.091
GPT	Cat 9 Vortex Style GPT	Hi-flow bypass rate (cum/sec)	None	99	1.011
Pond	Cat 1 Pond	% Reuse Demand Met	None	None	0
Pond	Cat 20 Pond	% Reuse Demand Met	None	None	0
Pond	MB3 Pond	% Reuse Demand Met	None	None	0
Pond	VB4 Pond	% Reuse Demand Met	None	None	0
Pre	Pre-Development Node	% Load Reduction	None	None	80.6
Pre	Pre-Development Node	TN % Load Reduction	45	None	78
Pre	Pre-Development Node	TP % Load Reduction	60	None	77.1
Receiving	Receiving Node	% Load Reduction	None	None	16.4
Receiving	Receiving Node	GP % Load Reduction	90	None	99.1
Receiving	Receiving Node	TN % Load Reduction	45	None	53.7

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Receiving	Receiving Node	TP % Load Reduction	60	None	68.4
Receiving	Receiving Node	TSS % Load Reduction	85	None	86
Urban	Cat 1 50% Bypass Urban	Area Impervious (ha)	None	None	0.95
Urban	Cat 1 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 1 50% Bypass Urban	Total Area (ha)	None	None	0.95
Urban	Cat 1 Impervious	Area Impervious (ha)	None	None	0.48
Urban	Cat 1 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 1 Impervious	Total Area (ha)	None	None	0.48
Urban	Cat 1 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 1 Pervious	Area Pervious (ha)	None	None	0.8
Urban	Cat 1 Pervious	Total Area (ha)	None	None	0.8
Urban	Cat 1 Urban	Area Impervious (ha)	None	None	0.95
Urban	Cat 1 Urban	Area Impervious (ha)	None	None	1.119
Urban	Cat 1 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 1 Urban	Area Pervious (ha)	None	None	0.060
Urban	Cat 1 Urban	Total Area (ha)	None	None	0.95
Urban	Cat 1 Urban	Total Area (ha)	None	None	1.18
Urban	Cat 10 50% Bypass Urban	Area Impervious (ha)	None	None	3.02
Urban	Cat 10 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 10 50% Bypass Urban	Total Area (ha)	None	None	3.02
Urban	Cat 10 Impervious	Area Impervious (ha)	None	None	0.91
Urban	Cat 10 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 10 Impervious	Total Area (ha)	None	None	0.91
Urban	Cat 10 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 10 Pervious	Area Pervious (ha)	None	None	1.62
Urban	Cat 10 Pervious	Total Area (ha)	None	None	1.62
Urban	Cat 10 Urban	Area Impervious (ha)	None	None	1.34
Urban	Cat 10 Urban	Area Impervious (ha)	None	None	2.703
Urban	Cat 10 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 10 Urban	Area Pervious (ha)	None	None	0.146
Urban	Cat 10 Urban	Total Area (ha)	None	None	1.34
Urban	Cat 10 Urban	Total Area (ha)	None	None	2.85
Urban	Cat 11 50% Bypass Urban	Area Impervious (ha)	None	None	0.78
Urban	Cat 11 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 11 50% Bypass Urban	Total Area (ha)	None	None	0.78
Urban	Cat 11 Impervious	Area Impervious (ha)	None	None	0.3
Urban	Cat 11 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 11 Impervious	Total Area (ha)	None	None	0.3
Urban	Cat 11 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 11 Pervious	Area Pervious (ha)	None	None	0.5

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 11 Pervious	Total Area (ha)	None	None	0.5
Urban	Cat 11 Urban	Area Impervious (ha)	None	None	0.54
Urban	Cat 11 Urban	Area Impervious (ha)	None	None	1.043
Urban	Cat 11 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 11 Urban	Area Pervious (ha)	None	None	0.056
Urban	Cat 11 Urban	Total Area (ha)	None	None	0.54
Urban	Cat 11 Urban	Total Area (ha)	None	None	1.1
Urban	Cat 12 50% Bypass Urban	Area Impervious (ha)	None	None	0.83
Urban	Cat 12 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 12 50% Bypass Urban	Total Area (ha)	None	None	0.83
Urban	Cat 12 Impervious	Area Impervious (ha)	None	None	0.3
Urban	Cat 12 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 12 Impervious	Total Area (ha)	None	None	0.3
Urban	Cat 12 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 12 Pervious	Area Pervious (ha)	None	None	0.48
Urban	Cat 12 Pervious	Total Area (ha)	None	None	0.48
Urban	Cat 12 Urban	Area Impervious (ha)	None	None	0.5
Urban	Cat 12 Urban	Area Impervious (ha)	None	None	1.214
Urban	Cat 12 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 12 Urban	Area Pervious (ha)	None	None	0.065
Urban	Cat 12 Urban	Total Area (ha)	None	None	0.5
Urban	Cat 12 Urban	Total Area (ha)	None	None	1.28
Urban	Cat 13 50% Bypass Urban	Area Impervious (ha)	None	None	0.1
Urban	Cat 13 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 13 50% Bypass Urban	Total Area (ha)	None	None	0.1
Urban	Cat 13 Impervious	Area Impervious (ha)	None	None	0.05
Urban	Cat 13 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 13 Impervious	Total Area (ha)	None	None	0.05
Urban	Cat 13 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 13 Pervious	Area Pervious (ha)	None	None	0.08
Urban	Cat 13 Pervious	Total Area (ha)	None	None	0.08
Urban	Cat 13 Urban	Area Impervious (ha)	None	None	0.1
Urban	Cat 13 Urban	Area Impervious (ha)	None	None	0.132
Urban	Cat 13 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 13 Urban	Area Pervious (ha)	None	None	0.007
Urban	Cat 13 Urban	Total Area (ha)	None	None	0.1
Urban	Cat 13 Urban	Total Area (ha)	None	None	0.14
Urban	Cat 14 50% Bypass Urban	Area Impervious (ha)	None	None	0.62
Urban	Cat 14 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 14 50% Bypass Urban	Total Area (ha)	None	None	0.62

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 14 Impervious	Area Impervious (ha)	None	None	0.31
Urban	Cat 14 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 14 Impervious	Total Area (ha)	None	None	0.31
Urban	Cat 14 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 14 Pervious	Area Pervious (ha)	None	None	0.52
Urban	Cat 14 Pervious	Total Area (ha)	None	None	0.52
Urban	Cat 14 Urban	Area Impervious (ha)	None	None	0.62
Urban	Cat 14 Urban	Area Impervious (ha)	None	None	1.100
Urban	Cat 14 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 14 Urban	Area Pervious (ha)	None	None	0.059
Urban	Cat 14 Urban	Total Area (ha)	None	None	0.62
Urban	Cat 14 Urban	Total Area (ha)	None	None	1.16
Urban	Cat 15 50% Bypass Urban	Area Impervious (ha)	None	None	0.61
Urban	Cat 15 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 15 50% Bypass Urban	Total Area (ha)	None	None	0.61
Urban	Cat 15 Impervious	Area Impervious (ha)	None	None	0.18
Urban	Cat 15 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 15 Impervious	Total Area (ha)	None	None	0.18
Urban	Cat 15 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 15 Pervious	Area Pervious (ha)	None	None	0.3
Urban	Cat 15 Pervious	Total Area (ha)	None	None	0.3
Urban	Cat 15 Urban	Area Impervious (ha)	None	None	0.28
Urban	Cat 15 Urban	Area Impervious (ha)	None	None	1.081
Urban	Cat 15 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 15 Urban	Area Pervious (ha)	None	None	0.058
Urban	Cat 15 Urban	Total Area (ha)	None	None	0.28
Urban	Cat 15 Urban	Total Area (ha)	None	None	1.14
Urban	Cat 16 50% Bypass Urban	Area Impervious (ha)	None	None	0.56
Urban	Cat 16 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 16 50% Bypass Urban	Total Area (ha)	None	None	0.56
Urban	Cat 16 Impervious	Area Impervious (ha)	None	None	0.28
Urban	Cat 16 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 16 Impervious	Total Area (ha)	None	None	0.28
Urban	Cat 16 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 16 Pervious	Area Pervious (ha)	None	None	0.47
Urban	Cat 16 Pervious	Total Area (ha)	None	None	0.47
Urban	Cat 16 Urban	Area Impervious (ha)	None	None	0.56
Urban	Cat 16 Urban	Area Impervious (ha)	None	None	0.910
Urban	Cat 16 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 16 Urban	Area Pervious (ha)	None	None	0.049

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 16 Urban	Total Area (ha)	None	None	0.56
Urban	Cat 16 Urban	Total Area (ha)	None	None	0.96
Urban	Cat 17 50% Bypass Urban	Area Impervious (ha)	None	None	2.41
Urban	Cat 17 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 17 50% Bypass Urban	Total Area (ha)	None	None	2.41
Urban	Cat 17 Impervious	Area Impervious (ha)	None	None	0.48
Urban	Cat 17 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 17 Impervious	Total Area (ha)	None	None	0.48
Urban	Cat 17 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 17 Pervious	Area Pervious (ha)	None	None	0.76
Urban	Cat 17 Pervious	Total Area (ha)	None	None	0.76
Urban	Cat 17 Urban	Area Impervious (ha)	None	None	0.43
Urban	Cat 17 Urban	Area Impervious (ha)	None	None	1.498
Urban	Cat 17 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 17 Urban	Area Pervious (ha)	None	None	0.081
Urban	Cat 17 Urban	Total Area (ha)	None	None	0.43
Urban	Cat 17 Urban	Total Area (ha)	None	None	1.58
Urban	Cat 18 Bypass Urban	Area Impervious (ha)	None	None	0.59
Urban	Cat 18 Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 18 Bypass Urban	Total Area (ha)	None	None	0.59
Urban	Cat 18 Impervious	Area Impervious (ha)	None	None	0.25
Urban	Cat 18 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 18 Impervious	Total Area (ha)	None	None	0.25
Urban	Cat 18 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 18 Pervious	Area Pervious (ha)	None	None	1.62
Urban	Cat 18 Pervious	Total Area (ha)	None	None	1.62
Urban	Cat 18 Urban	Area Impervious (ha)	None	None	0.493
Urban	Cat 18 Urban	Area Impervious (ha)	None	None	1.9
Urban	Cat 18 Urban	Area Pervious (ha)	None	None	0.026
Urban	Cat 18 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 18 Urban	Total Area (ha)	None	None	0.52
Urban	Cat 18 Urban	Total Area (ha)	None	None	1.9
Urban	Cat 19 50% Bypass Urban	Area Impervious (ha)	None	None	0.17
Urban	Cat 19 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 19 50% Bypass Urban	Total Area (ha)	None	None	0.17
Urban	Cat 19 Impervious	Area Impervious (ha)	None	None	4.11
Urban	Cat 19 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 19 Impervious	Total Area (ha)	None	None	4.11
Urban	Cat 19 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 19 Pervious	Area Pervious (ha)	None	None	3.29

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 19 Pervious	Total Area (ha)	None	None	3.29
Urban	Cat 19 Urban	Area Impervious (ha)	None	None	1.128
Urban	Cat 19 Urban	Area Impervious (ha)	None	None	0.17
Urban	Cat 19 Urban	Area Pervious (ha)	None	None	0.061
Urban	Cat 19 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 19 Urban	Total Area (ha)	None	None	1.19
Urban	Cat 19 Urban	Total Area (ha)	None	None	0.17
Urban	Cat 2 50% Bypass Urban	Area Impervious (ha)	None	None	0.96
Urban	Cat 2 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 2 50% Bypass Urban	Total Area (ha)	None	None	0.96
Urban	Cat 2 Impervious	Area Impervious (ha)	None	None	0.48
Urban	Cat 2 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 2 Impervious	Total Area (ha)	None	None	0.48
Urban	Cat 2 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 2 Pervious	Area Pervious (ha)	None	None	0.8
Urban	Cat 2 Pervious	Total Area (ha)	None	None	0.8
Urban	Cat 2 Urban	Area Impervious (ha)	None	None	0.96
Urban	Cat 2 Urban	Area Impervious (ha)	None	None	1.024
Urban	Cat 2 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 2 Urban	Area Pervious (ha)	None	None	0.055
Urban	Cat 2 Urban	Total Area (ha)	None	None	0.96
Urban	Cat 2 Urban	Total Area (ha)	None	None	1.08
Urban	Cat 20 Impervious	Area Impervious (ha)	None	None	1.27
Urban	Cat 20 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 20 Impervious	Total Area (ha)	None	None	1.27
Urban	Cat 20 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 20 Pervious	Area Pervious (ha)	None	None	1.27
Urban	Cat 20 Pervious	Total Area (ha)	None	None	1.27
Urban	Cat 21 Impervious	Area Impervious (ha)	None	None	1.38
Urban	Cat 21 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 21 Impervious	Total Area (ha)	None	None	1.38
Urban	Cat 21 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 21 Pervious	Area Pervious (ha)	None	None	1.38
Urban	Cat 21 Pervious	Total Area (ha)	None	None	1.38
Urban	Cat 22 Impervious	Area Impervious (ha)	None	None	0.49
Urban	Cat 22 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 22 Impervious	Total Area (ha)	None	None	0.49
Urban	Cat 22 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 22 Pervious	Area Pervious (ha)	None	None	9.25
Urban	Cat 22 Pervious	Total Area (ha)	None	None	9.25

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 23 50% Bypass Urban	Area Impervious (ha)	None	None	4.44
Urban	Cat 23 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 23 50% Bypass Urban	Total Area (ha)	None	None	4.44
Urban	Cat 23 Impervious	Area Impervious (ha)	None	None	2.22
Urban	Cat 23 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 23 Impervious	Total Area (ha)	None	None	2.22
Urban	Cat 23 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 23 Pervious	Area Pervious (ha)	None	None	3.7
Urban	Cat 23 Pervious	Total Area (ha)	None	None	3.7
Urban	Cat 23 Urban	Area Impervious (ha)	None	None	4.44
Urban	Cat 23 Urban	Area Impervious (ha)	None	None	5.235
Urban	Cat 23 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 23 Urban	Area Pervious (ha)	None	None	0.284
Urban	Cat 23 Urban	Total Area (ha)	None	None	4.44
Urban	Cat 23 Urban	Total Area (ha)	None	None	5.52
Urban	Cat 24 50% Bypass Urban	Area Impervious (ha)	None	None	0.91
Urban	Cat 24 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 24 50% Bypass Urban	Total Area (ha)	None	None	0.91
Urban	Cat 24 Impervious	Area Impervious (ha)	None	None	0.45
Urban	Cat 24 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 24 Impervious	Total Area (ha)	None	None	0.45
Urban	Cat 24 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 24 Pervious	Area Pervious (ha)	None	None	0.76
Urban	Cat 24 Pervious	Total Area (ha)	None	None	0.76
Urban	Cat 24 Urban	Area Impervious (ha)	None	None	0.91
Urban	Cat 24 Urban	Area Impervious (ha)	None	None	0.844
Urban	Cat 24 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 24 Urban	Area Pervious (ha)	None	None	0.045
Urban	Cat 24 Urban	Total Area (ha)	None	None	0.91
Urban	Cat 24 Urban	Total Area (ha)	None	None	0.89
Urban	Cat 25 50% Bypass Urban	Area Impervious (ha)	None	None	0.31
Urban	Cat 25 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 25 50% Bypass Urban	Total Area (ha)	None	None	0.31
Urban	Cat 25 Impervious	Area Impervious (ha)	None	None	0.16
Urban	Cat 25 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 25 Impervious	Total Area (ha)	None	None	0.16
Urban	Cat 25 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 25 Pervious	Area Pervious (ha)	None	None	0.26
Urban	Cat 25 Pervious	Total Area (ha)	None	None	0.26
Urban	Cat 25 Urban	Area Impervious (ha)	None	None	0.31

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 25 Urban	Area Impervious (ha)	None	None	0.331
Urban	Cat 25 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 25 Urban	Area Pervious (ha)	None	None	0.018
Urban	Cat 25 Urban	Total Area (ha)	None	None	0.31
Urban	Cat 25 Urban	Total Area (ha)	None	None	0.35
Urban	Cat 26 50% Bypass Urban	Area Impervious (ha)	None	None	0.62
Urban	Cat 26 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 26 50% Bypass Urban	Total Area (ha)	None	None	0.62
Urban	Cat 26 Impervious	Area Impervious (ha)	None	None	0.31
Urban	Cat 26 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 26 Impervious	Total Area (ha)	None	None	0.31
Urban	Cat 26 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 26 Pervious	Area Pervious (ha)	None	None	0.52
Urban	Cat 26 Pervious	Total Area (ha)	None	None	0.52
Urban	Cat 26 Urban	Area Impervious (ha)	None	None	0.62
Urban	Cat 26 Urban	Area Impervious (ha)	None	None	1.214
Urban	Cat 26 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 26 Urban	Area Pervious (ha)	None	None	0.065
Urban	Cat 26 Urban	Total Area (ha)	None	None	0.62
Urban	Cat 26 Urban	Total Area (ha)	None	None	1.28
Urban	Cat 27 50% Bypass Urban	Area Impervious (ha)	None	None	3.01
Urban	Cat 27 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 27 50% Bypass Urban	Total Area (ha)	None	None	3.01
Urban	Cat 27 Impervious	Area Impervious (ha)	None	None	1.61
Urban	Cat 27 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 27 Impervious	Total Area (ha)	None	None	1.61
Urban	Cat 27 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 27 Pervious	Area Pervious (ha)	None	None	3.43
Urban	Cat 27 Pervious	Total Area (ha)	None	None	3.43
Urban	Cat 27 Urban	Area Impervious (ha)	None	None	3.01
Urban	Cat 27 Urban	Area Impervious (ha)	None	None	4.049
Urban	Cat 27 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 27 Urban	Area Pervious (ha)	None	None	0.220
Urban	Cat 27 Urban	Total Area (ha)	None	None	3.01
Urban	Cat 27 Urban	Total Area (ha)	None	None	4.27
Urban	Cat 3 50% Bypass Urban	Area Impervious (ha)	None	None	3.39
Urban	Cat 3 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 3 50% Bypass Urban	Total Area (ha)	None	None	3.39
Urban	Cat 3 Impervious	Area Impervious (ha)	None	None	1.97
Urban	Cat 3 Impervious	Area Pervious (ha)	None	None	0

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 3 Impervious	Total Area (ha)	None	None	1.97
Urban	Cat 3 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 3 Pervious	Area Pervious (ha)	None	None	3.1
Urban	Cat 3 Pervious	Total Area (ha)	None	None	3.1
Urban	Cat 3 Urban	Area Impervious (ha)	None	None	3.39
Urban	Cat 3 Urban	Area Impervious (ha)	None	None	4.362
Urban	Cat 3 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 3 Urban	Area Pervious (ha)	None	None	0.237
Urban	Cat 3 Urban	Total Area (ha)	None	None	3.39
Urban	Cat 3 Urban	Total Area (ha)	None	None	4.6
Urban	Cat 4 50% Bypass Urban	Area Impervious (ha)	None	None	0.86
Urban	Cat 4 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 4 50% Bypass Urban	Total Area (ha)	None	None	0.86
Urban	Cat 4 Impervious	Area Impervious (ha)	None	None	0.41
Urban	Cat 4 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 4 Impervious	Total Area (ha)	None	None	0.41
Urban	Cat 4 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 4 Pervious	Area Pervious (ha)	None	None	0.68
Urban	Cat 4 Pervious	Total Area (ha)	None	None	0.68
Urban	Cat 4 Urban	Area Impervious (ha)	None	None	0.8
Urban	Cat 4 Urban	Area Impervious (ha)	None	None	1.138
Urban	Cat 4 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 4 Urban	Area Pervious (ha)	None	None	0.061
Urban	Cat 4 Urban	Total Area (ha)	None	None	0.8
Urban	Cat 4 Urban	Total Area (ha)	None	None	1.2
Urban	Cat 5 50% Bypass Urban	Area Impervious (ha)	None	None	2.01
Urban	Cat 5 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 5 50% Bypass Urban	Total Area (ha)	None	None	2.01
Urban	Cat 5 Impervious	Area Impervious (ha)	None	None	1.01
Urban	Cat 5 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 5 Impervious	Total Area (ha)	None	None	1.01
Urban	Cat 5 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 5 Pervious	Area Pervious (ha)	None	None	1.68
Urban	Cat 5 Pervious	Total Area (ha)	None	None	1.68
Urban	Cat 5 Urban	Area Impervious (ha)	None	None	2.01
Urban	Cat 5 Urban	Area Impervious (ha)	None	None	1.138
Urban	Cat 5 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 5 Urban	Area Pervious (ha)	None	None	0.061
Urban	Cat 5 Urban	Total Area (ha)	None	None	2.01
Urban	Cat 5 Urban	Total Area (ha)	None	None	1.2

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 6 50% Bypass Urban	Area Impervious (ha)	None	None	0.83
Urban	Cat 6 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 6 50% Bypass Urban	Total Area (ha)	None	None	0.83
Urban	Cat 6 Impervious	Area Impervious (ha)	None	None	0.19
Urban	Cat 6 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 6 Impervious	Total Area (ha)	None	None	0.19
Urban	Cat 6 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 6 Pervious	Area Pervious (ha)	None	None	0.29
Urban	Cat 6 Pervious	Total Area (ha)	None	None	0.29
Urban	Cat 6 Urban	Area Impervious (ha)	None	None	0.2
Urban	Cat 6 Urban	Area Impervious (ha)	None	None	1.014
Urban	Cat 6 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 6 Urban	Area Pervious (ha)	None	None	0.055
Urban	Cat 6 Urban	Total Area (ha)	None	None	0.2
Urban	Cat 6 Urban	Total Area (ha)	None	None	1.07
Urban	Cat 7 50% Bypass Urban	Area Impervious (ha)	None	None	1.14
Urban	Cat 7 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 7 50% Bypass Urban	Total Area (ha)	None	None	1.14
Urban	Cat 7 Impervious	Area Impervious (ha)	None	None	0.4
Urban	Cat 7 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 7 Impervious	Total Area (ha)	None	None	0.4
Urban	Cat 7 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 7 Pervious	Area Pervious (ha)	None	None	0.66
Urban	Cat 7 Pervious	Total Area (ha)	None	None	0.66
Urban	Cat 7 Urban	Area Impervious (ha)	None	None	0.67
Urban	Cat 7 Urban	Area Impervious (ha)	None	None	1.792
Urban	Cat 7 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 7 Urban	Area Pervious (ha)	None	None	0.097
Urban	Cat 7 Urban	Total Area (ha)	None	None	0.67
Urban	Cat 7 Urban	Total Area (ha)	None	None	1.89
Urban	Cat 8 Bypass Urban	Area Impervious (ha)	None	None	0.67
Urban	Cat 8 Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 8 Bypass Urban	Total Area (ha)	None	None	0.67
Urban	Cat 8 Impervious	Area Impervious (ha)	None	None	0.09
Urban	Cat 8 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 8 Impervious	Total Area (ha)	None	None	0.09
Urban	Cat 8 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 8 Pervious	Area Pervious (ha)	None	None	0.13
Urban	Cat 8 Pervious	Total Area (ha)	None	None	0.13
Urban	Cat 8 Urban	Area Impervious (ha)	None	None	0.654

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	Cat 8 Urban	Area Pervious (ha)	None	None	0.035
Urban	Cat 8 Urban	Total Area (ha)	None	None	0.69
Urban	Cat 9 50% Bypass Urban	Area Impervious (ha)	None	None	6.34
Urban	Cat 9 50% Bypass Urban	Area Pervious (ha)	None	None	0
Urban	Cat 9 50% Bypass Urban	Total Area (ha)	None	None	6.34
Urban	Cat 9 Impervious	Area Impervious (ha)	None	None	3.62
Urban	Cat 9 Impervious	Area Pervious (ha)	None	None	0
Urban	Cat 9 Impervious	Total Area (ha)	None	None	3.62
Urban	Cat 9 Pervious	Area Impervious (ha)	None	None	0
Urban	Cat 9 Pervious	Area Pervious (ha)	None	None	6.07
Urban	Cat 9 Pervious	Total Area (ha)	None	None	6.07
Urban	Cat 9 Urban	Area Impervious (ha)	None	None	4.93
Urban	Cat 9 Urban	Area Impervious (ha)	None	None	7.379
Urban	Cat 9 Urban	Area Pervious (ha)	None	None	0
Urban	Cat 9 Urban	Area Pervious (ha)	None	None	0.400
Urban	Cat 9 Urban	Total Area (ha)	None	None	4.93
Urban	Cat 9 Urban	Total Area (ha)	None	None	7.78
Urban	Existing Cat - Report 1	Area Impervious (ha)	None	None	0
Urban	Existing Cat - Report 1	Area Pervious (ha)	None	None	29.13
Urban	Existing Cat - Report 1	Total Area (ha)	None	None	29.13
Urban	Existing Cat - Report 2	Area Impervious (ha)	None	None	0
Urban	Existing Cat - Report 2	Area Pervious (ha)	None	None	32.59
Urban	Existing Cat - Report 2	Total Area (ha)	None	None	32.59
Urban	Existing Cat - Report 3	Area Impervious (ha)	None	None	0
Urban	Existing Cat - Report 3	Area Pervious (ha)	None	None	103
Urban	Existing Cat - Report 3	Total Area (ha)	None	None	103
Urban	Existing Cat - Report 4	Area Impervious (ha)	None	None	0
Urban	Existing Cat - Report 4	Area Pervious (ha)	None	None	28.98
Urban	Existing Cat - Report 4	Total Area (ha)	None	None	28.98
Urban	Existing Cat - Report 5	Area Impervious (ha)	None	None	0
Urban	Existing Cat - Report 5	Area Pervious (ha)	None	None	15.31
Urban	Existing Cat - Report 5	Total Area (ha)	None	None	15.31
Urban	Ext Cat 1	Area Impervious (ha)	None	None	1.213
Urban	Ext Cat 1	Area Pervious (ha)	None	None	23.55
Urban	Ext Cat 1	Total Area (ha)	None	None	24.77
Urban	Ext Cat 2	Area Impervious (ha)	None	None	0.862
Urban	Ext Cat 2	Area Pervious (ha)	None	None	4.587
Urban	Ext Cat 2	Total Area (ha)	None	None	5.45

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Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Bioretention	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	Bioretention	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	Bioretention	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	Bioretention	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	Bioretention	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	Copy of Bioretention	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	RGC	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	RGD	Hi-flow bypass rate (cum/sec)	None	99	100
Bio	RGE	Hi-flow bypass rate (cum/sec)	None	99	100
Pre	Pre-Development Node	GP % Load Reduction	90	None	0
Pre	Pre-Development Node	TSS % Load Reduction	85	None	75.3
Rain	Cat 1 Rainwater Tank	% Reuse Demand Met	80	None	41.30
Rain	Cat 10 Rainwater Tank	% Reuse Demand Met	80	None	41.63
Rain	Cat 11 Rainwater Tank	% Reuse Demand Met	80	None	41.63
Rain	Cat 12 Rainwater Tank	% Reuse Demand Met	80	None	41.4227
Rain	Cat 13 Rainwater Tank	% Reuse Demand Met	80	None	41.98
Rain	Cat 14 Rainwater Tank	% Reuse Demand Met	80	None	41.46
Rain	Cat 15 Rainwater Tank	% Reuse Demand Met	80	None	41.85
Rain	Cat 16 Rainwater Tank	% Reuse Demand Met	80	None	41.5757
Rain	Cat 17 Rainwater Tank	% Reuse Demand Met	80	None	41.5751
Rain	Cat 19 Rainwater Tank	% Reuse Demand Met	80	None	41.594
Rain	Cat 2 Rainwater Tank	% Reuse Demand Met	80	None	41.5516
Rain	Cat 23 Rainwater Tank	% Reuse Demand Met	80	None	41.50
Rain	Cat 24 Rainwater Tank	% Reuse Demand Met	80	None	41.6711
Rain	Cat 25 Rainwater Tank	% Reuse Demand Met	80	None	41.33
Rain	Cat 26 Rainwater Tank	% Reuse Demand Met	80	None	41.39
Rain	Cat 27 Rainwater Tank	% Reuse Demand Met	80	None	41.5542
Rain	Cat 3 Rainwater Tank	% Reuse Demand Met	80	None	41.4471
Rain	Cat 4 Rainwater Tank	% Reuse Demand Met	80	None	41.7797
Rain	Cat 5 Rainwater Tank	% Reuse Demand Met	80	None	58.26
Rain	Cat 6 Rainwater Tank	% Reuse Demand Met	80	None	41.40
Rain	Cat 7 Rainwater Tank	% Reuse Demand Met	80	None	41.53
Rain	Cat 9 Rainwater Tank	% Reuse Demand Met	80	None	41.4777
Rain	Rainwater Tank	% Reuse Demand Met	80	None	16.09

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