

Pre-Development Stormwater Quality Modelling Results

Source nodes

Location	Pre-Dev Hardstand	Pre-Dev Green Area
ID	3	4
Node Type	UrbanSourceNode	ForestSourceNode
Total Area (ha)	0.26	0.017
Area Impervious (ha)	0.208229075	0
Area Pervious (ha)	0.051770925	0.017
Field Capacity (mm)	70	70
Pervious Area Infiltration Capacity coefficient - a	210	210
Pervious Area Infiltration Capacity exponent - b	4.7	4.7
Impervious Area Rainfall Threshold (mm/day)	1.4	1.4
Pervious Area Soil Storage Capacity (mm)	170	170
Pervious Area Soil Initial Storage (% of Capacity)	30	30
Groundwater Initial Depth (mm)	10	10
Groundwater Daily Recharge Rate (%)	50	50
Groundwater Daily Baseflow Rate (%)	4	4
Groundwater Daily Deep Seepage Rate (%)	0	0
Stormflow Total Suspended Solids Mean (log mg/L)	2.15	1.6
Stormflow Total Suspended Solids Standard Deviation (log mg/L)	0.32	0.32
Stormflow Total Suspended Solids Estimation Method	Stochastic	Stochastic
Stormflow Total Suspended Solids Serial Correlation	0.27	0.27
Stormflow Total Phosphorus Mean (log mg/L)	-0.6	-1.1
Stormflow Total Phosphorus Standard Deviation (log mg/L)	0.25	0.25
Stormflow Total Phosphorus Estimation Method	Stochastic	Stochastic
Stormflow Total Phosphorus Serial Correlation	0.27	0.27
Stormflow Total Nitrogen Mean (log mg/L)	0.3	-0.05
Stormflow Total Nitrogen Standard Deviation (log mg/L)	0.19	0.19
Stormflow Total Nitrogen Estimation Method	Stochastic	Stochastic
Stormflow Total Nitrogen Serial Correlation	0.27	0.27
Baseflow Total Suspended Solids Mean (log mg/L)	1.2	0.78
Baseflow Total Suspended Solids Standard Deviation (log mg/L)	0.17	0.17
Baseflow Total Suspended Solids Estimation Method	Stochastic	Stochastic
Baseflow Total Suspended Solids Serial Correlation	0.31	0.31
Baseflow Total Phosphorus Mean (log mg/L)	-0.85	-1.52
Baseflow Total Phosphorus Standard Deviation (log mg/L)	0.19	0.19
Baseflow Total Phosphorus Estimation Method	Stochastic	Stochastic
Baseflow Total Phosphorus Serial Correlation	0.31	0.31
Baseflow Total Nitrogen Mean (log mg/L)	0.11	-0.52
Baseflow Total Nitrogen Standard Deviation (log mg/L)	0.12	0.12
Baseflow Total Nitrogen Estimation Method	Stochastic	Stochastic
Baseflow Total Nitrogen Serial Correlation	0.31	0.31
OUT - Mean Annual Flow (ML/yr)	2.06	5.56E-02
OUT - TSS Mean Annual Load (kg/yr)	371	1.49
OUT - TP Mean Annual Load (kg/yr)	0.572	2.87E-03
OUT - TN Mean Annual Load (kg/yr)	4.51	3.07E-02
OUT - Gross Pollutant Mean Annual Load (kg/yr)	54.8	0
Rain In (ML/yr)	2.71321	0.177402
ET Loss (ML/yr)	0.651203	0.120849
Deep Seepage Loss (ML/yr)	0	0
Baseflow Out (ML/yr)	0.108121	0.0353471
Imp. Stormflow Out (ML/yr)	1.88903	0
Perv. Stormflow Out (ML/yr)	0.0618629	0.0202244
Total Stormflow Out (ML/yr)	1.95089	0.0202244
Total Outflow (ML/yr)	2.05901	0.0555715
Change in Soil Storage (ML/yr)	0.0030004	0.0009809
TSS Baseflow Out (ML/yr)	1.7729	0.220359
TSS Total Stormflow Out (ML/yr)	369.287	1.26792
TSS Total Outflow (ML/yr)	371.06	1.48828
TP Baseflow Out (ML/yr)	0.01657	0.0011582
TP Total Stormflow Out (ML/yr)	0.555227	0.0017123
TP Total Outflow (ML/yr)	0.571797	0.0028705
TN Baseflow Out (ML/yr)	0.145719	0.0111676
TN Total Stormflow Out (ML/yr)	4.36655	0.0195366
TN Total Outflow (ML/yr)	4.51227	0.0307042
GP Total Outflow (ML/yr)	54.8484	0

No Imported Data Source nodes

No USTM treatment nodes

No Generic treatment nodes

Other nodes

Location

ID

Node Type

IN - Mean Annual Flow (ML/yr)

IN - TSS Mean Annual Load (kg/yr)

IN - TP Mean Annual Load (kg/yr)

IN - TN Mean Annual Load (kg/yr)

IN - Gross Pollutant Mean Annual Load (kg/yr)

OUT - Mean Annual Flow (ML/yr)

OUT - TSS Mean Annual Load (kg/yr)

OUT - TP Mean Annual Load (kg/yr)

OUT - TN Mean Annual Load (kg/yr)

OUT - Gross Pollutant Mean Annual Load (kg/yr)

Receiving Node

Junction 4

1

2

ReceivingNode

JunctionNode

2.11

2.11

373

373

0.575

0.575

4.54

4.54

54.8

54.8

0

2.11

0

373

0

0.575

0

4.54

0

54.8

Links

Location

Source node ID

Target node ID

Muskingum-Cunge Routing

Muskingum K

Muskingum theta

IN - Mean Annual Flow (ML/yr)

IN - TSS Mean Annual Load (kg/yr)

IN - TP Mean Annual Load (kg/yr)

IN - TN Mean Annual Load (kg/yr)

IN - Gross Pollutant Mean Annual Load (kg/yr)

OUT - Mean Annual Flow (ML/yr)

OUT - TSS Mean Annual Load (kg/yr)

OUT - TP Mean Annual Load (kg/yr)

OUT - TN Mean Annual Load (kg/yr)

OUT - Gross Pollutant Mean Annual Load (kg/yr)

Drainage Link

Drainage Link

Drainage Link

2

3

4

1

2

2

Not Routed

Not Routed

Not Routed

2.11

2.06

5.56E-02

373

371

1.49

0.575

0.572

2.87E-03

4.54

4.51

3.07E-02

54.8

54.8

0

2.11

2.06

5.56E-02

373

371

1.49

0.575

0.572

2.87E-03

4.54

4.51

3.07E-02

54.8

54.8

0

Post Development Stormwater Quality Modelling Results

Source nodes

Location	Post-Dev Imp	Post Dev - Roof
ID	3	4
Node Type	UrbanSourceNode	UrbanSourceNode
Total Area (ha)	0.187	0.09
Area Impervious (ha)	0.187	0.09
Area Pervious (ha)	0	0
Field Capacity (mm)	70	70
Pervious Area Infiltration Capacity coefficient - a	210	220
Pervious Area Infiltration Capacity exponent - b	4.7	4.7
Impervious Area Rainfall Threshold (mm/day)	1.4	10
Pervious Area Soil Storage Capacity (mm)	170	170
Pervious Area Soil Initial Storage (% of Capacity)	30	30
Groundwater Initial Depth (mm)	10	10
Groundwater Daily Recharge Rate (%)	50	50
Groundwater Daily Baseflow Rate (%)	4	4
Groundwater Daily Deep Seepage Rate (%)	0	0
Stormflow Total Suspended Solids Mean (log mg/L)	2.15	1.3
Stormflow Total Suspended Solids Standard Deviation (log mg/L)	0.32	0.32
Stormflow Total Suspended Solids Estimation Method	Stochastic	Stochastic
Stormflow Total Suspended Solids Serial Correlation	0.27	0.27
Stormflow Total Phosphorus Mean (log mg/L)	-0.6	-0.89
Stormflow Total Phosphorus Standard Deviation (log mg/L)	0.25	0.25
Stormflow Total Phosphorus Estimation Method	Stochastic	Stochastic
Stormflow Total Phosphorus Serial Correlation	0.27	0.27
Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.3
Stormflow Total Nitrogen Standard Deviation (log mg/L)	0.19	0.19
Stormflow Total Nitrogen Estimation Method	Stochastic	Stochastic
Stormflow Total Nitrogen Serial Correlation	0.27	0.27
Baseflow Total Suspended Solids Mean (log mg/L)	1.2	0
Baseflow Total Suspended Solids Standard Deviation (log mg/L)	0.17	0
Baseflow Total Suspended Solids Estimation Method	Stochastic	Stochastic
Baseflow Total Suspended Solids Serial Correlation	0.31	0.31
Baseflow Total Phosphorus Mean (log mg/L)	-0.85	0
Baseflow Total Phosphorus Standard Deviation (log mg/L)	0.19	0
Baseflow Total Phosphorus Estimation Method	Stochastic	Stochastic
Baseflow Total Phosphorus Serial Correlation	0.31	0.31
Baseflow Total Nitrogen Mean (log mg/L)	0.11	0
Baseflow Total Nitrogen Standard Deviation (log mg/L)	0.12	0
Baseflow Total Nitrogen Estimation Method	Stochastic	Stochastic
Baseflow Total Nitrogen Serial Correlation	0.31	0.31
OUT - Mean Annual Flow (ML/yr)	1.7	0.446
OUT - TSS Mean Annual Load (kg/yr)	302	11.3
OUT - TP Mean Annual Load (kg/yr)	0.502	6.94E-02
OUT - TN Mean Annual Load (kg/yr)	3.71	0.979
OUT - Gross Pollutant Mean Annual Load (kg/yr)	43.6	9.97
Rain In (ML/yr)	1.95142	0.939186
ET Loss (ML/yr)	0.253116	0.493248
Deep Seepage Loss (ML/yr)	0	0
Baseflow Out (ML/yr)	0	0
Imp. Stormflow Out (ML/yr)	1.69831	0.445938
Perv. Stormflow Out (ML/yr)	0	0
Total Stormflow Out (ML/yr)	1.69831	0.445938
Total Outflow (ML/yr)	1.69831	0.445938
Change in Soil Storage (ML/yr)	0	0
TSS Baseflow Out (ML/yr)	0	0
TSS Total Stormflow Out (ML/yr)	301.749	11.2917
TSS Total Outflow (ML/yr)	301.749	11.2917
TP Baseflow Out (ML/yr)	0	0
TP Total Stormflow Out (ML/yr)	0.501755	0.0693565
TP Total Outflow (ML/yr)	0.501755	0.0693565
TN Baseflow Out (ML/yr)	0	0
TN Total Stormflow Out (ML/yr)	3.7092	0.979199
TN Total Outflow (ML/yr)	3.7092	0.979199
GP Total Outflow (ML/yr)	43.6272	9.96828

No Imported Data Source nodes

USTM treatment nodes

Location	RWT
ID	5
Node Type	RainWaterTankNode
Lo-flow bypass rate (cum/sec)	0
Hi-flow bypass rate (cum/sec)	0.3
Inlet pond volume	0
Area (sqm)	7.5
Extended detention depth (m)	0.2
Permanent Pool Volume (cubic metres)	15
Proportion vegetated	0
Equivalent Pipe Diameter (mm)	50
Overflow weir width (m)	10
Notional Detention Time (hrs)	0.16
Orifice Discharge Coefficient	0.6
Weir Coefficient	1.7
Number of CSTR Cells	2
Total Suspended Solids - k (m/yr)	400

Total Suspended Solids - C* (mg/L)	12
Total Suspended Solids - C** (mg/L)	12
Total Phosphorus - k (m/yr)	300
Total Phosphorus - C* (mg/L)	0.13
Total Phosphorus - C** (mg/L)	0.13
Total Nitrogen - k (m/yr)	40
Total Nitrogen - C* (mg/L)	1.4
Total Nitrogen - C** (mg/L)	1.4
Threshold Hydraulic Loading for C** (m/yr)	3500
Horizontal Flow Coefficient	
Extraction for Re-use	On
Annual Re-use Demand - scaled by daily PET (ML)	0
Annual Re-use Demand - scaled by daily PET - Rain (ML)	0
Constant Daily Re-use Demand (kL)	0.525
User-defined Annual Re-use Demand (ML)	0
Percentage of User-defined Annual Re-use Demand Jan	23.97
Percentage of User-defined Annual Re-use Demand Feb	0.38
Percentage of User-defined Annual Re-use Demand Mar	0.29
Percentage of User-defined Annual Re-use Demand Apr	0.11
Percentage of User-defined Annual Re-use Demand May	0.03
Percentage of User-defined Annual Re-use Demand Jun	0.3
Percentage of User-defined Annual Re-use Demand Jul	0.29
Percentage of User-defined Annual Re-use Demand Aug	0.29
Percentage of User-defined Annual Re-use Demand Sep	7.99
Percentage of User-defined Annual Re-use Demand Oct	18.17
Percentage of User-defined Annual Re-use Demand Nov	19.6
Percentage of User-defined Annual Re-use Demand Dec	28.58
User-defined Re-use File	
Filter area (sqm)	
Filter perimeter (m)	
Filter depth (m)	
Filter Median Particle Diameter (mm)	
Saturated Hydraulic Conductivity (mm/hr)	
Infiltration Media Porosity	
Length (m)	
Bed slope	
Base Width (m)	
Top width (m)	
Vegetation height (m)	
Vegetation Type	
Total Nitrogen Content in Filter (mg/kg)	
Orthophosphate Content in Filter (mg/kg)	
Is Base Lined?	
Is Underdrain Present?	
Is Submerged Zone Present?	
Submerged Zone Depth (m)	
B for Media Soil Texture	-9999
Proportion of upstream impervious area treated	
Exfiltration Rate (mm/hr)	0
Evap Loss as proportion of PET	0
Depth in metres below the drain pipe	
TSS A Coefficient	
TSS B Coefficient	
TP A Coefficient	
TP B Coefficient	
TN A Coefficient	
TN B Coefficient	
Sfc	
S*	
Sw	
Sh	
E _{max} (m/day)	
E _w (m/day)	
IN - Mean Annual Flow (ML/yr)	0.446
IN - TSS Mean Annual Load (kg/yr)	11.3
IN - TP Mean Annual Load (kg/yr)	6.94E-02
IN - TN Mean Annual Load (kg/yr)	0.979
IN - Gross Pollutant Mean Annual Load (kg/yr)	9.97
OUT - Mean Annual Flow (ML/yr)	0.31
OUT - TSS Mean Annual Load (kg/yr)	5.85
OUT - TP Mean Annual Load (kg/yr)	4.68E-02
OUT - TN Mean Annual Load (kg/yr)	0.648
OUT - Gross Pollutant Mean Annual Load (kg/yr)	0
Flow In (ML/yr)	0.445938
ET Loss (ML/yr)	0
Infiltration Loss (ML/yr)	0
Low Flow Bypass Out (ML/yr)	0
High Flow Bypass Out (ML/yr)	0
Orifice / Filter Out (ML/yr)	0.308509
Weir Out (ML/yr)	0.001458
Transfer Function Out (ML/yr)	0
Reuse Supplied (ML/yr)	0.136656
Reuse Requested (ML/yr)	0.191782
% Reuse Demand Met	71.2561
% Load Reduction	30.4908
TSS Flow In (kg/yr)	11.2917
TSS ET Loss (kg/yr)	0

TSS Infiltration Loss (kg/yr)	0
TSS Low Flow Bypass Out (kg/yr)	0
TSS High Flow Bypass Out (kg/yr)	0
TSS Orifice / Filter Out (kg/yr)	5.82322
TSS Weir Out (kg/yr)	0.0256587
TSS Transfer Function Out (kg/yr)	0
TSS Reuse Supplied (kg/yr)	1.73516
TSS Reuse Requested (kg/yr)	0
TSS % Reuse Demand Met	0
TSS % Load Reduction	48.202
TP Flow In (kg/yr)	0.0693565
TP ET Loss (kg/yr)	0
TP Infiltration Loss (kg/yr)	0
TP Low Flow Bypass Out (kg/yr)	0
TP High Flow Bypass Out (kg/yr)	0
TP Orifice / Filter Out (kg/yr)	0.04645
TP Weir Out (kg/yr)	0.000307
TP Transfer Function Out (kg/yr)	0
TP Reuse Supplied (kg/yr)	0.0179144
TP Reuse Requested (kg/yr)	0
TP % Reuse Demand Met	0
TP % Load Reduction	32.5845
TN Flow In (kg/yr)	0.979199
TN ET Loss (kg/yr)	0
TN Infiltration Loss (kg/yr)	0
TN Low Flow Bypass Out (kg/yr)	0
TN High Flow Bypass Out (kg/yr)	0
TN Orifice / Filter Out (kg/yr)	0.643797
TN Weir Out (kg/yr)	0.0038028
TN Transfer Function Out (kg/yr)	0
TN Reuse Supplied (kg/yr)	0.230161
TN Reuse Requested (kg/yr)	0
TN % Reuse Demand Met	0
TN % Load Reduction	33.8643
GP Flow In (kg/yr)	9.96828
GP ET Loss (kg/yr)	0
GP Infiltration Loss (kg/yr)	0
GP Low Flow Bypass Out (kg/yr)	0
GP High Flow Bypass Out (kg/yr)	0
GP Orifice / Filter Out (kg/yr)	0
GP Weir Out (kg/yr)	0
GP Transfer Function Out (kg/yr)	0
GP Reuse Supplied (kg/yr)	0
GP Reuse Requested (kg/yr)	0
GP % Reuse Demand Met	0
GP % Load Reduction	100

No Generic treatment nodes

Other nodes

Location	Receiving Node	Junction 4	
ID	1	2	
Node Type	ReceivingNode	JunctionNode	
IN - Mean Annual Flow (ML/yr)	2.01	2.01	
IN - TSS Mean Annual Load (kg/yr)	308	308	
IN - TP Mean Annual Load (kg/yr)	0.549	0.549	
IN - TN Mean Annual Load (kg/yr)	4.36	4.36	
IN - Gross Pollutant Mean Annual Load (kg/yr)	43.6	43.6	
OUT - Mean Annual Flow (ML/yr)	0	2.01	
OUT - TSS Mean Annual Load (kg/yr)	0	308	
OUT - TP Mean Annual Load (kg/yr)	0	0.549	
OUT - TN Mean Annual Load (kg/yr)	0	4.36	
OUT - Gross Pollutant Mean Annual Load (kg/yr)	0	43.6	

Links

Location	Drainage Link	Drainage Link	Drainage Link	Drainage Link
Source node ID	2	4	5	3
Target node ID	1	5	2	2
Muskingum-Cunge Routing	Not Routed	Not Routed	Not Routed	Not Routed
Muskingum K				
Muskingum theta				
IN - Mean Annual Flow (ML/yr)	2.01	0.446	0.31	1.7
IN - TSS Mean Annual Load (kg/yr)	308	11.3	5.85	302
IN - TP Mean Annual Load (kg/yr)	0.549	6.94E-02	4.68E-02	0.502
IN - TN Mean Annual Load (kg/yr)	4.36	0.979	0.648	3.71
IN - Gross Pollutant Mean Annual Load (kg/yr)	43.6	9.97	0	43.6
OUT - Mean Annual Flow (ML/yr)	2.01	0.446	0.31	1.7
OUT - TSS Mean Annual Load (kg/yr)	308	11.3	5.85	302
OUT - TP Mean Annual Load (kg/yr)	0.549	6.94E-02	4.68E-02	0.502
OUT - TN Mean Annual Load (kg/yr)	4.36	0.979	0.648	3.71
OUT - Gross Pollutant Mean Annual Load (kg/yr)	43.6	9.97	0	43.6