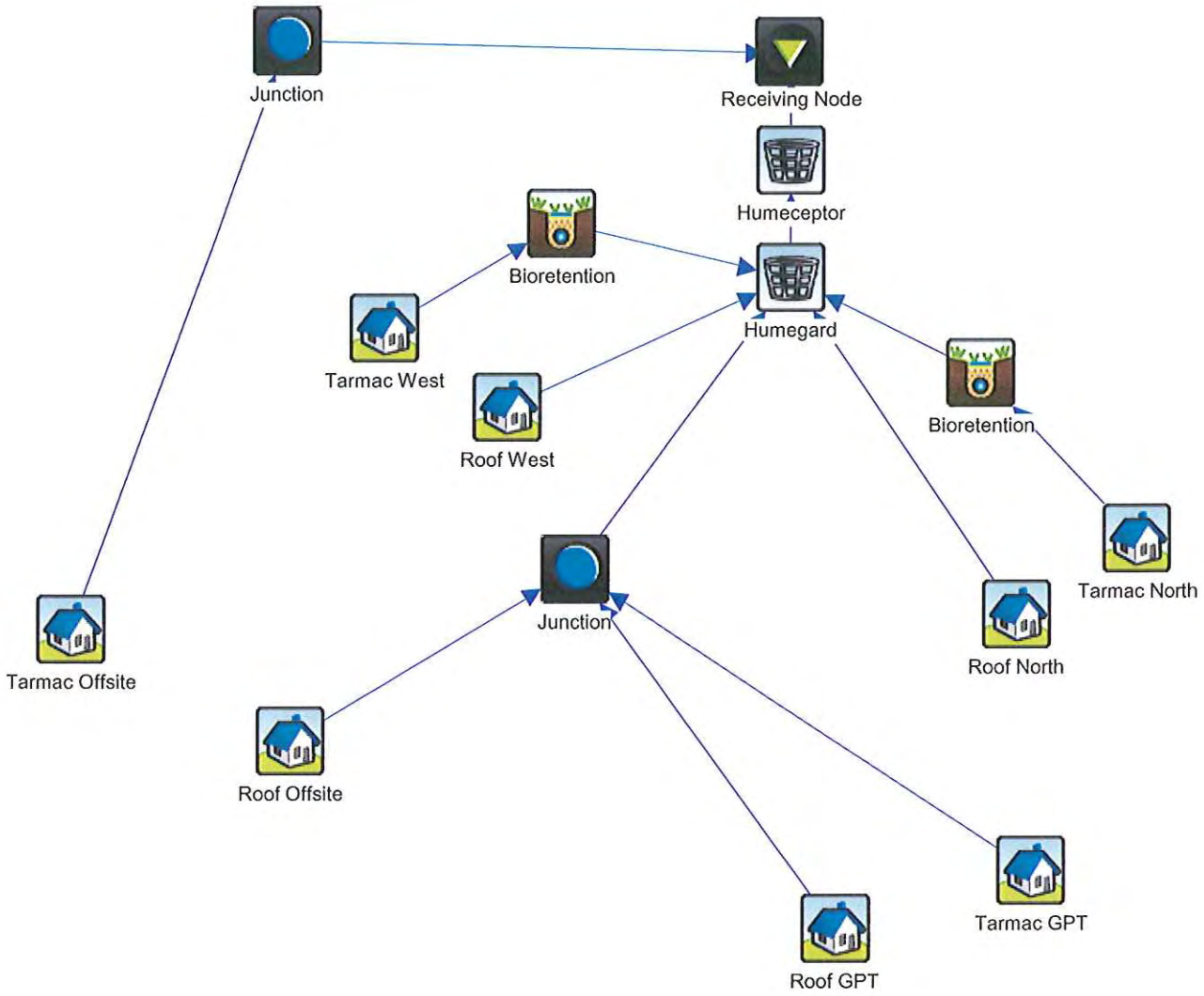
Junction
Receiving Node
Humeceptor
Bioretention
Humegard
Tarmac West
Roof West
Bioretention
Tarmac North
Junction
Roof North
Tarmac Offsite
Roof Offsite
Tarmac GPT
Roof GPT

Source nodes
Location,Site
ID,2
Node Type,UrbanSourceNode
Total Area (ha),2.46
Area Impervious (ha),2.24791982378855
Area Pervious (ha),0.212080176211455
Field Capacity (mm),80
Pervious Area Infiltration Capacity coefficient - a,200
Pervious Area Infiltration Capacity exponent - b,1
Impervious Area Rainfall Threshold (mm/day),1
Pervious Area Soil Storage Capacity (mm),120
Pervious Area Soil Initial Storage (% of Capacity),30
Groundwater Initial Depth (mm),10
Groundwater Daily Recharge Rate (%),25
Groundwater Daily Baseflow Rate (%),5
Groundwater Daily Deep Seepage Rate (%),0
Stormflow Total Suspended Solids Mean (log mg/L),2.2
Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.32
Stormflow Total Suspended Solids Estimation Method,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0.95
Stormflow Total Phosphorus Mean (log mg/L),-0.45
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.25
Stormflow Total Phosphorus Estimation Method,Stochastic
Stormflow Total Phosphorus Serial Correlation,0.95
Stormflow Total Nitrogen Mean (log mg/L),0.42
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.19
Stormflow Total Nitrogen Estimation Method,Stochastic
Stormflow Total Nitrogen Serial Correlation,0.95
Baseflow Total Suspended Solids Mean (log mg/L),1.1
Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17
Baseflow Total Suspended Solids Estimation Method,Stochastic
Baseflow Total Suspended Solids Serial Correlation,0.94
Baseflow Total Phosphorus Mean (log mg/L),-0.82
Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19
Baseflow Total Phosphorus Estimation Method,Stochastic
Baseflow Total Phosphorus Serial Correlation,0.94
Baseflow Total Nitrogen Mean (log mg/L),0.32
Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12
Baseflow Total Nitrogen Estimation Method,Stochastic
Baseflow Total Nitrogen Serial Correlation,0.94
OUT - Mean Annual Flow (ML/yr),24.2
OUT - TSS Mean Annual Load (kg/yr),4.82E3
OUT - TP Mean Annual Load (kg/yr),10.2
OUT - TN Mean Annual Load (kg/yr),70.6
OUT - Gross Pollutant Mean Annual Load (kg/yr),626
Rain In (ML/yr),28.367
ET Loss (ML/yr),4.14716
Deep Seepage Loss (ML/yr),0
Baseflow Out (ML/yr),0.429904
Imp. Stormflow Out (ML/yr),23.4049
Perv. Stormflow Out (ML/yr),0.385475
Total Stormflow Out (ML/yr),23.7904
Total Outflow (ML/yr),24.2203
Change in Soil Storage (ML/yr),-0.000424973
TSS Baseflow Out (ML/yr),5.83992
TSS Total Stormflow Out (ML/yr),4814.82
TSS Total Outflow (ML/yr),4820.66
TP Baseflow Out (ML/yr),0.0719081
TP Total Stormflow Out (ML/yr),10.1187
TP Total Outflow (ML/yr),10.1906
TN Baseflow Out (ML/yr),0.932314
TN Total Stormflow Out (ML/yr),69.6972
TN Total Outflow (ML/yr),70.6295
GP Total Outflow (ML/yr),626.299

No Imported Data Source nodes

No USTM treatment nodes

No Generic treatment nodes

Other nodes
Location,Receiving Node
ID,1
Node Type,ReceivingNode
IN - Mean Annual Flow (ML/yr),24.2
IN - TSS Mean Annual Load (kg/yr),4.82E3
IN - TP Mean Annual Load (kg/yr),10.2
IN - TN Mean Annual Load (kg/yr),70.6
IN - Gross Pollutant Mean Annual Load (kg/yr),626
OUT - Mean Annual Flow (ML/yr),0.00
OUT - TSS Mean Annual Load (kg/yr),0.00
OUT - TP Mean Annual Load (kg/yr),0.00
OUT - TN Mean Annual Load (kg/yr),0.00
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00

Links
Location,Drainage Link
Source node ID,2
Target node ID,1
Muskingum-Cunge Routing,Not Routed
Muskingum K,
Muskingum theta,
IN - Mean Annual Flow (ML/yr),24.2
IN - TSS Mean Annual Load (kg/yr),4.82E3
IN - TP Mean Annual Load (kg/yr),10.2
IN - TN Mean Annual Load (kg/yr),70.6
IN - Gross Pollutant Mean Annual Load (kg/yr),626
OUT - Mean Annual Flow (ML/yr),24.2
OUT - TSS Mean Annual Load (kg/yr),4.82E3
OUT - TP Mean Annual Load (kg/yr),10.2
OUT - TN Mean Annual Load (kg/yr),70.6
OUT - Gross Pollutant Mean Annual Load (kg/yr),626

Source nodes
Location,Tarmac West,Tarmac North,Tarmac GPT,Tarmac Offsite,Roof West,Roof Offsite,Roof North,Roof GPT
ID,1,2,3,4,5,6,7,8
Node Type,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode
Total Area (ha),0.289,0.261,0.274,0.232,0.25,0.36,0.395,0.396
Area Impervious (ha),0.201561585903084,0.208742511013216,0.248398502202643,0.161807224669604,0.248887665198238,0.36,0.395,0.396
Area Pervious (ha),0.0874384140969162,0.0522574889867841,0.0256014977973568,0.0701927753303963,0.00111233480176209,0,0,0
Field Capacity (mm),80,80,80,80,80,80,80,80
Pervious Area Infiltration Capacity coefficient - a,200,200,200,200,200,200,200,200
Pervious Area Infiltration Capacity exponent - b,1,1,1,1,1,1,1,1
Impervious Area Rainfall Threshold (mm/day),1,1,1,1,1,1,1,1
Pervious Area Soil Storage Capacity (mm),120,120,120,120,120,120,120,120
Pervious Area Soil Initial Storage (% of Capacity),30,30,30,30,30,30,30,30
Groundwater Initial Depth (mm),10,10,10,10,10,10,10,10
Groundwater Daily Recharge Rate (%),25,25,25,25,25,25,25,25
Groundwater Daily Baseflow Rate (%),5,5,5,5,5,5,5,5
Groundwater Daily Deep Seepage Rate (%),0,0,0,0,0,0,0,0
Stormflow Total Suspended Solids Mean (log mg/L),2.2,2.2,2.2,2.2,2.2,2.2,2.2,2.2
Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.32,0.32,0.32,0.32,0.32,0.32,0.32,0.32
Stormflow Total Suspended Solids Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0.95,0.95,0.95,0.95,0.95,0.95,0.95,0.95
Stormflow Total Phosphorus Mean (log mg/L),-0.45,-0.45,-0.45,-0.45,-0.45,-0.45,-0.45,-0.45
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.25,0.25,0.25,0.25,0.25,0.25,0.25,0.25
Stormflow Total Phosphorus Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Phosphorus Serial Correlation,0.95,0.95,0.95,0.95,0.95,0.95,0.95,0.95
Stormflow Total Nitrogen Mean (log mg/L),0.42,0.42,0.42,0.42,0.42,0.42,0.42,0.42
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.19,0.19,0.19,0.19,0.19,0.19,0.19,0.19
Stormflow Total Nitrogen Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Nitrogen Serial Correlation,0.95,0.95,0.95,0.95,0.95,0.95,0.95,0.95
Baseflow Total Suspended Solids Mean (log mg/L),1.1,1.1,1.1,1.1,1.1,1.1,1.1,1.1
Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17,0.17,0.17,0.17,0.17,0.17,0.17,0.17
Baseflow Total Suspended Solids Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Suspended Solids Serial Correlation,0.94,0.94,0.94,0.94,0.94,0.94,0.94,0.94
Baseflow Total Phosphorus Mean (log mg/L),-0.82,-0.82,-0.82,-0.82,-0.82,-0.82,-0.82,-0.82
Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19,0.19,0.19,0.19,0.19,0.19,0.19,0.19
Baseflow Total Phosphorus Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Phosphorus Serial Correlation,0.94,0.94,0.94,0.94,0.94,0.94,0.94,0.94
Baseflow Total Nitrogen Mean (log mg/L),0.32,0.32,0.32,0.32,0.32,0.32,0.32,0.32

Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12,0.12,0.12,0.12,0.12,0.12,0.12,0.12
Baseflow Total Nitrogen Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Nitrogen Serial Correlation,0.94,0.94,0.94,0.94,0.94,0.94,0.94,0.94
OUT - Mean Annual Flow (ML/yr),2.43,2.38,2.70,1.95,2.61,3.76,4.13,4.14
OUT - TSS Mean Annual Load (kg/yr),475,464,534,387,536,763,854,858
OUT - TP Mean Annual Load (kg/yr),1.00,0.967,1.13,0.793,1.06,1.63,1.72,1.72
OUT - TN Mean Annual Load (kg/yr),6.92,6.77,7.89,5.48,7.51,10.8,11.8,12.0
OUT - Gross Pollutant Mean Annual Load (kg/yr),64.7,62.5,69.8,52.0,66.5,95.7,105,105
Rain In (ML/yr),3.33256,3.00967,3.15959,2.67527,2.88283,4.15128,4.55488,4.5664
ET Loss (ML/yr),0.898351,0.634515,0.461927,0.721161,0.269049,0.387432,0.425101,0.426159
Deep Seepage Loss (ML/yr),0,0,0,0,0,0,0,0
Baseflow Out (ML/yr),0.16835,0.10136,0.0478838,0.135146,0,0,0,0
Imp. Stormflow Out (ML/yr),2.11507,2.18303,2.60689,1.69792,2.61379,3.76385,4.12978,4.14023
Perv. Stormflow Out (ML/yr),0.150952,0.0908844,0.042935,0.121179,0,0,0,0
Total Stormflow Out (ML/yr),2.26602,2.27392,2.64982,1.81909,2.61379,3.76385,4.12978,4.14023
Total Outflow (ML/yr),2.43437,2.37528,2.69771,1.95424,2.61379,3.76385,4.12978,4.14023
Change in Soil Storage (ML/yr),-0.000166405,-0.000100185,-4.73471E-5,-0.000133591,0,0,0,0
TSS Baseflow Out (ML/yr),2.29413,1.38295,0.652883,1.83859,0,0,0,0
TSS Total Stormflow Out (ML/yr),472.599,463.037,533.264,385.347,535.786,762.607,853.823,858.382
TSS Total Outflow (ML/yr),474.893,464.42,533.917,387.186,535.786,762.607,853.823,858.382
TP Baseflow Out (ML/yr),0.0279813,0.0169106,0.00796467,0.0224427,0,0,0,0
TP Total Stormflow Out (ML/yr),0.973283,0.949879,1.11848,0.770406,1.06371,1.6255,1.7231,1.72391
TP Total Outflow (ML/yr),1.00126,0.96679,1.12645,0.792849,1.06371,1.6255,1.7231,1.72391
TN Baseflow Out (ML/yr),0.366101,0.219519,0.103818,0.294134,0,0,0,0
TN Total Stormflow Out (ML/yr),6.55312,6.54766,7.78869,5.18457,7.50723,10.8381,11.8242,12.0059
TN Total Outflow (ML/yr),6.91922,6.76718,7.89251,5.4787,7.50723,10.8381,11.8242,12.0059
GP Total Outflow (ML/yr),64.7412,62.4967,69.7585,51.9722,66.4633,95.7071,105.012,105.278

No Imported Data Source nodes

USTM treatment nodes
Location,Bioretention,Bioretention
ID,9,10
Node Type,BioRetentionNodeV4,BioRetentionNodeV4
Lo-flow bypass rate (cum/sec),0,0
Hi-flow bypass rate (cum/sec),0.058,0.053
Inlet pond volume, ,
Area (sqm),96,162
Extended detention depth (m),0.3,0.3
Permanent pool volume (cum), ,
Proportion vegetated, ,
Equivalent pipe diameter (mm), ,
Overflow weir width (m),2,2
Notional Detention Time (hrs), ,
Orifice discharge coefficient, ,
Weir coefficient,1.7,1.7
Number of CSTR cells,3,3
Total Suspended Solids k (m/yr),8000,8000
Total Suspended Solids C* (mg/L),20,20
Total Suspended Solids C** (mg/L), ,
Total Phosphorus k (m/yr),6000,6000

Total Phosphorus C* (mg/L),0.13,0.13
Total Phosphorus C** (mg/L), ,
Total Nitrogen k (m/yr),500,500
Total Nitrogen C* (mg/L),1.4,1.4
Total Nitrogen C** (mg/L), ,
Threshold hydraulic loading for C** (m/yr), ,
Horizontal Flow Coefficient,3,3
Extraction for Re-use,Off,Off
Annual Re-use Demand - scaled by daily PET (ML), ,
Annual Re-use Demand - scaled by daily PET - Rain (ML), ,
Constant Daily Re-use Demand (kL), ,
User-defined Annual Re-use Demand (ML), ,
Percentage of User-defined Annual Re-use Demand Jan, ,
Percentage of User-defined Annual Re-use Demand Feb, ,
Percentage of User-defined Annual Re-use Demand Mar, ,
Percentage of User-defined Annual Re-use Demand Apr, ,
Percentage of User-defined Annual Re-use Demand May, ,
Percentage of User-defined Annual Re-use Demand Jun, ,
Percentage of User-defined Annual Re-use Demand Jul, ,
Percentage of User-defined Annual Re-use Demand Aug, ,
Percentage of User-defined Annual Re-use Demand Sep, ,
Percentage of User-defined Annual Re-use Demand Oct, ,
Percentage of User-defined Annual Re-use Demand Nov, ,
Percentage of User-defined Annual Re-use Demand Dec, , , ,
User-defined Re-use File, ,
Filter area (sqm),96,162
Filter perimeter (m),3,14
Filter depth (m),0.5,0.5
Filter median particle diameter (mm), ,
Saturated hydraulic conductivity (mm/hr),180,180
Infiltration Media Porosity,0.35,0.35
Length (m), ,
Bed slope, ,
Base Width (m), ,
Top width (m), ,
Vegetation height (m), ,
Vegetation Type,Vegetated with Effective Nutrient Removal Plants,Vegetated with Effective Nutrient Removal Plants
Total Nitrogen Content in Filter (mg/kg),997,997
Proportion of Organic Material in Filter (%),<5,<5
Orthophosphate Content in Filter (mg/kg),<55,<55
Is Base Lined?,Yes,Yes
Is Underdrain Present?,Yes,Yes
Is Submerged Zone Present?,No,No
Submerged Zone Depth (m), ,
B for Media Soil Texture,13,13
Proportion of upstream impervious area treated, ,
Exfiltration Rate (mm/hr),0,0
Evap Loss as proportion of PET, ,
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,0.37,0.37
S*,0.22,0.22
Sw,0.11,0.11
Sh,0.05,0.05
Emax (m/day),0.008,0.008
Ew (m/day),0.001,0.001
IN - Mean Annual Flow (ML/yr),2.43,2.38
IN - TSS Mean Annual Load (kg/yr),475,464
IN - TP Mean Annual Load (kg/yr),1.00,0.967
IN - TN Mean Annual Load (kg/yr),6.92,6.77
IN - Gross Pollutant Mean Annual Load (kg/yr),64.7,62.5
OUT - Mean Annual Flow (ML/yr),2.19,1.99

OUT - TSS Mean Annual Load (kg/yr),29.2,11.3
OUT - TP Mean Annual Load (kg/yr),0.165,0.128
OUT - TN Mean Annual Load (kg/yr),2.92,2.44
OUT - Gross Pollutant Mean Annual Load (kg/yr),95.4E-3,0.126
Flow In (ML/yr),2.42401,2.36427
ET Loss (ML/yr),0.249001,0.393339
Infiltration Loss (ML/yr),0,0
Low Flow Bypass Out (ML/yr),0,0
High Flow Bypass Out (ML/yr),0.0123386,0.0137349
Orifice / Filter Out (ML/yr),1.93309,1.89004
Weir Out (ML/yr),0.236625,0.0762675
Transfer Function Out (ML/yr),0,0
Reuse Supplied (ML/yr),0,0
Reuse Requested (ML/yr),0,0
% Reuse Demand Met,0,0
% Load Reduction,9.98188,16.2516
TSS Flow In (kg/yr),473.272,463.329
TSS ET Loss (kg/yr),0,0
TSS Infiltration Loss (kg/yr),0,0
TSS Low Flow Bypass Out (kg/yr),0,0
TSS High Flow Bypass Out (kg/yr),7.18838,2.72375
TSS Orifice / Filter Out (kg/yr),3.86618,3.78008
TSS Weir Out (kg/yr),18.1797,4.76528
TSS Transfer Function Out (kg/yr),0,0
TSS Reuse Supplied (kg/yr),0,0
TSS Reuse Requested (kg/yr),0,0
TSS % Reuse Demand Met,0,0
TSS % Load Reduction,93.8229,97.5678
TP Flow In (kg/yr),0.996158,0.961288
TP ET Loss (kg/yr),0,0
TP Infiltration Loss (kg/yr),0,0
TP Low Flow Bypass Out (kg/yr),0,0
TP High Flow Bypass Out (kg/yr),0.00463469,0.00621325
TP Orifice / Filter Out (kg/yr),0.104579,0.1035
TP Weir Out (kg/yr),0.0550302,0.0175449
TP Transfer Function Out (kg/yr),0,0
TP Reuse Supplied (kg/yr),0,0
TP Reuse Requested (kg/yr),0,0
TP % Reuse Demand Met,0,0
TP % Load Reduction,83.5123,86.7618
TN Flow In (kg/yr),6.88512,6.73189
TN ET Loss (kg/yr),0,0
TN Infiltration Loss (kg/yr),0,0
TN Low Flow Bypass Out (kg/yr),0,0
TN High Flow Bypass Out (kg/yr),0.0473059,0.0422603
TN Orifice / Filter Out (kg/yr),2.21852,2.19289
TN Weir Out (kg/yr),0.642776,0.195084
TN Transfer Function Out (kg/yr),0,0
TN Reuse Supplied (kg/yr),0,0
TN Reuse Requested (kg/yr),0,0
TN % Reuse Demand Met,0,0
TN % Load Reduction,57.7553,63.8997
GP Flow In (kg/yr),64.7394,62.4934
GP ET Loss (kg/yr),0,0
GP Infiltration Loss (kg/yr),0,0
GP Low Flow Bypass Out (kg/yr),0,0
GP High Flow Bypass Out (kg/yr),0.0953544,0.126379
GP Orifice / Filter Out (kg/yr),0,0
GP Weir Out (kg/yr),0,0
GP Transfer Function Out (kg/yr),0,0
GP Reuse Supplied (kg/yr),0,0
GP Reuse Requested (kg/yr),0,0
GP % Reuse Demand Met,0,0
GP % Load Reduction,99.8527,99.7978

Generic treatment nodes
Location,Humeceptor,Humegard,Gross Pollutant Trap
ID,11,12,16

Node Type,GPTNode,GPTNode,GPTNode
Lo-flow bypass rate (cum/sec),0,0,0
Hi-flow bypass rate (cum/sec),0.126,0.126,100
Flow Transfer Function
Input (cum/sec),0,0,0
Output (cum/sec),0,0,0
Input (cum/sec),10,10,10
Output (cum/sec),10,10,10
Input (cum/sec), , ,
Output (cum/sec), , ,
Input (cum/sec), , ,
Output (cum/sec), , ,
Input (cum/sec), , ,
Output (cum/sec), , ,
Input (cum/sec), , ,
Output (cum/sec), , ,
Input (cum/sec), , ,
Output (cum/sec), , ,
Input (cum/sec), , ,
Output (cum/sec), , ,
Input (cum/sec), , ,
Output (cum/sec), , ,
Input (cum/sec), , ,
Output (cum/sec), , ,
Gross Pollutant Transfer Function
Input (kg/ML),0,0,0
Output (kg/ML),0,0,0
Input (kg/ML),15.0560458776857,1000,15
Output (kg/ML),14.9400690534957,100,15
Input (kg/ML), , ,
Output (kg/ML), , ,
Input (kg/ML), , ,
Output (kg/ML), , ,
Input (kg/ML), , ,
Output (kg/ML), , ,
Input (kg/ML), , ,
Output (kg/ML), , ,
Input (kg/ML), , ,
Output (kg/ML), , ,
Input (kg/ML), , ,
Output (kg/ML), , ,
Input (kg/ML), , ,
Output (kg/ML), , ,
Input (kg/ML), , ,
Output (kg/ML), , ,
Total Nitrogen Transfer Function
Input (mg/L),0,0,0
Output (mg/L),0,0,0
Input (mg/L),5.01780199875431,4.99789070699106,50
Output (mg/L),3.50246986004236,4.02221736393539,50
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Total Phosphorus Transfer Function
Input (mg/L),0,0,0

Output (mg/L),0,0,0
Input (mg/L),4.99812682037518,4.97782696381473,5
Output (mg/L),3.51946187690226,4.00571815113218,5
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Total Suspended Solids Transfer Function
Input (mg/L),0,0,0
Output (mg/L),0,0,0
Input (mg/L),500.259404675815,500.21633960168,1000
Output (mg/L),100.29743316589,250.728626438137,1000
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
Input (mg/L), , ,
Output (mg/L), , ,
IN - Mean Annual Flow (ML/yr),21.5,21.5,0.00
IN - TSS Mean Annual Load (kg/yr),1.91E3,3.59E3,0.00
IN - TP Mean Annual Load (kg/yr),6.17,7.55,0.00
IN - TN Mean Annual Load (kg/yr),45.3,55.4,0.00
IN - Gross Pollutant Mean Annual Load (kg/yr),57.5,442,0.00
OUT - Mean Annual Flow (ML/yr),21.5,21.5,0.00
OUT - TSS Mean Annual Load (kg/yr),523,1.91E3,0.00
OUT - TP Mean Annual Load (kg/yr),4.48,6.17,0.00
OUT - TN Mean Annual Load (kg/yr),32.6,45.3,0.00
OUT - Gross Pollutant Mean Annual Load (kg/yr),57.2,57.5,0.00
Flow In (ML/yr),21.4095,21.4095,0
ET Loss (ML/yr),0,0,0
Infiltration Loss (ML/yr),0,0,0
Low Flow Bypass Out (ML/yr),0,0,0
High Flow Bypass Out (ML/yr),1.21552,1.21552,0
Orifice / Filter Out (ML/yr),0,0,0
Weir Out (ML/yr),0,0,0
Transfer Function Out (ML/yr),20.2023,20.2023,0
Reuse Supplied (ML/yr),0,0,0
Reuse Requested (ML/yr),0,0,0
% Reuse Demand Met,0,0,0
% Load Reduction,-0.038728,-0.0387092,0
TSS Flow In (kg/yr),1908.48,3583.22,0
TSS ET Loss (kg/yr),0,0,0
TSS Infiltration Loss (kg/yr),0,0,0
TSS Low Flow Bypass Out (kg/yr),0,0,0
TSS High Flow Bypass Out (kg/yr),175.885,225.429,0
TSS Orifice / Filter Out (kg/yr),0,0,0

TSS Weir Out (kg/yr),0,0,0
TSS Transfer Function Out (kg/yr),347.367,1683.06,0
TSS Reuse Supplied (kg/yr),0,0,0
TSS Reuse Requested (kg/yr),0,0,0
TSS % Reuse Demand Met,0,0,0
TSS % Load Reduction,72.5828,46.7383,0
TP Flow In (kg/yr),6.15693,7.53338,0
TP ET Loss (kg/yr),0,0,0
TP Infiltration Loss (kg/yr),0,0,0
TP Low Flow Bypass Out (kg/yr),0,0,0
TP High Flow Bypass Out (kg/yr),0.444283,0.485709,0
TP Orifice / Filter Out (kg/yr),0,0,0
TP Weir Out (kg/yr),0,0,0
TP Transfer Function Out (kg/yr),4.02302,5.67164,0
TP Reuse Supplied (kg/yr),0,0,0
TP Reuse Requested (kg/yr),0,0,0
TP % Reuse Demand Met,0,0,0
TP % Load Reduction,27.4428,18.2658,0
TN Flow In (kg/yr),45.0731,55.1827,0
TN ET Loss (kg/yr),0,0,0
TN Infiltration Loss (kg/yr),0,0,0
TN Low Flow Bypass Out (kg/yr),0,0,0
TN High Flow Bypass Out (kg/yr),3.15603,3.45428,0
TN Orifice / Filter Out (kg/yr),0,0,0
TN Weir Out (kg/yr),0,0,0
TN Transfer Function Out (kg/yr),29.2732,41.6275,0
TN Reuse Supplied (kg/yr),0,0,0
TN Reuse Requested (kg/yr),0,0,0
TN % Reuse Demand Met,0,0,0
TN % Load Reduction,28.0519,18.3045,0
GP Flow In (kg/yr),57.5508,442.458,0
GP ET Loss (kg/yr),0,0,0
GP Infiltration Loss (kg/yr),0,0,0
GP Low Flow Bypass Out (kg/yr),0,0,0
GP High Flow Bypass Out (kg/yr),8.34319,8.37006,0
GP Orifice / Filter Out (kg/yr),0,0,0
GP Weir Out (kg/yr),0,0,0
GP Transfer Function Out (kg/yr),-196.579,-197.017,0
GP Reuse Supplied (kg/yr),0,0,0
GP Reuse Requested (kg/yr),0,0,0
GP % Reuse Demand Met,0,0,0
GP % Load Reduction,85.5029,98.1083,100

Other nodes
Location,Receiving Node,Junction,Junction
ID,13,14,15
Node Type,ReceivingNode,JunctionNode,JunctionNode
IN - Mean Annual Flow (ML/yr),23.5,10.6,1.95
IN - TSS Mean Annual Load (kg/yr),911,2.15E3,387
IN - TP Mean Annual Load (kg/yr),5.27,4.48,0.793
IN - TN Mean Annual Load (kg/yr),38.0,30.7,5.48
IN - Gross Pollutant Mean Annual Load (kg/yr),109,271,52.0
OUT - Mean Annual Flow (ML/yr),0.00,10.6,1.95
OUT - TSS Mean Annual Load (kg/yr),0.00,2.15E3,387
OUT - TP Mean Annual Load (kg/yr),0.00,4.48,0.793
OUT - TN Mean Annual Load (kg/yr),0.00,30.7,5.48
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,271,52.0

Links
Location,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link
Source node ID,12,2,1,11,9,10,5,7,14,8,3,4,15,6
Target node ID,11,10,9,13,12,12,12,12,12,14,14,15,13,14
Muskingum-Cunge Routing,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed
Muskingum K, , , , , , , , , , , , , ,

Muskingum theta, , , , , , , , , , , , , , ,
IN - Mean Annual Flow
(ML/yr),21.5,2.38,2.43,21.5,2.19,1.99,2.61,4.13,10.6,4.14,2.70,1.95,1.95,3.76
IN - TSS Mean Annual Load
(kg/yr),1.91E3,464,475,523,29.2,11.3,536,854,2.15E3,858,534,387,387,763
IN - TP Mean Annual Load
(kg/yr),6.17,0.967,1.00,4.48,0.165,0.128,1.06,1.72,4.48,1.72,1.13,0.793,0.793,1.
63
IN - TN Mean Annual Load
(kg/yr),45.3,6.77,6.92,32.6,2.92,2.44,7.51,11.8,30.7,12.0,7.89,5.48,5.48,10.8
IN - Gross Pollutant Mean Annual Load
(kg/yr),57.5,62.5,64.7,57.2,95.4E-3,0.126,66.5,105,271,105,69.8,52.0,52.0,95.7
OUT - Mean Annual Flow
(ML/yr),21.5,2.38,2.43,21.5,2.19,1.99,2.61,4.13,10.6,4.14,2.70,1.95,1.95,3.76
OUT - TSS Mean Annual Load
(kg/yr),1.91E3,464,475,523,29.2,11.3,536,854,2.15E3,858,534,387,387,763
OUT - TP Mean Annual Load
(kg/yr),6.17,0.967,1.00,4.48,0.165,0.128,1.06,1.72,4.48,1.72,1.13,0.793,0.793,1.
63
OUT - TN Mean Annual Load
(kg/yr),45.3,6.77,6.92,32.6,2.92,2.44,7.51,11.8,30.7,12.0,7.89,5.48,5.48,10.8
OUT - Gross Pollutant Mean Annual Load
(kg/yr),57.5,62.5,64.7,57.2,95.4E-3,0.126,66.5,105,271,105,69.8,52.0,52.0,95.7

Humeceptor™ Water Quality Device

The **Humeceptor™** device is a worldwide market-leading product with in excess of 18,000 units in operation and is recognised as being a high performing product.
Humeceptor™ is not a gross pollutant trap and therefore should not be compared to other GPT's. Independent third party regulatory authorities under field conditions have extensively verified the performance of the **Humeceptor™** product to deliver a water quality outcome. These conditions implicitly take into consideration the varying hydrologic, hydraulic and pollutant export conditions that exist in the real world.

Humeceptor™, as oposed to GPT's, is a source control product targetting Petroleum Hydrocarbons, Oils, Grease, Total Suspended Solids, Heavy Metals & Nutrients. The device does have the capacity to capture small pieces of litter such as cigarette butts, pieces of paper etc, but is not desinged to reomvve litter.

It is common for many people within the industry to believe that GPT's can capture all these pollutants. Unfortunately this claim is far from the truth and is becoming, slowly but surely, a recognised fact based on field trials conducted by Councils in Australia and by companies such as Rinker in Australia and Stormceptor in the USA. The general performance of **Humeceptor™** is as follows:

- **Total suspended solids**: **Humeceptor™** can be sized to achieve anything up to the removal of about 85% of the total suspended solids load, depending on hydrology and particle size distribution. Generally, **Humeceptor™** is sized to achieve around 75% removal of total suspended solids based on an average particle size distribution with 60% of the material finer than 150 μm.

- **Total Petroleum Hydrocarbons**: **Humeceptor™** will generally remove 98% of the incoming hydrocarbon concentrations entrained within runoff when inlet concentrations exceed 2,000 ppm,

- **Heavy Metals**: In general, field data supports the removal of between 30 – 60% of the total heavy metal load, which reflects the capture of a majority of the particulate forms of various heavy metal species,

- **Nutrients (Nitrogen)**: Approximate removal efficiency for nitrogen of 45 – 50% and total phosphorus of about 30 – 40% is achievable. Again, this reflects the capture of the particulate forms of these contaminants rather than the processing of dissolved fractions.

Some of the reasons why the **Humeceptor™** will capture the above pollutants and a GPT will not are as follows:

- **Internal Operational Velocity** – The maximum operational velocity through **Humeceptor™** is 0.007m/s (compared with **Humegard™** GPT which operates at approximately 0.1 - 0.2 m/s). Many of the poorer performing GPT products generate operational velocities in excess of 0.5 to 1.2 m/s. You can remove coke cans with these velocities but you simply can not retain fines and hydrocarbons with the higher operational velocities and the turbulence that result,

- **Hume*ceptor***™ utilises an orifice to carefully control flow rates that are diverted into the treatment area of the product. Many products do not successfully control flow rates, which therefore leads to re-suspension and loss of accumulated material during high flow events

- The orifice generates a small vortex which successfully draws hydrocarbons into the lower chamber where they rise and are retained securely beneath the fibreglass insert, outside of the active flow region of the product. However, the vortex generated is only at the orifice. The treatment chamber does not utilise a vortex method of treatment which in our opinion creates many issues with regard to velocities and therefore potential capture efficiency,

- **Hume*ceptor***™ is a source control product rather than an end of line solution – therefore contaminants are captured relatively close to where they are being generated, preventing hydrocarbons from becoming emulsified within the drainage system,

- **Hume*ceptor***™ is sized using a continuous rainfall / runoff, pollutant export simulation using historical rainfall records. The unit has therefore been sized to successfully operate across a wide range of hydrologic conditions, including the small everyday rainfall events, 1 year, 2 year, 5 year ARI events – whatever has fallen in terms of rainfall within the simulation period has been accommodated in the product sizing and performance. The model is based on the United States EPA StormWater Management Model (SWMM) and is very similar to CRC for Catchment Hydrology - MUSIC model in terms of the fundamental modelling approach. The **Hume*ceptor***™ model has been calibrated against field data and indicates a high level of correlation with the field performance results.

Total Suspended Solids: The **Hume*ceptor***™ product is focussed on the retention of total suspended solids, particularly the fine material less than 60µm. The performance of most stormwater management solutions is actually highly dependant on the particle size distribution that is present. In this regard, the **Hume*ceptor***™ product assumes that 60% of the material is finer than 150 µm:

- 20% is 20 µm
- 20% is 60 µm
- 20% is 150 µm
- 20% is 400 µm
- 20% is 2000 µm

I have provided you with a graph below, **Figure 1**, which shows the results across a wide range of individual rainfall events from various sites, under a whole range of rainfall intensities and hydrologic conditions.