Nomenclatures

C_1	Cognitive parameter, the weight of a particles own experience in PSO
C_2	Social parameter, the weight of the combined experience of the swarm in PSO
C	Pipe roughness (Hazen-Williams)
C_{ij}=	Substance concentration (mg/l) at position x and time t in the link between nodes i and j
$C_{ij\ @x=0}$	Concentration at the start of the link connecting node i to node j in mg/L (where x=0)
$C_{kj@x=L}$	Concentration at the end of a link in mg/L
C_j	Chlorine concentration at junction node, mg/L.
C_{ks}	Concentration of contaminant in link k to s, mg/m^3
C_s	Concentration for the tanks, mg/L
Ct	Concentration of chlorine the water, throughout the transportation time, t
C_o	Chlorine concentration at the beginning of the transportation
d	Diameter of pipe, m
$\frac{dS}{dT}$	Change in storage, m^3/s
dV_s	Change in volume of tank at nodes, m^3
Dt	Change in time, seconds
F	Friction factor
g	Acceleration due to gravity, m/s^2
h_p	Pumping head gain, m
h_L	Head loss in pipes, m
h_m	Head loss due to minor losses, m
I	Injection Nodes
J	Critical Nodes
k_b	Bulk decay coefficient, d^{-1}
k_{ij}	Rate at which the substance reacts within the link (s^{-1})
$K_{i,j}$	Impulse response coefficients corresponding to injection nodes
k_w	Wall reaction constant with units of length over time, m/d
L	Length of pipe, m
M	Total numbers of critical nodes

M_i	Mass rate injected at injection node (i) at Source or Booster Stations, mg/min
N	Total number of Injection nodes
Pid	Parameter value of i^{th} particle corresponding to the best solution ever personally visited by the given particle in PSO
pgd	Parameter value corresponding to the best solution ever visited by any particle (the current global best) in PSO.
P_1 and P_2	Pressure at points 1 and 2 respectively, N/m^2
Q_i	Inflow to node in i^{th} pipe, m^3/s
Q_{ki}	Flow from k to i, m^3/sec
Q_{ks}	Flow from node k to s, m^3/s
Q_{sj}	Flow from node s to j, $m^{3/}s$
r_1 , r_2	Independent and uniformly distributed random numbers in PSO
Re	Reynolds number
U_i	Water used or leaving at the i^{th} node, m^3/s
V	Velocity of water in pipe, m/sec
Vid	Velocity of parameter d of ith particle in PSO
v_{ij}	Flow velocity in the link, m/s
v_1^2 and v_2^2	Velocity at points 1 and 2 respectively, m/s
V	Volume of tank at nodes, m^3
W	Inertia weight in PSO
xid	Value of parameter d of i^{th} particle in PSO
Z_1 and Z_2	Elevation at points 1 and 2 respectively, m
Γ	Fluid (water) specific weight, N/m^3
ε	Pipe roughness (Darcy-Weisbach)
N	Kinematic viscosity of water (resistance to flow).
χ	Constriction factor