
APPENDIX F-2

SONIR RESULTS, EXISTING CONDITIONS

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

Existing Conditions

NAME OF PROJECT

South Country Road Quiogue MFPRD

Quiogue, NY

8/9/2021

DATA INPUT FIELD

A	Site Recharge Parameters	Value	Units	B	Nitrogen Budget Parameters	Value	Units										
1	Area of Site	17.33	acres	1	Persons per Dwelling	0.00	persons										
2	Precipitation Rate	50.10	inches	2	Nitrogen per Person per Year	10.0	lbs										
3	Acreage of Fertilized Landscaping	0.00	acres	3	a. Sanitary Nitrogen Leaching Rate	84%	percent										
4	Fraction of Land in above	0.000	fraction	3	b. Treated Sanitary Nitrogen Leaching Rate	100%	percent										
5	Evapotranspiration from above	21.20	inches	4	Fertilized Landscaping	0.00	acres										
6	Runoff from above	0.50	inches	5	Fertilizer Application Rate (for above)	2.30	lbs/1000 sq ft										
7	Acreage of Natural Landscaping/Reveg	0.00	acres	6	Fertilizer Nitrogen Leaching Rate (for above)	20%	percent										
8	Fraction of above	0.000	fraction	7	Fertilized Land (other, if applicable)	0.00	acres										
9	Evapotranspiration from above	21.20	inches	8	Fertilizer Application Rate (for above)	0.00	lbs/1000 sq ft										
10	Runoff from above	0.50	inches	9	Fertilizer Nitrogen Leaching Rate (for above)	0%	percent										
11	Acreage of Unvegetated/Dirt Roads	3.54	acres	10	Outdoor Cat Population	0.19	pets/dwelling										
12	Fraction of above	0.204	fraction	11	Cat Waste Nitrogen Load	3.22	lbs/pet/year										
13	Evapotranspiration from above	21.20	inches	12	Outdoor Dog Population	0.35	pets/dwelling										
14	Runoff from above	0.00	inches	13	Dog Waste Nitrogen Load	4.29	lbs/pet/year										
15	Acreage of Water/Ponds	0.00	acres	14	Pet Waste Nitrogen Leaching Rate	25%	percent										
16	Fraction of Site in above	0.000	fraction	15	Area of Land Irrigated	0.00	acres										
17	Evaporation from above	30.00	inches	16	Irrigation Rate	24.00	inches										
18	Makeup Water (if applicable)	0.00	inches	17	Irrigation Nitrogen Leaching Rate	10%	percent										
19	Acreage of Natural	13.79	acres	18	Atmospheric Nitrogen Application/Load	0.04	lbs/1000 sq ft										
20	Fraction of above	0.796	fraction	19	Atmos. N Leaching Rate (Natural/Wetlands)	25%	percent										
21	Evapotranspiration from above	21.20	inches	20	Atmos. N Leaching Rate (Turf/Landscaped)	20%	percent										
22	Runoff from above	0.50	inches	21	Atmos. N. Leaching Rate (Ag; Imperv; Other)	40%	percent										
23	Acreage of Impervious/Paved/Bldgs	0.00	acres	22	Nitrogen in Water Supply	2.00	mg/l										
24	Fraction of Land in above	0.000	fraction	23	Nitrogen in Sanitary Flow	10.00	mg/l										
25	Evapotrans. from above	5.01	inches	<table border="1"> <thead> <tr> <th>C</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>1)</td> <td>Please refer to user manual for data input instructions; updated per LINAP.</td> </tr> <tr> <td colspan="2">Total Acreage Check</td> </tr> <tr> <td></td> <td>17.33</td> </tr> <tr> <td></td> <td>100%</td> </tr> </tbody> </table>				C	Comments	1)	Please refer to user manual for data input instructions; updated per LINAP.	Total Acreage Check			17.33		100%
C	Comments																
1)	Please refer to user manual for data input instructions; updated per LINAP.																
Total Acreage Check																	
	17.33																
	100%																
26	Runoff from Impervious	0.00	inches														
23	Acreage of Other	0.00	acres														
24	Fraction of Land in above	0.000	fraction														
25	Evapotrans. from above	21.20	inches														
26	Runoff from above	0.00	inches														
27	Acreage of Land Irrigated	0.00	acres														
28	Fraction of Land Irrigated	0.000	fraction														
29	Irrigation Rate	24.00	inches														
30	Number of Dwellings	0	units														
31	Water Use per Dwelling	0	gal/day														
32	Wastewater Design Flow (existing uses)	0	gal/day														

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

South Country Road Quiogue MFPRD

SITE RECHARGE COMPUTATIONS

A Fertilized Landscaping			Value	Units	B Unfertilized Landscaping			Value	Units
1	A = Fraction of Land in Cover Type		0.000	fraction	1	A = Fraction of Land in Cover Type	0.000	fraction	
2	P = Precipitation Rate		50.10	inches	2	P = Precipitation Rate	50.10	inches	
3	E = Evapotranspiration Rate		21.20	inches	3	E = Evapotranspiration Rate	21.20	inches	
4	Q = Runoff Rate		0.50	inches	4	Q = Runoff Rate	0.50	inches	
5	$R(a) = P - (E + Q)$		28.40	inches	5	$R(b) = P - (E + Q)$	28.40	inches	
6	$R(A) = R(a) \times A$		0.00	inches	6	$R(B) = R(b) \times A$	0.00	inches	

C Unvegetated/Dirt Roads			Value	Units	D Water/Ponds			Value	Units
1	A = Fraction of Land in Cover Type		0.204	fraction	1	A = Fraction of Site in Water	0.000	fraction	
2	P = Precipitation Rate		50.10	inches	2	P = Precipitation Rate	50.10	inches	
3	E = Evapotranspiration Rate		21.20	inches	3	E = Evaporation Rate	30.00	inches	
4	Q = Runoff Rate		0.00	inches	4	Q = Runoff Rate	0.00	inches	
5	$R(c) = P - (E + Q)$		28.90	inches	5	M = Makeup Water	0.00	inches	
6	$R(C) = R(c) \times A$		5.90	inches	6	$R(d) = \{P - (E+Q)\} - M$	20.10	inches	
					7	$R(D) = R(d) \times A$	0.00	inches	

E Natural			Value	Units	F Impervious/Paved/Roads			Value	Units
1	A = Fraction of Land in Cover Type		0.796	fraction	1	A = Fraction of Land in Cover Type	0.000	fraction	
2	P = Precipitation Rate		50.10	inches	2	P = Precipitation Rate	50.10	inches	
3	E = Evapotranspiration Rate		21.20	inches	3	E = Evapotranspiration Rate	5.01	inches	
4	Q = Runoff Rate		0.50	inches	4	Q = Runoff Rate	0.00	inches	
5	$R(e) = P - (E + Q)$		28.40	inches	5	$R(f) = P - (E + Q)$	45.09	inches	
6	$R(E) = R(e) \times A$		22.60	inches	6	$R(F) = R(f) \times A$	0.00	inches	

G Other			Value	Units	H Irrigation Recharge			Value	Units
1	A = Fraction of Land in Cover Type		0.000	fraction	1	A = Fraction of Land Irrigated	0.000	fraction	
2	P = Precipitation Rate		50.10	inches	2	I = Irrigation Rate	24.00	inches	
3	E = Evapotranspiration Rate		21.20	inches	3	E = Evaptranspiration Rate	21.40	inches	
4	Q = Runoff Rate		0.00	inches	4	Q = Runoff Rate	0.00	inches	
5	$R(g) = P - (E + Q)$		28.90	inches	5	$R(h) = I - (E + Q)$	2.60	inches	
6	$R(G) = R(g) \times A$		0.00	inches	6	$R(H) = R(h) \times A$	0.00	inches	

I Wastewater Recharge			Value	Units	J Runoff Recharge			Value	Units
1	WDF = Wastewater Design Flow		0	gal/day	1	Q(A) = Runoff from Landscaped	0.000	inches	
2	WDF = Wastewater Design Flow		0	cu ft/yr	2	Q(B) = Runoff from Unfertilized Landscaping	0.000	inches	
3	A = Area of Site		754,895	sq ft	3	Q(C) = Runoff from Unvegetated	0.000	inches	
4	$R(j) = WDF/A$		0.00	feet	4	Q(E) = Runoff from Natural	0.398	inches	
5	R(I) = Wastewater Recharge		0.00	inches	5	Q(H) = Runoff from Other	0.000	inches	
					6	Q(I) = Runoff from Irrigation	0.00	inches	
					7	$Q(tot) = Q(A)+Q(B)+Q(C)+Q(E)+Q(H)+Q(I)$	0.40	inches	

Total Site Recharge		
R(T) =		$R(A)+R(B)+R(C)+R(D)+R(E)+R(F)+R(G)+R(H)+R(I)+R(J)+Q(tot)$
R(T) =	28.90	inches

SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

South Country Road Quiogue MFPRD

SITE NITROGEN BUDGET

A Sanitary Nitrogen-Residential			
	Value	Units	
1	0	units	Number of Dwellings
2	0.00	capita	Persons per Dwelling
3	0.00	capita	P = Population
4	10	lbs	N = Nitrogen per person
6	0	lbs	N = (total; pre loss/removal)
7	84%	percent	LR = Leaching Rate
8	0.00	lbs	N(S) = P x N x LR
9	0.00	lbs	N = loss/removed

C Sanitary Nitrogen (Wastewater Design Flow)			
	Value	Units	
1	0	gal/day	CF = Commercial/STP Flow
2	0	liters/yr	CF = Commercial/STP Flow
5	10.00	mg/l	N = Nitrogen
6	0.00	lbs	N = Nitrogen
7	84%	percent	LR = Leaching Rate
8	0	milligrams	N(S) = CF x N x LR
9	0.00	lbs	N(S) = Sanitary Nitrogen
10	0.00	lbs	N = loss/removed

E Fertilized Land (Fertilized Landscaping)			
	Value	Units	
1	0	sq ft	A = Area of Land Fertilized
2	2.30	lbs/1000 sf	AR = Application Rate
3	0.00	lbs	N(T) = Nitrogen (total applied)
4	20%	percent	LR = Leaching Rate
5	0.00	lbs	N(F1) = A x AR x LR
6	0.00	lbs	N = loss/removed

G Atmospheric Nitrogen (existing condition)			
	Value	Units	
1	0.041	lbs/1000 sf	Application Load
2	601	1000 sf	Area of Natural/Wetlands/1000 sf
3	25%	percent	Leaching Rate
4	6.16	lbs/year	Atmos. N Load-1 (natural/wetlands)
5	0	1000 sf	Area of turf/landscaped/1000 sf
6	20%	percent	Leaching Rate
7	0.00	lbs/year	Atmos. N Load-2 (golf/turf)
8	0	1000 sf	Area of Impervious/Agricult/1000 sf
9	40%	percent	Leaching Rate
10	0.00	lbs/year	Atmos. N Load-3 (ag; imperv; other)
11	6.16	lbs	N(at) = N Load 1 + 2 + 3
12	18.47	lbs	N = loss/removed

B Cat Waste Nitrogen			
	Value	Units	
1	0.19	cats/dwelling	Number of Cats per Dwelling
2	0	cats	Number of Cats (Cats/dwelling x dwellings)
3	3.22	lbs/cat/year	Cat Waste Nitrogen Load
4	0.00	lbs/year	N(p) = AR x cats x Adjustment (if applicable)
5	25%	percent	LR = Leaching Rate
6	0.00	lbs	N(P) = N(p) x LR
7	0.00	lbs	N = (loss/removed)

B' Dog Waste Nitrogen			
	Value	Units	
1	0.35	dogs/dwelling	Number of Dogs per Dwelling
2	0	dogs	Number of Dogs (Dogs/dwelling x dwellings)
3	4.29	lbs/dog/year	Dog Waste Nitrogen Load
4	0.00	lbs/year	N(p) = AR x dogs x Adjustment (if applicable)
5	25%	percent	LR = Leaching Rate
6	0.00	lbs	N(P) = N(p) x LR
7	0.00	lbs	N = (loss/removed)

D Water Supply Nitrogen (other than wastewater, if applicable)			
	Value	Units	
1	0	gal/day	WDF = Wastewater Design Flow
2	0	liters/yr	WDF = Wastewater Design Flow
3	10.00	mg/l	N = Nitrogen in Water Supply
4	0	milligrams	N(WW) = WDF x N
5	0.00	lbs	N(WW) = Wastewater Nitrogen

F Fertilized Land (Unfertilized Landscaping)			
	Value	Units	
1	0	sq ft	A = Area of Land Fertilized 2
2	0.00	lbs/1000 sf	AR = Application Rate
3	0.00	lbs	N(T) = Nitrogen (total applied)
4	0%	percent	LR = Leaching Rate
5	0.00	lbs	N(F2) = A x AR x LR
6	0.00	lbs	N = loss/removed

H Irrigation Nitrogen			
	Value	Units	
1	0.00	inches	R = Irrigation Recharge (inches)
2	0.0000	feet	R = Irrigation Rate (feet)
3	1,045,440	sq ft	A = Area of Land Irrigated
4	0	cu ft	R(I) = R(irr) x A
5	0	liters	R(I) = Site Irrigation (liters)
6	2.00	mg/l	N = Nitrogen in Water Supply
7	0.00	lbs	N(T) = Nitrogen (total applied)
8	10%	percent	LR = Leaching Rate
9	0	milligrams	N(irr) = R(I) x N x LR
10	0.00	lbs	N(irr) = Irrigation Nitrogen
11	0.00	lbs	N = loss/removed

Total Site Nitrogen		
N=	N(S) + N(P) + N(WW) + N(F1) + N(F2) + N(ppt) + N(irr)	
N=	6.16	lbs



SIMULATION OF NITROGEN IN RECHARGE (SONIR)

NELSON, POPE & VOORHIS, LLC MICROCOMPUTER MODEL

NAME OF PROJECT

South Country Road Quiogue MFPRD
Quiogue, NY

FINAL COMPUTATIONS

A	Nitrogen in Recharge (concentr.)	Value	Units
1	N = Total Nitrogen (lbs)	6.16	lbs
2	N = Total Nitrogen (milligrams)	2,795,322	milligrams
3	R(T) = Total Recharge (inches)	28.90	inches
4	R(T) = Total Recharge (feet)	2.41	feet
5	A = Area of Site	754,895	sq ft
6	R = R(T) x A	1,818,038	cu ft
7	R = Site Recharge Volume	51,486,845	liters
9	NR = N/R	0.05	mg/l

CONCENTRATION OF NITROGEN IN RECHARGE		0.05
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A	Nitrogen in Recharge	Value	Units
1	N = Total Nitrogen (lbs)	6.16	lbs
2	N = Total Nitrogen (milligrams)	2,795,322	milligrams
3	R(T) = Total Recharge (inches)	28.90	inches
4	R(T) = Total Recharge (feet)	2.41	feet
5	A = Area of Site	754,895	sq ft
6	R = R(T) x A	1,818,038	cu ft
7	R = Site Recharge Volume	51,486,845	liters
9	NR = N/R	0.05	mg/l

Conversions used in SONIR	
Acres x 43,560 = Square Feet	Gallons x 0.1337 = Cubic Feet
Cubic Feet x 7.48052 = Gallons	Gallons x 3.785 = Liters
Cubic Feet x 28.32 = Liters	Grams / 1,000 = Milligrams
Days x 365 = Years	Grams x 0.002205 = Pounds
Feet x 12 = Inches	Milligrams / 1,000 = Grams

B	Site Recharge Summary	Value	Units
1	R(T) = Total Site Recharge	28.90	inches/yr
2	R = Site Recharge Volume	1,818,038	cu ft/yr
3	R = Site Recharge Volume	13,599,872	gal/yr
4	R = Site Recharge Volume	13.60	MG/yr

Nitrogen Load Summary - On-Site	Load	Percent
Sanitary Nitrogen (On-Site Wastewater)	0.00	0.00%
Fertilized Landscaping	0.00	0.00%
Dog Waste Nitrogen	0.00	0.00%
Cat Waste Nitrogen	0.00	0.00%
Atmospheric Nitrogen	6.16	100.00%
Irrigation Nitrogen	0.00	0.00%
Total Pounds Nitrogen	6.16	100.00%