Fermoy – Attachment 5

Assimilative Capacity Calculations

a) Mass Balance Equation for Orthophosphate:

Gauge number 18052, upstream location of discharge.

Median flow of River (station n. 18052) = 32.066 m^3/sec
Median $0PO_4$-P in River (upstream) = 0.033 mg/L

Average volume of discharge = 0.0412 m^3/sec
Median value for oPO_4-P in discharge = 1.13 mg/L

$$C_{final} = \frac{(32.066 \times 0.033) + (0.0412 \times 1.13)}{32.066 + 0.0412}$$

C_{final} = 0.03459 mg/L oPO_4-P

The increase in Orthophosphate due to the discharge of Fermoy WWTP is 1.59 µg/L.

Fermoy – Attachment 5

Assimilative Capacity Calculations

b) **Mass Balance Equation for BOD:**

Gauge number 18052, upstream location of discharge.

Flow of River (95%) = 6.8 m^3/sec
Average BOD in River (upstream) = 2.46 mg/L

Average volume of discharge = 0.0412 m^3/sec
Average BOD in discharge = 3.23 mg/L

$$C_{final} = \frac{(6.8 \times 2.46) + (0.0412 \times 3.23)}{6.8 + 0.0412}$$

C_{final} = 2.465 mg/L BOD

The increase in BOD due to the discharge of Fermoy WWTP is 0.005 mg/L.

Fermoy – Attachment 5

Assimilative Capacity Calculations

c) Mass Balance Equation for Suspended Solids:

Gauge number 18052, upstream location of discharge.

Flow of River (95%) = 6.8 m^3/sec
Average Suspended Solids in River (upstream) = 7.89 mg/L

Average volume of discharge = 0.0412 m^3/sec
Average Suspended Solids in discharge = 9.778 mg/L

$$C_{final} = \frac{(6.8 \times 7.89) + (0.0412 \times 9.778)}{6.8 + 0.0412}$$

C_{final} = 7.90 mg/L Suspended Solids

The increase in Suspended Solids due to the discharge of Fermoy WWTP is 0.011 mg/L.

Fermoy – Attachment 5

Assimilative Capacity Calculations

d) **Mass Balance Equation for Total Phosphate:**

Gauge number 18052, upstream location of discharge.

50% Median flow of River (station n. 18052) = 32.066 m^3/sec
Median TPO_4-P in River (upstream) = 0.131 mg/L

Average volume of discharge = 0.0412 m^3/sec
Median TPO_4-P in discharge = 1.27 mg/L

$$C_{final} = \frac{(32.066 \times 0.131) + (0.0412 \times 1.27)}{32.066 + 0.0412}$$

C_{final} = 0.13236 mg/L TPO_4-P

The increase in Total Phosphate due to the discharge of Fermoy WWTP is 1.37 µg/L.

Fermoy – Attachment 5

Assimilative Capacity Calculations

e) **Mass Balance Equation for Total Nitrogen:**

Gauge number 18052, upstream location of discharge.

Flow of River (95%) = 6.8 m^3/sec
Average Total Nitrogen in River (upstream) = 4.01 mg/L

Average volume of discharge = 0.0412 m^3/sec
Average Total Nitrogen in discharge = 14.26 mg/L

$$C_{final} = \frac{(6.8 \times 4.01) + (0.0412 \times 14.26)}{6.8 + 0.0412}$$

C_{final} = 4.07 mg/L Total Nitrogen

The increase in Total Nitrogen due to the discharge of Fermoy WWTP is 61.73 µg/L.

Fermoy – Attachment 5

Assimilative Capacity Calculations

f) Mass Balance Equation for Sulphate:

Gauge number 18052, upstream location of discharge.

Flow of River (95%) = 6.8 m^3/sec
Average Sulphate in River (upstream) = 15 mg/L

Average volume of discharge = 0.0412 m^3/sec
Average Sulphate of discharge = 15 mg/L

Average Sulphate in River (downstream) = 15 mg/L

Since upstream, downstream and discharge results for Sulphate are below the Limit of Detection, it is not possible to outline Assimilative Capacity Calculations for Sulphate.

Fermoy – Attachment 5

Assimilative Capacity Calculations

g) Mass Balance Equation for Ammonia-N:

Gauge number 18052, upstream location of discharge.

Flow of River (95%) = 6.8 m^3/sec
Average Ammonia-N in River (upstream) = 0.05 mg/L

Average volume of discharge = 0.0412 m^3/sec
Average Ammonia-N in discharge = 0.05 mg/L

Average Ammonia-N in River (downstream) = 0.05 mg/L

As the Ammonia as N concentration is below the analytical Limit Of Detection for the Wastewater Laboratory for the upstream, downstream and effluent concentrations, it is not possible to prepare Assimilative Capacity Calculations.
It should be noted that the discharge concentration of treated effluent for Ammonia as N is <0.1 mg/L of Ammonia as N (for statistical purposes in E4 recorded as 0.05mg/L).

Fermoy – Attachment 5

Assimilative Capacity Calculations

Assimilative Capacity Calculations were not performed for the following parameters, as the substances were below the limit of detection in the upstream samples, in the discharge samples and in the downstream samples:

(a) Chromium
(b) Copper
(c) Lead
(d) Nickel
(e) Cadmium
(f) Barium
(g) Boron
(h) Zinc
(i) Fluoride