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Land Surveying ⊕ Civil Engineering



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MV 5435

Red Arrow Road Community Housing – Modified Project Only

Site Conditions:

Locus lies entirely within the Lake Tashmoo Watershed
 Adjusted Nitrogen Load Limit: 1.60 kg/acre/year per WQMP
 Total lot area: 3.17 acres

Runoff Areas:

Roof area runoff to subsurface disposal:

Three dwellings (small) @ 1,000 sq ft / dwelling	3,000 sq ft
One dwelling (large) @ 1,300 sq ft	1,300 sq ft
One garage @ 400 sq ft	400 sq ft
Total:	4,700 sq ft

Roof area runoff to vegetated surface disposal: 0 sq ft

Impervious pavement to subsurface disposal: 0 sq ft

Impervious pavement to vegetated surface disposal: 0 sq ft

Pervious pavement to subsurface disposal: 0 sq ft

Pervious pavement to vegetated surface disposal: 10,300 sq ft

Managed Landscape Area:

Four units @ 4,000 sq ft / unit = 16,000 sq ft

Common gardens 2,500 sq ft

Total: 18,500 sq ft

Wastewater Parameters:

Effluent strength: 8 mg/l (per MVC staff and Klean Tu)

Flow Estimate: 4 units at [(67,700 GPY/unit) (90%)] = 243,720 GPY

Analysis:

$$[N(r) + N(l) + N(w)] < N(a)$$

N(r) Runoff N-load:

Roof runoff to subsurface disposal:

$$(3.91 \text{ ft/yr})(90\%)(4,700 \text{ sf})(28.32 \text{ l/cf})(0.75 \text{ mg/l}) / (1\text{M mg/kg}) = 0.35 \text{ kg/yr}$$

Roof runoff to vegetated surface disposal:

$$(3.91 \text{ ft/yr})(90\%)(0 \text{ sf})(28.32 \text{ l/cf})(0.38 \text{ mg/l}) / (1\text{M mg/kg}) = 0.00 \text{ kg/yr}$$

Impervious pavement runoff to subsurface disposal:

$$(3.91 \text{ ft/yr})(90\%)(0 \text{ sf})(28.32 \text{ l/cf})(1.50 \text{ mg/l}) / (1\text{M mg/kg}) = 0.00 \text{ kg/yr}$$

Impervious pavement runoff to vegetated surface disposal:

$$(3.91 \text{ ft/yr})(90\%)(0 \text{ sf})(28.32 \text{ l/cf})(0.75 \text{ mg/l}) / (1\text{M mg/kg}) = 0.00 \text{ kg/yr}$$

Pervious pavement runoff to subsurface disposal:

$$(3.91 \text{ ft/yr})(65\%)(0 \text{ sf})(28.32 \text{ l/cf})(1.50 \text{ mg/l}) / (1\text{M mg/kg}) = 0.00 \text{ kg/yr}$$

Pervious pavement runoff to vegetated surface disposal:

$$(3.91 \text{ ft/yr})(65\%)(10,300 \text{ sf})(28.32 \text{ l/cf})(0.75 \text{ mg/l}) / (1\text{M mg/kg}) = \underline{0.56 \text{ kg/yr}}$$

$$N(r) \text{ total:} = 0.91 \text{ kg/yr}$$

N(l): Landscape N-load:

$$(18,500 \text{ sf})(3 \text{ lb}/1000 \text{ sf})(20\%) / 2.205 \text{ lb/kg} = 5.03 \text{ kg/yr.}$$

N(w): Wastewater N-load:

N(w) enhanced (Klean Tu) denitrification:

$$(243,720 \text{ GPY})(3.785 \text{ l/gal})(8 \text{ mg/l}) / (1\text{M kg/mg}) = 7.38 \text{ kg/yr}$$

N(a): Allowable N-load:

$$(1.60 \text{ kg/acre/yr})(3.17 \text{ acres}) = 5.07 \text{ kg/yr}$$

$$[N(r) + N(l) + N(w)] < N(a)$$

$$N \text{ total} = 0.91 \text{ kg/yr} + 5.03 \text{ kg/yr} + 7.38 \text{ kg/yr} = 13.32 \text{ kg/yr}$$

$$\text{Overage: } 13.32 \text{ kg/yr} - 5.07 \text{ kg/yr} = 8.25 \text{ kg/yr}$$

Completed Mitigation (Nelson Mechanical Design – West Tisbury Assr Pcl 11-103):

Overage: 8.25 kg/yr

$$\text{Credit: } (67,700 \text{ GPY})(8 \text{ BR}/4 \text{ BR})(90\%)(3.785 \text{ l/gal})(26.25\text{-}8 \text{ mg/l}) / 1\text{M kg/mg} \\ = 8.42 \text{ kg/yr}$$