$$\Rightarrow \left(\nabla f(x) - \nabla f(y)\right)^T (x-y) - \mu \|x-y\|_2^2 \geqslant \frac{1}{L-\mu}\Big\{ \|\nabla f(x) - \nabla f(y)\|^2$$

$$+ \mu^2 \|x-y\|_2^2 - 2\mu\left(\nabla f(x) - \nabla f(y)\right)^T (x-y)\Big\}$$

$$\Rightarrow \left(\nabla f(x) - \nabla f(y)\right)^T (x-y) + \frac{2\mu}{L-\mu}\left(\nabla f(x) - \nabla f(y)\right)^T (x-y) \geqslant \frac{1}{L-\mu} \|\nabla f(x) - \nabla f(y)\|_2^2$$

$$+ \frac{\mu^2}{L-\mu}\|x-y\|_2^2 + \mu\|x-y\|_2^2$$

$$\left(\frac{L+\mu}{L-\mu}\right)\left(\nabla f(x) - \nabla f(y)\right)^T (x-y) \geqslant \frac{1}{L-\mu} \|\nabla f(x) - \nabla f(y)\|_2^2 + \frac{\mu^2}{L-\mu}\|x-y\|_2^2$$

$$+ \mu\|x-y\|_2^2$$

$$\Rightarrow \left(\frac{L+\mu}{L-\mu}\right)\left(\nabla f(x) - \nabla f(y)\right)^T (x-y) \geqslant \frac{1}{L-\mu} \|\nabla f(x) - \nabla f(y)\|_2^2 + \frac{\mu L}{L-\mu}\|x-y\|_2^2$$

$$\Rightarrow \left(\nabla f(x) - \nabla f(y)\right)^T (x-y) \geqslant \frac{1}{L+\mu} \|\nabla f(x) - \nabla f(y)\|_2^2 + \frac{\mu L}{L+\mu}\|x-y\|_2^2$$