The Hessian for a general model of our form is: $-\frac{1}{\sigma^2}\underline{X}^T\underline{X}$.

For a linear model, $\underline{X}$ has a column of ones for the constant of fit then $x_i$ for the gradient.

$$\underline{X} = \begin{bmatrix} 1 & 1 & \cdots & 1 \\ x_1 & x_2 & \cdots & x_N \end{bmatrix}^T.$$

Therefore, the Hessian is:

$$-\frac{1}{\sigma^2}\begin{bmatrix} 1 & 1 & \cdots & 1 \\ x_1 & x_2 & \cdots & x_N \end{bmatrix}\begin{bmatrix} 1 & x_1 \\ 1 & x_2 \\ \vdots & \vdots \\ 1 & x_N \end{bmatrix}$$

$$= -\frac{1}{\sigma^2}\begin{bmatrix} N & \sum_{i=1}^{N} x_i \\ \sum_{i=1}^{N} x_i & \sum_{i=1}^{N} x_i^2 \end{bmatrix}$$

The leading diagonal terms are $-\frac{N}{\sigma^2}$ & $-\frac{1}{\sigma^2}\sum_{i=1}^{N} x_i^2$, which only differ by a constant.