Reminders from basic probability theory:

If the probability of reading any individual bit wrongly is called P,
then the probability of reading any individual bit correctly is $1-P$,
and the proba[illegible]ole sequence of N bits correctly is $(1-P)^N$.

Reminder from comm[illegible]

For any storag[illegible]s even a little bit, P will be very small.
Really small.
But never zero.

Reminder from mathematics:

$$\begin{aligned}(1-P)^N \text{ is evaluated as } 1 &- NP \\ &+ N(N-1)P^2/2 \\ &- N(N-1)(N-2)P^3/6 \\ &+ N(N-1)(N-2)(N-3)P^4/24 \\ &- N(N-1)(N-2)(N-3)(N-4)P^5/120 \\ &+ N(N-1)(N-2)(N-3)(N-4)(N-5)P^6/720 \\ &\ldots\ldots \\ &\ldots\ldots \text{ all the way up to} \\ &+ P^N\end{aligned}$$

which takes a lot of calculating.

Another reminder from probability:

If P is very small, then $(1-P)^N$ is the same as e^{-PN}
which is easy to work out.

Another reminder from mathematics:

e is the special magic number 2.7182818284590452353602874713527......

So...

Combined error rates are very easy to calculate for any realistic system.

Let's say the single bit error rate is 10^{-5}, meaning that if you attempt to read a single bit there is a 1 in 100,000 chance of getting it wrong. Or that if you experimentally read a bit 100,000 times under identical circu[illegible]d expect to get it wrong once. Or that if you read 100,000 bits, you exp[illegible]ror.

The chances of readi[illegible] bits successfully, i.e. without any errors will be

$$e^{-0.00001N}$$

number of bits in a block	chances of reading it successfully
1,000	99%
4,096	96%
10,000	90%
20,000	82%
40,000	67%
100,000	37%
200,000	14%
400,000	1.8%
1,000,000	0.0045%

So you see why block size has to be kept relatively small.

A block on a hard disc has 4096 bits.
An error rate of 10^{-5} for a modern hard disc drive is not good.