Needs:

Functional Needs	Priority (1-5)
The solution needs to be able to measure the amount of dust in the grain silo	5 The whole point of the project
The solution needs to be able to tell if the silo has too much dust for the filtration system to handle	5 Also the whole point of the project
The solution needs to be able to detect if abnormal amounts of dust are incoming	4 Doesn't necessarily have to forecast the incoming dust, just have to recognize when it occurs, still likely useful/important
The solution needs to be able to recommend changing silos if the dust levels are too high	3 The user would know to change the silo when the system tells them that the levels are too high. But still a good reminder.
The solution needs to be accurate to limit potential false alarms/missed alarms	4 Being over-cautious is ok, but definitely don't want false alarms
The solution needs to be able to communicate with the existing HMI system at the facility	5 This is how the solution will communicate the dust levels, obviously important

Operational Needs	Priority (1-5)
The solution needs to be accessible	3 Hopefully won't need too much maintenance, but still need access to do so
The solution needs to be easy to install	2 Only gets installed once, ok if its a bit challenging to do so
The solution needs to fit within the existing infrastructure in the brewery	4 Don't want to have to change too much of what already exists. It takes time and money to do that
The solution needs to meet return on investment criteria	5 Past proposals were not accepted due to solution being too capital intensive

The solution needs to be easy and cheap to operate and maintain	5 Operation and maintenance was said to be one of their most important concerns in the interview

Problem statement:

Mill Street Brewery needs a system that can measure dust levels in the malt silos in order to provide warning of excessive dust conditions that can clog up the filtration system. The system needs to communicate with the existing computer system about dust levels, as well as be accurate and easy to operate and maintain.

Issues that need clarifying:

- Does the information received need to be continuous?
- What is the volatility of the data (how much time does it take for measured data to become outdated?)
- Are the silo operations continuous? If not, how long do they go on for/go off for?
- Are there any existing sensors such as a level sensor or weight sensor that we can integrate into the solution? If so, what are things they do well? What are things they can do better?
- Would the silo (potential location of the device) experience harsh weather conditions?
- What is the space we have to work within the infrastructure?
- What is an acceptable margin for error?
- What is the budget for the solution (including installation, training, maintenance costs, etc.)?
- Should our solution work for the silo of each kind of malt (i.e. organic, non-organic), and are there any differences in the conditions the different kinds of malt are kept in?

Data:

- Overload estimate: 3% (3 kg of dust to 100 kg of Malt)
- Friability of the malt
- Usage rate of the system

Benchmarks:

https://www2.aretas.ca/surface-dust-monitor/
https://lcdmcorp.com/distribution/silo-level-sensors/
https://lvlogics.com/silo-monitoring/
https://www.terabee.com/silo-monitoring-applications/
https://www.constructionmachinery.ca/silo-accessories.html
https://www.monitortech.com/PR/1008pr.shtml (for coal silos but still the same general idea)
http://harvest.com/solutions/agriculture/feed-silo-monitor/
https://www.mining-technology.com/sponsored/lime-powder-silo-measurement-overcoming-dust-generation-and-product-buildup/ (for lime but still the same general idea)
https://pulsarmeasurement.com/food-beverage/solids-silo-level-solids-flow-indication