Irrigation Water Quality

Use the Slides or the "Irrigation Water Quality Standards and Salinity Management Strategies" publication to answer the following questions

1. In water analysis, the salinity is typically measured by the Total dissolved solids (TDS) and Electric Conductivity EC values
2. Sodium and Salinity are the two common types of salt problems
3. Soils with high levels of total salinity are called Saline soils
4. Irrigation Water with high salinity is toxic to plants and poses a Salinity hazard.
5. SAR water values greater than 18-26 are considered a high sodium hazard and generally unsuitable for continuous use.
6. Hard water is generally classified as having a pH greater than 7.
7. 1.0 is the maximum salinity concentration in irrigation water that can be used while still achieving 100% yield potential.
8. Boron is an essential nutrient for grapes, but it becomes toxic at Boron levels equal to or greater than 1 mg/L ~ ppm
9. Na or Cl concentrations greater than 5-10 m^3/m^3 may cause foliar injury of grapevines in sprinkler irrigation.

Key

Introduction to Vineyard Drip Irrigation Design
Part 1: Determining Flow

A vineyard grower plants 400 vines and plans to install two, 1 GPH drip emitters per vine.

1. What is the total flow requirement of the vineyard in GPH? In GPM?

$$1\,\text{GPH} \times \frac{2}{\text{vine}} = \frac{2\,\text{GPH}}{\text{vine}} \times 400\,\text{vine} = 800\,\text{GPH} \approx \div 60 = 13.3\,\text{GPM}$$

2. If the vineyard has a well that supplies 10 GPM, can the entire vineyard be irrigated at the same time? If not, what is the minimum number of irrigation stations needed and the flow per station?

Vineyard = 13.3 GPM
Well = 10 GPM

No, will need at least 2 blocks

$$\frac{13.3\,\text{GPM}}{2\,\text{block}} = \frac{6.65\,\text{GPM}}{\text{block}}$$

Key

Introduction to Vineyard Drip Irrigation Design
Part 2: Determining Pressure

A vineyard grower plants 400 vines and plans to install two, 1 GPH drip emitters per vine.

1. Using the friction loss charts, what is the minimum size Class 200 PVC pipe needed to supply each station with a flow of 7 GPM?

$\frac{13.3\ GPM}{2} = 6.65 \approx 7\ GPM$ on chart = 3/4" Pipe

2. If the well is located 500 feet away from the closest corner to the top of the vineyard, how much pressure would you lose due to pipeline friction if using a ¾" Class 200 PVC Pipe? How much if using a 1" Class 200 PVC Pipe? (Assume 7 GPM flow rate)

3/4" Pipe = $\frac{2.47\ PSI}{100\ Ft} \times 500\ Ft = 12.35\ PSI\ Loss$

1" Pipe - $\frac{0.73\ PSI}{100\ Ft} = 500\ Ft = 3.65\ PSI\ Loss$

3. How much pressure do you need at the well if the drip emitters require 15 PSI, and the system loses 12 PSI in the pipeline, 3 PSI through the valve, 2 PSI through the meter, and 2 PSI through a filter?

Loss = 12 PSI Pipeline
3 PSI Valve
2 PSI Meter
2 PSI Filter

19 PSI Components
\+ 15 Drip Need

34 PSI Needed at Well