PROPOSAL SUMMARY

Western Skies Engineering proposed the installation of a livestock water pipeline in Park Valley, Utah. A pipeline would be needed to provide water from a recently drilled well to a series of troughs, providing water for 200 head of cattle. The proposed pipelines would total about 1 mile in length, cross a major highway, and rise and fall with the regional topography. An off-grid energy system was proposed to sustain the well, and a pump house proposed to protect the head of the well from the environment.

ALTERNATIVES

Western Skies Engineering looked at many alternatives. The three main categories and considerations were:

- **Pipe Location**
  - Bore under the highway
  - Utilize the existing culvert that runs under the highway
  - Use an existing well by the client’s house instead of the new well
- **Energy Source**
  - Set up a solar array for solar energy
  - Build a wind turbine to use wind energy
  - Install a battery pack that will be charged by both wind and solar energy
- **Pump House Material**
  - Build the pump house out of wood
  - Use corrugated Steel for the pump house
  - Construct the pump house with concrete

The selected alternatives were to bore under the highway for the pipeline location, power the pump with solar energy, and construct the pump house with wood.

The cost for the selected alternatives is broken down as follows:

- Material $63,111
- Design labor $36,750
- Total: $98,861

PRESENT DESIGN

The final design is for 2 in. pipe to be used for the entire project. The pipeline will start at the new well. The well will be protected by a wooden pump house with a concrete base and garage-style door. The pump house will also have a sunroof to accommodate equipment used in well maintenance. A hole will be bored under SR 30, and the pipeline will continue South, providing water to two different troughs. The pump in the well will be powered by solar energy from a solar array installed near the pump house. The solar array will be protected by a fence.

CRITERIA AND DECISION MATRIX

To facilitate the design process, the project was broken into three sections. These three sections are:

- Pipeline
- Pumphouse
- Energy

Alternatives generated for each section were evaluated using Decision Matrices. Each alternative was rated with how well it met section criteria. The sum of each alternative were compared and the highest scoring alternative selected.

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