Geoscience 436 – Subsurface Imaging for Archaeology
Spring 2010 Take Home Midterm
Due Thursday, March 31, 2011, by 3:30 PM in CHCB 311 or to me directly

1. I want a well written, professionally presented bid for a proposed archaeological survey:

An archeological survey of about 0.25 hectare square site in western Montana discovered many indicators suggesting the area includes a historic cemetery from the early 1900's. However, no headstones or other such artifacts still exist. The archaeologist in charge wants a resistivity survey of the area to help locate the edges of the burial area within the site. The land is reasonably flat, with scattered bushes, sandy/silty soils, occasional glacial erratics, and no fencing or power lines.

You are the bidding contractor for the required resistivity survey and are responsible for experimental design, fieldwork, data acquisition, data processing, and interpretation. Assume you are using the Syscal Switch.

Submit a professional bid which includes a:

- Concise description of the problem as you see it, with pertinent references to the professional literature suggesting that the resistivity survey will be successful.

- Detailed description of your proposed experiment with justification for why you chose the proposed array type, electrode spacing, and line separations, etc. Make sure you describe and explain your proposed procedures so they can be evaluated and compared to other bids.

- Summary of the basic parameters of resistivity surveying and a short discussion of possible problems and limitations of the survey.

- Description of the project report you intend to submit on completion (nature of data, figures and graphs)

- Proposed budget which includes an estimate of your field and report-writing time. Add in $250/day of equipment rental and base it all on $50/hour.

Your bid should be no longer than five printed pages not including figures or maps. If you need to, you may include additional items in an appendix. I want you to show your understanding of the problem and techniques and demonstrate your new ability to process and understand some professional literature related to subsurface imaging for archaeology. It must be well written.

2. Considering the problem above, design a gravity survey over a 5 x 10 meter patch of the cemetery isolated with your resistivity results. In this patch, you think there are four graves (2 rows, of two graves per row). Assume the graves and their fill are fluffed up so as to be 70% of the density of the surrounding soils. Use figures and calculations to their best advantage to support your case.

Consider:

- What are the width, length, and amplitude of the expected anomalies?
- What must the precision of the observations be to detect the expected anomalies above any noise?
- What will your station spacing be?
- How long will the acquisition of data take?
- Would gravity be an effective method for this problem? Why or why not?