Requirements and Specifications

- **Mechanical**

The mechanical requirements consist of size, weight and connectivity. The size and the weight deal with the controller, as it needs to rest in the vehicle in a non inhibiting way. Connectivity is the requirement for interfacing a connection between the battery, controller and the motor and user interface.

Specifications:

- Small Size 18 by 18 by 18 inches
- Weight: should not exceed 40 lbs.
- Heat sinks that can handle 80 degrees Celsius

- **Electrical**

The goal of the design is to develop a high powered forward only motor controller. The design must be very robust, to withstand the vibrations and variety of different motors and batteries. The design will need to be based on a microcontroller to be able to allow for current limiting, temperature sensing, voltage protection, and open throttle shut down.

Specifications:

- Finished product capable of 144Vdc nominal, 500A nominal
- 100 – 250Vdc operating range
- 1000A peak current
- 5K ohm potentiometer input

- 20Khz switching frequency

- **Environment**

  For the testing prototype, the device must be able to survive a diverse array of environmental conditions. Also, the device must be able to withstand dust, a wide range of temperatures, and vibration abuse.

- **Testing**

  The testing requirements include procedures and equipment.

  Procedures: Are to be created for testing the controller and given to Electric Blue Motors for later use

  Equipment: The controller will be tested for two weeks to ensure proper performance and functionality.

- **General**

  The General requirements include: reliability, safety and additional client preferences. Reliability is important to a working vehicle. Safety is also important, especially to keep the environment and people around the controller safe. The client's preference is that the controller should of low cost.

  Specifications:

  - Reliability: Meantime to failure of no less than 5,000 hours
  - Safety: System shutdown if Current or Voltage exceeds maximum for more than 0.1 seconds
  - Client Preferences: Client cost is to not exceed $350

- **Documentation**

Design documents will be well-kept and recorded. A spec sheet for the design will list all parts used, as well as the inputs and output signals. Documentation will be provided for all parts used in the test bench and final design. All records of all results and changes to the design will also be provided for reference as well as a timeline indicating probable completion dates. The following is an outline of what we wish to document:

  - Project Timeline consisting of milestones and prospective completion dates
  - Schematics of all designs will be drafted
  - Test results
    - Frequency
    - Voltage
    - Current
    - Power
  - Cost and parts availability
  - User Manual
    - Safety
    - Maintenance
  - Research Bibliography