Executive Summary

This report provides the analysis of Team four’s contributions to the enclosed, electric-assist recumbent bicycle. The team focuses on the research and design of five main components of the body of the Vehicle. These include; shape and size, interior adaptability, materials for the outer shell and electrical housings, frame dimensions and a locking mechanism. All research was conducted while adhering to the engineering principles listed in the FINDINGS section of the report.

The dimensions of the Vehicle have been decided as 2.78m long by 0.85m wide by 1.20m high. The Vehicle will have a slanted/curved roof to eliminate snow and rain buildup. For interior adaptability, the seat of the Vehicle was carefully designed while focusing mainly on the H-Point and spine curvature of the human body. The seat is designed to maximize comfort and improve posture of the user while still remaining adjustable and accessible for all body types and sizes. The materials for the Vehicle need to be durable and lightweight to provide the safest ride for the user. With this in mind, Glass-Fiber Reinforced Polyester is chosen for the outer shell as it is impact resistant and has a sleek attractive appearance. For the electrical housings, Glass-Filled Polycarbonate will be used because of its electrical insulation properties and strength to weight ratio. The wheel base and seat position were analyzed for the frame of the Vehicle. The wheel base will be 1.2m to allow the best balance between traction and handling. The seat will be placed at a 7:3 ratio from the back wheel (84cm from back) to maximize power generated by the user. Lastly, a locking option was for the Vehicle was researched. It was decided a more compact and lightweight version of the existing car lock can be integrated into the shell of the Vehicle to protect against theft.

In conclusion this report effectively conveys the research and designs for the five major components of the body of the electric-assist Vehicle. Further recommendations for all components discussed include:

* All components of the body must be as lightweight as possible to maximize efficiency and battery life without compromising on functionality and safety.
* All components of the body must be as inexpensive as possible to stay within the budget due to the high cost of other electrical components and the BionX system.