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## Electrical Systems Existing Conditions & Building Load Summary



### Executive Summary

The following Electrical Systems Existing Conditions and Building Load Summary report explores the existing electrical system design used in William H. Gates Hall. The report analyzes all areas and components used within this system, as well as actual electric consumption as calculated per the National Electric Code (NEC) 2005. An overall comprehensive analysis was completed on all electrical systems within the building, including but not limited to the power distribution system, lighting system, communication system, fire alarm system and security system. Documentation, design drawings and the specifications were used in order to fully understand and evaluate these existing building systems. Tools such as the single line diagram are included to help further understand the distribution system provided in William H. Gates Hall. In addition to looking at the distribution system as a whole, other specific topics such as ASHRAE shutoff requirements, overcurrent protection and transformer configuration are explored as well. Taking into consideration special issues pertaining to this particular building, important design considerations are also addressed.

In order to completely analyze the existing power distribution system within William H. Gates Hall, complete building load calculations were completed with guidance of NEC 2005. These calculations verify the main switchboard and transformer are sized appropriately to handle all loads within the building. These calculations included load summaries of lighting receptacle, motor (mechanical), elevator, and equipment loads. All necessary demand factors are included in the calculations per NEC requirements. In addition to this, NEC calculations were completed for distribution panels and their feeders to verify code compliance.

Upon completion of all load calculations, it is apparent that the electrical distribution system in William H. Gates hall is sized appropriately for all loads. The switchboard and primary transformer are both sized correctly for all connected and demand loads. Likewise, the overcurrent protection for these devices is appropriate for proper equipment protection. The majority of the equipment is sized to account for the recommended 125% oversize factor for future expansion of loads and panels. In addition, calculations of distribution panels and verification of properly sized feeders show that all distribution panels and their respective feeders are sized appropriately for their connected loads. This verification also extends to overcurrent protection devices of the distribution panels and their individual loads.

Specific information referenced within the report can be found in appendices, located at the end of the report. This includes the one-line diagram, feeder schedule for one-line and panel reference and the utility rate schedule.