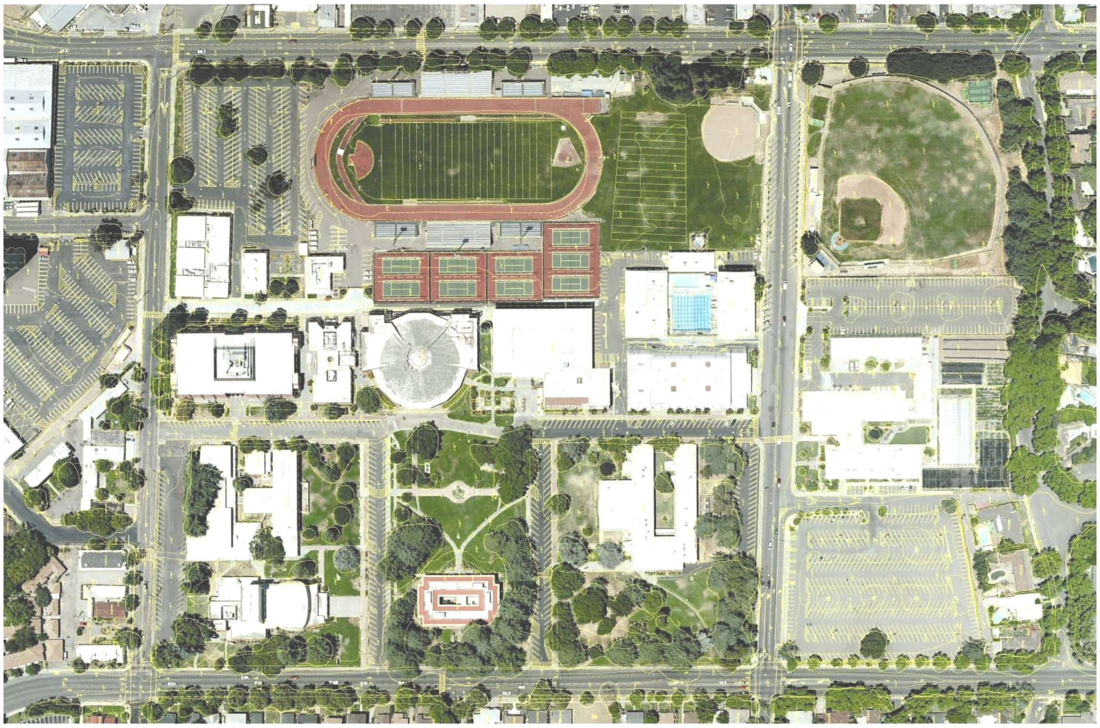
FACILITIES MASTER PLAN



EAST CAMPUS

WEST CAMPUS

VOLUME TWO

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TABLE OF CONTENTS

1 Utility Assessment and Infrastructure Plan

FACILITIES MASTER PLAN

Modesto Junior College

Site Utilities Conceptual Design Narrative

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Table of Contents

Introduction

Objective

Modesto Junior College (MJC) is in the process of master planning and has selected BFGC Architects, Alfa Tech and C2G as the architects and design engineers to provide the required site Civil, Technology, Plumbing, and Electrical conceptual design. To address this scope of work the overall design effort has been separated into separate Increments. The initial Increment-1 design reflected in this document and the supporting drawings will summarize work with MJC to further define expected future MJC master plan phasing and associated requirements. The summary will detail the required scope of work, provide a conceptual design document detailing options considered and identify upgrade pathways. The Site Utilities Upgrade Increment-1 Conceptual design will be used as a basis of design for the future Increments.

Overview

The goal of this conceptual design document is to examine the existing campus and identify recommendations for the required site utility upgrades based on the architectural master plan. These site upgrade recommendations will be coordinated with MJC personnel, and the MJC master plan team (BFGC Architects) to address both infrastructure, and construction phasing concerns. This document summarizes existing conditions, identifies options and analysis considered in the proposed final design configuration, and provides recommendations for the installation of site water, storm water, sewer, electrical, gas, telecommunications, steam, and energy management systems.

It is understood that this report, in conjunction with the associated drawings, provides the recommendations and coordination necessary for MJC examination. Input from MJC and the MJC master planning team will be discussed and incorporated into this document. This document is intended to define the accepted direction for the Increment-2 and Increment-3 detailed design of site utilities on the MJC campus, including the available input on phasing, energy efficiency, maintenance, and architectural considerations for the future campus growth. In the preparation of this document, coordination has been conducted with MJC facilities departments, the MJC Master Planning Team, MJC Telecommunications, and the local utilities to produce documents and drawings meeting the needs and expectations for the next design Increment. This report provides a basis of design and partial design criteria for the Increment-2 and Increment-3 detailed site utilities design scope of work at MJC.

Executive Summary

Overview

Modesto Junior College (MJC) is in the process of master planning for both the East and West campuses. Several new buildings are being planned, and many of the existing site utilities have reached their projected life expectancy and require replacement or upgrade.

The analysis in this document addresses each utility system in detail to describe the following:

- Existing Conditions: Describe the existing conditions for each utility.
- Analysis and Considerations: Explain what analysis was done to provide MJC with options for consideration.
- Proposed Solutions: Provide Recommendations for each site utility along with a conceptual plan.

The Appendix in this document provides details of 2006 electrical bills for both campuses, and supports some of the electrical recommendations.

Summary of Recommendations

The following are a summary of the conceptual site utility recommendations by system. Detailed information on each system type is provided in the report body for the indicated utility section.

1. Water Distribution System:

   East Campus: Create a dedicated water distribution system for fire suppression, potable, and irrigation. These new systems are to replace the existing sole source water system due to age, material and fire flow capacity.

   West Campus: Create a dedicated water distribution system for fire suppression and domestic demands. The new fire suppression system will be a new system designed to address the new buildings being added to the campus. A new dedicated domestic system is proposed for the campus. This system will incorporate previously upgraded pipeline installed in 2001. The separate irrigation system is to remain, with proposed upgrades to the existing hardware, controls and pumps.

2. Storm Drainage and Collection System:

   East Campus: Replace or repair the failing storm water injector wells located throughout the campus. Sustainable storm water improvements, such as a cistern, or water vault could be incorporated within the campus to re-use the collected storm water for irrigation watering.

   West Campus: Provide new storm drainage conduit associated with the proposed roadway and building improvements. New storm drainage conduit is to outlet to the existing detention facility on the campus. Portions of the existing arched corrugated metal pipe are to be replaced due to capacity or age.

3. Sanitary Sewer Distribution System:

   East Campus: Due to systems age provide a new sanitary main. Install the new line at sufficient depth to utilize existing laterals.

   West Campus: Due to system age and existing configuration, provide a new sanitary sewer main that discharges to Blue Gum Avenue. Install new line at sufficient depth to utility existing laterals. The reconfigured pipeline will allow the removal of the existing lift station on the campus.

4. Electrical Systems:

   East Campus: For economic reasons, new buildings in Increments 1 and 2 will be fed from existing Modesto Irrigation District (MID) transmission lines that circumvent the campus. Increment 3 includes a new substation and 12kV electrical distribution loop system on the campus. The existing 12kV transformers will be purchased from MID and reused. The power loop will be configured to provide two paths for providing power to assist maintenance in keeping facilities on line should one path have a failure or require maintenance. Install the electrical installation in a joint trench with gas, telecom and low voltage systems where practical to reduce overall installation cost.

   West Campus: Install a new 12KV distribution system in Increments that correspond to new construction. Provide a new substation and 12kV electrical distribution system on the campus while phasing out the existing 4.16kV system due to age and maintenance. Provide a new 12kV conduit loop with new 12kV/480V transformers with switches located in core areas throughout the campus such that campus areas can be phased onto the new electrical system and coordinated with construction. The existing underground 12kV transmission lines and transformers will be purchased from MID and reused. These transformer secondaries will feed existing buildings as they do now. The power loop will be configured to provide two paths for providing power to assist maintenance in keeping facilities on line should one path have a failure or require maintenance. Install the electrical installation in a joint trench with gas, telecom and low voltage systems where practical to reduce overall installation cost.

5. Telecommunication System:

   West Campus: Provide a new technology/low voltage raceway backbone for the campus to replace the existing system due to age and configuration. Provide the data raceways in a STAR topology to accommodate the proposed data center relocation and to provide for greater building interconnectivity and reliability.

   East Campus: Provide a new technology/low voltage raceway backbone for the campus to replace the existing system due to age and configuration. Provide the data raceways in a STAR topology to accommodate the proposed data center relocation and to provide for greater building interconnectivity and reliability.

6. Gas System:

   East Campus: The existing five gas meters and the existing underground gas piping shall remain and will be maintained and repaired as needed. When a new building is constructed, the adjacent existing gas meter and piping system shall be upgraded and new gas piping will be extended to the new building. Provide a gas isolation valve above grade at individual buildings.

   West Campus: Upgrade the existing gas meter and replace the existing underground gas piping system under Increment one. Provide a sectional gas isolation valve on the system, and gas isolation valves above grade at individual buildings.

7. Steam and Condensate Return Piping System:

   East Campus: Replace existing underground steam and condensate return distribution piping network. As an alternative, provide a dedicated boiler plant for each group of adjacent buildings (total four new boiler plants).

   West Campus: No steam and condensate system exists, nor is one proposed in the master plan.

8. Energy Management System:

   East Campus: Provide a DDC control system in all new and remodeled buildings and tie-in to existing site energy management system.

   West Campus: Provide a DDC control system in all new and remodeled buildings and tie-in to existing site energy management system.

Conceptual Design Narrative

East Campus Water Distribution System

Existing Conditions

Modesto Junior College, one of the oldest community colleges in the state, was organized in 1921 to serve the first junior college district established under a State Legislature Enabling Act. The former Modesto Junior College District was expanded into the larger Yosemite Community College District in 1964 by action of the district electorate. The district is geographically one of the largest in the State and transects more than 100 miles of the San Joaquin Valley from the Coast Range on the west to the Sierra Nevada on the east. The boundaries include nearly 4,000 square miles encompassing all of Tuolumne and Stanislaus Counties and parts of San Joaquin, Merced, Calaveras and Santa Clara Counties. Due to the size of Yosemite Community College District the District is comprised of three campuses; Modesto Junior College - East, Modesto Junior College - West, and Columbia Junior College. The East Campus is the original campus and the oldest in terms of infrastructure.

As previously mentioned, the Modesto Junior College - East Campus (MJC - EAST) campus was initialized in the late 1920's but the campus did not develop to its current status until the 1940's. The campus was continually expanded until the early 1970's. During this expansion program, the bulk of the current campus-wide water distribution system was installed. The backbone of the distribution system is an internally looped system inside the core campus area that provides water distribution for fire suppression needs as well as potable and irrigation uses. Although portions of the system are internally looped, the current deterioration of existing water valves has resulted in three separate water systems. The water is supplied to these three systems from three separate metered services located along the perimeter of the campus. These three connections are located on College Avenue, Coldwell Avenue and Stoddard Avenue. It also appears a forth connection is being added with the remodel of the current Auditorium, but was unable to be confirmed during the writing of this report.

From the primary pipeline network, a variety of 8-inch and smaller water lines branch out to distribute water to various buildings and areas on campus. The principal functions of these service lines include:

- Fire Suppression (fire hydrants, fire sprinkler systems, and fire department connections)
- Potable Water Supply (individual buildings, and drinking fountains)
- Irrigation Water (athletic fields, planters, and common lawn)

The pipe materials utilized on the system in primarily Asbestos Concrete Pipe (AC-pipe) with the smaller lines vary from solvent-weld polyvinyl chloride pipe (PVC) to ductile iron pipe (DIP) with the likelihood of limited amounts of copper and/or ferrous metal pipe used at or in the individual building services.

Analysis and Considerations

The most obvious deficiency in the water distribution system is the absence of a truly looped system. As indicated previously, an 8-inch main comprises a circlet around the core area of the college, but the loop does not interconnect with each other due to operational problems with an antiquated system.

This non-looping service is problematic on at least two levels. First, the entire campus is reliant on constant, uninterrupted water supply from the City of Modesto distribution system at single service location. This connection point can be taken out of service for routine maintenance, unexpected failure or contamination resulting in a total loss of supply to the MJC - East campus. In addition to achieving a desirable supply redundancy, an internal looped system provides for a more efficient design of the on-campus water infrastructure. This two-source configuration will effectively increase the capacity of individual network components. Moreover, the dual supply source will permit high flow delivery during a fire event (the worst-case scenario for water distribution systems) without increasing pipeline velocities. In many instances, a looped system will permit the use of smaller diameter mains, thereby reducing construction costs.

Modesto College also needs to consider the monthly meter fees associated with the current configuration. Currently the domestic irrigation and fire suppression are all conveyed by one conduit system. It is the experience with other community colleges that this configuration is common, but expensive when the District takes in the consideration the monthly water meter costs associated with a large meter addressing all three water systems. A considerable cost saving to community colleges can be found when they separate their irrigation, potable and fire suppression needs into three separate systems. The biggest savings results from the reduction in meter size for the potable system, when the fire suppression system is assigned to a dedicated conduit system. Current Public Utility Commission (PUC) policy states water agencies are not allowed to charge meter fees for fire suppression, only a monthly “stand-by fee”. With this policy, community colleges are able to remove their large water meters that were originally sized for fire flow, and replace the meter with a substantially smaller meter for domestic flow. It has been our experience that Districts were able to replace an existing 8-inch meter with a new dedicated domestic 4-inch meter which resulted in a $1,200 saving in water costs a month. It cannot be guaranteed that MJC would receive the same kind of savings, but this is something that should be analyzed and considered during future stages of water system implementation.

Another consideration for future water system improvements should be the current fire flow standard for the campus. Increment One improvements proposed for MJC – East campus are in schematic increment design. The type of construction and square footage of the proposed improvements have not been finalized. Additional discussions will need to be scheduled with the Modesto Fire Department staff regarding fire flow requirements for the campus since this data may substantially influence the fire flow requirements of the campus. Not only are fire flow requirements important, but the fire protection agency's preference with respect to a fully independent distribution system dedicated solely to fire suppression needs to be clarified. The issue at question is whether the fire hydrants within the campus would be considered to be comparable to those directly incorporated in a municipal system. This interpretation varies from agency to agency, with some jurisdictions requiring a dedicated fire system that meets the National Fire Protection Agency (NFPA) requirements.

Another concern with the existing water distribution system is that the potable water and fire suppression supply network also serves as the primary distribution source for the campus irrigation systems. This configuration, while economical from an initial cost standpoint, virtually eliminates the potential for development of an independent source of irrigation supply, such as recycled water or a local well supply. This is particularly important since water shortages in the Central Valley are prevalent and local agencies are actively working to advance the use of recycled water for irrigation use by institutional users such as Modesto Junior College.

Given the potential for recycled water (though at the time of this report, the City of Modesto has not started planning for a recycled water system), it is recommended that a separate irrigation distribution system be considered. Since this system would be required to maintain physical separation from the potable water system, there may not be sufficient width to include irrigation distribution mains within the proposed utility in all locations within the campus. This issue will be considered in greater detail in following stages of this investigation. The recycled pipeline network would utilize colored (purple) PVC pipe materials and would be designed to the same standards as the potable water system.

Much of the primary on-site water distribution mains are constructed of 8-inch diameter asbestos cement (AC) pipe. The use of AC pipe in potable water supply systems was common during in the 1940's, 1950's and 1960's when the MJC - EAST campus was expanded. By the late-1980's growing concerns with the carcinogenic nature of asbestos products combined with the emergence of large-diameter plastic pipe resulted in the eventual disuse of AC pipe in new water system construction. The safety of AC pipe for potable water applications has been highly debated. Although no longer manufactured, a substantial amount of AC pipe remains in service in North America and Europe. Researchers differ on the risk posed by competent in-place AC pipe, but it is widely believed that eroded or damaged pipe presents an increased potential for exposure to asbestos fibers.

There is universal agreement that cutting, drilling and machining of AC pipe is hazardous due to the generation of breathable fine airborne asbestos particles, the documented cause of asbestosis, mesothelioma and related illnesses. Although the AC pipe currently in the on-campus distribution system may still provide a safe water conveyance mechanism, repair and/or connection to it could expose construction and maintenance personnel to risk. Additionally, outside diameter is also abnormal to contemporary pipeline materials and midline connections to the pipeline would require the employment of qualified asbestos removal technicians.

To verify the deterioration of the existing pipe, it is recommended that Modesto Junior College budget funds for future fire flow testing and computer modeling to analyze the deterioration of the existing water system. The results of such fire flow testing and modeling can help determine the existing AC water distribution system has sustained a significant degree of deterioration. This determination can be based on comparisons of field test data compared with computer modeling of the system.

Recommendation for MJC-East Campus

Issues with the water distribution system such as pipe material (ACP), lacking of a looped system to provide adequate fire protection, and miscellaneous repairs made on the system suggest that MJC – East campus should implement a new water distribution system that addresses the larger issues discussed earlier herein. It is recommended that this new system be constructed using PVC C900 (PVC pipe rated for pressures less than 200 psi) or DIP. Both pipe materials are widely used in the water supply industry.

Proposed Increment – One Solutions

Until MJC can fund a new water distribution system for domestic, fire suppression, and irrigation the interim recommendation is to remove, install and repair the existing looped water system when the new Student Service Center is expanded at the existing Administration Building. Per existing conditions, the east side of the Administration Building is where a large portion of the water system interfaces with each other. With appropriate re-routing and pipeline extension, the existing water distribution system can be enhanced by re-establishing the campus loop until a new system can be implemented.

It is also recommended that the District hire an engineering firm to perform fire flow testing and computer modeling of the existing water system to provide necessary information for Department of State Architect approval for future construction within the East Campus. Computer modeling uses powerful computer programs (WaterCAD) that are widely used in the water supply industry to design and analyze complex pressurized piping systems. The program allows the creation of a network model that simulates pipes, pumps, tanks, valves, fittings and similar components that influence the flow of water in distribution systems.

The field testing and modeling activities are used synergistically to develop a realistic depiction of the distribution system's attributes. The modeling assisted in verification of the test data and in development of estimates of system characteristics such as pipe friction coefficients. The data generated from the flow testing provided a basis for calibration of the model, thereby improving its realism. The resulting model permits the extrapolation of the test data for use throughout the distribution network and to verify the exact limitations associated with the existing water distribution system.

Proposed Future Solutions

Preliminary indications are that three new water systems be developed to provide for the future needs of the college. The system should be designed to provide the required fire flow for any anticipated structures on the campus. In most instances, the largest demand is associated with the largest non-fire rated building (Type-N per the California Fire Code) on the campus. At the time of the preparation of this report the individual fire class of the various building has not been ascertained. It is recommended that once the architectural design of the new buildings is sufficiently detailed, that fire ratings be submitted to the local Fire Marshall for determination of the fire flow requirements. Once the fire ratings of the larger on-campus structures are available the specifics of the water distribution system can be firmly established.

Prior to preparation of construction documents, it is recommended that the District hire an underground locating crew to identify the location, size and vertical elevation of the domestic and sprinkler laterals associated with each building. In addition to building laterals, irrigation connection points should also be verified in the field. Obtaining this data prior to construction will clarify design intent and minimize additional cost during the construction implementation.

East Campus Storm Drainage Collection System

Existing Conditions

During the expansion of Modesto Junior College – East Campus (MJC – East) in the 1950's, 1960's and 1970's, a storm drainage system within the City of Modesto streets did not exist. This limitation forced the campus to manage their storm water runoff by creating percolation pits or drainage wells associated with each new project. The campus has somewhere between 25 to 35 drainage wells scattered throughout the campus that are approximately 50-feet to 70-feet deep. Per campus staff, the 70-foot deep wells have better performance (than shallower wells) since the wells have been extended to the correct sand strata that has the appropriate percolation rates to adequately drain the injector well. The wells are generally 24-inches in diameter and are filled with drain rock from bottom to the surface. The drainage wells address runoff associated with building roofs (via downspouts), streets and parking areas.

MJC - East's Ground Maintenance Supervisor has indicated that, with the exception of new drainage wells, the majority are clogged with siltation or not deep enough for effective percolation.

Also while walking the site in May of 2007, a lot of standing water and poorly drained curb and gutters were observed. Due to a drought season, and the last rain event happening in April, the field observations emphasized the poor drainage and ineffective drainage wells throughout the campus.

Analysis and Considerations

As a part of the storm drainage planning, the possibility of including "sustainable" storm water design elements that could be integrated within the college's on-site collection system was researched. With the rising cost for water, depletion of aquifers, and limitations requirements on potable water supplies, there has been a growing interest in progressive stormwater management using integrated design approaches and new commercially developed products.

In the engineering field, there has been a strong push for responsible drainage design that encourages the management of stormwater by using ground water infiltration and evaportranspiration to mitigate water loss before resorting to collecting and conveying the stormwater runoff from a site. For example, it is estimated that on undeveloped sites (natural ground cover conditions), between 80% and 90% of the water generated from a storm event either evaporates or infiltrates into the ground while the remaining 10% to 20% drains from the site as natural. In the case of MJC, where ground surface coverage is approximately 40-percent of the campus, 30% to 35% of the storm water could be expected to infiltrate or be absorbed through evapotranspiration. MJC –East Campus is currently implementing this method with their existing infiltration wells on site.

Modesto Junior College Facilities Department should also be aware that these drainage wells or percolation pits are considered Class V injection wells per the United States Environmental Protection Agency (EPA). By the EPA definition, Class V injection wells are any bored, drilled, or driven shaft or dug hole that is deeper than its widest surface dimension, or subsurface fluid distribution system. These systems must be reviewed and approved by the District's Regional Water Quality Control Board to verify compliance with the States Underground Injection Control

(UIC) program and protection of underground sources of drinking water (USDWs). The Federal program requires the following:

1. Submitting basic inventory information about the storm water drainage wells to the state or EPA.
2. Constructing, operating, and closing drainage wells in a manner that does not endanger USDWs.
3. Wells should be coordinate with the campus's Storm Water Pollution Prevention Plan required per the National Pollutant Discharge Elimination System (NPDES) program.

Another option for storm water management is stormwater harvesting. The idea has been around since ancient Rome, but only recently have we seen a renewed interest in the United States. With the use of large underground cisterns or individual rain barrels for buildings, the storm water is collected, or "harvested" into large storage containers. The water can then be used for plant irrigation, landscape ponds, or for maintenance washing. The rain barrel concept, while effective for residential areas, is of more limited value in an institution setting such as MJC where such catchments have less practicality.

As indicated previously, the second option for stormwater harvesting involves the use of cisterns. Cisterns are used for larger drainage areas and can be integrated with commercial irrigation system including pumps, level sensors, valves, and electronic controls. For example, the water that discharges to the quad area injector wells could be re-directed to an underground cistern for containment during the winter rain season. Once the cistern fills, additional water flow would overflow to the existing injector well or the irrigation system controls would be programmed to first pump water from the cisterns before calling for water from potable water sources.

Another storm water harvesting option is to connect rain gutters from individual buildings to cisterns or similar storage facilities. Not all buildings are appropriate for this type of conservation technique since roof materials, slopes, texture, size and location can impact water quality. These items will play into consideration of contaminates associated with roofing materials as well as contamination from organic materials such as leaves, animal and bird droppings and other solids. Roof collection of rainwater may influence the design, functionality and operation of buildings and its use should be evaluated on a case by case basis by the design team on each construction or renovation project.

The use of these sustainable drainage design concepts should be coordinated with a Storm Water Management Plan (SWMP) for the college. The SWMP, which should be implemented over the next five years, includes education and public participation programs and drainage mapping intended to assist in the detection of illicit discharges into the storm drain systems. Although, most of the SWMP deals more specifically with "good house keeping" and educational goals, the use of percolation basins and water harvesting techniques coincide with the underlying intent of the SWMP program.

Modesto Junior College should also be aware that a Storm Water Management Plan (SWMP) is required under the provisions of the Federal Government's Clean Water Act (as amended in 1987) to develop and implement non-point source pollution management programs. These mandated programs require certain measures be taken to abate pollutants carried by rainwater and urban runoff, herein referred to as stormwater runoff.

Increment One of the Clean Water Act, which was first enacted in 1990, California's nine Regional Water Quality Control Boards (RWQCBs) were each required to adopt a Nation Pollutant Discharge Elimination System (NPDES) permit process for stormwater systems for medium sized cities (those with populations between 100,000 and 250,000) and large municipalities (those having more than 250,00 people). Most of these permits are issued to a group of co-permitees encompassing an entire metropolitan area.

Under Increment Two of the Clean Water Act, which went into effect in 2003, the permitting processes required of larger municipalities are now imposed on smaller cities and on a variety of other agencies, including school districts. These are referred to as "Small Municipal Separate Storm Sewer Systems" (or "MS4s") and "Non-Traditional Small MS4s". Small MS4s are defined as municipal agencies serving less than 100,000 people and Non-Traditional Small MS4s include parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial waste, stormwater, or other waste.

Over the past two years the Region 5, Central Valley RWQCB (like most of the State's regional boards) has been occupied with processing and approvals for the small cities and towns that comprise the "traditional" Small MS4s. These traditional Small MS4s have been the Board's first priority and adoption of the numerous SWPPPs for these cities was a long and laborious process. With that task near completion, the Regional Board's next priority will be the processing the Non-Traditional Small MS4s, which includes the Yosemite Junior College District.

As a regulated non-traditional MS4, community colleges must submit a Notice of Intent (NOI) to the local (Region 5) RWQCB within 180 days of notification of designation (or later dated if stated by the RWQCB) and a develop a Stormwater Management Plan/Program (SWMP).

The Stormwater Management Plan/Program must describe Best Management Practices (BMPs), measurable goals, and timetables for implementation of Minimum Control Measures in the following six areas:

1. Public Education
2. Public Participation
3. Illicit Discharge Detention and Elimination
4. Construction Site Stormwater Runoff Control
5. Post Construction Stormwater Management
6. Pollution Prevention/Good Housekeeping for Municipal Operations

The SWMP must describe how pollutants in stormwater runoff will be controlled and delineate BMPs that address the six Minimum Control Measures. Each BMP must have accompanying measurable goals that will be achieved during the permit term. The definable goals shall be definable tasks such as the number of presentations through the School District, number of inlets to be labeled, or pollutant loading to reduce.

The primary goal of the permit application is to protect water quality from the impacts of stormwater runoff from Non-Traditional MS4s. The intent is that the stormwater quality impacts will be considered in all aspects of the community colleges activities and that community colleges department will work together in implementing the stormwater BMPs identified within the SWMP.

Proposed Increment – One Solutions

Engage a consultant to prepare a Storm Water Management Plan (SWMP) for the East-Campus. The plan should address management of the current storm system and concepts that can be implemented in future construction Increments. The SWMP must also address Best Management Practices associated with future construction projects within the campus. The SWMP is a living document that is referenced, monitored, and updated during the continual operation of the campus.

After reviewing the existing injector wells with the Regional Water Quality Control Board (RWQCB), capping ineffective wells and replace with new injector wells if deemed appropriate per the RWQCB is recommended.

Proposed Future Solutions

Implement "sustainable" storm water design elements that could be integrated within the college's on-site irrigation system. It is proposed that a water cistern to be installed in the center of the campus. The existing injector wells would be abandoned and storm water conduits would convey water to an underground vault (cistern). The vault would be sized to collect water during the winter rain season. The "gray water" would be pumped directly to an above ground "swing check valve" which would allow maintenance staff to alternate the water supply to the dedicated irrigation system. The District staff would be able to "swing" above ground line that connects either to the city potable water system or the gray water system. This would allow the District staff to use the gray water for spring irrigation until the vault was depleted. Once depleted, staff re-connects back to the City of Modesto's potable water system (or possible recycled water in the future).

This system, or others similar approaches, would allow the MJC-East to recycle storm water collected in the winter, eliminate storm water injector pumps, and reduce irrigation cost associated with the campus.

East Campus Sanitary Sewer Distribution System

Existing Conditions

During Modesto Junior College – East Campus (MJC – East) expansion in the 1950's, 1960's and 1970's, the current sanitary distribution system was installed throughout the campus. The system's main trunk line connects to the City of Modesto's sanitary main located in Coldwell Avenue and Stoddard Avenues at the north and south sides of the campus. The main trunk extends up-gradient from Coldwell Avenue through the core campus to its termination near the Administration building at the easterly side of the college property. Two secondary trunk mains serving the Auditorium, Music, Art, Founders Hall, Forum, Computer Science and Journalism buildings extend south to Stoddard Avenue.

The main trunk line of the system is primarily 8-inch in size before connecting to the building laterals. A large portion of pipe associated with the trunk line is an 8-inch vitrified clay pipe (VCP). Clay pipe has long been used for sanitary sewer mains and is still considered a competent product for this purpose. Unfortunately, clay pipe installed prior to the early 1980's is prone for leaking at pipe joints due to inferior water-tight joint construction. With a reputation of leaking joints and small pipe sections, its use has diminished more recently with the introduction of newer (and often more competitively priced) pipe materials such as PVC. Several manufacturers continue to produce VCP and it is specified as a standard in many public agencies.

Though the existing sanitary system is rather old, a new grease trap and sanitary laterals associated with the cooking facilities within the Student Service Center has recently been upgraded (2004).

MJC - East's Ground Maintenance Supervisor has indicated that, with the exception of minor clogging of laterals the wastewater system appears to be working adequately.

Analysis and Considerations

Analysis of the MJC - East construction program indicates that either a new gravity main or a plastic lining of the existing carrier pipe is recommended in the next 10 to 20 years. The size, length of main, and continual use on the campus suggest pipe lining as impractical repair for MJC - East, but such an approach should be further evaluated during the design Increment and before development of final construction documents. A more conventional alternative would be to replace the existing sewer mains with a parallel system using PVC pipe.

Recommendation for MJC-East Campus

The age of the existing sanitary sewer and pipe material (VCP), suggests that MJC – East campus should implement a new sanitary sewer distribution system that addresses the larger issues discussed earlier herein. It is recommended that this new system be constructed using PVC.

Proposed Increment - One Solutions

It is recommended that during the Increment – One Improvements, a new sanitary main is installed during the expansion of the Administration Building. The new sanitary main will replace the existing main located on the west side of the building. This new main will start at the expansion project and extend northwesterly towards the existing manhole located within the parking lot on the east side of the library. This will begin the first Increment of trunk main replacement.

Proposed Future Solutions

It is recommended that during this current evaluation, the installation of a new PVC sanitary main be considered within the main corridors of the campus during Increment II of MJC –East Modernization Project. This new main would begin at the City's existing sanitary line in Codwell Avenue and extend south through the existing parking lot and extend to the library. The new line would then extend southeast to the expanded Administration building/Student services Center constructed during Increment one modernization improvements. The new main will be built parallel to the existing VCP main and somewhat deeper. This will allow the existing laterals to be disconnected from the existing main and be reconnected to the PVC main with minimal interruption in service. The existing VCP can either be removed during the construction of the new water and sanitary main (new water main is proposed in the approximate location of the existing sewer main), or crushed in place and used for structural fill.

A new PVC sanitary main is also recommended to be installed within the street between the Computer Science and Founders Hall building corridor. The VCP pipe will be replaced with a new PVC pipe and will start in Stoddard Avenue and extended north to the existing Forum building. New PVC laterals should also be replaced along Stoddard Avenue for the existing music and art buildings.

Prior to preparation of construction documents, it is recommended that the District hire an underground locating crew to identify the location, size and vertical elevation of the sanitary laterals associated with each building. Obtaining this data prior to construction will clarify design intent and minimize additional cost during the construction implementation.

East Campus Electrical System

Existing Conditions

The Modesto Irrigation District (MID) has 12kV overhead transmission lines that circumvent the campus on all four side. These lines serve the campus buildings from several pad-mounted transformers located throughout the campus, mostly adjacent to the existing building that it serves. Most of the buildings are metered individually, although there are some smaller buildings that are fed from another building. In addition, there are separate services with pole mounted transformers for the baseball scoreboard, the baseball building, and the horticulture parking lot lights.
The existing site electrical configuration is identified on the existing site electrical distribution drawing attached to this report.

Analysis and Considerations

Site Power Distribution:

Communications and meetings with MID discussed the incoming service feeders for the facility and options available to serve the property. Some of the existing campus owned site distribution is radial and will affect multiple buildings in certain areas should a problem with the power feeder occur. For example, should the transformer at Founders Hall fail, this building and the adjacent Forum would lose power until this could be replaced. These buildings house the majority of the students on this campus.

Site Transformers:

All 12kV MID transformers provide 480V at the secondary, with the exception of the Ag-Instructional building, which has a 208V secondary. These transformers appear to be in good condition except at Founder's Hall, which is leaking oil. MID is aware of this and plans to replace this transformer in the near future.

Proposed Solutions

Distribution Methods for Building and Facility Power:

Because of the extensive MID distribution system located around the campus, it is recommended that new buildings in Increments one and two be served from new MID transformers for financial and maintenance reasons. MID would be responsible for their transformers and all primary power up to them.

The Increment Three proposed 12kV system is an open loop type and is detailed on the proposed electrical distribution drawing attached to this report. This configuration consists of a loop system routed through the campus utilizing the existing 12kV pad-mounted transformers located throughout the campus. The feeders will be tied by means of normally open switches in each new transformer unit. Existing transformers will be utilized and new switches installed where applicable. Feeders and switches will have adequate capacity to serve load of the full loop. Each new pad-mounted transformer will have two possible sources of power and the availability of power at transformers will be

substantially increased by comparison with the existing scheme. In case of 12kV feeder failure the service to transformers can be restored by manually switching the primary switches.
It is proposed to locate the new pad-mounted transformers centrally (as practical) to the loads (clusters of buildings).

Metering

Increment Three conceptual design proposes to provide 12kV utility metering at the new substation. Service at 12kV provides an energy cost savings compared to 480V metering. Based on current rates, this savings is equal to 10% of demand costs. Appendix A show the demand for 2006. This cost savings would be approximately $19,200 per year.

Installation

The routing of site power distribution can be coordinated with the site civil work to stage construction in areas and create the new campus power loop. The proposed routing drawing attached to this report indicates the proposed configuration and identifies how it coordinates with other new campus utilities.

As is mentioned above the transformer units shall be pad-mounted. New reinforced concrete pads shall be provided to match the units.

The new medium voltage cables shall be routed in red-concrete encased ducts. The ducts may require reinforcement in special cases, for example if installed under traffic area or at reduced depth.

Duct Bank Routing

The routing of the new 12kV duct banks shall be coordinated with routing of other underground piping to form utility corridors or to utilize the advantages of joint trenches. The clearances between 12kV electrical conduits and communication, gas, cable TV, low-voltage conduits shall be in compliance with the California Electrical Code, State of California General Order #128 or other applicable regulations.

Demolition

The installation of a new system and the removal of existing equipment shall be scheduled and coordinated with the campus facilities. There is little existing equipment to be removed, as the existing transformers will be purchased from MID. The majority of equipment to be removed is the existing overhead services at the existing baseball field and parking lot.

East Campus Telecommunications System

Existing Conditions

The existing site Telecommunication Pathway is a series of hand holds interconnecting the buildings with conduit. The infrastructure is newer than other facilities on site and is in reasonably good shape and is identified on the existing site Technology drawing attached to this report.

Analysis and Considerations

This analysis examines the Campus wide Outside Plant and Inter-building telecommunications infrastructure cabling and pathways.

The existing Outside Plant inter-building telecommunications infrastructure cabling consists of copper cabling for analogue services and connection from the existing MPOE/ Telco room located north of the Ansel Adams Building and a typical (6) strands of Multi-mode Optical Fiber and 50 pair Category 3 copper cable that support the LAN and voice services to the campus.

Local exchange carrier services are provided by SBC. The main service trunks enter the campus at the existing MPOE/ Telco room located north of the Ansel Adams Building. All analogue circuits are cross connected from this location and extend to each building on campus. There are (2) T1 services provided for Voice/Data, (1) T1 for Fax services and (1) T1 for remote management router, these services are extended from Telco/MPOE to the existing Data Center where terminating equipment are located. In addition, there are (2) OC-3 lines for Internet Service Provider (ISP) access that terminate in the Data Center that is located in District Office 1100.

The existing Outside Plant inter-building substructure pathway system was verified against the Topographical plans that were provided. The majority of the spare conduits are hand holes. Additional conduit pathways and hand hole will be needed to support the new buildings in each Increment respectively.

Proposed Solutions

It is recommended that all new buildings throughout the campus have direct backbone cable infrastructure connectivity in a physical star topology to the existing MPOE/ Telco space. Backbone cables would include Multi-Mode 50 Micron, Optical fiber connection for LAN services and Category 3 or better copper cable ties for analogue services to the collocated Data Center/ MPOE/ Telco distribution frames. All inter-building backbone cables should be suited for Outside Plant installation. The infrastructure pathways to support this design would require conduit arrangements and quantities that are not supported by the existing campus infrastructure system.

The renovation and phasing of projects over an extended period of time may require preservation of all backbone inter-building cabling terminations at the existing MPOE until such time when construction is complete and new inter-building backbone cabling installed.

Connection of all existing BDF/IDF throughout the campus to the Data Center would require evaluating each BDF/IDF in accordance with all telecommunications documents and standards produced by TIA/EIA to include:

ANSI/TIA/EIA 568-B.1 - Commercial Building Telecommunications Cabling Standard – Part 1: General requirements, April 1, 2001.

ANSI/TIA/EIA 568-B.1-1 - Commercial Building Telecommunications Cabling Standard - Part 1: General Requirements - Addendum 1 - Minimum 4-Pair UTP and 4-Pair ScTP Patch Cable Bend Radius, July 1, 2001.

ANSI/TIA/EIA 568-B.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components, April 1, 2001.

ANSI/TIA/EIA 568-B.2-1 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Components - Addendum 1 - Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling, June 1, 2002.

ANSI/TIA/EIA 568-B.2-2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair Cabling Components - Addendum 2, December 1, 2001.

ANSI/TIA/EIA 568-B.2-3 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair Cabling - Addendum 3 - Additional Considerations for Insertion Loss and Return Loss Pass/Fail Determination, March 1, 2001.

ANSI/TIA/EIA 568-B.3 - Optical Fiber Cabling Components Standard, March l, 2000.

ANSI/TIA/EIA-568-B.3-1 - Optical Fiber Cabling Components Standard - Addendum 1 - Additional Transmission Performance Specifications for 50/125 um Optical Fiber Cables, April 1, 2002.

ANSI/TIA/EIA 862 Building Automation Systems Cabling for Commercial Buildings, April 11, 2002.

ANSI/TIA/EIA 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.

ANSI/TIA/EIA 606-A – Administration Standard for Commercial Telecommunications Infrastructures, June 21, 2002.

International Standards Organization/International Electro technical Commission (ISO/IEC) DIS 11801, January 6, 1994.

Underwriters Laboratories (UL) Cable Certification and Follow up Program.

National Electrical Manufacturers Association (NEMA).

American Society for Testing Materials (ASTM).

National Electric Code (NEC), Latest Issue.

Institute of Electrical and Electronic Engineers (IEEE).

UL Testing Bulletin.

East Campus Gas Piping System

Existing Conditions

The existing five site gas meters and associated piping system with a medium pressure supply are original, and piping installed below grade has reached the life expectancy of steel pipe.

Analysis and Considerations

The site gas distribution was field verified in conjunction with the MJC site existing drawings provided for use in the engineering conceptual design. The existing gas piping from each gas meter connects to adjacent buildings. Due to the short run of existing underground gas piping to adjacent buildings, no replacement is required at this time.

When proposed additional buildings are constructed, the nearby existing gas meter shall be upgraded and the existing underground gas piping shall be replaced and extended to the new building. Each individual building will be designed to have a gas isolation valve, as part of the Site Utilities Upgrade scope of work package. Where possible, the gas will be installed within a joint trench with other utilities to minimize installation cost.

Proposed Solutions

Site gas piping system and gas meter is to be upgraded during the construction of the proposed additional buildings and boiler plants. The new main service gas meter is to be sized to the required capacity with medium pressure (5 psig) supply to each building.

Piping below grade is to be polyethylene pipe and piping above grade will be galvanized steel. Piping below grade shall be routed in a joint trench with electrical and low voltage raceways where possible.

Each building is to be provided with a low pressure gas through (14-inches, W.C.) with shutoff valve and pressure regulator.

The existing site gas piping is recommended for demolition and removal as each building gas service is upgraded. Gas lines in areas of construction are recommended to be removed, but gas lines that serve remote areas that are abandoned are recommended to be left in place due to cost considerations. It is noted that abandoning gas lines in place may make it more difficult for future construction as they may be identified by locating services or encountered during digging.

East Campus Steam and Condensate Return Piping System

Existing Conditions:

The East Campus has an existing Central Boiler Plant that supplies low pressure steam to the majority of the east campus buildings through an existing underground distribution network of steam and condensate return piping. The installation of both the boiler plant and the distribution piping dates back to the original construction in the late 1950’s.

Analysis and Considerations

The Central Boiler Plant is located on the east side of the Stadium. The plant has three steam boilers that were installed in 1958. The boilers burners have recently been upgraded to meet the latest air quality requirements. Although preventive maintenance procedures are regularly performed, the majority of the plant boilers, pumps, and equipment in the boiler plant have reached their end of useful life.

The steam distribution network consists of steam and condensate return piping that feeds the following buildings:

- Administration Building.
- Music Building.
- Art Building.
- Auditorium Building.
- Science Building.
- Gymnasium Building.
- Men & Women Lockers Buildings.
- Founders Hall.
- Forum Building.

The steam and condensate return piping were installed in 1958. The piping is installed in a concrete trench that is totally buried underground. Although manhole pits are provided at certain locations along the steam distribution network, excavation is required any time the piping requires inspection or maintenance. Little or no upgrade work has been performed on the steam and condensate return piping over the past 50 years. As indicated by the facilities staff, there have been little on no operation issues related to the steam and condensate piping network.

The layout of the East Campus existing steam and condensate return piping is shown on drawing MP1.0.

Proposed Solutions

The service life of steam distribution piping depends on the age of installation as well as the chemical treatment programs used to prevent corrosion buildup.

To correctly evaluate the life expectancy of existing steam and condensate return piping, a piping inspection and testing agency should be involved to analyze the existing piping corrosion rates, wall thickness and metal loss utilizing non-destructive testing methods (such as ultrasonic or X-ray testing). Such analysis would determine the aging conditions of the existing steam condensate piping network without requiring major excavation or interruption of system operations.

If the piping analyses detailed above indicated that the existing steam and condensate piping have reached its end of service life, replacement of existing piping would be required. This is indicated as Option 1 on drawing MP2.0.

As an alternative, we propose abandoning the existing steam distribution piping and install a dedicated boiler plant for each group of adjacent buildings. This alternative will eliminate the majority of the site steam and condensate piping.

A total of four new boiler plants will be required. Each boiler plant will require an enclosure and will be located close to the buildings it serves. The east campus buildings will be grouped as follows:

1. Boiler Plant #1: Music, Art and Auditorium Buildings.
2. Boiler Plant #2: Gym, Men Lockers and Women Lockers Buildings.
3. Boiler Plant #3: Founders Hall and Forum Buildings.
4. Boiler Plant #4: Science and Administration Buildings.

The layout of new boiler plants is indicated as Option 2 on drawing MP3.0.

East Campus Energy Management System

Existing Conditions

The HVAC equipment in the various buildings is controlled by an Energy Management System. The system is a Johnson Controls DDC system and has a dedicated fiber communication network connecting all buildings within the east campus and extending to the west campus buildings.

Although sufficient information could not be obtained about the existing control system installation, Johnson Controls is considered as one of the leading manufacturers on building automation and provide a variety of solutions to various building controls needs.

Provide new Johnson Controls DDC control systems in all new and remodeled buildings and tie-in to existing site energy management system.

West Campus Water Distribution System

Existing Conditions

Modesto Junior College, one of the oldest community colleges in the state, was organized in 1921 to serve the first junior college district established under a State Legislature Enabling Act. The former Modesto Junior College District was expanded into the larger Yosemite Community College District in 1964 by action of the district electorate. The district is geographically one of the largest in the State and transects more than 100 miles of the San Joaquin Valley from the Coast Range on the west to the Sierra Nevada on the east. The boundaries include nearly 4,000 square miles encompassing all of Tuolumne and Stanislaus Counties and parts of San Joaquin, Merced, Calaveras and Santa Clara Counties. Due to the increase of enrollment, Yosemite Community College District electorates and the County of Stanislaus quitclaimed the former Hammond General Hospital/Modesto State Hospital in August 1970. The County of Stanislaus has developed their portion of the former site into a consolidated juvenile justice center. In 1978, Yosemite Junior College used portions of their property to create Administration Offices and Modesto Junior College – West Campus (MJC – West).

March 1942, the initial acreage required for the establishment of Hammond General Hospital was acquired by the U.S. Army Corps of Engineers (USACE) by fee purchase from the County of Stanislaus with an additional 40 acres acquired in June 1942 by condemnation proceedings against the Modesto Irrigation District (MID). After the property acquisition, the USACE began building a general hospital using standard military barracks, wards, clinics, and support buildings. Hammond General Hospital specialized in neurology, general and orthopedic surgery, neurosurgery and psychiatry. Hammond General Hospital also maintained six “detention wards” for the mentally ill and a prison ward, all of which were surrounded by security fencing.

By 1945, the Hammond General Hospital was a 2,556-bed facility with approximately 240 buildings and other structures, including 78 wards, clinics, barracks, offices, warehouses, 6 mess halls, waste water treatment plant, and utility shops. The hospital also took advantage of a railway siding the northeast side of the property. The rail line was an off-spur of Southern Pacific Railroad Fresno Line. The line allowed for patient and freight transportation.

In December 1945 Hammond General Hospital was closed by the U.S. Army. In 1946, the State of California converted the site to a state mental hospital. The State of California operated the site as Modesto State Hospital under the Department of Mental Hygiene until 1970.

Sometime between the transition between the State of California and Yosemite Junior College, the onsite sanitary treatment plant associated with the Hammond General Hospital was removed. The sanitary conduit system was intercepted (prior to entering the treatment plant) by a new 20-foot deep lift station. This lift station would pump the sanitary effluent to the City of Modesto’s 54-inch trunk main located along the northwest side of the property.

During MJC – West expansion between the 1970’s and 1990’s, the domestic water laterals were extended to the existing water system that was installed during the 1940’s. In 2001 the District made major repairs to the existing water system. All existing valving was removed and replaced with new resilient wedge valves. In addition to new valves, portion of the existing Asbestos Concrete Pipe (AC Pipe) installed in the 1940’s was removed and replaced with new PVC C900 pipe.

The backbone of the distribution system is an internally looped system inside the core campus area that provides water distribution for fire suppression needs as well as potable uses. The water is supplied to these two systems from two separate metered service located along Blue Gum Avenue (south side of the campus).

From the primary pipeline network, a variety of 8-inch and smaller water lines branch out to distribute water to various buildings and areas on campus. The principal functions of these service lines include:

- Fire Suppression (fire hydrants, fire sprinkler systems, and fire department connections)
- Potable Water Supply (individual buildings, and drinking fountains)

The pipe materials utilized on the system in primarily Asbestos Concrete Pipe (AC-pipe) supplemented with the new PVC pipe installed in 2001. The smaller lines vary from solvent-weld polyvinyl chloride pipe (PVC) to ductile iron pipe (DIP) with the likelihood of limited amounts of copper and/or ferrous metal pipe used at or in the individual building services.

Due to low operating pressure provided by the City of Modesto (approximately 50 psi), MJC-West has a dedicated irrigation system that is supplied by two existing wells that occupy the property (at one time there were four wells, but only two are operated at this time). The wells are operated in a lead-lag scenario. This is an operational procedure were the one well starts first (lead) and is supported by a second well (lag) if demand is greater than the first well can meet. The wells are controlled by the water levels in a 30,000 gallon hydropneumatic tank. In addition to irrigation, the well water is delivered to agricultural area of the campus. The well water is pumped to a 10,000 gallon holding tank between the poultry buildings and is distributed by smaller pumps to the individual buildings associated with the agricultural area. MJC-West staff also indicated the well water has been tested and inadequate for domestic consumption.

During our investigation, Facilities indicated that Well No. 1 had its well pump removed in 2004 to bale, clean and repair the well screens associated with the well. Once cleaned, the well pump was reinstalled and has been functioning fine since the maintenance was complete.

Analysis and Considerations

The most obvious deficiency in the water distribution system is the capability to deliver the fire suppression required for the expansion within the campus. As indicated previously, an 8-inch main comprises a circle around the core area of the college, but age and size of the main will not be adequate to handle the fire flow required for the proposed buildings associated with Increment One Modernization (Allied Health, Science Center, GVM, and Planetarium are expected to be 83,000 sq. ft. and the new AG Pavilion is expected to be approximately 100,000 sq. ft.). The type of construction, square footage, and implementation of a sprinkler system has not been finalized. Additional discussions will need to be scheduled with the Modesto Fire Department staff regarding fire flow requirements for the campus since this data may substantially influence the fire flow requirements of the campus. It has been initially estimated that the fire flow demand for these improvements to be anywhere from 2,500 gpm to 6,500 gpm for 4-hours (once again, depending on type of construction and if the City of Modesto will allow reduction in fire flow, per the CA fire code, if the buildings are sprinkled). Preliminary investigation suggests these fire flow rates exceed the current capacity of the 8-inch looped system.

Not only are fire flow requirements important, but the fire protection agency's preference with respect to a fully independent distribution system dedicated solely to fire suppression needs to be clarified. At issue was the question as to whether fire hydrants within the campus would be considered to be comparable to those directly incorporated in a municipal system. This interpretation varies from agency to agency, with some jurisdictions requiring a dedicated fire system that meets the National Fire Protection Agency (NFPA) requirements. This system limitation may impact the future design of the Allied Health, Science Center, GVM, and Planetarium buildings (i.e. reduction in size or separate buildings), or require a much larger water system to accommodate these fire flow demands.

Modesto College also needs to consider the monthly meter fees associated with the current configuration. Currently the domestic and fire suppression are all conveyed by one conduit system. It is the experience with other community colleges that this configuration is common but expensive when the District takes into consideration the monthly water meter costs associated with a large meters addressing these water considerations. Considerable cost savings can be offered to community colleges when they separate their irrigation, potable and fire suppression needs into three separate systems. The biggest savings results from the reduction in meter size for the potable system, when the fire suppression system is assigned to a dedicated conduit system. Current Public Utility Commission (PUC) policy states water agencies are not allowed to charge meter fees for fire suppression, they are allowed only a monthly "stand-by fee" to be charged (normally significantly less then the large meter fee). With this policy, community colleges are able to remove their large water meters that were originally sized for fire flow, and replace the meter with a substantially smaller meter for domestic flow. It has been our experience that Districts were able to replace an existing 8-inch meter with a new dedicated domestic 4-inch meter which resulted in a $1,200 saving in water costs a month. It cannot be guaranteed that MJC would receive the same kind of savings, but this is something that should be analyzed and considered during future stages of water system implementation.

Another concern is the pipe material of the water system. Much of the primary on-site water distribution mains are constructed of 8-inch diameter asbestos cement (AC) pipe. The use of AC pipe in potable water supply systems was common during in the 1940's, 1950's and 1960's when the MJC - West campus was expanded. By the late-1980's growing concerns with the carcinogenic nature of asbestos products combined with the emergence of large-diameter plastic pipe resulted in the eventual disuse of AC pipe in new water system construction. The safety of AC pipe for potable water applications has been highly debated. Although no longer manufactured, a substantial amount of AC pipe remains in service in North America and Europe. Researchers differ on the risk posed by competent in-place AC pipe, but it is widely believed that eroded or damaged pipe presents an increased potential for exposure to asbestos fibers.

There appears to be universal agreement that cutting, drilling and machining of AC pipe is hazardous due to the generation of breathable fine airborne asbestos particles, the documented cause of asbestosis, mesothelioma and related illnesses. Although the AC pipe currently in the on-campus distribution system may still provide a safe water conveyance mechanism, repair and/or connection to it could expose construction and maintenance personnel to risk. Additionally, outside diameter is also abnormal to contemporary pipeline materials and midline connections to the pipeline would require the employment of qualified asbestos removal technicians.

Modesto College should also be aware that the City of Modesto installed a new 12-inch PCV C900 main in Collegiate Lane and Brink Avenue in 1997. This 12-inch main extends to the intersection of Brink Avenue and Shoemaker Avenue and continues west on Shoemaker Avenue for 400-feet.

Recommendation for MJC-West Campus

Issues with the water distribution system such as pipe material (ACP), lack of a large enough system to provide adequate fire protection, and miscellaneous repairs made on the system suggest that MJC – West campus should implemented two new water distribution system that addresses the larger issues discussed earlier herein (dedicated Fire Suppression System and a dedicated Domestic System).

The new Fire Suppression System shall connect to the new 12-inch main within Brink Avenue and continue through the campus and connect to the existing 10-inch main within Blue Gum Avenue between Prichard Avenue and Rosemore Avenue. This system shall be internally looped and reinforced with a second connection to the 10-inch main within Blue Gum Avenue at the intersection of Cummins and Blue Gum.

The District shall maintain the existing meter connections along Blue Gum, but reduce the meter size to accommodate the proposed dedicated domestic water system. The new domestic system would utilize a large portion of the 8-inch PVC pipe installed in 2001. The system would be extended and be looped through the campus.

It is recommended that this new system be constructed using PVC C900 (PVC pipe rated for pressures less than 200 psi) or DIP. Both pipe materials are widely used in the water supply industry.

To verify the deterioration of the existing pipe, it is recommended that Modesto Junior College budget funds for future fire flow testing and computer modeling to analyze the deterioration of the existing water system and what new pipelines can be salvaged for a new water distribution system. The results of such fire flow testing and modeling can help determine the existing AC water distribution system has sustained a significant degree of deterioration. This determination can be based on comparisons of field test data compared with computer modeling of the system. The modeling can also help determine the required domestic meter sizes needed for the improved system.

Proposed Increment - One Solutions

Until MJC can fund a new water distribution system for domestic and fire suppression for the whole campus, the interim recommendation is to install a new dedicated fire suppression system to accommodate the new Science Building/GVM and AG Pavilion. These two projects would require separate fire suppression improvements, but would be constructed to allow future expansion and integrity to the overall Conceptual Plan.

The Allied Health, Science Center, GVM, and Planetarium fire suppression system would start at Blue Gum Avenue and extend towards the new project. The fire suppression main would loop around the proposed building to insure adequate fire hydrant spacing and allow the system to loop and tie into the existing 8-inch PVC main. This looped system will need analyzing during the construction document Increment for fire flow adequacy.

The fire suppression system associated with the AG Pavilion will start at the 12-inch PVC main within Brink Avenue. The main will allow for future looping during a later Increment.

The Allied Health, Science Center, GVM, and Planetarium will use existing 8-inch PVC main to provide domestic services to the building. The AG Center will use new domestic water hot-taped along Brink Avenue.

We also recommend the District hire an engineering firm to perform fire flow testing and computer modeling of the existing water system to provide necessary information for Department of State Architect approval for future construction within the East Campus. Computer modeling uses powerful computer programs (Water CAD) that are widely used in the water supply industry to design and analyze complex pressurized piping systems. The program allows the creation of a network model that simulates pipes, pumps, tanks, valves, fittings and similar components that influence the flow of water in distribution systems.

The field testing and modeling activities are used synergistically to develop a realistic depiction of the distribution system's attributes. The modeling assisted in verification of the test data and in development of estimates of system characteristics such as pipe friction coefficients. The data generated from the flow testing provided a basis for calibration of the model, thereby improving its realism. The resulting model permits the extrapolation of the test data for use throughout the distribution network.

During Increment One, we recommend the current use of the onsite wells for irrigation and AG watering to remain.

Proposed Future Solutions

Completion of the two new water systems for the future needs of the college should be implemented. The system should be designed to provide the required fire flow for any anticipated structures on the campus. In most instances, the largest demand is associated with the largest non-fire rated building (Type-N per the California Fire Code) on the campus. At the time of the preparation of this report, the individual fire class of the various buildings or domestic water demands has not been ascertained. It is recommended that once the architectural design of the new buildings is sufficiently detailed, that fire ratings be submitted to the local Fire Marshall for determination of the fire flow requirements. Once the fire ratings of the larger on-campus structures are available the specifics of the water distribution system can be firmly established.

It is also recommended the irrigation well, hydro-pneumatic tank, and controls for the irrigation system be replaced. The modifications will allow a more efficient system to be installed with will reduce maintenance, and operational cost association with yearly use of the irrigation system. The dedicated system also allows the District to convert to recycled water if ever implemented and extended to Modesto Junior College West Campus.

West Campus Storm Drainage Collection System

During MJC – West expansion between the 1970's and 1990's, the storm laterals were extended to the existing storm drain trunk main installed during the 40's. The existing trunk main is arched corrugated metal pipe, varying in size that discharges to an existing storm water detention basin located at the northeast corner of the property. The detention basin has two emergency overflow pipelines that discharge to an existing concrete valley gutter along the west side of the property. This valley gutter discharges into the Modesto Irrigation District's (MID) irrigation channel (Lateral No. 3) location along the north property line.

MJC-West staff indicated the system is old and has some maintenance problems that are surface related, but the overall pipeline seems to work adequately.

Analysis and Considerations

As a part of the storm drainage planning, the possibility of including “sustainable” storm water design elements that could be integrated within the college’s on-site collection system was researched. With the rising cost for water, depletion of aquifers, and limitations requirements on potable water supplies, there has been a growing interest in progressive stormwater management using integrated design approaches and new commercially developed products. In the case of the West Campus, a “sustainable” storm water design element has been implemented since the inception of Hammond General Hospital detention basin at the northwest corner of the property.

The existing basin has been design to allow ground water infiltration and evaportranspiration by incorporating outlet pipes that are higher in elevation than the basin floor. When the basin is saturated and unable to infiltrate at a desirable rate, the storm water rises in elevation and discharges towards the MID irrigation cannel via the two outlet pipes. This system is an extraordinary implementation of current “Best Management Practices” for storm water.

The pipe system used to convey the storm water to the basins is the original corrugate metal arch pipe (CMP) installed in the 1940’s. The adequacy of the pipe was not analyzed during the conceptual Increment, but research has shown that CMP can last over a hundred years if conditions are appropriate for the pipe (non-corrosive soils, adequate slope to prevent standing-water within the pipe, and proper design water velocities to prevent pipe scour).

A Storm Water Management Plan (SWMP) should be prepared for the college. The SWMP, which should be implemented over the next five years, includes education and public participation programs and drainage mapping intended to assist in the detection of illicit discharges into the storm drain systems. Although, most of the SWMP deals more specifically with “good house keeping” and educational goals, the use of percolation basins and water harvesting techniques coincide with the underlying intent of the SWMP program.

Modesto College should also be aware that a Storm Water Management Plans (SWMP) is required under the provisions of the Federal Government’s Clean Water Act (as amended in 1987) to develop and implement non-point source pollution management programs. These mandated programs require certain measures be taken to abate pollutants carried by rainwater and urban runoff, herein referred to as stormwater runoff.

Increment One of the Clean Water Act, which was first enacted in 1990, California’s nine Regional Water Quality Control Boards (RWQCBs) were each required to adopt a Nation Pollutant Discharge Elimination System (NPDES) permit process for stormwater systems for medium sized cities (those with populations between 100,000 and 250,000) and large municipalities (those having more than 250,00 people). Most of these permits are issued to a group of co-permitees encompassing an entire metropolitan area.

Under Increment Two of the Clean Water Act, which went into effect in 2003, the permitting processes required of larger municipalities are now imposed on smaller cities and on a variety of other agencies, including school districts. These are referred to as “Small Municipal Separate Storm Sewer Systems” (or “MS4s”) and “Non-Traditional Small MS4s”. Small MS4s are defined as municipal agencies serving less than 100,000 people and Non-Traditional Small MS4s include parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial waste, stormwater, or other waste.

Over the past two years the Region 5, Central Valley RWQCB (like most of the State’s regional boards) has been occupied with processing and approvals for the small cities and towns that comprise the “traditional” small MS4s. These traditional small MS4s have been the Board’s first priority and adoption of the numerous SWPPPs for these cities was a long and laborious process.

With that task near completion, the Regional Board's next priority will be the processing the Non-Traditional Small MS4s, which includes the Yosemite Junior College District.

As a regulated non-traditional MS4, community colleges must submit a Notice of Intent (NOI) to the local (Region 5) RWQCB within 180 days of notification of designation (or later dated if stated by the RWQCB) and a develop a Stormwater Management Plan/Program (SWMP).

The Stormwater Management Plan/Program must describe Best Management Practices (BMPs), measurable goals, and timetables for implementation of Minimum Control Measures in the following six areas:

1. Public Education
2. Public Participation
3. Illicit Discharge Detention and Elimination
4. Construction Site Stormwater Runoff Control
5. Post Construction Stormwater Management
6. Pollution Prevention/Good Housekeeping for Municipal Operations

The SWMP must describe how pollutants in stormwater runoff will be controlled and delineate BMPs that address the six Minimum Control Measures. Each BMP must have accompanying measurable goals that will be achieved during the permit term. The definable goals shall be definable tasks such as the number of presentations through the School District, number of inlets to be labeled, or pollutant loading to reduce.

The primary goal of the permit application is to protect water quality from the impacts of stormwater runoff from non-traditional MS4s. The intent is that the stormwater quality impacts will be considered in all aspects of the College activities and that College departments will work together in implementing the stormwater BMPs identified within the SWMP.

Proposed Increment – One Solutions

Engage a consultant to prepare a Storm Water Management Plan (SWMP) for the West-Campus. The plan should address management of the current storm system and concepts that can be implemented in future construction Increments. The SWMP must also address Best Management Practices associated with future construction projects within the campus. The SWMP is a living document that referenced, monitored, and updated during the continual operation of the campus.

The campus should hire an underground utility inspector and televising crew to analyze the adequacy of the existing CMP pipe and storm drain inlet grates. Any minor deficiencies shall be repaired during increment one improvements. Large improvements should be identified and budgets for future improvements.

New storm drains associated with the new improvements should be double-wall corrugated high-density polyethylene pipe (HDPE) and connect to the existing trunk main system that discharges to the Detention/Retention System.

Proposed Future Solutions

Runoff associated with the Agricultural facilities may need to be treated in the future to meet Regional Water Quality Control Board requirements. Facilities designed to treat agricultural runoff may need to be implemented prior to discharging to the detention/retention facility. These matters will be needed to be verified by the design team prior to creating construction documents for further improvements.

Future storm drain implementations should coordinate with the Storm Water Management Plan prepared for the campus.

New storm drains associated with the new improvements should be double-wall corrugated high-density polyethylene pipe (HDPE) and connect to the existing trunk main system that discharges to the Detention/Retention System.

West Campus Sanitary Sewer Distribution System

During MJC – West expansion between the 1970's and 1990's, the sanitary laterals were extended to the existing sanitary "back-bone" installed during the 40's. During this time frame, the District also made minor modification to the existing lift station (air gap) but never made any modification or alterations to the existing system to eliminate the lift station.

The Districts main trunk line starts at the south-east side of the property and extends west towards the Child Development Center. The 1940 pipeline continues north between John Muir and Yosemite Hall buildings. The sanitary main continues pass the Ansel Adams and Sierra Hall buildings until reaching the parking lot. The main then continues west toward the lift station which is located across from the RV trailer/Temporary Housing parking lot (or southeast corner of the existing detention facility).

The main trunk line of the system is primarily 8-inch in size before connecting to the building laterals. A large portion of pipe associated with the trunk line is an 8-inch vitrified clay pipe (VCP). Clay pipe has long been used for sanitary sewer mains and is still considered a competent product for this purpose. Unfortunately, clay pipe installed prior to the early 1980's is prone to leaking at connection points due to inferior water-tight joint construction. With a reputation of leaking joints, and small pipe sections, VCP use has diminished more recently with the introduction of newer (and often more competitively priced) pipe materials such as PVC.

MPC's Ground Maintenance Supervisor has indicated that, with the exception of minor clogging of laterals the wastewater system appears to be working adequately.

Though lateral clogging has been a maintenance problem for the Facilities Department, the sanitary lift station has been the MJC-West's largest maintenance issue associated with the sanitary sewer. In addition to being a maintenance problem, the lift station is also considered a confined space by CAL-OSHA, and a continuous expense with operation, repair and replacement. The lift station's current warning mechanism and lights are currently inoperable.

Analysis and Considerations

The potential for elimination of the lift station was considered by MJC- West's staff to be highest priority in the evaluation of the sewerage collection system and the possibility for it's elimination by construction of a gravity system.

After reviewing the City of Modesto record drawings of sanitary sewer improvements within Blue Gum Avenue and Proust Avenue it appears that the City of Modesto installed sanitary sewer deep enough for the Campus to consider a new gravity sewer system within the campus. During 1980, the creation of West Campus Industrial Park required an extension of the sanitary main from Proust Avenue to Carpenter Road. This sanitary sewer is large enough, and deep enough to allow for a gravity system within MJC – West's campus.

Another concern is the condition of the existing sanitary pipe line is uncertain. There are a couple of possible means of addressing this issue, depending on the actual condition of the pipe. One option would be to install a plastic liner or smaller plastic carrier pipe within the existing conduit. The size and length of main, as well as cost of lining a main, seams to suggest this option as impractical for MJC, but such an approach should be further evaluated during the design Increment and before development of final construction documents. A more conventional alternative would be to replace the existing sewer mains with a parallel system using PVC pipe.

Due to the depth and OSHA confined space issues, evaluation of the existing conditions, capacity, or evaluation the controls for the well was not possible. But as mentioned earlier, warning mechanisms for pump failure are no longer operating.

Recommendation for MJC-West Campus

The age of the existing sanitary sewer and pipe material (VCP), suggests that MJC – West campus should implement a new sanitary sewer distribution system that addresses the larger issues discussed earlier herein. It is recommended that MJC-West fund a future sanitary sewer realignment to create a gravity sewer system. This new system shall be constructed using PVC pipe. The existing sanitary lift station should be removed from service and abandoned once the new gravity sewer has been constructed.

Proposed Increment - One Solutions

It is recommended that during the increment – one improvement, a new sanitary main shall be installed during the implementation of the new Allied Health, Science Center, GVM, and Planetarium buildings. The new sanitary main will be the start of the future gravity main installation for the campus. The main will start at the existing sanitary manhole located at the intersection of Blue Gum Avenue and Prickard Avenue and extend north towards the new buildings. This will remove any addition loading of the existing lift station and prepare the campus for a new gravity main in the future.

The District Receiving and Transportation building is adjacent to the gravity main that is down stream of the lift station. This allows this building to be connected to the existing main without impacting the operation of the existing lift station. The sanitary main currently flows to the western property line, then extend north toward the City of Modesto 54-inch trunk main. Before the campus proceeds with this connection, the District should hire an underground televising crew to place a remote video within the sewer to document the condition of the pipe. If portions of the pipe are in poor condition, the District should repair pipe in disrepair.

The Agricultural Pavilion (AG Pavilion) is located in the far northeast corner of the property. The Pavilion is an exceptionally long distance from Blue Gum Avenue. With this in mind, we recommend the Pavilion sanitary main be installed at a shallow elevation (minimum 4-feet of cover) with minimum slope towards the southwest. This new main could connect to an existing sanitary manhole at the northwest corner of the Tenaya Complex. The AG Pavilion main is to tie into this deep manhole with a standard drop connection installation. This will allow the AG Pavilion to discharge to the existing lift station temporarily until the future gravity main is extended to this manhole.

Another option for the AG Pavilion would be the installation of a new gravity sanitary main within Brink Avenue (City of Modesto right-of-way) and extend towards the intersection of Brink Avenue and Shoemaker Avenue (County of Stanislaus right-of-way). The sanitary main would then need to cross under the Modesto Irrigation District (MID) Lateral No. 3 canal and tie into the existing City of Modesto 54-inch trunk main. Due to the distance and easement acquisition, and limited funds available for utility improvements during Increment One. We chose to load the existing lift station with additional waste water, though it is preferred that a gravity system be implemented for this project.

Sizing of the main was not part of the scope of work for the conceptual Increment, nor is there enough information available regarding the conceptual buildings sanitary flow (AG Pavilion, Allied Health, Science Center, GVM, Planetarium, Receiving & Transportation and Health buildings) to adequately analyze the total flow and size required for these improvements, but with a minimal slope of 0.25-percent to 0.35-percent, the education and administrational portion of the campus will be able to gravity flow to Blue Gum Avenue.

Proposed Increment – Two Solutions

If MJC-West Campus completed the necessary recommendation during Increment One improvement, the completion of the gravity main towards Blue Gum Avenue is recommended. This Increment of work would include the following:

- A gravity main extension along south and east side of Yosemite Hall towards the existing Student Learning Center;
- A gravity main extension from the District Offices east towards the new sanitary main installed during Increment I improvements;
- Extend the sanitary main installed during Increment One towards Ansel Adams and Tenaya Complex and finish the connection to the AG Pavilion;
- Install a new sanitary main east to the future sports complex.

Prior to preparation of construction documents, it is recommended the District hire an underground locating contractor to identify the location, size and vertical elevation of the sanitary laterals associated with each building. Obtaining this data prior to construction will clarify design intent and minimize additional cost during the construction implementation.

We propose the Agricultural buildings located at the northwest corner of the school property to be redirected towards the City of Modesto's 54-inch trunk main located along the north property line.

The last sanitary improvement, which has been discussed earlier, is the removal of the sanitary lift station. This will be accomplished by the installation of a new sanitary main identified above. This new main will require the some deep trenching estimated to be in the range of 12-feet to 15-feet. The sanitary main will be installed at more conventional depths as the main approaches the individual building laterals (5-feet to 7-feet). The sewer will be connected to the City of Modesto's trunk main at the intersection of Blue Gum Avenue and Prichard Avenue.

West Campus Electrical System

Existing Conditions

The West campus electrical distribution system consists of a wide variety of voltages and service types. The original army-era overhead 4160V system remains through much of the campus. The newer buildings are served from underground 12kV Modesto Irrigation System (MID) lines and MID pad-mounted transformers. There are also various overhead single-Increment pole mounted transformers that serve the agricultural buildings.

The original 4160V system is served from an overhead 12KV line near the District administrative buildings. This service is metered at 12KV, and MJC single-Increment transformers step the voltage down to 4160V. The 4160V system is all overhead and is distributed through the older buildings on campus. Pole mounted transformers step the voltage down to 120/240V to serve these older buildings. Some of the services use three single-Increment transformers for 240V, 3-Increment delta services.

A 12kV MID line enters the campus underground from Brink Ave., and extends through the newer buildings all the way to Blue Gum Ave, where it is also tied to MID's 12kV distribution. A total of four (4) 12kV-480V MID pad-mounted transformers feed these newer buildings.

Analysis and Considerations

4160V System:

The 4160V distribution system is at the end of useful life and they are of obsolete types. Visual inspection identified several major deficiencies of the existing electrical system: poles that have and are falling down, excessive sag in the lines, possibility of PCB materials, inadequate seismic supports, absence of labeling, absence of spare parts, etc. Facilities personnel believe that this equipment is dangerous to maintain. The 4160V system requires replacement and should be phased out. A new 12kV MID loop system with pad-mount transformers and switches is the preferred method for the distribution.

12kV System:

Communications and meetings with MID discussed the incoming service for the facility and options available to serve the property. The existing configuration was examined and the proposed solution recommends an open loop configuration to allow each transformer the ability to be sourced from two directions. If a problem occurs on a line segment, that segment can be opened up and worked on while the other facility power transformers are served from the alternate direction in most cases. It is recommended that the power loop be operated in a open-loop configuration so that a failure on one leg of the loop will only power down that section of the campus, and allow for faster trouble shooting and isolation of the problem should it occur.

The routing of site power distribution can be coordinated with the site civil work to stage construction in areas and create the new campus power loop. The proposed routing drawings attached to this report indicate the proposed configuration and identifies how it coordinates with other new campus utilities.

Proposed Solutions

Distribution Methods for Building and Facility Power:

The proposed 12kV system is of open loop type built in Increments and is detailed on the proposed electrical distribution drawings attached to this report. This configuration consists of a loop routed through the campus from a new substation and through the existing 12kV pad-mounted transformers located near the newer buildings. It is recommended that the existing MID underground 12kV line and pad-mounted transformers be purchased from MID. Future phasing of the new buildings will eventually complete the loop and eliminate all of the 4160V system. This proposal allows phased disconnection and removal of the existing 4160V system. The 4160V transformer and feeders of each building cluster will be removed as soon as the respective new 12kV system is operational. The new feeders and switches will have adequate capacity to serve load of the full loop. Each pad-mounted transformer will have two possible sources of power and the availability of power at transformers will be substantially increased by comparison with the existing scheme. In case of 12kV feeder failure the service to transformers can be restored by manually switching the primary switches. It is proposed to locate the new pad-mounted transformers centrally (as practical) to the loads (clusters of buildings).

Phasing:

The construction is phased and buildings will require power utilities to be installed before existing structures are demolished. The proposed configuration will allow for the 12kV distribution to be put into place and buildings phased onto the system as they are scheduled for construction. In some locations the 12kV routing may need to be extended from an area pull box to the new building location for tie-in.

Equipment:

Based on the campus facilities experience and the survey data no new underground transformer or switch vaults are proposed. The transformer and switches shall be pad-mounted.

Transformer / switch units by several major manufacturers were evaluated. It is proposed to utilize Cooper Power Systems pad-mounted dead-front three-phased transformers with R-Temp fluid and switches for loop-feed.

The proposed medium voltage cables shall be 25 kV 133% insulation level rated, copper, Okonite Okoseal Type MV-105 or equal.

Metering:

It is proposed to provide 12kV utility metering at the new 12kV switchgear. The meter shall be interfaced with the campus management system via the Intranet or other designated campus communications model. Service at 12kV provides an energy cost savings compared to 480V metering. Based on current rates, this savings is equal to 10% of demand costs. Appendix A shows the demand for 2006. This cost savings would be approximately $19,388 per year. Note that the campus already receives a credit for the 4160V distribution system being metered at 12kV. In 2006 this savings was $3,226, so the net savings will be approximately $16,162.

Installation:

As is mentioned above the transformer units shall be pad-mounted. New reinforced concrete pads shall be provided to match the units.

The new medium voltage cables shall be routed in red-concrete encased ducts. The ducts may require reinforcement in special cases, for example if installed under traffic area or at reduced depth.

Duct Bank Routing:

The routing of the new 12 kV duct banks shall be coordinated with routing of other underground piping to form utility corridors or to utilize the advantages of joint trenches. The clearances between 12 kV electrical conduits and communication, gas, cable TV, low-voltage conduits shall be in compliance with the California Electrical Code, State of California General Order #128 or other applicable regulations.

Demolition:

The installation of a new system and the removal of existing equipment shall be scheduled and coordinated with the campus facilities. After the new 12 kV system is operational, the existing 4160V equipment needs to be removed and disposed in the legal matter as required by the applicable regulations. All cables in raceways need to be removed by code as they can not be left un-terminated in abandoned raceways. Raceways in areas of construction are recommended to be removed, but raceways that serve remote areas that are abandoned are recommended to be left in place with the cables removed for cost considerations. It is noted that abandoning raceways in place may make it more difficult in the future construction as they may be identified as active by locating services or encountered during digging.

West Campus Telecommunications System

Existing Conditions

The existing site Telecommunication Pathway is a series of Hand Holds interconnecting the buildings with conduit. The infrastructure is newer than other facilities on site and is in reasonably good shape and is identified on the existing site Technology drawings attached to this report.

Analysis and Considerations

This analysis examines the Campus wide Outside Plant and Inter-Building telecommunications infrastructure cabling and pathways.

The existing outside plant inter-building telecommunications infrastructure cabling consists of copper cabling for analogue services and connection from the existing MPOE/ Telco room located north of the Ansel Adams Building and a typical (6) strands of Multi-mode Optical Fiber and 50 pair Category 3 copper cable that support the LAN and voice services to the campus.

Local exchange carrier services are provided by SBC. The main service trunks enter the campus at the existing MPOE/ Telco room located north of the Ansel Adams Building. All analogue circuits are cross connected from this location and extend to each building on campus. There are (2) T1 services provided for Voice/Data, (1) T1 for Fax services and (1) T1 for remote management router, these services are extended from Telco/MPOE to the existing Data Center where terminating equipment are located. In addition, there are (2) OC-3 lines for Internet Service Provider (ISP) access that terminate in the Data Center that is located in District Office 1100.

The existing outside plant inter-building substructure pathway system was verified against the Topographical plans that were provided. The majority of the spare conduits are hand holes. Additional conduit pathways and hand hole will be needed to support the new buildings in each Increment respectively.

Proposed Solutions

It is recommended that all new buildings throughout the campus have direct backbone cable infrastructure connectivity in a physical star topology to the existing MPOE/ Telco space. Backbone cables would include Multi-Mode 50 Micron, Optical fiber connection for LAN services and Category 3 or better Copper cable ties for analogue services to the collocated Data Center/ MPOE/ Telco distribution frames. All inter-building backbone cables should be suited for Outside Plant installation. The infrastructure pathways to support this design would require conduit arrangements and quantities that are not supported by the existing campus infrastructure system.

West Campus Gas Piping System

Existing Conditions

The existing site gas meter and associated piping system with a medium pressure supply are original, and piping installed below grade has reached the life expectancy of steel pipe.

Analysis and Considerations

The site gas distribution was field verified in conjunction with the MJC site existing drawings provided for use in the engineering design. The existing gas piping is a radial configuration, and enters the facility from two PG&E gas meter. Due to the age of the gas piping, replacement is required.

The gas distribution from the entry point has been coordinated on the proposed gas distribution plans with the other campus utilities. There is a main gas feeder that extends through the campus and branches to the individual buildings in the proposed configuration. Each individual building will be designed to have a gas isolation valve, as part of the Site Utilities Upgrade scope of work package. Where possible, the gas will be installed within a joint trench with other utilities to minimize installation cost.

Proposed Solutions

Site gas piping system is to be upgraded with a new main service gas meter and piping system. The new main service gas meter is to be sized to have a capacity that will include existing and proposed additional buildings with medium pressure (5 psig) supply to each building.

Piping below grade is to be polyethylene pipe and piping above grade will be galvanized steel. Piping below grade shall be routed in a joint trench with electrical and low voltage raceways where possible.

Each building is to be provided with low pressure gas through a (14-inches, W.C.) with shutoff valve and pressure regulator.

The existing site gas piping is recommended for demolition and removal as each building gas service is upgraded. Gas lines in areas of construction are recommended to be removed, but gas lines that serve remote areas that are abandoned are recommended to be left in place for cost considerations. It is noted that abandoning gas lines in place may make it more difficult for future construction as they may be identified by locating services or encountered during digging.

West Campus Energy Management System

Existing Conditions

The HVAC equipment in the various buildings is controlled by an Energy Management System. The system is a Johnson Controls DDC system and has a dedicated fiber communication network connecting all buildings within the east campus and extending to the west campus buildings.

Although sufficient information could not be obtained about the existing control system installation, Johnson Controls is considered as one of the leading manufacturers on building automation and provide variety of solutions to various building controls needs.

Provide new Johnson Controls DDC control systems in all new and remodeled buildings and tie-in to existing site energy management system.

Appendix – A (2006 Load Data – East Campus)

MODESTO IRRIGATION DISTRICT

ELECTRICITY COST ANALYSIS FOR YOSEMITE COMMUNITY COLLEGE - EAST

2006 Costs on GS-3 Rate

Five Services Meter Totalized

Account 22220100016

Energy Usage Data	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Annual Totals
Demand (kW)	941	1,002	940	1,090	1,158	1,184	1,297	1,282	1,327	1,182	1,186	952	
Energy (kWh)	335,819	313,519	361,966	347,076	346,921	369,764	419,110	432,791	462,636	418,958	365,504	296,063	**4,470,127**
LOAD FACTOR %	48.0%	45.0%	51.8%	44.2%	40.3%	43.4%	43.4%	45.4%	48.4%	47.6%	42.8%	41.8%	45.2%
Reactive (kVAR)	523	577	519	683	722	754	787	732	762	700	673	511	
Interruptible kW Amount =	NA	NA	NA	NA	0	0	0	0	0	NA	NA	NA	
Transmission Voltage Discount =	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Actual 2006 Costs — *Rate change effective January 10, 2006*

GS-3 Rate	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Annual Totals
Customer Charge	$167	$172	$172	$172	$172	$172	$172	$172	$172	$172	$172	$172	$172
Demand Charge	$12,975	$14,230	$13,347	$15,477	$16,438	$16,819	$18,420	$18,211	$18,837	$16,790	$16,847	$13,513	$191,903
Interruptible Credit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Primary Voltage Credit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Energy Charge	$15,133	$14,652	$17,057	$16,204	$20,265	$21,520	$23,799	$25,744	$27,130	$19,702	$17,011	$13,572	$231,789
Reactive Charge	$75	$109	$70	$198	$204	$232	$198	$130	$141	$156	$115	$50	$1,678
Sub Total	**$28,350**	$29,163	$30,646	$32,051	$37,079	$38,743	$42,589	$44,257	$46,280	$36,820	$34,145	$27,307	$427,431
Totalized Meter Charge	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$1,440
Public Agency Discount	($2,835)	($2,928)	($3,077)	($3,217)	($3,720)	($3,886)	($4,271)	($4,438)	($4,640)	($3,694)	($3,427)	($2,743)	($42,875)
City Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEC Tax	$74	$69	$80	$76	$76	$81	$92	$95	$102	$92	$80	$65	$983
Total $	**$25,709**	**$26,424**	**$27,769**	**$29,030**	**$33,556**	**$35,058**	**$38,530**	**$40,034**	**$41,862**	**$33,338**	**$30,919**	**$24,750**	**$386,979**
Cents/kWh	7.66	8.43	7.67	8.36	9.67	9.48	9.19	9.25	9.05	7.96	8.46	8.36	**8.66**

MID Actual TOU Data	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06		kWh Winter	kWh Summer
On Peak kWh	203,311	198,037	240,004	217,947	120,515	126,208	132,454	161,427	165,512	274,541	225,219	165,762	2,230,937	1,524,821	706,116
Partial Peak kWh					99,118	106,026	111,565	125,175	128,324				570,208		570,208
Off Peak kWh	132,508	115,482	121,962	129,129	127,288	137,530	175,091	146,189	168,800	144,417	140,285	130,301	1,668,982	914,084	774,782
Total kWh	**335,819**	**313,519**	**361,966**	**347,076**	**346,921**	**369,764**	**419,110**	**432,791**	**462,636**	**418,958**	**365,504**	**296,063**	4,470,127		
On Peak kW	941	1,002	940	1,090	1,158	1,184	1,297	1,282	1,327	1,182	1,186	952			
Partial Peak kW															
Off Peak kW														kW	kVAR
Peak kW	941	1,002	940	1,090	1,158	1,184	1,297	1,282	1,327	1,182	1,186	952		13,541	7,943

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Appendix – B (2006 Load Data – West Campus)

MODESTO IRRIGATION DISTRICT

ELECTRICITY COST ANALYSIS FOR YOSEMITE COMMUNITY COLLEGE - WEST

2006 Costs on GS-3 Rate

Five Meter Totalized Services

Account 22220013012

Energy Usage Data	**Jan-06**	**Feb-06**	**Mar-06**	**Apr-06**	**May-06**	**Jun-06**	**Jul-06**	**Aug-06**	**Sep-06**	**Oct-06**	**Nov-06**	**Dec-06**	**Annual Totals**
Demand (kW)	848	1,054	979	1,093	1,387	1,419	1,553	1,411	1,526	1,112	1,119	901	
Energy (kWh)	354,430	337,566	385,733	352,757	348,202	388,155	475,949	450,660	467,113	415,604	363,506	325,043	**4,664,718**
LOAD FACTOR %	56.2%	46.0%	53.0%	44.8%	33.7%	38.0%	41.2%	42.9%	42.5%	50.2%	45.1%	48.5%	44.4%
Reactive (kVAR)	399	532	522	607	762	785	877	740	775	606	573	435	
Air Conditioning Tonnage (STEP)	NA	NA	NA	NA	10	10	10	10	10	NA	NA	NA	
Primary Voltage Discount =	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	

Actual 2006 Costs — *Rate change effective January 10, 2006*

GS-3 Rate													
Customer Charge	$45	$45	$172	$172	$172	$172	$172	$172	$172	$172	$172	$172	$172
Demand Charge	$7,289	$9,101	$13,903	$15,516	$19,701	$20,148	$22,051	$20,038	$21,664	$15,790	$15,886	$12,794	$193,882
STEP Program Credit	$0	$0	$0	$0	($20)	($20)	($20)	($20)	($20)	$0	$0	$0	($100)
Energy Charge	$21,360	$20,870	$17,859	$16,250	$20,345	$22,626	$26,858	$26,614	$27,516	$19,366	$16,729	$14,677	$251,070
Reactive Charge	$0	$7	$46	$87	$97	$108	$144	$49	$17	$71	$20	$0	$646
Primary Voltage Credit	($129)	($123)	($201)	($227)	($330)	($419)	($403)	($336)	($369)	($252)	($242)	($195)	($3,226)
Sub Total	**$28,564**	**$29,901**	**$31,779**	**$31,799**	**$39,965**	**$42,615**	**$48,802**	**$46,517**	**$48,980**	**$35,147**	**$32,565**	**$27,448**	$444,083
Totalized Meter Charge	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$1,440
Public Agency Discount	($2,856)	($3,002)	($3,190)	($3,192)	($4,009)	($4,274)	($4,892)	($4,664)	($4,910)	($3,527)	($3,268)	($2,757)	($44,540)
City Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CEC Tax	$78	$74	$85	$78	$77	$85	$105	$99	$103	$91	$80	$72	$1,026
Total $	**$25,906**	**$27,093**	**$28,794**	**$28,805**	**$36,153**	**$38,547**	**$44,134**	**$42,073**	**$44,293**	**$31,832**	**$29,496**	**$24,883**	**$402,009**
Cents/kWh	7.31	8.03	7.46	8.17	10.38	9.93	9.27	9.34	9.48	7.66	8.11	7.66	**8.62**

MID Actual TOU Data	**Jan-06**	**Feb-06**	**Mar-06**	**Apr-06**	**May-06**	**Jun-06**	**Jul-06**	**Aug-06**	**Sep-06**	**Oct-06**	**Nov-06**	**Dec-06**		kWh Winter	kWh Summer
On Peak kWh	197,060	192,573	230,168	203,888	125,943	138,528	152,633	169,469	173,631	257,988	208,735	163,930	2,214,546	1,454,342	760,204
Partial Peak kWh					90,507	101,818	114,602	118,614	123,395				548,936		548,936
Off Peak kWh	157,370	144,993	155,565	148,869	131,752	147,809	208,714	162,577	170,087	157,616	154,771	161,113	1,901,236	1,080,297	853,765
Total kWh	**354,430**	**337,566**	**385,733**	**352,757**	**348,202**	**388,155**	**475,949**	**450,660**	**467,113**	**415,604**	**363,506**	**325,043**	4,664,718		
On Peak kW	848	1,054	979	1,093	1,387	1,419	1,553	1,411	1,526	1,112	1,119	901			
Partial Peak kW															
Off Peak kW														kW	kVAR
Peak kW	848	1,054	979	1,093	1,387	1,419	1,553	1,411	1,526	1,112	1,119	901		14,402	7,612
Primary Meter Usage - TXN76	151	142	142	160	232	295	284	237	260	178	170	137			
Proration Factor	0.177539905	0.134694187	0.144621136	0.146060218	0.167508775	0.20805582	0.183013607	0.168088665	0.170424751	0.159713666	0.152316934	0.15249384			

Note: Rate changed from GS-2 to GS-3 3/1/2006

Prepared By: Mike Zweifel
Major Account Representative
Modesto Irrigitation District
(209) 526-7455
5/24/2007 mikez@mid.org

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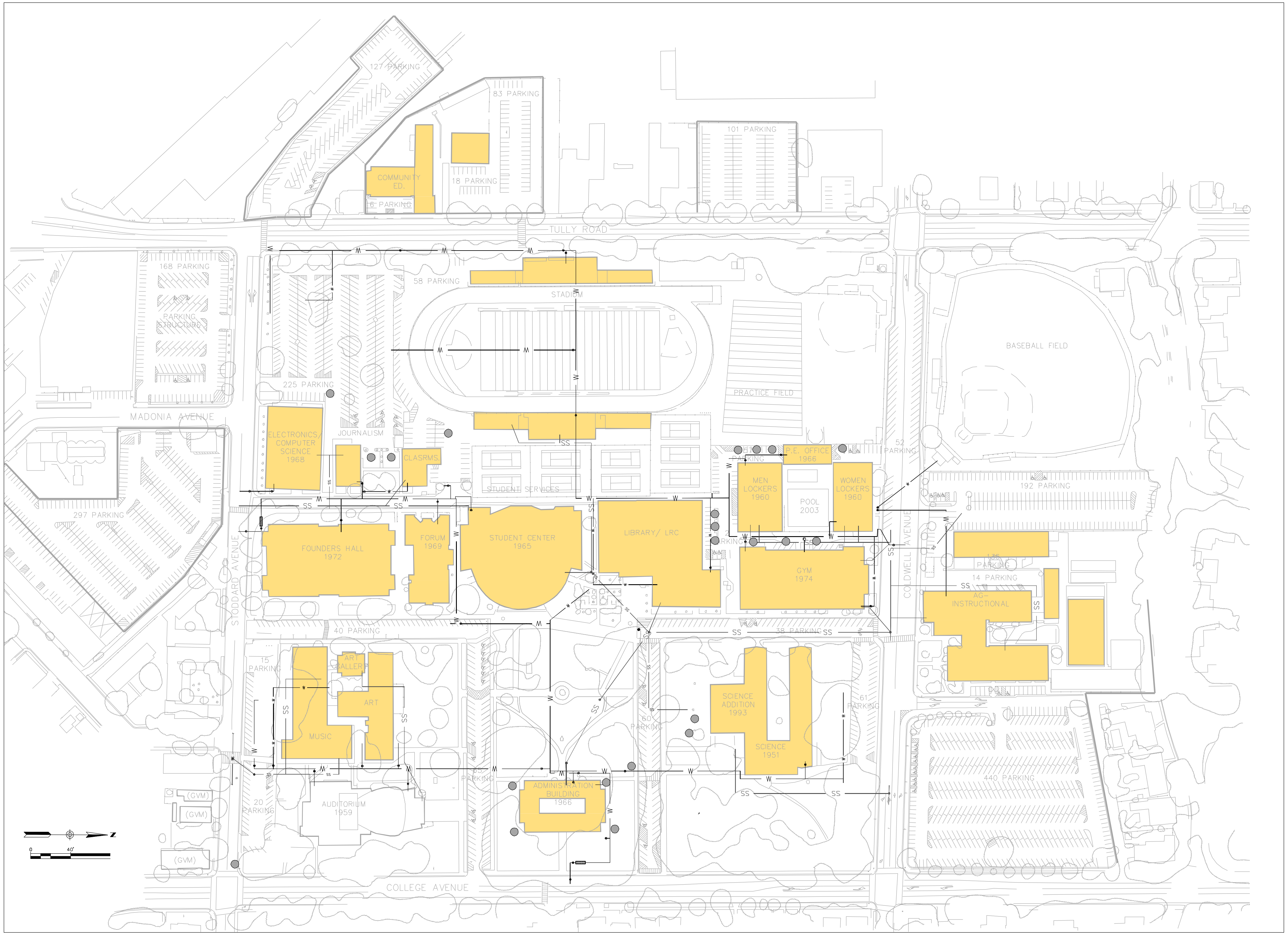
1.2 East Campus



LEGEND

- EXISTING STORM PERCULATION PIT
- EXISTING HYDRANT
- EXISTING WATER VALVE
- —— W —— EXISTING WATER
- —— SS —— EXISTING SEWER

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EAST CAMPUS
SITE PLAN -
PRELIMINARY
SITE LAYOUT
EXISTING UTILITIES

Version Date: Version time:

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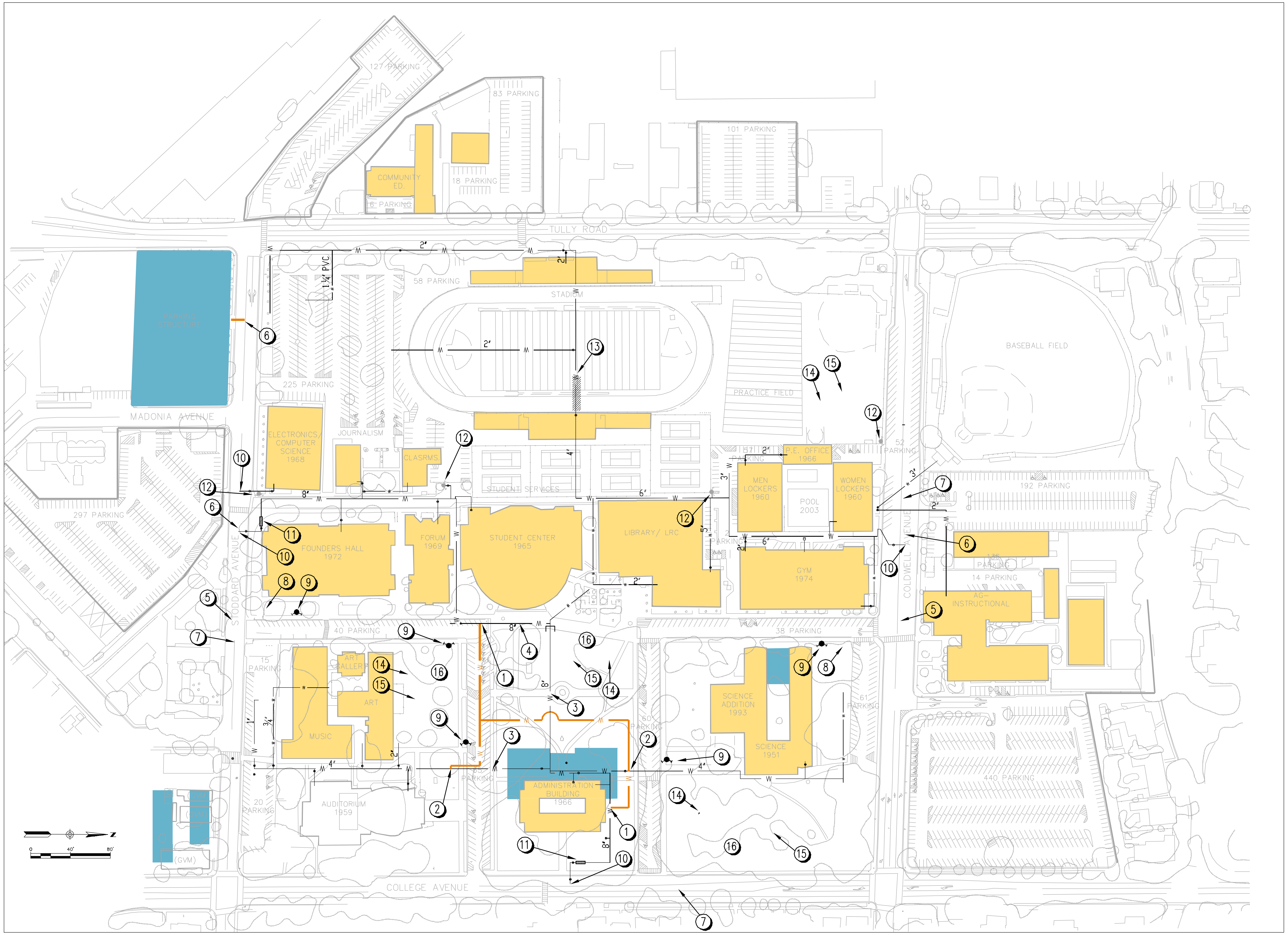

1. CONNECT INTO EXISTING 8" MAIN SYSTEM (INCREMENT I)
2. CONNECT INTO EXISTING 4" MAIN SYSTEM (INCREMENT I)
3. EXISTING LINE TO BE ABANDONED
4. EXISTING LINE TO REMAIN FOR INCREMENT I CONSTRUCTION
5. FUTURE FIRE SUPPRESSION POINT OF CONNECTION TO CITY'S WATER MAIN
6. FUTURE DOMESTIC WATER POINT OF CONNECTION TO CITY'S WATER MAIN
7. FUTURE IRRIGATION POINT OF CONNECTION TO CITY'S WATER MAIN
8. FUTURE BACKFLOW PREVENTER
9. FUTURE FIRE HYDRANT
10. EXISTING POC TO CITY'S WATER MAIN
11. EXISTING 8" BACKFLOW DEVICE
12. REMOVE & REPLACE HYDRANT
13. FUTURE IRRIGATION POC TO EXISTING WATER MAIN
14. IRRIGATION SWING CHECK VALVE
15. SEE STORM PLAN (C3)
16. TO IRRIGATION SYSTEM

INCREMENT I

RECOMMENDED UTILITY IMPROVEMENTS DURING INCREMENT I CONSTRUCTION FOR WATER DISTRIBUTION IS TO REROUTE WATER MAIN OUTSIDE PROPOSED ADMINISTRATION BUILDING IMPROVEMENTS. ALSO EXTEND WATER MAIN NORTHERLY TO TIE INTO EXISTING SYSTEM CREATING A LOOPED WATER DISTRIBUTION SYSTEM.

FUTURE UTILITY CONSTRUCTION

SUGGESTED UTILITY CONSTRUCTION FOR FUTURE WATER DISTRIBUTION IS SEPARATE FIRE SUPPRESSION, DOMESTIC, & IRRIGATION SYSTEM.

LEGEND

- INCREMENT 1 CONSTRUCTION
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED IRRIGATION – FOR FUTURE CONSTRUCTION
- PROPOSED FIRE SUPPRESSION SYSTEM – FOR FUTURE CONSTRUCTION
- PROPOSED WATER MAIN – FOR FUTURE CONSTRUCTION
- NEW WATER MAIN – INCREMENT ONE CONSTRUCTION
- EXISTING WATER MAIN

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EAST CAMPUS
SITE PLAN -
PRELIMINARY
SITE LAYOUT
WATER INCREMENT 1

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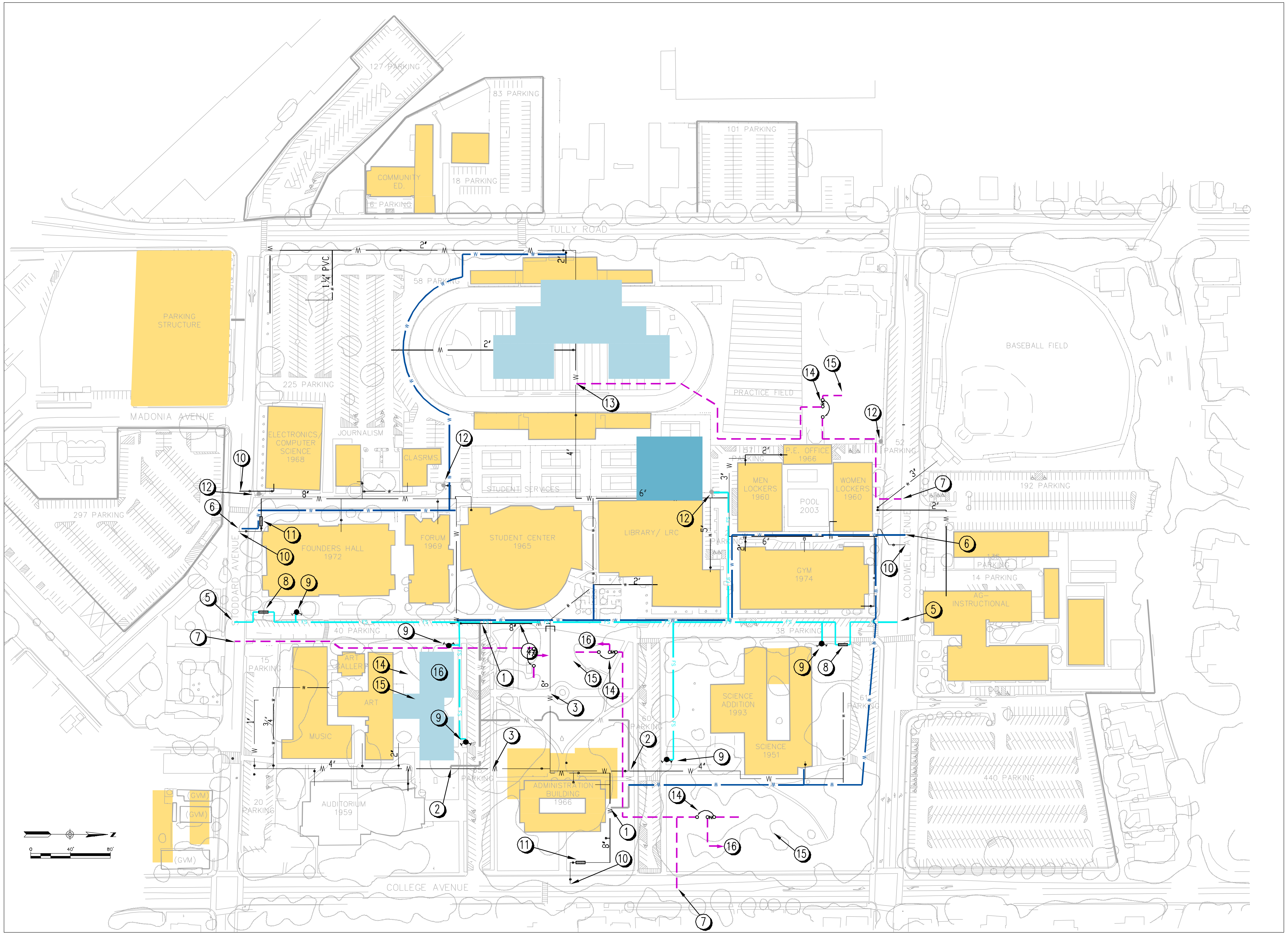

1. CONNECT INTO EXISTING 8" MAIN SYSTEM (INCREMENT 1)
2. CONNECT INTO EXISTING 4" MAIN SYSTEM (INCREMENT 1)
3. EXISTING LINE TO BE ABANDONED
4. EXISTING LINE TO REMAIN FOR INCREMENT 1 CONSTRUCTION
5. FUTURE FIRE SUPPRESSION POINT OF CONNECTION TO CITY'S WATER MAIN
6. FUTURE DOMESTIC WATER POINT OF CONNECTION TO CITY'S WATER MAIN
7. FUTURE IRRIGATION POINT OF CONNECTION TO CITY'S WATER MAIN
8. FUTURE BACKFLOW PREVENTER
9. FUTURE FIRE HYDRANT
10. EXISTING POC TO CITY'S WATER MAIN
11. EXISTING 8" BACKFLOW DEVICE
12. REMOVE & REPLACE HYDRANT
13. FUTURE IRRIGATION POC TO EXISTING WATER MAIN
14. IRRIGATION SWING CHECK VALVE
15. SEE STORM PLAN (C3)
16. TO IRRIGATION SYSTEM

INCREMENT 1

RECOMMENDED UTILITY IMPROVEMENTS DURING INCREMENT 1 CONSTRUCTION FOR WATER DISTRIBUTION IS TO REROUTE WATER MAIN OUTSIDE PROPOSED ADMINISTRATION BUILDING IMPROVEMENTS. ALSO EXTEND WATER MAIN NORTHERLY TO TIE INTO EXISTING SYSTEM CREATING A LOOPED WATER DISTRIBUTION SYSTEM.

FUTURE UTILITY CONSTRUCTION

SUGGESTED UTILITY CONSTRUCTION FOR FUTURE WATER DISTRIBUTION IS SEPARATE FIRE SUPPRESSION, DOMESTIC, & IRRIGATION SYSTEM.

LEGEND

INCREMENT 2	INCREMENT 3	
		NEW BUILDINGS
		EXISTING HYDRANT
		EXISTING WATER VALVE
		PROPOSED IRRIGATION – FOR FUTURE CONSTRUCTION
		PROPOSED FIRE SUPPRESSION SYSTEM – FOR FUTURE CONSTRUCTION
		PROPOSED WATER MAIN – FOR FUTURE CONSTRUCTION
		NEW WATER MAIN – INCREMENT ONE CONSTRUCTION
		EXISTING WATER MAIN

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EAST CAMPUS
SITE PLAN -
PRELIMINARY
SITE LAYOUT
WATER INCREMENT 2

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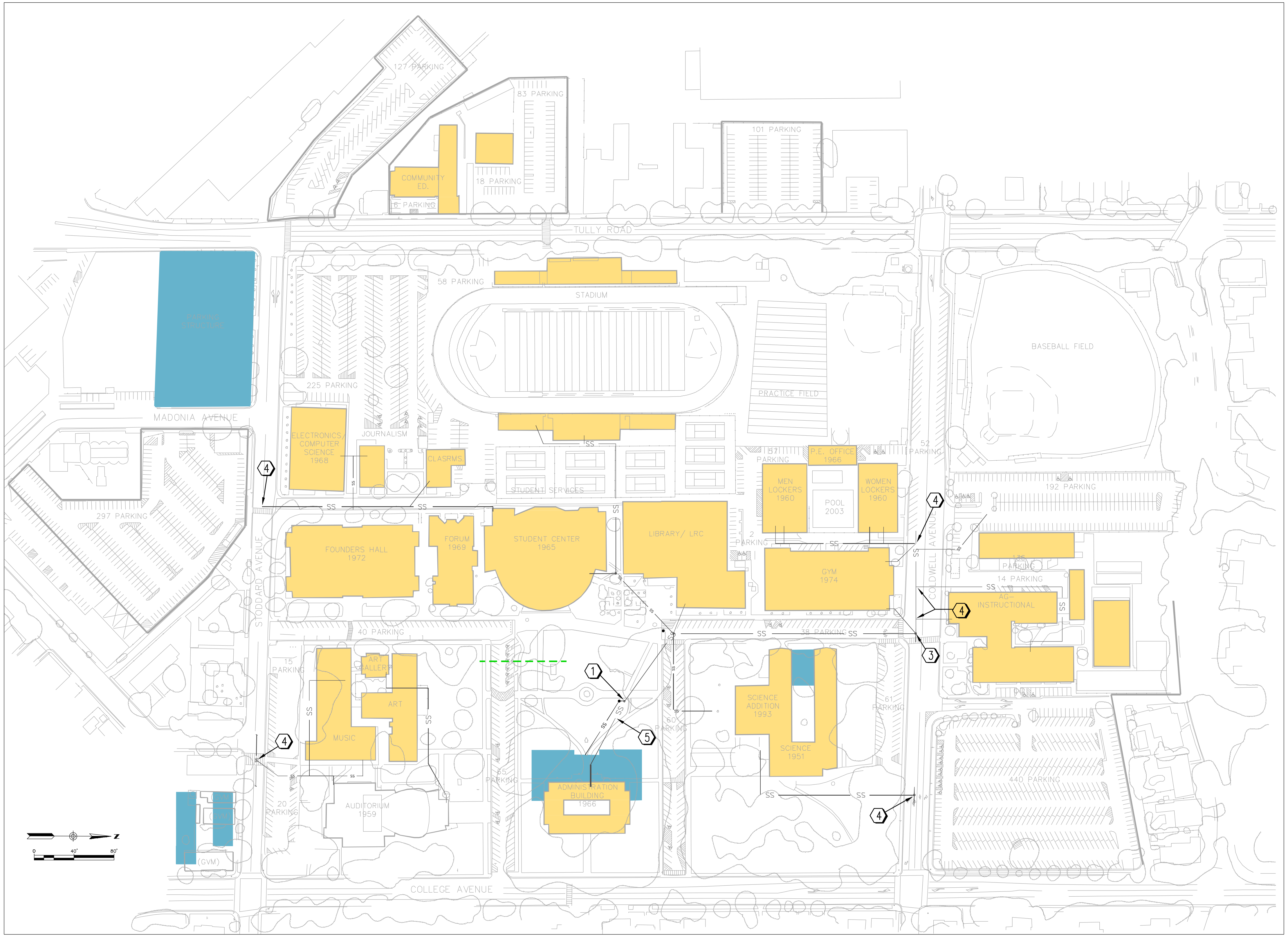

1. POC TO EXISTING SSMH FOR INCREMENT I CONSTRUCTION
2. FUTURE SEWER
3. FUTURE SEWER POC TO CITY'S MAIN
4. EXISTING POC TO CITY'S SANITARY MAIN
5. ABANDON EXISTING SANITARY

LEGEND

(blue box)	INCREMENT 1 CONSTRUCTION
—SS—⊙—SS—	SEWER MANHOLE
—— SS ——	EXISTING SANITARY SEWER
—— SS —— (red)	NEW SEWER – INCREMENT 1 CONSTRUCTION
- - - - (orange)	PROPOSED SEWER – FUTURE CONSTRUCTION

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EAST CAMPUS SITE PLAN - PRELIMINARY SITE LAYOUT SEWER INCREMENT 1

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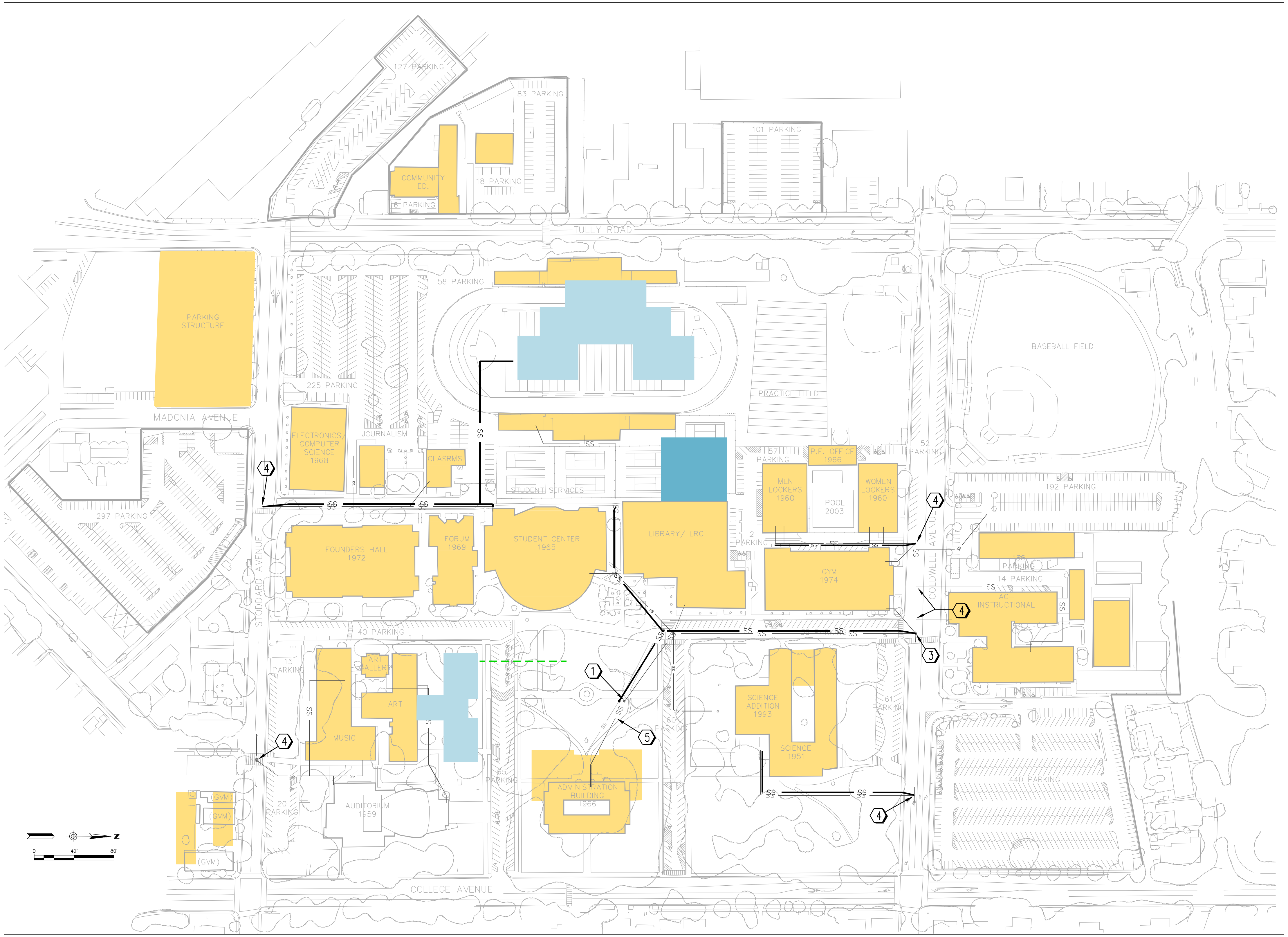

1. POC TO EXISTING SSMH FOR INCREMENT I CONSTRUCTION
2. FUTURE SEWER
3. FUTURE SEWER POC TO CITY'S MAIN
4. EXISTING POC TO CITY'S SANITARY MAIN
5. ABANDON EXISTING SANITARY

LEGEND

INCREMENT 2	INCREMENT 3	
		NEW BUILDINGS
—SS—●—SS—		SEWER MANHOLE
—— SS ——		EXISTING SANITARY SEWER
—— SS ——		NEW SEWER – INCREMENT 1 CONSTRUCTION
- - - - -		PROPOSED SEWER – FUTURE CONSTRUCTION

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EAST CAMPUS
SITE PLAN -
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SITE LAYOUT
SEWER INCREMENT 2

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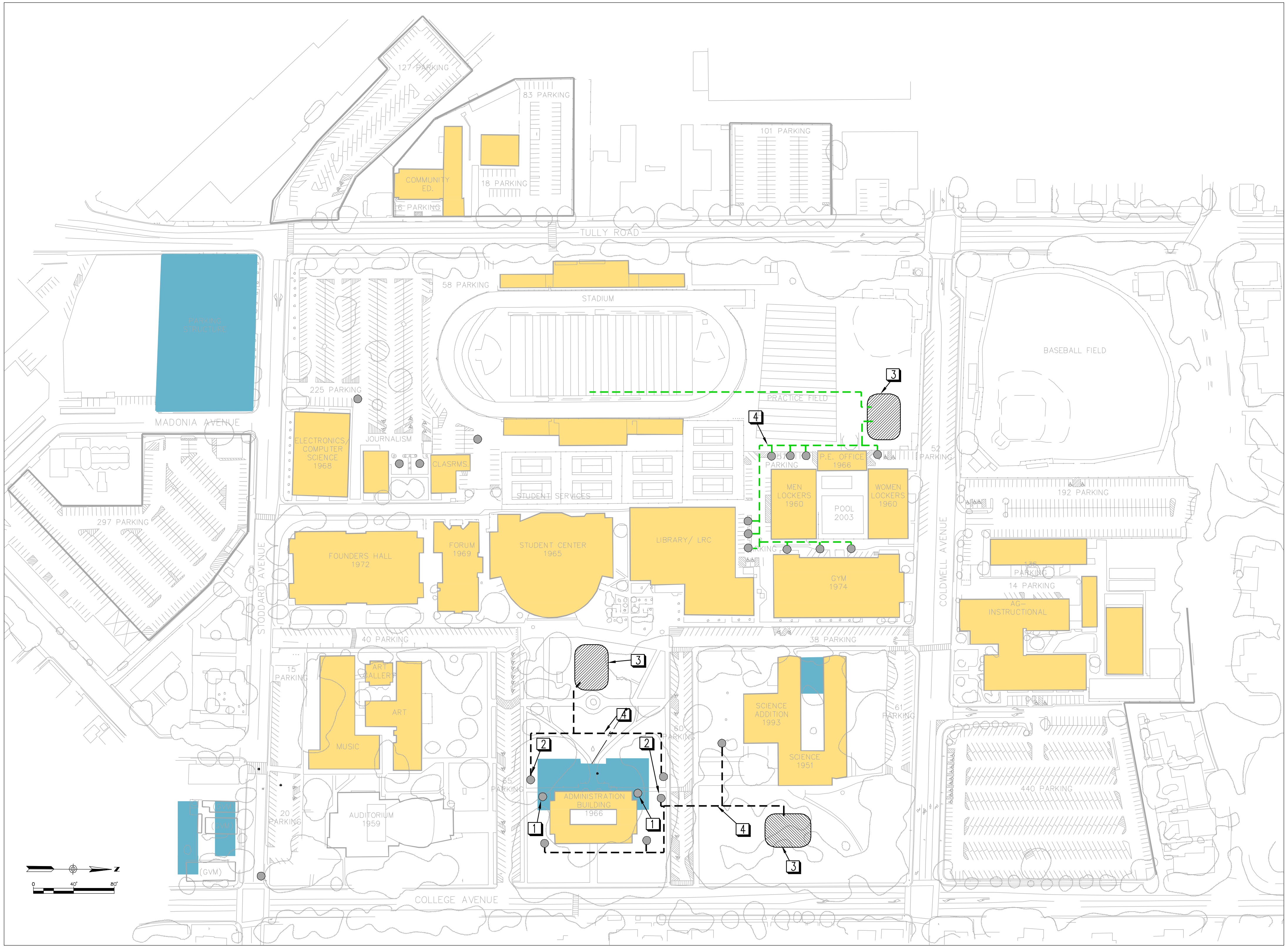

1 ABANDON (E) PERC. PIT & REROUTE (E) LINES TO NEW PERC. PITS

2 NEW PERCOLATION PIT

3 FUTURE UNDERGROUND DETENTION BASIN LOCATION

4 FUTURE - REROUTE STORM LINES FROM PERC PITS TO PROPOSED DETENTION FACILITY

INCREMENT I UTILITY CONSTRUCTION

RECOMMENDED UTILITY CONSTRUCTION FOR STORM DRAINAGE IS ABANDON PERCOLATION PITS BY NEW ADMINISTRATION BUILDING AND ADD NEW PERCOLATION PITS OUTSIDE (N) BUILDING LOCATION (SEE PLAN).

GENERAL STORM NOTE
FUTURE STORM LINES ARE SCHEMATIC ONLY. LOCATIONS OF PERCULATION PITS HAVE BEEN FIELD VERIFIED, HOWEVER, SOME MAY BE MISSING.

FUTURE UTILITY CONSTRUCTION

SUGGESTED UTILITY CONSTRUCTION FOR STORM DRAINAGE IS TO ABANDON EXISTING PERCOLATION PITS AND REROUTE CAMPUS DRAINAGE TO UNDERGROUND DETENTION BASIN & USE STORM WATER FOR CAMPUS IRRIGATION

LEGEND

STORM PERCOLATION PIT

PROPOSED STORM LINES – FOR FUTURE CONSTRUCTION

INCREMENT 1 CONSTRUCTION

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EAST CAMPUS
SITE PLAN -
PRELIMINARY
SITE LAYOUT
STORM INCREMENT 1

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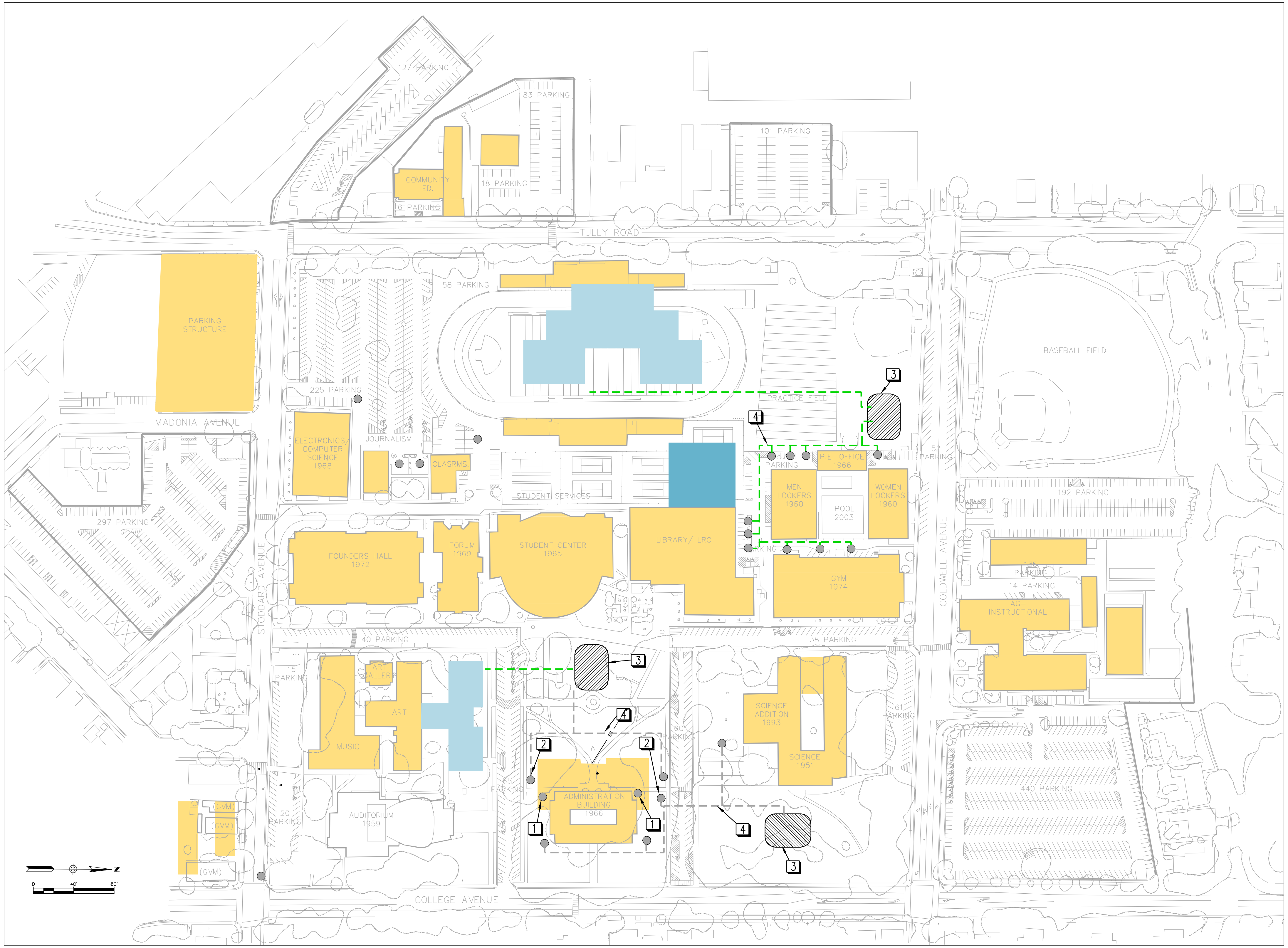

1. ABANDON (E) PERC. PIT & REROUTE (E) LINES TO NEW PERC. PITS
2. NEW PERCOLATION PIT
3. FUTURE UNDERGROUND DETENTION BASIN LOCATION
4. FUTURE - REROUTE STORM LINES FROM PERC PITS TO PROPOSED DETENTION FACILITY

INCREMENT I UTILITY CONSTRUCTION

RECOMMENDED UTILITY CONSTRUCTION FOR STORM DRAINAGE IS ABANDON PERCOLATION PITS BY NEW ADMINISTRATION BUILDING AND ADD NEW PERCOLATION PITS OUTSIDE (N) BUILDING LOCATION (SEE PLAN).

FUTURE UTILITY CONSTRUCTION

SUGGESTED UTILITY CONSTRUCTION FOR STORM DRAINAGE IS TO ABANDON EXISTING PERCOLATION PITS AND REROUTE CAMPUS DRAINAGE TO UNDERGROUND DETENTION BASIN & USE STORM WATER FOR CAMPUS IRRIGATION

GENERAL STORM NOTE
FUTURE STORM LINES ARE SCHEMATIC ONLY. LOCATIONS OF PERCOLATION PITS HAVE BEEN FIELD VERIFIED, HOWEVER, SOME MAY BE MISSING.

LEGEND

- STORM PERCOLATION PIT
- PROPOSED STORM LINES – FOR FUTURE CONSTRUCTION
- INCREMENT 2 / INCREMENT 3 — NEW BUILDINGS

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EAST CAMPUS
SITE PLAN -
PRELIMINARY
SITE LAYOUT
STORM INCREMENT 2

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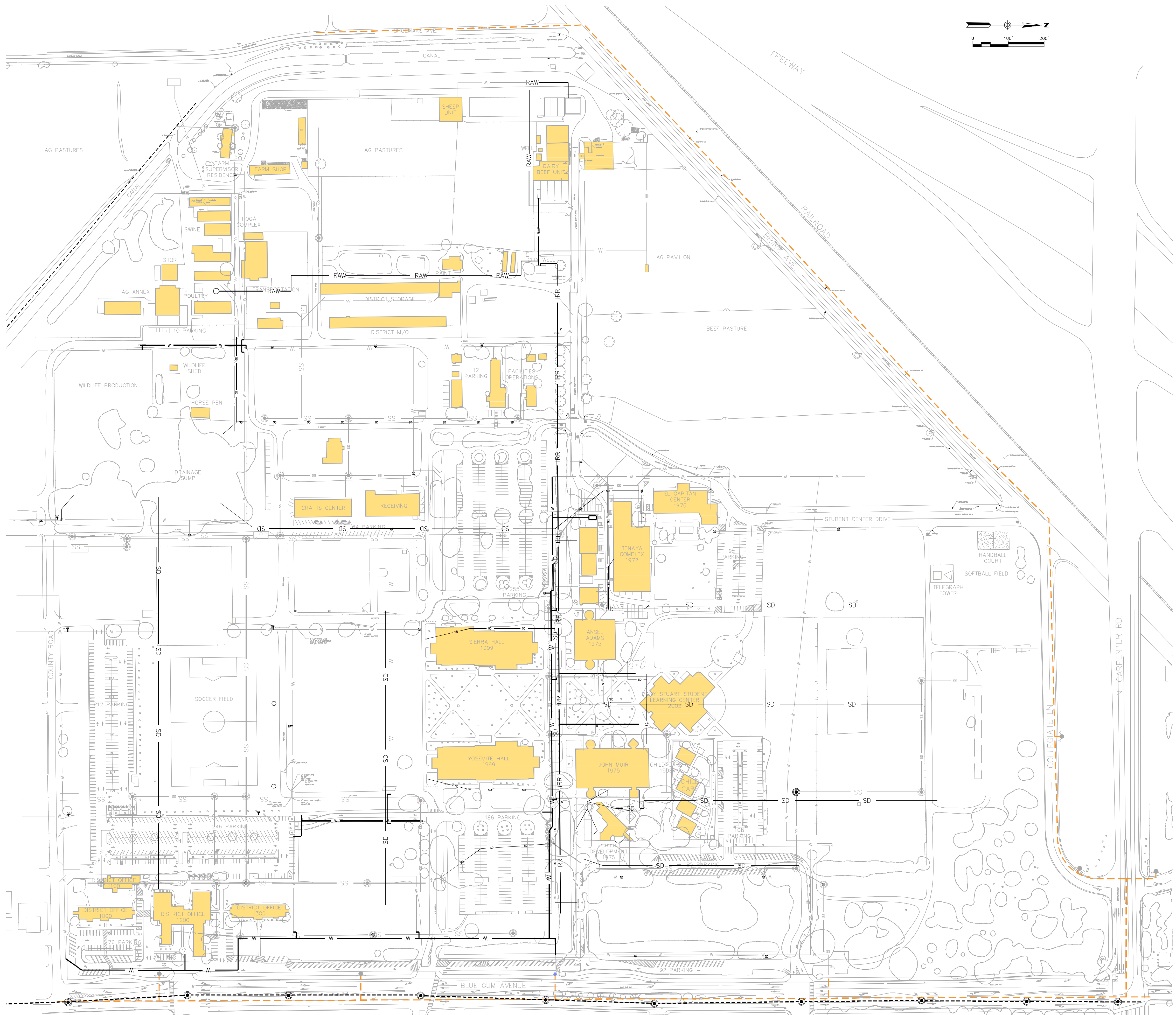
1.3 West Campus



EXISTING

- W — WATER MAIN POST 2000
- IRR — IRRIGATION
- SS — SEWER
- RAW — RAW WATER
- W — WATER MAIN PRE 2000
- CITY'S EXISTING WATER MAIN

0 100' 200'

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WEST CAMPUS SITE PLAN - PRELIMINARY SITE LAYOUT EXISTING UTILITIES

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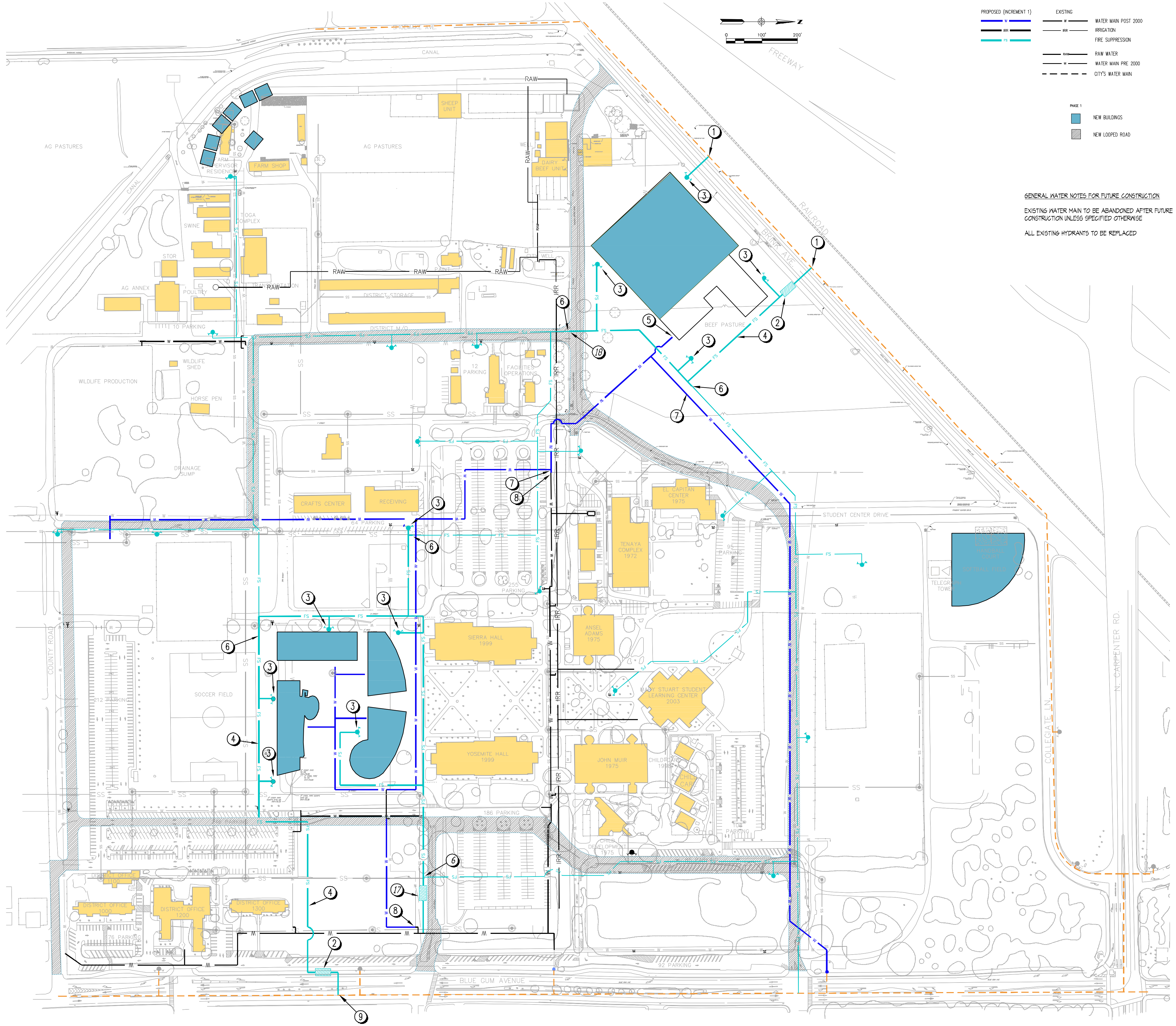

N

0 100' 200'

PROPOSED (INCREMENT 1) | EXISTING
WATER MAIN POST 2000
IRRIGATION
FIRE SUPPRESSION
RAW WATER
WATER MAIN PRE 2000
CITY'S WATER MAIN

PHASE 1
NEW BUILDINGS
NEW LOOPED ROAD

GENERAL WATER NOTES FOR FUTURE CONSTRUCTION

EXISTING WATER MAIN TO BE ABANDONED AFTER FUTURE CONSTRUCTION UNLESS SPECIFIED OTHERWISE

ALL EXISTING HYDRANTS TO BE REPLACED

1. P.O.C. TO CITY'S EXISTING 12" WATER MAIN
2. NEW BACKFLOW PREVENTER
3. INCREMENT I HYDRANT
4. NEW 12" PVC C900 FIRE SUPPRESSION MAIN
5. P.O.C. TO NEW BUILDING
6. FUTURE P.O.C. TO NEW FS MAIN
7. FUTURE P.O.C. TO NEW 4" DOMESTIC MAIN
8. P.O.C. TO EXISTING 8" WATER MAIN
9. NEW P.O.C. TO CITY'S EXISTING 10" WATER MAIN
10. FUTURE 12" PVC C900 FIRE SUPPRESSION MAIN
11. FUTURE P.O.C. TO CITY'S EXISTING 10" WATER MAIN
12. P.O.C. TO EXISTING WATER MAIN
13. FUTURE P.O.C. TO NEW WATER LINE & DISCONNECT FROM EXISTING MAIN
14. INCREMENT II HYDRANT
15. DOWNSIZE (E) METER FOR FUTURE DOMESTIC SYSTEM
16. EXISTING 8" WATER MAIN TO REMAIN. TO BE USED FOR FUTURE DOMESTIC SYSTEM
17. NEW TEMPORARY BACKFLOW PREVENTER TO BE REMOVED AFTER FUTURE FIRE SUPPRESSION SYSTEM IS CONSTRUCTED
18. P.O.C. TO EXISTING WATER MAIN & DISCONNECT AFTER FUTURE FIRE SUPPRESSION SYSTEM IS CONSTRUCTED

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WEST CAMPUS SITE PLAN - PRELIMINARY SITE LAYOUT WATER INCREMENT 1

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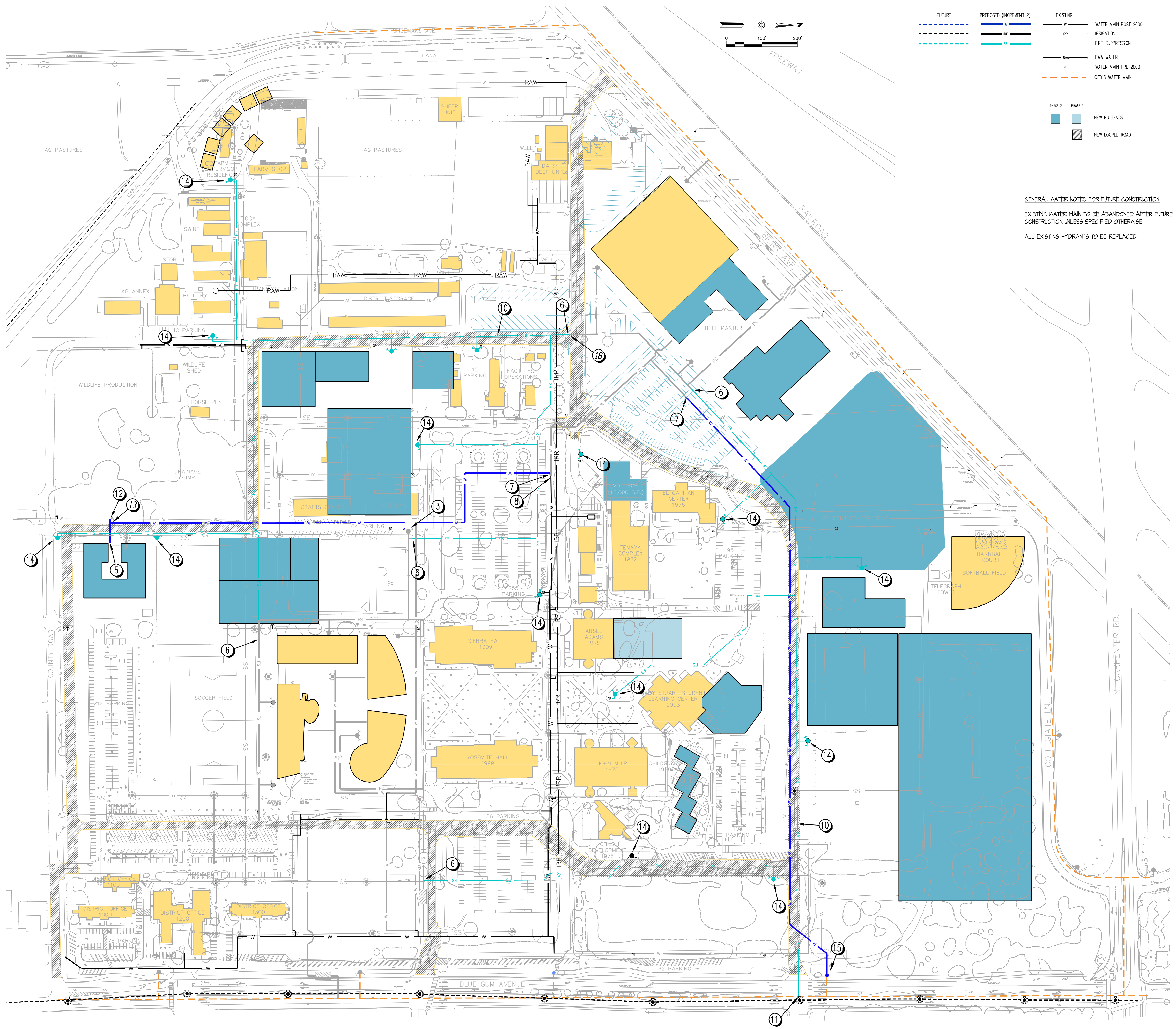

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2. NEW BACKFLOW PREVENTER
3. INCREMENT I HYDRANT
4. NEW 12" PVC C900 FIRE SUPPRESSION MAIN
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ALL EXISTING HYDRANTS TO BE REPLACED

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WEST CAMPUS SITE PLAN - PRELIMINARY SITE LAYOUT WATER INCREMENT 2

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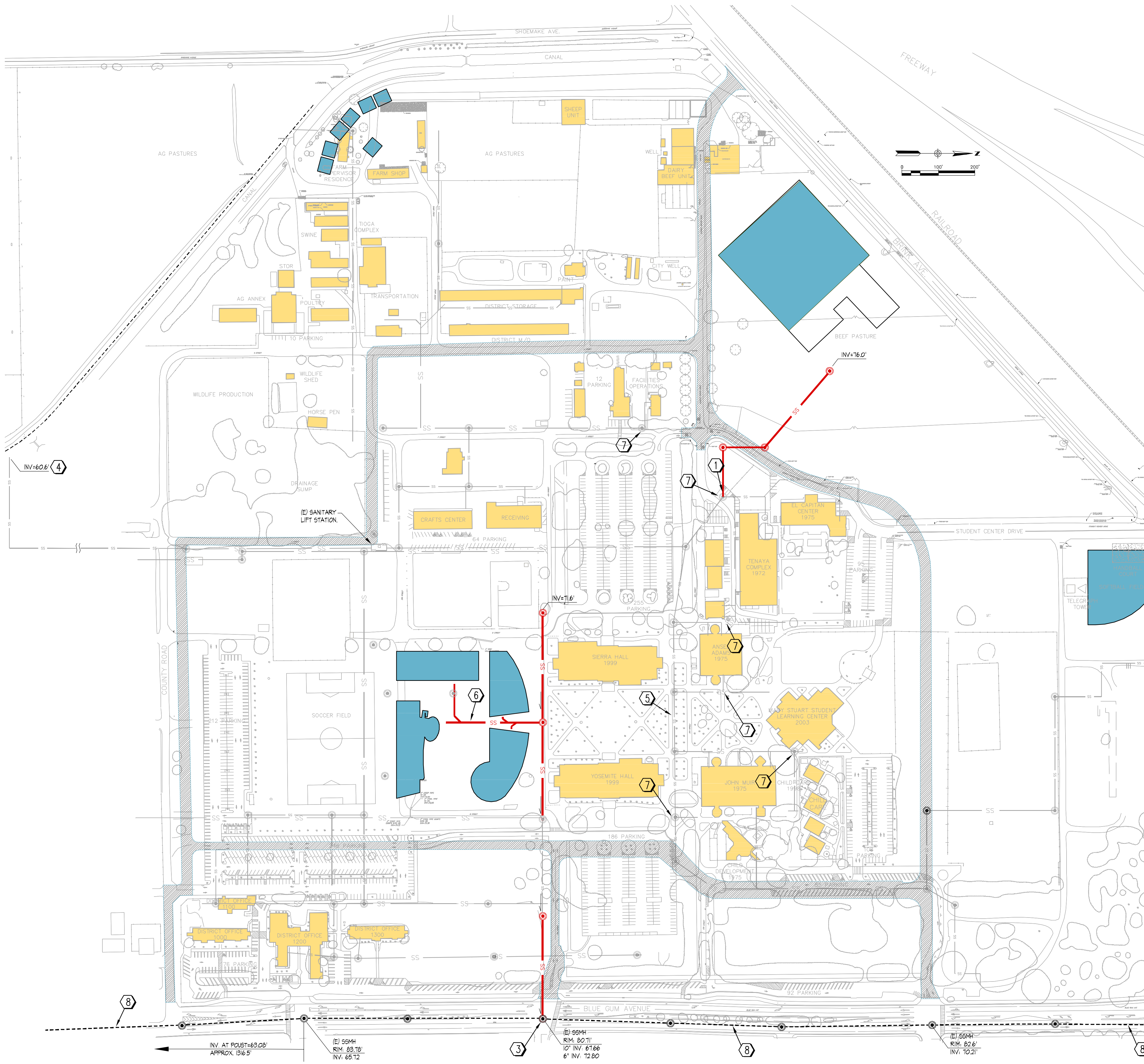

PROPOSED SEWER - FUTURE CONSTRUCTION
NEW SEWER - PHASE 1
EXISTING SEWER LINE
CITY'S EXISTING SEWER MAIN

PHASE 1
NEW BUILDINGS
NEW LOOPED ROAD

0 100' 200'

1. POC TO EXISTING SSMH FOR INCREMENT I CONSTRUCTION
2. FUTURE SEWER
3. NEW SEWER POC TO CITY'S EXISTING SSMH
4. EXISTING POC TO CITY'S SANITARY MAIN
5. ABANDON EXISTING SANITARY AFTER FUTURE FUTURE SANITARY CONSTRUCTION
6. NEW SEWER LATERAL
7. FUTURE P.O.C. TO EXISTING SSMH
8. EXISTING 10" VCP SS MAIN

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WEST CAMPUS SITE PLAN - PRELIMINARY SITE LAYOUT SEWER INCREMENT 1

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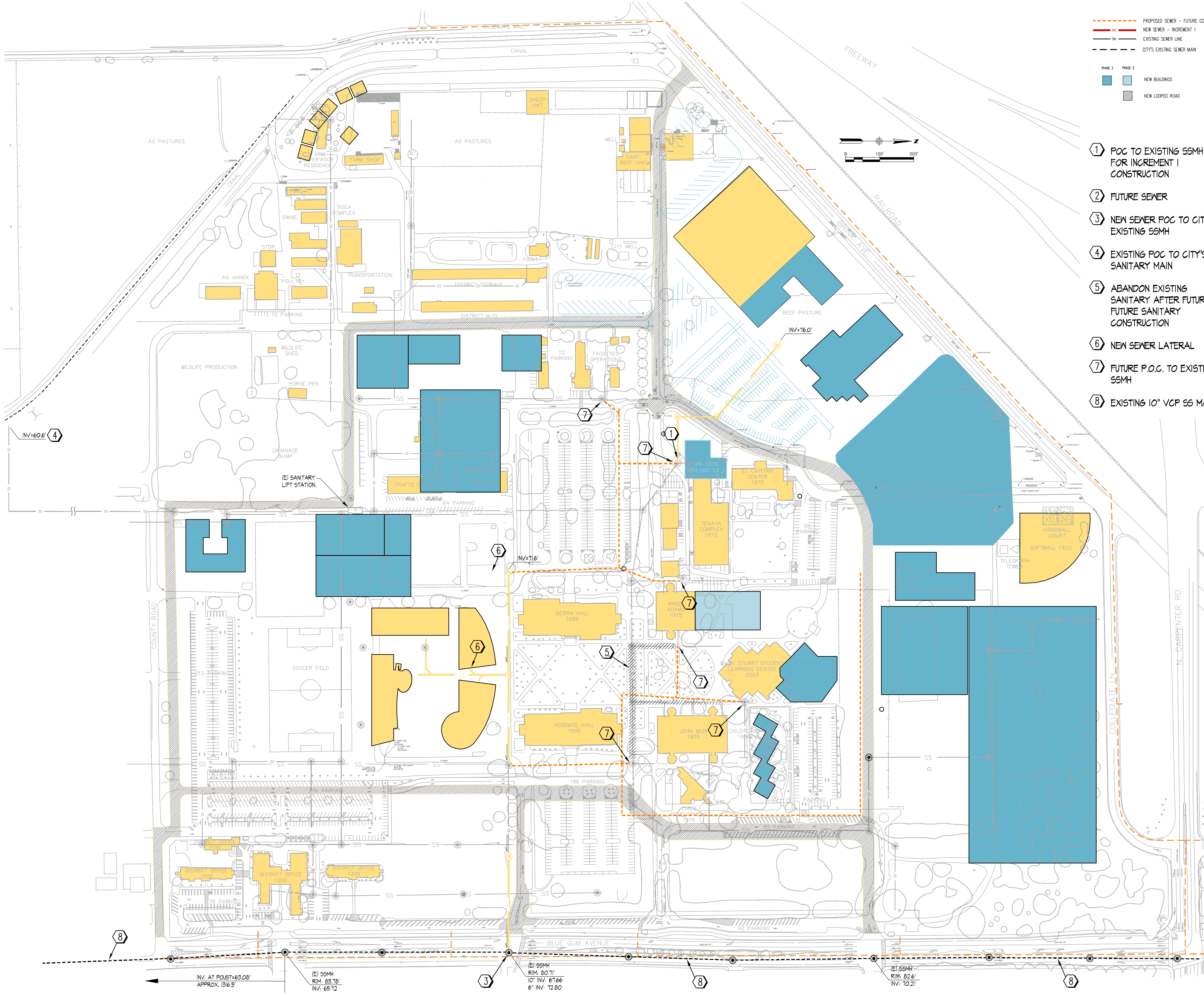

PROPOSED SEWER - FUTURE CONSTRUCTION
NEW SEWER - INCREMENT 1
EXISTING SEWER LINE
CITY'S EXISTING SEWER MAIN

PHASE 2 / PHASE 3 — NEW BUILDINGS
NEW LOOPED ROAD

1. POC TO EXISTING SSMH FOR INCREMENT I CONSTRUCTION
2. FUTURE SEWER
3. NEW SEWER POC TO CITY'S EXISTING SSMH
4. EXISTING POC TO CITY'S SANITARY MAIN
5. ABANDON EXISTING SANITARY AFTER FUTURE FUTURE SANITARY CONSTRUCTION
6. NEW SEWER LATERAL
7. FUTURE P.O.C. TO EXISTING SSMH
8. EXISTING 10" VCP SS MAIN

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WEST CAMPUS SITE PLAN - PRELIMINARY SITE LAYOUT SEWER INCREMENT 2

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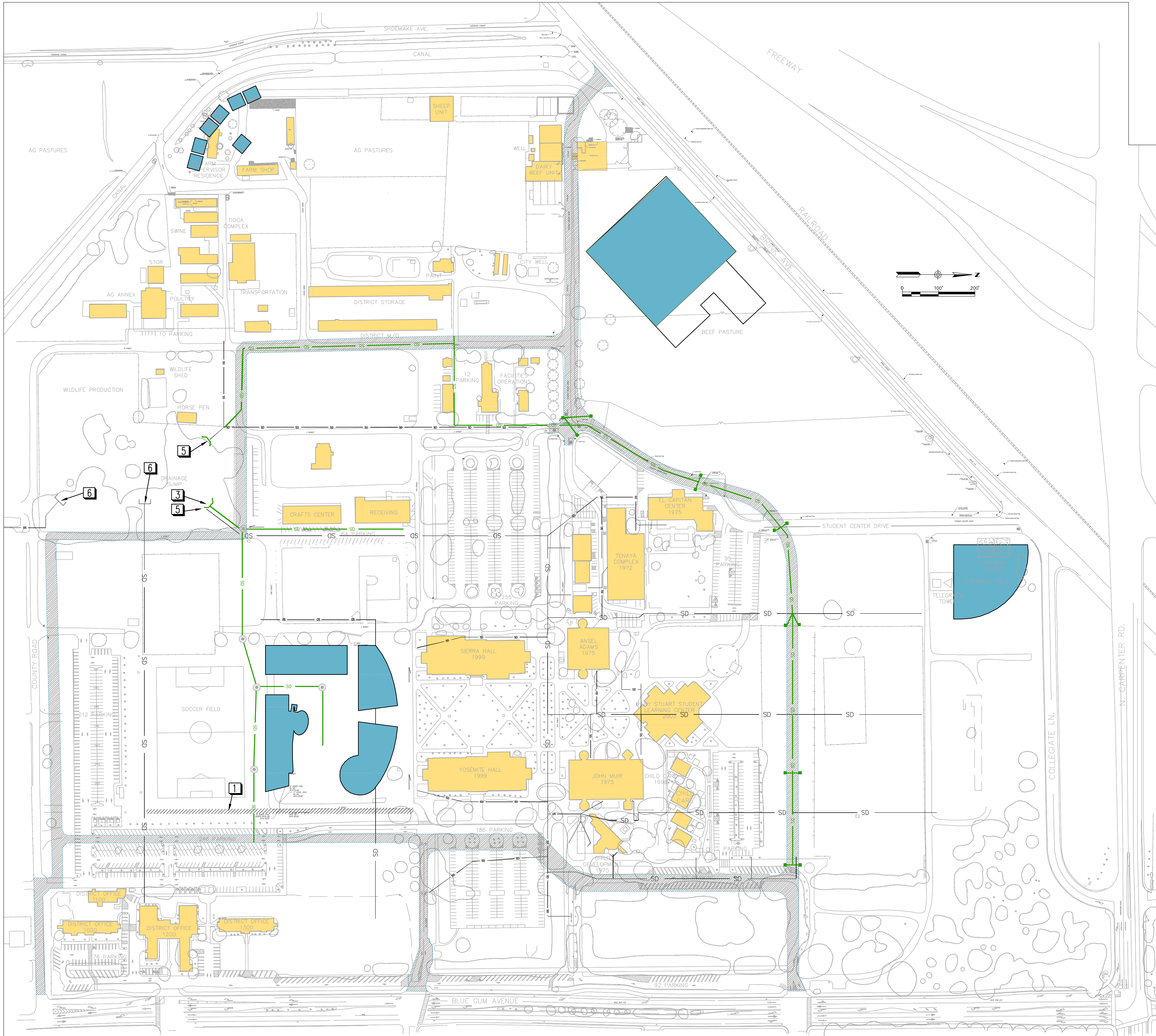

PROPOSED STORM - FUTURE CONSTRUCTION
NEW STORM - INCREMENT 1
EXISTING STORM LINE
NEW BUILDINGS
NEW LOOPED ROAD

1. EXISTING BYPASSES DETENTION/ RETENTION FACILITY. NOT RECOMMENDED FOR FUTURE
2. FUTURE P.O.C. TO EXISTING STORM DRAIN
3. NEW CONCRETE HEAD WALL
4. FUTURE P.O.C. TO NEW SDMH
5. INFLOW
6. OUTFLOW

0 100' 200'

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WEST CAMPUS
SITE PLAN -
PRELIMINARY
SITE LAYOUT STORM
INCREMENT 2

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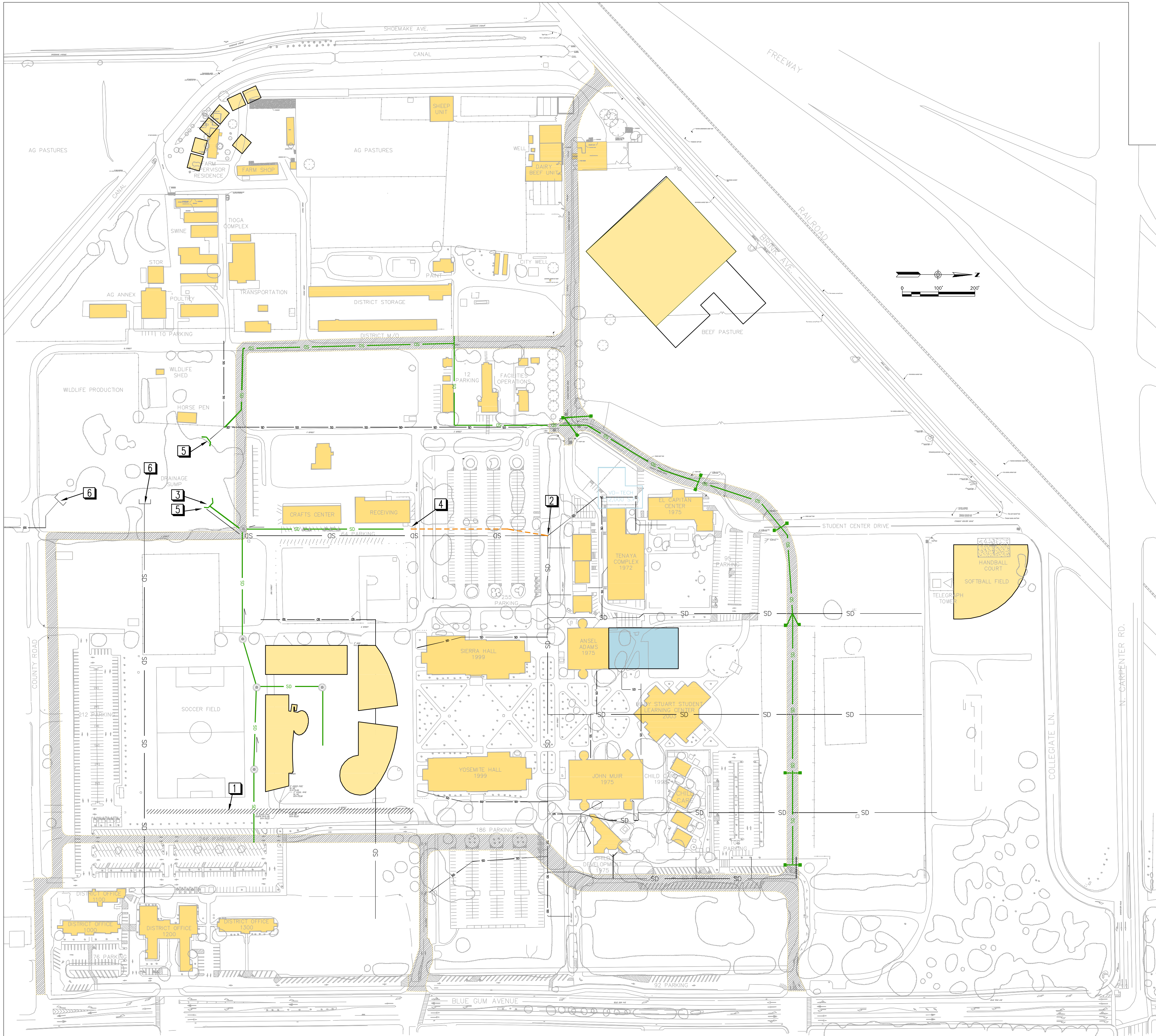

PROPOSED STORM – FUTURE CONSTRUCTION
NEW STORM – INCREMENT 1
EXISTING STORM LINE

PHASE 2 PHASE 3
NEW BUILDINGS
NEW LOOPED ROAD

1. EXISTING BYPASSES DETENTION/ RETENTION FACILITY. NOT RECOMMENDED FOR FUTURE
2. FUTURE P.O.C. TO EXISTING STORM DRAIN
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WEST CAMPUS SITE PLAN - PRELIMINARY SITE LAYOUT STORM INCREMENT 2 & 3

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2 A Guide to Understanding and Using the State Five-Year Construction Plan

A GUIDE

Understanding and Using The State Five-Year Construction Plan

(5YCP)

Prepared by Merle E. Cannon, 2510 Encinal Avenue, Alameda, CA 94501-4626

Telephone: 510-523-8070 Fax: 510-522-2397 eMail: cannon100@aol.com

A Guide to Understanding and Using The State Five year Construction Plan (5YCP)

What is the Five Year Construction Plan?

The Five Year Construction Plan is a tool available to a District for measuring the utilization of facilities. Simply put, it compares the capacity of facilities to the demands created by the actual and projected enrollment of a college or center.

In addition to being a useful tool for the District, the Five Year Construction Plan communicates to the State legislature, through control agencies, the capital outlay needs of a community college district over a five year period. It also serves as the foundation for capital outlay funding applications by delineating the capacity to load ratios for five categories of space defined in Title V of the California Administrative Code: lecture, laboratory, office, library, and audio-visual/TV (media).

Capacity to Load Ratio

This ratio, expressed as a percent, is the product of the computed capacity of the category of space divided by the actual (or projected) usage. Ratios above 100% indicate an excess of space; ratios below 100% indicate a deficiency of space.

Submission of the Five Year Construction Plan is a mandatory requirement (Ed Code Section 81,800, et. al.). It is submitted to the State Chancellor's Office of the California Community Colleges each year.

The plan essentially merges five components into a "logical" and measurable statement of the District's projected facility needs:

- Educational plan statements
- Inventory of existing space
- Enrollments
- FTE instructional staff
- Proposed facility project

1 EDUCATIONAL PLAN STATEMENTS

The educational plan statements define program requirements and directions for the district and for each of the campuses and centers; the statements in the Five Year Plan are much like executive summaries of the educational master plans and usually include the following:

A statement of PURPOSE

The CONTEXT OF THE COMMUNITY SERVED

Illustrative questions: Populations served?
Demographics changing?
Business community changing?
Emerging underserved populations?
Other unique situations?

The EDUCATIONAL APPROACH identifying the long range goals and the short term objectives (along with a short phrase explaining why)

Illustrative questions: New programs with timeline?
Terminating programs with timeline?
Changes in student services?
Changes in methods of instruction?
Other needs (library, AV, auxiliary services)?

Other statements concerning issues related specifically to FACILITY CONDITIONS or CIRCUMSTANCES that inhibit access or instruction in the manner in which it would best serve student learning

examples: The existing electrical systems cannot support the need for the implementation of computer assisted learning.

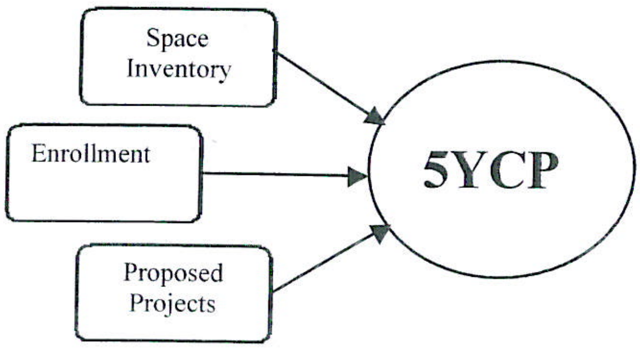
The mechanical systems are insufficient for the addition of needed biology and chemistry labs.

This statement is followed by an **energy plan statement** for the district or each site that describes the steps the district is taking to better use its energy resources.

2 THE QUANTITATIVE COMPONENTS

The plan consists of three principal quantitative components: space inventory, enrollment and proposed projects.

Quantitative Components of the Five Year Construction Plan (5YCP)



The space inventory, which is updated October 1 of each year by each community college district, provides a room summary for each building plus identifying quantitative data related to each room and the building. The reports from the space inventory database provide detail on the age, condition and gross square feet of each building along with assignable square feet, number of stations and usage of the rooms within the building. The usage elements provide a basis of sorting by room type (lecture, lab, office, etc.) and TOPs/CSS (taxonomy of programs/classification of service and support).

Selected Room Use Categories

110	Classroom	310	Office
115	Classroom Service	315	Office Service
210	Class Laboratory	350	Conference Room
215	Class Laboratory Service	410	Reading/Study Room
220	Special Class Laboratory	420	Stack
225	Special Class Lab Service	430	Open Stack Reading Room
230	Individual Study Laboratory	440	Processing Room
235	Individual Study Lab Service	455	Study Service
250	Non Clas Laboratory	530	Audio/Visual, Radio, TV
255	Non Class Lab Service	535	Audio/Visual, Radio, TV Service

Space Inventory Handbook, Chancellor's Office, California Community Colleges, 1994

Enrollment and WSCH (weekly student contact hour) forecasts are prepared annually by the Research and Analysis Unit of the Chancellor's Office of the California Community Colleges. These 15-year forecasts must be used in the preparation of the Five Year Construction Plan.

The forecasts are prepared using an econometric model in which enrollment is determined by the following independent variables:

1. real (price-adjusted) cost facing students, including fees and other direct costs
2. real operating budget expenditures (current expense of education) of colleges
3. population (focus on adult population and high school graduates)
4. unemployment
5. financial constraints, pre- and post-Proposition 13 (1978)

Once the enrollment forecast is complete, future WSCH are calculated using trends in academic loads as measured by WSCH per student. WSCH is calculated as the "average annual WSCH" of Fall and Spring (summer excluded). WSCH includes regular, daily, and positive hours (credit and non-credit) as reported by each district in its apportionment attendance reports (CCFS-320).

Using this "official" enrollment forecast a district then develops an enrollment and WSCH distribution that results in the definition of the details required for the Five Year Plan.

First, total enrollment and WSCH is distributed to each campus and center identified in the plan. Next, based on current and projected plans, the day graded enrollment is computed. The current day enrollment for each college also appears in the Chancellor's Office internet site in the MIS department records. This information is based upon information report by each District.

Day Graded Enrollment

The number of students enrolled in day credit courses for an enrollment period. Day is considered to be any class beginning or in session between the hours of 8:00 a.m. and 5:00 p.m. For most colleges, the percentage of day students fluctuates between 55% and 75%.

After the WSCH and day graded enrollment is computed and projected for each campus and center, the WSCH is further broken down into four elements: off-campus, physical education laboratory, on-campus lecture and on-campus laboratory. Existing WSCH information for the current year can be used as the base year.

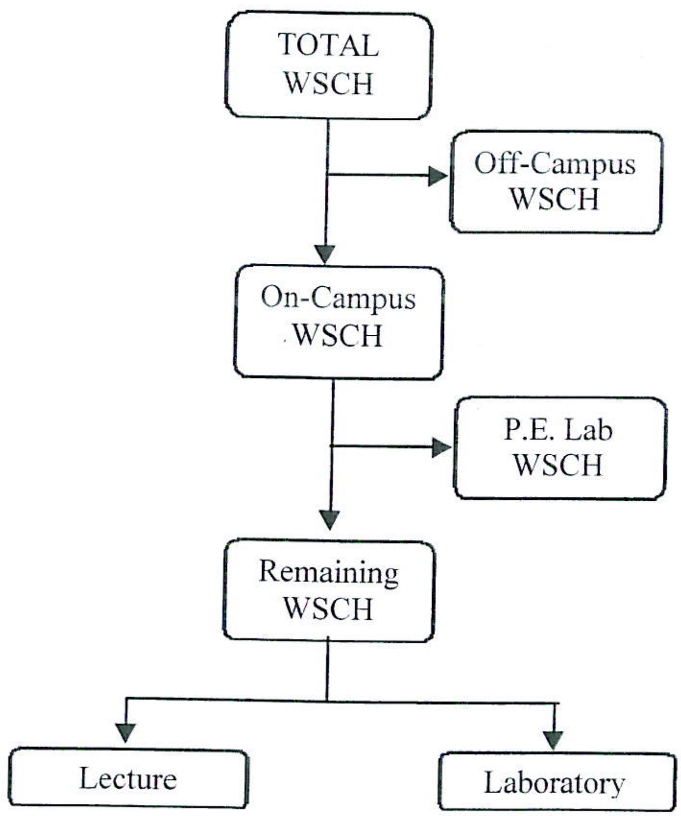
Off-campus WSCH is that instructional activity that takes place in facilities other than those identified in the campus/center space inventory. These include such alternate delivery methods as hospitals, businesses, TV courses, internships, internet, high schools, senior and community centers.

Physical education lab WSCH is the total of the instructional activity of all non-lecture portions of those courses in fitness, sports, athletics and the like whether conducted inside or outside; it is defined by TOP (taxonomy of programs) code 0835.

Off-campus and physical education lab WSCH are deducted from the total for the site and the remaining WSCH is defined as either lecture or laboratory.

WSCH Elements for Each Campus/Center

As required for use in the 5YCP



Before leaving the subject of enrollment, this may be the appropriate place for explaining the FTE staff number that is required in the preparation of the five year plan. FTE staff is the factor that is used to compute the space requirements for the office category in the Five Year Plan.

This component is prepared on the basis of the current staffing: the form to be completed for each site including the District Office (if appropriate) requires the following information:

Computation of FTE Instructional and Statutory Staff (a)	Total Certificated Instructional And Statutory Staff FTE (b)	Non-Instructional Portion FTE (c)	Net Total Instructional and Statutory Staff (b) minus (c) FTE (d)
Instructors:	________	________	________
Counselors: Includes certificated special program coordinators, Economic Opportunity program coordinators, statutory And Title 5 required staff, et. al.	________	________	________
Department Administrators:	________	________	________
Librarians: Include certificated director of audio/visual, et. al.	________	________	________
Institutional Administrators: Include certificated persons with responsibilities Covering the entire institution, such as Supt., Asst. Supt., Pres., Dean of Instruction, Director of Data Processing, et. al.	________	________	________
TOTAL	________	________	________

Column (b) is the total number of Column (a) distributed to categories.
Column © is the fraction of time expressed as full-time equivalents devoted to non-instructional work

Counselors, department administrators, and statutorily required staff are counted as if they had no non-instructional duties

---

Some other "guidelines" that can be used:

Use college/campus instructional staff for ALL of a fall semester

Include all certificated staff for day, extended day and adult education except those whose office is located off-campus.

Be sure to include the FTE equivalency of all par-time certificated staff that fit within the categories listed above.

Finally, project descriptions provide details of all capital outlay projects, both state and non-state funded, that are currently a part of the district's facilities plan; with the exception of architectural barrier removal and energy conservation projects all projects in excess of $250,000 are to be listed. The information required includes budget years and costs for each project phase (acquisition, preliminary plans, working drawings, construction, equipment), a brief project summary, an explanation of how the project supports the district educational and facility master plans and project assignable square feet (ASF), both primary and secondary.

Primary and Secondary Assignable Square Feet (ASF)

Primary ASF represents the desired new spaces required to meet a demand; secondary ASF represents changes to existing space that are effected or required as a result of the completion of the primary ASF. (example: A new health occupations building is proposed. The ASF of the new building is the primary ASF. As a result of the project, health occupation programs will move out of spaces in the science building. The vacated spaces are converted into science laboratories. The science labs represent secondary ASF.)

Note: Certain types of community college spaces referred to in the California Code of Regulations, Title 5, Section 57015, as "revenue generating facilities" are not eligible for the use of State construction funds. Included are parking lots and structures, bookstores, dormitories, student unions, and athletic stadiums (except physical education facilities).

3 COMPUTING CAPACITY

The space inventory reports provide a district with a summary of capacity spaces by classroom (lecture), laboratory, office, library and audio-visual/TV; this space is expressed in assignable square feet.

Assignable Square Feet (ASF)

ASF is the square footage of a space (or room) for assignment to occupants for a specific functional purpose. Gross square footage (GSF) is the total area of a building within the exterior walls including all ASF plus corridors, stairwells, rest rooms, wall thickness (interior and exterior), and mechanical, electrical, janitorial or other service areas, as well as one-half of the total square footage of outside overhang (beyond 12").

Title 5 of the California Administrative Code requires the use of specific standards in the computation of the five categories of capacity space. These standards are to be used consistently be all districts in determining the capacity of existing facilities. The following explanation of the five categories that follows includes some additional statements regarding the particular type of space that is being addressed.

TEACHING SPACES

Teaching spaces are identified as either lecture or laboratory depending on the nature of the student's participation in the instructional process. If the student requires the regular use of special equipment in the class it is usually considered a laboratory activity; a room designed to accommodate laboratory activity is classified as laboratory even if lecture takes place in the room more often than lab.

Computation of lecture and laboratory space requirements is based on weekly student contact hours (WSCH) for a 70 hour week (Monday through Friday, 8:00 a.m. to 10:00 p.m.). The total projected WSCH enrollments are separated into lecture and laboratory. Pure one hundred percent (100%) utilization of all rooms and all stations is not considered reasonable for a number of reasons:

> No guarantee that class enrollments will necessarily match the size of teaching areas available;

The need for a safety net to provide spaces for classes anticipated but are dependent on enrollments;

Human behavior patterns dictate some hours will be more popular (thereby requiring more teaching spaces) than others; e.g., lunch/dinner and local industry work hours can affect the hours people are willing to be in class;

Occasional uses of the "public" facilities for purposes other than the teaching program;

Laboratory (and sometimes lecture room) preparation/setup and breakdown time;

Potential for allowing a class to proceed or spill over beyond its usual hours to complete an issue or activity underway at the time;

Provide time when the room is empty to perform on-going maintenance, repair, cleaning, or painting;

Provide alternatives for cases where a room may become unusable due to an unexpected breakdown in the heating/cooling/ventilation systems, lighting, electrical, or other utilities, or a broken window, door, spill or other disruption;

The need for some lecture spaces adjacent to laboratories where this location limits its general use due to inconvenience, noise, safety, or the adjacent activities (fumes in a paint shop, hazards involved with people traveling in or around the laboratory area);

Laboratories with specialized equipment that can only be used for a single purpose regardless of enrollment (e.g., x-ray rooms, dental hygiene stations, auto mechanics, morgues);

Special scheduling needs (e.g., 3-hour block Monday night instead of 1-hour block Monday, Wednesday, and Friday).

Lecture Classrooms *(room types 110-115)*

This standard is used for determining space allocations for Lecture (Room Type 110) and Lecture Service (Room Type 115)

Lecture space allocations usually vary from 11.5 to 25.0 ASF/station depending on floor space; room configurations, type of seating and room service requirements (projection rooms, A.V. storage, maps storage, etc.) State standards provide for an average of 15 ASF/station. For college's with an enrollment less than 140,000 WSCH, a room must be in use 48 hours of the 70 hour week; for college's with an enrollment of 140,000 WSCH or more, a room must be in use 53 hours of the 70 hour week. Since it is most often the case, the details of the computation of the standard are illustrated for those college's with less than 140,000 WSCH.

Formula components: Room Use = 68.6% (48 out of 70 hrs)
Station Use (when room is in use) = 66%
ASF/station (average) = 15.0

Computing the standard:

ASF = WSCH x (15 ASF per station /(66% x 48 hrs per week))
ASF = WSCH x 0.473

To compute the WSCH capacity of space, the formula is:

WSCH = ASF / 0.473 ←

Laboratories *(room types 210-255)*

This standard is used for determining space allocations for Laboratories (Room Types 210, 220, 230, 250) and Laboratory Service (Room Types 215, 225, 235, 255). Until 2001, 230-255 spaces were typically used to identify lab type spaces that were not directly related to instruction or non-WSCH generating facilities. In 2001, the state created a software that incorporated these non-WSCH generating spaces into the computation of capacity for WSCH generating Laboratory space. It is now important for districts to assess the categorization of its non-WSCH generating spaces accordingly.

Laboratory space allocations vary depending on the equipment used, the instructional mode, and the activities that the student performs. The allocations for laboratories vary depending on the subject grouping since some programs require larger station sizes than others. State standards generalize the utilization rates as follows:

Formula components: Room Use = 39.3% (27.5 out of 70 hrs)

Station Use (when room is in use) = 85%
ASF/station (vary) = 30 – 200

Computing the standard:

ASF = WSCH x (ASF per station /(85% x 27.5 hrs per week))
ASF = WSCH x Factor, *where factor = ASF/100 WSCH* (see next page)

To compute the WSCH capacity of space, the formula is:

WSCH = (ASF / Factor) x 100 ←

Example: Computation of laboratory allocation

A laboratory and its supporting service spaces is to be constructed to accommodate a projected 1000 WSCH in the Biological Sciences subject area. What is the computed space requirement?

For biological sciences (see TOP code 0400 on next page):

Factor = 55 ASF/station or 235 ASF per 100 WSCH

Therefore,

ASF = 1000 WSCH x 55 ASF per station / (85% x 27.5 hours per week)

ASF = 2350 assignable square feet (ASF)

Or,

ASF = WSCH x Factor, *where factor = 235 ASF per 100 WSCH*

ASF = 1000 WSCH x 235 ASF per 100 WSCH

ASF = 2350 assignable square feet (ASF)

LABORATORY STANDARDS

TAXONOMY	SUBJECT GROUP	ASF/100 WSCH	ASF per STATION
0100	Agriculture and Natural Resources	492	115
0115	Agricultural & Forestry Power/Machinery	856	200
0200	Architecture and Environmental Design	257	60
0400	Biological Sciences	235	55
0500	Business and Management	128	30
0600	Communications	214	50
0700	Computer and Information Science	171	40
0800	Education	321	75
0936	printing and Lithography	342	80
0937	Tool and Machine	385	90
0945	Mechanical Technology	556	130
0947	Diesel Technology	856	200
0948	Automotive Technology	856	200
0950	Aeronautical and Aviation Technology	749	175
0952	Construction Crafts/Trades Technology	749	175
0954	Chemical Technology	556	130
0956	Industrial Technology	285	90
All other 900s	(Engineering)	321	75
1000	Fine and Applied Arts	257	60
1100	Foreign Language	150	35
1200	Health Services	214	50
1300	Consumer Education/Home Economics	257	60
1400	Law	150	35
1500	Humanities	150	35
1700	Mathematics	150	35
1800	Military Studies	214	50
1900	Physical Sciences	257	60
2000	Psychology	150	35
2100	Public Affairs and Service	214	50
2200	Social Sciences	150	35
3000	Commercial Services	214	50
4900	Interdisciplinary	257	60

Reference: California Code of Regulations, Title 5, Section 57028

Library *(room types 410-455)*

This category of space provides for traditional library spaces such as reading, study, circulation, processing, and stacks. However, the increased use of the computer as teaching/learning tool has added to the types of spaces that make up libraries. Traditional reference materials are going onto the computer reference files and CD-ROM is being utilized more extensively. To some extent microfilm is still being used to store some materials. Study stations are being equipped with computers and "writing" labs are being established for student use in class research or writing projects. Research is utilizing the internet. Because of these changes in the technology related to learning resources, a precise interpretation of the language associated with the standards will not make any sense.

Therefore, in using the planning guidelines provided, one should be reminded that the definitions used are only for the convenience of computing a reasonable allocation for learning resource space – NOT TO BE USED TO DEFINE OR LIMIT THE DESIGN OF THE SPACES.

The State of California standard is used as a planning basis:

> The TOTAL DISTRICT SPACE REQUIREMENT is computed on the basis of day graded enrollment (DGE), with 3,795 ASF considered a minimum working base. This base is for each campus in the District (e.g., two campuses would have a base of 7590 ASF = 2 x 3795 ASF per campus). The total space for the district is computed as follows:
>
> Initial increment = 3795 ASF per campus
>
> Additional increments:

For each of the first 3000 DGE:	ASF = 3.83 x DGE
For each additional DGE between 3000 and 9000:	ASF = 3.39 x DGE
For each additional DGE over 9000:	ASF = 2.94 x DGE

The resulting total space is then distributed to the campuses usually by prorating based on proportional enrollment activity. However, consider adjustments if the district operates an acquisition or processing system that utilizes one of the campuses as the lead.

Audio-Visual *(a.k.a. MEDIA; room types 530-535)*

Traditionally, this category provides for media production, storage, and distribution systems including control and sound rooms, media storage, and spaces for operation of equipment for the communication of these materials. Such areas used primarily for class instructional purposes are to be included in the computation of lecture and/or laboratory space.

The State of California standard is used as a planning basis:

> The TOTAL DISTRICT SPACE REQUIREMENT is computed on the basis of day graded enrollment (DGE), with 3,500 ASF considered a minimum working base. This base is applied only once for each District. The total space for the district is computed as follows:
>
> Initial increment = 3,500 ASF per District
>
> Additional increments:

For each of the first 3000 DGE:	ASF = 1.50 x DGE
For each additional DGE between 3000 and 9000:	ASF = 0.75 x DGE
For each additional DGE over 9000:	ASF = 0.25 x DGE

The resulting total space is then distributed to the campuses usually by prorating based on proportional enrollment activity. However, consider adjustments if the district operates a centralized distance learning studio or conducts other centralized functions that utilizes one of the campuses as the lead.

Office *(room types 310-355)*

Office space is a function of many factors; however, the major ones are the number of persons, number of persons per office or office area, financial resources, organizational pattern and program/functional needs. Planning for office space requirements can best be done by addressing each basic type of office. It is advisable for districts to establish their own guidelines to be applied on a uniform basis to avoid overbuilding in this category.

State standards provide for an overall allocation of office space at 140 ASF per "FTE Instructional and specifically mandated staff"; for small colleges (less than 35,000 WSCH) 160 ASF per "FTE Instructional and specifically mandated staff" is used.

The resulting computation is the allocation for all office and office service spaces for a campus including FACULTY AND COUNSELOR OFFICES, STUDENT GOVERNMENT OFFICES, CONFERENCE ROOMS, REGISTRATION AREAS, BUSINESS OFFICE, ADMINISTRATION, AND ALL OTHER OFFICE FUNCTIONS.

Examples:

For a college with 85,000 WSCH:	Assume records show and FTE staff of 200 Office space = 200 FTE x 140 ASF = 28,000 ASF
For a SMALL college with 34,000 WSCH	Assume records show an FTE staff of 100 Office space = 100 FTE x 160 ASF = 16,000ASF

DEFINITIONS

ASSIGNABLE SQUARE FEET (ASF)	The square footage of a space (or room) for assignment to occupants for a specific functional purposes.
GROSS SQUARE FEET (ASF)	The total area of a building within the exterior walls including all ASF plus thicknesses (interior and exterior), and mechanical, electrical, janitorial or other service areas, as well as one-half of the total square footage of outside overhang (beyond 12").
BUILDING EFFICIENCY	ASF divided by GSF expressed as a percent. The diagram on the following page illustrates the components of assignable and goross square feet. Typical net-to-gross percentages (%) range from 60-85% depending on the type of building and weather conditions.
STUDENT STATION OR STATION	The seat or workspace for <u>each</u> student in a lecture classroom or laboratory.
WEEKLY STUDENT CONTACT HOURS	The number of hours a week students actually occupy a station or seat for time associated with a officially recognized program. WSCH may be identified as credit or noncredit and in California is based on programs eligible for State funding. In California, the annualized average of fall and spring semesters is used as the planning base. Summer sessions are not included. Positive attendance hours are included as average WSCH equivalency over the time period.
FTE STUDENT	The total number of contact hours carried by all students divided by the number of weeks in the counting period and then divided by 15 weekly student contact hours.
HEADCOUNT ENROLLMENT	The total number of enrolled students regardless of the number of credit hours each carries. It is the number of individuals enrolled. No one person is counted twice.

DEFINITIONS
(continued)

DAY GRADED ENROLLMENT

The number of students enrolled in day credit courses for an enrollment period. Day is considered to be any class beginning or in session between the hours of 8:00 a.m. and 5:00 p.m.

WSCH CAPACITY

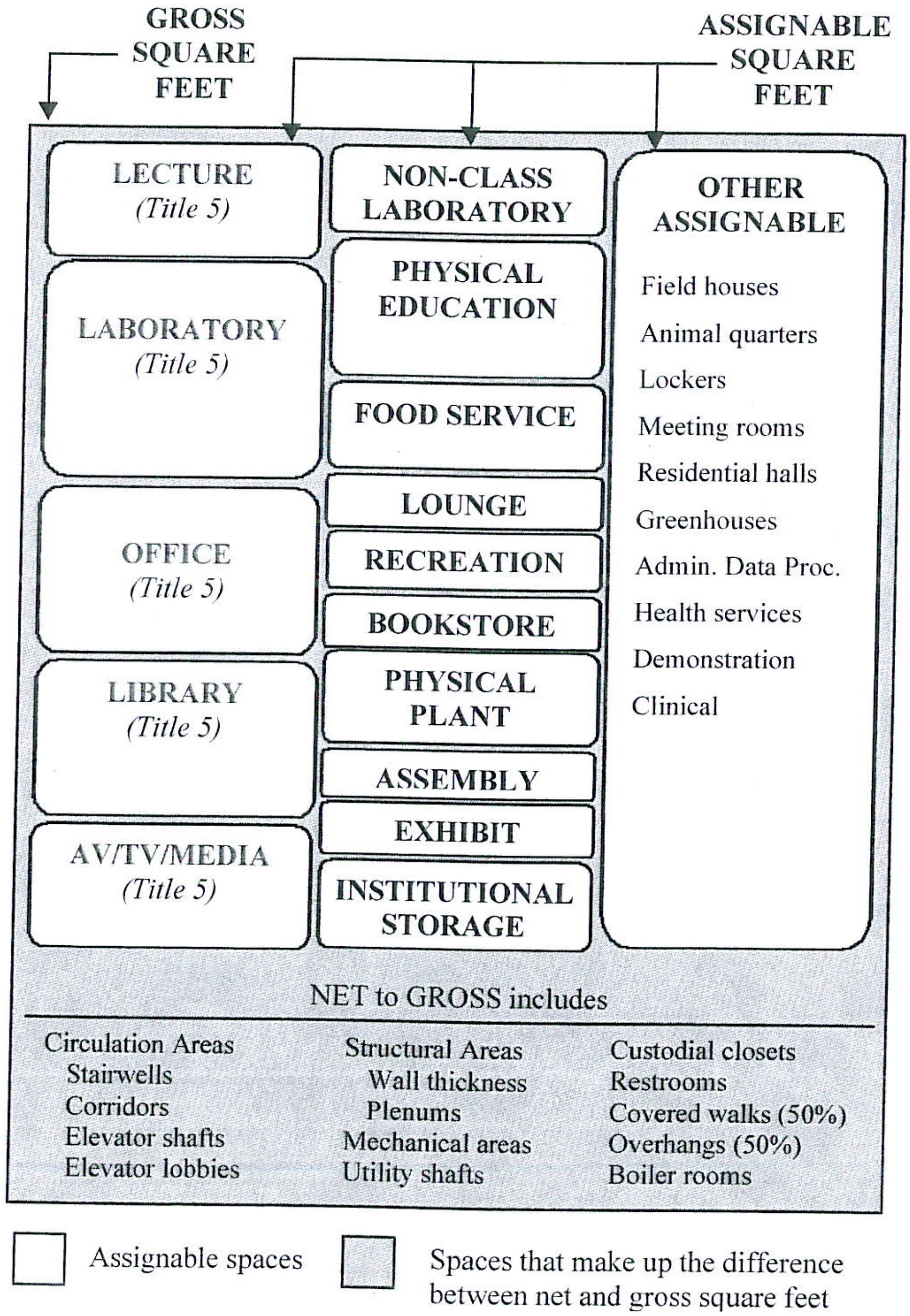
The enrollment level of lecture and/or laboratory space expressed in weekly student contact hours (WSCH) that can be reasonably supported by the available ASF of those categories of space.

CAPACITY:LOAD RATIO

The computed capacity of a type of space divided by the actual usage (usually expressed as a percentage). Over 100% indicates an overbuilt status.

BUILDING EFFICIENCY

Definition Diagram



What Makes Up the Library Formula?

The library formula is based on the cumulative derivatives of the following components:

<u>*Stack space*</u> = 0.1 ASF x Number of bound volumes

Number of volumes is computed as follows:

Initial increment = 16,000 volumes

Additional Increments:

(a) Under 3,000 DGE	= + 8 volumes per DGE
(b) 3,000 – 9,000 DGE	= + 7 volumes per DGE
(c) above 9,000 DGE	= + 6 volumes per DGE

<u>*Staff space*</u> = (140 ASF x number of FTE staff) + 400 ASF

Number of FTE staff is computed as follows:

Initial increment = 3.0 FTE

Additional Increments:

(a) Under 3,000 DGE	= + .0020 FTE staff per DGE
(b) 3,000 – 9,000 DGE	= + .0015 FTE staff per DGE
(c) above 9,000 DGE	= + .0010 FTE staff per DGE

<u>*Reader station space*</u> = 27.5 ASF x number of reader stations

Number of reader stations is computed as follows:

Initial increment = 50 stations

Additional Increments:

(a) Under 3,000 DGE	= + .10 stations per DGE
(b) 3,000 – 9,000 DGE	= + .09 stations per DGE
(c) above 9,000 DGE	= + .08 stations per DGE

Examples: *Computing Library Space*

***For a district with 2,500 DGE** (one campus)*

Stacks = 0.1 x (16,000 + 2,500x8))	3,600 ASF
Staff = 140 x (3+ (2500x 0.002))+400	1,520 ASF
Reader = 27.5 x (50 + (2500 x .10))	8,250 ASF
TOTAL	13,370 ASF

Using the "total" formula:

Initial increment	3,795 ASF
Additional increments = 2500 x 3.83	9,575 ASF
TOTAL	13,370 ASF

***For a district with 8,500 DGE** (two campuses)*

Stacks = 0.1 x ((2x16,000 + (3,000x8)+(5,500x7)))	9,450 ASF
Staff = 140 x ((2x3)+ (3,000x 0.002)+(5,500x.0015)))+(2x400)	3,635 ASF
Reader = 27.5 x ((2x50)+ (3,000 x .10)+(5,500 x .09)))	24,613 ASF
TOTAL	37,698 ASF

Using the "total" formula:

Initial increment = 3,795 x 2	7,590 ASF
Additional increments = (3000 x 3.83) + (5,500 x 3.39)	30,135 ASF
TOTAL	37,725 ASF

3 Guidelines for Facility Planning-Improving Capacity-to-Load Ratios

GUIDELINES FOR FACILITY PLANNING
Improving Capacity to Load Ratios
Modesto Junior College

The purpose of this document is to suggest some guiding principles to be used in the long-range facility planning process. The goal is to achieve a facility configuration that optimizes the use of operational funds and improves the long-term conditions of eligibility of the College/District in the State Capital Outlay program. While the primary focus of this set of guidelines is the improvement of the capacity to load ratios, it is critical to assure that the spaces of the college support the pedagogies and conditions necessary for a teaching/learning environment that is current, comfortable, safe, and beneficial to the students, faculty, and staff.

Capacity-to-load ratios establish a measure of the "effectiveness" of the utilization of certain spaces on a community college campus. Essentially the ratios compare what the existing space in a college's inventory can support ***to*** the actual demand for the space.

For lecture and laboratory spaces, enrollment in terms of weekly student contact hours (WSCH) is the basis for determination of the demand. If a ratio exceeds 100% it means that there is more space than is needed; or, in other words, the college can ABSORB additional enrollment without creating new space.

The State of California Education Code establishes the basis for computation of the capacity of five types of spaces: lecture, laboratory, office, library, and AV/TV/Media. The capacity-to-load ratios are reported annually in the mandatory submittal of a Five-Year Construction Plan to the State Chancellor's Office. The ratios are then used to determine the College's eligibility for the funding of projects in the State Capital Outlay Program.

A number of concepts can be employed during the renovation and remodel of facilities on the campus in an effort to improve the capacity-to-load ratios, the space array, and the teaching/learning environment:

Reconfigure classrooms to be more consistent with the scheduled sizes of the class sections. If a large number of class sections are sized for 30 students, it is counter-productive to have a large number of classrooms sized for 45 or more students; in particular, if there are very few section sizes exceeding 70 students, it is even more counter-productive to have a large number of rooms sized for 70-plus students.

Employ a multi-use philosophy in the development of space that allows for "peak load" lecture instruction. For whatever reasons, colleges seem to have peak demands for lecture space (for example, 9:00 am to 11:00 am). Rather than creating "lecture rooms" around this peak demand, it is suggested that non-capacity spaces such as meeting rooms, lounge space, breakout dining rooms, sectioned library study areas, and theater rehearsal rooms be created that can serve occasionally for lecture classes.

Create breakout lecture area within large vocational labs rather than creating separate lecture rooms. Formulas for computing laboratory capacity are more generous in terms of their effect on capacity-to-load ratios than those used for computing lecture capacity. The expected computed capacity of lecture space can be between 3-20 times greater than lab space depending on the discipline (TOPS code) of the program.

Employ the policy of general use classrooms. Capacity formulas are based on the expectation that a lecture room is in use 75% of a 70-hour week (M-F, 8am-10pm). Avoid single user lecture rooms. Sometimes it is difficult for instructors in certain disciplines to share lecture rooms because of certain permanently mounted support materials in the room. Having charts, maps,, and other support teaching materials in place and protected from vandalism is critical to an unencumbered delivery of the course. Remodeling and/or renovation projects should take this into account providing for built-in protection while creating a room that continues to be available for general usage.

Remove ineffective space from the inventory. Two methods come to mind: demolish the space or lease it out to another entity (which pays for operation and upkeep). The latter might include a provision in the lease agreement that permits the peak period usage of some spaces by the college.

Use the classification of meeting rooms rather than conference rooms. A meeting room is a room that is available, sometimes on a scheduled basis, to anyone. A conference room is a room that is available to serve the purposes of an individual. In the computation of capacity-to-load ratios, conference rooms are counted as office space; meeting rooms are non-capacity.

Change the net-to-gross building ratio. In the event that the current conditions of a building are such that it is necessary to improve the internal circulation (passageways), increase the size of restrooms, or add support facilities (janitorial or telecommunications), a remodeling or renovation project offers the opportunity to address these issues. This is especially the case where resizing of lecture spaces is an appropriate consideration.

Adopt the policy of shared and mixed discipline usage of computer labs. The use of a lab by a number of disciplines offers the opportunity to classify the space in the lab category to the advantage of the College. The following example is offered to illustrate this advantage.

Room 101 in Bldg X is a 1,200 assignable square foot laboratory with 40 computers. It is used three times a week for Accounting. It is suggested that during the hour of the week that the lab is not in use that courses in ESL and Graphic Arts be scheduled in the room. The **expected** enrollment production is currently computed at 938 WSCH; making the change results in an enrollment production expectation of 467 WSCH or roughly half the current level.

4 LEED Sustainability Guidelines

4.1 LEED- EB: Existing Building
For Existing Buildings, Upgrades,
Operations and Maintenance
Registered Building Checklist
Errata Sheet- Reference Guide

LEED for Existing Buildings v2.0
Registered Building Checklist

Project Name:
Project Address:

Yes	?	No				
				Sustainable Sites		**14 Points**
Y			Prereq 1	**Erosion & Sedimentation Control**		Required
Y			Prereq 2	**Age of Building**		Required
			Credit 1.1	**Plan for Green Site & Building Exterior Management** - 4 specific actions		1
			Credit 1.2	**Plan for Green Site & Building Exterior Management** - 8 specific actions		1
			Credit 2	**High Development Density Building & Area**		1
			Credit 3.1	**Alternative Transportation** - Public Transportation Access		1
			Credit 3.2	**Alternative Transportation** - Bicycle Storage & Changing Rooms		1
			Credit 3.3	**Alternative Transportation** - Alternative Fuel Vehicles		1
			Credit 3.4	**Alternative Transportation** - Car Pooling & Telecommuting		1
			Credit 4.1	**Reduced Site Disturbance** - Protect or Restore Open Space (50% of site area)		1
			Credit 4.2	**Reduced Site Disturbance** - Protect or Restore Open Space (75% of site area)		1
			Credit 5.1	**Stormwater Management** - 25% Rate and Quantity Reduction		1
			Credit 5.2	**Stormwater Management** - 50% Rate and Quantity Reduction		1
			Credit 6.1	**Heat Island Reduction** - Non-Roof		1
			Credit 6.2	**Heat Island Reduction** - Roof		1
			Credit 7	**Light Pollution Reduction**		1

Yes	?	No				
				Water Efficiency		**5 Points**
Y			Prereq 1	**Minimum Water Efficiency**		Required
Y			Prereq 2	**Discharge Water Compliance**		Required
			Credit 1.1	**Water Efficient Landscaping** - Reduce Potable Water Use by 50%		1
			Credit 1.2	**Water Efficient Landscaping** - Reduce Potable Water Use by 95%		1
			Credit 2	**Innovative Wastewater Technologies**		1
			Credit 3.1	**Water Use Reduction** - 10% Reduction		1
			Credit 3.2	**Water Use Reduction** - 20% Reduction		1

Yes	?	No				
4				**Energy & Atmosphere**		**23 Points**
Y			Prereq 1	**Existing Building Commissioning**		Required
Y			Prereq 2	**Minimum Energy Performance** - Energy Star 60		Required
Y			Prereq 3	**Ozone Protection**		Required
4			Credit 1	**Optimize Energy Performance**		1 to 10
					Energy Star Rating - 63	1
					Energy Star Rating - 67	2
					Energy Star Rating - 71	3
				4	Energy Star Rating - 75	4
					Energy Star Rating - 79	5
					Energy Star Rating - 83	6
					Energy Star Rating - 87	7
					Energy Star Rating - 91	8
					Energy Star Rating - 95	9
					Energy Star Rating - 99	10
			Credit 2.1	**Renewable Energy** - On-site 3% / Off-site 15%		1
			Credit 2.2	**Renewable Energy** - On-site 6% / Off-site 30%		1
			Credit 2.3	**Renewable Energy** - On-site 9% / Off-site 45%		1
			Credit 2.4	**Renewable Energy** - On-site 12% / Off-site 60%		1
			Credit 3.1	**Building Operation & Maintenance** - Staff Education		1
			Credit 3.2	**Building Operation & Maintenance** - Building Systems Maintenance		1
			Credit 3.3	**Building Operation & Maintenance** - Building Systems Monitoring		1
			Credit 4	**Additional Ozone Protection**		1

			Credit 5.1	**Performance Measurement -** Enhanced Metering (4 specific actions)	1
			Credit 5.2	**Performance Measurement -** Enhanced Metering (8 specific actions)	1
			Credit 5.3	**Performance Measurement -** Enhanced Metering (12 specific actions)	1
			Credit 5.4	**Performance Measurement** - Emission Reduction Reporting	1
			Credit 6	**Documenting Sustainable Building Cost Impacts**	1

Yes	?	No	Materials & Resources		16 Points
Y			Prereq 1.1	**Source Reduction & Waste Management** - Waste Stream Audit	Required
Y			Prereq 1.2	**Source Reduction & Waste Management -** Storage & Collection	Required
Y			Prereq 2	**Toxic Material Source Reduction -** Reduced Mercury in Light Bulbs	Required
			Credit 1.1	**Construction, Demolition & Renovation Waste Management -** Divert 50%	1
			Credit 1.2	**Construction, Demolition & Renovation Waste Management -** Divert 75%	1
			Credit 2.1	**Optimize Use of Alternative Materials** - 10% of Total Purchases	1
			Credit 2.2	**Optimize Use of Alternative Materials** - 20% of Total Purchases	1
			Credit 2.3	**Optimize Use of Alternative Materials** - 30% of Total Purchases	1
			Credit 2.4	**Optimize Use of Alternative Materials** - 40% of Total Purchases	1
			Credit 2.5	**Optimize Use of Alternative Materials** - 50% of Total Purchases	1
			Credit 3.1	**Optimize Use of IAQ Compliant Products** - 45% of Annual Purchases	1
			Credit 3.2	**Optimize Use of IAQ Compliant Products** - 90% of Annual Purchases	1
			Credit 4.1	**Sustainable Cleaning Products & Materials** - 30% of Annual Purchases	1
			Credit 4.2	**Sustainable Cleaning Products & Materials** - 60% of Annual Purchases	1
			Credit 4.3	**Sustainable Cleaning Products & Materials** - 90% of Annual Purchases	1
			Credit 5.1	**Occupant Recycling** - Recycle 30% of the Total Waste Stream	1
			Credit 5.2	**Occupant Recycling** - Recycle 40% of the Total Waste Stream	1
			Credit 5.3	**Occupant Recycling** - Recycle 50% of the Total Waste Stream	1
			Credit 6	**Additional Toxic Material Source Reduction** - Reduced Mercury in Light Bulbs	1

Yes	?	No	Indoor Environmental Quality		22 Points
Y			Prereq 1	**Outside Air Introduction & Exhaust Systems**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
Y			Prereq 3	**Asbestos Removal or Encapsulation**	Required
Y			Prereq 4	**PCB Removal**	Required
			Credit 1	**Outside Air Delivery Monitoring**	1
			Credit 2	**Increased Ventilation**	1
			Credit 3	**Construction IAQ Management Plan**	1
			Credit 4.1	**Documenting Productivity Impacts** - Absenteeism & Healthcare Cost Impacts	1
			Credit 4.2	**Documenting Productivity Impacts** - Other Productivity Impacts	1
			Credit 5.1	**Indoor Chemical & Pollutant Source Control** - Reduce Particulates in Air System	1
			Credit 5.2	**Indoor Chemical & Pollutant Source Control** - Isolation of High Volume Copy/Print/Fa	1
			Credit 6.1	**Controllability of Systems** - Lighting	1
			Credit 6.2	**Controllability of Systems** - Temperature & Ventilation	1
			Credit 7.1	**Thermal Comfort** - Compliance	1
			Credit 7.2	**Thermal Comfort** - Permanent Monitoring System	1
			Credit 8.1	**Daylight & Views** - Daylight for 50% of Spaces	1
			Credit 8.2	**Daylight & Views** - Daylight for 75% of Spaces	1
			Credit 8.3	**Daylight & Views** - Views for 45% of Spaces	1
			Credit 8.4	**Daylight & Views** - Views for 90% of Spaces	1
			Credit 9	**Contemporary IAQ Practice**	1
			Credit 10.1	**Green Cleaning** - Entryway Systems	1
			Credit 10.2	**Green Cleaning** - Isolation of Janitorial Closets	1
			Credit 10.3	**Green Cleaning** - Low Environmental Impact Cleaning Policy	1
			Credit 10.4	**Green Cleaning** - Low Environmental Impact Pest Management Policy	1
			Credit 10.5	**Green Cleaning** - Low Environmental Impact Pest Management Policy	1
			Credit 10.6	**Green Cleaning** - Low Environmental Impact Cleaning Equipment Policy	1

Yes	?	No	Innovation & Design Process		5 Points
			Credit 1.1	**Innovation in Upgrades, Operation & Maintenance**	1
			Credit 1.2	**Innovation in Upgrades, Operation & Maintenance**	1
			Credit 1.3	**Innovation in Upgrades, Operation & Maintenance**	1
			Credit 1.4	**Innovation in Upgrades, Operation & Maintenance**	1
			Credit 2	**LEED™ Accredited Professional**	1

Yes	?	No	Project Totals (pre-certification estimates)	85 Points
4				

Certified: 32-39 points, **Silver:** 40-7 points, **Gold:** 48-63 points, **Platinum:** 64-85

Errata Sheet

for the document titled:

LEED for Existing Buildings
Version 2.0
Reference Guide
First Edition
June, 2005

Note: updates to this document are posted on the Reference Guide electronic access Web page (via www.usgbc.org/myUSGBC)

Errata posted Fall 2006

Credit	Page	Erratum
SSp1	21	Under Requirements, line 10, change the word "Sedimentation" in "Chapter 3: Sedimentation and Erosion Control" to "Sediment".
SSc2	43	Add "**Congress for New Urbanism** www.cnu.org" to the Other Resources" category in the same format as the other resources after "Changing Places" and "Density by Design"
SSc3.2	49	Delete the "s" on the end of "buildings" in last line of last paragraph of Requirements section.
SSc3.2	55	In Table 2 title, change "Quartery" to "Quarterly".
SSc3.3	57	Under Submittals – Initial Certification Option B, add space between "lease" and "agreement".
SSc3.3	61	Replace "designate" with "offer" in the first sentence of the first paragraph under Option B.
SSc3.3	61	Replace the first sentence of the second paragraph under Option B to "Incentive programs for encouraging alternative vehicle ownership might include monetary grants to assist in purchasing alternative vehicles or preferred parking for alternative vehicle users (required by this credit).
SSc3.3	61	Replace the paragraph under Option C with "Provide preferred parking for AFV or ATV users equal to or greater than 3 percent of the total vehicle parking capacity on the site. Use employee newsletters, postings, signs or other forms of communication to inform occupants about the preferred parking program. Perform quarterly checks of the total vehicle parking capacity to verify that preferred parking program is offered for at least 3 percent of the total vehicle parking capacity. Expand the preferred parking program to meet demand until 10 percent or more of vehicle parking capacity serves preferred parking users."
SSc3.3	61	Replace the first paragraph of the Synergies & Tradeoffs section with "Earning this credit might involve installing refueling stations, designating spaces proximate to the building or covered spaces, providing discounted parking passes or guaranteeing parking access for AFV/ATV users. Adding designated parking or refueling stations may difficult at building sites with limited parking space. Expanding lot size to accommodate these facilities may affect other LEED-EB credits, including SS credit 4: Reduced Site Disturbance; SS Credit 5: Stormwater Management; and SS credit 6: Heat Island Reduction."

SSc3.3	62	Replace the sentence under Option B with "To calculate the number of alternative fuel or hybrid vehicles, multiply the total number of building occupants by 3 percent (see **equation 2**).
SSc3.3	62	Replace Equation 2 with "Number of alternative fuel/hybrid vehicles = Total number of building occupants x 0.03."
SSc3.3	62	Replace Equation 3 with "Required number of vehicle users offered preferred parking is the greater of: Total number of vehicle parking spaces x 0.03 OR Peak number of alternative vehicle users x 1.25."
SSc3.3	62	Replace the paragraph under Option C with "The number of alternative vehicle users that must be offered preferred parking is equal to the greater of: (a) the total number of vehicle parking spaces multiplied by 0.03 or (b) the number of alternative vehicle users x 1.25."
SSc3.3	63	Replace the second bullet and sub-bullet under Option B to "(Bullet) Preferred parking (Sub-bullet) Describe the type of preferred parking that serves alternative vehicle users (Sub-bullet) If the preferred parking program includes designated parking, provide drawings illustrating the location and number of spaces devoted to alternative fuel vehicles
SSc3.3	63	Replace the first bullet and all sub-bullets under Option C with "(Bullet) Preferred parking (Sub-bullet) Describe the type of preferred parking that serves alternative vehicle users (Sub-bullet) If the preferred parking program includes designated parking, provide drawings illustrating the location and number of spaces devoted to alternative fuel vehicles (Sub-bullet) Calculations must identify the total number of parking spaces and the number of vehicles served by the preferred parking program (Sub-bullet) As-necessary increases should be documented by submitting summaries of quarterly monitoring and findings by a responsible officer of the organization about the need for addition preferred parking."
SSc3.3	64	Add "**Electric Drive Transportation Association** www.electricdrive.org This industry association promotes electric vehicles through policy, information, and market development initiatives." to the Other Resources category in the same format as the other resources as a separate definition after "Electric Auto Association" and before "Electric Vehicle Association of the Americas
SSc3.3	65	Replace definition of "Preferred Parking" with "**Preferred Parking** is parking that is preferentially available to particular users. Preferred parking-related incentives might include designated spaces proximate to the building, designated covered spaces, discounted parking passes, guaranteed pass availability (for buildings that allot parking passes with a lottery system), etc."
SSc3.4	69	Replace the first sentence of the second paragraph in the Economic Issues section with "The minimum costs of implementing an organization carpool program might include program promotion, employee incentives, using signs to designate parking spaces, or offering discounted parking passes to carpoolers."
SSc3.4	70	Under Calculations, replace the paragraph under Option A with "To calculate the number of vehicles that the preferred parking program must have the capacity to serve, multiply the number of building occupants by 5 percent and divide by the number of occupants per carpool vehicle (see **Equation 1**). Assume that the Average Number of Occupants per Carpool Vehicle is equal to 2 unless documentation can be provided showing a carpool vehicle occupancy rate greater than 2.

<table>
<tr><td>SSc3.4</td><td>71</td><td>Replace “Identify preferred parking” with “Describe the preferred parking program” in the second sentence of the sub-bullet of the first bullet under Option A.</td></tr>
<tr><td>SSc3.4</td><td>71</td><td>Replace Equation 1 with “Preferred parking program capacity [vehicles] = (Number of building occupants x 0.005 / Average number of occupants per carpool vehicle)</td></tr>
<tr><td>SSc3.4</td><td>72</td><td>Replace definition of “Preferred Parking” with “Preferred Parking is parking that is preferentially available to particular users. Preferred parking-related incentives might include designated spaces proximate to the building, designated covered spaces, discounted parking passes, guaranteed pass availability (for buildings that allot parking passes with a lottery system), etc.”</td></tr>
<tr><td>SSc4</td><td>76</td><td>Insert “Monoculture plantings such as turf grass do not meet the criteria for conserving or restoring natural areas, and should not be considered natural area.” to follow the sentence listed as step 1 under Option A: Calculate Percent Onsite Natural Area.</td></tr>
<tr><td>SSc7</td><td>109</td><td>Add “California Energy Commission (CEC)
- 2005 California Energy Efficiency
Building Standards – Lighting Zones
www.energy.ca.gov/title24/2005standards/
outdoor_lighting/2004-09-30_
LIGHTING_ZONES.PDF
Provides a description of the outdoor
lighting zones developed for use in the
2005 California Energy Efficiency Building
Standards (Title 24)."
to the Other Resources category in the same format as the other resources as a separate definition before the "Illuminating Engineering Society of North America" text</td></tr>
<tr><td>WEp1</td><td>118</td><td>Replace Table One with the following table (to keep existing format & size)

Table 1: Energy Policy Act of 1992 Standards for Plumbing Fixture Water Usage
<table>
<tr><th>Fixture</th><th>Energy Policy Act of 1992 Standards for Plumbing Fixture Water Use</th></tr>
<tr><td>Water Closets [gpf]</td><td>1.60</td></tr>
<tr><td>Urinals [gpf]</td><td>1.00</td></tr>
<tr><td>Shower Heads [gpm]*</td><td>2.50</td></tr>
<tr><td>Lavatory Faucets & Aerators [gpm]**</td><td>2.20</td></tr>
<tr><td>Kitchen & Janitor Sink Faucets</td><td>2.20</td></tr>
<tr><td>Metering Faucets [gal/cycle]</td><td>0.25</td></tr>
</table>
* When measured at a flowing water pressure of 80 pounds per square inch (psi).
** When measured at a flowing water pressure of 60 pounds per square inch (psi).</td></tr>
<tr><td>WEp1</td><td>120</td><td>Under High-Efficiency Plumbing Fixtures line 11, change “in available plumbing fixtures.” to “for high-efficiency plumbing fixtures.”</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

WEp1	120	Combine Table 2 & Table 3 to reflect the following (keep format & size if possible): Table 2: Example Flush and Flow Fixtures – Performance Case

Flush Fixture	Flowrate [GPF]	Flow Fixture	Flowra[te] [GPM]
High-Efficiency Water Closet*	Below 1.3	High-Efficiency Lavatory Faucet	1.8
Low-Flow Water Closet	1.1	Low-Flow Lavatory Faucet	1.8
Ultra Low-Flow Water Closet	0.8	Ultra Low-Flow Lavatory Faucet	0.5
Dual-Flush Water Closet (Average-Flush)**	1.2	High-Efficiency Kitchen Sink Faucet	1.8
Composting Toilet	0.0	Low-Flow Kitchen Sink Faucet	1.8
High-Efficiency Urinal***	0.5	High-Efficiency Showerhead	2.0 & Below
Non-Water Urinal***	0.0	Low-Flow Showerhead	1.8
		Low-Flow Janitor Sink Faucet	2.5
		High-Efficiency Self Closing Faucet	0.2 gpc below

* High-efficiency toilets (HETs) include dual-flush toilets, 1.0-gpf pressure-assist toilets and1.3-gpf
gravity-fed single-flush toilets.
** Dual-flush toilets have an option of full flush (1.6 gal) or liquid-only flush (ranging between0.8 gpf and
1.1 gpf, depending upon design). When calculating water use reductions from installation of these
fixtures, use a composite (average) flush volume of 1.2 gpf.
***High-efficiency urinals are currently available at 0.5 gpf and 0.0 gpf. Urinals at 0.25 g
will be available in 2005.

WEp1	120	Under High-Efficiency Plumbing Fixtures, change "Tables 2 and 3" to "Table 2"
WEp1	121	Insert "The following assumptions must be followed in performing these calculations unless the applicant can provide justification explaining the need to deviate from them and prove the accuracy of the substituted values." before "Frequency data…" in the Calculations section.

<table>
<tr>
<td>WEp1</td>
<td>121</td>
<td>
Add Table 3 (this is Table 2 from NCc3 page 141 and should look identical):

Table 3: Standard Fixture Uses by Occupancy Type

<table>
<tr><th>Fixture Types</th><th></th><th>FTE</th><th>Student/ Visitor Uses/Day</th><th>Retail Customer</th><th>Resident</th></tr>
<tr><td>Water Closet</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>female</td><td>3</td><td>0.5</td><td>0.2</td><td>5</td></tr>
<tr><td></td><td>male</td><td>1</td><td>0.1</td><td>0.1</td><td>5</td></tr>
<tr><td>Urinal</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>female</td><td>0</td><td>0</td><td>0</td><td>n/a</td></tr>
<tr><td></td><td>male</td><td>2</td><td>0.4</td><td>0.1</td><td>n/a</td></tr>
<tr><td>Lavatory Faucet (duration 15 sec; 12 sec with autocontrol)</td><td></td><td>3</td><td>0.5</td><td>0.2</td><td>5</td></tr>
<tr><td>Shower (duration 300 sec)</td><td></td><td>0.1</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>Kitchen Sink, non-residential (duration 15 sec)</td><td></td><td>1</td><td>0</td><td>0</td><td>n/a</td></tr>
<tr><td>Kitchen Sink, residential (duration 60 sec)</td><td></td><td>n/a</td><td>n/a</td><td>n/a</td><td>4</td></tr>
</table>
</td>
</tr>
<tr>
<td>WEp1</td>
<td>121</td>
<td>
Add the following text after “Calculations and Documentation” title, before “Calculations” subtitle:

“Occupancy

Calculate the Full-Time Equivalent (FTE) building occupants based on a standard 8-hour occupancy period. An 8-hour occupant has an FTE value of 1.0 while a part-time occupant has an FTE value based on their hours per day divided by 8. (Note that FTE calculations for the project must be used consistently for all LEED-NC credits.) In buildings with multiple shifts, use the number of FTEs from all shifts, since this credit is based on annual water consumption. Estimate the Transient building occupants, such as students, visitors, and customers. Since this credit is based on annual water consumption, use a transient occupancy number that is a representative daily average. If the building has both FTE and Transient occupants, calculate the water use for each fixture separately for each occupancy type. This separation is necessary to represent the unique use patterns. For residential projects, the number of residents is used as the occupancy number.

Table 3 provides default fixture use values for different occupancy types. These values should be used in the calculations for this credit unless special circumstances exist within the project to require modification. The FTE uses are identical to those used in LEED-NC v2.1. The uses for the other occupancy types are provided as compromise default values based on v2.1 projects. Note that most buildings with Student/Visitor and Retail Customer occupants will also have FTE occupants.
</td>
</tr>
</table>

		The Student/Visitor category is intended for college buildings, libraries, museums, and similar building types. 50% of all Student/Visitor occupants are assumed to use a flush fixture and a lavatory faucet in the building and are not expected to use a shower or kitchen sink. 20% of etail Customer occupants are assumed to use a flush and a flow fixture in the building and no shower or kitchen sink. The default for Residential occupants is 5 uses per day of flush and flow fixtures, 1 shower, and 4 kitchen sink uses. For consistency across LEED projects, the calculations require the use of a balanced, one-to-one gender ratio unless specific project conditions warrant an alternative. For these special situations, the project team will need to provide a narrative description to explain the unique circumstances. The total fixture uses by all occupants must be consistent in the design and baseline cases."
WE p1	124	In Table 6, add vertical lines under "Flow Fixture"
WEp1	124	In the first paragraph below Table 6, change "below" to "above".
WEp1	125	The first part of Equation 6 should read, "Fixture Water Use [gal] per Occupant".
WEp1	125	The first part of Equation 7 should read, "Fixture Water Use [gal] per Square Foot".
WEp1	125	Add all of the following Resources: **"American Rainwater Catchment Systems Association** www.arcsa-usa.org Includes a compilation of publications, such as the Texas Guide to Rainwater Harvesting. **Choosing a Toilet** www.taunton.com/finehomebuilding/pages/h00042.asp An article in *Fine Homebuilding* that includes several varieties of water efficient toilets. **Composting Toilet Reviews** www.buildinggreen.com/features/mr/waste.html (802) 257-7300 An *Environmental Building News* article on commercial composting toilets. **National Climatic Data Center** www.ncdc.noaa.gov/oa/climate/aasc.html Useful site for researching local climate data, such as rainfall data for rainwater harvesting calculations. Includes links to state climate offices.

		Rocky Mountain Institute www.rmi.org/sitepages/pid15.php This portion of RMI's website is devoted to water conservation and efficiency. The site contains information on commercial, industrial and institutional water use, watershed management, and articles on policy and implementation." to the Other Resources category in the same format as the other resources and as a separate resource before the "Smart Communities Network " text
WEp1	125	Replace "All information needed to successfully document this credit can be found in the Submittals section of the LEED-EB Rating System and the LEED-EB Letter Templates." with " (Bullet) Fixture Water Use (Sub-bullet) For WE Prerequisite 1 and Credit 3.1, calculated water use based on fixture flow rates is adequate documentation. For WE Credit 3.2, you must submit fixture meter data to demonstrate the percent reduction from the baseline." in the Documentation section.
WEp1	125	Add **"Terry Love's Consumer Toilet Reports** www.terrylove.com/crtoilet.htm This website offers a plumber's perspective on many of the major toilets used in commercial and residential applications." to the Other Resources category in the same format as the other resources and as a separate resource after "Smart Communities Network " text and before "Water Closet Performance Testing"
WEc1.1&1.2	138	Under Table 1 notes, insert space between "Notes:" and "Annual".
WEc1	140	Add "**Texas Water Development Board** **Website** www.twdb.state.tx.us This website provides data from the state of Texas regarding water resources and services, such as groundwater mapping and water availability modeling. The site also provides published brochures regarding indoor and outdoor water efficiency strategies." to the Other Resources category in the same format as the other resources and as a separate definition before "Turf Irrigation Manual, Fifth Edition" and after "Texas Evaporation Website"
WEc3.1-3.2	151	Insert paragraph break before this text under "requirements": "To earn WE 3.2, measured fixture water use demonstrating required level of efficiency must be provided."
EAp1	163	Under Economic Issues, middle of last paragraph, remove extra period after "ten thousand per year.[7]."

EAp1	163	Replace the paragraph under Strategies & Technologies with "This prerequisite can be met by completing the entire commissioning process within the past three years of the end the LEED-EB performance period window, or by developing a 1- to 5- year Plan for completing the commissioning process. Project teams that have completed the commissioning process should document that all five actions listed in the Requirements section have been completed. For other buildings, a 1- to 5-Year Plan for completion of the commissioning requirements is necessary. The 1- to 5-Year Plan should include, at a minimum, the following items: • list of the commissioning team members (names and job titles) • comprehensive summary of building systems covered by the commissioning plan • description of the current status of the commissioning process for each building system, noting any milestones or relevant achievements to date • detailed schedule of actions, deadlines and project milestones, including anticipated month/year of completion"
EAp1	164	Insert "The existing building commissioning process starts with the preparation of a building operation plan that specifies the current operation needs of the building and how to meet them, followed by testing and repairing the buildings systems and equipment as necessary to ensure that they meet the plan." in front of the first paragraph in the Overall Strategy section.
EAp1	170	Add "**Building Commissioning Association (BCxA)** www.bcxa.org (877) 666-BCXA (2292) Promotes building commissioning practices that maintain high professional standards and fulfill building owners' expectations. The association offers a five-day intensive course focusing on how to implement the commissioning process, intended for Commissioning Authorities with at least two years' experience." to the Other Resources category in the same format as the other resources and as a separate resource after "ASHRAE Guidelines and before "California Commissioning Collaborative"
EAp1	170	Add **"Cx Assistant Commissioning Tool** www.ctg-net.com/edr2002/cx/ This web-based tool provides project-specific building commissioning information to design teams and enables users to evaluate probable commissioning cost, identify an appropriate commissioning scope, and access sample commissioning specifications related to their construction project.

		Department of Engineering Professional Development University of Wisconsin, Madison www.engr.wisc.edu (800) 462-0876 Offers commissioning process training courses for building owners, architects, engineers, operations and maintenance staff, and other interested parties. The program also offers accreditation of commissioning process providers and managers." to the Other Resources category in the same format as the other resources after "California Commissioning Collaborative" and before "Energy Star Building Manual"
EAp1	170	Add "**Portland Energy Conservation Inc. (PECI)** www.peci.org PECI develops the field for commissioning services by helping building owners understand the value of commissioning, and producing process and technical information for commissioning providers. Their focus includes both private and public building owners, and a wide range of building types. PECI manages the annual National Conference on Building Commissioning." to the Other Resources category in the same format as the other definitions after "Energy Star Building Manual" and before "A Practical Guide for Commissioning Existing Buildings"
EAp3	185	Replace "it is not" with "neither replacement nor conversion is" in the third sentence of the first paragraph in Strategies & Technologies.
EAp3	186	Insert "(Bullet) Results of third-party audit demonstrating upgrade is not economically feasible (Sub-bullet) Documentation should show that both replacement AND conversion were considered, but both are infeasible based on simple payback period of greater than 10 years." As a second bullet item under "Documentation"
EAc2	204	Add "**Clean Energy** **Union of Concerned Scientists** www.ucsusa.org/clean_energy (617) 547-5552 UCS is an independent nonprofit that analyzes and advocates energy solutions that are sustainable both environmentally and economically. The site provides news and information on research and public policy. to the Other Resources Category in the same format as the other definitions before "Database of State Incentives for Renewable Energy":

EAc2	204	Add "**Green-e Program** www.green-e.org (888) 634-7336 See the Summary of Referenced Standard for more information." to the Other Resources Category in the same format as the other resources after "ENERGY Guide" and before "Green Power Network"
EAc5.1-5.3	227	Insert the following text after the existing paragraph in Strategies & Technologies: **"Lighting Systems and Controls** Lighting systems and controls include electric lighting fixtures hard-wired to the building infrastructure and any systems operating to manage lighting electricity use. At least 90% of the installed built-in lighting capacity must be metered to earn this item. **Aggregation of all process electric loads** Meter electricity consumption for all end uses other than space heating, space cooling, ventilation, domestic water heating, and built-in lighting. Examples of process electric loads include plug loads, manufacturing processes, and kitchen refrigeration or cooking equipment. This item may also be earned by deducting all non-process electric energy use from building total electricity use. **Aggregation of all process natural gas loads** Meter natural gas consumption for all gas end uses except space heating, space cooling, and domestic water heating. Examples of process natural gas loads include manufacturing processes, laundry equipment, and kitchen refrigeration or cooking equipment. This item may also be earned by deducting all non-process natural gas use from building total natural gas use. **Separate meters that allow aggregation of all indoor occupants' related water use for required fixtures** Metering for this item provides data specific to fixture water use consumption as required for Water Efficiency Credit 3.2. See that credit's section for further guidance. **Separate meters for all indoor process water use** Indoor process water use includes all water end uses serving activities within the building structure except plumbing fixtures (toilets, urinals, showers, lavatories, etc.) and drinking water fountains. Examples of indoor process water use include cooling towers, laundering, dishwashing, indoor décorative water fountains, or manufacturing processes. This item may also be earned by deducting all non-process indoor water use from building total indoor water use. **Separate meters for all outdoor irrigation water use** Outdoor irrigation water use includes any water use outside the building structure for the purpose of promoting growth or health of plants, lawns, or similar functions. Operations like fountains or outdoor cleaning activities and other water applications should not be included unless they serve an irrigation function. **Chilled water system efficiency at variable loads (kW/ton) or cooling**

		loads (for non-chilled water systems) Chilled water systems - meter the whole-system electricity input and cooling tonnage output over time to derive the whole-system efficiency over time. Electricity input must be whole-system, including not only the chiller itself but also the chilled water pumps and, if applicable, the condenser water pumps and cooling tower and all associated controls. All chilled water systems in the building must be metered. Direct-expansion systems - Meter the total cooling load (tons) experienced over time by each cooling system exceeding 5 tons of rated output capacity. Systems smaller than 5 tons may be excluded, provided that all such systems in aggregate constitute no more than 10% of the building's total installed cooling capacity. **Cooling load** Meter the total cooling load (tons) experienced over time by each cooling system exceeding 5 tons of rated output capacity. Systems smaller than 5 tons may be excluded, provided that all such systems in aggregate constitute no more than 10% of the building's total installed cooling capacity. **Air and water economizer and heat recovery cycle operation** Metering these devices must provide data contributing to an assessment of either the amount of heating/cooling provided by the device or the amount of energy saved by the device's operation. **Boiler efficiencies** Metering of boiler (or furnace or heat pump) efficiencies may entail either annual spot measurement of the combustion efficiency of the boiler or the ongoing measurement of fuel use and heat output to determine the overall efficiency of the boiler. To earn this item all large boilers, furnaces, and heat pumps providing space heating to the building must be included. Systems smaller than 60,000 BTU/hr of rated heat output may be excluded, provided that all such systems in aggregate constitute no more than 10% of the building's total installed space heating capacity. **Building specific process energy systems and equipment efficiency** Metering energy use of a specific type of process electric load or process gas load within the building. To achieve this item, at least 90% of the total input energy capacity of the specific process or equipment type within the building must be metered (e.g., if the building contains 100 kBTU/hour of laundry equipment capacity, at least 90 kBTU/hr must be metered). **Constant and variable motor loads** Metering of electricity use of a specific application of stand-alone motors that are not tightly integrated within a larger system (i.e., air-handler fan motors, pump motors, or escalator/elevator motors qualify, but compressor motors, cooling tower fan motors, or laundry equipment motors do not). To achieve this item, at least 90% of the total input energy capacity of the specific process or equipment type within the building must be metered (e.g., if the building contains 100 kW of ceiling fan capacity, at least 90 kW must be metered). Also, the total metered use for this item must constitute at least 10% of the building's total electricity use.

		Variable frequency drive (VFD) operation Metering of electricity use of all motors controlled by variable-frequency drives. To achieve this item, at least 90% of the total input energy capacity of the motors controlled by VFDs must be metered (e.g., if the building contains 100 kW of motors controlled by VFDs, at least 90 kW must be metered). Also, the total metered use for this item must constitute at least 10% of the building's total electricity use. **Air distribution, static pressure and ventilation air volumes** Air distribution entails measurement of air flow to each heating/cooling zone via monitors in all the main building distribution ducts. Static pressure entails measurement of air distribution duct pressures at appropriate locations downstream of each air-handler supply fan (according to guidance published by ASHRAE) to ensure adequate air flows to all discharge registers. Ventilation air volumes measure the volume of outside air entering the building at each air-handler via mechanical ventilation. This item may be earned by implementing any one of these three measurement schemes."
MRp1.1	247	Delete first paragraph under Calculations section and replace with "A waste stream audit is the process by which the contents of the building waste stream is sorted and analyzed. The purpose of the audit is to evaluate and improve existing waste management programs, and identify additional source reduction, reuse and recycling opportunities. The "waste stream" should be considered all waste leaving the building site and directed to landfill, incineration, recycling, composting or resale facilities, as well as items identified for reuse within the building that would otherwise have been considered waste. Auditing the waste stream involves separating the waste stream into its component parts. For most buildings, this will involve integrating data from recycling hauler reports with data obtained from the actual sorting and weighing of, at a minimum, landfill/incineration-directed waste."
MRp1.2	257	Add "**California Integrated Waste Management Board** www.ciwmb.ca.gov/WasteChar/ Solid Waste Characterization Database, Estimated Solid Waste Generation Rates **California Statewide Solid Waste Characterization Study** www.ciwmb.ca.gov/Publications/default.asp?pubid=1097 Alternative Waste Calculations California Integrated Waste Management Board's (CIWMB) Statewide Waste Characterization Study in which the waste disposal rates of businesses are measured." to the Other Resources category in the same format as other resources after "Business Resource Efficiency & Waste Reduction" & before "City of Seattle Bills & Ordinances"

MRp1.2	257	Add **"Waste at Work Inform: Strategies for a Better Environment** www.informinc.org/wasteatwork.php (212) 361-2400 An online document from Inform, Inc., and the Council on the Environment of New York City on strategies and case studies to reduce workplace waste generation." to the Other Resources category in the same format as the other resources after "US EPA Waste Wise Program":
MRp2	263	In the second paragraph of Strategies and Technologies, delete "purchased during the performance period" from the end of the first sentence.
MRp2	263	In the second sentence of the second paragraph of Strategies and Technologies, replace "purchase" with "specify the procurement of"
MRp2	263	In the third paragraph of Strategies and Technologies, delete "to" in "comparable to mercury-containing light bulbs."
MRp2	263 264	Replace all text of items 1-7 under Develop and Implement a Plan for Achieving Targeted Picogram per Lumen Hour Levels and replace with "1. Identify the total number and type of mercury-containing bulbs that are currently in the building. This inventory should be based on bulbs currently installed in fixtures, not stocks of surplus bulbs in storage. 2. Obtain mercury content, lumen output and bulb life data for the bulb types identified in Step 1. Use these values to calculate the average picograms per lumen hour of the existing bulbs (see Table 1, or use the calculator included in the LEED-EB Submittal Template). If the average picogram per lumen hour of existing bulbs is below the targeted level, simply show that new bulbs purchased during the Performance Period have picogram per lumen hour values less than or equal to the bulbs they are replacing. Calculations and supporting documentation showing mercury content, lumen output and bulb life for existing bulbs should be included in the application submittal, as well as purchasing information for any new bulbs acquired over the Performance Period. 3. If the existing bulbs do not meet the target level, identify light bulb replacement options that fit the existing fixtures and have lower picogram per lumen hour values. Consider different combinations of bulbs and/or suppliers until you have identified a purchasing scheme that yields an average picogram per lumen hour that meets the targeted level. Please note that the purchasing plan should include a bulb replacement specification for each lighting fixture in the building (e.g., if there are 100 fixtures in the building, the purchasing plan must specify 100 bulbs). This purchasing plan should be developed prior to the start of the Performance Period, and included in the application submittal. 4. If any mercury-containing bulbs are purchased over the Performance Period, demonstrate that they are consistent with the plan established in Step 3 and include purchasing information in the application submittal. Please note that existing bulbs do not need to be replaced before their normal end of life, so purchases of new bulbs during the Performance Period should reflect normal purchase/replacement schedules."

MRp2	264	Under Calculations paragraph one, sentence two, replace "detailed calculation spreadsheet" with "calculator in the form of a sample LEED Online Submittal Template for MRp2"
MRp2	264	Under Calculations paragraph one, sentence three should read "The completed calculation should contain either an inventory of bulbs currently installed OR a purchasing plan for future bulb replacement."
MRp2	264	After the first paragraph in Calculations, insert this separate paragraph: "Successfully completing the picogram per lumen hour calculations requires information about the mercury content in milligrams per bulb for each type of mercury-containing bulb in the building. This information should be obtained from MSDSs or other public literature from the manufacturer, or by directly contacting the manufacturer/vendor and requesting a written statement reporting mercury content values. **Please note that mercury values generated by TCLP (Toxicity Characteristic Leaching Procedure) tests do not reflect total mercury content or mercury concentration in the bulb, and therefore are not appropriate for use in the LEED-EB calculations.** These values are reported in mg of mercury per liter of test solution, and cannot be converted to total mercury content through calculations."
MRp2	265	Replace link to Inform Fact Sheet: Mercury-Containing Lamps under Other Resources to "http://www.informinc.org/fact_P3mercury_lamps.php"
MRp2	265	Add the following to the end of the first paragraph under Documentation: "The purchasing policy should include a commitment to following a purchasing plan that meets the picogram per lumen hour target set by the organization, as well as guidance for tracking purchases and obtaining mercury-content data from manufacturers."
MRp2	265	Under the third bulleted item in Documentation, the first sentence should read "Provide manufacturer documentation that designates the mercury content (in milligrams), lumen output and bulb life for each type/model of light bulb."
MRp2	266	Delete Sample Organization Policy Addressing Mercury in Lighting.
MRc1	273	Calculations section, insert new paragraph after para. 1: "Note that if no construction activity relevant to this credit has taken place during the performance period, only one credit may be earned based upon the submission of a Waste Management Policy alone. No more than 1 credit may be earned from a policy without relevant construction activity, regardless of the percentage of construction waste for diversion to which the policy commits."
MRc1	275	Add a third sub-bullet under the "Documentation of policy compliance" bullet that reads "If no construction activity relevant to this credit has taken place during the performance period, one credit may be earned based upon the submission of a Waste Management Policy. No more than 1 credit may be earned from a policy without relevant construction activity, regardless of the percentage of construction waste for diversion to which the policy commits."
MRc1.1 & 1.2	275	Add "**Construction Materials Recycling Association** www.cdrecycling.org (630) 585-7530 A nonprofit dedicated to information exchange within the North American construction waste and demolition debris processing and recycling industry." to the Other Resources category in the same format as the other resources after ""Construction and Demolition Waste Recycling Information" and before "Construction Waste Management Handbook"

MRc1.1 & 1.2	275	Add "**Environmental Specifications for Research Triangle Park** **U.S. Environmental Protection Agency** www.epa.gov/rtp/new-bldg/environmental/ specs.htm Waste management and other specifications. **Recycling and Waste Management During Construction** **King County, OR** www.metrokc.gov/procure/green/ wastemgt.htm Specification language from city of Seattle and Portland Metro projects on construction waste management. **A Sourcebook for Green and Sustainable Building** www.greenbuilder.com/sourcebook/ ConstructionWaste.html A guide to construction waste management from the Sourcebook for Green and Sustainable Building." to the Other Resources in the same format as the other resources after "Construction Recycling and Waste Management" and before "US EPA Construction and Demolition Debris Web Site".
MR c2.1-2.5	277	Under Intent, add an "s" to the end of "building".
MRc2	285	Insert "If no purchases of relevant materials have occurred over the Performance Period, this credit cannot be earned." between the first and second sentence in the Calculations section.
MRc2	287	Add a third sub-bullet under the "Calculations" bullet that reads "If no purchases relevant to this credit have taken place during the performance period, no points can be earned."
MRc2.1-2.5	287	Under Table 9, the second and third lines should not be divided by a line – they are part of a single item.
MRc2	287	Add **"GreenSpec Building Green, Inc.** www.buildinggreen.com/menus/index.cfm (802) 257-7300 Detailed listings for more than 1,900 green building products, including environmental data, manufacturer information and links to additional resources. **Guide to Resource-Efficient Building Elements** www.crbt.org/index.html The Center for Resourceful Building Technology Directory of environmentally responsible building products. This resource provides introductory discussions per topic and contact information

		for specific products, including salvaged materials. (The CRBT project is no longer active, and the CRBT website is no longer updated. The National Center for Appropriate Technology is providing this website for archival purposes only). **Materials Exchanges on the Web Industrial Materials Exchange (IMEX) Local Hazardous Waste Management Program in King County, OR** www.govlink.org/hazwaste (206) 296-4899 A listing of materials exchanges on the Web. **Oikos** www.oikos.com A searchable directory of resourceefficient building products and sustainable design educational resources." **Recycled Content: What is it and What is it Worth?"** *Environmental Building News*, February 2005. www.buildinggreen.com/auth/article.cfm?filename=140201a.xml" to the Other Resources in the same format as the other resources after "Forest Stewardship Council" and before "Recycled Content Product Directory".
MRc2	288	Add **"Reuse Development Organization (ReDO)** www.redo.org (410) 669-7245 A national nonprofit located in Indianapolis, Indiana, that promotes reuse as an environmentally sound, socially beneficial and economical means of managing surplus and discarded materials. See the List of ReDO Subscribers for contacts around the United States." to the Other Resources in the same format as the other resources after "The Recycler's Exchange" and before "Salvaged Building Materials Exchange"
MRc3.1-3.2	291	Replace "2 Points" with "1-2 Points" in upper right corner of page
MRc3.1 & 3.2	291	Under Requirements, item e., change "add" to "added".
MRc3.1 & 3.2	293	Under Table 3, delete second "80" from bottom right line.
MRc3	296	Insert "If no purchases of relevant materials have occurred over the Performance Period, this credit cannot be earned." after the bulleted list and directly before the sentence that reads "The following calculation…"

MRc3	297	Add a fourth sub-bullet under the "Documentation of purchases" bullet that reads "If no purchases relevant to this credit have taken place during the performance period, no points can be earned."
MRc4.1-4.3	301	Replace "www.greanseal.com" with "www.greenseal.org".
MRc5.1-5.3	309	Under Submittal – Recertification, second bullet item, insert "of" between "type waste".
MRc5.1-5.3	313	In Table 2 and Table 3, delete rows "Auto batteries".
MRc5.1-5.3	314	Table 5 title should read "Battery and Mercury-Containing Light Bulbs Recycling Rate"
MRc5.1-5.3	314	Under Table 5, replace Column A reading "Florescent Lamps" with "Mercury-Containing Light Bulbs".
MRc5.1-5.3	315	Under Table 6, item 8, replace "Mercury Containing Light Bulbs" with "Batteries"
MRc5.1-5.3	315	Under Table 6, item 9, should read "Mercury-Containing" instead of "Mercury Containing".
MRc6	319	Delete "The spreadsheet should contain both the plan for achieving reduced mercury content and the mercury content of all light bulbs purchased during the performance period." from the Calculations section.
MRc6	320	Delete all text in the Documentation section and replace with "See MR-Prerequisite 2.0".
EQp1	327	Reformat "Submittals – Recertification" to match format of "Submittals – Initial Certification".
EQp1	330	Replace first paragraph under Calculations with: "The ASHRAE Ventilation Rate Procedure has recently been revised. The updated version redefines an occupied zone as a breathing zone and defines required outside air (OA) ventilation rates, CFM, depending on both per-person and per-unit floor area parameters. Thus, unlike the 1999 version of the standard, in the 2004 version the total ventilation CFM required per zone depends on *both* design occupancy levels *and* zone floor area. For many space types the resulting overall *effective* ventilation CFM/person remains similar in the 1999 and 2004 versions, but for some densely occupied spaces the 2004 version lowers the total CFM requirements."
EQp1	330	Change the first bullet under Documentation to read: "One-time or ongoing measurements by a technically qualified party showing that each AHU actually supplies the OA CFM required by ASHRAE 62.1-2004 under design-case operating conditions, during both heating and cooling seasons (as applicable):"
EQp1	330	Add a new bullet in front of the existing first bullet under Documentation that reads: "Calculation of the OA CFM required by ASHRAE 62.1-2004 to be supplied at each air-handling unit (AHU) based on current conditions in the occupied zones (current conditions may differ from conditions assumed at the original design). This requires specifying each zone's current space type, floor area, peak occupancy, and the proper CFM/person and CFM/sq ft coefficients from the standard. For multi-zone AHUs, the total AHU CFM must be built up from the characteristics of each zone. ASHRAE has introduced a spreadsheet, 62n-VRP.xls, that can be used to calculate the required ventilation rate. In addition to showing the required OA CFM for each AHU, it is also suggested that the applicant calculate the *effective* OA CFM/person required (based on the calculated total CFM and the design occupancy) for ease of comparing to conventional historical ventilation requirements."

EQp1	330	In the second sentence of the fist sub-bullet of the now second bulleted item under Documentation, change "should" to "must"
EQp1	330	Replace the second sub-bullet item of the now second bullet item under Documentation with the first starred item, and add all of the rest as additional sub-bullets: "* Specify the total number of AHUs serving occupied zones of the building, and if available, their total design capacities for supply air and ventilation air. If any system is variable-air-volume (VAV), also specify its designed minimum flow rates for supply air and ventilation air. * Explicitly define design-case operating conditions at which OA compliance must be verified, as described in ASHRAE 62.1-2004. Generally this occurs when system supply airflows are at the minimum values expected to occur during the year, typically during the swing seasons (e.g., zone or OA dampers at their minimum expected settings, VAV at their minimum speeds, VAV dampers at their minimum settings, etc.). * Measure the OA supplied by each AHU; no sampling among AHUs is permitted. * The OA testing must be done in such a way that compliance is assured during both the cooling season and heating season. For most systems heating and cooling operation are substantially the same for ventilation purposes, so this requires merely a declaration by the testing party that system operation is similar enough in both modes that testing in only one mode is sufficient to assure performance year-round. In unusual cases, e.g., heating and cooling systems using different distribution methods, or cooling-only buildings with no conditioning during winter, separate testing may be required. * If any AHU is physically incapable of providing the OA required by the reference standard, documentation should reference and reflect adherence to the 10 CFM/person minimum, and must demonstrate that the AHU was not designed to supply the CFM required by ASHRAE 62.1-2004 even when in proper working order. This analysis must be done per AHU: if some AHUs can comply with the reference standard and some cannot, the former must be shown to comply and the latter can use the 10 CFM/person exemption."
EQp2	337	Add **"What You Can Do About Secondhand Smoke as Parents, Decision Makers, and Building Occupants U.S. Environmental Protection Agency** www.epa.gov/smokefree/pubs/etsbro. html (800) 438-4318 An EPA document on the effects of ETS and measures to reduce human exposure to it." to the Other Resources in the same format as the other resources as its own resource after "the Smoke-Free Guide...":

EQp3	339	Under Requirements, third bullet, take out extra space between "building" and the comma.
EQp3	339	Under Requirements, third bullet, delete extra period at end of paragraph.
EQc1	353	Add "**ASHRAE 62.1-2004 Users Manual** Appendix A www.ashrae.org Provides information on CO2 sensors including demand control ventilation." to the Other Resources in the same format as the other resources as its own resource before "ASHRAE "
EQc3	367	Add **"Controlling Pollutants and Sources** **U.S. Environmental Protection Agency** www.epa.gov/iaq/schooldesign/controlling. html Detailed information on exhaust or spot ventilation practices during construction activity can be found toward the end of the webpage at the abovementioned URL address." to the Other Resources in the same format as the other resources as its own resource before "EPA Fact Sheet: Ventilation and Air Quality in Offices".
EQc3	367	Add **"Indoor Air Pollution Report (July,** **2005)** **California Air Resources Board** www.arb.ca.gov/research/indoor/ab1173/ finalreport.htm **The State of Washington (SOW) Program** **and IAQ Standards** www.aerias.org/kview.asp?DocId=85&sp aceid=2&subid=13 This IAQ standard for the state of Washington was the first state-initiated program to ensure the design of buildings with acceptable indoor air quality. **Sheet Metal and Air Conditioning** **Contractors' National Association, Inc.** **(SMACNA)** www.smacna.org (703) 803-2980 SMACNA is a professional trade association that publishes the referenced standard as well as Indoor Air Quality: A Systems Approach, a comprehensive discussion of the sources of pollutants, measurement, methods of control, and management techniques." to the Other Resources in the same format as the other resources as its own resource after "EPA Fact Sheet: Ventilation and Air Quality in Offices".

EQc4.1	371	Add ""**Do Green Buildings Enhance the** **Well-being of Workers? Yes"** ***Environmental Design + Construction*** www.edcmag.com/CDA/ArticleInformation/ coverstory/BNPCoverStory- Item/0,4118,19794,00.html This article by Judith Heerwagen, PhD in the July/August 2000 edition of *Environmental* *Design + Construction*, quantifies the effects of green building environments on productivity." to the Other Resources in the same format as the other resources as its own resource before "Health and Productivity Gains from Better Indoor Environments and Their Relationship with Building Energy Efficiency"
EQc4.2	376	Add ""**Do Green Buildings Enhance the** **Well-being of Workers? Yes"** ***Environmental Design + Construction*** www.edcmag.com/CDA/ArticleInformation/ coverstory/BNPCoverStory- Item/0,4118,19794,00.html This article by Judith Heerwagen, PhD in the July/August 2000 edition of *Environmental* *Design + Construction*, quantifies the effects of green building environments on productivity." to the Other Resources in the same format as the other resources as its own resource before "Indoor Health & Productivity (IHP) Project" and after "Daylighting in Schools..."
EQc6	389	Add **"A Field Study of PEM (Personal Environmental** **Module) Performance in** **Bank of America's San Francisco Office** **Buildings** www.cbe.berkeley.edu/research/pdf_files/ bauman1998_bofa.pdf This University of California, Berkeley Center for Environmental Design Research provides information on lighting quality, underfloor air distribution technologies and other topics." to the Other Resources in the same format as the other resources as its own resource before "Controls and Automation for Facilities Managers..."

EQc7.1	403	Add **"Enhance Indoor Environmental Quality (IEQ), The Whole Building Design Guide** www.wbdg.org/design/ieq.php The Indoor Environmental Quality section provides a wealth of resources including definitions, fundamentals, materials and tools." to the Other Resources in the same format as the other resources as its own resource before "ISO Standard 7726-1998" and after "Center for the Built Environment"
EQc7.1	403	Add "**The Usable Buildings Trust** www.usablebuildings.co.uk/ The Usable Buildings Trust promotes better buildings through the more effective use of feedback. Home of the PROBE studies includes an occupant survey that addresses thermal comfort along with other indoor environmental quality issues." to Other Resources in the same format as the other resources as its own resource after "ISO Standard 7730-1994"
EQc8.1-8.2	409	Replace "2 Points" with "1-2 Points" in upper right corner of page
EQc8.1 & 8.2	414	Add "**The Art of Daylighting** www.edcmag.com/CDA/ArticleInformation/features/BNP__Features__Item/0,4120,18800,00.html This Environmental Design + Construction article provides a solid introduction to daylighting." to Other Resources in the same format as the other resources as its own resource after "Analysis of the Performance of Students in Daylit Schools" and before "California Energy Commission Public Interest Energy Research (PIER) Program"
EQc8.1 & 8.2	414	Add **"New Buildings Institute's Productivity and Building Science Program** www.newbuildings.org/downloads/Final-Attachments/PIER_Final_Report(P500-03-082).pdf Provides case studies and report on the benefits of daylighting.

		Radiance Software http://radsite.lbl.gov/radiance/ Free daylighting simulation software from the Lawrence Berkeley National Laboratory" To the Other Resources in the same format as the other resources as its own resource after "Daylighting Performance and Design" and before "Tips for Daylighting with Windows"
EQc8.3-8.4	417	Replace "1 Point" with "1-2 Points" in upper right corner of page
EQc8.3 & 8.4	422	Add "**Analysis of the Performance of Students in Daylit Schools** www.innovativedesign.net/studentperformance. htm Nicklas and Bailey's 1996 study of three daylit schools in North Carolina. **The Art of Daylighting** www.edcmag.com/CDA/ArticleInformation/ features/BNP__Features__ Item/0,4120,18800,00.html This Environmental Design + Construction article provides a solid introduction to daylighting." to Other Resources in the same format as the other resources as its own resource before "Efficient Windows Collaborative"
EQc8.3 & 8.4	422	**Add** **"New Buildings Institute's Productivity and Building Science Program** www.newbuildings.org/downloads/Final- Attachments/PIER_Final_Report(P500- 03-082).pdf Provides case studies and report on the benefits of daylighting. **Radiance Software** http://radsite.lbl.gov Free daylighting simulation software from the Lawrence Berkeley National Laboratory" to Other Resources in the same format as the other resources as its own resource after "Efficient Windows Collaborative" and before "Tips for Daylighting with Windows"
UI-overview	461	In the second sentence, replace "design" with "maintenance"
UI-overview	461	In the third sentence, replace "features/practices" with "features or practices"
UI-overview	461	In the third sentence, replace "which generate increased environmental benefits" to "that generate increased environmental benefits"
UIc1	463	Under Intent, replace "building operation and upgrade teams" with "building operation, maintenance, and upgrade teams"

UIc1	464	Under Green Building Concerns, add "ongoing operations and upgrades of" between "related to" and "existing buildings"
UIc1	464	In the first sentence of Environmental Issues, replace "design" with "operations, maintenance, and upgrades"
UIc1	464	In the first sentence in Economic Issues, add "or management procedure" after "technology" at the end
UIc1	464	Under Strategies and Technologies, change it to read: "Credits in this section may be earned by documenting increased benefits to the environment in one of two ways: **Option 1** - Exemplary performance strategy. A building strategy or measure resulting in building performance that greatly exceeds the performance level required by an existing LEED-EB prerequisite or credit. For credits with mathematical metrics, teams must meet the performance tier defined by the next step in the mathematical progression listed in the credit, e.g., for EAc2 the team needs to provide at least 15% of building energy from an on-site renewable system or 75% from off-site purchases. If the next step in the progression requires 100% performance on a LEED-EB metric, then an innovation point can be earned by achieving 95% performance; if the next step in the progression requires greater than 100% performance then no innovation point can be earned. For credits with more than one compliance path, an IU point can also be earned by satisfying more than one compliance path, provided that doing so provides significant extra environmental benefits compared to satisfying a single compliance path. **Option 2** - Non-LEED-EB strategy. Sustainability strategies or measures that produce environmental benefits by different means than those addressed by any LEED-EB prerequisite or credit, or strategies that produce different environmental benefits not captured by LEED-EB at all. Regardless of which Option the project team chooses, the team is encouraged to investigate opportunities for innovative actions that will be particularly meaningful to the surrounding community in terms of their environmental benefit. For example, buildings located in an area with water shortages might take measures to significantly exceed the water efficiency requirements of LEED-EB. **Stringency Requirements** Only those strategies and measures that have significant environmental benefits are applicable to this credit, and the standard for earning IU credits is high. The strategy must be comprehensive, thorough, and effective, i.e., installing a single green product or addressing a single aspect of a sustainability issue is not a sufficient level of effort. Strategies that integrate building operations practices across technical categories are favored and are especially encouraged. The strategy must be applicable to other buildings, and must rise significantly above standard building operations and maintenance practices. The strategy must not contribute to earning any existing LEED-EB prerequisite or credit.

		For example, an environmental educational program consisting of simple signage in a building would not by itself be considered a significant benefit. Conversely, a visitor's center and interactive display, coupled with a web site and video would be an appropriate level of effort for earning an innovation credit. IU credits can be earned for strategies that have already been done in other buildings; it is not necessary that its implementation in the LEED-EB project building be the first time the strategy has been done. However, regardless of the performance level achieved, no more than one IU point can be earned by any single sustainable operations, maintenance, or upgrade strategy."
UIc1	464	In the last sentence of Economic Issues, change "cost" to "initial cost"

LEED-EB

Green Building Rating System

For Existing Buildings
Upgrades, Operations and Maintenance

Version 2

Updated July 2005
October 2004

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Introduction

LEED for Existing Buildings (LEED-EB) maximizes operational efficiency while minimizing environmental impacts. As a leading-edge, consensus-based system for certifying green building performance, operations, and maintenance, LEED-EB provides a road map for property managers, portfolio owners, and service providers to drive down operational costs, while increasing occupant productivity in an environmentally responsible manner.

The LEED-EB Rating System is a set of voluntary *performance standards* for the sustainable upgrades and operation of buildings not undergoing major renovations. It provides sustainable guidelines for building operations, periodic upgrades of building systems, minor space use changes and building processes.

LEED-EB addresses exterior building site maintenance programs, efficient/optimized use of water and energy, purchasing of environmentally preferred products, waste stream management and ongoing indoor environmental quality (IEQ). In addition, LEED-EB provides sustainable guidelines for whole-building cleaning/maintenance, recycling programs and systems upgrades to improve building energy, water, IEQ and materials use.

To achieve LEED certification, buildings must meet all Prerequisites in the Rating System and a minimum of 32 points. The flexibility of the Rating System allows building owners, mangers and practitioners to determine which credits to pursue based on performance goals. LEED-EB ratings are awarded according to the following point thresholds:

- ❐ Certified 32–39 points
- ❐ Silver 40–47 points
- ❐ Gold 48–63 points
- ❐ Platinum 64–85 points

LEED-EB, together with other LEED products, is intended to provide the existing building stock an entry point into the LEED certification process, both those new to LEED certification and buildings previously certified under LEED-NC.

Overview of LEED for Existing Buildings

LEED-EB is a voluntary performance standard for sustainable operations and maintenance of buildings and provides guidelines for sustainable upgrade over time.

LEED-EB provides an important opportunity for building owners to lead the way in reducing the environmental impact of buildings.

LEED-EB Certification Options

The goal of LEED-EB is to help building owners operate their buildings in a sustainable and efficient way over the long term. To achieve this goal, LEED-EB will provide certification and re-certification of building operation to recognize building owners' ongoing achievements. This includes both owners who have buildings certified under LEED-NC and those using LEED for the first time. LEED-EB can be used to certify the following types of buildings:

- LEED-NC certified buildings seeking ongoing re-certification
- LEED-EB certified buildings seeking ongoing re-certification
- Non-LEED buildings seeking initial certification and ongoing re-certification

Building Operating Performance Data

LEED-EB certification is based on actual building operating performance, not design expectations. The LEED-EB certification application must provide building performance data demonstrating that the building operation meets the LEED-EB Prerequisites and credits attempted.

Initial Certification under LEED-EB

Initial LEED-EB certification for all buildings: In the initial LEED-EB certification filing, performance data is required for some credits for the most recent three months of building operations. For those credits, applicants should extrapolate data to approximate one full year of data. Using the LEED-EB Letter Templates provided at the time of building registration, teams are required to submit all of the policy statements and documentation, along with performance data.

For buildings initially certified under LEED-NC: LEED-NC reduces the environmental impact of new building construction and creates the opportunity for sustainable building operation. However, delivery of the sustainability potential validated by LEED-NC certification requires successful implementation of an operations and maintenance program that capitalizes on the sustainable design features integrated into an LEED-NC building. To ensure that this potential for sustainable performance is actually delivered, LEED-NC buildings are encouraged to enroll in LEED-EB at the time of LEED-NC certification. Performance of buildings that are not actively maintained decline over time. LEED-EB provides a mechanism to help building owners and mangers maintain the potential of sustainable building performance verified by LEED-NC certification over the long term.

Re-Certification under LEED-EB

LEED-EB is the re-certification vehicle for all buildings, including buildings originally certified under LEED-NC or under LEED-EB.

LEED-EB re-certification applications require performance data for the entire period since the previous LEED-EB certification. The period between the previous LEED-EB certification and the current application is called the "performance period." To maintain LEED-EB certification, a re-certification application needs to be filed at least once every five years. LEED-EB re-certification applications can be filed as often as once per year. The documentation provided with the application needs to include policy statements for information that has changed electronic reports of the building operating performance data for the entire performance period — e.g. five years of performance data for a re-certification application, filed after five years, and one year of performance data for re-certification applications filed after one year.

Annual Re-Certification: Annual re-certification allows building owners, managers and occupants to have the ability to incorporate LEED-EB into annual performance reviews, annual budget planning or space leasing contracts. Annual re-certification also provides ongoing feedback so performance deficiencies can be identified and corrected and the positive impacts of improvements can be immediately recognized.

Applicability of LEED-EB to Historic Buildings

The flexibility afforded by the LEED Rating System allows for the applicability to historic buildings. LEED-EB is a performance not prescriptive standard. Provided the building meets all LEED-EB Prerequisites, certification can be achieved by demonstrating achievement of any combination of 32 credits (40% of the 85 points). During the development of LEED-EB, the U.S. Department of the Interior's Standards for Treatment of Historic Properties were reviewed and no direct conflicts were identified.

Structure of LEED-EB Prerequisites and Credits

LEED Prerequisites and Credits have identical structures.

- The "Intent" section describes the objective of each Prerequisite or Credit.
- The "Requirements" section describes what must be done to earn each Prerequisite or Credit.
- The "Strategies and Technologies" section describes ways for achieving each Prerequisite or Credit
- The "Submissions" section describes what must be submitted to document achievement of each Prerequisite or Credit.

Overview of the LEED-EB Participation and Certification Process

To apply for LEED-EB certification of your building:

- *Register* your building by going to the USGBC website and following links to the LEED section (www.usgbc.org/leed). From there click on 'Register Your Project' on the left-hand side of the screen and follow instructions for LEED-EB. Be sure to log-in if you are a USGBC member to reflect your member discount for the registration fees. When your project registers, you will gain access to the LEED-EB Version 2.0 Project Resource page on the USGBC website which includes the LEED-EB Version 2.0 Letter Templates and the Quarterly Reporting Template
- *Submittals*. For the LEED certification application submittal and subsequent materials requested during the review process, submit two full copies, and the corresponding certification fee (check payable to U.S. Green Building Council) to the address shown below:

  USGBC
1015 18th Street NW
Suite #508
Washington DC 20036
Attention: LEED-EB Certification Manager

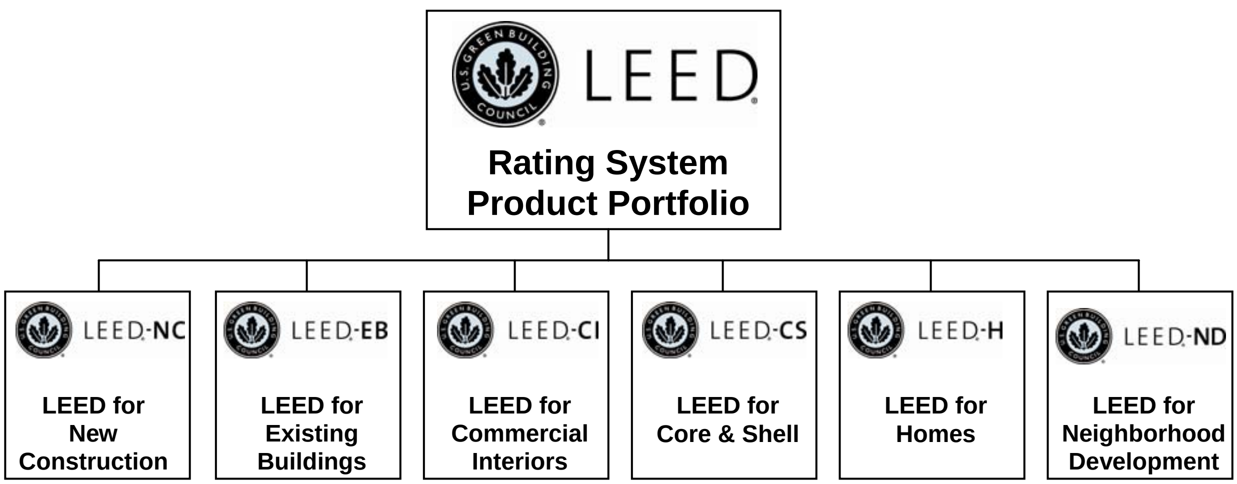
  The project team may submit as much of the documentation by CD as it finds practical. The required materials and suggested formats are as follows:
    - LEED-EB Version 2.0 Letter Templates
    - Performance Data
    - Overall project narrative including at least three project highlights
    - Drawings and photos illustrative of the project:
        - Site plan
        - Typical floor plan
        - Typical building section
        - Typical or primary elevation
        - Photo or rendering of project
- *Preliminary Review.* Within 30 days of receipt of materials the USGBC will issue the Preliminary LEED-EB Review, noting credit achievement anticipated, pending and rejected credits.
- *Supplementary Submittal.* The project team has 30 days from the receipt of the Preliminary Review to provide corrections and/or additional supporting documents (e.g., calculations, cutsheets and other backup) as a supplementary submittal to the application. Send two copies of all supplementary submittal materials to the USGBC address listed above.
- *Final Review.* The USGBC conducts a Final LEED-EB Review of the application within three weeks of receiving the re-submittal and notifies the project contact of certification status.
- *Award.* Upon notification of the LEED-EB certification, the project team has 30 days to accept or appeal the awarded certification. Upon the project's acceptance, or if it has not appealed the rating within 30 days, the LEED-EB certification is final. The project may then be referred to as a LEED-EB certified

project. The USGBC presents an award letter, certificate and metal LEED plaque indicating the certification level.

- *Appeal*. If the project team feels that sufficient grounds exist to appeal a credit denied in the Final LEED-EB Review, it has the option of appeal. The appeal fee is $500 per credit or prerequisite appealed. A review of these items will occur within 30 days or receipt of the appeal documentation at which time an Appeal LEED-EB Review will be issued to the applicant. Two copies of all appeal submittal materials should be sent to the USGBC address listed above.

Guide to When to Use Each LEED Product

The family of LEED rating systems is shown below. Some projects may have only one applicable Rating System while others may have more. USGBC encourages the project team to tally a potential point total using the Rating System checklists for all possibilities. The project is a viable candidate for LEED certification if it can meet all prerequisites and achieve the minimum points required in a given Rating System. Descriptions of all Rating Systems are also included below to help project teams make a decision about which LEED product to use. If questions or concerns remain, please e-mail leed-eb@usgbc.org or call 202-828-7422.



LEED for Existing Buildings (LEED-EB)

Use LEED-EB for rating existing building operating performance and building upgrades. Because existing building upgrades are a normal part of ongoing existing building operation, LEED-EB includes standards for construction and site protection as well as building and site operation.

For building upgrades, use LEED-EB if more than 50% of the building occupants will remain in the building through the upgrade process. The building can be defined as either the whole building or the portion that is being addressed in the LEED certification application. Another way to look at the scope of applicability for LEED-EB and LEED-NC: If the project involves a gut rehab or greater scope, use LEED-NC. If the project has less than a gut rehab scope use LEED-EB.

LEED for New Construction (LEED-NC)

LEED-NC covers the design and construction process for new construction and major reconstruction of buildings. LEED-NC addresses the whole building and building site.

For building upgrades, use LEED-NC if less than 50% of the building occupants remain in the building during the building upgrade.

For all building re-certifications use LEED-EB. LEED-EB covers re-certification of existing buildings for both buildings originally certified under LEED-NC and buildings originally certified under LEED-EB.

LEED for Core and Shell (LEED-CS)

LEED-CS addresses buildings being developed where the developer is responsible for the core and shell of the building and has no responsibility for the design and decisions concerning the interior space fit outs. LEED-CS covers the site, the building core and shell, but not the interior space fit outs.

LEED for Commercial Interiors (LEED-CI)

LEED-CI covers tenant improvements of interior spaces in single- and multi-tenant buildings. LEED-CI should be used for fit outs of interior spaces in buildings that do not include whole building or system upgrades. It is anticipated that LEED-CI will be used concurrently or in addition to LEED-NC, LEED-EB and LEED-CS.

LEED for Homes

LEED for Homes is will address single-family homes, detached and attached, and multifamily residential buildings with up to three stories, developed on a single lot.

LEED for Neighborhood Development (LEED-ND)

LEED-ND is under development and will address the design and location of new, multi-lot residential, commercial, or mixed-use developments. The evaluation will take place at the block or neighborhood scale and not evaluate the buildings themselves. A developer who wishes to certify both the homes and the development or subdivision itself will need to pursue both certifications.

Table of Contents

LEED-EB Project Checklist

Sustainable Sites — 14 Possible Points

Prereq 1	**Erosion and Sedimentation Control**	Required
Prereq 2	**Age of Building**	Required
Credit 1	**Plan for Green Site and Building Exterior Management**	2
Credit 2	**High Development Density Building and Area**	1
Credit 3.1	**Alternative Transportation:** Public Transportation Access	1
Credit 3.2	**Alternative Transportation:** Bicycle Storage & Changing Rooms	1
Credit 3.3	**Alternative Transportation**: Alternative Fuel Vehicles	1
Credit 3.4	**Alternative Transportation:** Car Pooling & Telecommuting	1
Credit 4	**Reduced Site Disturbance:** Protect or Restore Open Space	2
Credit 5	**Stormwater Management:** Rate and Quantity Reduction	2
Credit 6.1	**Heat Island Reduction:** Non-Roof	1
Credit 6.2	**Heat Island Reduction:** Roof	1
Credit 7	**Light Pollution Reduction**	1

Water Efficiency — 5 Possible Points

Prereq 1	**Minimum Water Efficiency**	Required
Prereq 2	**Discharge Water Compliance**	Required
Credit 1	**Water Efficient Landscaping:** Reduce Water Use	2
Credit 2	**Innovative Wastewater Technologies**	1
Credit 3	**Water Use Reduction**	2

Energy & Atmosphere — 23 Possible Points

Prereq 1	**Existing Building Commissioning**	Required
Prereq 2	**Minimum Energy Performance**	Required
Prereq 3	**Ozone Protection**	Required
Credit 1	**Optimize Energy Performance**	10
Credit 2	**On-site and Off-site Renewable Energy**	4
Credit 3.1	**Building Operations and Maintenance:** Staff Education	1
Credit 3.2	**Building Operations and Maintenance:** Building Systems Maintenance	1
Credit 3.3	**Building Operations and Maintenance:** Building Systems Monitoring	1
Credit 4	**Additional Ozone Protection**	1
Credit 5.1-5.3	**Performance Measurement:** Enhanced Metering	3
Credit 5.4	**Performance Measurement:** Emission Reduction Reporting	1
Credit 6	**Documenting Sustainable Building Cost Impacts**	1

Materials & Resources — 16 Possible Points

Prereq 1.1	**Source Reduction and Waste Management:** Waste Management Policy and Waste Stream Audit	Required

Prereq 1.2	**Source Reduction and Waste Management:** Storage & Collection of Recyclables	Required
Prereq 2	**Toxic Material Source Reduction:** Reduced Mercury in Light Bulbs	Required
Credit 1	**Construction, Demolition and Renovation Waste Management**	2
Credit 2	**Optimize Use of Alternative Materials**	5
Credit 3	**Optimize Use of IAQ Compliant Products**	2
Credit 4	**Sustainable Cleaning Products and Materials**	3
Credit 5	**Occupant Recycling**	3
Credit 6	**Additional Toxic Material Source Reduction:** Reduced Mercury in Light Bulbs	1

Indoor Environmental Quality — 22 Possible Points

Prereq 1	**Outside Air Introduction and Exhaust Systems**	Required
Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
Prereq 3	**Asbestos Removal or Encapsulation**	Required
Prereq 4	**PCB Removal**	Required
Credit 1	**Outside Air Delivery Monitoring**	1
Credit 2	**Increased Ventilation**	1
Credit 3	**Construction IAQ Management Plan**	1
Credit 4.1	**Documenting Productivity Impacts:** Absenteeism and Healthcare Cost Impacts	1
Credit 4.2	**Documenting Productivity Impacts:** Other Impacts	1
Credit 5.1	**Indoor Chemical and Pollutant Source Control:** Non-Cleaning – Reduce Particulates in Air Distribution	1
Credit 5.2	**Indoor Chemical and Pollutant Source Control:** Non-Cleaning –High Volume Copying/Print Rooms/Fax Stations	1
Credit 6.1	**Controllability of Systems:** Lighting	1
Credit 6.2	**Controllability of Systems:** Temperature & Ventilation	1
Credit 7.1	**Thermal Comfort:** Compliance	1
Credit 7.2	**Thermal Comfort:** Permanent Monitoring System	1
Credit 8.1	**Daylighting and Views:** Daylighting for 50% of Spaces	1
Credit 8.2	**Daylighting and Views:** Daylighting for 75% of Spaces	1
Credit 8.3	**Daylighting and Views:** Views for 45% of Spaces	1
Credit 8.4	**Daylighting and Views:** Views for 90% of Spaces	1
Credit 9	**Contemporary IAQ Practice**	1
Credit 10.1	**Green Cleaning:** Entryway systems	1
Credit 10.2	**Green Cleaning:** Isolation of Janitorial Closets	1
Credit 10.3	**Green Cleaning:** Low Environmental Impact Cleaning Policy	1
Credit 10.4-5	**Green Cleaning:** Low Environmental Impact Pest Management Policy	2
Credit 10.6	**Green Cleaning:** Low Environmental Impact Cleaning Equipment Policy	1

Innovation in Operation, Upgrades and Maintenance — 5 Possible Points

Credit 1.1	**Innovation in Operation & Upgrades**	1
Credit 1.2	**Innovation in Operation & Upgrades**	1
Credit 1.3	**Innovation in Operation & Upgrades**	1
Credit 1.4	**Innovation in Operation & Upgrades**	1
Credit 2	**LEED Accredited Professional**	1

Project Totals

80 possible base points plus 5 for IOUM

Certified	32–39 points
Silver	40–47 points
Gold	48–63 points
Platinum	64–85 points

Sustainable Sites (SS)

SS Prerequisite 1 Erosion and Sedimentation Control

Required

Intent

Control erosion to reduce negative impacts on water and air quality.

Requirements

Develop and implement a site erosion and sedimentation control policy that incorporates best management practices. The policy shall address ongoing maintenance of the facility's site to prevent soil erosion and sediment transfer under ongoing operation, as well as addressing erosion and sedimentation control for any future infrastructure repairs or other construction activities. The policy provisions shall address restoring eroded soil areas and eliminating conditions that result in erosion or sedimentation. The provisions addressing erosion and sedimentation control for additions and repairs shall require a sediment and erosion control plan, specific to the site, that conforms to U.S. Environmental Protection Agency (EPA) Document No. EPA 832/R-92-005 (1992), Storm Water Management for Construction Activities, Chapter 3: Sedimentation and Erosion Control, OR local erosion and sedimentation control standards and codes, whichever is more stringent. The person responsible for its ongoing implementation will sign off the facility sedimentation and control policy.

The plan shall meet the following objectives:

- Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse,
- Prevent sedimentation of storm sewer or receiving streams,
- Prevent polluting the air with dust and particulate matter, and

Log building operations and maintenance activity to ensure that plan has been followed.

Submittals – Initial LEED-EB Certification

- ❑ Provide a narrative summary of the site construction and erosion control policy that conforms to the referenced EPA standard. If local standards are followed, describe how they meet or exceed the EPA best management practices. The narrative summary should provide detailed information on all erosion and sedimentation control measures that may be implemented on the site.
- ❑ Provide the organization's erosion and sediment control policy that mandates implementation of erosion and sediment control techniques into all site construction plans and requires the techniques' inclusion into contract documents for any construction projects carried out on site.
- ❑ Provide copy of document committing organization to implement its erosion and sediment control policy.
- ❑ Provide a log showing that the plan has been followed.
- ❑ Provide photos documenting site problems identified and solutions implemented.

- For any construction projects begun or completed at the building over the performance period:
  - Declare that the project followed the erosion control policy.
  - Submit relevant sections of the erosion control plan (or drawings and specifications) highlighting the sediment and erosion control measures implemented during the performance period.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- Provide a statement that there have been no changes to the policy or plan since the initial LEED-EB filing.

OR

- If there have been changes to the policy or plan since the initial LEED-EB filing, provide the same information that is required for initial LEED-EB filings.

Provide performance documentation:

- For any construction projects begun or completed at the building site over the performance period, submit relevant sections of the erosion control plan (or drawings and specifications) highlighting the sediment and erosion control measures implemented.
- Provide a log showing plan has been followed.
- Provide photos documenting site problems identified and solutions implemented.

Potential Technologies & Strategies

Adopt an erosion and sediment control plan to be implemented during any construction project. Consider employing strategies such as temporary and permanent seeding, mulching, earth dikes, silt fencing, sediment traps and sediment basins. Erosion on existing sites typically is the result of foot traffic killing the vegetation, steep slopes where sheet flow from stormwater exceeds existing vegetation holding power, or point stormwater outflow that exceeds the holding power of the vegetation covering the soil. Identifying and eliminating these and other causes of erosion on the sites of existing buildings on an ongoing basis are important components of eliminating erosion and sedimentation.

SS Prerequisite 2 Age of Building

Required

Intent

Provide a distinction between buildings that are eligible to apply for LEED-NC certification and buildings that are eligible to apply for LEED-EB certification.

Requirements

Buildings that have not been certified under LEED-NC must be at least two years old before they can achieve certification under LEED-EB.

- Buildings that are more than two years old can register to participate in LEED-EB and apply for LEED-EB certification as soon as they are prepared to do so.
- LEED-NC Certified buildings that are less than two years old can also register to participate in LEED-EB and apply for LEED-EB certification or re-certification as soon as they are prepared to do so.
- Buildings that are less than two years old that have <u>not</u> been certified under LEED-NC can register to participate in LEED-EB but must reach two years of age before LEED-EB certification will be awarded by USGBC.

Submittals – Initial LEED-EB Certification

- ❑ Provide a statement that the building covered by the certification application will be at least two years old before certification is received.

OR

- ❑ If the building will be less than two years old when certification is received, provide a statement that the building covered by the certification application has been previously certified under LEED-NC.

Submittals – LEED-EB Re-Certification

- ❑ Provide all dates of previous LEED-NC or LEED-EB certifications.

Potential Technologies & Strategies

Project teams with control over the design and construction of new buildings are encouraged to register and earn certification under LEED-NC and then apply for ongoing recertification under LEED-EB. If this opportunity has been missed for a building less than two years old, project teams may register the building for LEED-EB and utilize the reporting and documentation tools available to registered LEED-EB projects. Early implementation of sustainable operations and maintenance strategies coupled with data collection and documentation of performance will enable buildings to achieve LEED-EB certification once the building is two years old.

SS Credit 1.1 & 1.2 Plan for Green Site and Building Exterior Management

1–2 Points

Intent

Encourage grounds/site/building exterior management practices that have the lowest environmental impact possible and preserve ecological integrity, enhance diversity and protect wildlife while supporting building performance and integration into surrounding landscapes.

Requirements

Have in place over the performance period a low-impact site and green building exterior management plan that addresses the topics listed below. One point is earned for each four items addressed.

1. Maintenance equipment
2. Plantings
3. Animal and vegetation pest control
4. Landscape waste
5. Irrigation management
6. Fertilizer use
7. Snow removal (where applicable)
8. Cleaning of building exterior
9. Paints and sealants used on building exterior
10. Other maintenance of the building exterior

Submittals – Initial LEED-EB Certification

- ❑ Provide a narrative overview of an organizational management plan for establishing/maintaining a low-impact site and building exterior plan that addresses and specifically highlights the actions from the list in the requirements that are being implemented.
- ❑ Provide quarterly reports over performance period documenting that this management plan is being implemented on an ongoing basis.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If there has been no change to the organizational management plan for establishing/maintaining a low-impact site and building exterior plan, clearly state this in update.

OR

- ❑ If there have been changes to the organizational management plan for establishing/maintaining a low-impact site and building exterior plan, provide an updated narrative overview of this plan that addresses and specifically highlights the actions from the list in the requirements that are being implemented.

Provide performance documentation:

- ❑ Provide quarterly reports over the performance period documenting that the organizational management plan is being implemented on an ongoing basis.

Potential Technologies & Strategies

Have in place over the performance period a low-impact site and green building exterior management plan that addresses overall site management practices, chemical/fertilizer/pest management/snow removal practices, building exterior cleaning and maintenance practices.

Include green cleaning and maintenance practices and materials that minimize environmental impacts in the green building exterior management plan.

Also include green landscape management actions, such as using a greater variety of plants, using more native plants, reducing size of lawns, changing maintenance practices, reducing the use of power equipment, stormwater control, using fertilizer on an as-needed basis, composting waste, applying integrated pest management, creating wildlife habitat, avoiding/removing invasive plants, protecting natural areas and using plants to reduce heating and cooling needs.

Utilize Integrated Pest Management (IPM), a safer and usually less costly option for effective pest management. An IPM program employs commonsense strategies to reduce sources of food, water and shelter for pests in buildings and on the grounds. IPM programs take advantage of effective pest management strategies and minimize the use of pesticides.

Use mulching mowers to significantly reduce yard waste generation, fertilizer needs and water consumption through retention of organic matter.

SS Credit 2 High Development Density Building and Area

1 Point

Intent

Channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.

Requirements

Occupy a building that has a density of at least 60,000 square feet of building floor space per acre located within an area with a density of at least 60,000 square feet of building floor space per acre (two-story downtown development). The goal is to encourage the occupancy of high development density buildings in high development density areas. Once earned and for subsequent re-certifications, the only requirement is that the building itself have the required density.

Submittals – Initial LEED-EB Certification

The following must be provided for the first time this point is earned:

- ❑ A signed statement that the building meets the required development density.
- ❑ A signed statement that the buildings in the surrounding area meet the required development density.
- ❑ Calculations showing that the building has a density of at least 60,000 square feet of building floor space per acre area.
- ❑ An area map and calculations showing that on average the buildings in the surrounding downtown area are at least two stories tall.

Submittals – LEED-EB Re-Certification

In re-certifications after this point has been earned once, only the following must be provided:

- ❑ A signed statement that the building meets the required development density.
- ❑ Calculations showing that the building has a density of at least 60,000 square feet of building floor space per acre area.

Potential Technologies & Strategies

Give preference to urban sites by occupying high development density buildings in urban areas with high development density.

SS Credit 3.1 Alternative Transportation: Public Transportation Access

1 Point

Intent

Reduce pollution and land development impacts from automobile use.

Requirements

Meet the criteria of at least one of the following three options:

Option A

- The building is located within 1/2 mile of a commuter rail, light rail or subway station.

Option B

- The building is located within 1/4 mile of two or more public or campus bus lines usable by building occupants.

Option C

- Building occupants are provided with a conveyance (shuttle link) that supplies transportation between the building and public transportation meeting the criteria in Option A or Option B above.

Submittals – Initial LEED-EB Certification

- ❑ Provide an area drawing or transit map highlighting the building location, the fixed rail stations and bus lines. Include a scale bar for distance measurement and indicate the distance between the building and each service.
- ❑ Provide records and results of quarterly contacts over the performance period with transit services to verify that service continues to be provided within specified distances from the building.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ Provide a signed statement declaring that there have been no changes to the distance between the building and the fixed rail stations and bus lines.

OR

- ❑ If there have been changes since the previous filing, provide updated information that meets initial LEED-EB filings requirements for Option A, B or C above.

Provide performance documentation:

- ❑ Provide records and results of quarterly contacts over the performance period with transit services to verify that service continues to be provided within specified distances from the building.

Potential Technologies & Strategies

Survey potential building occupants and determine if available mass transportation options meet their needs. Use existing transportation networks to minimize the need for new transportation lines. Provide sidewalks, paths and walkways to existing mass transit stops. Provide incentives such as transit passes to encourage occupants to use mass transit. Include the option of telecommuting in the building design and size facilities appropriately. Encourage off-site work as this reduces office space requirements and employee facilities. Engage public transportation link service providers. Explore the possibility of sharing facilities with other groups for transportation link services.

SS Credit 3.2 Alternative Transportation: Bicycle Storage & Changing Rooms

1 Point

Intent

Reduce pollution and land development impacts from automobile use.

Requirements

For commercial or institutional buildings, provide secure bicycle storage with convenient changing/shower facilities (within 200 yards of the building) for regular building occupants. Maintain bike storage and shower capacity that is sufficient for the greater of 1% of the building occupants or 125% of peak demand for these facilities.

For residential buildings, provide covered storage facilities for securing bicycles for 15% or more of building occupants in lieu of changing/shower facilities. These facilities may be provided incrementally as long as the capacity of the facilities supplied exceeds the demand for these facilities.

In campus settings, if secure bicycle storage and showers are provided for all buildings occupants on a campus-wide basis, the maximum distance from individual buildings to showers requirement can be replaced with a requirement that two lines be drawn at 90 degrees to each other through the center of the campus on a campus map and that it be documented that the bicycle storage and showers requirements are met for all buildings occupants within each quadrant.

Submittals – Initial LEED-EB Certification

- ❑ Provide site drawings (drawings showing where the showers and bike storage are located do not need to be the original building architectural drawings of the building), product cut sheets and/or photographs highlighting:
  - Bicycle securing apparatus.
  - Changing/shower facilities.
- ❑ Provide records and results of quarterly inspections over the performance period to verify that the initially identified number of bicycle securing apparatus and shower/changing facilities continue to be available and that bicycle storage peak usage is being tracked on a quarterly basis.
- ❑ Provide record of quarterly assessments of the number to building occupants and associated calculations to verify that these facilities continue to meet the credit requirements.
- ❑ If a LEED-NC certified building is less than two years old:
  - Document that secure bicycle storage with convenient changing/shower facilities (within 200 yards of the building) are provided for at least 5% of all building users.
- ❑ If building is more than two years old, document that:
  (1) The initially installed bike storage capacity is equal to the greater of the following:
    a) 125% of the peak demand for bicycle parking.
    b) 1% of the full-time equivalent building users.
  (2) The initially provided shower capacity is adequate based on required bike storage capacity calculated in (1) above.

(3) The bike storage capacity has been increased within six months for each time there is an increase in peak usage so that the bike storage capacity is maintained at 125% of the peak demand for bicycle parking until a maximum bike storage capacity of 5% of the building users is reached.

(4) The number of showers has been increased to provide the required shower capacity for any increase in the required number of bike storage identified in (3) above.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ Provide a signed statement declaring that there have been no changes to either number of building users, bike storage capacity or shower/changing facilities and that these facilities continue to meet the needs of the building occupants.
- ❑ Provide quarterly checks on the number to building occupants to verify that the bike storage capacity or shower/changing facilities continue to meet the needs of the building users and that bicycle storage peak usage is being tracked on a quarterly basis.

OR

If there have been changes in the number of building users and/or storage/shower/changing facilities, provide:

- ❒ Current site drawings, product cut sheets and/or photographs highlighting:
  - Bicycle securing apparatus.
  - Changing/shower facilities.

Provide performance documentation:

- ❑ Provide records and results of quarterly inspections to verify that the initially identified number of bicycle securing apparatus and shower/changing facilities continue to be available and that bicycle storage peak usage is being tracked on a quarterly basis.
- ❑ Provide a record of quarterly assessments of the number of building users and associated calculations to verify that these facilities continue to meet the credit requirements.
- ❑ Document that:

  (1) The installed bike storage capacity continues to be the greater than the larger of the following:

    a) 125% of the peak demand for bicycle parking.

    b) 1% of the full-time equivalent building users.

  (2) The bike storage capacity has been increased as necessary (within six months of identification of need), each time there has been an increase in peak usage so that the bike storage capacity is maintained at 125% of the peak demand for bicycle parking until a maximum bike storage capacity of 5% of the building users is reached.

  (3) That the provided shower capacity continues to be adequate based on required bike storage capacity calculated in (1) above.

Potential Technologies & Strategies

Add or maintain building transportation amenities such as bicycle storage (racks) and showering/changing facilities.

SS Credit 3.3 Alternative Transportation: Alternative Fuel Vehicles

1 Point

Intent

Reduce pollution and land development impacts from automobile use.

Requirements

Have a communication program in place over the performance period that promotes the use of alternative fuel vehicles for building occupants. In addition, meet the criteria of at least one of the following three options:

Option A

- Alternative fuel refueling station(s) for 3% of the total vehicle parking capacity of the site. NOTE: liquid or gaseous fueling facilities must be separately ventilated or located outdoors.

Option B

- Provide (or achieve result in some other way) alternative fuel vehicles or hybrid vehicles for 3% of building occupants.
- Provide preferred parking for these vehicles.

Option C

- Provide preferred parking programs for hybrid or alternative fuel vehicles for at least 3% of the total vehicle parking capacity and increase as necessary the amount of preferred parking to meet the demand for preferred parking up to 10% or more of the total vehicle parking capacity.

Submittals – Initial LEED-EB Certification

Option A

- ❑ Provide specifications and site drawings documenting that the installed alternative fuel refueling stations have the capacity to accommodate 3% or more of the total vehicle parking capacity.
- ❑ Provide records and results of quarterly inspections to verify that the initial alternative fueling capacity continues to be available.
- ❑ Provide evidence that the program to promote use of alternative fuel vehicles is communicated to building occupants.
- ❑ Perform quarterly checks of the total vehicle parking capacity to verify that these refueling facilities continue to have the capacity to accommodate 3% or more of the total vehicle parking requirements.

Option B

- ❑ Provide proof of ownership or lease agreement of at least two years to prove that alternative fuel vehicles are being provided for 3% of building occupants.
- ❑ Provide specifications and site drawings documenting that preferred parking is being provided for these vehicles.
- ❑ Provide evidence that the program to promote use of alternative fuel vehicles is communicated to building occupants.

- Perform quarterly checks of the total vehicle parking capacity to verify that alternative fuel vehicles continue to be provided to accommodate 3% or more of the total vehicle parking requirements.

<u>Option C</u>

- Provide specifications and site drawings and calculations documenting that:
  - Preferred parking for hybrid or alternative fuel vehicles is being provided for at least 3% of the total vehicle parking capacity
  - The amount of preferred parking has been increased as necessary so that the amount of preferred parking meets the demand for this preferred parking up to 10% or more of the total vehicle parking capacity.
- Perform quarterly checks of the total vehicle parking capacity to verify that preferred parking for alternative fuel vehicles continues to be provided and that it continues to meets the demand for this preferred parking up to 10% or more of the total vehicle parking capacity.
- Provide evidence that the program to promote use of hybrid vehicles is communicated to building occupants.

Submittals – LEED-EB Re-Certification

- If no changes in parking or building occupancy have occurred, provide a signed letter stating that there have been no changes, and reaffirm that the alternative fuel vehicle strategy certified in the initial LEED-EB Certification remains valid.

OR

- If there have been any changes to how option (A), (B) or (C) above is being met, provide documentation of the nature of any such changes. Provide specifications, drawings, calculations and the results from quarterly inspections over the performance period to demonstrate that the requirements certified under the initial LEED-EB Certification continue to be met and that the annual capacity of the alternative refueling stations meets demand.

Potential Technologies & Strategies

Provide transportation amenities such as alternative fuel refueling stations. Provide preferred parking for alternate fueled vehicles or hybrid vehicles. Provide alternate fueled or hybrid vehicles to building occupants or find a market-based way to get building occupants to drive alternative fuel or hybrid vehicles.

SS Credit 3.4 Alternative Transportation: Car Pooling and Telecommuting

1 Point

Intent

Reduce pollution and land development impacts from single-occupancy vehicle use.

Requirements

Option A

- Provide preferred parking and implement/document programs and policies for car pools or van pools capable of serving 5% of the building occupants and add no new parking.

Option B

- Operate an occupant telecommuting program over the performance period that reduces commuting frequency by 20% for 20% or more of the building occupants and provides the necessary communications infrastructure in the building to accommodate telecommuting.

Submittals – Initial LEED-EB Certification

Option A

- ❑ Provide a description, calculations, parking plan and company literature describing carpool and vanpool programs designed to serve 5% of the building occupants.
- ❑ Submit a summary for the performance period and an excerpt from underlying daily or weekly reports on car pool and van pool usage.
- ❑ Submit a letter verifying that the project has added no new parking over the performance period.

Option B

- ❑ Provide a detailed description of telecommuting program (including specific information on baselines, assumptions and calculation methodology) designed to reduce the commuting frequency by 20% for 20% or more of the building occupants.
- ❑ Submit a summary for the performance period and an excerpt from underlying daily or weekly reports on telecommuting participation documenting that this program is reducing the commuting frequency by 20% for 20% or more of the building occupants on an average basis over the performance period.

Submittals – LEED-EB Re-Certification

- ❑ Provide a letter of verification that there have been no changes that affect the building's achievement of the requirements of the credit.

OR

Option A

- ❑ If there have been changes in any of the credit achievement requirements:
  - Submit a summary for the performance period and an excerpt from underlying daily or weekly reports on car pool and van pool usage.

- Submit a letter verifying that the project has added no new parking over the performance period.

Option B

- Provide a detailed description of telecommuting program (including specific information on baselines, assumptions and calculation methodology) designed to reduce the commuting frequency by 20% for 20% or more of the building occupants.
- Submit a summary for the performance period and excerpts from underlying daily or weekly reports on telecommuting participation documenting that this program is reducing the commuting frequency by 20% for 20% or more of the building occupants on an average basis over the performance period.

Potential Technologies & Strategies

Provide incentives for using car pooling or telecommuting to encourage occupants to reduce vehicle miles traveled. Include the option of telecommuting in the building design and size facilities appropriately. Encourage off-site work as this reduces office space requirements and employee facilities.

Encourage car pooling through initiatives such as preferred parking areas for high-occupancy vehicles (HOV) and the elimination of parking subsidies for non–car pool vehicles.

SS Credit 4.1 & 4.2 Reduced Site Disturbance–Protect or Restore Open Space

1-2 Points

Intent

Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements

Have in place over the performance period, native or adapted vegetation or other ecologically appropriate features:

- SS Credit 4.1: Covering a minimum of 50% of the site area excluding the building footprint. (1 point)
- SS Credit 4.2: Covering a minimum of 75% of the site area excluding the building footprint. (1 point)

Improving/maintaining off-site areas with native or adapted plants or other ecologically appropriate features can count toward earning both SS Credit 4.1 and 4.2. Every 2 square feet off-site will be counted as 1 square foot on-site. Off-site areas must be documented with a contract with the owner of the off-site area that specifies the required improvement and maintenance of the off-site area.

Native/Adapted Plants are those that are indigenous to a locality or cultivars of native plant materials that have adapted to the local climate and are not considered invasive species or noxious weeds. Such plants require only limited irrigation water for sustenance once established, and do not require active maintenance such as mowing. Native/Adapted Plants should provide habitat value and promote biodiversity through avoidance of monoculture plantings.

Other ecologically appropriate features are natural site elements beyond vegetation that maintain or restore the ecological integrity of the site, and may include water bodies, exposed rock, un-vegetated ground, or other features that are part of the historic natural landscape within the region and provide habitat value.

Submittals – Initial LEED-EB Certification

- Provide highlighted site drawings with area calculations demonstrating that the declared percentage of the site area excluding the building footprint has been covered with native or adapted vegetation or other ecologically appropriate features over the performance period.
- Provide a list of the native or adapted plants used in earning this credit.
- Provide records and results of quarterly inspections for performance period to show that the declared percentage of the site area excluding the build footprint remains covered with native or adapted vegetation or other ecologically appropriate features.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- Provide a letter stating that no change has occurred if there has been no change in the site area.
- Provide summary results of quarterly inspections over the performance period to document that the declared percentage of the site area excluding the build footprint remains covered with native or adapted vegetation or other ecologically appropriate features.

OR

- ❑ If there have been changes since the previous filing, provide the same information as is required for initial LEED-EB filings.

Potential Technologies & Strategies

Perform a site survey to identify site elements and adopt a master plan for management of the building site. Activities may include removing excessive paved areas and replacing them with landscaped areas, or replacing excessive turf-grass area with natural landscape features. Work with local horticultural extension services or native plant societies to select and maintain indigenous plant species for site restoration and landscaping. Coordinate with activities, technologies and strategies under SSc1.

SS Credit 5.1 & 5.2 Stormwater Management: Rate and Quantity Reduction 1–2 Points

Intent

Limit disruption and pollution of natural water flows by managing stormwater runoff.

Requirements

Have a stormwater management plan in place over the performance period that is designed to mitigate runoff from the site. Mitigated stormwater is the volume of precipitation falling on the site that does not become runoff by leaving the site via means of uncontrolled surface streams, rivers, drains, or sewers. This mitigation can be accomplished through a variety of measures including perviousness of site, stormwater management practices (structural and non structural), capture of rainwater for reuse or other measures.

- SS Credit 5.1: Have measures in place on the site that mitigate at least 25% of the annual stormwater falling on the site. (1 point)

- SS Credit 5.2: Have measures in place on the site that mitigate at least 50% of the annual stormwater falling on the site. (1 point)

Submittals – Initial LEED-EB Certification

- ❑ Document Stormwater Runoff Mitigation.
  - Provide a narrative description and calculations showing the impact of the implemented stormwater management plan and the annual stormwater falling on the site mitigation percentage provided.
  - Provide records and results of quarterly inspections over the performance period to determine if the stormwater management plan on the site is being maintained and functions properly.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If there has been no change to the stormwater management plan since previous LEED-EB filing, provide statement that there has been no change.
- ❑ If there has been a change to the stormwater management plan since previous LEED-EB filing, provide updated information.
  - Provide a narrative description and calculations showing the impact of the stormwater management plan that has been implemented and how much mitigation of the annual stormwater load on the site it provides.
  - Provide records and results of quarterly inspections over the performance period to determine if the stormwater management plan has been implemented on the site is being maintained and functions properly.

Potential Technologies & Strategies

Increase perviousness by reducing the amount of impervious surface area or replace with permeable alternatives (e.g., paving blocks, porous concrete, green/vegetated roofs). Capture rainwater from impervious areas of the building for groundwater recharge or reuse within building. Use green/vegetated roofs. Utilize biologically based and innovative stormwater management features for pollutant load reduction such as constructed wetlands, stormwater filtering systems, bioswales, bioretention basins or filters and vegetated filterstrips.

SS Credit 6.1 Heat Island Reduction: Non-Roof

1 Point

Intent

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirements

Choose one of the following options:

Option A

- Provide (from existing canopy or within five years of landscape installation) shade on at least 30% of non-roof impervious surfaces on the site, including parking lots, walkways, plazas, etc.

Option B

- Use/maintain light-colored/high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces on the site, including parking lots, walkways, plazas, etc.

Option C

- Place/maintain a minimum of 50% of parking space underground.

Option D

- Use/maintain an open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area.

Submittals – Initial LEED-EB Certification

In addition to the documentation required for each specific compliance path, provide records and results of quarterly inspections over the performance period to determine that one of the following features are being maintained:

Option A

- ❑ Provide site plan highlighting all non-roof impervious surfaces and portions of these surfaces that will be shaded within five years. Include calculations demonstrating that a minimum of 30% of non-roof impervious surface areas will be shaded within five years.

Option B

- ❑ Provide third-party reflectance documentation, site plan, calculations and photographs documenting use of high-albedo materials on 30% of non-roof impervious surfaces.

Option C

- ❑ Provide a parking plan demonstrating that a minimum of 50% of site parking spaces are located underground.

Option D

- ❑ Provide third-party documentation on paving system perviousness, site plan, calculations and photographs for a pervious paving system with a minimum perviousness of 50%. Include calculations demonstrating that this paving system covers a minimum of 50% of the total parking area.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❐ If no change in the policies or techniques used to earn this credit has occurred, provide records and results of quarterly inspections over the performance period to determine that the specific feature used to earn this credit is being maintained.

OR

- ❐ If the policy or technique used to earn this credit in previous LEED-EB Certifications has changed, in addition to the documentation required for each specific compliance path, provide records and results of quarterly inspections over the performance period to demonstrate that the requirements continue to be met and maintained to reduce heat islands in non-roof areas.

Potential Technologies & Strategies

Employ strategies, materials and landscaping techniques that reduce heat absorption of exterior materials. Provide shade (calculated on June 21, noon solar time) using native or climate tolerant trees and large shrubs, vegetated trellises or other exterior structures supporting vegetation. Explore elimination of blacktop and the use of new coatings and integral colorants for asphalt to achieve light-colored surfaces. Position photovoltaic cells to shade impervious surfaces.

SS Credit 6.2 Heat Island Reduction: Roof

1 Point

Intent

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirements

Option A

- Have in place over the performance period ENERGY STAR®–compliant, high-reflectance and high emissivity roofing material that has a minimum emissivity of 0.9 when tested in accordance with ASTM 408 for a minimum of 75% of the roof surface.
- Provide records and results of quarterly inspections over the performance period to determine that these features are being maintained.

Option B

- Install/maintain a "green" (vegetated) roof for at least 50% of the roof area.
- Provide records and results of quarterly inspections over the performance period to determine that these features are being maintained.

Combinations of roofing materials that meet the requirements of Option A and Option B can be used providing they collectively cover the designated area. See the LEED-EB Reference Guide for guidance on calculating achievement of credit requirements based on using a combination of Option A and B roofing materials.

Submittals – Initial LEED-EB Certification

Option A

- ❑ Provide documentation demonstrating that roofing meets roofing material requirements of Option A. Documentation must include a roof plan, photographs and measurements of reflectance and emissivity. Manufacturer measurements are acceptable if the materials have been in place less than five years. If the materials have been in place more that five years, current measurements must be provided.
- ❑ Include area calculations demonstrating that the roofing material covers a minimum of 75% of the total roof area.
- ❑ Provide records and results of quarterly inspections over the performance period to determine that these features are being maintained.

Option B

- ❑ Provide documentation demonstrating that the requirements of Option B are met.
- ❑ Provide photographs and a roof plan documenting the installation/maintenance of a green vegetated roof system. Include a description of the green roof system being used and the types of vegetation being grown in the green roof. Include area calculations demonstrating that the roof system covering a minimum or 50% of the total roof area.

- Provide records and results of quarterly inspections over the performance period to determine that these features are being maintained.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- If no change in the policies or techniques used to earn this credit has occurred, provide records and results of quarterly inspections over the performance period to determine that the specific features used to earn this credit are being maintained.

OR

- If the policy or technique used to earn this credit in previous LEED-EB Certifications has changed, in addition to the documentation required for each specific compliance path, provide records and results of quarterly inspections over the performance period to determine that the roofing area continues to meet the requirements of Options A or B.

Potential Technologies & Strategies

Visit the ENERGY STAR Web site, www.energystar.gov, to research compliant products. Consider installing high-albedo and vegetated roofs to reduce heat absorption.

SS Credit 7 Light Pollution Reduction

1 Point

Intent

Eliminate light trespass from the building and site, improve night sky access and reduce development impact on nocturnal environments.

Requirements

Option A

- Light to the Night Sky
  - Shield all outdoor luminaries 50 watts and over so that they do not directly emit light to the night sky.

  OR
  - Provide calculations showing that less then 5% of light emitted by all outdoor lighting reach the night sky on an annual basis.
- Light Trespass
  - With the building interior, exterior and site lights on and off, measure the illumination levels at the same locations at regular intervals around the perimeter of the property. At least eight measurements are required with documentation that the measurements made are sufficient in quantity to be representative of the illumination levels on the perimeter of the property. The property perimeter illumination levels measured with the lights on must not be more than 10% above the levels measured with the lights off.
- Performance
  - Provide records and results of quarterly inspections to determine if required features are being maintained.

Option B

- Light to the Night Sky
  - Shield all outdoor luminaries 50 watts and over so that they do not directly emit light to the night sky.

  OR
  - Provide calculations showing that less then 5% of light emitted by all outdoor lighting reach the night sky on an annual basis.
- Light Trespass
  - Provide calculations showing that the maximum candela value of all interior lighting falls within the building (not out through windows) and the maximum candela value of all exterior lighting falls within the property. Provide documentation that all luminaires within a distance of 2.5 times their mounting height from the property line have shielding that allows less that 5% of the light from these fixtures to cross the property boundary.
- Performance
  - Provide records and results of quarterly inspections to determine if required features are being maintained.

Submittals – Initial LEED-EB Certification

Option A

- ❐ Provide documentation showing that the requirements for Option A have been met.

Option B

- ❐ Provide documentation showing that the requirements for Option B have been met.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If changes have occurred that affect the site or building lighting, provide updated documentation that the site or building lighting continues to meet the certification submittal requirements for Option A or B.

Provide performance documentation:

- ❑ Provide records and results of quarterly inspections over the performance period to show that the requirements for Option A or B continue to be maintained.

Potential Technologies & Strategies

Implement site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution. Minimize site lighting where possible and model the site lighting using a computer model to predict impacts when changing lighting. Technologies to reduce light pollution include full cutoff luminaries and low-reflectance surfaces.

Water Efficiency (WE)

WE Prerequisite 1 Minimum Water Efficiency

Required

Intent

Maximize fixture water efficiency within buildings to reduce the burden on potable water supply and wastewater systems.

Requirements

Reduce fixture potable water usage to a level equal to or below water use baseline, calculated as 120% of the water usage that would result if 100% of the total building fixture count were outfitted with plumbing fixtures that meet the Energy Policy Act of 1992 fixture performance requirements. If the building does not have separate metering for each water use (fixture use, process use, irrigation and other uses), the water use reduction achievements can be demonstrated with calculations. At least one meter for the overall building water use is required and metering for cooling towers and other process water uses are encouraged but not required.

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation show the baseline calculations. The baseline is calculated as 120% of the water usage that would result if 100% of the total building fixture count were outfitted with plumbing fixtures that meet the Energy Policy Act of 1992 fixture performance requirements.
- ❑ Demonstrate that the existing building fixture potable water use over the performance period is equal to or less than the baseline. Do this by providing annual water meter data for the performance period for potable water use inside the building OR by providing calculations, fixture cut sheets, and photographs.
- ❑ Provide calculations showing fixture potable water use per occupant and per square foot.

Submittals – LEED-EB Re-Certification

- ❑ If there has been no change to building potable water consumption relative to the 120% baseline since the previous LEED-EB filing:
  - Provide a statement that there has been no change.
  - Provide quarterly and annual fixture potable water meter data for water use inside the building showing that the annual potable water use is equal to or less than the calculated baseline over the performance period OR provide a statement confirming that the calculations, fixture cut sheets, and photographs initially submitted to demonstrate fixture potable water use are still valid.
- ❑ If there has been a change to building fixture potable water consumption relative to the 120% baseline, provide the same information as is required for initial LEED-EB filings.

Potential Technologies & Strategies

Reduce fixture potable water usage through automatic water control systems. Install, where possible, water-conserving plumbing fixtures that meet or exceed Energy Policy Act of 1992 fixture requirements in combination with ultra high efficiency or dry fixture and control technologies.

WE Prerequisite 2 Discharge Water Compliance

Required

Intent

Protect natural habitat, waterways and water supply from pollutants carried by building discharge water.

Requirements

<u>Option A</u>

If regulated by EPA National Pollution Discharge Elimination System (NPDES) Clean Water Act requirements, demonstrate NPDES permit compliance including use of any required oil separators, grease interceptors and other filtration for in-building generated discharges and proper disposal of any wastes collected.

<u>Option B</u>

If the facility is not regulated by a NPDES Permit, this prerequisite is achieved.

Submittals – Initial LEED-EB Certification

<u>Option A</u>

- ❑ If regulated by the EPA NPDES Clean Water Act requirements, provide documentation demonstrating ongoing NPDES permit compliance and ongoing discharge monitoring reporting (DMR) over the performance period being reported.

<u>Option B</u>

- ❑ Provide a letter of confirmation that the facility is not regulated by the EPA NPDES Clean Water Act requirements.

Submittals – LEED-EB Re-Certification

<u>Option A</u>

- ❑ If regulated by the EPA NPDES Clean Water Act requirements, provide documentation demonstrating ongoing NPDES permit compliance and ongoing discharge monitoring reporting (DMR) over the year being reported.

<u>Option B</u>

- ❑ Provide a letter of reconfirmation that the facility is not regulated by the EPA NPDES Clean Water Act requirements.

Potential Technologies & Strategies

If applicable, follow NPDES requirements and links to technical information on the EPA requirements. Establish a discharge monitoring report (DMR) process to bring and keep the NPDES Permit into compliance.

WE Credit 1.1 & 1.2 Water Efficient Landscaping–Reduce Water Use

1–2 Points

Intent

Limit or eliminate the use of potable water for landscape irrigation.

Requirements

Use high-efficiency irrigation technology, captured rain/recycled site water, or landscaping and other techniques to reduce potable water consumption for irrigation in comparison to conventional means of irrigation. If the building does not have separate metering for each water use (fixture use, process use, irrigation and other uses), the water use reduction achievements can be demonstrated with calculations. At least one meter for the overall building water use is required and metering for cooling towers and other process water use is encouraged but not required. In urban settings, where there is no lawn, credits can be earned by reducing the use of potable water for watering any roof/courtyard garden space or outdoor planters.

- WE Credit 1.1: 50% reduction in potable water use for irrigation over conventional means of irrigation. (1 point)
- WE Credit 1.2: 95% reduction in potable water use for irrigation over conventional means of irrigation. (1 point)

Submittals – Initial LEED-EB Certification

- ❑ Provide a brief narrative description, system schematics, photographs and calculations or meter readings demonstrating how much potable water use for irrigation is reduced in comparison to conventional means of irrigation. The head of facility management for the facility is required to sign off on the calculation of reduction in the amount of potable water used for irrigation.
- ❑ Provide a description of the type of irrigation system that is "conventional" in the area and the extent that the conventional type of irrigation system is used in the area.
- ❑ Provide quarterly reports over the performance period that document the maintenance activities implemented to ensure proper operation of the irrigation system.

Submittals – LEED-EB Re-Certification

- ❑ If there has been no change to the irrigation system or organizational policy regarding landscape irrigation:
  - Provide a letter stating that there has been no change.
  - Provide quarterly water meter readings for the performance period demonstrating how much the potable water use for irrigation is reduced in comparison to conventional means of irrigation OR provide a statement confirming that the calculations initially submitted to demonstrate irrigation water use are still valid OR update these calculations if conditions have changed.
  - Provide quarterly reports for the performance period that document the maintenance activities implemented to ensure proper operation of the irrigation system.

OR

- If there has been a change to the irrigation system or organizational policy regarding landscape irrigation, provide a brief narrative description, system schematics, photographs and calculations demonstrating how much potable water use for irrigation is reduced in comparison to conventional means of irrigation.

  The head of facility management for the facility is required to sign off on the calculation of reduction in the amount of potable water used for irrigation.

- Provide quarterly reports over the performance period that document the maintenance activities implemented to ensure proper operation of the irrigation system.

Potential Technologies & Strategies

Specify water-efficient, native or adapted, climate-tolerant plantings. Implement or maintain high-efficiency irrigation technologies that include micro irrigation, moisture sensors or weather data-based controllers. Feed irrigation systems with captured rainwater, gray water (site or municipal) or on-site treated wastewater. Consider not operating an irrigation system. Consider use of xeriscaping principles in dry/arid climates.

WE Credit 2 Innovative Wastewater Technologies

1 Point

Intent

Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Requirements

Option A

- Reduce use of potable water for building sewage conveyance by 50%, based on water use baseline calculated for WE Prerequisite 1.

Option B

- Treat 100% of wastewater on site to tertiary standards.

Submittals – Initial LEED-EB Certification

Option A

- ❑ Provide a narrative description of measures implemented to reduce potable water sewage conveyance. Include calculations demonstrating that potable water sewage conveyance volumes are reduced by 50% over baseline conditions.
- ❑ Provide quarterly and annual water meter data over the performance period showing that 50% reduction is being achieved on an average annual basis.

Option B

- ❑ Provide a narrative description and schematic drawings detailing equipment locations and that 100% of building wastewater is directed to an on-site wastewater treatment system that provides treatment to tertiary levels. Include a letter from the local health department documenting compliance with local code.
- ❑ Provide quarterly water meter readings over the performance period documenting that 100% of building wastewater volume is directed to on-site wastewater treatment system that provides treatment to tertiary levels.

Note: If the building does not have separate metering for each water use (fixture use, process use, irrigation and other uses), the water use reduction achievements can be demonstrated with calculations.

Submittals – LEED-EB Re-Certification

- ❑ If there has been no change to the wastewater conveyance system or organizational policy regarding wastewater, provide quarterly and annual water meter data over the performance period showing that the requirements of Option A or B continue to be met.

OR

- ❑ If there has been a change to the wastewater conveyance system or organizational policy regarding wastewater, provide the same information as is required under Option A or B for initial LEED-EB filings.

Potential Technologies & Strategies

Implement decentralized on-site wastewater treatment and reuse systems. Decrease the use of potable water for sewage conveyance by utilizing gray and/or black water systems. Non-potable reuse opportunities include toilet flushing, landscape irrigation, etc. Provide advanced wastewater treatment after use by employing innovative, ecological, on-site technologies including constructed wetlands, a mechanical re-circulating sand filter or aerobic treatment systems. For wastewater treatment systems, employ treatment methods appropriate to the requirement of state and local regulatory authorities for effluent disposal. Where possible, adopt innovative treatment systems that minimize energy use, and dispose of treated effluent by applying it to the land, either by surface application or subsurface dispersal. Utilize systems that re-circulate and reuse water to reduce water use.

WE Credit 3.1 & 3.2 Water Use Reduction

1–2 Points

Intent

Maximize fixture potable water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirements

Have in place over the performance period strategies and systems that in aggregate produce a reduction of fixture potable water use from the calculated fixture water usage baseline established in WE Prerequisite 1. If the building does not have separate metering for each water use (fixture use, process use, irrigation and other uses), the water use reduction achievements can be demonstrated for WE 3.1 with calculations. At least one meter for the overall building water use is required and metering for cooling towers and other process water use encouraged but not required. To earn WE 3.2, measured fixture water use demonstrating required level of efficiency must be provided.

- WE 3.1: 10% reduction in fixture water use from the baseline. (1 point)
- WE 3.2: 20% reduction in fixture water use from the baseline. (1 point)

Submittals – Initial LEED-EB Certification

- ❑ Demonstrate the amount of annual fixture potable water use. Do this by providing fixture water meter data for the performance period OR by providing calculations, fixture cut sheets, and photographs (this second method is valid only for Credit 3.1).
- ❐ Provide annual water meter data for total water use in the building.

Submittals – LEED-EB Re-Certification

- ❐ Demonstrate the amount of annual fixture potable water use. Do this by providing fixture water meter data for the performance period OR by providing calculations, fixture cut sheets, and photographs (this second method is valid only for Credit 3.1).
- ❐ Provide annual water meter data for total water use in the building.

Potential Technologies & Strategies

Reduce fixture water usage through automatic controls and other actions. Specify water-conserving plumbing fixtures that exceed Energy Policy Act of 1992 fixture requirements in combination with ultra-high efficiency or dry fixture and control technologies.

Energy & Atmosphere (EA)

EA Prerequisite 1 Existing Building Commissioning

Required

Intent

Verify that fundamental building systems and assemblies are performing as intended to meet current needs and sustainability requirements.

Requirements

Verify and ensure that fundamental building elements and systems are installed, calibrated and operating as intended so they can deliver functional and efficient performance. Carry out a comprehensive existing building commissioning including the following procedures:

1. Develop a comprehensive building operation plan that meets the requirements of current building usage, and addresses the heating system, cooling system, humidity control system, lighting system, safety systems and the building automation controls.
2. Prepare a commissioning plan for carrying out the testing of all building systems to verify that they are working according to the specifications of the building operation plan.
3. Implement the commissioning plan documenting all the results.
4. Repair or upgrade all systems components that are found to be not working according to the specifications of the building operation plan.
5. Re-test all building components that required repairs or upgrades to verify that they are working according to the specifications of the building operation plan.

OR

Submit a 1- to 5-Year Plan for continuous improvement of these aspects of commissioning requirements 1-5 until all aspects are completed. During the implementation of the continuous improvement plan, demonstrate continuous improvement on a yearly basis until all aspects are completed. All low-cost and no-cost measures must be implemented in the first two years of the implementation program.

Submittals – Initial LEED-EB Certification

- ❑ A narrative summary of the current building operation plan that highlights major building systems and assemblies.
- ❑ Documentation that all five actions in the Requirements have been completed.

  OR

- ❑ If one or more aspects of the five actions in the Requirements have not been completed, submit a 5-Year Plan that includes a schedule of annual actions that will be implemented in order to complete all five actions in the Requirements within five years.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ A narrative summary of the current building operation plan that highlights major building systems and assemblies.

AND EITHER

- ❑ Documentation that all five actions in the requirements have been completed.

OR

- ❒ If one or more aspects of the five actions in the requirements were not completed in the original submittal, submit a progress report showing that the 5-Year Plan remains on schedule for meeting all of the requirements.

Potential Technologies & Strategies

Begin the commissioning process activities by identifying the current building operating intents (Owner's Operational Requirements) and then proactively make sure that the buildings systems are operating as necessary to meet these operating intents.

EA Prerequisite 2 Minimum Energy Performance

Required

Intent

Establish the minimum level of energy efficiency for the building and systems.

Requirements

Demonstrate that the building has achieved an EPA ENERGY STAR rating of at least 60 utilizing the EPA's Portfolio Manager tool for building types addressed by ENERGY STAR,

OR

For building types not addressed by ENERGY STAR, demonstrate that the building has energy performance equivalent to an ENERGY STAR rating of at least 60, as calculated using the alternate method described in the LEED-EB Reference Guide.

Submittals – Initial LEED-EB Certification

- ❑ If the building type is addressed by ENERGY STAR, provide Portfolio Manager tool output, the Statement of Energy Performance, documenting that the building energy has achieved an EPA ENERGY STAR rating of at least 60.
- ❑ Provide a summary of the annual bills, including cost and usage amounts (kilowatt-hours, therms, gallons, etc.), for each type of energy used by the building.
- ❑ Provide copies of monthly building utility bills for the performance period (at least 3 months).

OR

- ❑ If the building is not a building type addressed by ENERGY STAR, provide calculations showing the building energy efficiency and performance meet the equivalent of an EPA ENERGY STAR rating of at least 60 using the alternate calculation method described in the LEED-EB Reference Guide.
- ❑ Provide a summary of the annual bills including cost and usage amounts (kilowatt-hours, therms, gallons, etc.) for each type of energy used by the building annually over the performance period.
- ❑ Provide copies of monthly building utility bills for the performance period (at least 3 months).

Submittals – LEED-EB Re-Certification

- ❑ If the building type is addressed by ENERGY STAR, provide an updated Statement of Energy Performance documenting that the building continues to maintain an EPA ENERGY STAR rating of at least 60.
- ❑ Provide a summary of the annual bills, including cost and usage amounts (kilowatt-hours, therms, gallons, etc.), for each type of energy used by the building annually over the performance period.
- ❑ Provide copies of monthly of building utility bills for the performance period (at least 12 months).

OR

- ❑ If the building is not a building type addressed by ENERGY STAR, provide calculations showing the building energy efficiency and performance continues to meet the equivalent of an EPA ENERGY STAR rating of at least 60 using the alternate calculation method described in the LEED-EB Reference Guide.

- Provide a summary of the annual bills, including cost and usage amounts (kilowatt-hours, therms, gallons, etc.), for each type of energy used by the building annually over the performance period.
- Provide copies of the most recent 12 months of building utility bills.

Potential Technologies & Strategies

Implement energy-efficiency retrofits and energy-saving techniques to reduce energy use to the level required to meet this prerequisite.

EA Prerequisite 3 Ozone Protection

Required

Intent

Reduce ozone depletion.

Requirements

Zero use of CFC-based refrigerants in HVAC&R base building systems unless a third party (as defined in the LEED-EB Reference Guide) audit shows that system replacement or conversion is not economically feasible.

Definition of required economic analysis: The replacement of a chiller will be considered to be not economically feasible if the simple payback of the replacement is greater than 10 years. To determine the simple payback, divide the cost of implementing the replacement by the annual cost avoidance for energy that results from the replacement and any difference in maintenance costs. If CFC-based refrigerants are maintained in the building, reduce annual leakage to 5% or less using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting and reduce the total leakage over the remaining life of the unit to less than 30% of its refrigerant charge.

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation that base building HVAC&R systems do not use CFCs.

OR

- ❑ Provide results of third-party audit demonstrating that replacement is not economically feasible.
- ❑ Provide documentation showing compliance with EPA Clean Air Act, Title VI, Rule 608 governing refrigerant management and reporting.
- ❑ Provide documentation showing that the annual refrigerant leakage rate is below 5%, and the leakage over the remainder of unit life is being maintained below 30%.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ Provide documentation that base building HVAC&R systems do not use CFCs.

OR

- ❑ Provide results of a current (performed within the last five years) third-party audit demonstrating that replacement is not economically feasible.
- ❑ Provide documentation showing compliance with EPA Clean Air Act, Title VI, Rule 608 governing refrigerant management and reporting.
- ❑ Provide documentation showing that the annual refrigerant leakage rate is below 5% and the leakage over the remainder of unit life is being maintained below 30%.

Potential Technologies & Strategies

Set up loss minimization procedures and systems to meet annual loss minimization standards and reporting requirements.

EA Credit 1 Optimize Energy Performance

1–10 Points

Intent

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Requirements

Demonstrate the EPA ENERGY STAR energy performance rating that the building has achieved. Utilize ENERGY STAR'S Portfolio Manager tool for building types addressed by ENERGY STAR,

OR

For building types not addressed by ENERGY STAR, demonstrate the ENERGY STAR equivalent rating for the building energy use, calculated using the alternate method described in the LEED-EB Reference Guide.

ENERGY STAR Rating	LEED-EB Points
63	1
67	2
71	3
75	4
79	5
83	6
87	7
91	8
95	9
99	10

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Submittals – Initial LEED-EB Certification

- Provide a summary of the annual bills, including cost and usage amounts (kilowatt-hours, therms, gallons, etc.), for each type of energy used by the building annually over the performance period.
- Provide copies of the most recent 12 months of building utility bills including both energy use and peak demand, if available.

AND EITHER

- If the building type is addressed by ENERGY STAR, provide Portfolio Manager tool output, the Statement of Energy Performance, documenting the building EPA ENERGY STAR rating over the performance period.
- If previously certified under LEED-NC, provide for the baseline (budget) building and design building projected energy consumption, projected peak demand and the energy points earned under LEED-NC.

OR

- If the building type is not addressed by ENERGY STAR, provide calculations showing the equivalent EPA ENERGY STAR rating for the building calculated using the alternate calculation method described in the LEED-EB Reference Guide.

Submittals – LEED-EB Re-Certification

Where documentation has been provided for EA Prerequisite 2, simply reference that material.

AND EITHER

- If the building type is addressed by ENERGY STAR, provide Portfolio Manager tool output, the Statement of Energy Performance, documenting the building EPA ENERGY STAR rating over the performance period.

OR

- If the building type is not addressed by ENERGY STAR, provide calculations showing equivalent EPA ENERGY STAR rating for the building calculated using the alternate calculation method described in the LEED-EB Reference Guide over the performance period.

Potential Technologies & Strategies

Implement energy-efficiency retrofits and energy-saving techniques to reduce energy use to the level required to meet this credit

EA Credit 2.1–2.4 On-Site and Off-Site Renewable Energy

1–4 Points

Intent

Encourage and recognize increasing levels of on-site and off-site renewable energy in order to reduce environmental impacts associated with fossil fuel energy use.

Requirements

Over the performance period, meet some or all of the building's total energy use through the use of on-site or off-site renewable energy systems. Points are earned according to the following table. The percentages shown in the table are the percentage of building energy use over the performance period that is met by renewable energy.

Off-site renewable energy sources are as defined by the Center for Resource Solutions (CRS) Green-e products certification requirements or the equivalent. Green power may be procured from a Green-e certified power marketer, a Green-e accredited utility program, or through Green-e certified Tradable Renewable Certificates or the equivalent. At least 25% of any off-site green power or Green Certificates used to earn this credit needs to be from new sources (sources constructed after 1997). For on-site renewable energy that is claimed for LEED-EB credit, the associated environmental attributes must be retained or retired and cannot be sold.

Up to the four-point limit, any combination of individual actions will be awarded the sum of the points allocated to those individual actions. For example, one point would be awarded for implementing 3% of on-site renewable energy. Two additional points would be awarded for meeting 30% of the building's energy load with renewable power or certificates over the performance period.

LEED-EB Points	On-site Renewable Energy		Off-site Renewable Energy / Certificates
1	3 %	OR	15 %
2	6 %	OR	30 %
3	9 %	OR	45 %
4	12 %	OR	60 %

Submittals – Initial LEED-EB Certification

- ❑ Provide system schematic diagrams and narrative highlighting on-site renewable energy systems installed in the building.
- ❑ Provide metered energy output of on-site renewable energy system over the performance period.
- ❑ Provide calculations documenting the percentage of the building's total energy requirements that was supplied by on-site renewable energy systems for the performance period.

OR

- Document the percentage of the building's total energy use that was met with renewable power or certificates over the performance period.
- Provide documentation demonstrating that the supplied renewable power or certificates over the performance period met the referenced Green-e requirements or the equivalent.
- Provide a letter stating a commitment to continue purchases of renewable power or certificates at the same or higher level over the next performance period.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- If there has been no change to the on-site renewable energy systems:
  - Provide metered energy output of on-site renewable energy system over the performance period.
  - Provide calculations documenting the percentage of the building's total energy requirements that was supplied by on-site renewable energy systems over the performance period.

OR

If there has been a change to the on-site renewable energy systems:

- Provide system schematic diagrams and narrative highlighting on-site renewable energy systems installed in the building.
- Provide metered energy output of on-site renewable energy system over the performance period.
- Provide calculations documenting the percentage of the building's total energy requirements that was supplied by on-site renewable energy systems for the performance period.

OR

- Document the percentage of the building's total energy use that was met with renewable power or certificates over the performance period.
- Provide documentation demonstrating that the supplied renewable power or certificates over the performance period met the referenced Green-e requirements or the equivalent.
- Provide a letter stating a commitment to continue purchases of renewable power or certificates at the same or higher level over the next performance period.

Potential Technologies & Strategies

Design and specify the use of on-site nonpolluting renewable technologies to contribute to the total energy requirements of the building. Consider and employ solar, geothermal, wind, biomass (other than unsustainably harvested wood) and biogas technologies.

Purchase renewable energy or renewable energy tradable certificates to meet some or all of the building's energy requirements. Review historic building electrical consumption trends. Research power providers in the area and select a provider that guarantees that a fraction of its delivered electric power is derived from net nonpolluting renewable technologies. If the project is in an open market state, investigate green power and power marketers licensed to provide power in that state. Grid power that qualifies for this credit originates from solar, wind, geothermal, biomass or low-impact hydro sources.

EA Credit 3.1 Building Operations and Maintenance: Staff Education

1 Point

Intent

Support appropriate operations and maintenance of buildings and building systems so that they continue to deliver target building performance goals over the long term.

Requirements

Have in place over the performance period a building operations and maintenance staff education program that provides each staff person primarily working on building maintenance with at least 24 hours of education each year over the performance period. The education program should provide information on building and building systems operation, maintenance and achieving sustainable building performance. Training must be of high quality and relevant to building operations and maintenance.

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation of the training received by building operations and maintenance staff for entire performance period.
- ❑ List the course titles and hours and annual total training hours for each staff person and the calculated annual average training hours for all by building operation and maintenance staff.

Submittals – LEED-EB Re-Certification

- ❑ Provide documentation of the training received by building operations and maintenance staff for entire performance period.
- ❑ List the course titles and hours and annual total training hours for each staff person and the calculated annual average training hours for all by building operations and maintenance staff.

Potential Technologies & Strategies

Arrange on-site or off-site training for building operations and maintenance staff that addresses building and building systems operation, maintenance and achieving sustainable building performance.

EA Credit 3.2 Building Operations and Maintenance: Building Systems Maintenance

1 Point

Intent

Support appropriate operations and maintenance of buildings and building systems so that they continue to deliver target building performance goals over the long term.

Requirements

Have in place over the performance period a comprehensive Best Practices Equipment Preventative Maintenance Program that provides in-house resources or contractual services to deliver post-warranty maintenance.

Submittals – Initial LEED-EB Certification

- Document ongoing operation over the performance period of a Best Practices Equipment Preventative Maintenance Program including documentation of in-house resources or contractual services to deliver post-warranty maintenance.

Submittals – LEED-EB Re-Certification

- Document ongoing operation over the performance period of a Best Practices Equipment Preventative Maintenance Program including documentation of in-house resources or contractual services to deliver post-warranty maintenance.

Potential Technologies & Strategies

Utilize either in-house resources or contractual services to deliver post-warranty equipment maintenance.

EA Credit 3.3 Building Operations and Maintenance: Building Systems Monitoring

1 Point

Intent

Support appropriate operations and maintenance of buildings and building systems so that they continue to deliver target building performance goals over the long term.

Requirements

Have in place over the performance period a system for continuous tracking and optimization of systems that regulate indoor comfort and the conditions (temperature, humidity and CO_2) delivered in occupied spaces. The system must include:

- Continuous monitoring of system equipment performance and of the indoor environmental conditions delivered in the building.
- Alarms for performance or conditions that require repair.
- A system in place that delivers prompt repairs to problems identified.

Submittals – Initial LEED-EB Certification

For system descriptions provide:

- ❒ A narrative of the systems employed to continuously monitor equipment function and space conditions. The narrative must describe how these systems are used to identify and resolve equipment problems and to continuously deliver indoor comfort and the conditions delivered in occupied spaces.
- ❒ List of system equipment for which performance is monitored and the number of points monitored.
- ❒ List of the indoor environmental conditions parameters monitored and the number of points monitored for each.
- ❒ List of settings for alarms.
- ❒ Description of system in place for delivering prompt repairs to problems identified.

AND

For performance over the performance period provide:

- ❒ Documentation of alarms that occurred.
- ❒ Percentage of time that desired conditions are delivered in the building on a floor area weighted basis.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

For system descriptions provide:

- ❒ Update of the description of the system in place if there have been any changes.

AND

For performance over the performance period provide:

- Documentation of alarms that occurred.
- Percentage of time that desired conditions are delivered in the building on a floor area weighted basis.

Potential Technologies & Strategies

Use of automated systems to monitor equipment function and indoor space conditions provides the opportunity to identify system problems automatically and issue an alarm that initiates procedures to fix the problems identified.

EA Credit 4 Additional Ozone Protection

1 Point

Intent

Reduce ozone depletion and support early compliance with the Montreal Protocol.

Requirements

Option A

- Do not operate base building HVAC, refrigeration or fire suppression systems that contain CFCs, HCFCs or Halons.

Option B

- Do not operate fire suppression systems that contain CFCs, HCFCs or halons,

AND

- Reduce emissions of refrigerants from base building HVAC and refrigeration systems to less than 3% of charge per year over the performance period using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting and reduce the leakage over the remainder of unit life to below 25%.

Submittals – Initial LEED-EB Certification

Option A

- ❑ Document that the base building HVAC, refrigeration and fire suppression systems do not contain CFCs, HCFCs or Halons.

Option B

- ❑ Document that fire suppression systems do not contain CFCs, HCFCs or halons.
- ❑ Document that emissions of refrigerants from base cooling equipment over the performance period are less than 3% of charge per year using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting.
- ❑ Provide documentation showing that leakage over the remainder of unit life is being maintained below 25%.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ Document that the base building HVAC, refrigeration and fire suppression systems do not contain CFCs, HCFCs or Halons.

OR

- ❑ Document that fire suppression systems do not contain CFCs, HCFCs, or halons.

- Document that emissions of refrigerants from base cooling equipment over the performance period are less than 3% of charge per year using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting.
- Provide documentation showing that leakage over the remainder of unit life is being maintained below 25%.

Potential Technologies & Strategies

Research and specify all building systems with non-ozone depleting equipment. Building systems to consider include HVAC, refrigeration and fire suppression systems. Common substitutes for HCFCs in HVAC and refrigeration systems are hydrofluorocarbons (HFCs).

EA Credit 5.1–5.3 Performance Measurement: Enhanced Metering

1–3 Points

Intent

Demonstrate the ongoing accountability and optimization of building energy and water consumption performance over time and add incentives for additional energy reduction.

Requirement

Have in place over the performance period continuous metering for the following items: (Up to 3 points can be earned — one point is earned for each four actions implemented/maintained)

- Lighting systems and controls.
- Separate building electric meters that allow aggregation of all process electric loads (Process electric loads are defined in the LEED-EB Reference Guide).
- Separate building natural gas meters that allow aggregation of all process natural gas loads (Process natural gas loads are defined in the LEED-EB Reference Guide).
- Separate meters that allow aggregation of all indoor occupants' related water use for required fixtures.
- Separate meters that allow aggregation of all indoor process water use (Process water uses are defined in the LEED-EB Reference Guide).
- Separate meters that allow aggregation of all outdoor irrigation water use.
- Chilled water system efficiency at variable loads (kW/ton) or cooling loads (for non-chilled water systems).
- Cooling load.
- Air and water economizer and heat recovery cycle operation.
- Boiler efficiencies.
- Building specific process energy systems and equipment efficiency.
- Constant and variable motor loads.
- Variable frequency drive (VFD) operation.
- Air distribution, static pressure and ventilation air volumes.

For each item metered, prepare, implement and maintain a program for using the data gathered to improve building performance over time.

Submittals – Initial LEED-EB Certification

- ❑ For each item metered, provide a description of the performance improvement program implemented using the data gathered to improve system/building performance over time.
- ❑ Provide quarterly reports on the metered data gathered and, for each item metered, a report card of its performance.
- ❑ Provide one day of actual output of all data recorded.

Submittals – LEED-EB Re-Certification

- ❑ If there have been any changes to the program implemented for using the data gathered for each item metered to improve building performance over time, provide an updated description of the program.

- Provide quarterly reports on the metered data gathered and, for each item metered, the resulting achievements in improving building performance.
- Provide one day of actual output of all data recorded.

Potential Technologies & Strategies

Have in place over the performance period continuous metering for the identified categories of energy, water usage and system performance. For each item metered, prepare, implement and maintain a program for using the data gathered to improve building performance over time. International Performance Measurement and Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy Savings can be used to track energy savings of specific energy-efficiency measures implemented in buildings.

EA Credit 5.4 Performance Measurement: Emission Reduction Reporting

1 Point

Intent

Document emission reduction benefits of building efficiency actions, retire a portion of the reductions and reduce emissions in the supply chain.

Requirements

Identify building performance parameters that reduce energy use and emissions.

- Track and record emission reductions delivered by energy efficiency, renewable energy and other building emission reduction actions.
- Report emission reductions using a third-party voluntary certification program.
- Retire at least 10% of the reported emission reductions through a third-party voluntary certification program. (To meet this requirement, the third-party voluntary emission reduction certification and retirement programs must be programs of credible organizations. Third-party programs shall notify any applicable local or regional emission reduction registries of the reported emission reductions.)
- Ask the suppliers of goods and services for the building to do the same by implementing actions of tracking, reporting, retiring emission reductions and asking their suppliers to do the same.

Submittals – Initial LEED-EB Certification

- ❑ Provide reporting of all building performance parameters that reduce energy use and calculate the total savings for each type of energy reduction.
- ❑ Provide reporting of renewable energy use and other emission reduction actions.
- ❑ Calculate and provide a report of the resulting reductions for the significant types of environmental emissions resulting from the energy-efficiency operations and other emission reduction actions using the emission reduction calculation protocol of a third-party voluntary certification program. Emission reductions to be documented include carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen oxides (NO_x), mercury (Hg), small particulates (PM2.5), large particulates (PM10) and volatile organic compounds (VOCs).
- ❑ Provide documentation of the retirement of at least 10% of the reported emission reductions through a third-party voluntary certification program.
- ❑ Provide documentation that the suppliers for the building have been asked to:
  - Report energy savings, energy-efficiency actions, renewable energy use and other emission reduction actions.
  - Report all types of resulting emissions reductions.
  - Retire at least 10% of these reductions through a third-party voluntary certification program.
  - Ask their suppliers of goods and services to do the same.
- ❑ Provide documentation that a third-party voluntary certification program has notified any applicable local or regional emission reduction registries of the reported emission reductions.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❐ Track and record on an annual basis over the performance period the energy use and emission reductions delivered by energy efficiency, renewable energy and other building emission reduction actions.
- ❐ Report emission reductions on an annual basis over the performance period using a third-party voluntary certification program.
- ❐ Retire at least 10% of the reported emission reductions through a third-party voluntary certification program.
- ❐ Ask new suppliers of goods and services for the building since the previous LEED-EB filings to do the same by implementing requirements 1, 2 and 3 above.

Potential Technologies & Strategies

Address all of the significant types of pollutants delivered by energy efficiency. This is important because negative health effects and other environmental impacts result from many pollutants, including carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen oxides (NO_x), mercury (Hg), small particulates (PM2.5), large particulates (PM10) and volatile organic compounds (VOCs). Energy efficiency, renewable energy and other building emission reduction actions make important contributions towards achieving positive health and environmental impacts at a low cost.

EA Credit 6 Documenting Sustainable Building Cost Impacts

1 Point

Intent

Document sustainable building cost impacts.

Requirements

Document overall building operating costs for the previous five years (or length of building occupancy, if shorter), and track changes in overall building operating costs over the performance period. Document building operating cost and financial impacts of all of the aspects of LEED-EB implementation on an ongoing basis.

Submittals – Initial LEED-EB Certification

- Provide documentation of all building operating costs for the previous five years (or length of building occupancy, if shorter).
- Track changes in overall building operating costs over the performance period relative to sustainable performance improvement initiatives implemented and maintained for the building and the site.
- Document building operating cost and the financial impacts in building operation covering all aspects of LEED-EB implementation on an ongoing basis.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- Provide documentation of all building operating costs for the previous five years (or length of building occupancy, if shorter).
- Track changes in overall building operating costs over the performance period relative to sustainable performance improvement initiatives implemented and maintained for the building and the site.
- Document building operating cost and the financial impacts in building operation covering all aspects of LEED-EB implementation on an ongoing basis.

Potential Technologies & Strategies

Track building operating costs to identify any positive impacts relative to sustainable performance improvements to building and operations.

Materials & Resources (MR)

MR Prerequisite 1.1 Source Reduction and Waste Management: Waste Management Policy and Waste Stream Audit

Required

Intent

Establish minimum source reduction and recycling program elements and quantify current waste stream production volume.

Requirements

Conduct a waste stream audit of the ongoing waste stream (not specific upgrade project waste) to establish a current building waste baseline that identifies the types of waste making up the waste stream and amounts of each type of waste in the waste stream. At a minimum, the audit should determine the amounts for paper, glass, plastics, cardboard and metals in the waste stream. Identify opportunities for source reduction and diversion. Operate over the performance period a waste reduction policy to reduce waste stream through source reduction purchasing strategies, collection station equipment, recycling and occupant education.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the waste stream audit to establish building waste baseline.
- ❑ Provide a copy of the waste reduction policy implemented to reduce waste stream through source reduction purchasing strategies, collection station equipment, recycling and occupant awareness notices.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If there has been no change to the waste reduction policy implemented to reduce waste stream, provide a signed letter documenting its continued existence and implementation.

OR

- ❑ If the waste reduction policy implemented to reduce waste stream has changed, provide a copy of the policy highlighting any changes.
- ❑ Provide a signed letter documenting the revised plan's implementation.

Potential Technologies & Strategies

Develop a waste reduction policy for reducing the building's waste stream. Start by conducting a waste stream audit to establish a current building waste baseline. Then evaluate how each type of waste identified in the waste stream can be reduced through source reduction, reuse and recycling. Finally develop, implement and maintain a waste reduction policy for the building that includes procurement/management policies to reduce waste stream through source reduction purchasing strategies, reuse where possible and recycling, as well as the collection station equipment and agreements, and occupant education needed for the successful achievement of the waste reduction goals.

MR Prerequisite 1.2 Source Reduction and Waste Management: Storage & Collection of Recyclables

Required

Intent

Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills or through incineration.

Requirements

Provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling. The recycling area needs to include (at a minimum) space for paper, glass, plastics, cardboard and metals. Recycling area capacity needs to be designed to accommodate at a minimum the potential recycling volumes identified in the waste stream audit for paper, corrugated cardboard, glass, plastics and metals.

If it can be documented for an existing building that there are no public or private recycling services available within the region where the building is located (within 50 miles of the building) for one or more of the identified materials, the building will be granted an exception to the requirement in this prerequisite for the identified material.

Submittals – Initial LEED-EB Certification

- ❑ Provide floor plans showing the area(s) dedicated to recycled material separation, collection and storage.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If there has been no change to the building-wide recycling collection support systems, provide a signed letter documenting their continued existence and operation.

OR

- ❑ If the building-wide recycling collection support systems have changed, provide floor plans highlighting any changes to the collection, storage and separation locations for recycling.

Potential Technologies & Strategies

Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area. Identify local waste handlers and buyers for glass, plastic, office paper, newspaper, cardboard, metals, organic wastes and other waste. Instruct occupants on building recycling procedures. Consider employing cardboard balers, aluminum can crushers, recycling chutes and other waste management techniques to further enhance the recycling program. Also explore implementing source reduction programs to reduce the amount of waste.

MR Prerequisite 2 Toxic Material Source Reduction: Reduced Mercury in Light Bulbs

Required

Intent

Establish and maintain a toxic material source reduction program to reduce the amount of mercury brought into buildings through purchases of light bulbs.

Requirements

- Maintain mercury content of all mercury-containing light bulbs below 100 picograms per lumen hour, on weighted average, for all mercury-containing light bulbs acquired for the existing building and associated grounds.
- The weighted average mercury content of these mercury-containing light bulbs is calculated by: 1) adding up the total weight of mercury in all the mercury-containing light bulbs acquired during the performance period (picograms of Hg); and then, 2) dividing total mercury content (picograms of Hg) by the sum of the lumen hour output of all the light bulbs (lumen hours: calculated by multiplying the rated hours (life) of each light bulb by the mean light output in lumens).
  - Rated hours of life are defined as stated by the manufacturer based on consistent testing (three hours on/20 minutes off for linear fluorescents and compact fluorescents; 11 hours on for HID light bulbs) and are based on the design or mean light output of the light bulbs (in lumens, fluorescent light bulbs measured with a ballast having a ballast factor of 1.0 and measured using instant-start ballasts except for T-5s, which are measured using program start ballasts).
  - The mean light output in lumens is the light output at 40% of light bulb life.
  - These calculations need to show for all acquired mercury containing light bulbs:
    - The total mercury content in the light bulbs.
    - The total lumen hours of light output for all the light bulbs.
    - The number of light bulbs of each type.
    - The overall weighted average mercury content in picograms/lumen hour.
  - If the mercury content documentation shows a range of mercury contents in milligrams, use the highest value in the range in these calculations.

Submittals – Initial LEED-EB Certification

- ❒ Provide a copy of the organizational policy specifying that all future purchases of mercury-containing light bulbs will be made in such a way that the average mercury content of the light bulbs is less than the specified level in picograms/lumen hour.
- ❑ Provide records of all acquisitions during the performance period of mercury-containing light bulbs for use in the building and grounds.
- ❑ Include manufacturer Material Safety Data Sheets (MSDSs) for each type of light bulb purchased showing mercury content of the light bulbs in milligrams.

- Provide calculations demonstrating that the weighted average mercury content of acquired light bulbs is less than the specified level in picograms per lumen hour. If an MSDS shows ranges of mercury contents in milligrams, use the highest value given in these calculations.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- Provide records of all acquisitions during the performance period of mercury-containing light bulbs for use in the building and grounds.
- Include manufacturer MSDS for each type of light bulb purchased showing mercury content of the light bulbs in milligrams.
- Provide calculations demonstrating that the weighted average mercury content of acquired light bulbs is less than the specified level in picograms per lumen hour.

AND EITHER

- If there has been no change to the purchasing policy specifying that the weighted average mercury content of these light bulbs is less than the specified level in picograms/lumen hour, provide a signed letter documenting its continued existence and implementation.

OR

- If the mercury-containing light bulb purchasing policy has changed, provide a copy of the revised plan highlighting any changes to the specified level picograms of mercury/lumen hour policy.

Potential Technologies & Strategies

Establish and follow a light bulb purchasing program that keeps the weighted average mercury content below specified level of picograms of mercury per lumen hour.

MR Credit 1.1 & 1.2 Construction, Demolition and Renovation Waste Management

1–2 Points

Intent

Divert construction, demolition and land-clearing debris from landfill and incineration disposal. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.

Requirements

Develop and implement a Waste Management Policy covering any future building retrofit, renovation or modification on the site. Quantify diversions of construction, demolition and land-clearing debris from landfill and incineration disposal by weight or volume.

- MR Credit 1.1: Divert at least 50% of construction, demolition and land-clearing waste from landfill and incineration disposal. (1 point)
- MR Credit 1.2: Divert at least 75% of construction, demolition and land-clearing waste from landfill and incineration disposal. (1 additional point)

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the Waste Management Policy that specifies inclusion of waste management specifications for any future building retrofit, renovation or modification that may occur on the site.
- ❑ Provide documentation that the Waste Management Policy has been followed:
    - For any building retrofit, renovation or modification that has occurred in the building over the performance period, provide calculations on end-of-project waste management rates, salvage rates and landfill rates demonstrating that at least 50% for 1 point or 75% for 2 points (by weight or volume) of construction wastes were recycled, salvaged or otherwise diverted from landfill and incineration.

  OR

    - Provide a written statement that no building retrofits, renovations or modifications were carried out in the building or on the site during the performance period.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

OPTION 1

- ❑ If there has been no change to the Waste Management Policy that specifies inclusion of waste management specifications for any building retrofit, renovation or modification, provide a signed letter documenting its continued existence and implementation.
- ❑ Provide documentation that the Waste Management Policy has been followed:
    - For any building retrofit, renovation or modification that has occurred in the building over the performance period, provide calculations on end-of-project waste management rates, salvage rates,

and landfill rates demonstrating that at least 50% for 1 point or 75% for 2 points (by weight or volume) of construction wastes were recycled, salvaged or otherwise diverted from landfill and incineration.

OR

- Provide a written statement that no building retrofits, renovations or modifications were carried out in the building or on the site during the performance period.

OPTION 2

- ❑ If there has been a change to the Waste Management Policy that specifies inclusion of waste management specifications for any future building retrofit, renovation or modification, provide a copy of the revised plan highlighting any changes.
- ❑ Provide documentation that the revised Waste Management Policy has been followed:
  - For any building retrofit, renovation or modification that has occurred in the building over the performance period, provide calculations on end-of-project waste management rates, salvage rates, and landfill rates demonstrating that at least 50% for 1 point or 75% for 2 points (by weight or volume) of construction wastes were recycled, salvaged or otherwise diverted from landfill and incineration.

  OR

  - Provide a written statement that no building retrofits, renovations or modifications were carried out in the building or on the site during the performance period.

Potential Technologies & Strategies

Develop and adopt a Waste Management Policy to be added as a general requirement for any construction to occur on the site. Identify licensed haulers and processors of recyclable materials. Identify markets for salvaged materials. Employ deconstruction, salvage and recycling strategies and processes. Document the cost for recycling, salvaging and reusing materials. Source reduction on the job site should be an integral part of the plan. Investigate salvaging/recycling lighting fixture pans when retrofitting.

MR Credit 2.1–2.5 Optimize Use of Alternative Materials

1–5 Points

Intent

Reduce the environmental impacts of the materials acquired for use in the operations, maintenance, and upgrades of buildings.

Requirements

Maintain a sustainable purchasing program covering at least office paper, office equipment, furniture, furnishings and building materials for use in the building and on the site. A template calculator will be provided for LEED-EB MR Credit 2.1–2.5. One point (up to a maximum of five) will be awarded for each 10% of total purchases over the performance period (on a dollar basis) that achieve at least one of the following sustainability criteria:

- Contains at least 70% salvaged material from off site or outside the organization.
- Contains at least 70% salvaged from on site through an internal organization materials & equipment reuse program.
- Contains at least 10% post-consumer or 20% post-industrial material.
- Contains at least 50% rapidly renewable materials.
- Is Forest Stewardship Council (FSC) certified wood.
- Contains at least 50% materials harvested and processed or extracted and processed within 500 miles of the project.

Note: In calculating the percentage of purchases over the performance period conforming to the requirements, each purchase can only receive credit against a single requirement (i.e., a purchase that contains both 10% post-consumer recycled content and is harvested within 500 miles of the project counts only once in this calculation).

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the organizational policy that specifies use of sustainability criteria for purchases of covered materials for use in the building or on the site.
- ❑ Provide documentation of all covered materials purchased and total cost of these purchases over the performance period.
- ❑ Provide documentation of all covered materials purchased that meet one or more of the specified sustainability criteria and the cost of these purchases over the performance period.
- ❑ Provide a calculation of the fraction of covered materials purchased that meet one or more of the specified sustainability criteria (on a cost basis).

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- If the organizational policy that specifies use of environmentally preferable purchasing standards for purchases of covered materials for use in the building or on the site has changed since the previous application for certification under LEED-EB, provide an updated copy of this organizational policy.
- Provide documentation of all covered materials purchased and total cost of these purchases over the performance period.
- Provide documentation of all covered materials purchased that meet one or more of the specified environmentally preferable purchasing standards and the cost of these purchases over the performance period.
- Provide a calculation of the fraction of covered materials purchased that meet one or more of the specified environmentally preferable purchasing standards (on a cost basis).

Potential Technologies & Strategies

When purchasing materials, supplies or equipment, specify that these must meet one or more of the specified sustainability criteria.

MR Credit 3.1 & 3.2 Optimize Use of IAQ Compliant Products

2 Points

Intent

Reduce the indoor air quality (IAQ) impacts of the materials acquired for use in the operation, maintenance and upgrades of buildings.

Requirements

Optimize use of air quality compliant materials inside the building to reduce the emissions from materials used in the building. Points are awarded for the existence of product purchasing policies for the building and site addressing the requirements of this credit and documentation of purchasing during the performance period in conformance with those policies, as described below. Subsequent re-certification is tied to both polices and purchasing performance, as described below. At a minimum, these policies must include the following product groups: paint and coatings, adhesives, sealants, carpet, composite panels, and agrifiber products. The building materials covered include any building materials covered by a.-e. below that are used for improvements, including upgrades, retrofits, renovations or modifications, inside the building.

One point shall be awarded, up to a maximum of 2 points, for each 45% of annual purchases calculated on a cost basis that conform with one of the following sustainability criteria:

a. Adhesives and sealants with a VOC content less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, or sealants used as fillers that meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.

   OR

b. Paints and coatings with VOC emissions that do not exceed the VOC and chemical component limits of Green Seal's Standard GS-11 requirements.

   OR

c. Carpet that meets the requirements of the CRI Green Label Plus Carpet Testing Program.

   OR

d. Carpet cushion that meets the requirements of the CRI Green Label Testing Program.

   OR

e. Composite panels and agrifiber products that contain no added urea-formaldehyde resins.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the organizational policy that specifies the use of these sustainability criteria for purchases of covered materials for use in the building.
- ❑ Provide documentation of all covered materials purchased and the total cost of these purchases over the performance period.
- ❑ Provide documentation of all covered materials purchased that meet one or more of the specified sustainability criteria and the cost of these purchases over the performance period.
- ❑ Provide a calculation of the percentage of covered materials purchased that meet one or more of the specified sustainability criteria (on a cost basis).

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- If the organizational policy that specifies use of these sustainability criteria for purchases of covered materials for use in the building or on the site has changed since the previous application for certification under LEED-EB, provide an updated copy of this organizational policy.
- Provide documentation of all covered materials purchased and the total cost of these purchases over the performance period.
- Provide documentation of all covered materials purchases that meet one or more of the specified sustainability criteria and the cost of these purchases over the performance period.
- Provide a calculation of the percentage of covered materials purchased that meet one or more of the specified sustainability criteria (on a cost basis).

Potential Technologies & Strategies

When purchasing materials, supplies or equipment, specify that these must meet one or more of the specified sustainability criteria.

MR Credit 4.1–4.3 Sustainable Cleaning Products and Materials

Points 1–3

Intent

Reduce the environmental impacts of cleaning products, disposable janitorial paper products and trash bags.

Requirements

Implement sustainable purchasing for cleaning materials and products, disposable janitorial paper products and trash bags. Cleaning product and material purchases include building purchases for use by in house staff or used by outsourced service providers. Calculate the percentage of the total sustainable material and product purchases that meet at least one of the specified sustainability criteria. The percentage of the total sustainable cleaning product and material purchases determine the number of points earned up to a total of 3 points. One point will be awarded for each 30% of the total annual purchases of these products (on a cost basis) that meet one of the following sustainability criteria:

- Cleaning products that meet the Green Seal GS-37 standard if applicable, OR if GS-37 is not applicable (e.g., for products such as carpet cleaners, floor finishes or strippers), use products that comply with the California Code of Regulations maximum allowable VOC levels.
- Disposable janitorial paper products and trash bags that meet the minimum requirements of U.S. EPA's Comprehensive Procurement Guidelines.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the organizational policy that specifies use of these sustainability criteria for purchases of covered materials for use in the building or on the site.
- ❑ Provide documentation of all covered materials purchased and the total cost of these purchases over the performance period.
- ❑ Provide documentation of all covered materials purchased that meet one or more of the specified sustainability criteria and the cost of these purchases over the performance period.
- ❑ Provide a calculation of the percentage of covered materials purchased that meet one or more of the specified sustainability criteria (on a cost basis).

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If the organizational policy that specifies use of these sustainability criteria for purchases of covered materials for use in the building or on the site has changed since the previous application for certification under LEED-EB, provide an updated copy of this organizational policy.
- ❑ Provide documentation of all covered materials purchased and the total cost of these purchases over the performance period.
- ❑ Provide documentation of all covered materials purchased that meet one or more of the specified sustainability criteria and the cost of these purchases over the performance period.
- ❑ Provide a calculation of the percentage of covered materials purchased that meet one or more of the specified sustainability criteria (on a cost basis).

Potential Technologies & Strategies

When purchasing materials or supplies, specify that they must meet one or more of the specified sustainability criteria.

MR Credit 5.1–5.3 Occupant Recycling

1–3 Points

Intent

Facilitate the reduction of waste and toxins generated by building occupants and building operations that are hauled to and disposed of in landfills or incineration.

Requirements

Have in place over the performance period a building occupant waste reduction and recycling program that addresses the separation, collection and storage of materials for recycling, including (at a minimum) paper, glass, plastics, cardboard/OCC, metals, batteries and fluorescent light bulbs and diversion from landfill disposal or incineration. Each time reusable architectural panels are moved and reinstalled, they can be counted as part of the total waste stream and included in the recycled component of the waste stream.

Collect and recycle at least 95% of the batteries used, and collect and recycle at least 95% of the fluorescent light bulbs used.

AND

- Divert/Recycle 30% of total waste stream (by weight or volume) (1 point)
- Divert/Recycle 40% of total waste stream (by weight or volume) (2 points)
- Divert/Recycle 50% of total waste stream (by weight or volume) (3 points)

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the building occupant waste reduction and recycling policy.
- ❑ Provide quarterly summary reports on the total waste produced by the building along with hauler documentation and calculations of the amount of each type of waste that has been recycled over the performance period.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If there has been no change to the building occupant waste reduction and recycling policy, provide a signed letter documenting its continued existence and implementation.
- ❑ Provide quarterly summary reports on the total waste produced by the building, along with hauler documentation and calculations of the amount of each type of waste that has been recycled over the performance period.

OR

- ❑ If there has been a change to the building occupant waste reduction and recycling policy, provide a copy of the revised plan highlighting any changes.
- ❑ Provide quarterly summary reports on the total waste produced by the building, along with hauler documentation and calculations of the amount of each type of waste that has been recycled over the performance period.

Potential Technologies & Strategies

Have in place over the performance period a building occupant waste reduction and recycling program that addresses the separation, collection and storage of materials for recycling, including (at a minimum) paper, glass, plastics, cardboard, metals, batteries and fluorescent light bulbs, and diversion from landfill disposal or incineration. Encourage a high level of recycling by building occupants.

MR Credit 6 Additional Toxic Material Reduction: Reduced Mercury in Light Bulbs

1 Point

Intent

Establish and maintain a toxic material source reduction program to reduce the amount of mercury brought into buildings through purchases of light bulbs.

Requirements

- Maintain mercury content of all mercury-containing light bulbs below 80 picograms per lumen hour of light output (picogram/lumen hour), on weighted average, for all mercury-containing light bulbs acquired for the existing building and associated grounds. (The weighted average mercury content of these light bulbs is calculated as described in MR Prerequisite 2).

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the organizational policy specifying that all future purchases of mercury-containing light bulbs will be made in such a way that the average mercury content of the light bulbs is less than the specified level in picograms per lumen hour.
- ❑ Provide records of all acquisitions during the performance period of mercury-containing light bulbs for use in the building and grounds.
- ❑ Include manufacturer MSDSs for each type of light bulb purchased showing mercury content of the light bulbs in milligrams.
- ❑ Provide calculations demonstrating that the weighted average mercury is less than the specified level in picograms per lumen hour for these light bulbs. If an MSDS shows ranges of mercury contents in milligrams, use the highest value given in these calculations.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ Provide records of all acquisitions during the performance period of mercury-containing light bulbs for use in the building and grounds.
- ❑ Include manufacturer MSDS for each type of light bulb purchased showing mercury content of the light bulbs in milligrams.
- ❑ Provide calculations demonstrating that the weighted average mercury content of all mercury-containing light bulbs acquired is less than the specified level in picograms per lumen hour for these light bulbs.

AND EITHER

- ❑ If there has been no change to the purchasing policy specifying that the weighted average mercury content of all mercury-containing light bulbs acquired is less than the specified level in picograms per lumen hour, provide a signed letter documenting its continued existence and implementation.

OR

- If the mercury-containing light bulb purchasing policy has changed, provide a copy of the revised plan highlighting any changes to the specified level picograms of mercury per lumen hour policy.

Potential Technologies & Strategies

Establish and follow a light bulb purchasing program that keeps the weighted average mercury content of all mercury-containing light bulbs below specified level of picograms of mercury per lumen hour.

Indoor Environmental Quality (IEQ)

IEQ Prerequisite 1 Outside Air Introduction and Exhaust Systems

Required

Intent

Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the health and well-being of the occupants.

Requirements

- Modify or maintain existing building outside-air (OA) ventilation distribution system to supply at least the outdoor air ventilation rate required by ASHRAE 62.1-2004. If this is not feasible due to the physical constraints of the existing ventilation system, modify or maintain the system to supply at least 10 cubic feet per minute (CFM) per person.
- Implement and maintain an HVAC System Maintenance Program to ensure the proper operations and maintenance of HVAC components as they relate to IAQ.
- Test and maintain the operation of all building exhaust systems, including bathroom, shower, kitchen and parking exhaust system.

Submittals – Initial LEED-EB Certification

- ❑ Provide a letter and backup tabular information from a mechanical engineer or HVAC system specialist demonstrating that the existing building outside-air (OA) ventilation distribution system supplies at least the outdoor air ventilation rate required by ASHRAE 62.1-2004. If this is not feasible due to the physical constraints of the existing ventilation system, modify or maintain the system to supply at least 10 CFM/person.
- ❑ Provide a letter and backup tabular information from a mechanical engineer or HVAC system specialist demonstrating that the exhaust air HVAC systems serving the building are operating as designed.
- ❑ Provide the results of quarterly inspections of the building OA/exhaust air system to verify that the system is operating as intended over the performance period.

Submittals – LEED-EB Re-Certification

- ❑ Provide the results of quarterly inspections of the building OA/exhaust air system to verify that the system is operating as intended over the performance period.

AND EITHER

- ❑ If there has been no change to the HVAC system, provide a letter from the facility manager or an HVAC system specialist documenting its continued performance.

OR

- ❑ If there has been a change to the HVAC system, provide the documentation required for initial submittals under LEED-EB.

Potential Technologies & Strategies

Conduct a visual inspection of OA air vent/dampers and remove any OA air vent/louver obstructions that restrict full OA capacity from entering the distribution system. Conduct airflow monitoring to document OA in terms of CFM. Compare measured flow to designed flow for each unit. Test the operation of each exhaust fan and verify that exhaust airflow meets design requirements/intentions. The U.S. EPA Guidelines for HVAC System Maintenance provide guidance on developing, implementing and maintaining an HVAC System Maintenance Program to ensure the proper operations and maintenance of HVAC components as they related to IAQ.

IEQ Prerequisite 2 Environmental Tobacco Smoke (ETS) Control

Required

Intent

Prevent or minimize exposure of building occupants, indoor surfaces and systems to Environmental Tobacco Smoke (ETS).

Requirements

Option A. Prohibit smoking in the building.

- Prohibit smoking in the building.
- Locate any exterior designated smoking areas at least 25 feet away from building entries, outdoor air intakes and operable windows.

Option B. Establish negative pressure in the rooms with smoking.

- Prohibit smoking in the building except in designated smoking areas.
- Locate any exterior designated smoking areas at least 25 feet away from building entries, outdoor air intakes and operable windows.
- Provide one or more designated smoking rooms designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room must be directly exhausted to the outdoors, away from air intakes and building entry paths, with no re-circulation of ETS-containing air to the non-smoking area of the building and enclosed with impermeable deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least an average of 5 Pa (0.02 inches water gauge) and with a minimum of 1 Pa (0.004 inches water gauge) when the door(s) to the smoking room are closed.
- Verify performance of the smoking room differential air pressures by conducting 15 minutes of measurement, with a minimum of one measurement every 10 seconds, of the differential pressure in the smoking room with respect to each adjacent area and in each adjacent vertical chase with the doors to the smoking room closed. The testing will be conducted with each space configured for worst case conditions of transport of air from the smoking rooms to adjacent spaces.

Option C. Reduce air leakage between rooms with smoking and non-smoking areas in residential buildings.

Note that Option C is for residential buildings only.

- Prohibit smoking in all common areas of the building.
- Locate any exterior designated smoking areas at least 25 feet away from building entries, outdoor air intakes and operable windows opening to common areas.
- Minimize uncontrolled pathways for ETS transfer between individual residential units by sealing penetrations in walls, ceilings and floors in the residential units, and by sealing vertical chases adjacent to the units. In addition, all doors in the residential units leading to common hallways shall be weather-stripped to minimize air leakage into the hallway. Acceptable sealing of residential units shall be demonstrated by a blower door test conducted in accordance with ASTM-779-03, Standard Test Method for Determining Air Leakage Rate By Fan Pressurization, AND use of the progressive sampling methodology defined in Chapter 7 (Home Energy Rating Systems (HERS) Required Verification And Diagnostic Testing) of the California Residential Alternative Calculation Method Approval Manual.

Residential units must demonstrate less than 1.25 square inches leakage area per 100 square feet of enclosure area (i.e. sum of all wall, ceiling and floor areas).

Submittals – Initial LEED-EB Certification

- Provide a declaration signed by the building owner or responsible party, declaring that the building will be operated under a policy prohibiting smoking along with a statement describing the location of exterior smoking areas.

OR

- Provide a declaration signed by the facility manager or responsible party demonstrating that the criteria described in the credit requirements have been met and performance has been verified using the method described in the credit requirements.

Submittals – LEED-EB Re-Certification

- Provide a declaration, signed by the building owner or responsible party, declaring that the building will be operated under a policy prohibiting smoking along with a statement describing the location of exterior smoking areas.

OR

- Provide a declaration signed by the facility manger or responsible party demonstrating that the design criteria described in the credit requirements have been met and performance has been verified using the method described in the credit requirements.

Potential Technologies & Strategies

Prohibit smoking in the building or provide negative pressure smoking rooms. For residential buildings, a third option is to provide very tight construction to minimize ETS transfer among dwelling units.

IEQ Prerequisite 3 Asbestos Removal or Encapsulation

Required

Intent

Reduce the potential exposure of building occupants to asbestos and prevent associated harmful effects of asbestos in existing buildings.

Requirements

- Have in place an asbestos management program.
- Identify the applicable regulatory requirements.
- Have survey records that identify where asbestos is located in the building an on the site so that the asbestos present can be addressed appropriately in the ongoing asbestos management program. If the existing survey records do not cover all areas of the building, conduct a survey to identify where asbestos-containing materials are present in the remaining areas of the building.

Submittals – Initial LEED-EB Certification

- ❑ Provide a letter from the facility manager, an accredited asbestos program manager or asbestos inspector stating that asbestos-containing materials are not present in the building, on the building exterior or on the site.

OR

- ❑ Provide a description of the current asbestos management program that identifies the applicable regulatory requirements and explains how the program is addressing asbestos remaining in the building on an ongoing basis.
- ❑ Review the past asbestos work done on the building and on the building site and use this data to prepare the history-based component of the asbestos survey for the building and the site by collecting the available information on: (1) where asbestos has been removed, (2) where asbestos remains and (3) how the remaining asbestos is being addressed.
- ❑ Update the asbestos survey for the building and the site with current information by: (1) sampling additional likely locations in the building and on the site for asbestos and (2) testing samples to see if asbestos is present.
- ❑ If the survey identifies any new locations with asbestos, add these to the description of how the asbestos management program is addressing asbestos remaining in the building on an ongoing basis.

Submittals – LEED-EB Re-Certification

Provide a description of the asbestos work done since the previous application for certification and provide any updates needed to the information submitted for the previous application for certification.

Potential Technologies & Strategies

Review the current asbestos management program and prepare a description of the program that identifies the applicable regulatory requirements and explains how the program will address asbestos remaining in the building on an ongoing basis.

Review asbestos work done in the building and on the building site and use this data to prepare the history-based component of the asbestos survey, collecting the available information on: (1) where asbestos has been removed, (2) where asbestos remains and (3) how the remaining asbestos is being addressed.

Update this survey with current information by: (1) sampling additional likely locations in building and on the site for asbestos and (2) testing samples to see if asbestos in present. If the survey identifies any new locations with asbestos, add these to the description of how the asbestos management program is addressing asbestos remaining in the building on an ongoing basis.

IEQ Prerequisite 4 Polychlorinated Biphenyl (PCB) Removal

Required

Intent

Reduce the potential exposure of building occupants to PCBs and PCB combustion byproducts in case of fire in the building.

Requirements

- Have in place a PCB management program.
- Identify the applicable regulatory requirements.
- Have a current survey that identifies where PCBs are located in the building and on the site so that the PCBs present can be addressed appropriately in the ongoing PCB management program.

Submittals – Initial LEED-EB Certification

- ❑ Provide a letter from the facility manager or a qualified PCB management professional stating that PCB-containing materials are not present in the building or on the site.

OR

- ❑ Provide a description of the current PCB management program that identifies the applicable regulatory requirements and explains how the program is addressing PCBs remaining in the building on an ongoing basis.
- ❑ Review the past PCB work done on the building and on the building site and use this data to prepare the history-based component of the PCB survey for the building and the site collecting the available information on: (1) where PCBs have been removed, (2) where PCBs remain and (3) how the remaining PCBs are being addressed.
- ❑ Update the PCB survey for the building and the site with current information by: (1) sampling additional likely locations in building and on the site for PCBs and (2) testing samples to see if PCBs are present.
- ❑ If the survey identifies any new locations with PCBs, add these to the description of how the PCB management program is addressing PCBs remaining in the building on an ongoing basis.

Submittals – LEED-EB Re-Certification

- ❑ Provide a description of the PCB work done since the previous application for certification and provide any updates needed to the information submitted for the previous application for certification.

Potential Technologies & Strategies

Review the current PCB management program, and prepare a description of the program that identifies the applicable regulatory requirements and explains how the program will address PCBs remaining in the building on an ongoing basis.

Review PCB work done in the building and on the building site and use this data to prepare the history-based component of the PCB survey by collecting the available information on: (1) where PCBs have been removed, (2) where PCBs remain and (3) how the remaining PCBs are being addressed.

Update this survey with current information by: (1) sampling additional likely locations in the building and on the site for PCBs and (2) testing samples to see if PCBs are present. If the survey identifies any new locations with PCBs, add these to the description of how the PCB management program is addressing PCBs remaining in the building on an ongoing basis.

IEQ Credit 1 Outdoor Air Delivery Monitoring

1 Point

Intent

Provide capacity for ventilation system monitoring to help sustain long-term occupant comfort and well-being.

Requirements

Install permanent monitoring systems that provide feedback on ventilation system performance to ensure that ventilation systems maintain minimum ventilation rates.

Option A

For mechanical ventilation systems that predominantly serve densely occupied spaces (spaces with a design occupant density greater than or equal to 25 people per 1,000 square feet (40 square feet per person)), do the following:

- Provide a CO_2 sensor or sampling location for each densely occupied space, and compare with outdoor ambient CO_2 concentrations.
- Test and calibrate CO_2 sensors to have an accuracy of no less than 75 ppm or 5% of the reading; whichever is greater. Sensors must be tested and calibrated at least once every five years or per manufacturers' recommendation.
- Monitor CO_2 sensors by a system capable of and configured to trend CO_2 concentrations on no more than 30 minute intervals.
- Configure system capability to generate an alarm visible to a system operator and, if desired, to building occupants if the CO_2 concentration in any zone rises more than 15% above that corresponding to the minimum outdoor air rate required by ASHRAE Standard 62 (see IEQ Prerequisite 1).
- CO_2 sensors may be used for demand-controlled ventilation provided the control strategy complies with ASHRAE Standard 62 (see IEQ Prerequisite 1), including maintaining the area-based component of the design ventilation rate.

Option B

For all other mechanical ventilation systems:

- An outdoor airflow measurement device must be provided that is capable of measuring (and, if necessary, controlling) the minimum outdoor airflow rate at all expected system operating conditions within 15% of the design minimum outdoor air rate.
- The outdoor airflow measurement device shall be monitored by a control system capable of and configured to trend outdoor airflow on no more that 15-minute intervals for a period of no less than six months.
- The control system shall be capable and configured to generate an alarm visible to the system operator if the minimum outdoor air rate falls more than 15% below the design minimum rate.

Option C

For natural ventilation systems, provide the following:

- CO_2 sensors located in the breathing zone of every densely populated room.
- CO_2 sensors located in the breathing zone of every natural ventilation zone.

- CO_2 sensor(s) located outdoors.
- CO_2 sensors shall provide an audible or visual alarm to the occupants in the space and building management if CO_2 conditions are greater than 530 parts per million above outdoor CO_2 levels or 1,000 parts per million absolute. The alarm signal should indicate that ventilation adjustments (i.e. opening windows) are required in the affected space.
- Operable windows areas must meet the requirements of ASHRAE 62.1-2004, section 5.1.

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation that the requirements for this credit have been met.

Submittals – LEED-EB Re-Certification

- ❑ If building systems and building operating practices have not changed since the previous LEED-EB certification filing, provide a statement to this effect.

OR

- ❑ If building systems or building operating practices have changed since the previous LEED-EB certification filing, provide documentation that the requirements for this credit have been met.

Potential Technologies & Strategies

Install/maintain permanent monitoring systems that provide feedback on ventilation system performance to ensure that those ventilation systems maintain minimum ventilation rates.

IEQ Credit 2 Increased Ventilation

1 Point

Intent

Provide additional outdoor air ventilation to improve indoor air quality for improved occupant comfort, well-being and productivity.

Requirements

Option A

For Mechanically Ventilated Spaces:

- Increase outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum required by ASHRAE 62.1-2004.

Option B

For Naturally Ventilated Spaces:

- Design natural ventilation systems for occupied spaces to meet the recommendations set forth in the "Good Practice Guide 237: Natural ventilation in non-domestic buildings" (1998). Determine that natural ventilation is an effective strategy for the project by following the flow diagram process shown in Figure 2.8 of the CIBSE Applications Manual 10: 2005, "Natural ventilation in non-domestic buildings."

AND EITHER

  - Use diagrams and calculations to show that the design of the natural ventilation systems meets the recommendations set forth in the CIBSE Applications Manual 10: 2005, "Natural ventilation in non-domestic buildings."

  OR

  - Use a macroscopic, multi-zone, analytic model to predict that room-by-room airflows will effectively naturally ventilate at least 90% of occupied spaces.

Submittals – Initial LEED-EB Certification

Option A

For mechanical ventilation systems:

❒ Provide measurements demonstrating that actual ventilation rates exceed the minimum rates required by ASHRAE 62.1-2004 by at least 30%.

Option B

For natural ventilation systems:

❒ Provide documentation that natural ventilation is an effective strategy for the project and follows the design recommendations established by CIBSE.

AND EITHER

  - Provide diagrams and calculations based on CIBSE Applications Manual 10.

  OR

- Provide diagrams and calculations based on results provided by a multi-zone analytical model.

Submittals – LEED-EB Re-Certification

- ❑ If there has been no change since the previous filing, provide a statement to this effect.

OR

- ❑ If these have been changes since the previous filing, provide the same information as is required for initial filings.

Potential Technologies & Strategies

For Mechanically Ventilated Spaces: Design ventilation systems to provide ventilation rates at least 30% larger than the minimum rates prescribed by the referenced standard.

For Naturally Ventilated Spaces: Follow the eight design steps described in CIBSE “Good Practice Guide 237”: 1) develop design requirements, 2) plan airflow paths, 3) identify building uses and features that might require special attention, 4) determine ventilation requirements, 5) estimate external driving pressures, 6) select types of ventilation devices, 7) size ventilation devices and 8) analyze the design. Use public domain software, such as NIST’s CONTAM, Multizone Modeling Software, along with LoopDA, Natural Ventilation Sizing Tool, to analytically predict room-by-room airflows.

IEQ Credit 3 Construction IAQ Management Plan

1 Point

Intent

Prevent indoor air quality problems resulting from any construction/renovation projects in order to help sustain the comfort and well-being of construction workers and building occupants.

Requirements

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and occupancy phases of the building as follows:

- During construction, meet or exceed the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings Under Construction, 1995, Chapter 3.
- Protect stored on-site or installed absorptive materials from moisture damage.
- If air handlers must be used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999.
- Replace all filtration media immediately prior to occupancy.
- Remove contaminants that may be remaining at the end of the construction period.
  - Conduct a minimum two-week building flush-out with new filtration media with 100% outside air after construction ends and prior to occupancy of the affected space. After the flush-out, replace the filtration media with new media, except for filters solely processing outside air.

  OR

  - After construction ends conduct a baseline indoor air quality testing procedure for the affected space in the building that demonstrates that the concentration levels for the chemical air contaminants are below specified levels. For each sampling point where the maximum concentration limits are exceeded conduct a partial building flush-out, for a minimum of two weeks, then retest the specific parameter(s) that were exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met.

Chemical Contaminate	**Maximum Concentration**
Formaldehyde	0.05 parts per million
Particulates (PM10)	20 micrograms per cubic meter above outside air conditions
Total Volatile Organic Compounds (TVOC)	500 micrograms per cubic meter
4-Phenylcyclohexene (4-PCH)	3 micrograms per cubic meter
Carbon Monoxide (CO)	9 parts per million

The air sample testing shall be conducted as follows:

- Air samples collected for every 25,000 square feet, or for each contiguous floor area, whichever is greater.

- Measurements conducted with the building ventilation system starting at normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout duration of the air testing.
- Building shall be fully finished and unoccupied. Furniture can be included in the testing if desired but it is not required.
- Test with time weight values of four hours with data logging.
- When re-testing non-complying building areas, take samples from the same locations as in first test.
- Copies of the IAQ testing results should describe the contaminant sampling and analytical methods, the locations and duration of contaminant samples, the field sampling log sheets and laboratory analytical data, and the methods and results utilized to determine that the ventilation system was started at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode through the duration of the air testing.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the Construction IAQ Management Plan that specifies inclusion of Construction IAQ Management specification provisions for any construction projects that may occur in the building.
- ❑ Application of management plan to any construction projects carried out in the building in the performance period.
  - If there have not been any construction projects during the performance period, provide a statement to this effect.
  - If there have been any construction projects carried out in the building during the performance period provide:
    - A list of the construction projects implemented during the performance period and for each one provide:
      - A copy of the construction IAQ Management Plan highlighting the six requirements of SMACNA IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.
      - Photographs of construction IAQ management measures such as protection of ducts and on-site stored or installed absorptive materials.
      - Technical information on filtration media used during construction and installed immediately prior to occupancy with MERV values highlighted.
      - Documentation of post construction flush-out or measurement of contaminant concentrations.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ Construction IAQ Management Plan that specifies inclusion of Construction IAQ Management specification provisions for the any construction projects that may occur in the building.
  - If there has been no change to the plan, provide a statement to this effect.
  - If there has been a change, provide the updated plan.
- ❑ Application of IAQ Management Plan to any construction projects carried out in the building during the performance period.

- If there were no construction projects during the performance period, provide a statement to this effect.
- If there were construction projects during the performance period, list these projects and document that the IAQ Management Plan was followed for each project.

Potential Technologies & Strategies

Specify containment control strategies including protecting the HVAC system, controlling pollutant sources, interrupting pathways for contamination, enforcing proper housekeeping and coordinating schedules to minimize disruption.

Specify the construction sequencing to install absorptive materials after the prescribed dry or cure time of wet finishes to minimize adverse impacts on IAQ Materials directly exposed to moisture through precipitation, plumbing leaks or condensation from the HVAC system that are susceptible to microbial contamination.

Use protective covers and sequencing of installation to protect absorptive materials including insulation, carpeting, ceiling tiles and gypsum products.

Appoint an IEQ Manager with owner's authority to inspect IEQ problems and require mitigation as necessary.

Sequence the application of building materials so that materials that may be significant sources of contaminants (e.g., composite wood products or wet products such as adhesives, paints and coatings, and glazing), significantly dissipate their emissions prior to the introduction of products that have capacity to absorb or trap contaminants (e.g., carpet and padding, fabric wall covering, acoustic tiles, upholstered furniture). Where protection cannot be provided by sequence of installations, protect adsorbing surfaces with vapor barriers and provide air exchange through temporary or permanent ventilation systems.

For IAQ testing consider using a recognized measurement protocol such as the EPA "Compendium of Methods for the Determination of Air Pollutants in Indoor Air."

IEQ Credit 4.1 Documenting Productivity Impacts: Absenteeism and Health Care Cost Impacts

1 Point

Intent

Document absenteeism, health care cost and productivity impacts of sustainable building performance improvements.

Requirements

Document the history of absenteeism and health care costs for building occupants for the previous five years (or length of building occupancy with a minimum of 12 months) and track changes in absenteeism and health care costs (claim costs must be provided and any reductions in premium costs should be provided if available) for building occupants over the performance period relative to sustainable building performance improvements.

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation of the history of absenteeism and health care costs for building occupants for the previous five years (or length of building occupancy with a minimum of 12 months).
- ❑ Track changes in absenteeism and health care costs (claim costs must be provided and any reductions in premium costs should be provided if available) for building occupants over the performance period relative to sustainable building performance improvements.

Submittals – LEED-EB Re-Certification

- ❑ Provide documentation of the history of absenteeism and health care costs for building occupants for the previous five years (or length of building occupancy with a minimum of 12 months).
- ❑ Track changes in absenteeism and health care costs (claim costs must be provided and any reductions in premium costs should be provided if available) for building occupants over the performance period relative to sustainable building performance improvements.

Potential Technologies & Strategies

Track absenteeism and health care costs for building occupants to identify any positive impacts relative to sustainable performance improvements to building IEQ and operations.

IEQ Credit 4.2 Documenting Productivity Impacts: Other Productivity Impacts

1 Point

Intent

Documentation of the other productivity impacts (beyond those identified in IEQ Credit 4.1) of sustainable building performance improvements.

Requirements

Document the other productivity impacts (beyond those identified in IEQ Credit 4.1) of sustainable building performance improvements for building occupants. Address and track changes in the impact on the amount of work done and errors made or other productivity impacts for building occupants over the performance period relative to sustainable building performance improvements. This documentation needs to be provided for the previous five years (or length of building occupancy with a minimum of 12 months).

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation of the other productivity impacts for building occupants (beyond those identified in IEQ Credit 4.1) of sustainable building performance improvements. The documentation needs to address the impact on the amount of work done and errors made by building occupants relative to sustainable building performance improvements. This documentation also needs to be provided for the previous five years (or length of building occupancy with a minimum of 12 months).

Submittals – LEED-EB Re-Certification

- ❑ Provide updated documentation over the performance period of the other productivity impacts for building occupants (beyond those identified in IEQ Credit 4.1) of sustainable building performance improvements. The documentation needs to address the impact on the amount of work done and errors made by building occupants relative to sustainable building performance improvements. This documentation also needs to be provided for the previous five years (or length of building occupancy with a minimum of 12 months).

Potential Technologies & Strategies

Set up a system to track changes in the impacts on amount of work done and errors made by building occupants over the performance period relative to sustainable building performance improvements (beyond those identified in IEQ Credit 4.1).

IEQ Credit 5.1 Indoor Chemical and Pollutant Source Control: Non-Cleaning System – Reduce Particulates in Air Distribution

1 Point

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment.

Requirements

Have filters with particle removal effectiveness MERV 13 or greater in place over the performance period for all outside air intakes and for the returns for the re-circulation of inside air. Establish and follow a regular schedule for maintenance and replacement of these filters.

Submittals – Initial LEED-EB Certification

- Document that the building has had filters in place over the performance period with particle removal effectiveness MERV 13 or greater for all outside air intakes and for the returns for the re-circulation of inside air.
- Document that a regular schedule for maintenance and replacement of these filters has been established and followed over the performance period.

Submittals – LEED-EB Re-Certification

- Document that the building has had filters in place over the performance period with particle removal effectiveness MERV 13 or greater for all outside air intakes and for the returns for the re-circulation of inside air.
- Document that a regular schedule for maintenance and replacement of these filters has been established and followed over the performance period.

Potential Technologies & Strategies

Install and maintain in place filters with a particle removal effectiveness MERV 13 or greater for all outside air intakes and for the returns for the re-circulation of inside air. Establish and follow a regular schedule for maintenance and replacement of these filters.

IEQ Credit 5.2 Indoor Chemical and Pollutant Source Control: Non-Cleaning – Isolation of High-Volume Copying/Print Rooms/Fax Stations

1 Point

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment.

Requirements

Have in place over the performance period structural deck-to-deck partitions with separate outside exhausting, no air re-circulation and negative pressure to contain and isolate high volume copying/print rooms/fax stations. High volume means any copy machine, print or fax station with a monthly copy usage of more than 40,000 pages. This credit can also be earned by putting all copiers, printers, and fax machines exceeding a lower monthly capacity or usage threshold (selected by the building owner) in isolated separately ventilated rooms.

Submittals – Initial LEED-EB Certification

- Provide a building plan showing all locations of high-volume copying/print rooms/fax stations and photographs or drawings of structural deck-to-deck partitions.
- Provide documentation of separate outside exhausting, no air re-circulation and negative pressure relative to surrounding occupied areas and isolation of high-volume copying/print rooms/fax stations.

Submittals – LEED-EB Re-Certification

- If the building systems pertaining to high-volume copying/print rooms/fax stations have not been changed, provide a letter documenting their continued existence and use.

OR

- If the systems pertaining to high-volume copying/print rooms/fax stations have been changed, provide a building plan showing all locations of high-volume copying/print rooms/fax stations and photographs or drawings of structural deck-to-deck partitions.
- Provide documentation of separate outside exhausting, no air re-circulation and negative pressure relative to surrounding occupied areas and isolation of high volume copying/print rooms/fax stations.

Potential Technologies & Strategies

Have in place over the performance period structural deck-to-deck partitions with separate outside exhausting, no air re-circulation and negative pressure to contain and isolate high-volume copying/print rooms/fax stations. Develop a plan to minimize unnecessary use of convenience printers and copiers by moving larger copying and printing jobs currently being done on convenience copiers and printers to high-volume printers and copiers in isolated spaces meeting the requirements of this credit.

IEQ Credit 6.1 Controllability of Systems: Lighting

1 Point

Intent

Provide a high level of temperature, ventilation and lighting control by individual occupants or specific groups in multi-occupant spaces (e.g., classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

Requirements

Provide lighting controls, for at least 50% of building occupants, enabling adjustments to suit individual task needs and preferences, or those of a group sharing a multi-occupant space or workgroup area.

Submittals – Initial LEED-EB Certification

- ❐ Provide documentation signed by the responsible party, demonstrating and declaring that the required lighting controls are provided.
- ❐ Provide drawings showing location of lighting controls.

Submittals – LEED-EB Re-Certification

- ❐ If there has been no change to the occupant lighting control strategy or related occupant use of the building since the previous LEED-EB filing, provide a statement that the system continues to deliver required occupant control.

OR

- ❐ If there has been a change to this information since the previous LEED-EB filing, provide an updated documentation, signed by the responsible party, demonstrating the changes made and declaring that the required lighting controls are provided.

Potential Technologies & Strategies

Implement system and occupant control of lighting, employing ambient and task lighting that provide for basic space lighting with occupant controls for preference and to suit the needs of their specific tasks.

IEQ Credit 6.2 Controllability of Systems: Temperature & Ventilation

1 Point

Intent

Provide a high level of temperature and ventilation control by individual occupants or specific groups in multi-occupant spaces (e.g., classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

Requirements

Provide individual temperature and ventilation controls for at least 50% of the building occupants, enabling adjustments to suit individual needs and preferences, or those of a group sharing a multi-occupant space or workgroup area. Operable windows may be used in lieu of individual controls for occupants in spaces near the windows (20 feet inside of and 10 feet to either side of the operable part of the window), and where the operable windows meet the requirements of ASHRAE 62.1-2004 paragraph 5.1.

Submittals – Initial LEED-EB Certification

Provide documentation, signed by the responsible party, demonstrating and declaring that the required ventilation and temperature controls are provided.

Submittals – LEED-EB Re-Certification

- ❒ If there has been no change to the temperature and ventilation control strategy or related occupant use of the building since the previous LEED-EB filing, provide a statement that the system continues to deliver required occupant control.

OR

- ❒ If there has been a change to this information since the previous LEED-EB filing, provide updated documentation, signed by the responsible party, demonstrating the changes made and declaring that the required temperature and ventilation controls are provided.

Potential Technologies & Strategies

Provide occupant controls for temperature and ventilation. Consider strategies to include under-floor HVAC systems with individual diffusers, displacement ventilation systems with control devices, operable windows at perimeter spaces, ventilation walls and mullions.

IEQ Credit 7.1 Thermal Comfort: Compliance

1 Point

Intent

Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

Requirements

Comply with ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy.

Submittals – Initial LEED-EB Certification

- ❒ Provide documentation that the project complies with ASHRAE Standard 55-2004.

Submittals – LEED-EB Re-Certification

Provide update of previous filings:

- ❑ Provide documentation that the project complies with ASHRAE Standard 55-2004.

AND EITHER

- ❒ If there have been no changes to comfort criteria, building systems or related occupant use of the building since the previous LEED-EB filing, provide a statement that the building continues to comply with the specified standard per the original submittal.

OR

- ❑ If there have been changes to comfort criteria, building or building systems, or occupant use of the building, update the documentation to reflect comfort criteria and compliance as the building is currently configured and used.

Potential Technologies & Strategies

Establish comfort criteria per ASHRAE Standard 55-2004 to ensure that building and systems design have the capability of providing performance to meet the comfort criteria.

IEQ Credit 7.2 Thermal Comfort: Permanent Monitoring System

1 Point

Intent

Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

Requirements

Provide a permanent monitoring system to ensure building performance to the desired comfort criteria as determined by IEQ Credit 7.1, Thermal Comfort: Compliance.

Submittals - Initial LEED-EB Certification

Provide documentation signed by the engineer or responsible party that identifies the comfort criteria, the strategy for ensuring performance to the comfort criteria, a description of the permanent monitoring system implemented and the process for corrective action to meet the requirement.

Submittals - LEED-EB Re-Certification

Provide an update of previous filings:

- Provide performance documentation to the comfort criteria as generated by the permanent monitoring system, indicating performance compliance and/or exceptions experienced with corrective actions taken for the period since the last LEED-EB certification.

Potential Technologies & Strategies

Implement systematic monitoring of the actual performance of the building to the comfort criteria defined by IEQ Credit 7.1.

As appropriate, monitoring may include measurement and trending of temperatures, relative humidity, and CO_2 or air speed at locations selected according to their variability and impact on occupant comfort.

IEQ Credit 8.1 & 8.2 Daylight and Views: Daylight

2 Points

Intent

Provide a connection between indoor spaces and the outdoor environment through introduction of daylight and views into the occupied areas of the building.

Requirements

Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry and other low-occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight. Provide glare control for all windows where direct penetration of sunlight would interfere with normal occupant activities.

Achievement of a 2% daylight factor in:

- IEQ Credit 8.1: 50% of all spaces occupied for critical visual tasks. (1 point)
- IEQ Credit 8.2: 75% of all spaces occupied for critical visual tasks. (1 point)

Submittals – LEED-EB Certification

- ❑ Provide building floor plan copies and calculations indicating where the space plan has been implemented on the percentage of the total building area. Include area calculations defining the daylighting and daylight prediction calculations demonstrating a minimum Daylight Factor of 2% in these areas.
- ❑ Provide documentation of glare control features for all windows where direct penetration of sunlight would interfere with normal occupant activities.

Submittals - LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ Provide documentation of glare control features for all windows where direct penetration of sunlight would interfere with normal occupant activities.

AND EITHER

- ❑ If there has been no change to the amount of daylighting since the previous LEED-EB filing, provide a statement that the required daylighting percentages are achieved.

OR

- ❑ If there has been a change to the amount of daylighting since the previous LEED-EB filing, provide building floor plan copies and calculations indicating where the space plan has been implemented on a percentage of the total building area. Include area calculations defining the daylighting and daylight prediction calculations demonstrating a minimum Daylight Factor of 2% in these areas.

Potential Technologies & Strategies

Work to achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 50% to 75% of all space occupied for critical visual tasks.

IEQ Credit 8.3 & 8.4 Daylight and Views: Views

2 Points

Intent

Provide a connection between indoor spaces and the outdoor environment through introduction of daylight and views into the occupied areas of the building.

Requirements

Develop and adopt a space churn renovation plan and policy that specifies the goal of achieving direct line of sight to vision glazing for building occupants from 90% of all regularly occupied spaces (not including copy rooms, storage areas, mechanical, laundry and other low-occupancy support areas).

AND

- IEQ Credit 8.3: Achieve direct line of sight to vision glazing for building occupants from 45% of regularly occupied spaces. (1 point)
- IEQ Credit 8.4: Achieve direct line of sight to vision glazing for building occupants from 90% of regularly occupied spaces. (1 point)

Regularly occupied spaces are considered as having access to views if they provide direct line of sight to vision glazing, where horizontal view angles to the vision glazing are not less than 10 degrees (must include partition base and glazing frame if appropriate). Vision glazing is vertical windows between 2’6” and 7’6” above the floor. Views to vision glazing may be direct or through interior windows.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the building space churn renovation plan and policy that specifies the goal of achieving direct line of sight to vision glazing from 90% of all regularly occupied spaces, (not including copy rooms, storage areas, mechanical, laundry and other low-occupancy support areas).
- ❑ Provide building floor plan copies and calculations indicating where the space plan has been implemented:
    - For 45% of all regularly occupied spaces.
    - For an additional 45% (90% total) of all regularly occupied spaces.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If there has been no change to the occupant views achievements since the previous LEED-EB filing, provide a statement that the building continues to meet the credit requirements.

OR

- ❑ If there has been a change to the occupant views achievements since the previous LEED-EB filing, provide a copy of the building space churn renovation plan and policy that specifies the goal of achieving direct line of sight to vision glazing from 90% of all regularly occupied spaces, (not including copy rooms, storage areas, mechanical, laundry and other low-occupancy support areas).
- ❑ Provide building floor plan copies and calculations indicating where the space plan has been implemented:

- For 45% of all regularly occupied spaces.
- For an additional 45% (90% total) of all regularly occupied spaces.

Potential Technologies & Strategies

Develop and implement a space renovation plan and policy that specifies the goal of achieving direct line of sight to vision glazing from 90% of all regularly occupied spaces. Utilize opportunities created by churn to gradually implement this plan over time.

IEQ Credit 9 Contemporary IAQ Practice

1 Point

Intent

Enhance IAQ performance by optimizing practices to prevent the development of indoor air quality problems in buildings correcting indoor air quality problems when they occur and, maintaining the well- being of the occupants.

Requirements

Develop and implement on an ongoing basis an IAQ management program for buildings based on the EPA document "Building Air Quality: A Guide for Building Owners and Facility Managers," EPA Reference Number 402-F-91-102, December 1991, which is available on the EPA Web site, www.epa.gov/iaq/largebldgs/graphics/iaq.pdf.

Submittals – Initial LEED-EB Certification

- Provide a copy of the IAQ management program for the building based on the EPA document "Building Air Quality: A Guide for Building Owners and Facility Managers."
- Provide documentation of the ongoing implementation over the performance period of the IAQ management program for the building.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- If there has been no change to the IAQ management program for the building since the previous LEED-EB filing, provide a statement that there has been no change.

OR

- If there has been a change to the IAQ management program for the building since the previous LEED-EB filing, provide updated information. Provide an updated copy of the IAQ management program for the building based on the EPA document "Building Air Quality: A Guide for Building Owners and Facility Managers."
- Provide documentation of the ongoing implementation over the performance period of the IAQ management program for the building.

Potential Technologies & Strategies

Operate over the performance period, a program to enhance IAQ performance by optimizing practices to prevent the development of indoor air quality problems in buildings, maintaining the well-being of the occupants. Survey building and evaluate systems to identify potential IEQ problems and implement an ongoing program to prevent these problems from occurring, and maintain a high level of IAQ on an ongoing basis. Include in the program a plan for preventing moisture accumulation and mold in the building. For additional information, see the EPA Web site, www.epa.gov/iaq/largebldgs/baqtoc.html.

IEQ Credit 10.1 Green Cleaning: Entryway Systems

1 Point

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems, and the environment.

Requirements

Utilize over the performance period entryway systems (grills, grates, mats etc.) to reduce the amount of dirt, dust, pollen and other particles entering the building at all entryways, and develop the associated cleaning strategies to maintain those entryway systems, as well as the exterior walkways.

Submittals – Initial LEED-EB Certification

- Provide a building plan and photos showing all high-volume entryways and installed entryway systems (grills, grates, mats, etc.) and the written procedures for cleaning and maintaining these entryway systems.
- Provide quarterly reports over the performance period documenting that these entryway systems have been effectively used, cleaned and maintained on a regular basis.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- If the building entryway systems have not been changed, provide a letter documenting that the procedures for cleaning and maintaining these entryway systems have not been changed.
- Provide quarterly reports over the performance period documenting that these entryway systems have been effectively used, cleaned and maintained on a regular basis.

OR

- If the building entryway systems have been changed or the procedures for cleaning and maintaining these entryway systems have been changed, provide a building plan showing all high-volume entryways and photos of installed entryway systems (grills, grates, mats, etc.) and the procedures for cleaning and maintaining these entryway systems have not been changed. Highlight the changes that have been made.
- Provide quarterly reports over the performance period documenting that these entryway systems have been effectively used, cleaned and maintained on a regular basis.

Potential Technologies & Strategies

Design all exterior entrances with entryway systems (grills, grates, mats etc.) to catch and hold dirt particles and to prevent contamination of the building interior.

Design exterior stone, brick or concrete surfaces to drain away from building entrances.

Utilize low-maintenance vegetation in building entrances within the landscape design.

Avoid plants, trees and bushes in building entrance areas that are varieties that yield berries, flowers and leaves that are likely to be tracked into the building.

Base plant selection on an IPM approach to eliminate pesticide applications that have the potential to track into the building.

Provide a water spigot and electrical outlet at entryways for maintenance and cleaning activities.

IEQ Credit 10.2 Green Cleaning: Isolation of Janitorial Closets

1 Point

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems, and the environment.

Requirements

Have in place over the performance period structural deck-to-deck partitions with separate outside exhausting, no air re-circulation and negative pressure in all janitorial closets. Provide hot and cold water and drains plumbed for appropriate disposal of liquid waste in areas where janitorial equipment and chemicals are stored and/or water and cleaning chemical concentrate mixing occurs.

Submittals – Initial LEED-EB Certification

- ❑ Provide a building plan showing all areas where janitorial closets are located where cleaning chemical storage, janitorial equipment storage and/or water and cleaning chemical concentrate mixing occurs.
- ❑ For janitorial closets, provide photos or drawings of structural deck-to-deck partitions, and documentation of separate outside exhausting, no air re-circulation, negative pressure relative to surrounding occupied areas and drains plumbed for appropriate disposal of liquid waste.
- ❑ Provide a copy of the cleaning chemical storage guidelines and policy adopted by your organization.
- ❑ Provide a written description of how the janitorial closets were used for cleaning chemical storage over the performance period.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If the building systems pertaining to cleaning chemical mixing and storage have not been changed, provide a letter documenting their continued existence and use.
- ❑ Provide a written description of how the janitorial closets were used over the performance period.

OR

- ❑ If the systems pertaining to cleaning chemical mixing and storage have been changed, provide a building plan showing all areas where janitorial closets are located where chemical storage, janitorial equipment storage, and/or water and chemical concentrate mixing occurs.
- ❑ For cleaning chemical mixing and storage areas, provide photos or drawings of structural deck-to-deck partitions, and documentation of separate outside exhausting, no air re-circulation, negative pressure relative to surrounding occupied areas and drains plumbed for appropriate disposal of liquid waste.
- ❑ Provide a copy of the cleaning chemical storage guidelines and policy adopted by your organization.
- ❑ Provide a written description of how the janitorial closets were used for cleaning chemical storage over the performance period.

Potential Technologies & Strategies

Have in place over the performance period structural deck-to-deck partitions with separate outside exhausting, no air re-circulation and negative pressure in all janitorial closets.

Provide hot and cold water and drains plumbed for appropriate disposal of liquid waste in areas where water and cleaning chemical concentrate mixing occurs and janitorial equipment are stored.

Implement policies, procedures and mixing systems that minimize exposure of cleaning staff to concentrated cleaning chemicals.

IEQ Credit 10.3 Green Cleaning: Low Environmental Impact Cleaning Policy

1 Point

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems, and the environment.

Requirements

Have in place over the performance period a low-impact environmental cleaning policy addressing:

- Sustainable cleaning systems.
- Use of sustainable cleaning products.
- Use of chemical concentrates and appropriate dilution systems.
- Proper training of maintenance personnel in the hazards, use, maintenance and disposal of cleaning chemicals, dispensing equipment and packaging.
- Use of hand soaps that do not contain antimicrobial agents (other than as a preservative system), except where required by health codes and other regulations (i.e., food service and health care requirements).
- Use of cleaning equipment that reduces impacts on IAQ.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the low environmental impact cleaning policy adopted by your organization.
- ❑ Provide documentation that this policy has been followed over the performance period.
  - Provide documentation/specifications on the chemical and cleaner dispensing and dilution equipment used.
  - Provide documentation identifying the date and activities associated with floor maintenance.
  - Provide documentation of cleaning worker training.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If the low environmental impact cleaning policy has not been changed, provide a letter documenting its continued existence and implementation.
  - Provide documentation that this policy has been followed over the performance period.
  - Provide documentation identifying the date and activities relative to floor care maintenance.
  - Provide documentation of cleaning worker training.
  - Provide documentation on the chemical and cleaner dispensing and dilution equipment used.

- Provide documentation identifying the date and activities associated with floor maintenance.

OR

- ❑ If the low environmental impact cleaning policy has been changed, provide a copy of the low environmental impact cleaning policy adopted by your organization highlighting all changes.
  - Provide documentation that this policy has been followed over the performance period.
  - Provide documentation of cleaning worker training.
  - Provide documentation identifying the date and activities associated with floor maintenance.
  - Provide documentation on the chemical and cleaner dispensing and dilution equipment used.

Potential Technologies & Strategies

Have in place over the performance period a low-impact environmental cleaning products and housekeeping policy that addresses sustainable cleaning and hard flooring coating systems products and utilization of concentrated cleaning products. Floor coating products that are free of zinc are preferred.

IEQ Credit 10.4 & 10.5 Green Cleaning: Low Environmental Impact Pest Management Policy

2 Points

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems, and the environment.

Requirement

Develop, implement and maintain a low environmental impact integrated indoor pest management policy. Any cleaning products included in the integrated pest management policy must meet the requirements identified in MR Credit 4.1–4.3.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the low environmental impact pest management policy adopted by the organization:
  - The plan shall promote safer alternatives to chemical pesticides while preventing economic and health damage caused by pests. The plan shall implement the use of IPM techniques to reduce the need for reliance on chemical pesticides. When pesticides may be necessary, the plan shall ensure that clear and accurate notification concerning the use of pesticides be made available so that measures may be taken to prevent and address pest problems effectively without endangering occupants, janitorial workers or visitors.
  - The plan should address:
    - Integrated methods.
    - Site or pest inspections.
    - Pest population monitoring.
    - An evaluation of the need for pest control.
    - One or more pest control methods, including sanitation, structural repairs, mechanical and living biological controls, other non-chemical methods and, if nontoxic options are unreasonable and have been exhausted, a least toxic pesticide.
  - The plan shall include a communication strategy to provide notification of the IPM system. This shall include information and notice to tenants or directly to occupants in an owner-occupied building. The notice shall include a description of the integrated pest management system and a list of all pesticides, including any least toxic pesticide that may be used in the building as part of the integrated pest management system; the name, address, and telephone number of the contact person of the building; and a statement that the contact person maintains the product label and material safety data sheet (MSDS) of each pesticide used by the building, that the label or MSDS is available for review upon request, and that the contact person is available for information and comment.

- The communications strategy shall address “Universal Notification,” which requires notification not less than 72 hours before a pesticide, other than a least toxic pesticide, is applied in a building or on surrounding grounds that the building maintains.
- The plan shall address under what circumstances an emergency application of pesticides in a building or on surrounding grounds being maintained by the building can be conducted without complying with the earlier provisions. In addition, address notification strategies to ensure that occupants and janitorial workers are notified 24 hours in advance of the pesticide application.

- ❑ Provide documentation that the Low Environmental Impact Pest Management Policy has been followed during the performance period.

Submittals – LEED-EB Re-certification

Provide an update of previous filings:

- ❑ Provide documentation that the Low Environmental Impact Pest Management Policy has been followed during the performance period.

AND EITHER

- ❑ If there has been no change to this policy since the previous LEED-EB filing, provide a statement that there has been no change.

OR

- ❑ If there has been a change to this policy since the previous LEED-EB filing, provide an updated policy.

Potential Technologies & Strategies

Evaluate current indoor pest management actions and develop a plan for upgrading the approach used to be a low environmental impact integrated indoor pest management approach.

IEQ Credit 10.6 Green Cleaning: Low Environmental Impact Cleaning Equipment Policy

1 Point

Intent

Reduce exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment.

Requirement

Implement a policy for the use of janitorial equipment that maximizes effective reduction of building contaminants with minimum environmental impact.

Cleaning equipment policy needs to specify that:

- Vacuum cleaners meet the requirements of the Carpet & Rug Institute “Green Label” Testing Program-Vacuum Cleaner Criteria and are capable of capturing 96% of particulates 0.3 microns in size and operate with a sound level less than 70dBA.
- Hot water extraction equipment for deep cleaning carpets is capable of removing sufficient moisture such that carpets can dry in less than 24 hours.
- Powered maintenance equipment including floor buffers, burnishers and automatic scrubbers is equipped with vacuums, guards and/or other devices for capturing fine particulates, and shall operate with a sound level less than 70dBA.
- Propane-powered floor equipment has high-efficiency, low-emissions engines.
- Automated scrubbing machines are equipped with variable-speed feed pumps to optimize the use of cleaning fluids.
- Battery-powered equipment is equipped with environmentally preferable gel batteries.
- Where appropriate, active micro fiber technology is used to reduce cleaning chemical consumption and prolong life of disposable scrubbing pads.
- Powered equipment is ergonomically designed to minimize vibration, noise and user fatigue.
- Equipment has rubber bumpers to reduce potential damage to building surfaces.
- A log will be kept for all powered housekeeping equipment to document the date of equipment purchase and all repair and maintenance activities and include vendor cut sheets for each type of equipment in use in the logbook.

Submittals – Initial LEED-EB Certification

- ❑ Provide a copy of the low environmental impact janitorial equipment policy adopted by your organization.
- ❑ Provide a record of the janitorial equipment used in the building and a log of the maintenance of each piece of equipment over the performance period. Include vendor specifications for each type of equipment in use.

Submittals – LEED-EB Re-Certification

Provide an update of previous filings:

- ❑ If there has been no change to the low environmental impact janitorial equipment policy since the previous LEED-EB filing, provide a statement verifying its continued existence and operation.
- ❑ Provide a record of the janitorial equipment used in the building and a log of the maintenance of each piece of equipment over the performance period. Include vendor specifications for each type of equipment in use.

OR

- ❑ If there has been a change in the low environmental impact janitorial equipment policy, provide a copy of the plan highlighting any changes.
- ❑ Provide a record of the janitorial equipment used in the building and a log of the maintenance of each piece of equipment over the performance period. Include vendor specifications for each type of equipment in use.

Potential Technologies & Strategies

Develop, implement and maintain a policy for the use of janitorial equipment that maximizes effective reduction of building contaminants with minimum environmental impact. Evaluate the janitorial equipment currently being used and make a plan for upgrading to janitorial equipment that maximizes effective reduction of building contaminants with minimum environmental impact.

Innovation in Upgrades, Operations and Maintenance

IUOM Credit 1 Innovation in Upgrades, Operations and Maintenance

1–4 Points

Intent

To provide building operation and upgrade teams with the opportunity to be awarded points for additional environmental benefits achieved beyond those already addressed by LEED-EB Rating System

Requirements

Credit 1.1 (1 point)	Provide documentation of each proposed innovation credit, including a description of the achievement, the additional environmental benefits delivered and the performance metrics used to document the additional environmental benefits delivered over the performance period.
Credit 1.2 (1 point)	Same as Credit 1.1
Credit 1.3 (1 point)	Same as Credit 1.1
Credit 1.4 (1 point)	Same as Credit 1.1

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation of each proposed innovation credit, including a description of the achievement, the additional environmental benefits delivered, and the performance metrics used to document the additional environmental benefits delivered over the performance period.

Submittals – LEED-EB Re-Certification

- ❑ Provide documentation of each proposed innovation credit, including a description of the achievement, the additional environmental benefits delivered, and the performance metrics used to document the additional environmental benefits delivered over the performance period.

Potential Technologies & Strategies

Implement and maintain over the performance period actions that provide added environmental benefits. These can either be actions that substantially exceed an existing LEED-EB performance credit requirement or actions not addressed in LEED-EB that provide substantial added environmental benefits.

IUOM Credit 2 LEED Accredited Professional

1 Point

Intent

To support and encourage the operation, upgrade and project team integration required for LEED-EB implementation in buildings and to streamline the application and certification process.

Requirements

At least one principal participant of the project team is a LEED Accredited Professional.

Submittals – Initial LEED-EB Certification

- ❑ Provide documentation stating the LEED Accredited Professional's name, title, company and contact information.

Submittals – LEED-EB Re-Certification

- ❑ Provide documentation stating the LEED Accredited Professional's name, title, company and contact information.

Potential Technologies & Strategies

Engage a LEED Accredited Professional within your organization.

Have someone in your organization study the LEED-EB Rating System and the LEED-EB Reference Guide and take the LEED Accreditation exam. Consider having this person also take the LEED-EB specialization portion of the LEED Accreditation exam.

Hire a LEED Accredited Professional to support your project. Consider selecting a LEED Accredited Professional experienced with LEED-EB that has also taken the LEED-EB specialization portion of the LEED Accreditation exam.

4.2 LEED- NC: New Construction
For Multiple Buildings and On-Campus Building Projects
Registered Project Checklist
Fact Sheet
Errata Sheet- Reference Guide

LEED for New Construction v2.2
Registered Project Checklist

Project Name:
Project Address:

Yes	?	No			
			Sustainable Sites		**14 Points**
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
			Credit 1	**Site Selection**	1
			Credit 2	**Development Density & Community Connectivity**	1
			Credit 3	**Brownfield Redevelopment**	1
			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
			Credit 4.3	**Alternative Transportation**, Low-Emitting & Fuel-Efficient Vehicles	1
			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
			Credit 5.1	**Site Development,** Protect of Restore Habitat	1
			Credit 5.2	**Site Development,** Maximize Open Space	1
			Credit 6.1	**Stormwater Design,** Quantity Control	1
			Credit 6.2	**Stormwater Design,** Quality Control	1
			Credit 7.1	**Heat Island Effect,** Non-Roof	1
			Credit 7.2	**Heat Island Effect,** Roof	1
			Credit 8	**Light Pollution Reduction**	1

Yes	?	No			
			Water Efficiency		**5 Points**
			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
			Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
			Credit 2	**Innovative Wastewater Technologies**	1
			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
			Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Yes	?	No			
			Energy & Atmosphere		**17 Points**
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
			Credit 1	**Optimize Energy Performance**	1 to 10
				10.5% New Buildings or 3.5% Existing Building Renovations	1
				14% New Buildings or 7% Existing Building Renovations	2
				17.5% New Buildings or 10.5% Existing Building Renovations	3
				21% New Buildings or 14% Existing Building Renovations	4
				24.5% New Buildings or 17.5% Existing Building Renovations	5
				28% New Buildings or 21% Existing Building Renovations	6
				31.5% New Buildings or 24.5% Existing Building Renovations	7
				35% New Buildings or 28% Existing Building Renovations	8
				38.5% New Buildings or 31.5% Existing Building Renovations	9
				42% New Buildings or 35% Existing Building Renovations	10
			Credit 2	**On-Site Renewable Energy**	1 to 3
				2.5% Renewable Energy	1
				7.5% Renewable Energy	2
				12.5% Renewable Energy	3
			Credit 3	**Enhanced Commissioning**	1
			Credit 4	**Enhanced Refrigerant Management**	1
			Credit 5	**Measurement & Verification**	1
			Credit 6	**Green Power**	1

continued...

Yes	?	No			
			Materials & Resources		**13 Points**
Y			Prereq 1	**Storage & Collection of Recyclables**	Required
			Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
			Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1
			Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
			Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
			Credit 3.1	**Materials Reuse**, 5%	1
			Credit 3.2	**Materials Reuse**,10%	1
			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
			Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
			Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regiona	1
			Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regiona	1
			Credit 6	**Rapidly Renewable Materials**	1
			Credit 7	**Certified Wood**	1

Yes	?	No			
			Indoor Environmental Quality		**15 Points**
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
			Credit 1	**Outdoor Air Delivery Monitoring**	1
			Credit 2	**Increased Ventilation**	1
			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
			Credit 6.1	**Controllability of Systems**, Lighting	1
			Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
			Credit 7.1	**Thermal Comfort**, Design	1
			Credit 7.2	**Thermal Comfort**, Verification	1
			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Yes	?	No			
			Innovation & Design Process		**5 Points**
			Credit 1.1	**Innovation in Design**: Provide Specific Title	1
			Credit 1.2	**Innovation in Design**: Provide Specific Title	1
			Credit 1.3	**Innovation in Design**: Provide Specific Title	1
			Credit 1.4	**Innovation in Design**: Provide Specific Title	1
			Credit 2	**LEED® Accredited Professional**	1

Yes	?	No		
			Project Totals (pre-certification estimates)	**69 Points**

Certified: 26-32 points, **Silver:** 33-38 points, **Gold:** 39-51 points, **Platinum:** 52-69 point

Errata Sheet

for the document titled:

LEED for New Construction
Version 2.2
Reference Guide
Second Edition, September 2006

Notes:

- Updates to this document are posted on the LEED for New Construction Rating System page and the Reference Guide electronic access Web page (via www.usgbc.org/myUSGBC).
- 1st Edition errata posted November 17, 2005, and June 29, 2006, have been incorporated into the 2nd Edition of the LEED for New Construction Reference Guide.

Errata posted Spring 2007

Intro	ii	Change the USGBC address to: U.S. Green Building Council 1800 Massachusetts Ave, NW Suite 300 Washington, DC 20036
Intro	12	Under the second paragraph of LEED Green Building Rating System: History of LEED, add the definition of LEED so the first sentence begins: "The first LEED (Leadership in Energy and Environmental Design) Pilot Project Program…"
Intro	15	At the end of the last paragraph, add "Credit rulings posted after the registration date may be applied by the project team at their choosing (exception: the project's own CIRs must always be adhered to)."
Intro	17	Under Updates and Addenda, replace "addenda" with "errata"
Intro	18	In the last paragraph under Updates and Addenda, add "errata" between "credits," and "and credit rulings".
SSc1	29	Clarification of "water body" definition. Under Approach and Implementation, add a new paragraph after the second paragraph that reads: "Regarding the fifth bullet point of the Requirements, the Clean Water Act is vague in defining "water body" and thus requires interpretation. Small man-made ponds, such as those used in stormwater retention, fire suppression and recreation are not to be included in this definition for LEED purposes. Man-made wetlands and other water bodies created to restore natural habitat and ecological systems are not exempt. Wetlands are addressed specifically by the fourth bullet point of the Requirements."
SSc1	30	Replace the existing ESRI web link with "www.esri.com/hazards"

SSc2	37	Delete the text under "Exemplary Performance" and replace with the following language from the CIR dated September 22, 2006: "Based on evidence that higher density locations can achieve substantially and quantifiably higher environmental benefits, the following threshold requirements can be used to qualify a project for an exemplary performance Innovation Credit: A LEED for New Construction project must first meet the requirements of Option 1 of SSc2 (density path) in LEED for New Construction v2.2. Additionally, the project must meet one of the two following requirements: ▪ The project itself must have a density of at least double that of the average density within the calculated area (see equation 2). *OR* ▪ The average density within an area twice as large as that for the base credit achievement must be at least 120,000 square feet per acre. To double the area, use equation 2 but double the property area first. These requirements are based on the decision that a project achieving exemplary performance for this credit should: ▪ Not lower the existing average density of the area, ▪ Achieve a density of at least twice the threshold of the base credit, *AND/OR* ▪ Locate within an area of established density that is larger than that required for the base credit, which is why the radius used in the base credit has been doubled."
SSc2	39	Add to the definition of Square Footage: "Only 2 stories of a parking structure may be counted as part of building square footage. Surface parking (only 1 story of parking) cannot count as part of building square footage; this is to ensure efficient use of land adjacent to the building footprint. Both structured and stacked parking are allowable in square footage calculations."
SSc4.1	49	Under Exemplary Performance, add a new paragraph with language from Credit Ruling dated September 11, 2006: "Based on evidence that locations with higher transit density can achieve substantially and a quantifiably higher environmental benefit, meeting the following threshold qualifies a project for exemplary performance Innovation Credit. This follows the Center for Clean Air Policy's finding that average transit ridership increases by 0.5% for every 1.0% increase in growth of transit service levels, which leads to the conclusion that quadrupling transit service generally doubles transit ridership. To accomplish this quadrupling of service and doubling of ridership, at a minimum: ▪ Locate the project within ½ mile of at least two existing commuter rail, light rail, or subway lines, *OR* locate project within ¼ mile of at least two or more stops for four or more public or campus bus lines usable by building occupants; *AND* ▪ Frequency of service must be such that at least 200 transit rides per day are available in total at these stops. A combination of rail and bus is allowable. This strategy is based on the assumption that the threshold of the base credit would provide, in most cases, at least 50 transit rides per day (half-hourly service 24 hours per day or more frequent service for less than 24 hours per day). If, on average, transit ridership increases by 0.5% for every 1.0% increase in transit service, then quadrupling the number of rides available would, on average, double the transit ridership. (4 x 50 rides = 200 rides). Include a transit schedule and map within your LEED certification submittal."

SSc4.3	61	"Electric Drive Transporation Association", should be "Transportation"
SSc4.3	61	Under the Natural Gas Vehicle Coalition, replace the existing web link with "http://www.ngvc.org".
SSc4.4	63	Add a space below "Provide no new parking" under Option 4 to separate Option 4 requirements from the italicized text. Add a title, "NOTES:" in the new space between Option 4 and the italicized text.
SSc4.4	63	Under Requirements, below the italicized text in NOTES, add: "When parking minimums are not defined by relevant local zoning requirements, or when there are no local zoning requirements, either: A) Meet the requirements of Portland, Oregon, Zoning Code: Title 33, Chapter 33.266 (Parking and Loading) OR, if this standard is not appropriate for the building type, B) Install 25% less parking than the building type's average listed in the Institute of Transportation Engineers' Parking Generation study, 3rd Edition."
SSc4.4	64	Replace the text under Summary of Referenced Standard with the following text: "**Portland, Oregon, Zoning Code: Title 33, Chapter 33.266 (Parking and Loading)** Available through http://www.portlandonline.com/planning/. **Institute of Transportation Engineers' *Parking Generation*, 3rd Edition** Contact LEED Customer Service for details."
SSc5.2	74	The definition of Open Space Area needs clarification. Replace with: "Open Space Area is as defined by local zoning requirements. If local zoning requirements do not clearly define open space, it is defined for the purposes of LEED calculations as the property area minus the development footprint; and it must be vegetated and pervious, with exceptions only as noted in the credit requirements section. For projects located in urban areas that earn SS Credit 2, open space also includes non-vehicular, pedestrian-oriented hardscape spaces."
SSc7.1	90	In the second paragraph of Approach and Implementation, replace the existing web link for "Albedo: A Measure of Pavement Surface Reflectance," with "http://www.pavement.com/Downloads/RT/RT3.05.pdf".
SSc7.1	91	In the first sentence of Exemplary Performance, delete "a minimum of".
SSc7.1	93	Under American Concrete Pavement Association, replace the existing web link for "Albedo: A Measure of Pavement Surface Reflectance," with "http://www.pavement.com/Downloads/RT/RT3.05.pdf".
SSc7.2	97	In Table 1, the row for Aluminum should be labeled "Aluminum Coating". Revise Infrared Emittance to be "0.25" and SRI to be "50".
SSc7.2	99	Under Extensive Green Roofs, replace the existing web link with http://www.wbdg.org/design/greenroofs.php.
SSc8	110	Under Sky & Telescope, replace the existing web link with "http://skytonight.com/resources/darksky"
WEc1	120	In the first column, delete the following: "The values for ET in various regions throughout the United States can be found in regional agricultural data (see Resources section)." To be replaced by: "The Resources section provides a link to ET data."

WEc1	124	Under Resources, replace the reference to "Texas Evapotranspiration Web Site" with the following: **Rain Bird® ET Manager™ Scheduler** http://www.rainbird.com/landscape/products/controllers/etmanager.htm This free software provides sufficient local evapotranspiration data for the United States and Canada. Use data from the closest or most climate-appropriate location.
WEc1	124	Under Water-Efficient Landscaping: Preventing Pollution and Using Resources Wisely, replace the existing web link with "http://www.epa.gov/OW-OWM.html/water-efficiency/docs/water-efficient_landscaping_508.pdf"
WEc2	135	Under How to Conserve Water and Use it Effectively, replace the existing web link with "http://www.epa.gov/OWOW/nps/chap3.html"
WEc2	135	Under On-site Wastewater Treatment Systems Manual, replace the existing web link with "http://www.epa.gov/OW-OWM.html/septic/pubs/septic_management_handbook.pdf"
WEc3	145	Under Smart Communities Network, replace the existing web link with "http://www.smartcommunities.ncat.org/".
WE	147	Under Endnote 2, replace the existing web link with "http://www.epa.gov/OW-OWM.html/water-efficiency/docs/water-efficient_landscaping_508.pdf"
EA	150	Insert "*" in the "Construction Submittal" cell in Table 1 for EAc3, Enhanced Commissioning.
EA	150	On Table 1, change "Eac3" to "EAc3" and change "Eac4" to "EAc4"
EAp1	161	Under The Building Commissioning Handbook, replace the existing web link with "http://www.bcxa.org/resources/index.shtm"
EAc1	193	Under the Office of Energy Efficiency and Renewable Energy, replace the existing web link with "http://www.eere.energy.gov/buildings/"
EAc1	193	Under Sustainable Buildings Industry Council (SBIC), replace the existing link with "http://www.nrel.gov/buildings/energy10.html"
EAc2	204	Under Net Metering, replace the existing web link with "http://www.eere.energy.gov/greenpower/markets/netmetering.shtml"
EAc4	217	In Example Calculation 1, there are incorrect calculations. Please make the following changes outlined in red in the Calculations portion of the table:

Calculations

Tr Total Leakage (Lr x Life + Mr)	**LCGWP** (GWPr x Tr x Rc)/ Life	**LCODP x 10^5** 100,000 x (ODPr x Tr x Rc)/ Life	**Refrigerant Atmospheric Impact = LCGWP + LCODP x 10^5**	**(LCGWP + LCODP x 10^5) x N x Qunit**
40%	90.72	0	**90.7**	5443
40%	156.6	352	**508.6**	1017
30%	112.1	252	**364.1**	364
			Subtotal:	**6825**
Average Refrigerant Atmospheric Impact = [Σ (LCGWP + LCODP x 10^5) x Qunit] /			108.3	

<table>
<tr><td>EAc4</td><td>218</td><td>In Example Calculation 2, there are incorrect calculations. Please make the following changes outlined in red in the Calculations portion of the table:

<table>
<tr><th>Tr
Total Leakage (Lr x Life + Mr)</th><th>LCGWP
(GWPr x Tr x Rc)/ Life</th><th>LCODP x 10^5
100,000 x (ODPr x Tr x Rc)/ Life</th><th>Refrigerant Atmospheric Impact = LCGWP + LCODP x 10^5</th><th>(LCGWP + LCODP x 10^5) x N x Qunit</th></tr>
<tr><td>33%</td><td>37.9</td><td>0</td><td>37.9</td><td>18939</td></tr>
<tr><td>50%</td><td>93.5</td><td>210</td><td>303</td><td>15173</td></tr>
<tr><td>40%</td><td>113.9</td><td>256</td><td>369.9</td><td>18496</td></tr>
<tr><td></td><td></td><td></td><td>Subtotal:</td><td>52608</td></tr>
<tr><td colspan="4">Average Refrigerant Atmospheric Impact = [Σ (LCGWP + LCODP x 10^5) x Qunit] / Qtotal :</td><td>87.7</td></tr>
</table></td></tr>
<tr><td>EAc4</td><td>218</td><td>In Calculation 3, change the Average Refrigerant Atmospheric Impact to “10^5” instead of “105”</td></tr>
<tr><td>EAc5</td><td>222</td><td>Under International Performance Measurement & Verification Protocol, replace the existing web link with “www.evo-world.org/ipmvp.php”. In the description below, replace “IPMVP” with Efficiency Valuation Organization (EVO).</td></tr>
<tr><td>EAc5</td><td>223</td><td>Under Submittal Documentation, the first sentence should read “This credit is submitted as part of the Construction Submittal.”</td></tr>
<tr><td>EAc6</td><td>228</td><td>Before the numbered items in Approach and Implementation insert the following:

“NOTE: The power product purchased to comply with credit requirements need not be Green-e certified, but projects are required to document to USGBC that their renewable supplier has 1) met the Green-e criteria, and 2) properly accounted for the eligible renewable resources sold. This documentation to USGBC must include some type of meaningful verification work performed by a qualified, disinterested third party.

Example documentation methods to USGBC that meet this requirement include: a) providing a state-mandated power disclosure label from the renewable supplier in states with meaningful regulatory requirements for renewable energy disclosure and accounting practices, as well as meaningful penalties for violations; b) providing a green power scorecard or rating from a credible, independent entity that performs meaningful verification of green power characteristics and accounting practices. In either case projects must confirm that the third-party entity’s regulatory or verification programs are meaningful, summarizing those programs to USGBC as part of their certification application and highlighting any auditing or other independent checks the program performs. Other documentation methods will be considered on a case-by-case basis.”</td></tr>
<tr><td>MRc1</td><td>248</td><td>For clarification purposes, replace the definition of Interior Non-Structural Components Reuse to “Interior Non-Structural Components Reuse is determined by dividing the total area (sq. ft.) of retained interior, non-structural components by the total area (sq. ft.) of the interior, non-structural components included in the completed design.”</td></tr>
<tr><td>MRc2.1</td><td>249</td><td>Add to last sentence on the page, in regards to salvage materials: “(see page 251)”</td></tr>
<tr><td>MRc2</td><td>251</td><td>Insert as the last sentence of the Approach & Implementation section: “Materials salvaged and reused on-site can contribute to this credit if they are not included in Credit 3 calculations.”</td></tr>
<tr><td>MRc2</td><td>254</td><td>Under Waste Spec, replace the existing web link with “http://www.tjcog.dst.nc.us/regplan/wastspec.htm”.</td></tr>
<tr><td>MRc3</td><td>259</td><td>Revise the last sentence in the second column, first paragraph, to read “Materials contributing toward achievement of Credit 3 cannot be applied to MR Credits 1, 2, 4, 6 or 7. If MRc3 is not being attempted, applicable materials can be applied to another LEED credit if eligible.”</td></tr>
</table>

MRc3	262	Under Old to New, replace the existing web link with "http://www.lifecyclebuilding.org/resources/Old%20to%20New%20Design%20Guide.pdf"
MRc4	269	Within the definition of Pre-Consumer Content, third sentence, replace "this" with "the pre-consumer"
MRc7	283	In "Chain-of-Custody Requirements" section, second paragraph, delete "and all lumber". Thus, only the manufacturer's CoC number is needed for individually labeled lumber used in the project.
EQp2	296	Move the first sentence in bullet 5 of Option 3 to the end of the 4th bullet on page 295.
EQp2	296	Replace the existing web link for the Residential Manual for Compliance with California's 2001 Energy Efficiency Standard with "http://www.energy.ca.gov/title24/2001standards/residential_manual/index.html".
EQp2	297	Replace the existing web link for Residential Manual for Compliance with California's 2001 Energy Efficiency Standards (For Low Rise Residential Buildings), Chapter 4 with "http://www.energy.ca.gov/title24/2001standards/residential_manual/res_manual_chapter4.PDF"
EQp2	298	Replace the existing web link for Energy Rating Systems (HERS) Required Verification and Diagnostic Testing, California Low Rise Residential Alternative Calculation Method Approval Manual with "http://www.energy.ca.gov/title24/2001standards/residential_manual/res_manual_chapter4.PDF"
EQp2	298	Remove the resource "What You Can Do About Secondhand Smoke as Parents, Decision Makers, and Building Occupants". This article no longer exists.
EQc1	304	Under Submittal Documentation, change "prerequisite" to "credit".
EQc2	308	Change the date of The Carbon Trust Good Practice Guide 237 to "(1999)" and replace the existing web link with "http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=GPG237&metaNoCache=1".
EQc2	314	Under Building Air Quality Action Plan, replace the existing web link with "http://www.epa.gov/iaq/largebldgs/#Building%20Air%20Quality%20Action%20Plan".
EQc3.1	320	Under The State of Washington (SOW) Program and IAQ Standards, replace the existing web link with "http://www.aerias.org/DesktopModules/ArticleDetail.aspx?articleId=85"
EQc4.1	335	Under Green Seal Standard 36, replace the existing web link with "http://www.greenseal.org/certification/standards/commercialadhesives.cfm".
EQc4.1	336	Under Green Seal Standard 36, replace the existing web link with "http://www.greenseal.org/certification/standards/commercialadhesives.cfm".
EQc4.2	337	Under Requirements, add to the end of the first bullet point: "Primers must meet the VOC limit for non-flat paint."
EQc4.2	337	In the second bullet under Requirements, replace "GC-03" with "GS-03" to fix the typographical error.
EQc4.2	337	In the third bullet under Requirements, add "The following list of SCAQMD VOC limits are examples. Refer to the standards for complete details." After the last sentence and before the sub bullets.
EQc4.2	338	Under Green Seal Standard GS-11, replace the existing web link with "http://www.greenseal.org/certification/standards/paints.cfm".
EQc4.2	338	Under Green Seal Standards GC-03, replace the existing web link with http://www.greenseal.org/certification/standards/anti-corrosivepaints.cfm.
EQc4.3	341	Under Potential Technologies and Strategies, replace the existing web link for Acceptable Emissions Testing for Carpet with "http://www.cal-iaq.org/VOC/Section01350_7_15_2004_FINAL_PLUS_ADDENDUM-2004-01.pdf".
EQc4.3	342	Under Testing Criteria, replace the existing web link with "http://www.cal-iaq.org/VOC/Section01350_7_15_2004_FINAL_PLUS_ADDENDUM-2004-01.pdf".
EQc5	353	In the first sentence of the first bullet of the Requirements, delete "all" and add to the end of the sentence "and that serve as regular entry points for building users." Delete the last sentence under this same bullet ("Qualifying entry ways are those that serve as regular entry points for building users.")

EQc5	355	Under the first bullet in Submittal Documentation, replace "provided" with "specified/installed". Under the second bullet, replace "installed" with "specified/installed"
EQc5	356	Under Green Seal, replace the existing web link with "http://www.greenseal.org/findaproduct/index.cfm#cleaners".
EQc5	356	Under Janitorial Products Pollution Prevention Project, replace the existing web link with "http://www.westp2net.org/janitorial/jp4.cfm".
EQc6.1	360	Under Do Green Buildings Enhance the Well-Being of Workers? Yes, replace the existing web link with "http://www.edcmag.com/CDA/Archives/fb077b7338697010VgnVCM100000f932a8c0". At the end of the description add "This article requires free registration to Environmental Design + Construction."
EQc6.2	364	Under Do Green Buildings Enhance the Well-Being of Workers? Yes, replace the existing web link with "http://www.edcmag.com/CDA/Archives/fb077b7338697010VgnVCM100000f932a8c0". At the end of the description add "This article requires free registration to Environmental Design + Construction."
EQc8.1	380	Under The Art of Daylighting, replace the existing web link with http://www.edcmag.com/CDA/Archives/10e5869a47697010VgnVCM100000f932a8c0". At the end of the description add "This article requires free registration to Environmental Design + Construction."
EQc8.1	380	Under New Buildings Institute's Productivity and Building Science Program, replace the existing web link with "http://newbuildings.org/lighting.htm".
EQc8.1	380	Under The Whole Building Design Guide, Daylighting, replace the existing web link with "http://www.wbdg.org/design/daylighting.php".
EQc8.1	380	Under Lighting Controls, replace the existing web link with "http://www.wbdg.org/design/electriclighting.php".
EQc8.2	387	Under New Buildings Institute's Productivity and Building Science Program, replace the existing web link with "http://newbuildings.org/lighting.htm".
EQc8.2	387	Under The Art of Daylighting, replace the existing web link with http://www.edcmag.com/CDA/Archives/10e5869a47697010VgnVCM100000f932a8c0". At the end of the description add "This article requires free registration to Environmental Design + Construction."
EQc8.2	387	Under The Whole Building Design Guide, Daylighting, replace the existing web link with "http://www.wbdg.org/design/daylighting.php".
EQc8.2	387	Under Lighting Controls, replace the existing web link with "http://www.wbdg.org/design/electriclighting.php".
Glossary	408	Under Net Metering, replace the existing web link with "http://www.eere.energy.gov/greenpower/markets/netmetering.shtml".

As the first and most widely accepted green building rating system in the United States, LEED® for New Construction (LEED-NC) has seen remarkable growth since it was first released in 1999. The USGBC has learned many lessons that have enabled us to continuously improve this third-party certification system to make it more effective and more user-friendly. Over the past two years, volunteers and staff have incorporated public comments and lessons learned into what we believe is a smarter, more effective rating system. We want to help you understand the proposed changes for LEED-NC v2.2. The following summarizes the major technical changes in the ballot draft of LEED-NC v2.2 along with frequently asked questions (FAQs) on the transition.

Major Credit Changes from LEED-NC v2.1 to the 2.2 ballot draft

SSc5.2- Site Development: Maximize Open Space	Open space definition has been refined to address both urban and suburban settings
SSc6.2- Stormwater Design: Quality Control	Stormwater control systems must be capable of treating 90% of runoff and removing 80% of total suspended solids. System performance information on phosphorous removal is no longer required.
SSc7.2- Heat Island Effect: Roof	New performance metric (Solar Reflectance Index)
SSc8- Light Pollution Reduction	Requirements for control of interior lighting to prevent spillover and restructuring of the exterior lighting requirement
WEc1.2- Water Efficient Landscaping	Use of municipally provided non-potable water is acceptable for credit compliance
The Commissioning Credits (**EAp1** and **EAc3**)	Major clarifications were made to the credit to standardize LEED Commissioning Scope of Work
The Energy Performance Credits (**EAp2** and **EAc1**)	Updated Referenced Standard (ASHRAE 90.1-2004), new energy modeling protocol, two new prescriptive compliance paths
EAc4- Enhanced Refrigerant Management	Credit is now based on refrigerant management methodology established in TSAC refrigerant report
MRc4- Recycled Content	Updated Referenced Standard (ISO 14201)
MRc5.1- Regional Materials	New requirements on what constitutes "regional"
EQp1- Minimum IAQ Performance	Updated Referenced Standard (ASHRAE 62.1-2004)
EQc2- Increased Ventilation	Credit basis has been changed from ventilation effectiveness to provision of higher than code minimum ventilation
EQc3.2- Construction IAQ Management Plan: Before Occupancy	Clarification on building flush-out procedures provided. New IAQ testing protocol has been established. Requirement for installation of MERV 13 filters has been moved to EQc5
EQc4.3- Low-Emitting Materials: Carpet Systems	Updated, Enhanced Referenced Standard (Green Label Plus)
EQc4.4- Low-Emitting Materials: Composite Wood & Agrifiber Products	Revised definition of composite wood. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins
EQc5- Indoor Chemical & Pollutant Source Control	Provision of properly sized and maintained walk off mats is now acceptable. Mechanically ventilated buildings must have MERV 13 or higher filtration media.
EQc6- Controllability of Systems	Re-structured credit basis: EQc6.1 - lighting, EQc6.2 - thermal control based on ASHRAE 55-2004
EQc7- Thermal Comfort	EQc7.1 and EQc7.2 have an updated Referenced Standard (ASHRAE 55-2004). EQc7.2 now requires a survey method for verification
EQ8.1- Daylight & Views: Daylight 75% of Spaces	Credit can be achieved by three compliance paths: calculation of glazing factor; daylight simulation; or direct measurement of daylighting performance in completed building

Alternative options were added for the following credits: **SSc2**- Development Density and Community Connectivity, **SSc4.3**- Alternative Transportation: Low-Emitting and Fuel-Efficient Vehicles, **SSc4.4**- Alternative Transportation: Parking Capacity, **SSc6.1**- Stormwater Design: Quality Control, and **EAc6**- Green Power. Also, the Submittals section is no longer part of the Rating System to ensure that documentation can be more flexible, streamlined, and explained on our website and in the Reference Guide. Virtually every credit has been altered to some degree.

If you are interested in a particular credit you do not see listed here, please read through the Rating System for more specifics.

Frequently Asked Questions

Q: Why didn't you consider adding or removing credits in this revision?
A: This upgrade to version 2.2 is meant to correct known problems with LEED-NC as a smaller incremental change. The addition and removal of credits will occur in LEED-NC version 3, which will begin development soon.

Q: Will my 2.0/2.1 project have to comply with these new standards?
A: All registered LEED-NC v2.0/v2.1 projects will still be able to apply for certification using the standard in place at the time of project registration. When approved, LEED-NC v2.2 will be the only LEED-NC version available for registration. Projects will NOT be able to register for LEED-NC v2.1 after v2.2 has been approved by our members. *If you are working on a v2.1 project that you have not registered yet, and you don't want to use v2.2, you must register your project before October 28, 2005.*

Q: Can my v2.0/v2.1 project use the methods in 2.2 to achieve credits, without switching entirely to 2.2?
A: Based on feedback from LEED-NC project teams and users, USGBC has reconsidered and changed a LEED policy regarding the use of LEED-NC v2.2 credit compliance paths by LEED-NC v2.1/2.0 registered projects. It has become apparent since the release of v2.2 that credit modifications and compliance paths that were balloted for v2.2 are also appropriate and should be made available for use in v2.1/2.0 projects, with certain limitations. For more details, go to http://www.usgbc.org/ShowFile.aspx?DocumentID=1704 .

Q: Will there be new resources for LEED-NC v2.2 projects?
A: We are working on updating all of our LEED-NC resources for 2.2. If the ballot passes, the following items will be available at the Greenbuild Conference & Expo in Atlanta November 9-11, 2005:

- The new LEED-NC v2.2 Reference Guide ($150 for members, $200 for non-members)
- A new LEED-NC Technical Review Workshop
- Online, reduced-cost registration for LEED-NC v2.2 projects
- LEED-NC v2.2 Letter Templates
- Customer Service, web site information, etc

The LEED Accreditation Exam will not transition to the v2.2 version until later in 2006. If you are planning to take the exam soon, you should continue to study the LEED-NC v2.1 Rating System and Reference Guide (which will still be available for purchase on our website).

Q: Will the project registration fee structure change for 2.2?
A: Some of the fees will change, although all of the details are not yet final. However, the registration fee will be lower and will not be based on building square footage. USGBC is discussing lower fees for small projects, but otherwise the fees will be comparable to the current fees for 2.1.

To register your project: Go to www.usgbc.org/leed, then "Register your Project."

To read the ballot draft of LEED-NC v2.2: Go to www.usgbc.org, and click on the home page item relating to the LEED-NC v2.2 Ballot.

Important Dates
September 28, 2005 - LEED-NC v2.2 Ballot begins
October 27, 2005 - LEED-NC v2.2 Ballot ends
If the ballot is approved...
October 28, 2005 - Last day to register for LEED-NC v2.1
October 31, 2005 - First day to register for LEED-NC v2.2
November 7, 2005 - All resources mentioned above will be available. The Reference Guide will be available for purchase online (and at Greenbuild).

LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects

(AGMBC)

For use with the LEED-NC Green Building Rating System Versions 2.1 and 2.2

October 2005

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Table of Contents

Introduction

The purpose of this Application Guide is to provide direction in applying the Leadership in Energy and Environmental Design® Green Building Rating System Versions 2.1 and 2.2 for New Construction and Major Renovations (LEED-NC) to projects in a campus or multi-building setting such as corporate campuses, college campuses, and government installations (i.e. there is one owner or common property management and control). The application guide is intended for projects where several buildings are constructed at once, in phases, or a single building is constructed in a setting of existing buildings with common ownership or planning with the ability to share amenities or common design features. Throughout this guide, the term "campus" is used to represent all of these permutations.

LEED-NC Rating System, Support Materials and Tools

LEED is a program of the U.S. Green Building Council (USGBC) that establishes performance goals in five environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. In addition, a sixth category, Innovation & Design Process, addresses those environmental issues not included in the environmental categories such as acoustics, community enhancement, education, and expertise in sustainable design. Many issues specific to campus projects that are not addressed by the existing credit structure may be included in the Innovation & Design Process category.

The rating system is supported by the LEED-NC Reference Guide, a document that provides additional information and guidance for each LEED Prerequisite and Credit. Consult the LEED-NC Rating System, Reference Guide and www.usgbc.org for more information on the LEED program, the LEED application process, and the USGBC.

Working in concert with the rating system and reference guide, the LEED-NC Submittal Template is a helpful tracking and documentation tool, as well as a required submittal for LEED certification. The Version 2.0 Calculator spreadsheets still remain helpful for some credits.

LEED-NC Application Guide for Multiple Buildings and On-Campus Projects

This Application Guide facilitates using LEED-NC as a performance standard for greening the design of a building or set of buildings within a campus setting (college, corporate, military, multi-use development, etc.), or a group of buildings certifying as a set. A project involving several buildings may be built all at once, or in phases. The latter is especially applicable to large developments.

The Application Guide provides an opportunity for building owners to reduce the environmental impact of buildings by approaching green building in a broader context. Opportunities for reducing environmental impact may be spread over several buildings, a complex of buildings, or an entire campus or installation. Credits are available to each building that benefits from the shared amenities. This approach allows for economies of scale, enabling more opportunities to reduce the environmental impact of buildings and infrastructure.

The Application Guide analyzes the intent of each LEED-NC credit and prerequisite as developed for commercial facilities and interprets them for campus and installation projects. The greatest opportunities for new interpretations arise in credits associated with Sustainable Sites, Water Efficiency, and Energy and Atmosphere. Materials and Resources and Indoor Environmental Quality credits have fewer campus-specific interpretations and remain mostly the same as LEED-NC, merely requiring aggregation of performance results. The total points available under this guide are the same as LEED-NC v2.1 and 2.2 with no new credits added to or deleted from the basic rating system.

This application guide interprets and supplements the LEED criteria for projects. Where appropriate and unique to the campus or multiple building environment, alternative campus requirements and submittals that meet the intent of the basic rating system are provided. The LEED-NC Rating System and the Reference Guide are the governing documents for all LEED certification applications.

The LEED Multiple Buildings and Campus Committee

The LEED Steering Committee instructed the Multiple Buildings and Campus Committee to create an application guide that would be a simple overlay onto LEED-NC. Although simple in concept, this guide will assist many LEED projects – e.g. at the time of release, approximately 7% of all LEED registered project square footage is that of higher education facilities, which is just one of the sectors served by the guide. The MB&C Committee's ultimate desire is a LEED rating system that can be used to certify entire campuses and military installations in order to more thoroughly impact these market sectors.

USGBC gratefully acknowledges the following committee members (past and present) for their contributions to this document.

Don Fournier (Chair)	University of Illinois Building Research Council
Mark Maves (Vice Chair)	SmithGroup, Inc

Mike Chapman	Naval Facilities Engineering Command
Julia Chlarson	Centers for Disease Control and Prevention
Amanda Eichel	formerly of the University of California
Dagmar Epsten	The Epsten Group, Inc
Merritt Mike	formerly of Southface Energy Institute
Jules Paulk	formerly of Southface Energy Institute
Perrin Pellegrin	University of California, Santa Barbara
Teresa Pohlman	Pentagon Renovation Program
John Popovic	formerly of Case Western Reserve University
Richard Schneider	U. S. Army Engineering Research & Development Center
Melissa Solberg	formerly of Ford Land Development Corporation
Joel Stout	University of Cincinnati, Division of the University Architect

Overview

How to Use the Application Guide

This Application Guide is designed to complement the LEED-NC Green Building Rating System and the LEED-NC Reference Guide. The prerequisites and credits are supplemented, where necessary, by alternative Requirements and Submittals in order to apply the rating system to on-campus projects and multiple-build projects. *Credit requirement alternatives in this Application Guide may be used instead of the regular LEED-NC requirements, but are not mandatory as they may not apply in all situations.* The USGBC's CIR process also applies to this Application Guide and its requirements.

If appropriate, each prerequisite or credit includes Application Guidance with a discussion of related technologies and strategies. The Application Guide should be used as a working document that is referenced frequently throughout the design process.

Campus and Multiple Building Issues

The most detailed application guidance is necessary in the Sites category, as it presents the most challenges. Most credits in other categories simply allow the option of aggregate calculations. Campus settings sometimes have established property lines between segments of the campus, but share a common infrastructure between areas. Street lighting within a campus (e.g., lighted walkways) may technically encroach upon an adjacent property within the campus boundary. Similarly, stormwater from the campus may enter into a common retention pond or treatment facility specifically built for the campus. The use of natural treatment processes and distributed approaches are encouraged in the campus setting. The campus may own a wastewater treatment system and utilize the gray water for irrigation purposes. Streets and right of ways may be turned over to the local government after completion. Infrastructure and common amenities can be shared in campus settings and may contribute to performance achievement, thus helping to capture LEED points. The approach must be consistently applied across the project and all such cases are carefully scrutinized by the USGBC.

Some campus and multiple building projects may be mixed use development where the campus is developing a portion of the project and a separate party (or parties) is developing the remainder of the project. In such cases, the campus entity may define the LEED scope in such a way as to omit buildings that will be built by a separate party. This choice should be made with due consideration of the issues and projects are advised to keep omissions within the site boundaries to reasonable limits, in particular to parts of the overall project over which the project team will not have control. When the project is one building, the parts of the building within the campus entity's scope must meet LEED requirements. It is recommended that these buildings demonstrate that specific steps have been taken and guidance provided to insure that future build-out can also meet LEED requirements. The development of a thorough and instructive set of design guidelines and recommendations, coupled with building infrastructure to support future LEED build-outs, is encouraged to ensure that the building will perform as a LEED building after build-out.

The Certification Process for Multiple Buildings and within Campus Settings

Any project team utilizing this guide simply registers its project under the standard LEED-NC program. A project already registered can choose to use the application guide at any time before certification submittal, but should do so as early as possible during the pre-design or design stage.

*** ***Note:*** The following certification processes are in pilot phase, and may be revised at any time. The most up-to-date version will be posted on the Web site along with this application guide. ***

There are three approaches to certifying buildings in the campus or installation setting:

- Certifying a new building within a setting of existing buildings that are considered a campus, i.e. there is one owner or common property management and control.

- Certifying a group of new buildings as a package where the entire building set will be rated as a package and only one rating received. These buildings may constitute the entire campus or be a subset of an existing campus.

- Certifying new buildings where each new building is constructed to a set of standards but will receive an independent rating based on achievement of credits beyond the standards specific to that building. These buildings may constitute the entire campus or be a subset of an existing campus.

Each of these approaches will be discussed separately and registration and certification provided for that particular approach.

Certifying a new building within a setting of existing buildings

The certification process is essentially the same as the LEED-NC certification process for the given building. When certifying a single building under the Application Guide, you may choose campus requirements and submittals in lieu of the standard LEED-NC requirements and submittals where unique aspects of the campus setting have an impact on the credit affecting the building, e.g. where stormwater management practices are campus-wide rather than building-specific.

A reasonable and logical “LEED project site” boundary must be defined for LEED purposes. The project scope of work and the site area affected by the construction generally suffice to inform this definition. The defined site must remain consistent for all LEED credits. The Application Guide provides details on special considerations for shared amenities such as parking (adjacent and, more often, remote) and open space.

Certifying a group of new buildings as a package where the entire building set will be rated as a package and only one rating received

For entities that construct a set of buildings at once or over a defined time period in a campus setting, certification of each building individually could result in excessive documentation, much of which would be duplicated between buildings. In this case the option of rating the entire building set may be the best choice. When certifying a set of buildings under the Application Guide, you may choose campus requirements and submittals in lieu of the standard LEED-NC requirements and submittals where unique aspects of the campus setting impact the credit affecting the buildings. The Application Guide provides the methods for calculations and submittals for credits that may be averaged across the set of buildings and defines which credits must be met by each individual building. Using the averaging techniques, where applicable, allows for one rating to be applied to the building set, thereby minimizing documentation. Identify the group of buildings with a single name for LEED registration and certification.

Certifying new buildings where each new building is constructed to a set of standards but will receive an independent rating based on achievement of credits beyond the standards

1. Many campus build entities establish design standards (e.g. campus master plans and specifications) that will be applied repeatedly to new buildings. These elements may be site- or building-specific. The campus build process allows applicants to certify a “prototype” credit set that is intended for repetition on subsequent projects. The total credits beyond the standards may vary from building to building. Project teams will be permitted to designate prerequisites as prototypes.

2. **Certification Review for the First Project:**

    a. USGBC shall conduct a thorough and complete review of the first project, including prototype credits.

    b. The certification submittal shall include all supporting background information for prototype prerequisites/credits, and specific guidance will be developed for these requirements (similar to that created for LEED-NC audits).

    c. Projects will receive a Preliminary and Final LEED Review for all prerequisites/credits pursued, following the published review process.

    d. The Appeal process shall be an option for any prerequisite/credit which is part of this first project.

e. All approved prototype prerequisites/credits will be designated as such in the Final or Appeal LEED Review of this first project. Any denied prototype prerequisite/credit shall not be included in the prototype set.

3. Certification Reviews For Subsequent Project(s):

a. Subsequent projects shall be reviewed per the current process, which includes up to six prerequisites/credits selected for audit. It will be at the discretion of the review team whether or not a prototype credit will be selected as one of the up to six for audit.

b. These projects will not be required to submit documentation on approved prototype prerequisites/credits unless selected for audit in the Preliminary LEED Review.

c. Failure of an audited prototype prerequisites or credit will result in that item being denied in the current review. The denied item will temporarily drop out of the set of approved prototype prerequisites/credits as the project team will be required to demonstrate achievement of this specific item for the next three consecutive project application reviews. Once achievement is demonstrated, this item will return to the prototype set. If achievement is NOT demonstrated in any one of the next three consecutive project application reviews, the item shall be permanently removed from the prototype set.

d. Appeals will not be permitted for prototype prerequisites/credits in subsequent projects.

e. Prerequisites/credits may be dropped from the approved set of prototype prerequisites/credits at the project team's discretion. Once removed from the set, this item shall not be reviewed as a prototype prerequisite/credit unless it is re-established as such by demonstrating achievement of this specific item for three consecutive project application reviews, or per the steps outlined in #2 above.

f. Prerequisites/credits may be added to the approved set of prototype prerequisites/credits at the project team's discretion. It must be established as such by demonstrating achievement of this specific item for three consecutive project application reviews or per the steps outlined in #2 above (for the latter, this action shall occur with an individual project application, and a fee will be associated with adding this item to the prototype set).

The process above assumes that all buildings will be constructed to a specific standard and that credits associated with that standard can receive preliminary approval. Within the campus setting, the situation can arise where certain site-related amenities would not be constructed until after the building project is complete. This may result in some pending credits for buildings. These pending credits cannot be awarded until the actual master plan is put into effect and the shared amenities constructed. The individual projects have two choices:

1. Complete certification of the project with certain credits “pending.” These pending credits may alter the rating of the project. If the project is rated without the pending credits, its rating will be based on only those credits achieved. Once the pending credits are available, the project can be recertified and the credits awarded at that time.

2. Await certification until all credits are available.

The volume/campus build process can also be a useful tool for developers to use when managing a portfolio of buildings. Tracking site-specific issues and benefits of individual credits or strategies and the lessons learned during the process will inform future design revisions and decisions. Whether building and certifying projects one at a time, or as a package of several buildings, project teams must be fair and reasonable in defining the project scope and site boundaries and be consistent across credit calculations.

Summary of Prerequisites and Credits

Sustainable Sites	14 Possible Points
Prerequisite 1: Erosion and Sedimentation Control	Required
Credit 1: Site Selection	1
Credit 2: Urban Redevelopment	1
Credit 3: Brownfield Redevelopment	1
Credit 4: Alternative Transportation	4
Credit 5: Reduced Site Disturbance	2
Credit 6: Stormwater Management	2
Credit 7: Reduced Heat Island Effect	2
Credit 8: Light Pollution Reduction	1

Water Efficiency	5 Possible Points
Credit 1: Water Efficient Landscaping	2
Credit 2: Innovative Wastewater Technologies	1
Credit 3: Water Use Reduction	2

Energy and Atmosphere	17 Possible Points
Prerequisite 1: Fundamental Building Systems Commissioning	Required
Prerequisite 2: Minimum Energy Performance	Required
Prerequisite 3: CFC Reduction in HVAC&R Equipment	Required
Credit 1: Optimize Energy Performance	10
Credit 2: Renewable Energy	3
Credit 3: Additional Commissioning	1
Credit 4: Ozone Protection	1
Credit 5: Measurement and Verification	1
Credit 6: Green Power	1

Materials and Resources	13 Possible Points
Prerequisite: Storage and Collection of Recyclables	Required
Credit 1: Building Reuse	3
Credit 2: Construction Waste Management	2
Credit 3: Resource Reuse	2
Credit 4: Recycled Content	2
Credit 5: Local/Regional Materials	2
Credit 6: Rapidly Renewable Materials	1
Credit 7: Certified Wood	1

Indoor Environmental Quality	**15 Possible Points**
Prerequisite 1: Minimum IAQ Performance	Required
Prerequisite 2: Environmental Tobacco Smoke (ETS) Control	Required
Credit 1: Carbon Dioxide (CO2) Monitoring	1
Credit 2: Ventilation Efficiency	1
Credit 3: Construction IAQ Management Plan	2
Credit 4: Low-Emitting Materials	4
Credit 5: Indoor Chemical and Pollutant Source Control l	1
Credit 6: Controllability of Systems	2
Credit 7: Thermal Comfort	2
Credit 8: Daylighting and Views	2

Innovation and Accredited Professional Points	**5 Possible Points**
Credit 1: Innovations in Design	4
Credit 2: LEED Existing Building Accredited Professional	1

TOTAL POINTS AVAILABLE	**69**

SUSTAINABLE SITES

SS Prerequisite 1: Erosion & Sedimentation Control

Application Guidance

When the site incorporates more than one building, consider the phasing of construction and how the control plan will be modified over time to achieve the requirements. Site disturbance may also be phased and erosion control techniques applied at appropriate times. For large sites, this may be required by law, so effective planning at this scale is highly recommended.

SS Credit 1: Site Selection

Application Guidance

The requirements of this credit are very specific to the project site; substitution of other parcels to meet these requirements is not allowed. Selection of a site for multiple buildings—especially one that is developed over a long period of time—will require effective site layout and planning to be sure all buildings will be able to meet the requirements.

If the site of a multiple-building development does not fully comply with credit requirements, then the buildings can not achieve the credit under a single group certification. However, in such a situation, an individual building is still eligible for the credit if it can be demonstrated that:

1. the area disturbed by the building's construction activity complies with credit requirements and this is demonstrated within the LEED application submittal. This approach is expected to be most useful when buildings are being constructed at different times; OR

2. credit requirements are met for the area defined by a reasonable "LEED project site boundary" that corresponds to the buildings' development footprints or other fair subdivision method. The LEED application submittal must include thorough justification for this artificial site boundary, as it will be closely scrutinized. The LEED project boundary must remain consistent for all credits. This approach is expected to be most useful when buildings are constructed within the same or overlapping time frames.

SS Credit 2: Development Density & Community Connectivity

Application Guidance

NC Version 2.2 provides a "community connectivity" option that is most likely preferable for most campus and non-urban settings. Version 2.1 guidance reflects interpretations that provide compliance pathways adjusted for campus settings.

For Version 2.2, Option 2 (Community Connectivity):

Single buildings on a campus and each building within multiple building projects must comply with the credit requirements as written in order to achieve the compliance path.

For Version 2.1 (and Version 2.2 Option 1):

Requirements

a) Show that the project complies with the Version 2.1 credit requirements as written and incorporating the concepts in the "supplemental application guidance" section, below.

OR

b) If the site is located in an existing urban area and the contiguous property is over 15 acres the project may use the campus boundaries in lieu of a documentation circle to calculate density.

OR

c) Show that the project complies with a regional or campus master planning effort to redevelop an area with existing infrastructure into a higher density area with an ultimate intended density that reflects desired local development conditions and meets the intent of this credit.

Submittals for (c)

To document that the project has achieved credit equivalence, provide the following information in addition to the Submittal Template:

- Documentation showing that the project is being located in a previously developed area with existing development and infrastructure. (New development in a greenfield would not be considered appropriate in this case.) Provide information about the existing development density based on either the documentation circle or the property boundaries.
- Documentation verifying that the project location is within a designated dense urban or campus growth area.

- Documentation that the project is resulting in increased development density that meets or contributes to the goals of the urban development plan or campus master plan.

Supplementary Application Guidance

Typical programmatic requirements for a campus or installation can include common green spaces, land used for agriculture, and outdoor recreation spaces (except sport stadiums). These will all decrease average density when included in the calculations, yet they provide important functions and quality-of-life to a campus. Therefore, these types of required, programmed, low-density outdoor land uses may be considered added to the list of exceptions on page 21, step 5 of the LEED-NC v2.1 Reference Guide, along with "undeveloped public areas such as parks and water bodies."

Using the campus boundary for density calculations (if the campus is at least 15 acres) is beneficial because it does not penalize existing rural or suburban institutions for their neighbors' lower development density, nor does it benefit urban campuses for their neighbors' higher density. The stipulation of 15 acres was chosen because it generally indicates a sizable campus that is deemed to have a substantial enough impact to serve the credit's intent. Using this method also reduces some of the burden of documentation compared to original requirements. Once it is completed for one campus project it is simply updated for the next one, rather than defining a new boundary circle each time and researching additional buildings within a slightly different radius.

A new building is best located where shared physical and intellectual resources exist. Locating it next to an area with a higher density just to promote density rather than where it rationally belongs is not reasonable and it may create negative impacts for transportation and other community aspects. The credit's intent is well served by encouraging campuses to increase their on-campus density (even if existing density is not quite 60,000sf/acre). This approach might also encourage better master planning of building-to-infrastructure relationships on campus.

The LEED-NC v2.1 Reference Guide (page 20) says "Work with local jurisdictions and follow the urban development plan to meet or exceed density goals." Many university campuses and government installations are not required to follow local jurisdictions in this regard and should therefore establish their own density goals that meet the intent of this credit.

SS Credit 3: Brownfield Redevelopment

Application Guidance

Large brownfield site redevelopments may vary in the amount of remediation required for specific buildings under consideration. As long as the entire site is considered a brownfield, credit may be given to buildings on portions of that site that are contaminant free and require no specific remediation for their development footprint.

SS Credit 4.1: Alternative Transportation - Public Transportation Access

Application Guidance

Work with the transit authority to re-engineer bus routes and stops to service the site so that each building is within the required proximity. Consider establishing transit corridors and zones within the campus to ensure availability and access for the entire campus. Either public or campus bus lines must be in place by the end of construction to receive credit on that basis. Campus bus lines must interface with public mass transit. If there is no local mass transit, the campus bus line must connect with a commercial bus or rail line.

For rail transit systems that have not yet been constructed, a letter from the transit authority (stating the intent to establish the rail station and confirming funding sources) is sufficient to qualify for the credit. Campus shuttles to the closest operational station (if local) can be an interim solution until a new, closer station is in full operation.

SS Credit 4.2: Alternative Transportation - Bicycle Storage & Changing Rooms

Application Guidance

The requirements are applicable to each building in a multiple-build project. When calculating the bicycle rack capacity for transients in a non-residential building, address the loading possible at one time and not the cumulative loading based on the total transients in a day. Locate the bicycle storage facilities within 50 feet of the frequently used entrances. Transient (e.g. students, in the case of a campus building) occupancy is required to be included when calculating bicycle storage capacity.

Full-time staff (or staff FTE) may be used to calculate shower/changing room requirements. For this calculation, transients are to be defined as visitors to the building for less than 7 hours**.** Establish overlapping zones within the campus for ready access to shower and changing facilities.

If the project(s) is a mixed used development including residential buildings and other types of buildings, such as barracks complex on a military installation or a residential section of a campus, each building needs to meet the bicycle storage requirements based on its usage and occupancy.

A project is exempt from the shower facility requirement if all non-transient building occupants are housed on the same campus as that building (i.e. a military installation), or within a ½ mile of the building(s).

SS Credit 4.3: Alternative Transportation - Alternative Fuel, Low Emission and Fuel-Efficient Vehicles

Application Guidance

Requirements

Provide alternative fuel vehicles (ultra low sulfur diesel, CNG, LNG, electric, fuel cell, E85; or use average B50 biodiesel in standard diesel engine), low-emission and/or fuel efficient vehicles* for 3% of the full time employees (FTE) in the building(s) AND provide preferred parking for these vehicles, AND have access to a nearby alternative fueling station.

OR

Where the campus has a central fleet operation or motor pool, at least 50% of the vehicles available must be alternative fuel vehicles (as defined above).

Bi-fuel vehicles must utilize the alternative fuel option.

In the case of centralized parking, accommodations for alternative-fueled vehicles may be made at the central facilities, providing that those accommodations are credited cumulatively to each building's need based on the preceding criteria. The centralized parking must be within ¼ mile of the building(s) or serviced by a campus shuttle.

** Low-emission and fuel-efficient vehicles are defined as vehicles that are either classified as Zero Emission Vehicles (ZEV) by the California Air Resources Board or have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide.*

Submittals

Provide a LEED Submittal Template and (back-up documentation that proves faculty/staff/students/employees/residents own vehicles via the preferred parking incentive program), a map identifying the location(s) of the alternative fueling facility, and for campus/installation fleet vehicles provide proof of ownership of, or 2 year lease agreement for, alternative fuel vehicles and calculations indicating that alternative fuel vehicles will serve 3% of building occupants. Provide site drawings or parking plan highlighting preferred parking or alternative fuel vehicles.

OR

Provide a LEED Submittal Template with specifications and site drawings highlighting alternative refueling stations. Provide calculations demonstrating that these facilities accommodate 3% or more of the total vehicle parking capacity. If centralized parking is used, provide documentation that the parking meets the requirements for distance or shuttle service.

Supplementary Application Guidance

The campus environment lends itself very well to centralized parking concepts which may more readily accommodate preferred parking. A centralized alternative fueling area may be a viable alternative in the case of flexible fuel vehicles. Fleet purchases and/or fuel choices (e.g. biodiesel) may be strategically combined to achieve the performance target. Consider incentive programs for faculty/staff/students.

SS Credit 4.4: Alternative Transportation - Parking Capacity

Application Guidance

Campuses are often exempt from local zoning laws regarding parking, and thus determine their own standards. Calculation and documentation for this credit may be done either on a project by project basis or a campus-wide basis.

Requirements

If applicable local zoning code indicates there are no minimum parking capacity requirements, or if the campus entity is exempt from local codes, size the parking capacity in transit-oriented developments (TOD's) according to the minimum requirements by building typology as outlined in the Portland, Oregon Title 33 Planning and Zoning -Chapter 33.266 for Parking and Loading, Table 266-1 and 266-2 (at http://www.planning.ci.portland.or.us/zoning/ZCTest/200/266_parking.pdf) AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants,

OR

For rehabilitation projects add no new parking and reduce the capacity of existing oversized parking AND provide preferred parking for carpools or vanpools capable of serving 5% of the building occupants.

Accommodations for carpools and vanpools may be made at the central parking facilities, providing that they are credited to only one building or project based on the preceding criteria. The centralized parking should be within ¼ mile of the building(s) served or be serviced by a shuttle bus.

Supplementary Application Guidance

The campus environment lends itself very well to centralized parking concepts which may more readily accommodate preferred parking. An alternative method of establishing parking requirements have been provided. It is suggested that the method that generates the least parking be utilized. Long term master planning of campus parking facilities is recommended. A successful application of demographic analysis of parking facility users will help identify where parking will work best to serve mixed uses. An example is to locate parking garages where they can effectively be used by at least two groups or shifts per day, rather than a garage dedicated to just an 8am-5pm work force

When calculating the carpool space requirement on a campus where no parking is permitted within the specific project boundary, it is permissible to meet this credit by providing carpool spaces outside of the project boundary to serve the 5% of building occupants. These spaces must not be counted toward other LEED projects. Signage restricting carpool parking only to this project's occupants is not necessary. The "preferred" parking requirement is satisfied if a campus shuttle bus route serves satellite parking lots and structures. Calculation and documentation for this credit may also be achieved on a campus-wide basis. When using the campus-wide approach:

- If all parking spaces are permitted and designated as residential and commuter, the number of commuter permits may be used as the basis of calculations for carpool spaces.
- The credit can be achieved by proxy if local jurisdictional requirements that exceed the credit requirements and it is clearly demonstrated in the LEED submittal.
- Comprehensive transportation management programs are eligible for an innovation point.

Regardless of the compliance approach utilized, it is necessary to sufficiently promote the carpool program.

SS Credit 5.1

Version 2.1: **Reduced Site Disturbance -** Protect or Restore Open Space

Version 2.2: **Site Development -** Protect or Restore Habitat

Application Guidance

Submittals

- For greenfield sites, provide the LEED Submittal Template and attach a list of buildings indicating that each has met requirements.
- For previously developed sites where there are multiple buildings in the project scope, enter aggregate data in the Submittal Template, as appropriate.

Supplementary Application Guidance

Consider the aspects of construction phasing and the use of future building footprints for staging areas and temporary disturbance locations. On projects that are only a portion of a larger development and artificial site boundaries are defined for the LEED project, be sure that they are reasonable, logical, chosen with all credits in mind, and that their use is consistent through all credits. For multiple buildings, consider aggregating any restored previously degraded parts of the site as larger areas of habitat are more effective.

SS Credit 5.2

Version 2.1: **Reduced Site Disturbance -** Development Footprint

Version 2.2: **Site Development -** Maximize Open Space

Application Guidance

Requirements

Open space area can be either adjacent to the building(s) or at another location on the campus. It must be aggregated and contiguous, not divided and dispersed. The open space may be at another campus site as long as it is placed in a permanent reserve status.

Submittals

- If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template.

- For campus areas where the choice is made to have the open space set-aside not adjacent to the buildings provide documentation showing the requirements have been met and the land is in a natural state or been returned to a natural state and conserved for life of the buildings.

Supplementary Application Guidance

Open space does not have to be contiguous to the building(s) to which it is accredited. Open space may be aggregated and set aside as a larger plot of land. The land must be in a natural state or returned to a natural state; quads and playing fields do not count towards attaining this credit. This may enhance ecosystems and provide a larger piece of habitat. Clustering of buildings is good practice in terms of concentrating the impact of development in a limited area, leaving more of the site in its natural state, or providing for larger areas of habitat. Establishment of the project boundary with all credits in mind can enhance this process. Vegetated roofs may also contribute to credit compliance if the plantings meet the definition of native/adapted.

SS Credit 6.1

Version 2.1: **Stormwater Management** - Rate and Quantity

Version 2.2: **Stormwater Design:** Quantity Control

Application Guidance

Requirements

The credit requirements may be met using a centralized approach affecting the defined project site and that is within the campus boundaries. Distributed techniques based on a watershed approach are then required.

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template. Demonstrate that centralized stormwater management strategies using distributed technologies achieve credit performance requirements.

Supplementary Application Guidance

A master planning approach to storm water management and overall impervious surface management that is campus-wide or based on the local watershed is preferred over stormwater management planning limited to one project site at a time. The campus setting with larger boundaries and settings allows comprehensive stormwater management techniques to be applied on a larger scale and with more flexibility. This provides economies of scale and affords greater opportunities for clustering buildings, increasing natural settings, and applying distributed management techniques cost effectively. Phasing of projects may affect when a Master Plan is implemented and how the specific building(s) under consideration will be accommodated.

SS Credit 6.2
1 Point

Version 2.1: Stormwater Management – Treatment

Application Guidance

Same as credit 6.1.

SS Credit 7.1: Heat Island Effect - Non-Roof

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template and list the buildings meeting this credit.

Supplementary Application Guidance

The campus setting with larger boundaries and settings allows comprehensive heat island management techniques to be applied on a larger scale and with more flexibility. This provides economies of scale and affords greater opportunities for clustering buildings, increasing pervious surfaces and natural settings, and applying management techniques cost effectively.

SS Credit 7.2: Heat Island Effect - Roof

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template and provide a list of buildings meeting the credit.

Supplementary Application Guidance

An average of compliance for building roof areas may be used to meet these requirements when more than one building is on the site. For each building or for the group of buildings, combinations of high albedo and vegetated roof must collectively cover 75% of the roof area.

SS Credit 8: Light Pollution Reduction

Application Guidance

Requirements

Develop an exterior lighting master plan that includes the project site and the surrounding buildings in a comprehensive manner addressing the safety and security issues of the campus environment by sharing exterior lighting amenities while minimizing light pollution and energy consumption. The lighting master plan must show that it incorporates the credit requirements as well as the following:

- How this plan will reduce light trespass and night sky access and specific projects fit into the overall design.
- How safety, security, and comfort will be enhanced by the use of a master plan.

Submittals

- Provide exterior lighting master plan that addresses the project site and buildings and infrastructure showing how overall light pollution is reduced.
- Provide a design narrative from the Architect, Electrical Engineer, or responsible party that demonstrates what measures have been implemented for the registered LEED building(s) to meet the provisions of the exterior lighting master plan in the campus requirements.

WATER EFFICIENCY

WE Credit 1: Water Efficient Landscaping

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template. Submit appropriate documentation supporting the design of the rainwater collection system, the landscape design, and the extent of the supplemental temporary irrigation system.

Supplementary Application Guidance

Landscaping in the larger context of the campus provides abundant opportunity to implement solutions that require less water and for capturing rainwater or recycled water. Large campuses may consider treating its buildings' wastewater to standards for non-potable uses.

While consistency in site boundaries is required, the initial flexibility in site boundary selection and building clustering options allow for enhanced opportunities for sharing captured or reusable water. The project may also use native plants and other landscape alterations leading to a lower water demand. A temporary irrigation system may be used during establishment period for landscape.

WE Credit 2: Innovative Wastewater Technologies

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter weighted aggregate data in the Submittal Template.

Supplementary Application Guidance

When the site has more than one building, a weighted average of the site buildings, based on square footage, must be used to meet the requirements of the credit. This method ensures that each building generally meets the performance requirements.

Opportunities of scale may also allow more effective use of rain harvesting techniques or innovative and economical waste treatment technologies for the building(s) on the site. Options include packaged biological nutrient removal systems, constructed wetlands, and high-efficiency filtration systems.

WE Credit 3: Water Use Reduction

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter weighted aggregate data in the Submittal Template.

Supplementary Application Guidance

When the site has more than one building, a weighted average of the site buildings, based on square footage, must be used to meet the requirements of the credit. This method ensures that each building generally meets the performance requirements.

Opportunities of scale may also allow more effective use of certain techniques in differing buildings on the site.

Because of the varying occupant numbers in some types of campus buildings (including students, staff, and visitors) an alternative method of calculating this credit may be used. Rather than basing the calculations on the number of occupants, the water use may be based on the total number of each type of applicable fixtures in the building and the estimated number of uses for each of these. For example, for public water closets a sample calculation is as follows: Total Daily Water Use (Public WC) = Total Number Of Fixtures x Estimated Daily Uses x Flow Rate(GPF) x Duration

The calculations should use the same fixture count and daily use numbers for the base and proposed case. This provides a reasonable representation of base and proposed case water use. Calculations should include all flush fixtures and the following flow fixtures: public and private lavatories, public and private showers, kitchen faucets, and laboratory and service lavatories.

The following as process loads may be excluded: eyewash fountains, emergency showers, water coolers, and water fountains.

ENERGY & ATMOSPHERE

EA Prerequisite 1

Version 2.1: Fundamental Building Systems Commissioning

Version 2.2: Fundamental Commissioning of the Building Energy Systems

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this prerequisite.

Supplementary Application Guidance

Every building on the project site must document compliance. An employee in the owner's organization, who is not responsible for project design or construction management or supervision of the project and who has the appropriate credentials, would be the preferred commissioning authority for EA Prerequisite 1. The documentation for EA Prerequisite 1 may be from the design firm, but the individual acting as the commissioning authority must not be responsible for project design, construction management, or supervision.

In the campus setting, other elements and site features associated with a building project, such as fountains, irrigation system, wheelchair lifts, 'help phones', and exterior lighting systems which are not actual part of a building should also be considered for the commissioning process.

Many campus organizations have commissioning requirements for all projects such as a Project Delivery Process (PDP) Manual which outlines required commissioning related steps for each project phase, from initial scoping to closeout. It is suggested that these types of documents be reviewed for compliance with the LEED fundamental commissioning requirements and be modified, if necessary, to ensure that the strategies employed by the design team to achieve the fundamental commissioning credit fulfills all requirements set forth by the LEED reference guide. A local document or manual as well as any specifications that reference the manual may be submitted along with documentation of how the local manual and procedures specifically meet or exceed the referenced LEED standard. A local manual may serve as documentation for the development of the commissioning plan as long as the manual also complies with the LEED reference guide. The intent of the fundamental commissioning prerequisite will be met assuming the applicant provides information demonstrating their standard building practices, as outlined in the locally-generated procedures manual, meet or exceed the LEED referenced commissioning requirements.

EA Prerequisite 2: Minimum Energy Performance

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this prerequisite.

Supplementary Application Guidance

When designing a group of buildings, orientation and site utilization can have a major impact on energy consumption. Consider the group of buildings as a whole for the application of passive tempering and alternative energy applications.

EA Prerequisite 3

Version 2.1: CFC Reduction in HVAC&R Equipment

Version 2.2: Fundamental Refrigeration Management

Application Guidance

Requirements

Each building in the project must meet this prerequisite. If the building(s) is connected to a central chilled water system, that system must either be CFC free or a commitment to phasing out CFC-based refrigerants must be in place, with a firm timeline of five years from completion of the project. Prior to phase out, reduce annual leakage of CFC-based refrigerants to 5% or less using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting.

An alternative compliance path for buildings connected to a central chilled water system requires a third party (as defined in the LEED-EB Reference Guide) audit showing that system replacement or conversion is not economically feasible. The definition of the required economic analysis is: the replacement of a chiller(s) will be considered to be not economically feasible if the simple payback of the replacement is greater than 10 years. To determine the simple payback, divide the cost of implementing the replacement by the annual cost avoidance for energy that results from the replacement and any difference in maintenance costs including make-up refrigerants. If CFC-based refrigerants are maintained in the central system, reduce annual leakage to 5% or less using EPA Clean Air Act, Title VI, Rule 608 procedures governing refrigerant management and reporting and reduce the total leakage over the remaining life of the unit to less than 30% of its refrigerant charge.

Submittals

Provide a LEED Submittal Template, signed by a licensed professional engineer or architect and an attached list of the buildings declaring that each building's HVAC&R systems do not use CFC-based refrigerants.

OR

Provide a modified LEED Submittal Template, signed by a licensed professional engineer or architect with an attached list of the buildings and a letter of commitment from the campus/installation declaring its intention to phase-out CFCs and a summary of the phase out plan describing actions and approximate time frame. AND demonstrate that until phase out, existing CFC containing equipment meets EPA Title VI, Rule 608, procedures for refrigerant management and reporting.

OR

Provide results of third-party audit demonstrating that replacement is not economically feasible based a 10-year simple pay-back analysis. AND provide documentation showing compliance with EPA Clean Air Act, Title VI, Rule 608 governing refrigerant management and reporting. Provide documentation showing that the annual refrigerant leakage rate is below 5%, and the leakage over the remainder of unit life is being maintained below 30%.

Supplementary Application Guidance

If connecting to a central system containing CFC refrigerants operate according to USEPA criteria and plan for phasing out the CFC refrigerants. The use of CFCs in central plants is an ongoing issue for the campus environment. Systems using CFCs are older and less efficient than newer systems using modern refrigerants. It is in the best interests of all to phase out the use of CFCs from several perspectives including ozone depletion, global warming potential, and energy efficiency. When funds are lacking to modernize central chiller plants, the use of third party financing may be a viable alternative if the energy savings from the new equipment can pay for the initial investment. Consider contracting with an energy services company that fronts the equipment, guarantees savings, and is paid out of a share of the savings.

EA Credit 1: Optimize Energy Performance

Application Guidance

Requirements

This credit applies to each building within the project scope. To receive a single rating for a group of buildings, use a weighted average for the group of buildings based on their conditioned square footage, or aggregate the data into one PRM calculation, so that performance is achieved by buildings of varying sizes within a certifying group. Each building must still meet EA Prerequisite 1 and may receive its own rating if that is desired.

Supplementary Application Guidance

Consider energy sources such as waste heat or recovered resources. Reduced energy cost may reflect the effect of time-dependent valuation of energy (time-of-use) rates or demand charges when working in conjunction with permanently installed efficiency or storage systems. Environmental impacts result from the operation and expansion of energy infrastructure both on and off site. Application of the more efficient combined heat and power systems and energy storage systems may be applied more effectively in the campus environment. Since the buildings are rated based upon the energy (and its cost) that crosses the building boundary, more efficient central energy systems and thermal storage should be used as the basis of energy cost reductions in the calculation of the building's energy performance. Calculation instructions for Version 2.1 and 2.2 will be supplied as supplements to the respective Reference Guides.

EA Credit 2: On-Site Renewable Energy

Application Guidance

Requirements

A group of buildings may be evaluated on a group average, based on square footage, or each building may receive its own rating.

Submittals

For multiple buildings either use aggregate data in the Submittal Template and provide a list of the buildings or provide a Submittal Template for each building.

Supplementary Application Guidance

Consider orientation of the buildings as a group for maximum access to renewable energy. A central renewable energy system may be more cost effective than individual systems on the separate buildings. In the case where the renewable energy equipment is not physically located on the applicant building(s), provide data for each building showing the projected energy consumption and the percentage to be met with their prorated or dedicated share of renewable energy. The owner should also submit a certification letter acknowledging that the renewable energy from a central system will apply only to the submitted project(s) and will not be applied to subsequent buildings for any future LEED certifications.

Another campus consideration may be the energy used to light pathways and other connective routes between multiple buildings in a group. For Version 2.1, the energy benefit of solar-powered pole lights can be applied to EA Credit 2 (Renewable Energy) on a special calculation basis. Normally, site lighting is not included in the ASHRAE 90.1 energy model unless attached to the building. After the energy modeling is completed, add the unregulated site lighting’s electricity requirements to the design case’s Regulated Subtotal (DEC) and add the solar-powered pole lights’ contribution to it. This special calculation method awards the use of the technology within the appropriate context. The pole lighting contribution is not to be factored into EA Credit 1 calculations. Version 2.2 Option 1 accounts for site lighting within the updated referenced standard.

EA Credit 3
1 Point

Additional (Enhanced) Commissioning

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this credit.

Supplementary Application Guidance

The Reference Guide elaborates that the intent of the credit is that "The Additional Commissioning Credit ensures peer review through independent, third party verification.” An employee in the owner's organization, who is not responsible for the management or design of the project and who has the appropriate credentials, may serve as the "independent" commissioning authority. For example, if a university has architects who design the campus buildings, an engineer from the facility management staff can be considered the independent commissioning authority.

EA Credit 4

Version 2.1: Ozone Protection

Version 2.2: Enhanced Refrigerant Management

Application Guidance

Requirements

Each building in a multiple building project must meet the requirements of this credit in order to achieve it. In a campus setting, even if the project is only a single building, this often involves a central plant.

Version 2.1: If the building(s) is (are) connected to a central chilled water system, that system must be HCFC free or a commitment must be in place to phasing out HCFC-based refrigerants within 5 years from completion of the project.

Version 2.2: If the building(s) is (are) connected to a central chilled water system, that system must meet the credit requirements.

Supplementary Application Guidance

This credit is problematical to some campus situations where the central system is not owned by the campus operator. Negotiations with the chilled water supplier may be effective in getting their commitment to comply with v2.1 or v2.2 requirements. For Version 2.2, have the chilled water supplier perform the required calculations and submit a letter showing compliance.

In the selection of refrigerants, consider their global warming potential as part of the analysis criteria. A life-cycle analysis that includes the future impact of the Montreal Protocol should guide choice of refrigerants.

EA Credit 5: Measurement and Verification

Application Guidance

Requirements

Each building in a project must independently meet the requirements of this credit.

Submittals

If there are multiple buildings, attach a list of the buildings meeting the credit criteria. Separate M&V plans may be required for buildings that significantly differ.

Supplementary Application Guidance

Consider adding the functions that meet the requirements of this credit to a central energy management and control system for the campus. This would allow a continuous commissioning process for the building and maintenance issues could be centrally alarmed and personnel dispatched to keep systems in peak operating mode.

EA Credit 6: Green Power

Application Guidance

Requirements

Green power may be purchased on a centralized basis and credit attributed to a specific project. This same green power may not be credited to another project.

Submittals

Provide certification that any purchased green power is solely applied as credit to this project. If more than one building is to receive credit, provide data for each building showing the projected energy consumption of the buildings and the percentage to be met with green power. If the green power is generated by a campus entity, show that it meets Green-e standards.

Supplementary Application Guidance

Volume discounts are available from some Green Tag brokers. Therefore, it may be financially advantageous to the campus owner if multiple buildings are achieving this credit. Cogeneration from renewable sources (that meet Green-e standards) would be credited in EA Credit 2. Consider ID Credits for exemplary performance when 100% of green power content is used for extended periods.

MATERIALS & RESOURCES

MR Prerequisite 1: Storage & Collection of Recyclables

Application Guidance

Requirement

A central sorting and collection facility serving multiple buildings will also meet the intent of this credit as long as provisions are made for the collection of the recyclable materials within each building.

Submittals

If a central facility is used for sorting and/or temporary storage, include a narrative that succinctly describes collection procedures, frequency (based on generation estimates) and facilities.

MR Credit 1.1 to 1.3: Building Reuse

Application Guidance

Submittal

If there are multiple buildings in the project scope, enter aggregate data in the primary Submittal Template. Also provide one hardcopy version of the Submittal Template for each building's data.

MR Credit 2: Construction Waste Management

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template.

Supplementary Campus Application Guidance

Additional strategies for campuses include documenting salvage that occurs by owner organizations prior to the building being turned over to contractors for demolition including offering materials to academic programs on campus such as fine arts or architectural studios or for troop construction projects on military installations.

MR Credits 3 through 7

Application Guidance

Submittals

If there are multiple buildings in the project scope, enter aggregate data in the Submittal Template.

INDOOR ENVIRONMENTAL QUALITY

EQ Prerequisite 1: Minimum IAQ Performance

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

EQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

Version 2.1 projects can use any Version 2.2 compliance path (v2.2 requirements are simply a compilation of v2.1 credit rulings).

Submittals

List all buildings and identify which method was used on each.

EQ Credit 1: Carbon Dioxide (CO_2) Monitoring

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

EQ Credit 2: Ventilation Effectiveness

Application Guidance

Requirements

If there are multiple buildings on the project site, each building must independently meet the requirements.

EQ Credit 3.1 and 3.2: Construction IAQ Management Plan

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Version 2.1 projects can use any Version 2.2 compliance path (v2.2 requirements are simply a compilation of v2.1 credit rulings).

EQ Credit 4.1: Low-Emitting Materials - Adhesives & Sealants

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Application Guidance

Version 2.2 requirements are more stringent than Version 2.1.

EQ Credit 4.2: Low-Emitting Materials - Paints and Coatings

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Application Guidance

Version 2.2 requirements are more comprehensive (and thus more stringent) than Version 2.1.

EQ Credit 4.3: Low-Emitting Materials - Carpet

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 4.4: Low-Emitting Materials - Composite Wood

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Application Guidance

Version 2.2 requirements are more comprehensive (and thus more stringent) than Version 2.1.

EQ Credit 5: Indoor Chemical & Pollutant Source Control

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 6.1: Controllability of Systems- Perimeter Spaces

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Campus Application Guidance

Examine trade-offs of natural ventilation using operable windows in spaces that will need to be darkened for projection equipment. Some types of power operated black-out shades can be pulled from their tracks by breezes through large window openings. If natural ventilation is a priority and power shades are also required, employ strategies that do not utilize the glazing area of the exterior walls.

EQ Credit 6.2: Controllability of Systems, Non-Perimeter Spaces

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 7.1: Thermal Comfort- Compliance with ASHRAE 55-1992

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

Supplementary Campus Application Guidance

Version 2.1 projects can use the Version 2.2 compliance path (v2.2 requirements are simply a compilation of v2.1 credit rulings).

EQ Credit 7.2: Thermal Comfort- Permanent Monitoring System

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

EQ Credit 8.1 and 8.2: Daylight and Views

Application Guidance

Requirements

If there are multiple buildings on the project site, then each building must independently meet the requirements.

INNOVATION & DESIGN PROCESS

ID Credit 1.1 – 1.4: Innovation in Design

Application Guidance

In the campus setting and with multiple buildings, additional innovative opportunities arise, specifically with infrastructure and site issues. Economies of scale allow for more creativity and application of initiatives with larger scopes. The strategies and documentation for achieving innovation credits related to the site may be "duplicated" in multiple buildings or multiple applications for separate buildings, provided a clear description of how the whole site achieves the intended credits is presented. It must be clear that none of the required areas or facilities is counted twice. Each credit should be carefully assessed and treated fairly, respective of overall site issues (e.g., pervious surfaces) versus individual building issues (e.g., roofing). For example, if the project is applying for SSc5.2, which requires that permanent open space be designated adjacent to the building, the area of this open space must reflect the combined footprints of all of the buildings.

An innovation credit is warranted if activities and/or programs inspired by a LEED project are applied to the campus as a whole, thus delivering correspondingly larger environmental benefit.

ID Credit 2: LEED Accredited Professional

No application guidance is necessary.

5 Bond Program Overview & Facilities Committee Workplan

5.1 BOND PROGRAM OVERVIEW

In response to growing facilities needs, the Board of Trustees placed a capital-outlay bond before voters, given the shortage of available State funds. That Bond, Measure-E, passed in November, 2004, made available a total of $326,174,000. Of this total, MJC was allocated $220,110,000 to accomplish the following designated improvements:

Repair, Upgrade and/or Replace Aging Obsolete Classrooms, Library, Science Labs, Facilities, Instructional Buildings

Upgrade classrooms and buildings, fix leaky roofs and decaying walls, replace outmoded equipment, improve technology and accessibility, and remove hazardous materials at the following campus buildings:

A. Founders Hall Instructional Building and Learning Resource Center
Upgrade classrooms, heating and ventilations systems. Expand Center for Learning Assistance including Reading and Writing Center and Math Drop-In Tutoring Center. Upgrade classrooms, computer labs, Social Science lab.

B. Science, Health and Nursing Lab Building
Accommodate increasing student demand by upgrading and expanding classrooms and labs for pre-nursing program including: anatomy, physiology, and micro-biology, chemistry classrooms and labs.

C. John Muir Hall Health Instructional Building (Formerly South Hall)
Expand Allied Health programs including Dental Assisting, Medical Assisting and Respiratory Care classrooms and labs. Expand student access to educational materials and upgrade continued learning classrooms.

D. Student Center
Repair and upgrade existing student center to accommodate an interactive technology center, student health services, counseling services, international/multi-cultural center and space for student clubs, student and staff meeting rooms.

E. Student Services Building
Repairing and upgrading an existing building into a one-stop student services center to house financial aid, admissions and counseling services.

F. Softball Complex
To expand the physical education opportunities for women, build a softball field and seating area.

G. Science Instructional Building
Establish expanded classrooms and instructional labs for Geology, Astronomy, Earth Science, Botany, Zoology, Biology and Anthropology. Expand educational opportunities and improves access for students including the Great Valley Museum. Promote partnerships within the local education community through a new Science Community Center.

Expand Job Training Opportunities

A. Nursing and Health Education Training Center
Expand Nursing and health job training classrooms and laboratories to accommodate increasing demand. Expand science labs.

B. Job Technology Training Center
Establish a technology center with classrooms and computer labs for training courses that meet the demands of today's changing workforce.

C. Agriculture and Environmental Science Instructional Building
Establish an Agriculture Science Center to house classes in farming production, business, and horticulture, food processing and biological sciences. Establish a soils and plant research lab. Establish modular living units for students. Upgrade and repair animal quarters. Establish agricultural training and seminar center.

Expand Access to Educational Opportunities in Underserved Communities

A. Turlock Educational Outreach Site
Acquire site to establish a permanent location for a Modesto Junior College education presence in Turlock.

B. West Side Educational Outreach Site
Acquire site to establish a permanent location for Modesto junior College education center in Patterson, accommodating increasing demand in Stanislaus and Merced Counties which is the largest growing region in MJC's service area.

C. Library and Learning Resources Center
Establish a learning resources center to include up-to-date research materials, Internet access, computer labs, student study rooms, and expanded Distance Learning programs.

Safety and Security, Improve Access

A. Increase access to parking and improve campus safety.

B. Increase student safety by upgrading lighting, security, pedestrian areas and meet standards for disabled students.

C. Reduce parking impact on the neighboring community by building a parking structure.

5.2 PROGRAM BUDGET COMPOSITION

The Program budget numbers expressed in this Plan contain an inflation allowance (geared to produce equitable outcomes for construction monies), regardless of individual project(s) timing. Each Budget consists of the following components:

A. Construction Costs (hard-dollar value of competitive bids to be awarded).

B. Soft Costs (those costs necessary to design, manage and deliver construction):
1. A&E design/engineering
2. Construction Management
3. Legal/advertising/printing
4. Agency approval fees
5. Testing and inspection; haz-mat abatement; pest control (termite/dry-rot)
6. Furniture and equipment

C. Proposed new Outreach Sites involve land-acquisition and related infrastructure costs.

D. Other Costs:

1. Contingencies (design/construction/program changes).
2. Inflation (market conditions/materials shortage/etc.)
3. Legal and bond-sales fees

Because MJC facilities were established many years ago, there will be several “unforeseen conditions” that become apparent during construction, when attics, walls, ducts and underground utilities/foundations are exposed.

5.3 DESIGN AND CONSTRUCTION DELIVERY

These issues summarize the realities of construction-deliver, which is still an imperfect science/craft, containing many variables. The projects must be designed and modernized or constructed to meet current codes/seismic, ADA-accessibility; energy management, while permitting current and future instructional delivery and allowing for flexibility, as program-decisions change.

It begs the ultimate question: **How does MJC prepare for and provide effective learning environments to meet increasing and continuously-changing needs with limited capital-outlay and operations funding?**

I. Facilities Responses

The collective responses to these challenges relate directly to facilities in, at least, the following ways:

A. Increased utilization and efficiencies of existing facilities/spaces/resources. Existing facilities are under-scheduled/utilized, which must be improved over time.

B. Shared facilities with business, community, other departmental, educational and public agencies… to serve a common constituency.

C. Increased use of electronic and communications technology that increase service-delivery and enhance teaching/learning in the instructional spaces: classrooms, labs, library-media centers, presentation and vocational/technical and support spaces.

D. Facilities that recognize and meet students as savvy, mobile-consumers, who have other options/choices for their educational-dollar investment.

E. Built-in flexibility to meet current and foreseeable future needs/changes.

F. Effective and efficient student support services that are centralized, well organized, attractive and facilitative to the educational encounter.

G. Inter-connectivity of “campus” to other off-campus sites to avoid duplication of available services (i.e. interactive communications, distance-learning and shared resources that promote qualitative learning).

H. Prepare for changes that cannot yet be forecast, but are predicted to occur in an ever-increasing and faster rate of change.

5.4 IMPLEMENTATION GUIDELINES

I. Documents and Policies

Guiding the Measure-E Bond Program Implementation will be the following (Board of Trustees approved) documents and policies:

A. District's Long-Range Strategic Plan.

B. College's Educational Master Plan, 2006-2007.

C. Program Management Plan – Revised February 23, 2006.

D. State Chancellor's Office Guidelines and Planning Standards.

II. Inherent Program Goals

Inherent in this Master Plan for capital-outlay projects are the following Program Goals:

A. Wise and effective use of public funds (State and Local) with appropriate oversight and accountability.

B. Decision-making in a collaborative process that includes opportunities for input from stakeholders at various levels.

C. Clear, accurate and responsive communications with Community, stakeholders and governing agencies.

D. Compliance with applicable codes, regulations and adopted policies/procedures.

E. Reliance upon educational program-plans as the shaper of instructional spaces/environments/tools.

F. Ongoing planning and decision-making process that is consistent and equitable across the college community, allowing for changes and updates over time.

G. Professionalism in conduct, communications and relationships at all levels, as hard-decisions are made.

MASTER PLAN PROCESS
For
Modesto Junior College

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Bakersfield
San Luis Obispo
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San Jose, CA 95113
408.924.0811
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www.bfgc.com
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TABLE OF CONTENTS

EDUCATIONAL DELIVERY PLAN

Modesto Junior College-Master Plan

A. EDUCATIONAL FOCUS:

1. East Campus – Post-Secondary Transfer Programs
2. West Campus – Career-skills, Vocational and Community Programs; Comprehensive Core Programs

B. ISSUES TO BE RESOLVED:

1. 'Core' program offerings – student/faculty mobility vs. duplication of services (i.e. Nursing Program); shuttle bus service vs. student/staff vehicles
2. Separate 'Campus culture' – common vs. separate identity
3. Land, as a resource:
   a. East site is land-locked; athletic fields/pool/facilities are land-intensive;
   b. West site has ample land for expansion, athletic facilities and new buildings
4. Student services – centralize for efficiency, but available on each campus
5. How to handle growth:
   a. Determine where growth is likely to occur (site and program)
   b. Determine if Regional Centers will resolve major growth demands

C. GROWTH OPTIONS

1. Demolish/replace older existing buildings – East Campus; increase density
2. Shift athletic facilities to West Campus
3. Upload West Campus, where land exists
4. Rely on Regional Centers (i.e. Turlock, Patterson, Oakdale and Calaveras) to accommodate growth

MANAGEMENT PLAN
Modesto Junior College-Master Plan

I. ORGANIZATIONAL

A. Establish Project SCOPE (Kitchell/BFGC) – Exhibit A/Contract
B. Identify key-stakeholders and committee(s)
C. Execute Master Plan Agreement – BFGC/Board of Trustees
D. Gather all existing documents from Yosemite Community College District (YCCD)
E. Furnish insurance certificates to YCCD
F. Execute Consultant Agreements (BFGC)

II. MANAGEMENT

A. Establish Project Deliverables
B. Establish Project Schedule (Exhibit C/Contract)
C. Develop Communications Plan (CP)
D. Develop Work Plan (WP), showing key tasks/milestones
E. Develop Quality Assurance Plan
F. Develop Task Assignments/Accountability Matrix

III. PLANNING PROCESS

A. Needs Assessment
B. Scope Definition (identify secondary-effects)
C. Alignment of prioritized needs with resources
D. Scope + budget + schedule confirmation
E. Develop a work plan and management plan (time loaded tasks with responsibilities matrix)
F. Confirm all educational program decisions/directions (from Educational Masterplan)
G. Process should identify:

- Stakeholders (input/criteria)
- Ground Rules
- Decision-making process
- Communications Plan
- Critical issues
- 'Sacred-cows'
- Milestone/review dates
- Contingencies

H. Develop organizational concepts/options
I. Test options for consistency with:

- Educational vision/mission
- Needs (immediate and long-range)
- Resources (watch for 'scope-creep')

J. Establish 'design-standards'/guidelines
K. Develop campus conceptual plan(s)
L. Discuss/refine campus concept-plan
M. Accept refined concept plan and recommend Master Plan for approval
N. Forward Master Plan for approval to:

- College Council
- President
- Chancellor
- Board (final adoption)

WORK PLAN

Modesto Junior College-Master Plan

I.	**REVIEW EXISTING DISTRICT DOCUMENTATION – TASK ONE**	**Scheduled Milestone Date**

*A. Site Surveys and Aerials – East and West Campuses — 06/01/06
*B. Property boundaries and easements (typical)
*C. Topographic Surveys
*D. Utility Maps/Plans (As-Builts) showing sizes/locations
*E. Site Improvement Plans (roads/streets, parking lots, walkways)
*F. Traffic/Parking Surveys or studies (recent)
*G. Current Building(s) Projects – Site and Floor Plans
*H. Geohazards and Soils/Geotech Investigations/Reports

* = Still awaiting critical information

II. MEETING ATTENDANCE AND CONSULTATION – TASK TWO — Monthly: May-Dec.

A. Provide Records of Conference for meetings, as required
B. Consult with President/Facilities Director/Committee Chair(s) and Program Manager, as required.

III. UTILITY INFRASTRUCTURE – TASK THREE — 07/31/06

A. Determine existing utility capacities
B. Provide existing conditions report
C. Develop new Master Utility Plan:

1. Electrical
2. Telecom
3. Water
4. Sanitary Sewer
5. Storm Drain
6. Gas

IV. EAST AND WEST CAMPUS MASTER PLANS – TASK FOUR — 08/15/06

A. Develop land-use and new buildings site locations plans
B. Develop service roads, parking and walkway location plans
C. Coordinate with Project Architects re: individual buildings locations

V. ADA ASSESSMENT AND COMPLIANCE PLANS – TASK FIVE — 10/17/06

A. Perform existing site and buildings ADA assessment, pursuant to T-24 accessibility requirements
B. Develop ADA-Barrier Removal Plan-Site and existing buildings
C. Develop ADA-Transition Plans-East and West Campuses

VI. CAMPUS DESIGN GUIDELINES AND STANDARDS – TASK SIX 11/14/06

A. Develop materials and architectural-design vocabulary for East and West Campuses
B. Develop entry/gateway, signage and way-finding
C. Develop LEEDs Guidelines for projects design/construction

VII. EDUCATIONAL PROGRAM AND SPACE STANDARDS – TASK SEVEN 11/21/06

A. Develop District 'space-standards' consistent with State funding eligibility
B. Develop educational (campus) concepts
C. Develop educational space programs for new buildings

VIII. TECHNOLOGY STANDARDS – TASK EIGHT 12/04/06

A. Facilitate Strategic Technology Plan
B. Develop 'District Standards' for Classrooms and Labs for Technology

IX. SWING-SPACE AND PHASING PLAN - TASK NINE 12/19/06

A. Prepare design/construct phasing concepts, in concert with Kitchell-PM
B. Prepare Interim Housing (swing-space) needs assessment to minimize program disruption

X. MISCELLANEOUS SUPPORT SERVICES – TASK TEN On-Going

A. Provide miscellaneous consulting/advisory services, as required, with Kitchell-PM and College representatives
B. Perform informational presentations (i.e. Board of Trustees, Community, etc.), as required

<u>COMMUNICATIONS PLAN</u>

Modesto Junior College-Master Plan

The intent of this <u>Communications Plan</u> (CP) is to ensure the timely and accurate collection and distribution of information to all appropriate parties necessary to facilitate informed decision-making and recordation. It recognizes the CP becomes the key medium through which groups, committees, and teams derive information in a shared-governance environment. The CP is to establish a clear, predictable path and ultimate respository for all participants and affected stakeholders to the Master Plan process and decisions.

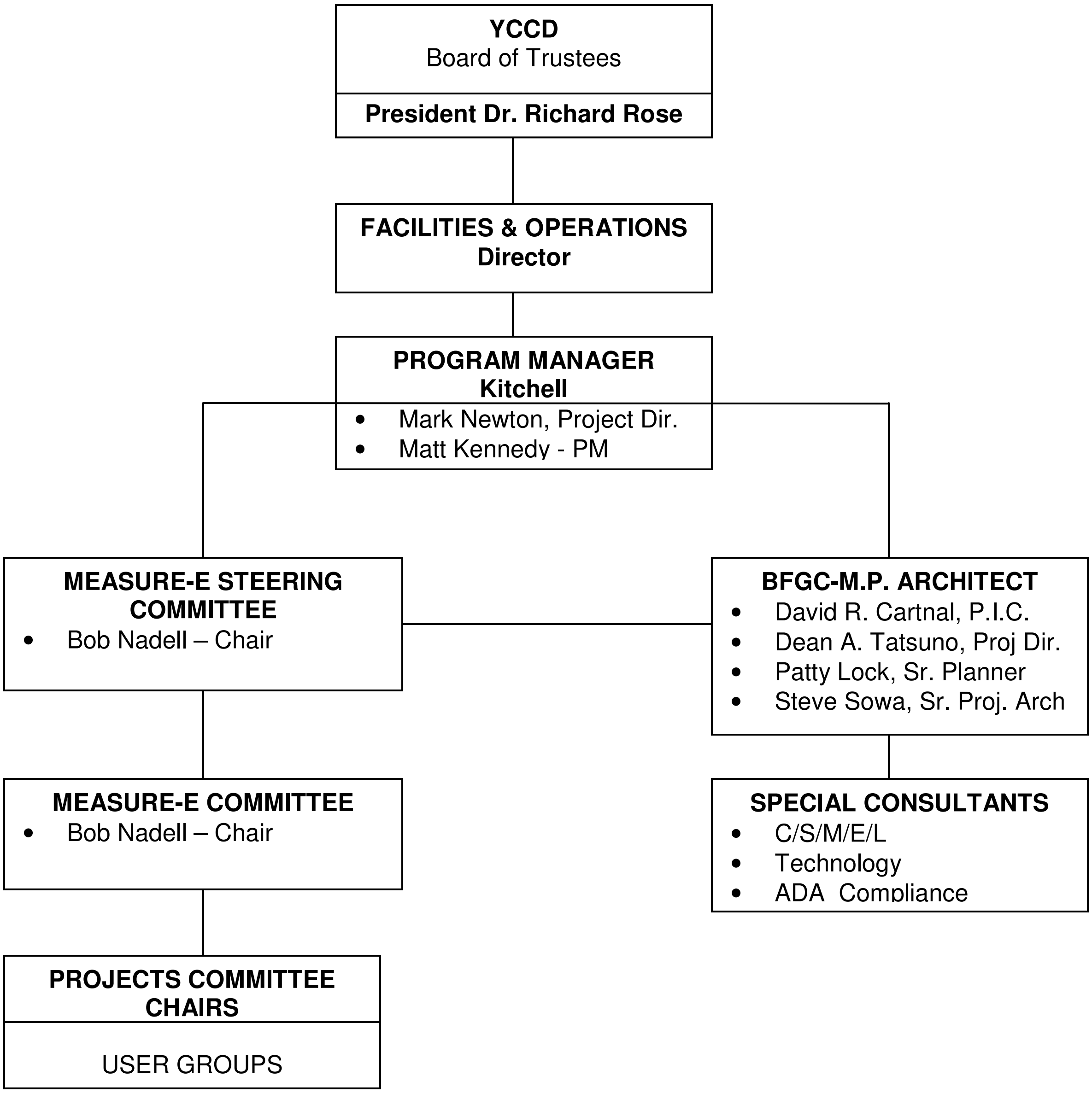
The CP permits diverse methods (i.e. e-mail, telecom, written and/or oral), while adhering to a consistent documentation process, so as to avoid the omission or distribution of mis-information.

The Program Manager (PM), Kitchell, becomes the central funnel of all communications / directives / planning activities from policy-makers through administration (i.e. Board to President to Facilities Director) through Kitchell to appropriate, affected parties. Similarly, all communications / information / requests / scheduling flow upward from appropriate stakeholders (i.e. User Groups, to Projects Committee Chairs, to Measure E Committee Chair to Measure-E Steering Committee Chair) through Kitchell to appropriate parties.

BFGC, in it's role as Master Plan Architect will communicate officially through three (3) participants, charged with the ultimate delivery of the final product:

1. Kitchell-PM
2. Facility Director
3. Measure-E Chair

(Refer to attached Diagram for a graphic depiction of the CP)



COMMUNICATIONS PLAN (CP)-Diagram

<u>TASK ASSIGNMENTS/ACCOUNTABILITY MATRIX</u>

Modesto Junior College-Master Plan

The following outline attempts to re-affirm the understanding of the Planning Team, as to which party has the <u>primary responsibility</u> for leading the designated task(s):

• Project Authorization and Approval, including scope, budget and contract authority; Final Master Plan adoption	Board of Trustees
• Acceptance of Master Plan Recommendations, for approval by Board of Trustees; provide input re: Educational 'Mission' for each campus	District Chancellor
• Approval of Master Plan Recommendations	MJC President
• Review and acceptance of Final Master Plan Recommendations as adopted by Measure-E Committee; forward same to President for approval	College Council
• Selection of Master Planning Firm; Development of recommendations for final Master Plan; adopt Committee 'Vision' Statement	Measure-E Committee
• Contract preparation and negotiation	PM
• Management, scheduling and control of process and outcome	PM
• Provide current Demographic Study and Educational Strategic Plan	Facility Director
• Alignment of Campus wishes/needs with District guidelines/directives, including all aspects of facilities planning, design and construction	Facility Director
• Develop and prioritize Campus wishes/needs relative to the Bond-Master Plan, in concert with BFGC & Kitchell	Measure-E Steering Committee
• Schedule and conduct monthly Committee planning meetings leading to recommendations for Final Master Plan	Measure-E Committee Chairs
• Develop key planning milestones/tasks for planning process; facilitate input-gathering and discussion/deliberations/decision-making	BFGC
• Identify basic campus organizational principles, including Options for both East and West Campuses	BFGC

• Perform Campus buildings relationships and adjacencies analysis to reflect Educational Strategic Plan, including circulation, service and parking	BFGC
• Establish site design parameters and options for new building locations/concepts	BFGC
• Develop growth/expansion options/alternatives for both East and West Campuses	BFGC

QUALITY ASSURANCE PLAN

Modesto Junior College-Master Plan

The Master Plan will undergo a formal Quality Assurance (Q/A) process as part of the on-going planning, delivery and recordation process.

The Q/A Plan includes the following proactive steps:

1. Use of written documentation to convey all information and directives, including written Transmittal Forms.

2. Use of written, dated recordation of all criteria, meeting notes, records of telecom.

3. On-going monthly review of project information, including notation of any changes to prior scope/criteria/directives.

4. Providing copies of written information (items-1 thru 3, above) to the Planning Team (Kitchell-PM, Facilities Director and Committee Chair). Highlight any material changes to the Planning Team.

5. Provide 'Draft' copies of all work-product to the Planning Team for review / comment / concurrence, prior to issuing product as a final document.

6. Employ licensed, experienced staff throughout planning process, who are committed to using sound, professional judgment in all decision making.

7. Remain current with California State Chancellor's Office standards and procedures.

8. Use clear, concise communications …. recognizing lay-members of committees / user-groups may be unfamiliar with professional design/construct industry semantics. Do not 'assume'. Communications is more than the text or wording …. It's about content, tone and (listener's) understanding/interpretation.

9. Check and double-check (independent 'eyes') each work-product, before it is issued, for:

    a. Content
    b. Completeness
    c. Accuracy
    d. Consistency

PROJECTS SCOPE OUTLINE-MEASURE-E

Modesto Junior College-Master Plan

				*Project Budget	Phase
I.	**EAST CAMPUS**				
	A.	Parking Structure	@	$11.57M	1
	B.	Student Services	@	9.37M	1
	C.	Auditorium-out-to-bid	@	(N.I.C.)	1
	D.	Student Center	@	7.25M	2
	E.	Library/LRC	@	19.79M	2
	F.	Science Community Center	@	32.97M	2
	G.	'Founders Hall'	@	25.32M	3
	H.	Science Bldg. Labs	@	1.66M	3
II.	**WEST CAMPUS**				
	A.	Ag. Inst'l Bldg. & Greenhouse	@	$18.60M	1
	B.	Ag. Modular Living Units	@	1.25M	1
	C.	Allied Health & Life Science	@	26.65M	1
	D.	Softball Complex	@	.28M	1
	E.	'John Muir Hall'	@	4.34M	2
	F.	Ag Animal Facilities	@	1.69M	2
	G.	Ag Multipurpose Pavilion	@	.45M	2
		(Subject to Private Fund-Raising)		($13.4M)	

*Budget reflects Measure-E Bond-language and represent TOTAL Project Allocation, not just Construction Costs.

FACILITIES MASTER PLANNING COMMITTEE – CHARGE:

Purpose: The Committee shall function as the Global Planning Advisors to the various District, College, User-Groups, Consultants & Community participants, helping to shape the Modesto Jr. College's facilities planning, design & delivery. The objective is to establish the College's global Facilities direction for the next 30-years and beyond.

Role: The Committee shall advise the Office of the President in formulating key planning recommendations for 'The College' (both East/West Campuses and the Patterson Center), within the established principles of shared governance, so as to develop facilities short, intermediate and long-term decisions that will be approved by the President, Chancellor and ultimately be adopted by the Board of Trustees in the following areas:

1. **District's Mission & Strategic Plan**
2. **College's Educational Master Plan & Desired Culture**
3. **Demographic Patterns–current trends & future forecasts**
4. **Land & Resource Constraints**
5. **Program Offerings & Building(s) Placement**
6. **Schedule, Sequencing & Implementation Considerations**

Authority: The Committee shall be appointed by The President, to serve under the direction of the District's Facilities Director (or designee, thereof) and the College's Professional Consultants–Kitchell (Program Manager) & BFGC (Master Plan Architects) for the duration of the

Master Plan development process (estimated to be 6-months). They will have the authority to bring recommendations to The President, through the College Council, working in cooperation with the Measure-E Projects Committee Chairs.

Representation: The following constituents shall represent The College's diverse interests and perspectives in this planning process, not to necessarily express the specific point-of-view of the group from which they will be chosen, but to ensure that all appropriate voices are heard in this collective, consensus-building global-process:

1-Vice President of Instruction
2-Faculty Representatives
1-Instructional Dean
1-Student Services Adm.Rep
1-Classified Employee Rep
1-Assoc. Student Rep
1-Facilities & Events Specialist Rep
1-District Facility Planner

Communications: The Committee Chair shall communicate all requests, records of meetings, findings and recommendations to the Office of The President through the College Council. It is the intent to conduct all deliberations and information processing in an atmosphere of openness and transparency that ensures all stakeholders of The College Community, both internal and external, have the opportunity to provide input in areas that may affect them. Use of the College's website is encouraged for all meeting notices, agendas, minutes of meetings and draft-recommendations being considered. This will facilitate open, informed decision-making in the best interests of the College & the District.

<u>MEASURE-E PROJECTS COMMITTEE</u> – <u>CHARGE</u>

<u>Purpose</u>: This Committee shall function as the detailed advisors to the College, User-Groups & Consultants with respect to the specific requirements of each, individual project identified in the Measure-E Bond Program. The objective is to identify, communicate and coordinate the needs of individual projects, as they are developed, so as to be compatible with and seamlessly interface with other projects being planned & constructed.

<u>Role</u>: This Committee shall advise the College Council, acting through the District's Facilities Director, in areas where individual project boundaries and/or spheres-of-influence adjoin or overlap other planned projects. Issues of individual building placement, shared walkways, access road and/or parking, entrances, design vocabulary (materials, themes, colors) and scale shall be addressed by this Committee. Project scope/budget shall not be materially changed from the Board-approved Master Projects List.

<u>Authority</u>: The Committee shall be appointed by the Office of the President, to serve under the direction of the District's Facilities Director (or designee, thereof) working in collaboration with the District's Program Manager–Kitchell, The Master Plan Architect–BFGC and the individual Project Architect(s) selected for each, respective project. The duration of this appointment shall coincide with the schedule for design & buildout of the Measure-E projects. Recommendations for issues that appear to be a material change or are in conflict with the Master Plan, shall be brought to the Executive Committee for resolution.

<u>Representation</u>: This Committee shall have twelve (12) representatives representing the cross-section of actual projects planned within Measure-E, as follows:
1- Vice President Student Services (Chair)
10-Project Committee Representatives
1-ASMJC Student Representative

<u>Communications</u>: The Committee Chair shall communicate all requests for information, services, guidelines or resources to the Facilities Director. Meeting Agendas, minutes and draft recommendations shall be presented, in writing, as well as posted to the College website to facilitate open, informed decision-making and appropriate project coordination from the various individual project-teams.