Angela D. Alsobrooks
County Executive

DESIGN PROCEDURE MANUAL FOR PROFESSIONAL SERVICES

Design Quality Control

Process & Deliverables

2025

INTRODUCTION

Prince George's County Plans, Designs, Constructs, and operates numerous public facilities such as library, community and recreation center, office, clinic, emergency management center, correction facility, judicial facility, police station, fire station, laboratory, , conference center, civic building, transit center, parking garage, maintenance depot, animal shelter, and host of other facilities that are all serving the citizens of the Prince George's County Maryland. County has a great interest in the highest quality buildings for the comfort of its occupants and those who visit them for business. As a public developer we are very interested in the best practices to sustain the environment through energy efficiency, pollution prevention, revitalizing communities, and establish standards and policies that will enhance life in the county. One of the documents that provide us with the requirements and standards to achieve these goals is the building design manual.

Although the State of Maryland and Prince George's County construction codes and regulations are pioneers in the safeguarding of our natural resources, the new green building concepts and hard work and guidelines of organizations such as the US Green Building Council (USGBC) have raised everybody's awareness.

This manual is a collection of our experiences in planning, design, construction, and operation of buildings. The purpose of this Manual (in this document and others may be referred to as "Design Manual-DM", or "Prince George's County Design Manual-PGDM" is to provide guidelines to architects and engineers designing new and renovate existing facilities for Prince George's County, Maryland. This manual is intended to summarize information on what is expected by the County, either by choice or by the specialized nature of the facility, and to avoid historical problems with planning, design, and construction, and with subsequent operations and maintenance. The DM includes information of a repetitive nature, common to most County facilities and projects.

It is recognized that all standards indicated herein are not universally applicable to every project. Further, these standards do not replace professional design analyses. Consultants are expected to conduct independent evaluations of the requirements and to discuss with the Office of the Deputy / Associate Director of any difficulty in meeting these requirements. Also, it is not intended that these standards be used directly as contract specifications. ***For simplicity, they are devoid of the legal qualifications and language needed by contract specifications. If there are any conflicts, the Contract Agreement signed by the County and the Consultant and or Contractor shall take precedence.***

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General

Phases

ATTACHMENTS:

- Capital Improvement Program - Building Standards
- Office of Information Technology - Infrastructure Specifications

PROCEDURE

General

A. General Scope of the Work

1. The A/E shall include comprehensive design services within their price proposal, encompassing all necessary major and minor disciplines as appropriate for the project type:
   a. Architecture
   b. Structural engineering
   c. Mechanical engineering
   d. Electrical engineering
   e. Plumbing engineering
   f. Civil engineering
   g. Code analysis
   h. Cost estimate
   i. Interior design
   j. Furniture layout, selection, and specifications (for renovation projects existing furniture analysis)
   k. Interior/exterior signage and way finding
   l. Geotechnical engineering
   m. Survey
   n. Landscape architecture and design
   o. Fire protection engineering
   p. Life safety
   q. Security
   r. Acoustical engineering
   s. Lighting and special lighting design
   t. Audio video design
   u. Communications
   v. Information technology engineering
   w. Commissioning
   x. Energy engineering
   y. LEED
   z. Food service design
   aa. Vertical transportation
   bb. Equipment
   cc. Hardware
   dd. Traffic engineering
   ee. Construction administration
   ff. Construction quality control
   gg. Interior & Exterior signage
   hh. Interior Wayfinding & Room numbers
   ii. and other design and construction services as needed for the design of a complete facility.

2. The result of any contract with the A/E must be documents (Including Permits) that provide a complete and fully functional facility. The schedule for the AE contract should also include PEER review time and Permit Processing. The price proposal should include all associated 3rd Party/PEER review related cost.
3. The A/E team (architects and engineers that are selected to design a project) must read and comply with these requirements.
4. County project manager will enforce these requirements.
5. These procedures shall be strictly adhered to during all phases of the project.

   These requirements are not to restrict or limit requirements that are necessary to obtain building permit or other permits required for the design and construction of buildings in Prince George's County. Design shall conform to all applicable codes, regulations and requirements of the agencies that issue various permits.
6. Upon analysis of all available information and prior to initiation of any design tasks, the A/E shall participate in an orientation meeting and if offered in a quality control training workshop scheduled by the County. The A/E shall have in attendance the individuals who will represent the primary planning, architectural and engineering disciplines on the project and others as may be requested by the County.
7. The A/E must participate and attend in all meetings required during the design and construction with the governing regulating agencies and code officials and applicable utilities.
8. It is expected that progress meetings be held at least on a bi-weekly basis throughout the project including construction phase.
9. A/E must coordinate and arrange for all necessary design development, work sessions, charrette workshops, fact finding, data collection, and interviews. These meetings are not part of the progress meetings and must be scheduled separately. All related disciplines must attend all such meetings. Participation of various related disciplines is mandatory.
10. All work sessions and design meetings must be held in the County offices unless otherwise agreed by the County managers.
11. The A/E shall be responsible for all aspects of site utility planning and coordination. This includes coordinating with utility providers to plan and confirm requirements for site utilities. Securing all necessary permits, approval and documentation related to site utilities. Ensuring timely communication with utility providers to avoid project delays and maintain compliance with regulatory requirements. The A/E shall provide all utility-related documentation to the County as part of the project records. This includes all building, signage, and utility coordination required for the State Highway Authority and all necessary traffic impact analysis.
12. A/E must ensure that design follows all MD State elevator requirements for lighting, hvac, power, life safety and all other divisions not listed.
13. Consultant is responsible for all coordination required for furniture and specialty equipment vendors. Consultant is to provide all necessary specification documents required for bidding.
14. A/E's proposal is to include all necessary design cost required to meet the scope of work detailed in the Prince George's County design manual. County will not be responsible for additional 3rd party consultant fees that are not included in the base proposal.
15. The A/E must carry $3 million errors & omission insurance.

C

DELIVERABLES/ SUBMITTALS

Drawing Requirements

B. Production

1. The outside dimensions of drawings, including schematic design, design development and construction documents drawings, shall not exceed 36x48 inches and are preferred to be a maximum of 30x42 inches. Within these dimensions, there shall be a 1/2-inch border at top, bottom, and right side, and a 1.5-inch border at the left side.
2. The title block of each drawing shall conform to the sample. An electronic copy will be provided to the A/E.
3. Title sheet lettering shall be simple line or block lettering arranged in accordance with the sample.
4. The name of the architect and each of the consultants shall appear clearly on the title sheet. The seal of registration and signature shall appear directly below each name. A facsimile signature stamp will not be accepted. On the title sheet Professional Engineers shall stamp in the discipline in which they are registered.
5. Drawings shall be clear and legible.
6. Scale of floor plans shall be 1/4" =1'-0" wherever feasible and not less than 1/8" =1'-0".
7. The system of numbering and sequence of drawings for projects shall use a discipline identification and a 3-digit drawing identification number (2 digits may be acceptable for small projects). The discipline identification will define the discipline, i.e. Civil = C, Structural = S, and etc. The 3-digit drawing identification number will define the drawing type, variation, and drawing sequence. The first digit of the drawing identification number defines the type of drawing such as, general = 0, composite plan = 1, plans = 2, and etc. The second digit of the drawing identification number defines the variation of the drawing, such as, E201 = Electrical first floor lighting plan, E211 = Electrical first floor power plan, and etc. The third digit of the drawing identification number defines the sequence, such as, E201 = Electrical first floor lighting plan, E202 = Electrical second floor lighting plan, and etc. For demolition plans the discipline identification shall have a D added, such as CD = Civil Demolition, AD = Architectural Demolition, and etc.

a.	General	G
1)	General Information	G001
2)	Code/Life Safety	G101
b.	Civil	C
1)	General Survey	C001
2)	Composite Plans	C101
3)	Site Plans	C201
4)	Sections	C401
c.	Site	L
1)	General	L001
2)	Composite Plans	L101
3)	Site Plans	L201
4)	Sections	L301
5)	Details	L401
d.	Landscaping	L
1)	General	LS001
2)	Composite Plans	LS101
3)	Site Plans	LS201
4)	Sections	LS301
5)	Details	LS401
e.	Structural	S
1)	General	S001
2)	Foundation Plans	S101
3)	Framing Plans	S201

4) Framing Diagrams S301
5) Foundation Details S401
6) Super Structure Details S501
7) Detail Schedules S601

f. Architectural A
1) General A001
2) Composite Plans A101
3) Floor Plans A201
4) RCPs A301
5) Enlarged Plans A401
6) Exterior Elevations A501
7) Interior Elevations A601
8) Sections A701
9) Exterior Details A801
10) Interior Details A901

g. Furniture F
1) Follow similar format to Architectural

h. Interior Design ID
1) Follow similar format to Architectural

i. Food Service FS
1) Follow similar format to Architectural

j. Signage SG
1) Follow similar format to Architectural

k. Mechanical M
1) General M001
2) Composite Plans M101
3) Floor Plans M201
4) Enlarged Plans M301
5) Sections M401
6) System Diagrams M501
7) Details M601
8) Control Diagrams M701

l. Fire Protection FP
1) Follow similar format to Mechanical

m. Plumbing P
1) Follow similar format to Mechanical

n. Electrical E
1) Follow similar format to Mechanical

o. Security SU
1) Follow similar format to Mechanical

p. Telecommunication T
1) Follow similar format to Mechanical

q. Audio Visual AV
1) Follow similar format to Mechanical

8. Each of the consultants, sub-consultants, etc., must include in their working drawings a site drawing identifying work germane to their part of the contract, including appropriate details. The prime consultant must prepare two specific site drawings in addition to all others. One must be the demolition drawing for the site that shows all site features (general construction, mechanical, electrical, utilities, irrigation, lighting, paths, roads, curbs, etc.), that occupy the site with appropriate notations for removal, retention, protection - whatever the disposition may be. The other must be a drawing that shows the finished site including the existing to remain and the new work to be done by all contractors and sub-contractors on the site - even though this may represent some duplication of other drawings. This drawing must specifically identify the precise

location and routing for all site features and the relative coordination. Details unique to the installation, which do not affect location coordination, need not be included herein. In order to appreciate the true impact of various installations, all must be shown to true scale (by line thickness or double-line as appropriate).

9. Drawings submitted shall be black line prints on white.
10. An arrow indicating true North shall be shown on all floor plans (for green design analysis). Sheet North arrow can be used in addition to true north but must be clearly delineated.
11. Pressed lettering is not acceptable. All drawings must be prepared with CADD.
12. Key plans and key sections shall be shown on all sheets.
13. Documents shall provide all information required by agencies issuing the permits.
14. All drawings for all phases must have adequate legends, symbols and annotations to fully describe the design and materials on the drawings. Unused legends and icons must not be shown.
    a. The A/E must provide the number of sets of documents as identified in the ***Table of Deliverables During the Design Phases***. Unless otherwise noted in the contract the following quantities must be delivered:
    b. Minimum **2** sets of full-size drawings
        1) 2 for PM team
        2) 1 for the user agency
    c. Minimum **2** sets of half size drawings
        1) 1 for the user agency
        2) 1 for PM team
15. With each submittal to the County the A/E must deliver electronic files of the documents in their native format and Adobe PDF format. Electronic format requirements are specified within this document.

C. Electronic File Format and CADD

1. Format
    a. CADD Files shall be submitted on Flash Drives (not on DVDs).
    b. Consultants and/or A/E acknowledges that all these files may be used by the County for marketing, presentation, project documents, meeting handouts, and all other needs that the County may have as an owner. In case if in the future there is a need for renovation or repair of the building, CADD drawings may be used by County employees or consultants for the production of such drawings as background information. **The intent is not to design and construct other facilities by duplicating a consultant's design or violating the A/E's copyright.**
    c. Consultants are responsible for the accuracy of electronic documents and must verify they match printed submittals specifically, 100% construction documents, permit set, bid set, and as-built drawings.
    d. Text files shall be in a format compatible with the Microsoft Windows operating system. The compatibility of files created on computers using other operating systems shall be verified prior to delivery.
    e. Files may be provided in either a standard .zip archive file format or a self-extracting .exe archive file format. Other archiving and/or compression formats are not acceptable.
    f. 2D, 3D, and animated renderings shall be submitted in the following three formats:
        1) Native file system (format generated by the software)
        2) JPG
        3) Adobe PDF.
        4) Renderings shall be produced in high resolution.
    g. All drawings, reports, specifications, booklets, and etcetera shall be submitted in the following formats:
        1) Native file system (format generated by the software)
        2) A single PDF file that includes the entire document and matches the printed

copy including cover sheet.

3) AutoCAD 2004 .DWG (or current version if approved by the Project Manager)

2. Computer-Aided Design and Drafting (CADD)

a. Before start of CADD production, A/E shall provide the County with a booklet of CADD standards and procedure that complies with these requirements.

b. This document describes the standards for CADD. Submittals that deviate from these standards shall be deemed unacceptable and will be returned to the consultant.

c. All review submittals and record drawing submittals shall be provided in the form of CADD files. The requirement to provide CADD record drawings may be waived by project managers where production of said drawings is impractical and/or inappropriate, such as manufacturers' catalog sheets.

d. CADD drawings may be created using any software capable of meeting the defined standards, but all submittals shall be provided in .DWG format and shall be compatible with the latest AutoCAD or ADT version. Additional CADD software or add-on software packages shall not be employed if their use creates proxy objects or other entities which cannot be fully manipulated using only AutoCAD. Consultants using software other than AutoCAD are responsible for confirming, prior to distribution that all CADD files comply with these standards.

e. If BIM software is used, the A/E must provide all data base related to the project in order to be able to reproduce charts and schedules by using the software. Submission of information in .DWG format is still required.

f. Record drawings shall not contain layout lines or other extraneous elements. Files shall be purged of unused blocks, layers, line types, fonts, or similar elements.

g. Drawings for projects involving renovations shall differentiate between existing, new, and demolished construction.

h. The sheet set title-block shall be coordinated and approved by the county prior to use on drawings.

i. All CADD drawings shall conform to the latest American Institute of Architects (AIA) layering guidelines, as defined in CADD Layer Guidelines published by the American Institute of Architects Press, Washington, D.C.

j. All fonts and external reference files that are used in the drawing files shall be included with their respective drawings. Wherever feasible, only standard AutoCAD fonts shall be used; non-standard fonts that cannot be provided without violating software licensing agreements or copyright regulations, shall not be used. Font and external reference addresses shall be relative to a directory on the delivery disk, not to a directory on the consultant’s computer.

k. All drawings shall be drawn at full scale in the model space. When a drawing contains elements to be plotted on the same sheet but at differing scales, AutoCAD’s layout must be used.

l. Entity colors shall be defined “by layer”, not by the entity.

m. Dimensions shall be associative, relating directly to the actual dimensions of CAD entities. The values of dimensions shall not be overridden or edited by hand.

n. Site plans, building plans and the plans for specific disciplines shall all have the same origin point, such that drawings can be overlaid exactly. Drawing elements shall all lie in the positive portion of the drawing coordinate system.

o. Entities that are supposed to be grouped into one unit shall remain in this form. Text, dimensions, and blocks shall not be exploded, either manually or automatically during a conversion process.

p. A documentation file named "readme.txt" that contains important project and associated computer files shall be included with the drawing and project files on the delivery disk(s).

At a minimum, this file shall contain the following:

1) County's project number and project title
2) Tenant Agency
3) Name of the facility if different from the project name
4) Consultant name, address, and phone number
5) Name of County Project Manager and Tenant Agency contact person
6) Contractor name, address, and phone number
7) Scope of work / project description.

q. The file name for each drawing shall match the sheet number as indicated in the final documents.

Specification Requirements

D. Format

1. All specifications must be in the latest CSI format.
2. The technical arrangement of the CSI MASTERFORMAT and the Three-Part Section Format are explained in detail in the CSI manual.
3. Provide the County with a copy of the specification on CD in MS Word (.DOC). Filenames must include the CSI section number and title.
4. Provide an original copy of the Specification for printing on high quality bond paper, not bound.
5. The section numbers and titles established at the beginning of the project must conform to the latest CSI system and shall be the same as for section numbers and titles throughout the project.
6. The format of specification documents must be:
   a. Black on white, clear and legible.
   b. Letter size (8-1/2 inches x 11 inches) neatly bounded on the left side.
   c. Double sided and paginated so new sections begin on the right page.
   d. Have protective cover and back
   e. Enough margins shall be maintained to allow for binding and printing on both sides of each sheet.
   f. Page number must appear on each page. Page numbers shall be indicated as Page X of X.
   g. Project name must be on all pages.
   h. RFP/IFB number if available must be on all pages.
   i. Data date and phase must be on all sheets.
   j. All sections must use the same font type, font size and format. Headers and footers must match between sections. Do not include consultant firm names in headers or footers. Footers must contain the section number and title.
7. The cover sheet must include the following information:
   a. Name of the project
   b. User agency name
   c. County seal
   d. RFP/IFB number
   e. Prince George's County
   f. Office of Planning and Development or Division of Building Design and Construction
   g. Date of submittal
   h. Design phase
8. The following general information applies to the development of specifications:
   a. Describe the extent of the work, the materials and workmanship, and include the work under the proper section. If any portion is covered by another section, there shall be clear and distinct cross-referencing between the sections. Merely to state "by others" is not acceptable.
   b. Provide for a minimum of three manufacturers of material except as directed by the

County. DO NOT USE terms such as “EQUIVALENT” or “OR EQUAL”.

c. Do not use general clauses intended to be all-inclusive in lieu of complete descriptions.
d. Do not duplicate standard requirements that are contained in the contract form.
e. Use consistency throughout, the word "will" to designate what the County or the Designer can be expected to do, and the word "shall" what is mandatory for the Contractor to do.
f. Use the same term throughout for the same subject and the term shall be the same as that used on the drawings.
g. Do not use the term "etc."
h. Avoid such terms as "to the satisfaction of the Designer," as directed by the Designer," "as approved," and "as required."
i. Specify work in appropriate Sections according to local trade jurisdiction.
j. Symbol:

	Do not use	Use Instead
1)	#	Number, no., or pounds
2)	%	Percent
3)	"	Inch or in.
4)	x	by
5)	'	Feet or ft.
6)	+	Plus
7)	-	Minus
8)	o	degree
9)	/	per or at

k. Alternates shall be fully and properly described and cross-referenced in the specifications and drawings.
l. The A/E must provide as minimum number of sets of documents as identified in the ***Table of Deliverables During the Design Phases***. Unless otherwise noted in the contract as the following quantities must be delivered:
   1) 4 set for PM team
   2) 1 set for the file
   3) 1 set for the Facilities Management

Cost Estimating Requirements

E. General

1. The A/E must establish a cost control plan and present it to the County at the middle of Concept Planning Phase.
2. Cost estimator must attend all cost estimating and verification meetings and must reconcile all questions and incorporate all modifications and value engineering items into a revised copy and resubmit for review as soon as possible so that project schedule is not delayed.
3. A/E is responsible for adhering to the budget. Projects that are estimated above budget shall be revised free of charge to the County.
4. Cost estimates at each phase must contain a market analysis to determine the cost escalation factor to the mid-point of construction. Appropriate back-up data must be included to substantiate the market analysis.

F. Format

1. The cover sheet must include the following information:
   a. Name of the project
   b. User agency name
   c. County seal
   d. RFP/IFB number
   e. Date of submittal

f. Design phase
g. Estimator's name

2. Each cost estimate sheet must include the following information in the header or footer of each page:
   a. "Prince George's County" (header).
   b. Name and number of the project (header).
   c. Project phase and date (footer).
   d. Division and section per CSI format (footer).
   e. No name of the cost estimator on individual sheets.
   f. Page number of total -Page X of Y- (footer).
3. Cost estimate data must be presented in the following format:
   a. The estimate shall reflect the current construction cost.
   b. All cost estimates shall be in CSI format.
   c. Each item must show unit labor, unit material, quantity, unit, extended labor, extended material, and total cost.
   d. Each section must have a grand total.
   e. Each division must have a grand total.
4. The summary sheet must include the following:
   a. All information must appear in the header or footer of each sheet as described above.
   b. Total cost of each CSI division including General Conditions.
   c. Overhead, Profit, Insurances, and Bonds (OPIB) must be shown independently and after total of division costs and on the summary sheet only.
   d. Design contingency must be shown at after OPIB items.
   e. Construction cost escalation must be added after the design contingency and on the summary sheet only.
   f. Total cost of building and site must be separately shown in the summary.
   g. The estimated number of calendar days required for construction of the project.
   h. Number of days to mid-point of construction from the cost estimate date.
   i. Cost of building construction per gross square foot of the building.
   j. Cost of site per square foot of site.
5. Report Format:
   a. All cost estimates must also be submitted in a format approved by the County for comparison of various cost estimates done in phases. This can be accomplished by using pre-approved Excel forms or software approved or recommended by the County. The purpose of this requirement is that various versions of cost estimates in the separate phases could be compared in detail. Cost estimator through A/E must provide the following reports:
      1) Summary of each CSI format showing total cost of CSI divisions.
      2) A report that compares cost of divisions in various phases of design.
      3) A report that filters and compares the previous cost estimate with the most recent one and showing all items with equal or more than %5 variance. A/E must work with the project manager to define the variance range.
   b. The A/E must provide as minimum number of sets of documents as identified in the ***Table of Deliverables During the Design Phases*** at the end of this document. Unless otherwise noted in the contract as an exception the following quantities must be delivered:
      1) 1 set for the PM team

Presentation Requirements

G. Renderings

1. All projects must have renderings to illustrate and delineate the design in the best manner possible
2. Following are the list of full colored renderings required for all projects:

a. A site plan showing the mass of the building with the roof plan, landscaping, and all major site elements with sun shadows.
b. All elevations
c. At least one section
d. At least one exterior perspective of the entire building, including the main entrance.
e. Renderings must be of professional quality.
f. 3d animation of the interior and exterior of the building (large projects above 20 Million).
g. If renderings are not computer generated, then the A/E must digitally photograph the rendering and submit the digital format (JPG) as well as printed format.
h. In addition to electronic format on Flash Drive, all renderings must also be provided in the printed format for presentation (large size, board size, etc.) as well as 8.5x11 for the record.
i. At least one rendering by the choice of the County must be framed for display.

H. Slide Show

1. There are many occasions during the design that the A/E team is required to present the project by use of video projection. These presentations must be done in a slide show format. The most commonly used formats are Adobe PDF, and Microsoft PowerPoint. The A/E must provide an electronic copy as well as printed copies of such presentations to the County prior to such presentation. If not possible the A/E must arrange with the County project manager for immediate submittal of such presentations not later than the day of the presentation.
2. All presentations must be submitted on CD-ROM and either in .PDF or .PPO format.

I. Material Boards and Samples

1. A/E must present all materials selected for review and approval by the County in a format that is portable and presentable to others such as material boards and binders.
2. Heavy building materials such as masonry can be presented in actual size.
3. All interior finishes must be presented on board tagged with where it is used and primary specifications.
4. Furniture selections must be presented in a binder and include pictures of the furniture, finish samples, and specifications.

Design Quality Control (DQC) Requirements

J. General

1. Prince George's County requires a high degree of design and quality control during the design process. In this section all required deliverables that relate to design quality control are described. A/E must be clear about these requirements and if there are any questions they must be forwarded to the County before start of the design phase.
2. It is intent of the County to assist the A/E in providing the County with high quality construction Documents. Non-coordinated, low-quality drawings and specifications are the first contributors to the cost overrun of the projects. Prince George's County has a specific process in conducting progress meetings and review of drawings.
3. Quality assurance and quality control must be consciously considered throughout all design and construction phases of each project. Completeness and thoroughness of the work at each design phase will be critically reviewed and acceptance delayed until requirements are met.
4. Orientation meeting
   a. As soon as the design contract is signed, the County Project Manager will schedule the orientation or kickoff meeting. The Associate Director and Using agency will attend the meeting and must be notified. Agenda for this meeting includes:
      1) Introduction of the team including the tenant and other stakeholders as well as Office of Central Services staff involved in the project and their roles. All consultants must be attending this meeting. The intent is to know those who make decisions as well as those who design the project. Therefore, attendance of project managers and project architect/engineers of various disciplines is mandatory.
      2) Review of the County project management process with accompanying charts.
      3) Review of the project schedule.
      4) Review of the project budget and means of cost control including cost estimating for various phases and alternate adds and deducts.
      5) Establishing progress meetings and who should attend.
      6) Review deliverables.
      7) Review the review process
      8) Answer any questions that the A/E or tenant may have.
5. One of the principal roles of the prime consultant is to take charge of overall project coordination. Accordingly, the prime consultant must take responsibility for schedules, costs, sub-consultants, permit submittal, and all aspects of project management; and final contract documents must give clear evidence that such has been the case. The County will require that the prime consultant develop and use a project Management cloud-based platform and plan checking program that includes all disciplines.
6. The contractual direction to the consultant will come from the County's Deputy /Associate Director for CIP. The consultant shall confirm any perceived change in project direction or scope with County's Project Manager prior to proceeding with each new direction. In issues of technical design and submittal approvals, the Project Manager will have primary responsibility. The Project Manager will have the responsibility to assure all issues and concerns raised by the County staff have been satisfactorily resolved. The Project Manager will also be responsible for assuring that all interested parties are involved as needed in the project discussions and reviews.
7. Sub-consultants must also bear considerable responsibility for design coordination. As facilities become more complex, the work of the sub-consultants generally requires more space. That space must be thoroughly defined and properly incorporated into the building. The space required is not only to house the equipment but also must provide for convenient operation, maintenance and repair over the years to follow. Each consultant is responsible for coordination of documents with all other disciplines with which their work is to be integrated.

8. The A/E must furnish for review by the County, not later than 2 weeks after receipt of a Notice to Proceed, its Design Quality Control (DQC) plan. The plan must identify all items listed in this document and must include sample forms where forms are required.
9. Submit the name, qualifications (in resume format), and responsibilities of each person assigned a DQC function. Staff must include:
    a. Design Quality Control Manager - The DQC Manager must report directly to a principal of the firm. DQC Manager cannot be the Project Manager. The principal in this context shall mean the individual with responsibility for the overall management of the firm including quality production. The DQC Manager must be a registered architect or engineer, and an experienced design person with a minimum of 10 years' experience in architectural or engineering design, 5 years of which must be in DQC.
    b. Supplemental Personnel - The A/E must provide as part of the DQC organization, as a minimum, specialized personnel for the following areas:
    c. HVAC Engineer - Registered P.E. with minimum 10 years design experience to provide quality control review, checking and coordination of HVAC system.
10. At the end of each phase there will be an A/E performance evaluation in which completeness and timeliness of these requirements play an important role.
11. A/E must complete and submit the design check list included in this manual at the end each phase.
12. County project manager will adhere to and enforce these requirements.

K. Submittal Tracking Plan

1. A/E must submit a checklist identifying agency, agency contact, submittal format, comments, submittal, follow-up, re-submittal, and final approval dates. A listing of submittals being tracked, including permits, utilities and County review submittal. (see sample at the end of this document)

L. Scope Tracking System:

1. The A/E must create a system of tracking the scope changes during the design. All deviations from the POR must be recorded and tracked until the end of design process. The tracking log must include the impact of such change on the other aspects of the project including schedule and cost.

M. Coordination Plan:

1. A checklist or matrix format identifying design elements requiring coordination by phase, consultants responsible for coordination sign-off, coordination issues, check dates, follow-up, and final resolution.

N. Space Calculation Charts:

1. The A/E must present to the County a full area calculation and tabulation report at the end of each phase. This report must show the result of calculations in the previous phases as well. Report must be generated in a spread sheet format -Excel- (print copy & electronically) and be organized by operational groups as presented in the POR or agreed by the County. Calculations must be accompanied with a floor plan graphic showing various categories of tabulations in color. The floor plans must be precise and show programmable areas for each space. The list and graphics must be updated at all times.

O. Review Process

1. Progress Review Meeting
    a. Throughout the design process the AE team and not just the prime consultant, must attend a bi-weekly meeting to review, coordinate, and monitor the progress of the project. These meetings are for the benefit of the owner and all stockholders should attend them. There might be a need for more meetings such as weekly meetings to meet the review process

requirements and Design Quality Control. It is imperative that these requirements be met in order to assure timely and thorough review and compliance with the project schedule.

b. Design sub-consultants must be included as integral members of the project team in the early stages of design. They must attend all progress meetings. Most often a simple issue has been forgotten to be relayed to subs or simply their absence in the design progress meeting deprives the team from their early reaction to issues and ultimately the project suffers from the lack of integration and coordination. Due to the increasing intensity of technical requirements in buildings of all types, it is mandatory

that each technical field be fully represented even in the early stages of design to assure that adequate provisions are included in the floor plans.

2. Informal Reviews

a. In addition to the formal progress review periods, it is important that many less formal reviews occur. It is imperative that thorough communication and understanding exist between County staff and consultants. This process is to assure that the County's needs are understood, accommodated, and that each new facility be designed with maintenance and operation requirements fully recognized. These considerations are best dealt with via a series of on-the-board reviews with the consultants to consider design options and make decisions while the design is still flexible. More review and concurrence achieved mid-phase will help minimize the end-of-phase comments.

3. Quality Control Review

a. National statistics have shown that 80% of documents errors and omissions occur in only 20% of the items on a given set of documents and this 20% tend to be repeated with each project. Of these errors and omissions, over 50% are directly related to interdisciplinary coordination issues. The design consultant shall implement a document quality control plan to minimize the impact of poor coordinated documents.

b. In the case of large size projects (above 20 Million), the A/E is required to provide a formal Document Quality Control Review (DQCR) vendor to assist in realizing quality contract documents. This review is not intended to relieve the consultant of their responsibility for producing complete and integrated documents. Based on the Multi-Check team review methodology, the DQCR must consist of a three-step process of 1-check, 2- correct, and 3-re-check. The QC team will use detailed discipline-based checklists, color coded annotation, and narrative comments to identify conflicts, errors, and or omissions from, and between the various elements of the bid documents. The Design Team will respond to all QC checks and comments, resolving interferences and conflicting design while expanding and completing gaps and omissions in the documents. As a final the QC team leader will recheck the corrected documents to verify that corrections were made.

c. At the end of each phase of the project the A/E must present the design documents to the County. Reviewers will ask questions to better familiarize themselves with the design.

d. County will review contract documents for overall completeness and compliance with the functional program and County standards, due to staffing limitations this is not intended to be the comprehensive plan checking/coordination process. The prime contractor shall check the plans and coordination before submission to the County for review. Documents that are incomplete or poorly coordinated will be returned to the consultants until they are deemed ready for review by County staff.

e. Two to three weeks are required for the County to review the drawings and prepare a set of consolidated comments to the A/E. The County project manager is encouraged to meet with all reviewers and go over all comments and filter out similar or non-related comments.

f. Consolidated comments shall be forwarded to the A/E for preliminary review.

g. The A/E is responsible for distribution and coordination of all comments among

various consultants involved in the project.

h. The A/E must respond in writing to each comment. If a comment is not incorporated the A/E must provide a rationale for not incorporating the comment. This response must be provided within one week after comments provided to the A/E.

i. Project manager, reviewers and the A/E will meet in a comments review session. Comments shall be divided in the following categories:
   1) **Will Comply**: A/E will comply but can be deferred to the next phase. Written PM approval is needed and should be noted.
   2) **Incorporate**: A/E will comply and must be incorporated in the documents before notice to proceed to the next phase.
   3) **Dismissed**. Written PM approval is required.
   4) **Not Feasible**: If the work is required but for some reason cannot be done, the Section Chief of Design must approve all deviations from the County standards and requirements in writing.

j. If revisions are needed the A/E must present an updated schedule to show that the project will not fall behind the contract master schedule. If the schedule needs to be compressed it is not acceptable to shorten the review periods. All deviations from the master schedule must be approved by the Deputy / Associate Director of CIP. The A/E must understand that any delay of the master schedule is in conflict with the contract and all requests for extension of time must be approved by the Contract Administrator.

4. Other Reviews

a. In addition to the document reviews noted above, sustainability review, ADA review, constructability review, commissioning review, Permit review, Mandatory Referral and historical review may be necessary.

P. Minutes of Meetings

1. A/E must provide minutes of the meetings not later than 3 working days after such meeting to the County. Large projects are required to have the meeting minutes typed electronically during the meeting so they can be verified before the end of the meeting. This will minimize confusion and provide clear direction to all parties.

2. Minutes of the meetings should include the following information:

a. Name of the project
b. Date and time of the meeting
c. Name of attendees
d. Location of the meeting
e. Agenda
f. Every subject or issue must be numbered sequentially.
g. At the following meetings if an issue is resolved it must be grayed out and after 2 meetings it should be deleted from the list.
h. A list of actions required for the following meetings including responsible party and time frame and deadline to perform the task.

3. County and recipients of the minutes should have 5 calendar days to respond and or correct the minutes.

4. Minutes of the meeting must be distributed to the entire team including the County team.

Q. Decision Log

1. Decision Log is a mechanism to record all important and incremental decisions that are made during the design process. Most often there are members of the team that miss few design progress meetings and later on they may comment or request items that are previously decided and approved to be completed in a certain way.

2. A/E must provide Decision Logs not later than 3 working days after such meeting to the

County.

3. Decision Log is an independent document from the minutes of the meeting.
4. All decisions made (approved by the County) must be logged sequentially in a table format.
5. All logs must include:
   a. Title
   b. Date of the decision made
   c. Approving party
   d. Affecting disciplines for coordination.
6. County and recipients of the Decision Logs should have 5 calendar days to respond and or correct the minutes.
7. Decision Logs must be distributed to the entire team including the County team.
8. Decision Logs must be generated during each progress; however, a complete and most updated Decision log must be submitted by the A/E to the County with each request for payment. Invoices will be rejected if not accompanied with this log.

R. Project Schedule

1. Project schedule is a mechanism to follow the production of the design and assure that all activities are happening within the required time frame. Prince George's County requires that all projects have a detailed project schedule indicating all activities. Project schedule must be in Primavera or compatible format approved by the County.
2. Initial project schedule must be delivered to the County not later than two (2) weeks after the initial orientation meeting. An updated schedule is to be provided to the County prior to each progress meeting. The A/E is to provide a recovery schedule for all activities that become 14 days overdue. The recovery schedule must indicate the A/E's plan to bring the overdue activities current.
3. Project schedule must be updated as soon as a change in the schedule is apparent.
4. A complete and most updated Project Schedule must be submitted by the A/E to the County with each request for payment. Invoices will be rejected if not accompanied with this schedule. Incomplete and not updated schedules will not be accepted for payments.
5. All schedules must also include:
   a. Name of the project
   b. Date of data entry
   c. Print date
   d. Project phases
6. Schedules must be provided to the County in the following formats:
   a. A complete color print including all activities, duration, early start, early finish, late finish, dependencies, time bars with the name of activity on the left side and critical path in red color, and dependency links.
   b. A base line of the original schedule must be kept, and an actual bar must be shown for each activity. This way the progress of the project is compared to the original schedule.
   c. A typical (template) project schedule will be provided to the A/E for modification and use. This template is in Primavera format and must be modified or used as needed for the project.
   d. Schedules must include activities and tasks for documents submissions to the County, state and other reviewing and permitting entities.

S. Schedule Log

1. Schedule Log is a mechanism to record all important and incremental events and decisions that changes the project schedule during the design process.
2. A/E must provide Schedule Logs not later than 3 working days after the change to the County.
3. Schedule Log is an independent document from the Project Schedule.

4. All schedule changes (approved by the Deputy / Associate Director of CIP) must be logged sequentially in a table format.
5. All logs must include:
    a. Title
    b. Date of the schedule change
    c. Approving party
    d. Affecting disciplines for coordination.
6. County and recipients of the Schedule Logs shall have 5 calendar days to respond and or correct the log.
7. Schedule Log must be distributed to the entire team including the County team.
8. Schedule Log must be generated during the project progress; however, a complete and most updated Schedule Log must be submitted by the A/E to the County with each request for payment. Invoices will be rejected if not accompanied with this log.

K. Design Document Progress Log

1. Design Document Progress Log (DDPL) is a mechanism to record and keep track of progress for all disciplines and all design documents including but not limited to drawings, specifications and any other documents that are submitted at all incremental submissions.
2. A/E must provide the "Design Document Progress Log" with all incremental design submittals according to “Table of Phases and Deliverables”. No progress submittal shall be accepted unless accompanied by the Design Document Progress Log.
3. A typical template is provided at the end of this document.
4. Design Document Progress Log must include:
    a. Title, project name and CIP number
    b. Date of current submission
    c. Date of last submission
    d. County PM, A/E firm and A/E PM name
    e. Document reference numbers and titles
    f. Status of the documents using action codes as designated in the log.
    g. Brief description of what has been changed or updated since the last submission for each document.
5. A/E PM shall review and sign the DDPL in the designated area of the Log.
6. Design Document Progress Log must be generated during the project progress; however, a complete and updated DDPL must be submitted with each request for payment. Invoices will be rejected if not accompanied by this log.

L. Life Cycle Cost Analysis (LCCA)

1. LCCA is a decision-making tool for building owners and designers. The analysis accounts for initial costs associated with constructing or renovating a facility as well as the cost of owning and operating a facility over its useful life. The LCCA report provides a method of evaluating the various systems so a building owner can select the best system for the building. The analysis should be based on the comparison of minimum of three (3) options or alternatives selected. The three chosen systems must be different from each other, such as a central chiller plant and a heat pump split system. For example, a heat pump split system and an air conditioning split system with gas or electric furnace are essentially the same systems and may not be used for comparison with each other.
2. The LCCA process must be complete, accurate, and timely to benefit the design team and the facility's decision makers. It is important to complete this part of the LCCA submittal prior to the beginning of design development stage so that any recommended changes can be easily incorporated into the design.
3. The LCCA must be done by a qualified professional accepted by the office of Central

Services. A list of systems and components that require LCCA must be prepared during the Schematic Design phase. Before engaging in the LCCA, the three options must be approved by the project manager.

4. For selection of items that relate to the energy use in the building LCCA must be done using computer modeling and simulation (major mechanical components or systems, envelope, lighting, power, etc.).
5. For selection of other components and elements of design a simple LCCA is sufficient and must include the following:
   a. Present value of the item
   b. Life expectancy of the item
   c. Operational and maintenance cost of the item during it's expected life
   d. Non quantifiable qualities such as aesthetic or compatibility must also be mentioned
   e. Reason for selection of one over the other options.

M. Construction Cost Change Log

1. Construction Cost Change Log is a mechanism to monitor the design and its conformance to the established construction cost budget.
2. This document includes:
   a. A list of all items that caused the CCAP (Construction Cost Award Price) to change.
   b. Cost change for each item.
   c. A log of all alternate Adds (additions) with their cost, date added and approving party.
   d. A log of all alternate Deducts with their cost, date and approving party.
   e. A chart comparing change in the construction cost escalation since the project start date.
   f. A chart indicating use of design contingency. An incremental reduction of percent allocated must be shown with date and approving party.
   g. Change in overall cost per square foot since start of the project.
   h. Construction Cost Change Log must be generated during the project progress; however, a complete and most updated Construction Cost Change Log must be submitted by the A/E to the County with each request for payment. Invoices will be rejected if not accompanied with this log.

N. Priority Planning & Design

1. The A/E shall provide priority planning and design services for select building systems and components as requested by the County to facilitate a partial or early release for construction. This requirement is intended to allow specific construction activities to commence in advance of the full design completion, supporting project schedule efficiency and phased construction planning.
2. The A/E shall be responsible for:
   a. Prioritizing and accelerating the design of designated systems or components, such as foundations, structural framing, mechanical/electrical/plumbing systems, exterior envelope, and civil or other critical elements identified by the County.
   b. Coordinating with the County, AHJ and consultants to determine specific design deliverables and timelines required for early release.
   c. Providing necessary documentation, including drawings, specifications, and any related approvals, to enable the partial release without impacting the integrity, cost, and schedule of the overall design

PROJECT PHASES

Phases

O. General

1. The project is broken down into individual phases to describe significant portions of work and project milestones. The phases are described using stages and submittal requirements. Stages are defined as periods of work within a phase. Each stage has a minimum set of requirements but does not have a specific time period assigned to it. One stage within a phase may be 2 weeks and another stage within a phase may be 6 weeks. Ultimately stage duration will be determined by the amount of effort required to complete that stage. Information listed under each phase/stage is intended to help define the County's minimum requirements for the phase/stage. Some of the information under the phase/stage is listed in CSI format, which is a mechanism to organize the information. Use of the CSI format is as an informational tool and is not meant to be all inclusive. The A/E must provide all information required, whether listed or not, to complete a fully functional building. Any work that is not listed must be provided in a timely manner so the County can review and comment on the work.

P. Conceptual Planning Phase

1. In this phase program of requirements is validated and site and building mass is decided.

Q. Schematic Design Phase

1. In this phase site is fully analyzed, building systems are selected, floor layouts and partition types are generated. There is some understanding of building and finish materials.

R. Design Development Phase

1. In this phase all systems are fully developed, all details are designed and communicated, interior design is finished, furniture layout is prepared and furniture plan is completed, Materials and finishes are selected. **There shall be no design decisions left after this phase.**

S. Construction Documents Phase

1. In this phase the A/E team will develop a complete construction document for the purpose of permitting as well as bidding. **No design decisions shall be left for this phase.**

T. Bidding and Negotiations Phase

1. In this phase the project is bid, and the team will evaluate the bids and engage in cost control activities including value engineering and cost reduction with the contractor if needed.

U. Construction Phase

1. In this phase the A/E will perform construction administration, quality control of construction, and commissioning.

V. Post Construction Phase

1. In this phase the A/E is required to assist the County in warranty period checks.

Phase 1: Conceptual Planning – CP

W. Stage 1: Program and Data Verification-CP

1. Division 01: General Requirements

a. The purpose of the Conceptual Planning Phase is to establish the basic site design concepts, verify and establish the capability of the site to meet the program parameters, and arrive at possible solutions. The A/E's solutions will be reviewed by the County.

b. Unless otherwise specified in the Contract, the A/E must present at least three conceptual design schemes for County review and selection.

c. Verification Requirement

1) In accordance with the County's A/E contract for design services, the A/E team must meet, as necessary, with the Project Manager, other agents of the County and representatives of the User Agency in workshop sessions to validate spaces and their size, and validate the total programmable, net and gross square feet for the building.

2) The A/E team must also attend in a meeting coordinated by the County Project Manager to meet with representatives of local, state, Federal, M-NCPPC, DPIE, DOE, WSSC and other code enforcing and regulatory agencies to clarify and verify permitting requirements and jurisdictions. Results of this meeting must be recorded and shared with all participants for future reference during the design and construction of the project. The intent is to become aware of all requirements and mitigate project delays...

3) The A/E must collect, verify, and document all legal documents such as property plans, deed line demarcation, utility company's Right of Way and easements, zoning requirements, master plan, sector plan, leases and any contract or agreement that exists between the County and other parties that may have an impact in one form or other on the project. This information must be presented to the County in the submittal binder.

4) Validate the information given to the design team including the Program of Requirements. A critical function of this phase is to reconcile the programmed need to the proposed design. It also serves to clarify the functional program, identify functional program oversights or excesses, and generally verify that the proposed program is feasible from a facility development perspective.

5) If the project is a renovation, the County may have facility drawings, specifications, design computations, maintenance manuals, air balance records, etc. Consultants are expected to fully utilize these resources, in conjunction with thorough hands-on review of existing conditions, to ensure that alterations of and additions to existing facilities do not over tax existing systems to meet new requirements. The Project Manager will provide assistance.

as available to allow consultants to obtain all necessary information germane to the project program. It is mandatory that consultant's field-verify all reference information and as-built conditions since the County cannot guarantee that all conditions have remained static since last time that they have been "officially" altered or documented. The Consultant shall provide a copy of the field-verified conditions to the Project Manager. If existing drawings of the facility do not exist, it is the A/E's responsibility to investigate measure, document and draft the existing conditions.

d. Submittal Requirement

1) Provide the County with a progress report.

2. Division 01 81 13: Sustainable Design Requirements

a. Conduct a charrette meeting to establish LEED certification points and green design goals. (For LEED Projects)

3. Division 02: Existing Conditions

a. For renovation projects, A/E must start mobilizing and sending technical staff to the site/Building to collect all necessary information and start documentation of the existing conditions as needed and stipulated in the POR template for renovation projects.

4. Division 02 21 00: Site Survey

a. The A/E shall complete a boundary topographic survey of the existing site including all existing element of the site required for the design and construction of the Project. The survey shall be submitted to the County for review and approval.
b. Verify and document all right of ways that might exist.
c. Verify and document zoning requirements.
d. Verify and document property lines, deed lines and possible legal or permitting issues that need attention.
e. Verify and document possible pedestrian safety issues.
f. Verify and document building location.
g. Verify and document vehicular access.
h. Verify and document pedestrian access.
i. Discuss security needs for the site and building and how it might impact the site configuration and building location design.

5. Division 02 30 00: Subsurface Investigation

a. Start process of geotechnical analysis of the site.

6. Divisions 10 and 11: Specialties and Equipment (including equipment in Divisions 27 and 28)

a. Review existing specialties and equipment with Project Manager and User Agency to determine items for reuse, define list of future items to be included, and confirm programmed space sizes are adequate.
b. Prepare consolidated list (existing to be reused and items projected to satisfy future requirements) of specialties and equipment with associated critical dimensions. List of equipment may be included on the drawings or provided as supplemental information.
c. The Project Manager may deem it necessary for certain projects, to require additional equipment information be assembled at this stage in the process. Reference requirements for equipment schedule defined in 'Submittal Requirements for Schematic Design Phase' if appropriate.

7. Division 12 50 00: Furniture

a. Review existing furniture/furnishings with Project Manager and User Agency to determine furniture/furnishings for reuse, define list of additional items to be included, and confirm programmed space sizes are adequate. Assign item numbers and photograph existing pieces if deemed appropriate by Project Manager at this stage.
b. The Project Manager may deem it necessary for certain projects, to require additional furniture/furnishings information be assembled at this stage in the process. Reference requirements for furniture inventory defined in 'Submittal Requirements for Schematic Design Phase' if appropriate.
c. Prepare preliminary furniture budget.
d. Binder shall include:
    1) Preliminary furniture budget.
    2) Projected list of reused and new furniture with critical dimensions.

X. Stage 2: Site and Building Concepts-CP

1. Division 01: General Requirements

a. Plan and start process of geotechnical analysis of the site.
b. Verify Availability of utilities (Water, electricity, telephone, fiber optic line, gas, and other features that might be over or under ground)
c. Verify Presence of wetland, streams, etc.
d. Conduct a preliminary code analysis and report.

e. Explore and document options of building massing that conform to the zoning and easement requirements.
f. Explore and document locations of the building on the site that conform to the zoning and easement requirements.

2. Division 01 81 13: Sustainable Design Requirements
   a. Full analysis of what can be done to the site and building location to meet and exceed green and LEED requirements.
   b. Register project with USGBC.
3. Division 02 22 19: Traffic Assessment
   a. MNCPP-C (or authority having jurisdiction and the State Highway Administration must be consulted in this matter to find out if they require a traffic study for this project.
   b. Analysis that based on the adjacent roads if traffic study is needed or not. If needed, provide the consultant and arrange for a traffic study based on use of facility.
4. Division 02 24 00: Environmental Assessment
   a. Verify existence of any champion trees on the site.
5. Division 02 30 00: Subsurface Investigation
   a. Provide seismic geotechnical surveys of the site. This is to verify the three-dimensional configuration of the subsurface conditions. Also provide a limited number of spot boring verifications. Further boring test will be done after SD phase.
6. Division 27: Communications
   a. Verify and document existence of fiber optics and telephone lines.
7. Division 32 70 00: Wetlands
   a. Document and present wetlands, streams and all other environmentally sensitive features of the site.
8. Division 33: Utilities
   a. Verify and document availability of utilities (water, electricity, telephone, fiber optic line, sanitary sewer, storm drain, natural gas, ponds and reservoirs, and other features that might be over or under ground)
   b. Verify and document utility right of ways that might exist
9. Division 34: Transportation
   a. Verify and document public transportation and closest bus stops and metro station.

Y. Submittal Requirements for the Conceptual Planning Phase-CP

1. Division 01: General Requirements
   a. Submittal Requirement
      1) All revisions, validations, verifications, and conceptual drawings and sketches and reports must be presented to the County in a booklet format (8.5x11 with 11x17 inserts if needed) for review and record. Changes to the original program must be clearly identified.
      2) A/E must produce as many sketches and concepts as necessary to satisfy the County that the concepts of the design are acceptable.
      3) Cost estimates must be provided for major CSI divisions (a list is provided at the end of this section. At this point cost estimates are most probably in SF format.
      4) A/E shall not proceed to the schematic phase unless Contract Administrator is satisfied that CCAP can be met and a notice to proceed is issued.
      5) A/E will present the conceptual design to the OFFICE OF CENTRAL SERVICES Architectural Review Committee (ARC).
      6) The A/E must provide as minimum number of sets of documents as identified in the ***Table of Deliverables During the Design Phases*** at the end of this document. Report

must be delivered to the County in a 3-ring binder format. Unless otherwise noted in the contract as an exception the following quantities must be delivered:

a) 2 set for the PM team

2. Division 01 81 13: Sustainable Design Requirements
   a. Report of green/LEED requirements.
   b. Prepare preliminary LEED score card.
   c. Estimate costs for individual LEED points.
   d. Copy of project registration with USGBC.
3. Division 01 91 00: Commissioning Requirements
   a. Report documenting that the A/E has started working on the commissioning plan.
4. Division 02 22 19: Traffic Assessment
   a. Report on the status of traffic study.
5. Division 02: Existing Conditions
   a. Document results of building condition assessments and survey.
6. Division 02 21 00: Site Survey
   a. Provide results of all various site survey and verifications.
7. Division 02 24 00: Environmental Assessment
   a. Provide results of all verifications.
   b. Verify and present existence of any champion trees on the site.
8. Division 02 30 00: Subsurface Investigation
   a. Provide results of the geotechnical surveys.
9. Division 27: Communications
   a. Document existence of fiber optics and telephone lines
10. Division 32 70 00: Wetlands
    a. Document and present wetlands, streams and all other environmentally sensitive features of the site.
11. Division 33: Utilities
    a. Document availability of utilities (Water, electricity, telephone, fiber optic line, sanitary sewer, storm drain, natural gas, ponds and reservoirs, and other features that might be over or under ground)
    b. Document utility right of ways that might exist
12. Division 34: Transportation
    a. Document public transportation and closest bus stops and metro station. b.

Phase 2: Schematic Design – SD

Z. General

1. Division 01: General Requirements

a. The purpose of the Schematic Phase is to establish the basic design concepts, develop and implement the program parameters, and arrive at solutions. The designer's solutions will be reviewed by the County. No significant departure from the approved schematic submittal will be allowed unless prior written approval is obtained from the County.
b. Unless otherwise specified in the contract, the A/E must present at least three design schemes for ideas and concepts for the County to review and choose.
c. The A/E shall interface with all Agencies requiring permits and approvals for the Project as to the progress of the design and incorporate comments as required.
d.

AA. Stage 1: Site Design & Building Layout-SD

1. Division 01: General Requirements

a. In this stage the A/E must develop conceptual building layout and locate the building on the site. Following are brief description of items to be considered:
   1) Building mass
   2) Location of the building on the site
   3) Site features that will impact the design
   4) Sun movement and shadow analysis
   5) Possible major landscaping features and elements to assist green design
   6) Pedestrian and vehicular movements on the site
   7) Location of major utilizes on the site
   8) Completing floor layouts responding to the program of requirements.
   9) Recognizing historical issues.
   10) Parking layout
   11) Entrance to the building
   12) Possible type of roof
b. All Conceptual Planning Phase comments must be incorporated at this stage. Delay incorporating CP comments later is not acceptable since it will create confusion in reviewing the documents.
c. Civil engineer must start survey and recording site elements to inform the design.
d. A progress set or report must be delivered to the County to show progress in the schedule and as prerequisite for payment.
e.

BB. Stage 2: Systems Selection-SD

1. Division 01: General Requirements

a. The A/E must continue on all elements of the design, but in order to ensure full coverage of all aspects of the design, the County requires the A/E to specifically concentrate on the following elements of design in this stage. In this stage the A/E must develop building systems selection:
   1) Building structure
   2) Mechanical system
   3) Electrical system (need for transformer, size of service, entry point, emergency generator, etc.)
   4) Plumbing system (entry point, sewer, location of meter, pressure, etc.)
   5) Roof type
   6) Envelope type
b. Civil engineer must be finished with the survey of the site.
c. A progress set or report must be delivered to the County to show progress in the schedule and as prerequisite for payment.

CC. Submittal Requirements for the Schematic Design Phase

1. Division 01: General Requirements

a. One (1) set of the drawings shall be of presentation size and quality in color as necessary to brief the project design committee concerning the quality and scope of the project.
b. A/E will present the schematic design phase to the Project Manager.
c. Unless otherwise specified in the contract, the A/E must present at least three design schemes for ideas and concepts for the County to review and choose.
d. The schemes will be evaluated by the Office of Central Services and the user agency to determine a workable and appropriate design solution in respect to site conditions, program of requirements and funds available.
e. The A/E shall assist the County in conducting a public presentation meeting.
f. The A/E shall establish communication with the M-NCPPC (or local planning commission) through County project manager for the Mandatory Referral process and prepare all required documents to obtain M-NCPPC approval of the project.
g. Provide phasing plan and analysis of the construction sequencing.
h. Documents prepared by the A/E for the schematic design submittal and approval shall include a report. The report shall include, but not be limited to, graphic representations of the results of the various environmental planning and design studies to assure the feasibility of site development. It shall also include review of available geologic and geotechnical information and test borings applicable to establishment of facilities location.
i. Should the documents submitted not conform to the requirements outlined in this manual, the A/E must revise, correct and complete the documents and reprint at its own expense and with no additional cost to the County as required to obtain the County's approval.
j. All drawings must have adequate legends, symbols and annotations to fully understand the design and materials on the drawings.
k. Floor plans
    1) Develop floor plans for all levels showing walls, major wall types, room name and number, room size, door swings, major mechanical equipment, and etc.
    2) Floor plans delineating programmatic functional divisions in filled colors with full legend.
l. Possible materials and finishes must be discussed and presented.
m. Specification Requirements -SD
    1) Outline specifications for each CSI section used.
    2) Outline specification requirements shall consist of design narrative as described in the commissioning program.
    3) The specifications shall be comprehensive and complete as the schematic documents permit and shall address all relevant component/sections of the work and where required by the scope of the project.
n. Estimating Requirements - SD
    1) The estimate shall be developed in as much detail as the schematic drawings and specifications permit. Cost for each section of the specification shall be included.
o. Renderings – SD
    1) Variety of renderings can and must be presented at this phase suitable for public presentation including:
        a) Elevations
        b) Sections
        c) Floor plans
        d) Site plan with roof, shadow and landscaping
        e) Axonometric or perspective view of the building on the site
        f) Axonometric or perspective view of interior spaces
p. Model – SD

1) A working model must be prepared by the A/E to show site contour and building mass and location with enough details to be able to relay the site and building concepts. Major site elements such as roads, wetland, wooded areas, etc. must be clearly delineated. This model should be transportable to various meetings for presentation. Although this is not a final professional model, it cannot be rough or amateurish.

2. Division 01 81 13: Sustainable Design Requirements
   a. The A/E shall prepare all the necessary documentation for LEED certification to USGBC. Provide a copy of the LEED binder to the County.
   b. Detailed cost analysis of the cost impacts for each LEED credit.
   c. Detailed calculations for each credit to be pursued.
3. Division 01 91 00: Commissioning Requirements
   a. Major goals for the commissioning must be outlined at this phase. This is the foundation for the next phases and focuses the attention of the design team on the possible commissioning issues.
4. Division 02: Existing Conditions
   a. When providing new layouts and design all existing conditions must be fully considered.
   b. If project is a renovation, SD package must include a report of existing situation and issues. There should also be draft construction phasing plan.
5. Division 02 21 00: Site Survey
   a. Site survey must be completed.
   b. Provide all documentations for site survey.
6. Division 02 22 19: Traffic Assessment
   a. Final traffic study must be presented.
7. Division 02 24 00: Environmental Assessment
   a. Final environmental assessment report must be presented.
8. Division 02 30 00: Subsurface Investigation
   a. Provide results of the geotechnical surveys.
9. Division 03: Structural System
   a. Provide structural systems layout with overall dimensions and floor elevations.
   b. Identification of structural system, i.e., precast, structural steel with composite deck, structural steel with bar joists, etc.
   c. Identification of foundation requirements: i.e., fill requirements, piles, caissons, spread footings, etc.
10. Division 07: Envelope
    a. Provide envelope system such as façade cladding, widow system, roof system and green/ LEED/energy efficiency discussions for the envelope design.
11. Division 07 71 00: Roof
    a. A roof plan showing slopes, drains, parapets. Annotate all features.
12. Division 07 77 00: Exterior Walls
    a. Develop elevations of all sides to show the design intent, style, height, materials, colors, and other devices on the façades.
    b. Preliminary exterior wall cross sections and elevations indicating location and size and type of fenestration and indicating overall thermal transfer value for the exterior wall envelope along with each type of proposed insulating material.
    c. Minimum of two cross-sections with floor heights, including basement spaces identifying program spaces and relationship to site configurations.
    d. Delineate day-lighting features.
13. Division 08: Openings (Doors & Windows)
    a. All doors smaller or larger than 36 inches wide must be annotated.

14. Division 08 70 00: Hardware
    a. Hardware information to be collected.
15. Division 09 50 00: Ceiling
    a. Provide a ceiling plan showing major ceiling types, light fixtures, and ceiling height.
16. Division 09 60 00: Flooring
    a. Provide a flooring layout showing various possible finishes and materials.
17. Division 10 06 10 Exterior Signage
    a. Provide locations of exterior signs.
18. Division 10 06 11 Interior Signage
    a. Start planning for interior signs
19. Division 10 21 00 Toilet Compartments
    a. Show toilet partitions.
20. Division 10 22 26 Operable Partitions
    a. Show operable partitions on layouts
21. Division 10 71 13 Exterior Sun Control Devices
    a. Schematic sections and elevation should show sun control devices to be fully developed in later phases.
22. Division 10 73 00: Protective Covers (Canopies, etc.)
    a. All protective covers must be delineated.
23. Divisions 10 and 11: Specialties and Equipment (including equipment in Divisions 27and 28)
    a. Prepare spread sheets to include designated item number, type, manufacturer, model number, size, clearances, electrical and mechanical requirements for all specialties and equipment intended for reuse and projected for future requirements. Spread sheets shall include but are not limited to, office equipment, residential appliances, vending machines, audiovisual specialties and equipment, special equipment, data and voice communications equipment, and electronic security equipment. Schedules may be included on the drawings or provided as supplemental information.
    b. Compile manufacturers' cut sheets of scheduled specialties and equipment.
    c. Floor plans should delineate all equipment including office equipment, AV equipment, etc. to be fully developed in later phases.
24. Division 11 26 00: Kitchen Equipment
    a. If project has a large commercial kitchen, the kitchen layout must be provided.
25. Division 12 50 00: Furniture
    a. Prepare inventory of furniture/furnishings (free-standing and systems) identified for reuse and coordinate with planned dimensions of intended spaces. Furniture Inventory to include:
        1) Assigned item number (if tagging is deemed appropriate).
        2) Current location / user;
        3) Item type and description (i.e. Chair, Task);
        4) Dimensions;
        5) Manufacturer and product number (if available);
        6) Electrical and tel/data components particulars (if applicable);
        7) Material(s) / finish;
        8) Quantity;
        9) Condition;
        10) Refurbishment and/or reupholstery notes (where applicable);
        11) Photo;
        12) Intended or possible location(s).
    b. Furniture and loose equipment layout plan indicating size and location of all furniture and equipment. Existing furniture to be reused shall be distinguished from furniture to be purchased.
    c. Furniture budget based on proposed layout that identifies new or reused/refurbished

furniture (free-standing and systems) in all spaces; budget list prices; budget net prices; quantities; total cost; taxes; delivery and installation charges; and product that proposed budget is based on.

d. Preliminary furniture timetable identifying timeframes for design phase activities, preparation of specifications/bid documents, order placement/confirmation, manufacturing lead times, and delivery and installation in coordination with Project Schedule. Identify product selection options that present challenges to the schedule and/or anticipated pricing increases that may impact timing of procurement process.

e. Binder shall include:
   1) Furniture inventory;
   2) Furniture and equipment plan;
   3) Furniture budget;
   4) Cut sheets of product that budget prices are based on.
   5) Furniture timetable.

26. Division 12 3 13: Bicycle Racks

a. Provide bicycle racks outside

27. Division 13: Special Construction

a. If any special construction system is designed, it must be clearly outlined in this phase for closer attention in the next phases.

28. Division 14: Conveying Equipment

a. All vertical circulation elements must be clearly identified and dimensioned on the drawings.

29. Division 21; Fire Suppression

a. Provide floor plans analyzing exit routs and major life safety features.

30. Division 22: Plumbing

a. As indicated above a site utility master plan showing sanitary and storm sewer layout.
b. Drawings showing locations of sewage ejectors and grinders (if required), and storm manholes.
c. Plumbing/sprinkler design schematic diagrams showing service entry, etc.
d. Green and LEED analysis of the plumbing system.

31. Division 22 40 00: Plumbing Fixtures

a. All plumbing fixtures must be shown.

32. Division 23: HVAC

a. Submit preliminary HVAC calculations to document the following:
   1) Envelope: U values utilized for the walls, roof and U values and Shading Coefficients for windows and skylights.
   2) HVAC Zones: Preliminary zone HVAC calculations to document the sizing of the HVAC equipment.
   3) Block Load: Preliminary block load calculations to document total building loads. Provide necessary engineering calculations to determine heating and cooling loads of the building.

b. HVAC System Selection:
   1) Propose three (3) alternate HVAC systems that apply to this particular type of facility.
   2) Perform an Energy Simulation and Life Cycle Cost Analysis of the three (3) proposed systems. All systems shall as a minimum comply with ASHRAE 90.1-2004 (latest) energy efficiencies and lighting power budgets.
   3) Provide general written description of each system, describing its major components, major operating features and why it was selected for this particular facility.
   4) Provide one-line schematic diagram showing major components and a brief sequence

of operations.

5) Listing of the major equipment associated with each HVAC system and quantification of capacities. (Example: 100 tons air cooled chiller, two each 1000 MBH gas fired boilers, etc.)
6) Provide floor plan showing location of all equipment (indoor & outdoor) for each system. The schematic diagrams shall indicate approximate available spaces for servicing the major equipment.
7) Provide description of all energy conservation features included in the Energy simulation for each system.
8) Provide utility Rates: Rates employed in the life cycles cost analysis.
9) Provide operating/Occupancy schedule utilized in the Energy simulation.
10) Provide preliminary Cost estimate for each HVAC system. Provide results of the Energy Simulation for each system.
11) Provide life cycle cost analysis for each system.
12) Provide written report summarizing all of the above and recommending one system for the facility.

c. The AE during the SD phase is preparing three (3) alternate layouts (schemes) for the County to consider. These three schemes will be submitted at the end of the SD phase with the AE's recommendation for one scheme. Since the Mechanical SD analysis will run concurrently with the AE's analysis, the Mechanical Engineer will select one of the three layouts that is the most representative of what will be recommended. During this phase, the Architect will need to provide the Mechanical Engineer with the following:
   1) Area of each function and its orientation.
   2) Grouping of functions.
   3) Block layout to scale. The engineer will utilize this for their preliminary HVAC calculations.
   4) Special requirements.
d. Technique indicating overall combined heat transfer coefficient for roof/ceiling composite and roof area including the proposed insulating materials.
e. The A/E shall develop an overall strategy for energy conservation to meet the energy budget included with the Program of Requirements including building thermal envelope, HVAC system selection, heat recovery options, lighting design and day lighting design. The A/E shall simulate proposed building strategies using a computer-based version of DOE2 as specified by the County, in order to influence the building design and attain compliance with the County's desired energy budget. The A/E will prepare and submit an energy analysis report to document the design strategy,
life-cycle analyses, and annual energy consumption for the Schematic Design. The schematic diagram shall show duct layout.

33. Division 26; Electrical

a. Lighting on separate distribution, roughly sized.
b. Major electrical equipment roughly scheduled indicating size, capacity and total loads.
c. A one-line diagram should be drawn in which a single line represents three phases of power system, and it should be properly drawn, showing correct power distribution path from the normal power source and generators to *each* downstream load panels— including the ratings and sizing of each piece of electrical equipment, their circuit conductors, conduit size and their protective devices.
d. Low voltage systems: Identify all low voltage systems and their requirements.
e. Provide electrical design load calculations. The following basic electrical system design calculations and information must be performed by the consultant for all projects, during the preliminary phase and prior to the final completion of design. Load calculation documentation to be submitted will include.

1) Load calculations and building power requirements for sizing of electrical distribution equipment, transformers, motor, and feeders. Including running and starting load requirements
2) Emergency and legally required standby power requirements including equipment type and sizing.
3) Preliminary estimate of annual energy consumption; include a list of potential energy savings options.
4) Load analysis to support selection of equipment efficiency and conductor sizes including cut sheets. Group load calculation to (Power, lighting, HVAC, and Elevator)
5) Verification of compliance with current code and standards.
6) Lightning protection risk assessment and recommendations study.

34. Division 26 50 00: Lighting

a. The A/E is to provide Lighting Design strategy for the building to meet energy conservation goals set by the County.
b. Documentation to be submitted at this stage will include:
   1) Statement of foot- candles to be maintained for each type of task surface in the building.
   2) Calculation based on the latest required ASHRE of lighting wattage budget and current established standards (IESNA Standard) of lighting quality and illumination level for the building interior and exterior. Including catalog cut sheets
   3) Strategy for meeting lighting budget.
   4) Day-lighting design and analysis.
   5) Implementation of lighting control requirements
c. Photometric Analysis: Provide drawing and analysis in graphic and text using light distribution software (photometric) to show point to point light distribution in FC. The analysis should include the following:
   1) Photometric drawings indicating FC and height of point values
   2) High lighting below and above standard (or requirement) points
   3) Light level at building perimeter (exterior windows)
   4) Light level at property lines
   5) Strategies for light pollution control
   6) Various type of light source
   7) Blocking of lighting concern zones (areas that in the program require certain lighting level) both for interior of the building and site
   8) Manufacturer light distribution cut sheets for each light fixture clearly correlated with light fixture types on the drawings
   9) On large projects provide a rendering of site night lighting plan by using appropriate software.

35. Division 27 20 00: Data Communication

a. Computer system must be identified. Possible entry point for the data line to the building must be identified.
b. Conduct a meeting with the County DTS to review the data system and where major related equipment should be located.
c. Verify all electrical needs for the computers and peripherals.
d. Cable trays a must for all data and communication cabling

36. Division 27 30 00: Voice Communications

a. Telephone system must be identified. Possible entry point for the telephone line must be identified.
b. Conduct a meeting with the County DTS to review the telephone system and where major telephone equipment should be located.

37. Division 28: Electronic Safety and Security

a. Outline of the security systems for the project including locking, control, observation, central control, and materials to be used.

38. Division 31: Earthwork

a. Identify possible grading, cut and fill, erosion and sediment controls

39. Division 32: Exterior Improvements

a. Site plan with building footprint and grading plan with a minimum of 2'- 0" contour lines showing cuts and fills, entrance driveway, parking and circulations.
b. Site plan delineating all legal parameters of the property including all public, private, and utility right of ways.
c. Site plan for the storm water management, erosion and sediment control plans.
d. File for the site concept plan with the County Department of Permitting Services or the municipal code enforcing agency.
e. Site plan indicating all major utilities and entrance location to the building such as Water, electricity, telephone, fiber optic line, gas, and other features that might be over or under ground.
f. Geotechnical report outlining findings resulting from soil borings, test pits, sonar analysis of the soil layers, soils analyses, soil bearing values, and other geotechnical studies of the affected area.
g. File for NRI/FSD with M-NCPPC.
h. A report of pedestrian safety.
i. Way finding and signage plan.

40. Division 32 70 00: Wetlands

a. Site plan showing wetland

41. Division 33: Utilities

a. Show location of all utilities.
b. Present intended location of utilities to utility companies for preliminary approval.

Phase 3: Design Development – DD

CC. General -DD

1. Division 01: General Requirements
   a. Upon written notice to proceed from the County, the A/E shall start the Design Development Phase.
   b. The purpose of the Design Development Phase is to select all building systems, present them to the County in series of progressive meetings, and finalize all design elements and components of the building. No design decision, selection of systems, materials and or finishes may be left for the next phase.
   c. Upon County acceptance and approval of the schematic design, the building systems and exterior wall locations (building "footprint") may be changed only as approved in writing by the County. No significant departure from the approved design development submittal will be allowed during the next phase, unless prior written approval is obtained from the County.
   d. During this phase A/E must submit progress documents at various stages. The intent of these submittals is for the County to monitor progress of the work and while the A/E is proceeding with the work to provide comments. Theses incremental in-phase submittals are not the same as 100% submittal at the end of Design Presentation Phase which will be reviewed by a team of County professionals to assure compliance with all requirements and control the quality of design. In no circumstances County's review of documents substitutes the A/E's coordination and responsibility of compliance with all requirements.
   e. The A/E shall interface with all agencies requiring permits and approvals for the Project as to the progress of the Design and incorporate comments as required.
   f. The A/E shall assist the County in conducting a public presentation meeting.
   g. The A/E shall establish communication with the MNCPPC through the County project manager for the Mandatory Referral process and prepare all required documents to obtain M-NCPPC approval of the project.
   h. The A/E shall interface with all agencies requiring permits and approvals for the Project as to the progress of the design and incorporate comments as required so as not delaying the Project.
2. Division 02 30 00: Subsurface Investigation
   a. Provide any other required spot borings based on the building layout.
   b. Provide waterproofing recommendations.
   c. Provide drainage information.
   d. Provide water table information.
   e. Provide test pits.
   f. For existing buildings, provide test pits at foundations to determine existing conditions and capacities.

3. **Stage 1: Floors Layout & Site Coordination - DD**

1. Division 01: General Requirements
   a. In this phase the A/E and must mostly concentrate on completing the floor layout responding to the program of requirements.
   b. All Schematic Design Phase comments must be incorporated by the end of this stage. Delay incorporating SD comments later is not acceptable since it will create confusion in reviewing the documents.
   c. All site issues must be coordinated. Mechanical, electrical, utilities, environmental issues must be finalized.
   d. Site concept plan approval must be at hand.
   e. Civil engineer must be already completed all site plans.
   f. A progress set or report must be delivered to the County to show progress in the schedule and as prerequisite for payment.

EE. Stage 2: Systems Coordination - DD

1. Division 01: General Requirements

a. In this stage all building systems must be coordinated. An integration sheet must be prepared showing various systems in different colors and updated in the next stages to coordinate at the minimum the following systems:
   1) Structural beams and joists.
   2) Lighting
   3) Mechanical ducts and diffusers
   4) Sprinkler pipes

FF. Stage 3: Interior Systems & Materials- DD

1. Division 01: General Requirements

a. In this stage all interior systems must be designed including:
   1) Interior layout
   2) Signs. Room signage numbers shall be shown on all plans.
   3) Furniture
   4) Finishes
   5) Lighting
   6) Electrical
   7) Communications
   8) Doors, windows and hardware
   9) All materials (interior or exterior)

GG. Stage 4: Design Coordination - DD

1. Division 01: General Requirements

a. In this stage A/E must coordinate all design elements to make sure that all disciplines are coordinated, and no information is missing.

HH. Stage 5: Design Presentation - DD

1. Division 01: General Requirements

a. In this stage A/E concentrates in production of all design development materials for submittal and presentation to the County.

II. Submittal Requirements for the Design Development Phase

1. Division 01: General Requirements

a. One (1) set of the drawings shall be of presentation size and quality in color and as necessary to brief the project design committee concerning the quality and scope of the project.

b. A/E will present the design development phase to the OFFICE OF CENTRAL SERVICES

c. All design solutions must be evaluated by the OFFICE OF CENTRAL SERVICES and the user agency for approval.

d. Provide updated phasing plan and analysis of the construction sequencing.

e. Documents prepared by the A/E for the design development submittal and approval shall include a report. The report shall include, but not be limited to, graphic representations of the results of the various environmental planning and design studies to assure the feasibility of site development. It shall also include review of available geologic and geotechnical information and test borings applicable to establishment of facilities location. The written report must describe the project in greater detail than the schematic design document report and shall take into account the County's comments on the previous submittal.

f. Should the documents submitted not conform to the requirements outlined in this

manual, the A/E must revise, correct and complete the documents and reprint at its own expense and with no additional cost to the County as required to obtain the County's approval.

g. A/E must provide the County cut sheets and catalogues of materials, finishes, equipment, furniture, or other design components that are selected during the design for review and approval.
h. Floors plans layouts for all levels in sufficient detail and dimensions showing walls, major wall types, room name and number, room size, door swings, major mechanical equipment, other appliances and equipment's that take floor space, bulkhead dash lines, etc.
i. Floor plans delineating programmatic functional divisions identified by colored shading with full legend.
j. Partially dimensioned floor plans, final room and partition locations including all openings.
k. Gross net, and programmable area calculations for each space to show conformance with the Program of Requirements as amended. A chart must be produced to analyze various space elements as identified in the space measurement section in this manual.
l. Complete code analysis consisting of all fire walls and partitions, building areas, egress paths and capacities, construction and use types, etc. – Fully coordinated with all permitting authorities.
m. Specification Requirements – DD
    1) Specifications for each CSI section used.
    2) Specification requirements shall consist of design narrative as described in the commissioning program.
    3) The specifications shall be comprehensive and complete and shall address all relevant component/sections of the work and where required by the scope of the project.
    4) Specifications that are to accompany design development drawings shall consist of a comprehensive description of the project and the materials proposed for use in the work. The general scope shall be indicated by Sections as required for Construction Specifications. The "PROJECT DESCRIPTION" shall be a narrative description of the project and shall include all applicable architectural, civil, structural, mechanical and electrical programs and/or systems.
n. Estimating Requirements – DD
    1) Cost estimates shall include complete breakdowns of each CSI section indicating materials, labor, units, unit costs and total cost. The total cost shall include in the labor item all insurance, state and federal payroll taxes, and any payments to the unions. The total cost shall include all General Contractors' and Subcontractor's overhead and profits. A/E must also submit completed cost estimating summary in Excel file as provided by the county.
o. Renderings – DD
    1) Variety of renderings can and must be presented at this phase suitable for public presentation including:
        a) Elevations
        b) Sections
        c) Floor plans
        d) Site plan with roof, shadow and landscaping
        e) Axonometric or perspective view of the building on the site
        f) Axonometric or perspective view of interior spaces
p. Model – DD
    1) A working model must be prepared by the A/E to show site contour and building mass

and location with enough details to be able to relay the site and building concepts. Major site elements such as roads, water bodies, wetlands, wooded areas, etc. must be clearly delineated. This model should be transportable to various meetings for presentation. Although this is not a final professional model, it should present a finished appearance.

2. Division 01 81 13: Sustainable Design Requirements

a. The A/E shall prepare all the necessary documentation for LEED certification.

b. A separate LEED verification and green design control meeting must be conducted to verify all green goals.

c. Submit LEED/ Green design binder to the County. This binder must include:
   1) Minutes of all green meetings and discussions.
   2) Score cards. Keep score cards of various phases unchanged for tracking.
   3) A section must be devoted to each requirement of LEED with explanation of design decisions as to how meet LEED Silver certification or more.
   4) Documentation to be submitted for LEED certification which includes among other things; cut sheets of selected materials and equipment; and energy calculations, all energy efficiency data and energy design documents.

d. Energy Conservation:
   1) Continuation of design strategies for energy conservation approved in the prior phase.
   2) Submit for review and approval an energy analysis report reflecting the increased level of detail of the Design Development Phase. Report must be based on actual window areas & type, light fixtures specified, etc. and plug loads. It will reflect user pattern and a more refined occupancy schedule. Form and content of the report shall be as described in the County's Energy Program of Requirements.
   3) The report will utilize efficiencies (EER) based on the actual equipment selected as the Basis of Design.
   4) The report will include and list energy strategies that were investigated for the building and applicable to the selected HVAC system. The report will describe each item considered, show its first costs, simulate and quantify its energy reduction contribution in terms of annual BTUH and dollars and calculate its economic payback.
   5) The report will recommend the energy conservation strategies that should be incorporated to the design and will incorporate them into a final Energy Simulation run utilizing a DOE2 computer simulation program or equivalent.
   6) The report will utilize the actual light power budgets of the selected fixtures and those shown in the reflected ceiling plans.
   7) Data on major types of light fixtures and lamps showing Efficiency (lumens/watt), Lamp Output (lumens/lamp), and photometric reports for fixture and diffusers.
   8) Actual efficiencies of all HVAC equipment selected as basis of design.
   9) Actual window area and glazing types from architectural design development plans.
   10) Realistic schedules and usage patterns on a zone-by-zone basis.

e. The A/E will prepare and submit a design development energy analysis report, to document the design strategy, life-cycle analysis, and annual energy consumption for the project.

f. The A/E shall review County guidelines for energy conservation and incorporate required features in the project design, including design of an energy management system compatible with County central computers.

3. Division 01 91 00: Commissioning Requirements

a. Major goals for the commissioning must be outlined at this phase. This is the foundation for the next phases and focuses the attention of the design team on the possible commissioning issues.

4. Division 02: Existing Conditions

a. All existing conditions must be fully presented on drawings.

5. Division 02 30 00: Subsurface Investigation
   a. Final report of the subsurface investigation must be presented.
6. Division 03: Structural System
   a. Structural drawings indicating type and character of structural systems, including sizes of typical members, size, overall dimensions, and floor elevations.
   b. Allowable soil bearing pressure and elevation of footings and slabs.
   c. Foundation drawings.
   d. Footing, beams, columns, and connection schedules.
   e. Certification by the A/E that the structural design has been coordinated with other disciplines and no interferences or dimensional conflicts are shown.
7. Division 06 22 00: Millwork
   a. Millwork must be fully presented with finishes, quality of construction, and details.
8. Division 07: Envelope
   a. All envelope materials and finishes must be fully discussed and presented.
   b. Submit calculations supporting the U values utilized for the walls, roof and U values and Shading Coefficients for windows and skylights.
9. Division 07 10 00: Damp-proofing & Waterproofing
   a. Selected system must be fully presented.
10. Division 07 20 00: Thermal Protection
    a. Selected system must be fully presented.
11. Division 07 25 00: Weather barriers
    a. Selected system must be fully presented.
12. Division 07 71 00: Roof
    a. Identification of roof system, deck, membrane flashing and drainage
    b. Roof plan showing slopes, drains, parapets, major equipment's and other features that might impact the roof system. Annotate all features.
    c. Roof section showing roof system, deck, membrane flashing and drainage.
    d. Materials and finished.
13. Division 07 77 00: Exterior Walls
    a. Elevations
       1) Develop detailed elevations of all sides to show the design intent, style, height, materials, colors, and other devices on the façades.
    b. Sections
       1) Building sections showing floor elevations, floor to floor heights, floor to ceiling heights, roof, day-lighting features, and wall construction.
       2) Wall sections showing wall construction, materials, water proofing, air barrier, water management system, flashing, and typical enlarged details at various locations including at roof parapet, floors, ground level floor, lowest floor, and foundation.
       3) Exterior wall cross sections and elevations indicating location and size and type of fenestration and indicating overall thermal transfer value for the exterior wall envelope along with each type of proposed insulating material.
14. Division 08: Openings (Doors & Windows)
    a. All doors and windows must be annotated.
    b. Door schedule showing all types and quality levels coordinated with security plans.
15. Division 08 70 00: Hardware
    a. Hardware schedule coordinated with doors and windows and security plan.
16. Division 09: Finishes
    a. Develop finish schedule identifying all finishes.
    b. A/E must present at least three schemes to the County for selection, review and

approval.

17. Division 09 50 00: Ceiling
    a. Provide a ceiling plan showing major ceiling types, light fixtures, and ceiling height.
18. Division 09 60 00: Flooring
    a. Provide a flooring layout showing various possible finishes and materials.
19. Division 09 70 00: Wall Finishes
    a. Must be fully specified and scheduled.
20. Division 09 80 00: Acoustic Treatment
    a. Must be fully specified and scheduled.
21. Division 09 90 00: Painting
    a. Must be fully specified and scheduled.
22. Division 10: Specialties
    a. All sub items to this division must be fully specified and scheduled.
23. Division 11: Equipment
    a. All sub items to this division must be fully specified and scheduled.
        1) Division 11 26 00: Kitchen Equipment
        2) Division 11 28 00: Office Equipment (Computer, copier, etc.)
        3) Division 11 52 00: Audio- Visual Equipment
24. Division 12: Furnishings
    a. All sub items to this division must be fully specified and scheduled.
        1) Division 12 10 00: Artwork
        2) Division 12 20 00: Window Treatments
        3) Division 12 30 00; Casework
        4) Division 12 93 00: Site Furnishing
        5) Division 12 93 13: Bicycle Racks
25. Division 12 50 00: Furniture
    a. Furniture and loose equipment layout plan indicating size and location of all furniture and equipment. Existing furniture to be reused shall be distinguished from furniture to be purchased.
    b. Enlarged furniture plans and details/illustrations, including specially designed items or elements, to indicate finished appearance and functional operation if necessary.
    c. Updated Furniture Budget based on proposed layout that identifies new or reused/refurbished furniture (free-standing and systems) in all spaces; budget list prices; budget net prices; quantities; total cost; taxes; delivery and installation charges; and product that proposed budget is based on.
    d. Furniture selection options – provide cut sheets, constructed samples (where possible), photographs, showroom tours (as deemed appropriate), finish and material options (samples of actual materials and colors), and pricing information for each item to be selected. Multiple options for selection required, and all options are to be coordinated with other furniture and architectural finish selections for the space(s).
    e. Furniture timetable identifying timeframes for design phase activities, preparation of specifications/bid documents, order placement/confirmation, manufacturing lead times, and delivery and installation in coordination with Project Schedule. Identify product selection options that present challenges to the schedule and/or anticipated pricing increases that may impact timing of procurement process.
    f. Binder shall include:
        1) Furniture plan;
        2) Furniture budget;
        3) Cut sheets / photographs;

4) Finish and material selections;
5) Furniture timetable.

26. Division 12 59 00: Systems Furniture

a. Provide complete layout of systems furniture (existing furniture to be reused shall be distinguished from furniture to be purchased).
   1) Panel plans
   2) Manufacturer
   3) Finishes
   4) Electrical, communication devices
   5) Accessories and components (including lighting and files)
   6) Electrical feed system (wall or poles)
   7) Dimensions
   8) Budget cost from vendor(s)

b. Systems Furniture selection options – provide: optional layouts/components, cut sheets, showroom tours, finish and material options (actual samples and colors), and pricing information for each configuration. Multiple options for selection required, including multiple manufacturers/vendors. All options are to be coordinated with other furniture and architectural finish selections for the space(s).

c. Furniture timetable identifying timeframes for design phase activities, preparation of specifications/bid documents, order placement/confirmation, manufacturing lead times, and delivery and installation in coordination with Project Schedule. Identify product selection options that present challenges to the schedule and/or anticipated pricing increases that may impact timing of procurement process.

d. Binder shall include:
   1) Systems Furniture plan;
   2) Systems Furniture budget;
   3) Cut sheets / photographs;
   4) Finish and material selections;
   5) Systems Furniture timetable.

27. Division 13: Special Construction

a. If any special construction system is designed, it must be clearly outlined in this phase for closer attention in the next phases.

28. Division 14: Conveying Equipment

a. All vertical circulation elements must be clearly identified and dimensioned on the drawings.

29. Division 21; Fire Suppression

a. Provide floor plans analyzing exit routs and major life safety features.
b. Sprinkler plan with location of heads and standpipe. Coordinated with joists and beams, lighting, duct work, and sprinkler riser diagrams.
c. Floor protection equipment room layout and description of wet or dry type systems, hose racks or cabinets and fire department tie-ins.
d. Design of a fully functional state of the art fire alarm system that meets Prince George's County code requirements for this type of facility fully coordinated with permitting authorities.
e. Location of fire pumps, booster pumps, hose connections and standpipes.
f. Provide fire hydrant flow tests.
g. Sprinkler Occupancy Hazard Classification:
   - Identify the Building spaces with the types of Hazards Areas as follows for Sprinkler Hydraulic Design Requirements per NFPA -13:
     a) Light Hazard,
     b) Ordinary Hazard

c) Extra Hazard etc.

h. Show the incoming sprinkler system (Doubled Lined) with following details that include but not limited to :

(a)Water Alarm Gong, (b) Fire Department Connection, 36 inches above the grade, (c) Normally Closed Bypass Valve for Testing Back Flow Preventer, (4) Pressure Switch, Connect to Fire Alarm System, (5) Pressure Gauge, (7) Wet Pipe Alarm Check Valve, (8) Retarding Chamber, (9) Drain Line with Valve, (10) Alarm Test Valve, (11)O.S. & Y Gate Valve with Tamper Switch, (12) Back Flow Preventer, etc.

30. Division 22: Plumbing

a. As indicated above a site utility master plan showing sanitary and storm sewer layout.
b. Drawings showing locations of sewage ejectors and grinders (if required), and storm manholes.
c. Green and LEED analysis of the plumbing system.
d. Floor plans indicating locations of all plumbing fixtures and special features, and approximate size of all piping systems, principal items of equipment and typical riser diagrams.

31. Division 22 40 00: Plumbing Fixtures

a. All plumbing fixtures must be fully specified and presented.

32. Division 23: HVAC

a. Submit all HVAC calculations for the building's heating, air conditioning and ventilation loads. The submitted calculations will be performed with the Carrier Hap program or approved equal. The calculations will support the capacities of the equipment selected for each zone and capacities of all major equipment**. For projects above 30,000 SFT new construction, the AE to submit CFD analysis for HVAC system**. The analysis is for system optimization, ventilation design, office/room simulation, fume hood design (Kitchen/Labs only).
b. Technique indicating overall combined heat transfer coefficient for roof/ceiling composite and roof area including the proposed insulating materials.
c. Floor plans and sections of mechanical rooms showing the location of all major HVAC equipment.
d. The equipment layouts shall show the necessary clearances for maintenance accessibility and sections as required to convey to the County that adequate clearances have been provided. Include elevations detailing heights and locations of ductwork, piping, conduits, wiring, structural and other building elements.
e. Provide energy model and life cycle cost analyses for at least three different systems and recommend the best option.
f. Information on the heating and cooling systems should indicate in sufficient detail the source of heat and cooling and method and location of heating and cooling distribution and controls within the building.
g. Show locations and sizes of piping systems, air handling systems and principal items of equipment such as compressors. Also include necessary controls and riser diagrams.
h. Boiler Plant and/or incinerator designs shall comply with all requirements of the Department of Environmental Protection, as well as all applicable regulations and the building code.
i. Provide drawing sheet(s) that at a minimum indicate all spaces that will require detailed drawings for all major equipment and devices.
j. Provide control schematic for HVAC controls.
k. Provide drawing sheet(s) that at a minimum indicate all spaces that will require

schedule of all equipment and devices to be incorporated.

l. Provide duct and pipe sizing calculations.
m. Provide block and zone heating and cooling load calculations using approved design assumptions and software.
n. Provide refined size and cost estimates of major equipment.
o. Equipment footprints and installation and maintenance clearances shown on drawings for all heating and cooling plant equipment, plus air-handlers, pumps, fan coil units, convectors and other terminal equipment. Provide sections on typical mechanical equipment rooms to show elevation and mounting details.
p. Data sheets on all mechanical equipment to be used as basis of design.
q. Ductwork Layout: drawings will include combination of double line and single line ductwork to identify sizes, routing and distribution of air systems. All air type devices and thermostat locations proposed must be shown.
r. Single line schematic diagram of the HVAC piping system shall be included.
s. Single line control schematic diagram describing the proposed sequence of operation shall be included control point list for the Management and Control System.
t. Control schematics showing sensors and actuators with alphanumerical designations coordinated with sequence of operation.
u. Heating and cooling load calculations for each space and major duct or pipe runs sized to interface with structural members.
v. Location of devices in the ceilings.
w. An analysis of availability of components, construction sequence and scheduling, economic tradeoffs, acoustical and vibration control, safety and maintenance requirements.
x. Results of the energy analysis integrated in mechanical design.
y. Equipment schedule for all major HVAC components including energy efficiency ratings for each.
z. Certification by the A/E that the mechanical design has been coordinated with other disciplines and no interfaces or dimensional conflicts exist.
aa. Following divisions must be fully designed, specified, and presented.
    1) Division 23 08 00: Commissioning of HVAC
    2) Division 23 10 00: Facility Fuel System
    3) Division 23 20 00: HVAC Piping and Pumps
    4) Division 23 30 00; HVAC Air Distribution
    5) Division 23 40 01: HVAC Air Cleaning Devices
    6) Division 23 50 00: Central Heating Equipment
    7) Division 23 60 00: Central Cooling Equipment
    8) Division 23 70 00: Central HVAC Equipment
    9) Division 23 80 00; Decentralized HVAC Equipment

33. Division 25: Integrated Automation

a. Must be fully specified and scheduled.

34. Division 26; Electrical

a. Lighting on separate distribution, roughly sized.
b. Major electrical equipment roughly scheduled indicating size, capacity and total loads.
c. A complete one-line diagram should be drawn in which a single line represents three phases of power system, and it should be properly drawn, showing correct power distribution path from the normal power source and generators to *each* downstream load panels— including the ratings and sizing of each piece of electrical equipment, their circuit conductors, conduit size and their protective devices.
d. All service connections and electrical equipment (panels, transformers and switch gear)

shall be located on centerline of tiles.

e. All services for special purposes shall be located and indicated.
f. All power consuming equipment and load characteristics.
g. Development of specific electrical power service and distribution systems, lighting, telephone, fire detection and alarm, security and electronic communications systems appropriate for the project, including computer network, cable TV and sound systems.
h. Equipment room layouts and clearances shown on drawings.
i. Electrical distribution riser diagram.
j. Wiring chases shown on drawings.
k. Total electric load calculation.
l. Major electrical equipment (switchgear, distribution panels, emergency generator, transfer switches, UPS system, etc.) dimensioned and drawn to scale into the space allocated.
m. Interior electrical loads estimate for systems furniture, receptacles, lighting, and any special use areas.
n. Analysis shall be made of availability of components, construction sequence and scheduling, economic tradeoffs, safety and maintenance requirements.
o. Draft specifications for each CSI section used.
p. Legend showing all symbols on drawings.
q. Certification by the A/E that the electrical design has been coordinated with other disciplines and County Department of Technology Services and no interferences or dimensional conflicts exist.
r. Low voltage systems
    1) Identify all low voltage systems and their requirements.
s. Following divisions must be fully designed, specified, and presented.
    1) Division 26 08 00: Commissioning of Electrical Systems
    2) Division 26 09 26: Lighting Control Devices
    3) Division 26 20 00: Low Voltage Electrical Distribution
    4) Division 26 31 00: Photovoltaic Collectors
    5) Division 26 40 00; Facility Lightening Protection

35. Division 26 50 00: Lighting

a. Development of lighting systems for the project following County technical guidelines for lighting and comments from Schematic Design.
b. The A/E is to provide Lighting Design strategy for the building to meet energy conservation goals set by the County.
c. Lighting Design to achieve a complete and acceptable design within wattage budget for project. Explicitly list specific lamp and ballast and diffuser by make and model on drawings and list same in specifications for all lighting equipment.
d. Specify lighting output (lumens) and efficiency (lumens/ watt) for any lamp and ballast.
e. Lighting shall be indicated as to type, location and intensities in foot candles for each space, room, or typical space.
f. Site lighting layout for the entire complex included data sheets for proposed fixtures and lamps and the proposed mounting height for each fixture pole.
g. Lighting, power, telecommunications and office automation devices and receptacles shown in plan.
h. Light fixture schedule with types and quantities proposed along with data sheets.
i. Development of lighting systems for the project following County technical guidelines for lighting and comments from Schematic Design.
j. Ceiling plans showing light fixture locations coordinated with room tasks, and multi- level switching arrangements.
k. Documentation that the design meets the ASHRAE 90.1P power budget established for the

project.

l. Luminance calculations for the design by the zonal cavity method.
m. Day-lighting analysis as directed by the County Representative.
n. Documentation to be submitted at this stage will include:
   1) Statement of foot- candles to be maintained for each type of task surface in the building.
   2) Calculation based on the latest required ASHRE of lighting wattage budget and current established standards (IESNA Standard) of lighting quality and illumination level for the building interior and exterior. Including catalog cut sheets
   3) Strategy for meeting lighting budget.
   4) Day-lighting design and analysis.
   5) Implementation of lighting control requirements
   6) Development of lighting systems for the project following County technical guidelines for lighting and comments from Schematic Design to include; (a) reflected ceiling plans with light fixture locations coordinated with room tasks, multi-level switching arrangements; and detailed schedule of lighting fixtures, lamps and ballasts; (b) documentation that the design meets the ASHRAE 90.1P power budget established for the project; (c) illuminance calculations for the design by the zonal cavity method for lighting below 20 fc; (d) point illuminance calculations where requested above 20 fc; (e) daylighting analysis as directed by the County Representative.
o. Photometrix Analysis: Provide drawing and analysis in graphic and text using light distribution software (photometrix) to show point to point light distribution in FC. The analysis should include the following:
   1) Photometrix drawings indicating FC and height of point values
   2) High lighting below and above standard (or requirement) points
   3) Light level at building perimeter (exterior windows)
   4) Light level at property lines
   5) Strategies for light pollution control
   6) Various type of light source
   7) Blocking of lighting concern zones (areas that in the program require certain lighting level) both for interior of the building and site
   8) Manufacturer light distribution cut sheets for each light fixture clearly correlated with light fixture types on the drawings
   9) On large projects provide a rendering of site night lighting plan by using appropriate software.

36. Division 26 51 00; Interior Lighting
   a. Must be fully designed, specified and scheduled.

37. Division 26 56 00: Exterior Lighting
   a. Must be fully designed, specified and scheduled.

38. Division 27: Communications
   a. Must be fully designed, specified and scheduled.

39. Division 27 20 00: Data Communication
   a. Computer system must be identified. Possible entry point for the data line to the building must be identified.
   b. Conduct a meeting with the County DTS to review the data system and where major related equipment should be located.
   c. Verify all electrical needs for the computers and peripherals.

40. Division 27 30 00: Voice Communications
   a. Telephone system must be identified. Possible entry point for the telephone line must be identified.
   b. Conduct a meeting with the County DTS to review the telephone system and where major telephone equipment should be located.

c. Concept computer network and telephone system cable and conduit backbone design including all connections, drops, equipment racks, cable trays, electrical services, grounding systems and proposed equipment locations fully coordinated and in compliance with County Department of Technology Services (DTS).
d. Raceway systems for telephone, Local Area Network cabling, emergency communications etc. designed to County standards.

41. Division 27 40 00: Audio Video Communications
a. Complete audio video drawings, specifications, and schedules.

42. Division 28: Electronic Safety and Security
a. Outline of the security systems for the project including locking, control, observation, central control, and materials to be used.
b. Security and non-security system logics.
c. Security and non-security hardware and locking control systems.
d. Central control layout and control schemes.
e. Miscellaneous security equipment.

43. Division 31: Earthwork
a. Site plans: various site plans to show the followings:
1) Existing and proposed contours. Plan must show a minimum of 2'- 0" contour lines showing cuts and fills,
2) Locations of the proposed building or buildings. Building locations must be referenced from main survey baseline.
3) Property lines, bench marks, set backs.
4) Entrance driveway, parking and circulations including profiles, typical roadway cross- sections, and markings.
5) All legal parameters of the property including all public, private, and utility right of ways.
6) Storm water management and sediment control plans.
7) File the site concept plan with the County Department of Permitting Services or the municipal code enforcing agency.
8) All utilities existing and proposed (water, electricity, telephone, fiber optics, gas, etc.), showing their location, elevation, size, and entrance location to the site and the building s, and indicating whether over or under ground. Must coordinate the utility information with the local utility Co. requirements and records.
9) Updated geotechnical report outlining findings resulting from soil borings, test pits, sonar analysis of the soil layers, soils analyses, soil bearing values, and other needed geotechnical studies.
10) Natural Resource Inventory Forest Stand Delineation plan for approval by M-NCPPC, or Forest Conservation Plan for approval by municipal code enforcing agency.
11) Pedestrian safety analysis and report.
12) Landscaping plan.
13) Sediment and erosion control plan.
14) Construction staging plan.
15) Fire department connections and fire hydrants. These documents shall be fully coordinated with all permitting authorities and utility companies.
16) Following divisions must have already been completed, designed, specified and presented.
a) Division 31 22 00: Grading
b) Division 31 23 00: Excavating and Fill
c) Division 31 25 00; Erosion and Sediment Controls
d) Division 31 60 00: Special Foundations and Load Bearing Elements

44. Division 32: Exterior Improvements
a. Following divisions must have already been completed, designed, specified and

presented.

1) Division 32 10 00: Bases, Ballasts, and Paving
2) Division 32 18 00: Athletic and recreational Surfacing
3) Division 32 31 00: Fences and Gates
4) Division 32 32 00; Retaining Walls
5) Division 32 70 00: Wetlands
6) Division 32 80 00: Irrigation
7) Division 32 90 00: Planting

45. Division 33: Utilities

a. Utility Services for Construction

1) It is essential that construction utility services availability be addressed in the construction documents.
   a) The consultant shall discuss with public utility companies to determine what sources and options are available for contractor's use.
   b) Describe what public utility companies will provide by way of connections, metering, transformers, etc.
   c) Payment responsibility for hookup charges and energy use prior to project completion shall be clearly identified.

b. Following divisions must have already been completed, designed, specified and presented.

1) Division 33 08 00: Commissioning of Utilities
2) Division 33 10 00; Water Utilities
3) Division 33 30 00: Sanitary Sewerage Utilities
4) Division 33 40 00: Storm Drain Utilities
5) Division 33 47 00: Ponds and Reservoirs
6) Division 33 50 00: Fuel Distribution Facilities
7) Division 33 70 00: Electrical Utilities
8) Division 33 73 00: Utility Transformers
9) Division 33 80 00: Communications Utilities

Phase 4: Construction Documents – CD

JJ. General

1. Division 01: General Requirements
   a. Upon written notice to proceed from the County, the A/E shall start the Construction Documents phase.
   b. The purpose of the Construction Documents Phase is to produce a complete set of drawings, specifications and other legal documents to be able to successfully obtain building permits, bid the project and engage in the construction phase of the project.
   c. Upon County acceptance and approval of the design development documents, the building systems and exterior wall locations (building "footprint") maybe changed only as approved by the County. No significant departure from the approved design development submittal will be allowed during the next phase, unless prior written approval is obtained from the County.
   d. During this phase A/E must submit progress documents at the end of each stage. The intent of these submittals is for the County to monitor progress of and to provide comments on the work while the A/E is proceeding. These incremental in-phase submittals are not the same as the 100% submittal, which will be reviewed by a team of County professionals to assure compliance with all requirements and control the quality of design. The County's review of documents does not substitute for the A/E's responsibility for coordination and compliance with all requirements.
   e. The A/E shall interface with all Agencies requiring permits and approvals for the Project as to the progress of the Design and incorporate comments as required.
   f. Should the documents submitted not conform to the requirements outlined in this manual, the A/E must revise, correct and complete the documents and reprint at its own expense and with no additional cost to the County as required to obtain the County's approval.

KK. Stage 1: Documents Setup – CD

1. Drawings and CADD setup
   a. AE must continue to work on all aspects of production during this stage, but for coordination and quality control focus will be on documents setup.
   b. AE must present the drawing set organization. Compliance with the requirements of this manual must be verified. Refer to the Drawing Requirements at the beginning of this section.
   c. Provide a set for review.

C. Stage 2: Details Setup – CD

1. Details development
   a. AE must continue to work on all aspects of production during this stage, but for coordination and quality control focus will be on details.
   b. AE must develop a complete set of details cross referenced to related sheets.
   c. Provide a set for review.

2. **Stage 3: Integration Coordination – CD**
3. Division 01: General Requirements
   a. AE must continue to work on all aspects of production during this stage, but for coordination and quality control focus will be on details.
   b. The A/E shall assist the County in conducting a public presentation meeting.
   c. Provide updated phasing plan and analysis of the construction sequencing.
   d. All drawings must be fully dimensioned, with legends, annotated and referenced to other documents.

e. A final integration sheet must be provided to coordinated, structure, ductwork, sprinkler, lighting, diffusers, speakers, and all other features that may interfere with each other and cause change of design during construction.

f. The A/E must submit a complete commissioning plan and schedule for approval by County in this phase, detailing how: all the project services and systems will be checked for compliance with the construction documents and tested for performance; the maintenance and operation manuals will be prepared, and operations and maintenance training conducted; and the building placed in an operational steady state condition ready for turnover to County. Such plan is to be included in the construction contract documents for implementation of applicable portions by the Construction Contractor. The Commissioning Plan is to include the following information:

g. Equipment Maintenance Manuals
   1) The Mechanical and Electrical contractors shall be required to prepare maintenance manuals for the servicing of all equipment installed as a part of their division. The general contractor shall prepare maintenance manuals for equipment in other divisions.
   2) The information contained in the manuals shall be grouped in an orderly arrangement under basic categories, i.e., Primary Distribution Equipment, Secondary Systems Equipment, Special Raceways, Motors & Controls, Lighting Equipment, Clock & Program Equipment, Fire & Security Alarm Equipment, Central Supervisory Equipment, Special Communication Systems, etc.
   3) The manuals shall have typewritten index and divider sheets between categories with identifying tabs.
   4) Data incorporated into manuals shall be neat, clean copies, 8-1/2" x 11" size for binding.
   5) The information included must be the exact equipment installed, not the complete "line" of the manufacturer. Where sheets show the equipment installed, as well as other equipment, the installed equipment shall be neatly and clearly identified on such sheets.
   6) Manuals shall contain shop drawings, wiring diagrams, operating and maintenance instructions, replacement parts list, equipment nameplate data and performance curves or Tables for all equipment and systems installed under the project. All control systems shall be fully described along with operation descriptions and all system interfaces.
   7) Wiring diagrams for each system shall be complete drawings for the specific system installed under the contract. "Typical" diagrams will not be acceptable unless properly marked to indicate the exact field installations.
   8) The completed manuals shall be contained in slant ring view binders (3 "D" rings) with clear vinyl overlay on the front cover and spine. The binders shall have heavy-duty nylon reinforced hinges. The front cover "slip sheet" shall include County, project name & number, building name, date, architect, appropriate engineer (mechanical, electrical, whatever), and reference to specific contents (e.g., Mechanical Operations and Maintenance Manual, Electrical Operations and Maintenance Manual, Warranties and Bonds, Furnishings, whatever). The spine "slip sheet", shall include: County, building name, and project name and number, and year.
   9) The General Contractor shall coordinate volumes from all trades into a distinctive set; with complete uniformity of color, format, cover "slip sheets", indexing, tabbing, etc. The final volumes shall have a very professional quality and appearance.
   10) One preliminary copy of all volumes, including covers and "slip sheets", shall be submitted to the Project Manager for review and approval.

11) Three complete copies of all volumes shall be delivered to the Owner upon approval of the preliminary copy, before systems turnover to the Owner and/or Owner training. The completed manuals shall be utilized during the training and commissioning process to verify the contents and assist with both processes.

h. AE must conduct a complete coordination workshop to include the owner and all major and critical disciplines.

i. Provide a set for review.

NN. Stage 4: Permit Documents – CD

1. Division 01: General Requirements

a. One (1) set of the drawings shall be of presentation size and quality in color.

b. The A/E shall provide the required number and type of documents to obtain permits and approval of governmental authorities having jurisdiction over the Project.

c. All drawings must be fully dimensioned, with legends, annotated and referenced to other documents.

d. Obtain all necessary approvals from all required permitting authorities to do the construction. This may include OFFICE OF CENTRAL, M-NCPPC, DPIE, MDOT, SHA, and other local, state, and federal permitting and regulating agencies.

e. The sets containing the original approvals will be retained by the County as the official approved sets.

f. The A/E shall participate in such reviews and meetings as are necessary to ensure that the project design conforms to all applicable codes and all requirements of responsible agencies and will make any changes to the Construction Documents which are required for issuance of all permits and legal authorizations needed to construct the Project.

g. The A/E shall obtain and deliver to the County all permits and approvals required of the work excluding trade permits that must be obtained by the general or subcontractors. In some jurisdictions it is required that permit fees and applications to be paid and filed with the permitting officials prior to the selection of the contractors. In those cases, the A/E must file and obtain all such permits as necessary for progress of the project prior to bidding.

h. The A/E must provide as minimum number of sets of documents as identified in the ***Table of Deliverables During the Design Phases*** at the end of this document. Unless otherwise noted in the contract as an exception the following quantities must be delivered:

1) Minimum **3** sets of full-size drawings
   a) 2 for OCS
   b) 1 for the user agency
2) Minimum **2** sets of half size drawings
   a) 1 for the file
   b) 1 for the user agency

OO. Stage 5: Bid Documents – CD

1. Division 01: General Requirements

a. The A/E shall review the County's General Conditions for Construction consisting generally of: (a) Bidding and Contract Requirements; (b) General Conditions; and (c) Supplementary Conditions and make recommendations as to bidding procedures and other factors affecting budget and scheduling. The General and Supplemental Conditions can only be modified by the County Attorney's office.

b. Documents for the bid must be 100% finished and complete. A/E must be advised that especially after this phase incomplete documents or any changes will have additional cost impact to the County.

c. The A/E must certify in writing that the project can be constructed within the Budget.

d. All drawings must be fully dimensioned, with legends, annotated and referenced to other

documents.

e. The A/E shall prepare such clarifications and solicitation amendments to the bidding documents as may be required and submit to the County for review. The County will then direct the A/E to provide a reproducible copy of the approved amendment for reproduction and distribution by the County.

f. The resulting final construction document submittal is to be a complete, fully coordinated, integrated package, suitable for bidding distribution, without any need for amendments or further clarification.

g. The A/E and its consultants shall finalize the list of warranties and expected submittals, including test results and operating and maintenance information. The list should be organized by Construction Specification Institute (CSI) Division, Section and Paragraph numbers and submitted to the County prior to the bid opening. This listing shall be the basis of the A/E's, Counties and Construction Contractor's submittal logs.

h. The A/E shall prepare a comprehensive listing of all construction submittals and all contractor required warranties for County's review and approval. This listing will be used by the A/E and the County to confirm submittal compliance and warranty provisions.

i. The A/E must certify in writing that the project can be constructed within the Budget.

j. Single or multiple contracts may be required by the County, and the detailed drawings for each contract shall be prepared by the A/E with appropriate designation noted thereon.

k. Provide the final updated schedule for the construction sequence so that the Owner and the Contractor may reliably predict and schedule outages, space access and business interruptions. If there are long lead items that impact the construction schedule, they should be identified early for possible Owner purchase. Specific areas of coordination need to be identified to alert bidders to special work area problems.

l. Utility Services for Construction
   1) It is essential that construction utility services availability be addressed in the contract documents. For County construction, the consultant shall discuss with public utility company what sources and options are available to the contractor; describe what public utility company will provide in the way of connection, metering, transformers, etc. Payment responsibility for hookup charges and energy use prior to project completion shall be clearly identified.
   2) The Consultant shall show the layout for utilities connection on the drawings.

m. The A/E must deliver final and complete contract documents to the reproduction firm identified by the County. These documents will remain available for reproduction for as long as is necessary to complete bidding and contract award. The A/E is then responsible for retrieving the documents. The prime consultant is responsible for coordination, completeness, and accuracy of all printable documents at the printshop. Extra printing cost due to incompleteness, inaccuracy, lack of coordination, etc. must be paid by the consultant and not the owner.

n. The A/E must provide as minimum number of sets of documents as identified in the ***Table of Deliverables During the Design Phases*** at the end of this document. Unless otherwise noted in the contract as an exception the following quantities must be delivered:
   1) Minimum **2** sets of full-size drawings
      a) 1 for Construction Section
      b) 1 for Design Section review team
   2) Minimum **2** sets of half size drawings
      a) 1 for the file
      b) 1 for the user agency

PP. Submittal Requirements for the Construction Documents Phase

1. Division 01: General Requirements

a. Complete site plans: various site plans to show the followings:
   1) Existing and proposed grades and contours. Plan must show a minimum of 2'- 0".

contour lines showing cuts and fills,

2) Layout and location of all proposed work including buildings, structures, retaining walls and other site improvements with details.
3) Locations of the proposed building or buildings. Building locations must be referenced from main survey baseline.
4) Property lines, benchmarks, setbacks.
5) Entrance driveway, parking and circulations including profiles, typical roadway cross- sections, and markings.
6) All legal parameters of the property including all public, private, and utility right of ways.
7) Storm water management and sediment control plans.
8) This is the phase to file for the site concept plan with the County Department of Permitting Services or the municipal code enforcing agency.
9) All utilities existing and proposed (water, electricity, telephone, fiber optics, gas, etc.), showing their location, elevation, size, and entrance location to the site and the building s, and indicating whether over or under ground. Must coordinate the utility information with the local utility Co. requirements and records. [Note to Designer: Use a separate site drawing to show utilities on projects with excessive layouts and details].
10) Updated geotechnical report outlining findings resulting from soil borings, test pits, sonar analysis of the soil layers, soils analyses, soil bearing values, and other needed geotechnical studies.
11) Natural Resource Inventory Forest Stand Delineation plan approved by M-NCPPC.
12) Forest Conservation plan approved by municipal code enforcing agency.
13) Pedestrian safety analysis and report.
14) Landscaping plan.
15) Sediment and erosion control plan.
16) Construction staging plan.
17) Fire department connections and fire hydrants. These documents shall be fully coordinated with all permitting authorities and utility companies.
18) The Designer shall certify, in writing, to the County that all applicable local and state officials have been contacted regarding each utility connection and that the department responsible for permits or connection approval has agreed to the system's use.

b. Floor plans
   1) Floors plans layouts for all levels fully detailed, annotated, and dimensioned showing walls, major wall types, room name and number, room size, door swings, major mechanical equipment, other appliances and equipment's that take floor space, bulkhead dash lines, etc.
   2) Gross and net area calculations for each space to show conformance with the Program of Requirements as amended. Sample charts to be used are at the end of this document.
   3) Complete code analysis consisting of all fire walls and partitions, building areas, egress paths and capacities, construction and use types, etc. – Fully coordinated with all permitting authorities.

c. Specification Requirements – CD
   1) The Specifications shall be in final form and the Project Description that accompanied the Outline Specifications in the Schematic and Design Development Phases shall be updated.
   2) The A/E must work with the County project manager to produce incremental completed specification as construction documents progress through this phase.
   3) In order to prepare the project manual for bidding which includes complete specifications, the County will provide the General Conditions of the Contract, Advertisement for Bids, Instructions to Bidders, and Construction Proposal Forms and Agreement(s) which the A/E shall incorporate into the Construction Documents.

4) Specification must include design narrative as described in the commissioning program.
5) Specifications that are to accompany Construction Document shall consist of a comprehensive description of the project and the materials proposed for use in the work. The general scope shall be indicated by Sections as required for Construction Specifications. The "PROJECT DESCRIPTION" shall be a narrative description of the project and shall include all applicable architectural, civil, structural, mechanical and electrical programs and/or systems.
6) The A/E shall fully coordinate all aspects of the technical specifications with the General Conditions and additional documents provided by the County to produce a comprehensive construction contract manual.
7) Submittal requirements must be clearly identified in the specifications.
8) Operations and Maintenance Training
   a) The specifications shall include requirements for the contractor to provide detailed training and instruction for County personnel. It shall be a requirement that the contractor videotape all training sessions and a copy provided to the County prior to final completion.
   b) The instruction or training periods shall not commence until the systems involved are complete, tested, and operating, and O & M manuals and as-builts completed.
   c) The contractor shall be required to have qualified individuals conducting all training. As a minimum, training personnel shall be foremen or superintendents from the trade involved, or a factory representative for special equipment or systems.

d. Estimating Requirements – CD
   1) Cost estimates shall include complete breakdowns of each CSI section indicating materials, labor, units, unit costs and total cost. The total cost shall include in the labor item all insurance, state and federal payroll taxes, and any payments to the unions. The total cost for each Section shall include all General Contractors' and Subcontractor's overhead and profits.

e. Renderings – CD
   1) Variety of renderings can and must be presented at this phase suitable for public presentation including:
      a) Elevations
      b) Sections
      c) Floor plans with and without programmatic functional divisions delineated by colored shading with full legend
      d) Site plan with roof, shadow and landscaping
      e) Axonometric or perspective view of the building on the site
      f) Axonometric or perspective view of interior spaces

f. Model – CD
   1) A final professional model must be prepared by the A/E to show site contour and building mass and location with enough details to be able to relay the site and building concepts. Major site elements such as roads, wetland, wooded areas, etc. must be clearly delineated. This model should be transportable to various meetings for presentation.

2. Division 01 81 13: Sustainable Design Requirements

a. The A/E shall prepare all the necessary documentation for LEED certification. A copy must be submitted to the County.

b. A separate LEED verification and green design control meeting must be conducted to verify all green goals. The A/E shall prepare all the necessary documents for LEED certification.

c. The LEED binder must be completed to include:
   1) LEED score sheets for various phases.
   2) Details of strategies for LEED compliance.
   3) Cut sheets of equipment’s and materials.
   4) Copy of related correspondences.
   5) Copy of all minutes of meetings related to LEED.

6) All other documents related to sustainable design as requested by the County.

d. Energy Conservation Design shall be in sufficient detail and with appropriate efficiency specifications to enforce construction contractor compliance with energy efficient construction. This includes, but is not limited to:
   1) Continuation of design strategies for energy conservation approved in the prior phase.
   2) Submit for review and approval an energy analysis reflecting the increased level of detail of the Construction Document Phase. Form and content of the report shall be as described in the County's Energy Program of Requirements.
   3) Actual lighting wattage from lighting design development plans.
   4) Actual efficiencies of all HVAC equipment selected as basis of design.
   5) Actual window area and glazing types from architectural design development plans.
   6) Realistic schedules and usage patterns on a zone-by-zone basis.
   7) Efficiency specifications shown with equipment schedule on drawings and specifications for all heating and cooling equipment, motors and major appliances.
   8) Detail of insulation and vapor barriers, including ceiling spaces and exterior wall.
   9) Details of sealing or gasketing of all joints and specifications for airtightness of windows and doors.
   10) Specification of exterior glazing U-Value, shading coefficient and visible transmittance.

3. Division 01 91 00: Commissioning Requirements
   a. A completed Commissioning plan. See CD phases requirements.
   b. All checklists and testing forms must be included in the commissioning plan.
   c. A dedicated meeting must be coordinated among project team to review the commissioning plan and its requirements, and a plan of action must be generated for the construction phase.

4. Division 02: Existing Conditions
   a. Must be fully documented.

5. Division 02 21 00: Site Survey
   a. Must be fully documented.

6. Division 02 22 19: Traffic Assessment
   a. Must be fully documented.

7. Division 02 24 00: Environmental Assessment
   a. Must be fully documented.

8. Division 02 30 00: Subsurface Investigation
   a. Must be fully documented.

9. Division 03: Structural System
   a. Structural drawings indicating type and character of structural systems, including sizes of typical members, size, overall dimensions, and floor elevations.
   b. Allowable soil bearing pressure and elevation of footings and slabs.
   c. Foundation drawings.
   d. Footing, beams, columns, and connection schedules.
   e. Certification by the A/E that the structural design has been coordinated with other disciplines and no interferences or dimensional conflicts are shown.
   f. Completed structural floor plans, specifications and schedules with detailing.
   g. Boring plans with dates, ground elevation water level, and bottom grades of footings and slabs plotted.
   h. Foundation plan with bottom grades showing layout of all footings, walls, slabs on grade including reinforcing, grade beams, and columns; include design soil bearing pressures and live loads for each area.
   i. Floor and roof plans of structural systems including framing, grades of finished floors and depressed areas, with locations and dimensions for all openings. Also indicate design floor loads.
   j. Complete foundation wall elevation and typical sections, with reinforcing indicating location, dimensions and grades for all footings, steps and wall openings.

k. Complete details and section with dimensions for all construction joints, reinforcing and other embedded items.
l. Schedules (with dimensions) for all lintels, beams, joists and columns.
m. Unless detailed on the drawings, the following information shall appear in the general notes, Sheet S-1: class and 28 day strength of concrete for each portion, structural steel and concrete reinforcing design stresses for each type of structural member, concrete cover for each type of structural member, shrinkage and temperature steel requirements, reinforcing laps for main reinforcing and temperature steel, bend point, cutoff, and hook locations for all members, minimum beam and lintel bearing. Reinforcing steel fabrication shall be in accordance with most recent ACI, "Manual of Standard Practice for Detailing Reinforced Concrete." Structural steel fabrication shall be in accordance with the AAISC "Manual of Steel Construction."
n. Roof structural systems shall be designed for minimum of 1/2 inch per foot pitch to roof drains.

10. Division 06 22 00: Millwork
a. Must be fully documented.

11. Division 07: Envelope
a. All envelope materials and finishes must be fully discussed and presented.
b. Elevations
    1) Develop detailed elevations of all sides to show the design intent, style, height, materials, colors, and other devices on the façades.
c. Sections
    1) Building sections showing floor elevations, floor to floor heights, floor to ceiling heights, roof, day-lighting features, and wall construction.
    2) Wall sections showing wall construction, materials, water proofing, air barrier, water management system, flashing, and typical enlarged details at various locations including at roof parapet, floors, ground level floor, lowest floor, and foundation.

12. Division 07 10 00: Damp-proofing & Waterproofing
a. Must be fully documented.

13. Division 07 20 00: Thermal Protection
a. Must be fully documented.

14. Division 07 25 00: Weather barriers
a. Must be fully documented.

15. Division 07 71 00: Roof
a. Roof plan showing slopes, drains, parapets, major equipment's and other features that might impact the roof system. Annotate all features.
b. Roof section showing roof system, deck, membrane flashing and drainage.

16. Division 07 77 00: Exterior Walls
a. Exterior wall cross sections and elevations indicating location and size and type of fenestration and indicating overall thermal transfer value for the exterior wall envelope along with each type of proposed insulating material.

17. Division 08: Openings (Doors & Windows)
a. All doors and windows must be annotated.
b. Door schedule showing all types and quality levels coordinated with security plans.

18. Division 08 70 00: Hardware
    1) Hardware schedule coordinated with doors and windows and security plan.
a. Division 09: Finishes Develop finish schedule identifying all finishes.
b. Finish plans for all levels with complete annotation, legend and schedule.

19. Division 09 50 00: Ceiling
a. Provide reflected ceiling plans for all levels showing ceiling types, light fixtures, and ceiling height.

20. Division 09 60 00: Flooring

a. Provide flooring plans for all levels showing various possible finishes and materials.

21. Division 09 70 00: Wall Finishes
22. Division 09 80 00: Acoustic Treatment
    a. Must be fully documented.
23. Division 09 90 00: Painting
    a. Must be fully documented.
24. Division 10: Specialties
    a. Must be fully documented.
25. Division 10 06 10.13 Exterior Signage
    a. Must be fully documented.
26. Division 10 06 10.16 Interior Signage
    a. Complete Sign plan(s) and specifications with schedule fully referenced to the other documents.
    b. Special graphics, directional signage and graphic system.
27. Division 10 21 00 Toilet Compartments
    a. Must be fully documented.
28. Division 10 22 26 Operable Partitions
    a. Must be fully documented.
29. Division 10 71 13 Exterior Sun Control Devices
    a. Must be fully documented.
30. Division 10 73 00: Protective Covers (Canopies, etc.)
    a. Must be fully documented.
31. Division 11: Equipment
    a. Must be fully documented.
        1) Division 11 26 00: Kitchen Equipment
        2) Division 11 28 00: Office Equipment (Computer, copier, etc.)
        3) Division 11 52 00: Audio- Visual Equipment
        4) Division 11 65 00: Athletic and Recreational Equipment
        5) Division 11 82 00: Solid Waste Handling Equipment
32. Division 12: Furnishings
    a. Must be fully documented.
        1) Division 12 10 00: Artwork
        2) Division 12 20 00: Window Treatments
        3) Division 12 30 00; Casework
33. Division 12 50 00: Furniture
    a. Coded Furniture Plans and loose equipment layout indicating size and location of all furniture and equipment.
    b. Enlarged furniture plans and details/illustrations, including specially designed items or elements, indicating finished appearance and functional operation if necessary.
    c. Coded quantity/type schedule fully referenced to the plans.
    d. Furniture specification for each item to be purchased and/or refurbished/reupholstered sufficient for bidding and/or quotation preparation. Note that procurement process may involve multiple bid/requests for quotation packages and/or vendors/contracts.
    e. Furniture budget (coded to coordinate with Coded Furniture Plan) that identifies new or reused/refurbished/reupholstered furniture (free-standing and systems) in all spaces; selected product; list prices; net prices; quantities; total cost; taxes; delivery and installation charges; vendor; and lead time. Quotation(s) from the furniture vendor(s) to support the cost identified in the Furniture Budget. Quotation must include furniture delivery lead time.
    f. Samples of actual finish and material selections.
    g. Furniture timetable identifying timeframes for preparation of specifications/bid documents, order placement/confirmation, manufacturing lead times, and delivery and installation in coordination with Project Schedule. Identify challenges to the schedule and/or anticipated pricing increases that may impact timing of procurement process.

h. Binder shall include:
    1) Coded furniture plan with quantity/type schedule;
    2) Furniture budget;
    3) Furniture specifications;
    4) Cut sheets / photographs;
    5) Samples of finish and material selections;
    6) Furniture timetable.

34. Division 12 59 00: Systems Furniture

a. Must be fully documented.
b. Coded Furniture Plans identifying overall system layout; detailed system configuration(s) and components; critical dimensions; coordination with electrical and low-voltage services. Detailed layouts to include material and finish specifications for all components.
c. Coded quantity/type schedule fully referenced to the plans.
d. Documents/specifications must be sufficient for bidding and/or quotation preparation. Note that procurement process may involve multiple bid/requests for quotation packages and/or vendors/contracts.
e. Furniture budget (coded to coordinate with Coded Furniture Plan) that identifies selected product; list prices; net prices; quantities; total cost; taxes; delivery and installation charges; vendor; and lead time.
f. Samples of actual finish and material selections.
g. Furniture timetable identifying timeframes for preparation of specifications/bid documents, order placement/confirmation, manufacturing lead times, and delivery and installation in coordination with Project Schedule. Identify challenges to the schedule and/or anticipated pricing increases that may impact timing of procurement process.
h. Binder shall include:
    1) Coded furniture plan with quantity/type schedule;
    2) Furniture budget;
    3) Furniture specifications;
    4) Cut sheets / photographs;
    5) Samples of finish and material selections;
    6) Furniture timetable.

35. Division 12 93 00: Site Furnishing

a. Must be fully documented.

36. Division 12 13 13: Bicycle Racks

a. Must be fully documented.

37. Division 13: Special Construction

a. If any special construction system is designed, it must be fully detailed and specified.

38. Division 14: Conveying Equipment

a. Must be fully documented.

39. Division 21; Fire Suppression

a. Must be fully documented.

40. Division 22: Plumbing

a. As indicated above a site utility master plan showing sanitary and storm sewer layout.
b. Drawings showing locations of sewage ejectors and grinders (if required), and storm manholes. Plumbing/sprinkler design diagrams showing service entry, etc.
c. Green and LEED analysis of the plumbing system.
d. Floor plans indicating locations of all plumbing fixtures and special features, and size of all piping systems, principal items of equipment and typical riser diagrams.
e. Plumbing and sprinkler riser diagrams.
f. All work done by the Plumbing Subcontractor, which includes, but not limited to all water, gas, air, vacuum, sanitary and storm wastes, and accessories. Foundation drain lines are the work of the General Contractor and shall not be indicated on the plumbing drawings. Site utilities shall be indicated on the utility drawings.
g. Plumbing work, other than site work, shall not be combined on the same sheets with the

Fire Protection, HVAC, electrical, or other drawings except with the prior approval of the County.

h. Trapping primer and venting of all plumbing fixtures including floor drains.
i. Water and gas supply sources, storm and sanitary discharge mains.
j. All piping shall be carefully sized, and all sizes shall be indicated on drawings and riser diagrams. Indicate all directions of flow and pitch on piping.
k. All accessories, valves, fixtures including all drinking fountains, grease traps for kitchen waste and all necessary panels, identified as to type and size.
l. Plumbing Legend and/or graphical symbols on the first sheet of the plumbing drawings in accordance with the American National Standards Institute (ANSI).
m. Domestic water booster pumps, boiler feed water, meter location, hose bibs.
n. Hot water; storage tanks, piping material, hanger details.
o. Complete sprinkler plumbing plans, risers and equipment.
p. Plumbing and sprinkler riser diagrams, sprinkler equipment layout, standpipe locations if applicable, and fire extinguisher locations.

41. Division 22 11 00; Facility Water Distribution
a. Must be fully documented.

42. Division 22 13 00: Facility Sanitary Sewerage
a. Must be fully documented.

43. Division 22 40 00: Plumbing Fixtures
a. Must be fully documented.

44. Division 23: HVAC
a. General
1) The first sheets of drawings in the mechanical set and the electrical set should be devoted to indexes, abbreviations, symbols, line nomenclature, and site plans; followed by one-eighth inch scale floor plans of the building and various systems which are, in turn, followed by one-quarter inch scale mechanical and electrical room drawings and details. Schematic diagrams and equipment schedules must be shown in full detail as separate drawings.
2) The heating and cooling systems indicating in sufficient detail the source of heat and cooling and method and location of heating and cooling distribution and controls within the building.
3) Heating and cooling load calculations for each space and major duct or pipe runs sized to interface with structural members.
4) Results of the energy analysis integrated in mechanical design.
5) Certification by the A/E that the mechanical design has been coordinated with other disciplines and no interfaces or dimensional conflicts exist.
6) Show locations and sizes of piping systems, air handling systems and principal items of equipment such as compressors. Also include necessary controls and riser diagrams.
7) Provide duct and pipe sizing calculations.
8) Block zone and room-by-room heating and cooling load calculations using approved design assumptions and software.
9) Data sheets on all mechanical equipment to be used as basis of design.
10) Double line layout of the air distribution system for the entire facility, showing location of supply diffusers, return grills, outside air intake louvers, building exhaust louvers, etc.
11) Single line piping diagram for heating, cooling and condenser water flow, showing all major accessories.
12) Sequences of operation for the HVAC systems with control point list for the Management and Control System.
13) Control schematics showing sensors and actuators with alphanumerical designations coordinated with sequence of operation.

14) Location of fire pumps, booster pumps, hose connections and standpipes.
15) Location of devices in the ceilings.
16) An analysis of availability of components, construction sequence and scheduling, economic tradeoffs, acoustical and vibration control, safety and maintenance requirements.
17) Equipment schedule for all major HVAC components including energy efficiency ratings for each.
18) All piping, ductwork and equipment should be sized and shown.
19) All piping and ductwork in mechanical rooms and pipe spaces to be double lined at 1/4 scale.
20) All duct work to be double lined on the floor plan.
21) Large scale mechanical details should be complete.
22) Details of HVAC controls.
23) All equipment schedules shown on the drawings.
24) Mechanical Commissioning Plan.
25) Master list of equipment submittals along with submission schedule.
26) Data sheets on all mechanical equipment specified, including diffusers and grilles.
27) Detailed coordination of air-distribution system with architectural elements, plumbing wiring and fire suppression systems.
28) Showing details of branch duct take-offs.
29) Single-line piping diagram for heating, cooling and condenser water flow, showing all major accessories.
30) Detailed sequence of operations for the HVAC systems using alphanumeric designations for sensors and actuators as shown on control schematics, with detailed control point list, specifications and operation strategies for the Management and Control System.
31) Complete control schematics showing sensors and actuators with alphanumerical designations coordinated with sequence of operation.
32) Detailed specifications covering energy efficiency, maintainability factors, and quality of each HVAC component.
33) County standard specification for Operation and Maintenance manual and training requirements appropriately modified for this project.
34) Site utilities shall be indicated on the utility drawings.
35) HVAC work, other than site work, shall not be combined on the same sheets with Fire Protection, Plumbing, Electrical, or other drawings except with the prior approval of the County.
36) All systems shall be sized at all reductions and riser diagrams of piping and duct systems shall be indicated.
37) All directions of flow and pitch on piping, and direction of flow, volumes for duct systems shall be indicated.
38) All equipment, accessories, valves and dampers with all necessary access panels, identified as to type and size.
39) Access panels, where required for access to valves and dampers, etc., shall be indicated on drawing.
40) All major equipment, including but not limited to, the boilers, chiller, air handler's pumps must be installed on a 4'' thick housekeeping pad.
41) Cooling tower design shall be indicated on the drawings showing site location, elevations and floor plan of equipment layout and typical flow diagram as related to the total HVAC system.
42) Adequate ventilation shall be provided in utility tunnels. Ventilation for exterior utility tunnels shall be indicated on the utility drawings.
43) All fire and smoke dampers, access panels and doors shall be installed in accordance with the latest edition of NFPA Code 90.a.

b. Mechanical Room:
1) Plan and section of mechanical rooms.

2) Boiler Plant and/or incinerator designs shall comply with all requirements of the Department of Environmental Protection, and all applicable regulations and the building code.
3) Accessibility plans showing that mechanical and electrical equipment can be serviced and maintained. Show elevations detailing the differences in elevations of piping, conduits, wiring, structural and other building elements.
4) Large scale mechanical room plans showing equipment locations, clearances and sections.
5) Detailed equipment room layouts and clearances shown on drawings for all heating and cooling plant equipment, air-handlers, pumps, fan coil units, convectors and other terminal equipment. All ductwork and piping in the mechanical room to be double-lined. Provide elevations as required.
6) In all designs of new and/or replacement boiler and chilled water plant, provide a flow diagram detailing steam or hot water distribution systems, return systems, including all existing equipment and their function, as well as any proposed expansions with all necessary instrumentation and controls.
7) Maintenance accessibility analysis including sections of the HVAC equipment.
8) Provide installation details for all major equipment.
9) Provide schedules for all equipment and devices.
10) Indicate amount of air flow (both supply and return through the duct in CFM.
11) Indicate positive and negative pressure zone.
12) Avoid using sound liners. Should sound liner be used by County authorization, the liner be protected by perforated galvanized sheet.
13) Do not specify flex duct more than 6'. Flex duct shall be insulated with Mylar lining from the factory.
14) The air handlers and the duct system shall not be hanged from the lower chord of the joist.
15) Indicate smoke detector locations per code.

c. Controls drawings shall include the followings:
1) Provide HVAC control diagram
2) Provide sequence of controls
3) Address mechanical room ventilation requirements.

45. Division 23 08 00: Commissioning of HVAC
a. The A/E must use Commissioning Guide to develop the Commissioning Plan for approval by the County.
b. Equipment Maintenance Manuals
1) See CD phases requirements.

46. Division 23 10 00: Facility Fuel System
a. Must be fully documented.

47. Division 23 20 00: HVAC Piping and Pumps
a. Must be fully documented.

48. Division 23 30 00; HVAC Air Distribution
a. Must be fully documented.

49. Division 23 40 00: HVAC Air Cleaning Devices
a. Must be fully documented.

50. Division 23 50 00: Central Heating Equipment
a. Must be fully documented.

51. Division 23 60 00: Central Cooling Equipment
a. Must be fully documented.

52. Division 23 70 00: Central HVAC Equipment
a. Must be fully documented.

53. Division 23 80 00; Decentralized HVAC Equipment
a. Must be fully documented.

54. Division 25: Integrated Automation

a. Must be fully documented.

55. Division 26; Electrical

a. Lighting on separate distribution, roughly sized.
b. Major electrical equipment roughly scheduled indicating size, capacity and total loads.
c. Major electrical equipment roughly scheduled indicating size, capacity and total loads.
d. A complete one-line diagram should be drawn in which a single line represents three phases of power system, and it should be properly drawn, showing correct power distribution path from the normal power source and generators to each downstream load panels— including the ratings and sizing of each piece of electrical equipment, their circuit conductors, conduit size and their protective devices.
e. All service connections and electrical equipment (panels, transformers and switch gear) shall be located on centerline of tiles.
f. All services for special purposes shall be located and indicated.
g. All power consuming equipment and load characteristics.
h. Development of specific electrical power service and distribution systems, lighting, telephone, fire detection and alarm, security and electronic communications systems appropriate for the project, including computer network, cable TV and sound systems.
i. Equipment room layouts and clearances shown on drawings.
j. Electrical distribution riser diagram.
k. Wiring chases shown on drawings.
l. Total electric load calculation.
m. Major electrical equipment (switchgear, distribution panels, emergency generator, transfer switches, UPS system, etc.) dimensioned and drawn to scale into the space allocated.
n. Interior electrical loads estimate for systems furniture, receptacles, lighting, and any special use areas.
o. Analysis shall be made of availability of components, construction sequence and scheduling, economic tradeoffs, safety and maintenance requirements.
p. Completed specifications for each CSI section used.
q. Legend showing all symbols on drawings.
r. Certification by the A/E that the electrical design has been coordinated with other disciplines and County Department of Technology Services and no interferences or dimensional conflicts exist.
s. Electrical drawings shall indicate the following on utility drawings.
    1) Site utilities shall be indicated on utility drawings.
    2) Electrical work, other than site work, shall not be combined on the same sheets with Fire Protection, Plumbing, HVAC, or other drawings except with the prior written approval of the County.
    3) General arrangement: floor plan of each floor. Typical sections through the structure, floor and ceiling heights and elevations, and type of construction, including concrete pads shall be indicated.
    4) Interior lighting system: type of wiring, light fixture schedules, location and mounting heights of all fixtures, receptacle and switch outlets, sizes and types of all lamps and ballast, conduits, all other accessories and riser diagrams shall be indicated on the drawings. Indicate details and method of supporting electrical fixtures and conduits including empty conduits and outlets for telephone and communication equipment. Designer shall include on the drawing statement that all electrical lighting fixtures be supported from the building structure, and shall be independent of ducts, pipes, ceilings and their supporting members.
    5) Power system; locations, types, and method of control for all motors, heaters, appliances, controllers, starters, branch circuits, feeder conductors and conduits. Indicate riser diagrams. Show details and indicated method of supporting electrical conduit.

6) Signal systems; locations and types of all outlets and equipment, service connections, wiring diagrams, all other essential details.
7) Services; location and details of all services, whether overhead or underground, feeder sizes, plans and elevations of switchgear and transformers, metering and service switchboard arrangements, wiring and ground fault diagram and bus ducts. These items must be approved by local utility Company.
8) Generator; location, size, type of fuel, method of connection and protection of all generators, transformers, exciters, motor generators, switch gear, transfer switches and associated equipment, current characteristics and equipment capacities. Indicate equipment connections by means of one line and/on wiring diagrams and schedule all major items of equipment and all instruments.
9) Underground work; the sizes and locations of manholes and types of cables, number, size and location of ducts, locations, sizes and types of cable supports, fireproofing, duct line profile, and one line diagram of connections.
10) Pole line work; location, length, treatment and class of poles, guying, cross -arms, insulators, circuiting, transformers, protective and switching devices, lighting arresters, special structures, diagrams, current characteristics and grounding.
11) Exterior lighting; location, size, and types of transformers, luminaries, lamps and ballast, poles, cables, ducts, conduits and manholes, details of control equipment and connection diagrams.
12) Emergency system details including transfer switch, type of fuel.
13) One line diagram indicating load in KVA, and available short circuit amperes at each transformer, switchboard, distribution panelboard, branch circuit panelboard, and at major pieces of equipment.
14) Riser diagram for all systems.
15) Data outlets & conduits with pull wires.

t. Electrical construction documents shall be coordinated with all other construction documents eliminate conflicts and to locate electrical outlets, fixtures, panels, switchgear, equipment and accessories.
u. Lighting plan should show all switching and controls, fixture schedule should be complete and lighting details should be complete.
v. Power distribution plans
w. Distribution information on all power consuming equipment except lighting and device branch wiring should be complete.
x. All electrical equipment schedules should be complete.
y. System components should be located on plans.
z. Electrical Commissioning Plan
aa. Final specifications for all CSI sections used. bb.
Legend of all symbols shown on drawings
cc. Certification by the A/E that the electrical design has been coordinated with the other disciplines and County Department of Technology and no interferences or dimensional conflicts exist.
dd. Electrical construction documents include the preparation and submission of detailed engineering calculations and drawings for electrical work entailed by the approved architectural design and engineering analysis shall include all electrical requirements of the work including but not limited to power acquisition and emergency generation, power distribution, interior, exterior and parking lot lighting, telephone and communications systems, including sound systems, cable TV, fire detection and alarm, security systems, low voltage systems, direct current applications and emergency and special effects lighting.
ee. Electrical construction documents include, but are not limited to:
1) Reflected ceiling plans showing light fixture locations coordinated with room tasks, multi-level switching arrangements, detailed fixture schedules listing make and model of all lamps, ballasts, diffusers and fixtures.

2) Final size and cost of major components.
3) Equipment room layouts and clearances shown on drawings.
4) Electrical riser diagram.
5) Wiring chases shown on plans.
6) Cross checks with security documents.

ff. Analysis shall be made of availability of components, construction sequence and scheduling, economic trade-offs, safety and maintenance requirements.

gg. Low voltage systems

1) Identify all low voltage systems and their requirements.

56. Division 26 08 00: Commissioning of Electrical Systems

a. Must be fully documented.

57. Division 26 09 26: Lighting Control Devices

a. Must be fully documented.

58. Division 26 20 01: Low Voltage Electrical Distribution

a. Must be fully documented.

59. Division 26 31 00: Photovoltaic Collectors

a. Must be fully documented.

60. Division 26 40 00; Facility Lightening Protection

a. Must be fully documented.

61. Division 26 50 00: Lighting

a. The A/E is to provide lighting design strategy for the building to meet energy conservation goals set by the County.
b. Lighting shall be indicated as to type, location and intensities in foot candles for each space, room, or typical space.
c. Site lighting layout for the entire complex including data sheets for proposed fixtures and lamps and the proposed mounting height for each fixture pole.
d. Lighting, power, telecommunications and office automation devices and receptacles shown in plan.
e. Light fixture schedule with types and quantities proposed along with data sheets.
f. Minimum of three manufactures must be specified for each specialty light fixture.
g. Ceiling plans showing light fixture locations coordinated with room tasks, and multi- level switching arrangements.
h. Documentation that the design meets the ASHRAE 90.1P power budget established for the project.
i. Luminance calculations for the design by the zonal cavity method.
j. Day-lighting analysis as directed by the County Representative.
    1) Statement of foot- candles to be maintained for each type of task surface in the building.
    2) Calculation based on the latest required ASHRE of lighting wattage budget and current established standards (IESNA Standard) of lighting quality and illumination level for the building interior and exterior. Including catalog cut sheets.
    3) Strategy for meeting lighting budget.
    4) Day-lighting design and analysis.
    5) Implementation of lighting control requirements
    6) Development of lighting systems for the project following County technical guidelines for lighting and comments from Schematic Design to include; (a) reflected ceiling plans with light fixture locations coordinated with room tasks, multi-level switching arrangements; and detailed schedule of lighting fixtures, lamps and ballasts; (b) documentation that the design meets the ASHRAE 90.1P power budget established for the project; (c) illuminance calculations for the design by the zonal cavity method for lighting below 20 fc; (d) point illuminance calculations where requested above 20 fc; (e) daylighting analysis as directed by the County Representative.
k. Photometric Analysis: Provide drawing and analysis in graphic and text using light distribution software (photometric) to show point to point light distribution in FC. The

analysis should include the following:

1) Photometric drawings indicating FC and height of point values
2) High lighting below and above standard (or requirement) points
3) Light level at building perimeter (exterior windows)
4) Light level at property lines
5) Strategies for light pollution control
6) Various type of light source
7) Blocking of lighting concern zones (areas that in the program require certain lighting level) both for interior of the building and site
8) Manufacturer light distribution cut sheets for each light fixture clearly correlated with light fixture types on the drawings
9) On large projects provide a rendering of site night lighting plan by using appropriate software.

62. Division 26 51 00; Interior Lighting

a. Must be fully documented.

63. Division 26 56 00: Exterior Lighting

a. Must be fully documented.

64. Division 27: Communications

a. Must be fully documented.

65. Division 27 10 00: Structured Cabling

a. Must be fully documented.

66. Division 27 20 00: Data Communication

1) Computer system must be identified. Entry point for the data line to the building must be shown.
2) Verify all electrical needs for the computers and peripherals.
3) Raceway systems for telephone, Local area network cabling, emergency communications etc. designed to County standards.

67. Division 27 30 00: Voice Communications

1) Telephone system must be identified. Entry point for the telephone line must be shown.
2) Complete computer network and telephone system cable and conduit backbone design including all connections, drops, equipment racks, cable trays, electrical services, grounding systems and proposed equipment locations fully coordinated and in compliance with County Department of Technology Services (DTS).
3) Raceway systems for telephone, Local Area Network cabling, emergency communications etc. designed to County standards.

68. Division 27 40 00: Audio Video Communications

1) Complete audio video drawings, specifications, and schedules.
2) AV system must be coordinated with other building systems.
3) Commissioning Plan must explain AV coordination.

69. Division 28: Electronic Safety and Security

a. Provide floor plans analyzing exit routs and major life safety features.
b. Floor protection equipment room layout and description of wet or dry type systems, hose racks or cabinets and fire department tie-ins.
c. Fire protection drawings shall indicate standpipe location, sprinkler systems, access panels, fire pumps and accessories.
d. Fire Protection work, other than site work, shall not be combined on the same sheets with the plumbing, HVAC, electrical, or other drawings except with the prior approval of the County.
e. Completed specification of the security systems for the project including locking, control, observation, central control, and materials to be used.
f. Security and non-security system logics.
g. Security and non-security hardware and locking control systems.
h. Central control layout and control schemes.

i. Miscellaneous security equipment.
j. Security commissioning plan.

70. Division 31: Earthwork
a. Must be fully documented.
1) Division 31 22 00: Grading
2) Division 31 23 00: Excavating and Fill
3) Division 31 25 00; Erosion and Sediment Controls
4) Division 31 60 00: Special Foundations and Load Bearing Elements

71. Division 32: Exterior Improvement
a. Must be fully documented.
1) Division 32 10 00: Bases, Ballasts, and Paving
2) Division 32 18 00: Athletic and recreational Surfacing
3) Division 32 31 00: Fences and Gates
4) Division 32 32 00; Retaining Walls
5) Division 32 70 00: Wetlands
6) Division 32 80 00: Irrigation
7) Division 32 90 00: Planting

72. Division 33: Utilities
a. Must be fully documented.
1) Division 33 08 00: Commissioning of Utilities
2) Division 33 10 00; Water Utilities
3) Division 33 30 00: Sanitary Sewerage Utilities
4) Division 33 40 00: Storm Drain Utilities
5) Division 33 47 00: Ponds and Reservoirs
6) Division 33 50 00: Fuel Distribution Facilities
7) Division 33 70 00: Electrical Utilities
8) Division 33 73 00: Utility Transformers
9) Division 33 80 00: Communications Utilities

Bidding and Negotiations Phase

QQ. General

1. After receiving written authorization from the County, the A/E shall proceed with the Construction Bid/Award Phase.

2. Prepare all addenda during the bid period.

3. County will conduct bidding, award, and negotiations but the A/E must be available to the County for assistance in performing these tasks.

4. The A/E shall compute, establish and itemize the added cost or deduction to the estimated contract price for all items to be included in the addendum in written form.

5. Addendum pages, including any drawings, shall be numbered consecutively with total attachments indicated on each page, i.e., page 1 of 8, page 2 of 8, -- page 8 of 8.

6. The A/E is to review requests for substitutions and submit recommendation(s) to County for approval.

7. If requested by the County A/E must review and evaluate bids and qualifications of the bidders.

8. The County will schedule and conduct a Pre-bid submission conference with prospective bidders to review the Project requirements. The A/E team must participate in the conference to explain and clarify bidding documents. If needed within three (3) calendar days after the pre bid conference the A/E shall deliver to the County an amendment required as a result of the pre-bid conference.

9. Should first bidding or negotiation produce prices in excess of the approved budget, the A/E shall participate with the County in as many follow up re-bid, renegotiation, and design revisions, at no additional cost to the County until a bid obtained with a price(s) within the approved Budget or acceptable to the County. The County will assist in design revision decisions. All redesigns must be approved by the County. The revised documents shall be submitted to all permitting authorities.

for approval if needed.

10. If the A/E revise the design or conduct re-bidding under its responsibilities set out in the preceding paragraph, its Construction Administration Phase and Post Construction Phase services shall be extended to take design revision/re-bid delays into account at no additional expense to the County.
11. The A/E shall assist the County in the preparation of the Contract(s) between County and Construction Contractor(s) for the County's execution. The A/E will assist the County in coordinating award(s) and Notice(s) to Proceed.
12. The A/E shall assist the County in Bidding and Negotiation Phase activities as defined in this section relative to Furniture Services (free-standing and systems).

Construction Administration Phase

RR. General

1. The Notice to Proceed from the Project Manager for the Construction Administration Phase of the Project will coincide with the notice to proceed to the Construction Contractor and the phase will terminate with the completion of all punch list items by the contractor and final payment to the construction contractor.
2. Construction Administration, unless stipulated otherwise by contract, is the responsibility of the prime consultant. This includes schedule, costs, conformance to drawings change orders, specifications, submittals, compliance with codes, tests, quality (workmanship), commissioning, final review and acceptance and warranty. Correction of shoddy workmanship cannot be deferred until the final punch list is prepared - it must be actively pursued throughout the construction period - starting at the pre-construction conferences. It is particularly important to review portions of the work that may be covered up or otherwise made difficult and costly to correct by subsequent work.
3. All consultants must take full responsibility for monitoring their portion of the contractor's work and assure that the completed project reflects favorably upon all trades and design disciplines.
4. One of the most important early steps in the construction process is review of submittals. Consequently, submittal requirements must be clearly identified in the contract documents.
5. A/E must attend and prepare minutes for all progress meetings including as minimum two. (2) pre-construction meetings.
6. A/E must use standard AIA forms where such forms are not provided by the County.
7. A/E must understand the role of A/E and its responsibilities as outlined in the General Condition of Contract Between the County and the Construction Contractor.
8. The A/E shall be responsible for reviewing, validating, and responding to all Request for Information, drawing discrepancies, and specification disputes submitted by the contractor. The A/E must provide prompt and informed input on all design-related issues to ensure the accuracy, clarity, and constructability of the project. This shall include and consist of the following:
    a. Communicate clearly and provide detailed explanations for all design issues raised by the contractor or County.
    b. Attend biweekly meetings with the County and contractor to discuss design-related questions, provide real-time input, and assist in resolving any outstanding design issues that may impact construction progress.
    c. Maintain familiarity with all aspects of the design and be prepared to speak to design elements as required, ensuring project alignment with the original design intent and functional requirement.
    d. The A/E shall work to mitigate design conflicts and assist in finding resolutions that do not impact project costs or schedule. If the A/E determines that a design-related issue is not the result of contractor error, any associated costs for rectifying the issue will not be the responsibility of the County.
9. The A/E shall consult with the County and participate in all decisions as to the acceptability of subcontractors and other persons and organizations proposed by the Construction Contractor for various portions of the work.
10. The A/E must provide change order/quotation services consisting of:

b. Preparation, reproduction and distribution of drawings and specifications to describe wo rk to be added, deleted and/or modified.
c. Review of proposals from contractor(s) for reasonableness of quantities and costs
d. Review and recommendations relative to changes in time for Substantial Completion.
e. If requested by the County, negotiations with contractor(s) on County's behalf relative to costs of Work proposed to be added, deleted or modified.
f. Assisting the County in the preparation of appropriate construction contract modification documents.
g. Coordination of communications, approvals, modifications and record-keeping relative to Changes in the Work.

11. The A/E shall render to the County, within five (5) calendar days unless otherwise authorized by the County, interpretations of requirements of the Contract Documents This response time is intentionally less than the General Conditions of Construction Contract to allow for review by the

County. The A/E shall make all interpretations consistent with the intent of and reasonably inferable from the Contract Documents. These interpretations shall be subject to approval by the County. The A/E's decision in matters relating to artistic effect shall be consistent with the intent of the Contract Documents and concurred with by the County.

12. Should errors, omissions or conflicts in the drawings, specifications or other Contract Documents by the A/E be discovered, the A/E will prepare and submit to the County, within ten (10) calendar days unless otherwise authorized by the County, such amendments or supplementary documents and provide consultation as may be required, for which the A/E shall make no additional charges to the County.
13. The A/E shall not be responsible for construction means, methods, techniques, sequences or procedures, or safety precautions and programs in connection with the Work and shall not be responsible for the Construction Contractor's failure to carry out the Work in accordance with the Contract Documents.
14. Periodic visits of the A/E shall be not less than bi-weekly to coincide with the construction progress meetings with the Construction Contractor. Each engineering discipline shall make periodic visits not less than once a month during the course of work applicable to its discipline. During critical work phases, each of the disciplines may be required to make additional visits. On the basis of such on-site observations, the A/E and its consultants shall take the appropriate steps to protect the County against defects and deficiencies in the Work of the Construction Contractor. If the A/E observes any work that does not conform to the Contract Documents, the A/E shall immediately make an oral and preliminary written report of all such observations to the County and Construction Contractor. The A/E and its consultants shall not be required to make exhaustive or fulltime on-site observations to check the quality or quantity of the Work but shall make as many observations as may be reasonably required to fulfill their obligations to the County.
15. Field Reports must be done as a minimum on a bi-weekly basis. AIA Field Report form should be used. The A/E shall render final written field reports relating to the periodic visits and observations of the Project as required to the County within three (3) calendar days of the visit and in a format required by the County.
16. The A/E shall be responsible for assisting the Construction Contractor in obtaining governing agency occupancy approval. If any exceptions arise related to the design or specified materials the A/E will provide their services to correct the situation at no additional cost to County.
17. The AE must provide Project Closeout services upon notice from the contractor(s) that the Work, or a designated portion thereof which is acceptable to the County, is sufficiently complete, in accordance with the Contract Documents, to permit occupancy or utilization for the use for which it is intended, and consisting of:
    a. A detailed inspection with County representative(s) for the conformity of the work to the Contract Documents to verify the punch list of the items to be completed or corrected submitted by the contractor(s) is complete.
    b. Determination of the monetary amounts to be withheld until final completion.
    c. Securing consent of sureties, if any, to reduction in or partial release of retainage or the making of final payment.
    d. Issuance of Certificate(s) of Substantial Completion.
    e. Issuance of Certificate(s) of Final Completion.
18. The A/E shall participate in all required construction completion meetings.
19. The A/E shall prepare all the necessary documentation for LEED certification.
20. The A/E must maintain a complete set of submitted and contract documents at the print shop as required in previous phases.
21. The A/E shall assist the County in Construction Administration Phase activities as defined in this section relative to Furniture Services (free-standing and systems).
22. The A/E shall provide complete change order review and evaluation services to ensure that proposed changes are necessary, accurately priced, comply with project requirements, and maintain the projects design intent.
    a. Conduct a thorough review of all relevant documents associated with each change order. Review the original contract documents, including project scope, drawings, and specifications. Examine contractor-submitted change order documentation, including cost breakdowns, labor, materials, and any supporting justifications. Review any previous

project correspondences, including RFIs, submittals, or meeting notes related the change.

b. Assess the necessity and validity of the change order request to determine if it aligns with the project scope or addresses an unforeseen condition. Evaluate the reasons provided for the change (unforeseen site conditions, design clarifications, regulatory requirements). Determine if the requested change is essential for project completion or quality. Confirm that the change order request is not already covered within the original project scope.
c. Ensure all cost associated with the change order are reasonable, accurate, and properly substantiated. Review detailed cost breakdowns, including labor rates, material costs, and equipment expenses. Compare requested costs with industry standards and historical cost date via RS Means. Verify that quantities, material grades, and pricing align with the project specifications and contract allowances. Identify any markups, overhead, and profit charges, ensuring they are consistent with contract terms.
d. Evaluate the impact of the change order on the project's timeline and schedule. Review the contractor's proposed changes to the project schedule. Assess whether the change order will require adjustments to milestones or completion dates. Determine of the change order impacts critical path activities or could lead to project delays.
e. Ensure that the change order request complies with project requirements, codes, and quality standards. Verify that the proposed work meets project design intent, building codes, and industry standards. Ensure that any substituted materials or methods proposed in the change order meet or exceed original quality requirements. Confirm that any alterations align with the overall architectural and engineering design.
f. Summarize findings and provide a clear recommendation for approval, rejection, or modification of the change order. Document all findings, analyses, and justification related to the change order. Prepare a formal report outlining the necessity, cost reasonableness, schedule impact, and compliance of the proposed change. Provide a clear recommendation for each change order, noting any suggested revisions or conditions for approval.
g. Provide a comprehensive report for each change order, including documentation review, cost analysis, schedule impact, compliance assessment, and recommendation. Change order reviews to be completed within 5 business days of receipt.
h. Provide a monthly summary tracking log for all change order submissions, statuses, and final dispositions to be reviewed with the county Project Manager.

SS. Documents Review

1. The County will establish with the A/E procedures to be followed for review and processing of all shop drawings, catalog submissions, Project reports, test reports, maintenance manuals, and other necessary documentation, as well as requests for changes and applications for extensions of time.
2. The A/E must review all RFI, submittals, shop drawings, substitution requests, invoices and contractor's requests and respond in a timely fashion in accordance with the general condition of the contract.
3. The A/E shall review and approve shop drawings, samples, schedules, schedule of values, and other submissions of Construction Contractor(s) as well as the Work performed by the Construction Contractor(s) for conformance with the design concept of the Project and for compliance with the Contract Documents. The review and return of submittals shall be accomplished by the A/E within fourteen (14) calendar days from date of receipt or as identified in the General Condition of Contract, except when otherwise authorized by the County. This response time is intentionally less than the General Conditions of Construction Contract to allow for review by the County.
4. Based on observations at the site and upon the Construction Contractor's applications for payment, the A/E shall determine the amount owed to the Construction Contractor(s), pursuant to the terms of the County/Construction Contractor Agreement and shall within seven (7) calendar days after receipt of Application from Construction Contractor, issue Certificates for Payment to the County in such amounts. The County shall consult with the A/E in the determination of the amount due the Construction Contractor and the A/E shall sign the Certificate of Payment prior to the time it is transmitted to the County for payment. The A/E's signing of a Certificate of Payment shall constitute a representation by the A/E to the County, based upon the A/E's observations at the site and the data comprising the Application for Payment that the Work has progressed to the point indicated, that to the best of the A/E's knowledge, information and belief, the quality of the Work appears to be in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion; the results of any subsequent tests required by the Contract Documents; minor deviations from the Contract Documents correctable prior to completion; and to any specific qualifications stated in the Certificate for Payment), and that the Construction Contractor is entitled to payment in the amount certified. However, if it should later be found that the Construction Contractor has failed to comply with its contract with the County in any way or detail, such failures and subsequent compliance shall be the sole responsibility of said Construction Contractor provided that A/E has complied with the terms and conditions of the contract.
5. By signing a Certificate for Payment to the County, the A/E shall not be deemed to represent that it has made any examination to ascertain how and for what purpose the Construction Contractor has used the monies paid on account of the Construction Contract Sum. If, in accordance with its duty, the A/E advises the County of nonconforming work, the A/E shall confirm the nonconformance in writing to the County within three (3) calendar days of observation.
6. When the Construction Contractor states that the Work or portions of the Work are substantially complete, the A/E and its consultants shall inspect the Work or portions of the Work, prepare and submit to the County with in three (3) calendar days, typed punch lists of the Work of the Construction Contractor(s) which is not in conformance with the Contract Documents. The A/E shall transmit such punch lists to the Construction Contractor(s) and County. The A/E will inspect and prepare a punch list on all portions of the Work.
7. The A/E will not issue revised construction documents without prior approval of the County, i.e. substitutions, drawing changes, and letters of correction.
8. The A/E and its consultant(s) shall conduct up to three (3) comprehensive Substantial Completion inspections per construction contract at the request of the County. If more than three (3) Substantial Completion inspections are required for the project through no fault of the A/E, the additional inspections shall be deemed additional services.

9. The A/E shall review facts and make a recommendation to the County for any claims or disputes arising as a result of this phase.
10. The A/E must review and approve all Operation and Maintenance (O&M) manuals and warranties submitted by the construction contractor(s) and require the construction contractor to provide final and complete O&M manuals to the County prior to substantial completion.
11. The A/E shall assist the County in Construction Administration Phase activities as defined in this section relative to Furniture Services (free-standing and systems).

TT. Commissioning, Quality Control, Testing

1. The A/E shall assist the County in its management of the implementation of the Commissioning Plan and verification of compliance by the Construction Contractor to the Commissioning Plan. This assistance shall include coordination and verification of all maintenance and training manuals, and recommendations on training and scheduling. A commissioning schedule/plan shall be maintained and updated every other week by the construction contractor. The A/E shall maintain records of the commissioning process and document the bi-weekly progress of the Commissioning Plan. The A/E shall provide review and recommendations when required to keep this progress on schedule.
2. The County shall have authority to condemn or reject Work when in the County's or the A/E's opinion the Work does not conform to the Contract Documents. The A/E will verify non-conformance and the County will issue a formal notice to the construction contractor. Whenever in the County's or the A/E's reasonable opinion it is considered necessary or advisable to ensure the proper implementation of the intent of the Contract Documents, the County shall have the authority to require special inspection or testing of any Work in accordance with the provisions of the Contract Documents whether or not such Work is fabricated, installed or completed.
3. The A/E shall provide assistance in the original operation of any equipment or system such as initial start-up, testing, adjusting and balancing.
4.

Post Construction Phase

UU. General

1. The Notice to Proceed for the Post Construction Phase will coincide with the issuance of the substantial completion certificate and the phase shall be complete per the Master Schedule and Critical Contract Completion Period.
2. The A/E and its consultants shall conduct a warranty inspection with the County and using agency of the project nine months after substantial completion to identify items that need correction before contractor’s Two-year warranty period expires. A/E must provide a list of items to be corrected in coordination with the County.
3. The A/E and its consultants shall conduct an inspection with the County and using agency of the project, with the exception of furniture and equipment, ten (10) calendar days prior to warranty expiration and provide to the County a written report specifying any warranty deficiencies which may exist.
4. The A/E shall assist the County with any design issues identified during the warranty phase and verify that all equipment and systems are properly installed and functioning in accordance with the design and specifications.
5. A/E shall conduct inspections(s) upon notice by the contractor(s) that the work is ready for final inspection and acceptance and notify the County and contractor(s) of deficiencies discovered in follow-up inspections, if any. A/E shall receive and review transmittal of warranties, affidavits, receipts, releases and waivers of lien or bond indemnifying the County against liens and secure consent of surety or sureties, if any, to the making of final payment(s).
6. The A/E and/or its consultants shall observe and review test data of the original operation of any equipment or system such as initial start-up testing, adjusting and balancing to verify that all equipment and systems are properly installed and functioning in accordance with the design and specifications.

7. The A/E and its consultants shall conduct up to three (3) comprehensive Final Completion inspections for the project at the request of the County. If more than three (3) Final Completion inspections are required for the project, through no fault of the A/E, the additional inspections shall be deemed additional services.
8. Upon correction of the deficiency reports (punch lists), and acceptance of all other close-out submittals and certificates of the Construction Contractor, the County and the A/E shall approve the Application for Final Payment.
9. The A/E will provide a review of the implementation of the Commissioning Plan and assist the County in obtaining a fully functional project that meets all requirements of the Contract Documents.
10. The A/E shall review facts and make a recommendation to the County for any claims or disputes arising as a result of this phase.
11. The A/E is responsible for integration of the construction contractors provided as built drawings into a final "As Built" set in CADD or BIM format and two (2) hard copies deliverable to County. The A/E shall prepare a set of reproducible record drawings which show significant changes in the Work made during the construction process, based on neatly and clearly marked-up contract drawings, prints, and other data furnished by the Construction Contractor(s) and the applicable Amendments, Clarifications, and Change Orders which occurred during the Project. Two sets of full-size drawings must be hard copies (one mylar and one bond); the other set must be in CADD format.
12. The A/E will assist the County with coordinating the loose furniture installations and delivery. The A/E shall provide up to three (3) comprehensive furniture installation inspections to verify all loose furniture has been delivered and installed correctly without damage as approved by the using agency.

The A/E shall assist the County in Post-Construction Administration Phase activities as defined in this section relative to Furniture Services (free-standing and systems).

Selected CSI Divisions for Reference Only

1. Division 01: General Requirements
   a. Division 01 81 13: Sustainable Design Requirements
   b. Division 01 91 00: Commissioning Requirements
2. Division 02: Existing Conditions
   a. Division 02 21 00: Site Survey
   b. Division 02 22 19: Traffic Assessment
   c. Division 02 24 00: Environmental Assessment
   d. Division 02 30 00: Subsurface Investigation
3. Division 03: Concrete - Structural System
4. Division 04: Masonry- Structural System
5. Division 05: Metals Structural System
6. Division 06 22 00: Wood, Plastics, and composites (Millwork)
7. Division 07: Thermal and Moisture Protection - Envelope
   a. Division 07 10 00: Damp-proofing & Waterproofing
   b. Division 07 20 00: Thermal Protection
   c. Division 07 25 00: Weather barriers
   d. Division 07 71 00: Roof
   e. Division 07 77 00: Exterior Walls
8. Division 08: Openings (Doors & Windows)
   a. Division 08 70 00: Hardware
9. Division 09: Finishes
   a. Division 09 50 00: Ceiling
   b. Division 09 60 00: Flooring
   c. Division 09 70 00: Wall Finishes
   d. Division 09 80 00: Acoustic Treatment
   e. Division 09 90 00: Painting
10. Division 10: Specialties
    a. Division 10 06 10.13 Exterior Signage
    b. Division 10 06 10.16 Interior Signage
    c. Division 10 21 00 Toilet Compartments
    d. Division 10 22 26 Operable Partitions
    e. Division 10 71 13 Exterior Sun Control Devices
    f. Division 10 73 00: Protective Covers (Canopies, etc.)
11. Division 11: Equipment
    a. Division 11 26 00: Kitchen Equipment
    b. Division 11 28 00: Office Equipment (Computer, copier, etc.)
    c. Division 11 52 00: Audio- Visual Equipment
    d. Division 11 65 00: Athletic and Recreational Equipment
    e. Division 11 82 00: Solid Waste Handling Equipment
12. Division 12: Furnishings
    a. Division 12 10 00: Artwork
    b. Division 12 20 00: Window Treatments
    c. Division 12 30 00; Casework
    d. Division 12 50 00: Furniture
    e. Division 12 59 00: Systems Furniture

f. Division 12 93 00: Site Furnishing
g. Division 12 93 13: Bicycle Racks

13. Division 13: Special Construction
    a. Division 13 11 00: Swimming Pools
    b. Division 13 28 00: Athletic and Recreational Special Construction
14. Division 14: Conveying Equipment
15. Division 21; Fire Suppression
16. Division 22: Plumbing
    a. Division 22 11 00; Facility Water Distribution
    b. Division 22 13 00: Facility Sanitary Sewerage
    c. Division 22 40 00: Plumbing Fixtures
17. Division 23: HVAC
    a. Division 23 08 00: Commissioning of HVAC
    b. Division 23 10 00: Facility Fuel System
    c. Division 23 20 00: HVAC Piping and Pumps
    d. Division 23 30 00; HVAC Air Distribution
    e. Division 23 40 00: HVAC Air Cleaning Devices
    f. Division 23 50 00: Central Heating Equipment
    g. Division 23 60 00: Central Cooling Equipment
    h. Division 23 70 00: Central HVAC Equipment
    i. Division 23 80 00; Decentralized HVAC Equipment
18. Division 25: Integrated Automation
19. Division 26; Electrical
    a. Division 26 08 00: Commissioning of Electrical Systems
    b. Division 26 09 26: Lighting Control Devices
    c. Division 26 20 00: Low Voltage Electrical Distribution
    d. Division 26 31 00: Photovoltaic Collectors
    e. Division 26 40 00; Facility Lightening Protection
    f. Division 26 50 00: Lighting
    g. Division 26 51 00; Interior Lighting
    h. Division 26 56 00: Exterior Lighting
20. Division 27: Communications
    a. Division 27 10 00: Structured Cabling
    b. Division 27 20 00: Data Communication
    c. Division 27 30 00: Voice Communications
    d. Division 27 40 00: Audio Video Communications
21. Division 28: Electronic Safety and Security
22. Division 31: Earthwork
    a. Division 31 22 00: Grading
    b. Division 31 23 00: Excavating and Fill
    c. Division 31 25 00; Erosion and Sediment Controls
    d. Division 31 60 00: Special Foundations and Load Bearing Elements
23. Division 32: Exterior Improvement
    a. Division 32 10 00: Bases, Ballasts, and Paving
    b. Division 32 18 00: Athletic and recreational Surfacing
    c. Division 32 31 00: Fences and Gates
    d. Division 32 32 00; Retaining Walls
    e. Division 32 70 00: Wetlands
    f. Division 32 80 00: Irrigation
    g. Division 32 90 00: Planting
24. Division 33: Utilities
    a. Division 33 08 00: Commissioning of Utilities

b. Division 33 10 00; Water Utilities
c. Division 33 30 00: Sanitary Sewerage Utilities
d. Division 33 40 00: Storm Drain Utilities
e. Division 33 47 00: Ponds and Reservoirs
f. Division 33 50 00: Fuel Distribution Facilities
g. Division 33 70 00: Electrical Utilities
h. Division 33 73 00: Utility Transformers
i. Division 33 80 00: Communications Utilities

25. Division 34: Transportation

End of Section

AV/COMMUNICATION STANDARDS FOR COUNTY BUILDINGS

2025

1. Teleconferencing and Video Facilities (Project Based; Standards TBD by CIP)

1.1. All major County facilities will have at least one conference room with interactive video equipment. This will be used for videoconferences, training and long-distance interviews. Besides security on the room, it will also need storage and wiring provision for the equipment. The requirement for this room is subject to change pending CIP budget approval.

1.2. A dedicated cable TV shall be provided in each building required to be wired for cable TV access.

1.3. All conference, consult, huddle, team and or similar rooms are to receive a TV display outlet, wall mounted with back box, and (2) data drops with HDMI AV connection ports. Provide floor box/poke thru with duplex power, data, USB-A and USB-C combo outlet. Provide conduit from AV floor box to HDMI connection at tv wall. The requirement for this room is subject to change pending CIP budget approval.

1.4. All multipurpose rooms are to receive (2) TV display outlets, wall mounted with back box, and (2-4) data drops with HDMI AV connection ports. Provide floor box/poke thru with duplex power, data, USB-A and USB-C combo outlet. Provide conduit from AV floor box to HDMI connection at tv wall. The requirement for this room is subject to change pending CIP budget approval.

2. Communications BY COUNTY OIT DEPARTMENT

2.1. General Considerations.

2.1.1. The Consultant shall include a Communications engineer – in the design of any new building to ensure telecommunications requirements are considered.

2.1.2. The sizes and configurations of communications rooms in a building will depend upon several factors, chiefly: The number of people (workstations) in the building; The number of people (workstations) on each floor; The nature of technology in use in the building, e.g., number of personal computers, number and kind of mid- and mainframe computers, printers, interactive-voice-response systems, applications servers and so forth.

2.1.3. Security. In general access to all telecommunications rooms should be controlled by proximity cards rather than keys. This method allows a log of everyone who entered such rooms and allows quick and simple shutdown of access when a card is lost or an employee (County, contractor, US West or other) leaves service.

2.2. **Communications Rooms (Project Based; Standards TBD by CIP)**

2.2.1. Main Distribution Frames – usually a large room in the basement or on a lower level where fiber optic and copper cables from outside the building enter and can be cross-connected to the internal wiring plant. Considerations:

2.2.2. Space, power and HVAC for main telephone switch.

2.2.3. Vented battery plant in a separate room from the communications room. See also OSHA requirements for such rooms.

2.2.4. Space and power and HVAC for main building County data communications devices (switches, routers).

2.2.5. UPS (uninterruptible power supplies) for most telephone and data com equipment.

2.2.6. Backup generator. Such a generator may be required based upon the importance of the building and the communications requirements of the building tenants. Such a generator could be located in a separate room near the MDF or in another part of the building.

2.2.7. Wall board – punch down block field.

2.2.8. Intermediate Distribution Frames – a room on each floor where fiber optic and copper cables that run vertically inside the building from the MDF can be cross-connected to the floor distribution cabling.

2.2.9. IDF's could be located on every floor, or, if properly designed, perhaps every third floor;

2.2.10. Wall board – punch down block field

2.2.11. Space and power and HVAC for each floors data communications switches

2.3. **Wiring Infrastructure Considerations (including Workstations):**

2.3.1. Wiring from outside the building:

2.3.2. County Communications requirements

2.3.3. Dual entrances to the building (from two separate directions)

2.3.4. Fiber optic cable will need to enter the building as CCTV requires fiber optic cable for real time monitoring.

2.3.5. Copper cable

2.3.6. Telecommunications companies requirements

2.3.7. Provision for multiple companies

2.3.8. Cable television. Connect to CATV vendors probably via fiber optic cable to the MDF, with CATV distributed to certain floors and rooms via coaxial cable.

2.3.9. Vertical wiring from MDF to IDFs on each floor:

2.3.10. Provide 4 empty conduits with pull line, 4" in diameter, from the MDF to each floor IDF

2.3.11. Later fiber optic or copper cable will be pulled inside the conduits

2.3.12. Floor distribution wiring:

2.3.13. Four pair (eight wire) twisted pair cables to each jack

2.3.14. Category 6 wire

2.3.15. Workstation requirements:

2.3.16. Four jacks in a quad-plex wall plate at each workstation

2.3.17. RJ45 jacks

2.3.18. One telephone and one data jack at each workstation, plus considerations for other devices – fax, second phone, second computer, modems, etc.

2.3.19. General requirements

2.3.20. Plan an additional 15% quad-plexes per floor to cover fax machines, printers etc. in common work areas

2.3.21. Plan at least one power-fail phone per 10 workstations, including one power-fail phone in each conference room

2.3.22. Conference rooms

2.3.23. Plan one quad-plex every six linear feet – a minimum of two per room

2.3.24. Plan one telephone instrument per room

2.4. Consolidated Server and Computer Room considerations

2.4.1. Plan one major computer/server room for the building, located adjacent, but separate from the MDF. The separate room is for security and fire suppression.

2.4.2. Additional rooms may be required on other floors depending upon user requirements.

2.4.3. See considerations for UPS, battery and generator backup under item #2 above.

2.5. Radio requirements (Project Based; Standards TBD by CIP)

2.5.1. Some facilities may require an inside antenna (e.g., “leaky coax”) to insure proper 800 MHz public safety radio coverage inside the building.

2.5.2. Some facilities may require BDA’s to amplify or repeat outside radio signals (800 MHz or other) and rebroadcast them inside the building.

2.5.3. The roofs of some facilities may be appropriate for supporting antennas for 800 MHz public safety or other radio broadcast.

END OF THE DOCUMENT

ELECTRICAL STANDARDS FOR COUNTY BUILDINGS

2025

1. General (01 00 00)

1.1. This document provides a general and broad scope of requirements for various building components.

1.2. When approved by the County is requested, County means Office of Central Services

1.3. Design

1.3.1. Building image should reflect a public facility, a place for people, a civic landmark, durability, strength, openness, accessibility, high standards, Green, sustainability, etc.

1.3.2. The space offered or designed must project a professional and aesthetically pleasing appearance including an attractive front and entrance.

1.3.3. The design of the space must be conducive to efficient layout and good utilization

1.4. Code and other compliances

1.4.1. Building and site must be designed in compliance with all applicable codes and regulations including Federal, State, County, Local jurisdictions, regulating agencies, utility companies, etc.

1.4.2. Facilities must be design in strict adherence with the latest “Prince George’s County y Manual for Planning, Design, and Construction of Buildings” (Design manual).

1.4.3. For detail information about components of Building Standards see the Design Manual.

1.4.4. Site and buildings must be designed for LEED certification.(Green)

1.5. Standard Contract Forms

1.5.1. Department of procurement updates these documents regularly. These documents shall be used as boilerplate for all contracts and published with the RFP and other advertisements for consultant services.

2. Electrical Requirements General (26 00 00)

2.1. All electrical systems must be designed for an anticipated 30 to 40 year life span before requiring major repairs or replacements.

2.2. Primary switch cubicles can exceed the height of standard doorways. Allowances should be made for installation, and changes or additions to switchgear sections during the life of the building.

2.3. Weights of transformers could not exceed floor loadings. Make sure that lifting eye and floor loading are accommodated in the design. Seismic supports and restraints are necessary.

2.4. In remodel projects, shutdowns of existing feeders and services may be necessary. These shutdowns may have to occur after normal working hours to prevent interruption of critical operations. The cost of such premium working hours can have a major impact on the construction estimate. Also, temporary power may be necessary to maintain service to critical loads.

2.5. Operation of power tools may have to be scheduled with the owner to reduce the noise impact on day to day operations of the facilities.

2.6. There are several existing control systems on the site from energy management to fire alarm systems. Interfacing new systems into the existing systems needs to be carefully coordinated, both from the installation standpoint of the contractor and the interface with existing systems operated by the County.

2.7. Abandonment of equipment and raceways in place is not acceptable.

2.8. AE must include the following requirement in the specifications:

"Contractor and manufacturer supplying equipment such as UPS must agree and make available directly to the County, all warranties, parts, documentations, training manual and training, special tools and software to fully service the equipment under the same terms. County may choose a Service Agent for this purpose and the contractor and manufacturer must agree to provided above mentioned services and provisions to the County Service Agent."

3. Power Distribution (26 00 01)

3.1. Anticipating future loads or special needs is difficult, however providing flexibility of power distribution within County facilities is imperative. Local distribution must be planned with generous conduit sizing, sleeving, and extra space in principal electrical cabinets or closets. Sleeving and conduit up-sizing is a modest-cost investment toward serving unknown future requirements, which can then be accommodated by the relatively inexpensive installation of increased size wiring.

3.2. Comply with latest IES light levels, with localized or task lighting.

3.3. Fluorescent light fixtures to generally 2'x4' four T-8 lamps. In special areas 2'x2' may be authorized by the County.

3.4. Down lights to have LED high efficiency lamps

3.5. Use of incandescent lamps will be authorized by special permission from the County for specialty areas.

3.6. Lighting control systems shall accommodate use by other than the normal building occupants; e.g., custodial staff, maintenance mechanics, etc., who may not be familiar with unique provisions. Hence, a convenient means for on/off control must be provided for service support staff otherwise frustrated staffs who don't understand normal operation may abort sophisticated control systems.

3.7. Use of energy saving switching such as dual switching, daylight zoning, and occupancy sensors is required.

3.8. Light output shall not vary in response to an input voltage variance of less than 10% of rated voltage.

3.9. Total Harmonic Distortion shall be less than 10%.

3.10. Ballast shall be full Rapid Start.

3.11. Ballast shall have a sound rating of A or better.

3.12. All lighting fixtures shall be of high quality construction, designed for long life and easy maintenance. The use of high efficiency metallized reflectors is encouraged for energy conservation and maintenance.

3.13. Replacement parts should be readily available and easily secured from the manufacturer/supplier.

3.14. In fire rated ceilings, the fixture installation must also comply with the U.L. construction requirements of the ceiling listing.

3.15. In the interest of energy conservation, the lowest reasonable ambient illumination level will be encouraged with the balance of the volt-amp allowance used for task lighting. Multiple switching and split circuiting will be preferred to constant higher light levels. Task lighting should be maximized.

3.16. Provide ground fault protection on exterior lighting circuits.

3.17. Convenient means must be provided for relamping, cleaning, repairing, or replacing lighting fixtures. Special consideration must be given to fixtures mounted in high or other inaccessible or hazardous locations by providing chain or cable-operated disconnecting hangers, winches, catwalks, overhead access, etc.

3.18. Emergency lighting shall also be provided in mechanical and electrical rooms. Position fixtures over equipment control stations and pathways.

3.19. All street and walkway lighting fixtures shall be individually protected by an in-line waterproof fuse holder located in the pole base. The fuse shall be on the line side of the ballast.

3.20. Provide USB-A & USB-C combo outlets to all lobby areas, private offices, workstations, receptions and pantries.

4. Emergency Power (26 00 02)

4.1. Emergency power generating equipment should be designed during the schematic design by the County. Such system should be located in or around the facility with noise and access considerations.

5. Electrical Sub Metering System (26 00 03)

5.1. The county desire is to segregate the electrical power usage, particularly for HVAC,Lighting, and general Power systems on all new county facilities.

5.2. The sub metering system will allow the county a better knowledge of how energy is used within a facility; it allows management to identify a collection of prospects to improve efficiency, minimize waste, and reduce energy consumption, it reveals existing or imminent problems that can negatively affect a facility's operation; it provides accurate evaluation of spare electrical system capacity, determines each system cost portion and allows facility managers to more effectively target and address equipment that is operating below a predetermined energy efficiency threshold. The system must be capable of inter link with county energy management system.

5.3. At a minimum, power monitoring and metering equipment must record the minimum and maximum of each power usage, keep an event log, and trend voltage, current, kW, kWh, kVA, kVAR, power factor, and current total harmonic distortion and report it to the county energy management system (EMS) located at the seven locks facility.

6. Electrical Short Circuit Coordination and Voltage Drop Study (26 00 04)

6.1. The Short Circuit Coordination and Voltage Drop Study are critical part for the safe, efficient, & economical operation of the electrical distribution system in county facilities. An engineering analysis & coordination study must be performed for all new county facilities. The analysis must include a short-circuit analysis with protective device evaluation, a protective device coordination study, a motor starting study (for larger motors project specific), and voltage drop study analysis. The engineering analysis & coordination study must be coordinated as follows:

6.2. Provide short-circuit and protective device coordination study for the county facilities electrical distribution design system. The intent of these studies are to verify that the specified and supplied equipment are properly rated, correctly applied, and within industry and manufacturer's tolerances. The study must include all portions of the electrical distribution system from the normal and alternate sources of power throughout the distribution system down to the electrical panel or disconnect device. The short circuit study must be coordinated for normal, standbys, and emergency power conditions. The study must be in accordance with applicable ANSI and IEEE Standards & must be calculated by means of the SKM Power Tools or equal. Documentation study submittals must include a summarized final report including the following.

1. Executive summary including introduction and scope of work.
2. Short-circuit methodology analysis results and recommendations
3. Short-circuit device evaluation table
4. Protective device coordination methodology analysis results & recommendations
5. Protective device settings table
6. Time-current coordination graphs and recommendations.

6.2.1. The study must include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.

6.2.2. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.

6.2.3. One-line riser diagram computer generated clearly identifying individual equipment buses, bus numbers, equipment and breaker rating in kw and Kva, the ohmic impedance, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location, device numbers used in the time-current coordination analysis, voltage drop at each bus and other necessary information's pertinent to the computer analysis.

6.2.4. Interactive alarms for warnings and limit violations.

6.2.5. Detailed customizable output reports

6.3. Provide voltage drop calculation study. The voltage drop study must be performed to determine the steady-state loading profile of the each county facility electrical system. The load-flow study must calculate the voltage drop on each feeder, the voltage at each bus, and the power flow in all branch and feeder circuits. Losses in each branch and total system power losses are also calculated. The recommended sizing both feeders and branch circuits to prevent a voltage drop exceed 3 percent at the farthest outlet, where the maximum total voltage drop of the feeders and branch circuits does not exceed 5 percent.

7. Electrical Rooms and Closets (26 20 00)

7.1. Provide separate rooms or closets for communications equipment.

7.2. Adequate space for electrical equipment shall be provided in the basement utility connection to provide for proper management of all central electrical utilities and their distribution within the building. Distribution within the building shall be via readily accessible electric rooms or closets. Electric rooms or closets must be independent from all other types of closets, e.g., communications, telephone, custodial, etc. Adequate ventilation for heat producing and/or heat

sensitive electrical equipment must be provided. Piping is absolutely not allowed in transformer vaults and main switchgear areas. The County must not be exposed to the risks that can result from lack of proper design attention to this requirement.

7.3. Separate rooms shall be designated to accommodate the immediate and / or future installation of on-site co-generation of power (i.e., micro-turbine engines or fuel cells).

7.4. Provide concrete bases and housekeeping pads for all transformers and equipment, seismically designed with structural connections to floor slab, and channel or angle iron frames for welded equipment fastening.

7.5. Design for future removal or replacement of transformers and provide ventilation for removal of heat generated by the transformers.

7.6. Install all medium voltage services for buildings in rooms or spaces with concrete or solid masonry walls and ceilings.

7.7. In general, allocate floor space for future switchgear.

7.8. The room design shall take into consideration the possibility of flooding when below grade.

7.9. Adequate doors, hatchways, etc., to permit ready installation or removal of major equipment.

7.10. Provide ventilation completely separate from the building ventilating systems.

7.11. Mechanical piping and ductwork must not be installed in electrical equipment and transformer rooms except where required for operation of the electrical equipment.

7.12. Piping and ductwork must never be installed directly over any transformer or switchgear. Sprinklers are the only exception, if installed to protect electrical equipment.

7.13. Adequate lighting, ventilation, and sound control must be provided, including emergency lighting and receptacles, if emergency system is available.

7.14. In shops or similar areas, branch panels may be mounted on or in walls.

7.15. Special attention must be given to the design of the floor structure to permit future openings in the slab without weakening the structure. Provide capped sleeves, knockouts and floor space for future conduit.

CIP Electrical Plan Submission Requirements:

The requirements listed below are in addition to the building standards and CIP design manual.

1. Address of project on plans matches application
2. Drawings are legible. (Note: Handwritten text on drawings is not accepted.
3. Building Code and all other associated codes for the project with the correct year are shown on the drawing set, use group, and number of stories
4. Name, Address and Phone information is on the cover sheet or individual plan sheets of designer(s).
5. Drawings are sized to 24” x 36” (minimum). Minimum Plan Scale is 1/8 inch = 1 foot with a text height of 1/8”. Details are 1/4 inch = 1 foot.
6. Graphic scale is provided on all plans. Column Grid IDs are included as appropriate
7. Plans are labeled. (Ex: For Bid Only, Permit Only, or 80% Progress, etc.)
8. All permit set drawings have a cover page and a drawing index. Index matches sheet number.
9. Key Plan is included on each applicable drawing to show the location(s) of work.
10. True North Arrow is included on all floor and site plans. Plan north arrow is optional.
11. Building and Trades plans are orientated with the same plan north.
12. All fire-rated walls and partitions are clearly delineated on all plans, including Architectural, MEP, Fire & IT plans. Appropriate legends and symbols are included.
13. Scope of work is provided. Work description is specific and matches documents submitted.
14. Symbols and abbreviations list is included.
15. New, existing and demo work is clearly distinguished
16. Required original seal and signature by a Maryland Professional Engineer, including professional statement certification with Expiration date of license per state of Maryland, COMAR 09.23.03.10 is provided.
17. Symbols, abbreviations list, electrical scope of work, and all applicable codes are provided. Refer to DPIE’s website for applicable Building Codes and Bulletins.
18. Power riser diagram including wiring method type, feeder sizes, conduit size, cable size and the over-current protection device, size and rating is provided
19. Electrical energy calculation certification per International Energy Conservation Code (IECC) is provided; the software may be downloaded at www.energycodes.gov
20. Fire alarm control panel (FACP) location is shown

21. A wall-mounted, battery pack operated emergency illumination is provided for all working spaces including service equipment, switchboards, panel boards, load centers and motor control centers installed indoors in all commercial occupancies per Prince George's County Code, Subtitle 9, Section 9-104.01.
22. Lighting Fixture schedule is provided
23. Reflective ceiling plans for each floor indicating fixture location, type and lighting level required (in foot-candles) including track lighting, window lighting and homeruns are provided.
24. Power Layout: Floor plans showing location of power receptacles, switches, audio/visual, and telephone/data outlets including homeruns are provided.
25. Panel schedules, panel locations: Layouts of electrical rooms at a scale not less than twice that of the floor plans are provided. All required clearances are shown. Required door swings, working space clearance(s), including verification of above ceiling mechanical units power devices/equipment clearances are in accordance with Article 110.26, National Electrical Code (NEC) and are provided. Control diagrams/details are included
26. Demand load calculations, including new additions and new additions added to existing loads, are provided. For the existing electrical service(s) with load modifications, load calculations required per NEC article 220.87 are provided.
27. Fire pumps, if applicable: The means of emergency sources, service size, feeder size and fullload running current of the locked-rotor current, and the over-current protection device sized in accordance with National Fire Protection Association (NFPA) 20 and Article 695 of the NEC are provided. (Refer to Prince Georges County Code Subtitle 9 for the additional requirements for the power.)
28. The location of the emergency power source and distribution system for lighting and power are provided. Also, the location of transfer switch(es) are verified.
29. The system grounding details for the main incoming service switch including the size of grounding electrode conductor(s) and size of bonding jumper(s) are provided.
30. The emergency system and transfer equipment are separated by a wall or wall(s) with a minimum fire rating of two (2) hours per Prince George's County Code, Subtitle 9, Section 9-109.01.
31. Power distribution plans indicating incoming service, generators, docking station and panelboards, etc., and outlines of mechanical equipment (for coordination) are provided.
32. Exit signs and means of egress lighting, interior and exterior (building, ground and pole mounted) are provided.
33. The physical location of lighting controls such as sensors, switches, time clock, etc. are indicated.
34. The physical location of service equipment (C/T cabinet, meter, service disconnect) are indicated on the power plan.
35. Doors to electrical rooms are equipped with permanent signage reading "NO STORAGE" in letters not less than the room identification; OR the working space as defined by NEC is marked by a 2" wide yellow line and stenciled "NO STORAGE — ELECTRICAL WORKING SPACE" in 2"-high, yellow letters in mechanical rooms, electrical rooms, and service areas.

36. Overall electrical load calculations are provided in KVA.
37. Layouts of elevator machine rooms at a scale not less than twice that of the floor plans are provided. All equipment and required clearances for coordination are shown.
38. Interface points for communications, fire alarm, and Emergency Communication Systems are indicated.
39. Details to include duct bank, under/through footing penetration, housekeeping/equipment pads, lighting switching, grounding details for service entrance and individual transformers are provided.
40. Grounding riser diagram for generators, transfer switches, main-tie-main switchboards, and separately derived systems are provided.
41. All “lay-in” luminaires will require independent suspension to the building structure per Prince George’s County Code Subtitle 9, Section 9-108.02. Provide details

END OF THE DOCUMENT

EXTERIOR BUILDING STANDARDS FOR COUNTY BUILDINGS

2025

1. General (01 00 00)

1.1. This document provides a general and broad scope of requirements for various building components.

1.2. When approved by the County is requested, County means Office of Central Services

1.3. Design

1.3.1. Building image should reflect a public facility, a place for people, a civic landmark, durability, strength, openness, accessibility, high standards, Green, sustainability, etc.

1.3.2. The space offered or designed must project a professional and aesthetically pleasing appearance including an attractive front and entrance.

1.3.3. The design of the space must be conducive to efficient layout and good utilization

1.4. Code and other compliances

1.4.1. Building and site must be designed in compliance with all applicable codes and regulations including Federal, State, County, Local jurisdictions, regulating agencies, utility companies, etc.

1.4.2. Facilities must be design in strict adherence with the latest “Prince George’s County y Manual for Planning, Design, and Construction of Buildings” (Design manual).

1.4.3. For detail information about components of Building Standards see the Design Manual.

1.4.4. Site and buildings must be designed for LEED certification.(Green)

1.5. Standard Contract Forms

1.5.1. Department of procurement updates these documents regularly. These documents shall be used as boilerplate for all contracts and published with the RFP and other advertisements for consultant services.

2. Accessibility Provisions (01 00 01)

2.1. It is County policy to provide a barrier free environment that will benefit all people: the disabled, infants, seniors, and the temporarily injured, etc. Such an environment should not be perceived as unusual or burdensome, but rather simply another aspect of our cultural fabric needing positive integration. The design teams shall design County projects so that all, including the disabled, can experience community activity.

2.2. Full compliance with ADA is required.

3. Concrete (03 00 00)

3.1. General

3.1.1. All projects that include concrete shall conform to the requirements of the latest edition of American Concrete Institute ACI 301 "Specifications for Structural Concrete for Buildings". These specifications shall be used essentially in their entirety by referral in the project Specifications.

3.1.2. The Designer shall review the mandatory and supplemental requirements listed in ACI 301. Items not listed in these Specifications will be assumed to be inapplicable to the project or shall be subject to the option of the General Contractor.

3.1.3. As a requirement of the Specifications, two (2) copies of the latest revision of ACI 301 shall be furnished by the General Contractor for use in the field by the General Contractor and the Construction Representative.

3.1.4. Floors, walls and and the roof above shall have reinforcement steel galvanized as in subparagraph f, below.

3.1.5. No insulating concrete fill shall be used on roof decks.

3.1.6. All exposed embedded items in exterior concrete or parking garage floors or ramps shallbe galvanized if fabricated from ferrous metal as in subparagraph f), above.

3.1.7. The specifications shall include a provision requiring that the General Contractor shall submit his proposed methods for curing of concrete to the Designer for approval prior to placement of any concrete.

3.1.8. The Specifications shall direct the General Contractor to maintain an accurate daily recordof the locations in which concrete is placed and shall furnish a certified copy of this record to the Designer.

3.1.9. The Contract Specifications shall also include the Specification Standard paragraph entitled "Additional Concrete due to Unanticipated Soil conditions".

3.1.10. All underground chambers for exterior electrical work shall be constructed of cast-in-place concrete or one-piece precast concrete chambers.

4. Metals (05 00 00)

7.1.1. All miscellaneous and ornamental iron to be exposed to the weather or high humidityareas and fabricated of corrosive iron or steel shall be hot-dip galvanized after fabrication whenever possible in accordance with ASTM A386 or A123 as applicable. All hot-dip galvanized steel shall be inspected for compliance with ASTM requirements and shall be stamped to indicate the ASTM number and the ounces of zinc per square of surface.

7.1.2. Galvanized items to receive additional finishes shall be additionally treated by applying a passivating process equal to Bonderizing, Granodizing or Duncanizing.

7.1.3. All iron and steel, not to be galvanized, shall require a shop coat of metal primer prior to shipping.

5. Wood and Plastics (06 00 00)

8.1.1. All lumber used for blocking, nailing cleats and other wood set in exterior walls or roofs or in contact with damp concrete, shall be impregnated, under pressure with a wood preservative. All treated wood shall be dried before installation and all field cuts shall be brush treated with the preservative materials.

6. Envelope (07 00 00)

6.1. Exterior walls

6.1.1. Exterior walls to be brick, cast stone, concrete masonry units (high quality and decorative

types), or other long-lasting high-quality materials. Materials and finishes must be suitable for the function of the building.

6.1.2. Exterior walls must be calculated such that the dew point is on the outside surface of the vapor barrier. Air and vapor barrier must be provided. Cavity between the inside sandwich and outside must be 2" and weep holes must be provided.

6.1.3. Envelope must be air tight. All openings, windows, doors, joints, etc. must be sealed. Wrappings must fold into the rough opening to cover the entire thickness of the wall before installation of doors or windows and opening.

6.2. Glazing

6.2.1. Glazing units and windows must be High-Performance, U factor smaller than 0.39 Btu/hr-ft2-deg F, Shading Coefficient (SC) smaller than 0.55, double pane, low E (0.34 or better), with tinted and reflective glass with frames that are equipped with thermal breaks all around. Architectural shading devices for control of sun light are highly recommended.

6.2.2. Windows must be extended as minimum from 2'-6" above finished floor to 7'-6" (5' high). Maximum view to outside must be provided.

6.2.3. All windows must be weather-tight. Opening windows must be equipped with locks. Off street, ground level windows and those accessible from fire escapes, adjacent roofs, and other structures that can be opened must be fitted with a sturdy locking device.

6.2.4. Provide light control reflective blinds for all windows. (Green)

6.3. Roof

6.3.1. Roofs must be design to comply with NRCA Roofing and Waterproofing Manual latest edition.

6.3.2. Roofing color must be light color to comply with LEED certification requirements.

6.3.3. <u>The county prefers 60 MIL TPO roofing for new and renovation(replacement) projects</u>

7. Doors and windows (08 00 00)

7.1. Exterior doors must be heavy duty full flush, hollow steel construction, solid core wood, or insulated tempered glass. Wood doors must be at least 1.75 inches thick. Exterior doors must be weather-tight, equipped with automatic door closers and open outward. Hinges, pivots, and pins shall be installed in a manner which prevents removal when the door is closed and locked. All Exterior doors to be equipped with panic hardware with an electric strike.

7.2. Interior doors must have a minimum opening of 36 by 80 inches. Hollow wood doors are not acceptable. They must be flush, solid core natural wood, veneer faced or equivalent finish as

8. Site (32 00 00)

8.1. Site disturbance

8.1.1. Building location must be coordinated with the topography so that minimum area of the site is disturbed (minimum cut and fill).

8.1.2. In design of site, natural topography of the land must be respected to the maximum level possible.

8.1.3. Valuable natural resources must be protected.

8.2. Building location

8.2.1. Orientation of the building must be in relation to the sun movement and energycalculations.

8.3. Accessibility

8.3.1. All site functions must be accessible.

8.3.2. Site circulations must be efficient.

8.4. Vehicular Access

8.4.1. A comprehensive analysis of the vehicular circulation and its interaction with pedestrian movement must be provided.

8.4.2. In order to service any facility it is imperative that service vehicles have direct access to the facility. Early in the design process, the amount of service vehicle traffic to be generated by the facility must be identified and accounted for in the plan. A dedicated vehicular access for delivery and service vehicles is mandatory and should be thoughtfully integrated into the overall design philosophy for the building and the site. It is not unusual for service, delivery or construction vehicles to access buildings in ways different than planned, therefore pedestrian pathways, plazas, etc., shall be designed for vehicular loads just the same as all streets.

8.5. Serviceability

8.5.1. Every building built in the County is intended to serve its purpose over a long period of years. The initial design and construction is only a brief moment in time and cost for the facility. The true value and quality of a building is measured over the years by its ability to adjust to the needs of the end-users and the cost of servicing the components and systems within the building. A building cannot function if it cannot be serviced. Although it is important to get the "front door" right, it is the "back door" that determines how well the building will work. When building services can be provided to meet all requirements and be virtually transparent to the end users, then the building is most likely a success.

8.6. Safety and security

8.6.1. Site must be pedestrian friendly and safe.

8.6.2. Provisions of Crime Prevention Through Design must be considered.

8.6.3. Separation of vehicular and pedestrian access must be maintained and their relationship must be analyzed for maximum safety.

9. Side walk (32 00 01)

9.1. Sidewalks to be 5 feet wide minimum. Finishes shall be as bright as possible.
9.2. Use of pervious materials for on site sidewalks is promoted.

10. Natural Gas (33 00 02)

10.1. Natural gas if available and shall be utilized where appropriate in mechanical spaces.For remodel projects, verify adequacy of service.

10.2. Connections to existing and activation of all new lines will be under the supervision of the utility provider company.

10.3. All welds must be inspected.

11. Water Service (33 10 00)

11.1. Water service to the facility shall be provided from the adjacent central water distribution mains in accordance with the utilities drawing provided for the project. Separate services shall be provided for fire protection where utilized. For remodel projects, verify adequacy of service.

11.2. Gate valves eight (8) inch size and larger shall be fitted with an auxiliary bypass line andvalve; four (4) inch size.

11.3. All water mains will be installed per WSSC requirements, except that connections to existing water mains owned and maintained by the jurisdictions outside of the WSSCregion.

11.4. At the entry to buildings and at other locations where a water main crosses backfill, provide a concrete grade beam to support the pipe. Support off the building and/or firm soil.

11.5. Provide flexibility in piping on unstable earth and provide a flex joint at building entry.

11.6. Test pressure shall not be less than 50 psi above static, but no less than 200 psi or morethan 200% of the working pressure for the class and size of pipe tested.

11.7. The line shall be filled between valves with all air expelled at high points. Test pressure shall then be applied and maintained, for at least 2 hours. Test pressure must be maintained without pumping for 15 minutes with a pressure drop of less than 15 psi.

11.8. When incoming water pressure exceeds eighty (80) psig, provide a pressure reducing station with two PRV's (each sized at 2/3 of total flow) in parallel, each valved to operate independently. A minimum pressure of twenty five (25) psig should be provided at the highest point of the building. The assembly shall include appropriate valves, strainers, gauges, drains, etc. and include a bypass. All this should be in accordance with WSSC requirements and code.

11.9. Each building service shall include a water meter. It is also recommended to submeter any large single uses of water within a building or facility.

11.10. Water piping shall not be installed below slabs on grade except for trap priming lines.

11.11. The building water header shall be constructed type L copper pipe.

12. Sanitary Sewer and Storm Drainage (33 40 00)

12.1. Sanitary sewer and storm drainage systems shall be separated. Corrosive waste may require a dilution/neutralizing tank. Hazardous wastes are disposed of by a collection service. Roof drains, footing drains, and area drains shall be connected to the storm drainage system. All active and/or inactive sanitary or storm piping within the footprint of the facility shall be removed and relocated as appropriate. All systems shall be designed for gravity conveyance. Pumping of sewage or storm drainage is not permitted without specific approval of the County. For remodel projects, verify adequacy of service.

12.1.1. All lateral and trunk sanitary sewers shall be sized to flow full under maximum anticipated flow while maintaining minimum velocities under average flow conditions. In general, design flow velocities shall be kept within the range of 3-8 feet per second.

12.1.2. No pipe smaller than 6 inch size shall be used.

12.2. The minimum size of side sewers shall be six (6) inches.

12.3. All waste drains shall be gravity systems. Sump pumps and sewage pumps shall not be used without specific approval.

12.4. Waste piping and drainage systems under slabs on grade shall be extra heavy cast iron soil pipe.

12.5. Roof drains shall be cast iron or brass, with cast iron or brass high dome strainers. The first section of pipe below the drain must be cast iron or brass.

12.6. Wastes and clean water drains shall be collected independently in each building and carried separately to the city sanitary sewer and storm drains respectively. If no storm drain exists within 200 feet of the building, connect clean water drains to sanitary sewers and provide for future connection to storm drains.

12.7. All footings shall have footing drains connected to the storm drain system. Footing drains shall not be connected to an interior sump pump

12.8. All area drains, yard drains, window well drains, and the like shall be connected to thestorm drain system.

12.9. Invert elevations of sanitary sewer lines leaving the buildings shall be of sufficient depthto permit future connection of a waste line from any point in the basement area.

12.10. Drains from transformer vaults having oil-filled transformers and shop areas where oil is present shall connect to sanitary sewers through a County approved oil interceptor.

12.11. Crosses shall not be used in waste piping.

12.12. Waste and drainage piping crossing excavated areas shall be supported on precast concrete beams supported by the building structure and undisturbed earth.

12.13. Clean outs shall be the full size of the piping served.

12.14. Pipe bedding under floor slabs shall be Type IV.

13. Mechanical System (23 00 00)

13.1.1. Mechanical ventilation shall be provided for all spaces. Even though the exterior rooms may be provided with code-complying ventilation capacity in the fenestration (window/door design), a minimum six air change per hour ventilation rate shall be mechanically maintained to alleviate the problems of the "air-tight" building and preclude opening windows during the heating season for ventilation purposes, which becomes an uncontrolled heat loss and causes undesirable drafts. However, mixed systems utilizing temperature-controlled exhaust fans with operable windows for ventilation during hot days is recommended where feasible.

13.1.2. Supply air intakes and exhaust fan discharges are critical issues for the building being planned and for the buildings surrounding the site selected for the new building. Outdoor air intakes must be carefully located to avoid ingesting contaminated air from exhaust air discharges from this or other buildings, vehicles in roadways or at loading docks, etc. Similarly, exhaust air discharges from this building must be carefully located to avoid recirculation into the building and to avoid contaminating the air intakes of adjoining buildings. Experience indicates that mistakes are virtually irreversible or, at best, are exceedingly costly to correct. Air intake and discharge requirements must be resolved before almost all other design considerations due to the influence such decisions will have on all of the rest of the design.

14. Emergency Power (26 00 02)

14.1. Emergency power generating equipment should be designed during the schematic design by the County. Such system should be located in or around the facility with noise and access considerations.

15. Electrical Sub Metering System (26 00 03)

15.1. The county desire is to segregate the electrical power usage, particularly for HVAC,Lighting, and general Power systems on all new county facilities.

15.2. The sub metering system will allow the county a better knowledge of how energy is used within a facility; it allows management to identify a collection of prospects to improve efficiency, minimize waste, and reduce energy consumption, it reveals existing or imminent problems that can negatively affect a facility's operation; it provides accurate evaluation of spare electrical system capacity, determines each system cost portion and allows facility managers to more effectively target and address equipment that is operating below a predetermined energy efficiency threshold. The system must be capable of inter link with county energy management system.

15.3. At a minimum, power monitoring and metering equipment must record the minimum and maximum of each power usage, keep an event log, and trend voltage, current, kW, kWh, kVA, kVAR, power factor, and current total harmonic distortion and report it to the county energy management system (EMS) located at the seven locks facility.

16. Parking (34 00 01)

16.1. General

16.1.1. Provide number of parking spaces designated for hybrid cars

16.1.2. If possible investigate use of pervious parking surface

16.1.3. Provide number of bike racks.

16.1.4. Provide number of lockers for bikers.

16.2. Open Parking area

16.2.1. Parking must be asphalt with 6 inches of gravel base, 4" of base course and 2" of top course.

16.2.2. Parking spaces must be striped with white color

16.2.3. Parking lighting must be with fixtures that have cut off glare angle of not more than 60 degree from the center line of the light fixture. (Green)

16.2.4. Lamps to be High Pressure Sodium (HPS) with maximum of 3 foot candle at the bottom of the fixture and not less than 1 foot candle at the border with other fixtures. (Green)

16.3. Parking garage

16.3.1. Parking must be concrete coated with special epoxy non skid texture, color to be medium warm gray.

16.3.2. Parking spaces must be striped with white color

16.3.3. Parking lighting that are at the edge of the garage and visible from outside, must be with fixtures that have cut off glare angle of not more than 45 degree from the center line of the light fixture.

16.3.4. Lamps to be Metal Halide with maximum of 10 foot candle at the bottom of the fixture and 5 foot candle at the border with other fixtures.

16.3.5. Top level if open must be off white color concrete.

16.4. Bike Rack

16.4.1. Bike racks must be provided for all facilities and should be coordinated with Prince George's County Arts and Humanities Council. 301-772-8943

16.4.2. Bikes need two point of contact to hold them stable and to enable locking of frame and wheel.

16.4.3. Use U form bike racks.

16.4.4. Bikes are expensive. Racks need to be located in place of high visibility to provide security by making them well lighted and located near the entrances.

16.4.5. Preferably bike racks should be placed under covered areas for weather protection.

16.4.6. Bike lockers provide both security and protection from weather.

16.4.7. A general role of thumb is 1 rack per 25 vehicle parking spaces of a facility.

16.4.8. Spacing requirements are about 7'L x 4' W per rack and a stable concrete or asphalt surface is needed. A specialized security bolt should be utilized.

16.4.9. Pedestrian and ADA thoroughfare should be considered in rack placement.

17. Service areas (34 00 00)

17.1. Loading dock

17.1.1. Where necessary to provide for the safe and efficient transfer of large quantities or sizes of material in and out of County facilities, a loading dock should be provided. It is the

consultant's responsibility to identify the extent of requirements during the schematic and design development phases of each project and then incorporate all associated provisions into the contract documents. In general, the program will dictate whether a separate service entrance with loading dock is required. If required, it is for custodial service deliveries; mail delivery and pick-up; waste collection and removal; recycling; facility maintenance; delivery services (U.P.S., Federal Express, etc.); general contractors and subcontractors; movers; etc. In some cases, there is a possibility of mail and package screening. Considerable care must be exercised in regard to minimizing conflicts with provisions for disabled persons.

17.1.2. Loading dock must be provided for all buildings unless otherwise noted. Loading platform must be 4’ high with levelers for 55’ foot trucks or as identified by the user.

17.2. Vehicle & Loading Access Doors

17.2.1. Building interior vehicle access, some loading areas, “Sally Ports”, and other building interior areas are generally accessed through large door systems. In all cases possible, such doors are to be “Overhead Panel”, or “Horizontal Sliding”, rather than “Overhead Coiling” door systems. In new buildings, early design consideration is to be paid to providing sufficient overhead clearance at sufficient horizontal clearance from the door and inside the space, to allow for “Overhead Panel” doors. The doors are to have oversize, or the heaviest possible operating hardware, to provide for both operational reliability and durability.

17.3. Service Areas

17.3.1. Service areas and loading docks must be carefully located in consideration of other design features of the building and adjoining existing buildings. This area must accommodate various functions such as waste management, recycling, chemical waste, pickup and delivery. All-weather, access must be provided. Verify sizes of waste and recycling containers with the Project Manager.

17.4. Waste Handling

17.4.1. Effective waste management must be carefully considered at the very beginning stages of design. Some facilities may have waste that is considered to be hazardous or waste that requires special handling by designated regulatory agencies. Waste handling provisions must be carefully developed and in such a way as to not negatively affect or diminish the aesthetics or functional provisions required for site standard presentation.

17.4.2. Effective recycle management provisions consisting of work space for waste management staff and retention space for segregated waste awaiting routine pickup must be included in the waste handling area of all facilities.

17.5. Trash area

17.5.1. An area must be provided to accommodate trash bins one for each of general, glass, plastics, paper, and metal. (Green)

17.6. Custodial Provisions

17.6.1. Designers must make adequate provisions for the receipt, storage and redistribution of custodial supplies for the building and for the efficient operational servicing of the building. Custodial closets for local storage and control of supplies and equipment, in

close proximity to the freight elevator, should be included on every floor.

Site landscaping work

1. Purpose

The purpose of these guidelines is to call attention to various Specification items that will require proper paraphrasing, when applicable. Specification standards have been developed for certain portions of the work and shall be incorporated into the contract specifications, verbatim, when applicable, except indexing. The guidelines and standards of all Specification Divisions, except Division 1, shall utilize the CSI Three Part Specification System.

a) The methods and procedure for compaction operations shall be set forth in the Specifications in specific detail.

b) The words "satisfactory disposal" of all materials to be removed for the proper execution of the work shall be defined in the Specifications.

c) Where a site development contract precedes a building project on the same site, the engineering and surveying work shall be included in the site contract with the following additional requirements:

   (1) The General Contractor shall be responsible for, and pay for costs incurred and shall obtain a final topographic and location survey immediately after completion of the Site Work.

   (2) The work shall be performed in accordance with the Professional Practice of Surveying and Mapping within Civil Engineering as published by the American Congress on Surveying and Mapping, by a Land Surveyor or a Civil Engineer registered in the State of Maryland.

   (3) The Designer shall include a complete description of the survey work to be accomplished by the General Contractor.

   (4) Record Drawings for the Site Work shall be maintained during construction by a Registered Surveyor or Engineer in the employ of the General Contractor. Drawings shall be maintained and finalized as required in DIVISION 1, General Requirements.

   (5) At the completion of the contract, the Registered Surveyor or Engineer shall submit the General Contractor for processing to the County, a complete reproducible set of Record Drawings showing all conditions, together with his registration seal and signature.

d) Landscape: This part is divided into two sections:

1. Soft Landscape Items which includes plant material, ground cover, shrubs, and trees.

2. Hard Landscape Items which includes parking lots, curbs, gutters, site furnishings, etc.

SECTION 1. SOFT LANDSCAPE ITEMS

General: In the selection of plant material, consideration should be given to the very cold winters experienced in recent years. Many plant materials, particularly broadleaf evergreens, died during the winter months. We are recognizing a significant climate shift, so that plant materials indigenous to zones to the north of us, say Pennsylvania, are preferable to those previously identified as suited to the Maryland - Virginia zone.

Grasses: The following grasses are favored:

K-31 Tall Fescue - heavy traffic areas
Perennial Ryegrass - heavy traffic areas
Ben-sun A-34 Bluegrass - general lawn areas
Red Fescue (Creeping) - general lawn areas
Bentgrass (colonial or Creeping) - general lawn areas
K-31 Tall Fescue or Perennial Ryegrass should also be used near outdoor swimming pools where chlorine may be present.
New sod should be fertilized with low nitrogen fertilizer to ensure a well established root system.
Hydroseeding can be used, except on steep slopes and drainage swells where sod is more appropriate.

Slopes and Grass: A 2% slope in a grass area is optimum. Avoid slopes less than 2%. The maximum grass slope that can be maintained safely and efficiently is 30%. Slopes over 30% should be terraced, covered with rip-rap, or treated in a manner to facilitate maintenance and provide safe pedestrian access and avoid erosion.

Ground Covers: The selection of ground covers should take into account the likely pedestrian traffic in the area. Plant materials easily crushed by foot traffic should not be used where pedestrians may be tempted to short-cut across plant beds. Favored ground covers are:

Japanese Spurge (Pachysandra Terminatis) - areas of light foot traffic

Blue Rug Juniper (Juniperus Horizontalis) - areas of both light and heavy foot traffic

Crown Vetch (Coronilla Varia) - on slopes

Parking Lot Screens: All planting in a parking lot should be placed least 6'-0" from the face of a curb or curb stop, otherwise the material will be damaged by cars. In all instances the applicable zoning code should be checked and complied with for screening of parking areas.

Favored Screen Material:

Buckhorn (Rhamnus Cathartica)
Canadian Hemlock (Tsuga Canadensis)
Yews (Taxus)
Arborvitae (Thuja)
English Laurel (Laurocerasus Officinalis)
Buford Holly)Ilex Cornuta Bufordi)
Winged Eunonymus (Eunonymus Alatus)

Avoid Legustrom as it does not survive winters.

The parking lot screens are most effective when they are installed 18" high minimum and 2'-0" maximum spacing. (Check local zoning codes)

In plant areas within parking lots, if less than 3 ft. is provided from curb to curb for plant material, use either concrete or sod. The space is too small for screen planting, ground cover, shrubs or tress. Provide at least 160 sq. ft./tree.

Avoid ivy of all types, as it serves to collect trash, and does not look good until well established.

Shrubs: The following is a list of shrubs that have been found to thrive and survive around County buildings:

Japanese Holly (Ilex Convexa)
Buford Holly (Ilex Cornuta Bufordi)
Winged Burning Bush (Eunonymus Altaus)
Golden Bell Forsythia (Forsythia Intermedia)
Sweet Pepper Bush (Clethra Alnifolia)
Leather Leaf Viburnum (Viburnum Rhytido Phylum)
Wright Viburnum (Viburnum Wright)
Arrowood Viburnum (Viburnum Dentatum)
Saving Juniper (Juniperus Sabina)
Pfitzer Juniper (Juniperus Chinensis Pfitzer Iana)
Vase Juniper (Juniperus Communis Depressa)
Azaleas - Various types and colors - Hardy northern variety only.
Rhododendrons - Various colors - in locations protected from high winds.

Avoid placing shrubs and ground cover under large overhangs where they are cut off from rainfall. Avoid shrubs and trees w/poisonous berries.

Evergreens: The following evergreens are recommended:

Douglas Fir (Pseudotsuga Taxifolia)
Norway Spruce (Picea Abies)
Colorado Blue Spruce (Picea Pungens Koster)
White Pine (Pinus Strobus)
Scotch Pine (Pinus Sylvertris)
Austrian Pine (Pinus Nigra)
American Hemlock (Tsuga Canadensis)
Pyramidal Arborvitae (Thuja Occidentalis Pyramidalis)

Avoid broad leaf evergreens such as Magnolias because they suffer severely from windburn in winter months.

Ornamental and Shade Trees: The following are recommended:

Crimson King Maple (Acer Platanoides Schwedleri)
Sugar Maple (Acer Saccharum)
Norway Maple (Acer Plantanoides Columnare)
Japanese Red Maple (Acer Palmatum Atropurvureum)
Green Ash (Fraxinus Pennsylvanica Lanceolata)
Redmond Linden (Tilia Euclora Redmon)
American Linden (Tilia Americana)
Russian Olive (Elaeagnus Augustifolia)
American Holly (Ilex Opaca)
Big Leaf Holly (Ilex Crenata Latifolia)
English Holly (Ilex Aquifolium)
Honey Locust (Gleditsia Triacanthus Inermis)
River Birch

Avoid Clump Birches.

Flowering Trees: The following flowering trees are favored:

Kwazan Cherry (Prunus Kwanzan)
Mount Fugi Cherry (Prunus Serrulata)
Yoshino Cherry (Prunus Yeddensis)
Weeping Cherry (Prunus Subhirtella Pendula)
Red Bud (Cercis Canadensis)
Ruby Tree (Prunus Cerasifera Pissardi)
Rose of Sharon (Hibiscus Syriacus)
Golden Raintree (Koelreteria Paniculata)
Washington Hawthorn (Crathegus Phaenopyrum)

Avoid flowering crab apple trees because of the need for pruning, problems with tent caterpillars, and Japanese beetles. Do not place Hawthorn on sites used by children or near pedestrians.

Street Trees: The following street trees are favored:

Red Oak (Quercus Borealis)
London Plane Tree (Platanus Acerfolia)
Bradford Pear
Sweetgum (Liquidambar Styraciflua)

Preservation of Existing Trees: Very often extreme measures are made to preserve large existing trees, particularly in parking lot areas. Our experience has been that many of these trees survive no more than three years and must be removed.

If any of the following changes are likely to occur around an existing tree, the probability that it will survive is limited:

1. Change of grade around base of tree.
2. Reduction of root system by more than 30%.
3. Impervious surface, such as paving, within drip line of tree.
4. Compaction of earth within drip line of tree during construction byconstruction vehicles.
5. Trees not pruned if root system is reduced up to 30%.

The designer should work to preserve clumps of trees rather than individual specimens, where possible.

In-Lawn Plantings:

Trees should be planted in shrub areas wherever practical. If trees must be planted in lawns they should be located at least 8 feet from any walls, fence or other obstruction. Lawn trees should be provided with 24" of bare sod free soil beyond and around a full circle of the tree. Avoid tree planting which creates lawn areas less than 30 inches wide. Where this condition occurs substitute mulch for sod. When planting groves of 3 or more trees provide a continuous mulched area between the trees to facilitate mowing.

Chemical Run-Off:

Salts and other chemicals are frequently used for snow and ice removal on parking lots, driveways and sidewalks. Site development should be designed so that this run-off does not contaminate shrubs and trees. Consideration should be given to piping run-off from parking lots, driveways and sidewalks directly to storm water management systems. The use of swells or french drains should be considered to prevent chemical run-off problems in planted areas.

SECTION 2. HARD LANDSCAPE ITEMS

Pavers: Do not use loose laid brick pavers. All pavers should be laid over a concrete slab and all joints should be grouted.

Sidewalks: Sidewalks to the entrance of buildings should be at least 6'-0" wide to permit three persons to walk abreast. Locate sidewalks where people are likely to walk, design with the flow. Provide radii at intersections so that grass at corners is not worn down. Avoid acute angles in layout

	when possible. An exposed aggregate finish is preferred over a smooth concrete finish.
Wheel Stops:	Avoid using wood railroad ties for wheel stops. When possible use standard curb and gutter instead of concrete wheel stops. Wheel stops interfere with snow removal. Use wheel stops to prevent cars damaging transformers and on grade mechanical equipment adjacent to parking lots. However, it is preferable that equipment is set back at least 6'-0" from curb face to eliminate need for the wheel stops.
Decorative Stone:	Under overhang areas around buildings use pavers or decorative stone instead of plant material. Plant material paving in these locations receive poor light and little rain water. The decorative stone should be small in size so that it does not become a problem in high vandalism areas.
Bicycle Racks:	Bicycle racks should be of simple design and easily repaired. Painted bicycle racks constructed of round pipe are preferred. The racks should be bolted to a concrete slab and located close to the front entrance door - in view of building staff.
Railings:	Railings on exterior steps should be aluminum. The use of aluminum is very important near swimming pools and other damp situations. Drain plugs should be provided on vertical supports.
Benches: benches.	Wood benches should be sealed - avoid varnish on exterior
Fencing:	In public areas wood slate fencing should be used. Use of chain link fencing should be limited as far as practical and used only when security or safety or protected of equipment considerations apply.
Retainage/Cribbage:	Use new pressure treated wood or composite stone systems. Do not use railroad ties.
Curbs:	Use concrete curbs, do not use rolled asphalt curbs. In large grass area, provide curb cut for lawn mowing equipment.
Flagpoles:	In general, each building should have a single, free-standing flagpole near the main entrance. The flagpole should be equipped to fly two flags, one above the other. A spotlight must light the flags.
Building Identification Signs:	Names of buildings or street numbers shall be metal letters attached to the building wall.

[Note to Designer: Fill in extra payment costs for additional excavation, rock excavation and additional gravel borrow after approval from the County.]

END OF THE DOCUMENT

FIRE PROTECTION STANDARDS FOR COUNTY BUILDINGS

2025

1. Fire Protection

1.1. Location of fire alarm devices, fire alarm control panel and fire alarm annunciator panel (if applicable)

1.2. Fire sprinkler system type (ex. NFPA 13R, 13, 13D), if applicable

1.3. Location of voice alarm devices, voice alarm control panel and voice alarm annunciator panel (if applicable

1.4. Location of duct smoke detectors

1.5. Manual pull station location of the hood suppression system; for a commercial kitchen hood, refer to 2017 NFPA 96, 2018 IBC Sec. 904.2.2, 2018 IMC Sec. 507

1.6. For I and R-4, the condition of occupants is needed per Chapter 3 of 2018 IBC and NFPA 101; for day care occupancies, the ages and the number of children are needed

1.7. Presence of any hazardous materials or medical gas — provide complete list with quantity and container sizes.

1.8. Generator with above ground storage tank (AST) storing Class I/II flammable combustible liquids; check Prince George's County Subtitle 11, Section 11-260 for limitations

1.9. Site plan showing location of portable fire extinguishers, fire hydrant location(s) and Fire Department Connection (FDC) as per IBC and Subtitle 4; include when the installation of the automatic sprinkler system is required.

END OF THE DOCUMENT

MECHANICAL BUILDING STANDARDS FOR COUNTY BUILDINGS

2025

1. General (01 00 00)

1.1. This document provides a general and broad scope of requirements for various building components.

1.2. When approved by the County is requested, County means Office of Central Services

1.3. Design

1.3.1. Building image should reflect a public facility, a place for people, a civic landmark, durability, strength, openness, accessibility, high standards, Green, sustainability, etc.

1.3.2. The space offered or designed must project a professional and aesthetically pleasing appearance including an attractive front and entrance.

1.3.3. The design of the space must be conducive to efficient layout and good utilization

1.4. Code and other compliances

1.4.1. Building and site must be designed in compliance with all applicable codes and regulations including Federal, State, County, Local jurisdictions, regulating agencies, utility companies, etc.

1.4.2. Facilities must be design in strict adherence with the latest “Prince George’s County y Manual for Planning, Design, and Construction of Buildings” (Design manual).

1.4.3. For detail information about components of Building Standards see the Design Manual.

1.4.4. Site and buildings must be designed for LEED certification.(Green)

1.5. Standard Contract Forms

1.5.1. Department of procurement updates these documents regularly. These documents shall be used as boilerplate for all contracts and published with the RFP and other advertisements for consultant services.

2. Mechanical System (23 00 00)

2.1. The County’s goal in the design of mechanical and electrical systems serving their facilities is to select systems and equipment that; are appropriate to the type of space served; give maximum value for their initial costs; are cost-effective to operate, maintain, and repair; provide quality indoor air; and support the sustainability policies of the County. The specifics for the selection and design of these systems are elaborated in this document. The consultant shall review and become familiar with these requirements which shall not be violated without specific notice and approval.

2.2. If room data sheets for support spaces, e.g., mechanical and electrical rooms and closets, custodial spaces, loading docks, etc., have not been completed prior to award of the design contract, the selected consultant must begin by developing room data sheets for all support spaces of this type, involving representatives of the Department(s) effected and the Project Manager. This work must be completed during the schematic design phase.

2.3. Baseline HVAC Air System requirements (from Energy Design Guideline)

SYSTEM	COMPONENT	CRITERIA
AIR HANDLER	FAN	blow through configuration backward-curved airfoil (unless cfm < 3,000)
	DRIVE	Variable frequency drive on all VAV AHU's. Soft start on all constant volume AHU's.
	DISCHARGE	Minimum length of four equivalent diameters before any obstructions or take offs at discharge of fan.
	HOUSING	Double-wall construction IAQ .double slopped drain pan design.
	MOTOR	Premium High efficiency.
	OUTSIDE AIR INTAKE	outside air must mix in the return air duct to eliminate temperature stratification prior to entering the AHU.
	FILTER AND COIL FACE VELOCITY	300 fpm or less maximum design velocity.
	FILTRATION	65% dust spot efficiency minimum. Provide filter module with pre-filters.
DUCT WORK	TYPE	main ducts to be round spiral (preferred) or oval spiral. do not use rectangular. branch ducts to be round spiral. do not use rectangular duct in the gymnasiums.
	VAV BOXES	full DDC boxes. do not use fan-powered boxes.
	DIFFUSERS	louvered cone diffusers, stamped one-piece construction with Coanda pockets-no mitered pieces. do not use perforated diffusers.
	TAKEOFFS	Minimum straight, unobstructed duct run of 4 to 6 (preferred) duct diameters before any takeoffs bends or transitions. Takeoffs require 45 degree boots.
	TRANSITIONS	Expansions in duct diameter must include a transition not exceeding 20 degrees divergence angle.
	LINING	No interior lining may be use unless contained in double-wall construction.
	FLEX DUCT	Maximum run of 6 feet on flex duct connections. show hard duct up to 6 feet of any diffuser. Show a segmented elbow detail for connection between flex duct and diffusers.
OUTDOOR AIR ENERGY CONTROL		on air handlers with greater than 3000 cfm outside air relief requirements, one of the following options must be used:

SYSTEM	COMPONENT	CRITERIA
1)	ENERGY RECOVERY	Desiccant wheel energy recovery system. (Resize heating and cooling capacity to include effect of energy recovery and reduce first cost.)
2)	CO2 SENSING	Modulate AHU outdoor and return air dampers with pid loop to maintain 1000 ppm co2 in the return air.
COMPLETE AIR SYSTEM	OVERALL AIRFLOW EFFICIENCY	VAV less than 1.0 hp per 1000 cfm constant volume-less than 0.6 hp per 1000 cfm
	CONTROLS	Complete DDC for automatic temperature control, valves and actuators, and energy management functions. Provide complete point list on drawings. Specify Nigara control EMS.
	SEQUENCE OF OPERATION	Use owner's standard sequence of operation for vav systems (see EMS section). Provide logic diagram on drawings supporting the verbal sequence of operation.

2.4. Design temperature

INDOOR COOLING	**78 F**
INDOOR HEATING	**68 F**
OUTDOOR SUMMER	**1% OR PER LATEST ASHRAE**
OUTDOOR WINTER	**99% OR PER LATEST ASHRAE**

2.5. Hot and Chilled water circulation system must be designed with at least two pumps one main and one stand-by. The pump control shall have capability of cycling on and off between the main and stand-by pumps.

2.6. Chiller water system shall be designed to be drained for winter freeze protection. Glycol shall not be used for freeze protection unless it is absolutely needed for operation of the building to run specific program.

2.7. Electric Resistance Heating Is not permitted

2.8. Do not design the heating system with one boiler. The heating system must be equipped with at least two boilers with a minimum of 20% redundancy.

2.9. Boilers must be equipped with boiler management system (BMS per manufacturer recommendation and with all safety devices. For each boiler power cut-off switch must be installed outside the boiler room and adjacent to the boiler room door. Boiler plant shall be design with reverse return piping unless it conflicts manufacturer recommendation.

2.10. Table: Minimum Performance of Heating and Cooling Equipment

COOLING EQUIPMENT TYPE	CONDENSING METHOD	COOLING CAPACITY (BTU/HR)	SIZE (TONS)	MINIMUM COOLING EFFICIENCY	MINIMUM HEATING EFFICIENCY
AIR-CONDITIONERS	AIR COOLED	<65,000	0 TO 5	11.0 EER	2.2 COP
HEAT PUMP	AIR COOLED	<65,000	0 TO 5	12.5 SEER	2.2 COP
SPLIT SYSTEMS	AIR COOLED	>65,000	>5	9.5 EER	2.2 COP
HYDRONIC HEAT PUMPS	WATER SOURCE	ALL CAPACITIES	ALL SIZES	11.5 EER	4.0 COP
CHILLERS	AIR-COOLED		<150	<1.25 W/TON	
	WATER-COOLED		>150	<0.63 W/TON	

HEATING EQUIPMENT TYPE	FUEL	HEATING CAPACITY (BTU/HR)	MINIMUM THERMAL EFFICIENCY	MINIMUM ANNUAL EFFICIENCY
BOILERS	GAS	<300,000	93%	90% A.F.U.E.
BOILERS	GAS	>300,000	93%	
FURNACES	GAS	<300,000		90% A.F.U.E.
SERVICE WATER HEATING	GAS	ALL	0.90	

2.11. Air Distribution System (23 30 00)

2.11.1. All return air must be in the duct system

2.11.2. Duct construction details shall conform to the recommendations of the ASHRAE 55 guide and data book and SMACNA (Require Class III leakage rate

2.11.3. Drawings shall show the specific location of fire dampers.

2.11.4. Supply outlets shall be suitably located to avoid drafts caused by colliding air patterns or disruption of air flow caused by vertical obstructions in the ceiling such as drop light fixtures, ceiling beams, or proximity to the wall.

2.11.5. Rectangular ductwork shall not be used in high velocity air systems.

2.11.6. The duct system shall not be internally sound-lined. If sound-lined is absolutely necessary to reduce noise level, the designer shall specify perforated galvanized sheet metal lined top of the internal sound-line. High velocity ductwork leakage shall not exceed eight (8) cfm per 100 square feet of duct surface under a pressure of five (5) inches wg.

2.11.7. Rectangular duct shall not be used in the gymnasium.

2.11.8. High velocity ductwork leakage shall not exceed eight (8) cfm per 100 square feet of duct surface under a pressure of five (5) inches wg.

2.11.9. Length of the flex duct shall not exceed 6 feet.

2.11.10. Flex duct shall be factory insulated with Mylar lining.

2.11.11. The duct connection from main to branch and from branch to sub-branch shall be equipped with 45-degree boot.

2.11.12. Each plenum area shall be provided with a light. All lights in a single fan system shall be switched as a group. Switch shall include an "ON" pilot light.

2.11.13. The construction document shall notify the contractor not to hung duct system from the lower chord of the joist.

2.11.14. Perforated plate ceiling diffusers and grills should not be used without approval from The County. The diffusers and grills shall be louver type.

2.11.15. Air deflection must be adjustable for all types of ceiling supply diffusers.

2.11.16. The supply return and exhaust in the natatorium and high humidity areas such as shower rooms shall be aluminum sheet metal with welded and flanged water tight joints.

2.11.17. Plenums shall be rigidly constructed of eighteen (18) gauge (minimum) galvanized sheet metal.

2.11.18. Angle iron bracing inside plenums shall be galvanized.

2.11.19. Access doors to ducts (hinged, latched, with sponge plastic seals) shall be provided upstream and downstream from all coils and elsewhere where frequent access is required.

2.11.20. Access doors shall be provided for all plenum areas with latches operative from both inside and outside the plenum.

2.11.21. All access doors shall be self-closing due to the direction of air flow and by pressure differential.

2.11.22. Access panels shall be provided at all fire dampers and elsewhere where occasional access is required. These access panels maybe held in place with sheet metal screws with sponge

plastic seal for sizes less than 12" x 12". For large size access panel use hinges and/or latches.

2.12. Occupancy sensors

2.12.1. Carbon Dioxide (CO_2) sensors must be used in the conference room and other highly concentrated occupied spaces.

2.13. Ventilation

2.13.1. Mechanical ventilation shall be provided for all spaces. Even though the exterior rooms may be provided with code-complying ventilation capacity in the fenestration (window/door design), a minimum six air change per hour ventilation rate shall be mechanically maintained to alleviate the problems of the "air-tight" building and preclude opening windows during the heating season for ventilation purposes, which becomes an uncontrolled heat loss and causes undesirable drafts. However, mixed systems utilizing temperature-controlled exhaust fans with operable windows for ventilation during hot days is recommended where feasible.

2.13.2. All interior ventilation shall meet occupancy-driven building code ventilation requirements, maximum internal heat-gain cooling requirements, and fume exhaust make-up air requirements. Supply air ventilation systems shall be variable volume type to assure that minimum amounts of supply air are processed at all times to assure minimum operating costs throughout the entire system. Heating and cooling energy costs are second only to custodial costs in regard to the annual cost of operating facilities, as such ASHRAEstandard 90.1 must be observed to ensure energy efficient mechanical design. Every energy cost reduction resulting from improved design techniques is an investment in the life-long economic value of the building and should be pursued to the maximum extent within the given program and budget.

2.13.3. Supply air intakes and exhaust fan discharges are critical issues for the building being planned and for the buildings surrounding the site selected for the new building. Outdoor air intakes must be carefully located to avoid ingesting contaminated air from exhaust air discharges from this or other buildings, vehicles in roadways or at loading docks, etc. Similarly, exhaust air discharges from this building must be carefully located to avoid recirculation into the building and to avoid contaminating the air intakes of adjoining buildings. Experience indicates that mistakes are virtually irreversible or, at best, are exceedingly costly to correct. Air intake and discharge requirements must be resolved before almost all other design considerations due to the influence such decisions will have on all of the rest of the design.

2.14. Temperature/Humidity Control and Energy Management

2.14.1. The building control system must allow for maximum operational efficiency and flexibility as well as competitive pricing on future expansion and upgrades. Building temperature, humidity and energy management controls shall be direct digital control (DDC) technology utilizing distributed microprocessor-based apparatus. Each building shall be designed to operate in a "stand alone" mode but shall include the necessary features for communication and control with a remote operator's station. Connection to a remote operator's station must be included at the time of bid and construction. The inclusion of such shall have no bearing on the environment control system to be provided.

2.14.2. The variable volume requirements are the most sensitive and stringent requirements for the system. Fume exhaust air quantities will vary based on current use; supply air quantities will vary to match and to accommodate cooling requirements; yet pre-determined differential air conditions must be maintained between adjoining occupancies. These requirements must be automatically sustained.

2.15. Mechanical Rooms and Pipe/Duct Shafts

2.15.1. Consultants shall identify an adequate amount of mechanical room space which makes allowance for efficient operation, servicing, repair, and removal of mechanical equipmentas part of the Basic Technical Program. Mechanical rooms shall not be planned for any other use, specifically, they may not to be used as janitorial materials storage or rest break areas.

2.15.2. In addition to rooms required for HVAC equipment and distribution, a working room for mechanical equipment, having clear and easy access to the exterior, shall be provided inthe basement, adjacent to the utility tunnel connection, to provide for proper management of all central mechanical utilities and their distribution within the building. Distribution within the building shall be via readily accessible pipe and duct shafts.

2.15.3. To the maximum extent possible, mechanical equipment shall be located in interior space. Interior mechanical rooms also must be planned with adequate sound insulation to mitigate the noise generated by mechanical equipment. It is preferred, that when rooftop equipment is necessary, that the equipment area be completely enclosed with a louvered wall and covered with a roof structure. Penetrations of the outer roof are discouraged. Use of open air "wells" should be considered at strategic locations so that exhaust ducts and plumbing vents can move horizontally under the roof, enter the wells through vertical surfaces and then turn vertically to discharge to atmosphere without penetrating the horizontal waterproof roof membrane.

2.16. Magnetic Bearing Chillers

2.16.1. Magnetic bearing chillers should be considered for every project. Available technology include centrifugal compressors as small as 75 tons.

2.16.2. Unit shall contain multi- stage, oil free magnetic bearing, hermetical centrifugal compressor. Each compressor shall operate inlet guide vanes in concert with variable frequency drive to optimize part load efficiency.

2.16.3. Performance: The chiller shall be capable of operation down to 10 percent of full loadrating with standard ARI entering condenser water relief without hot has bypass.

2.16.4. Chiller Components:

A. Compressors:

i. The unit shall have two stage magnetic bearing, oil free hermetic centrifugal compressors. The compressor drive rain shall be capable of coming to a complete safe stop in the event of a power failure.

B. Motor:

i. Permanent magnet, synchronous motor of the hermetic type, sized appropriately to fulfill compressor horsepower requirements. Motor shall be liquid refrigerant cooled with internal thermal overload protection devices embedded in the winding of each phase. Motor shall be compatible with variable frequency drive operation.

C. Chiller Control

i. Microprocessor based control architecture to include a controller for each compressor and a unit controller. The following parameters shall be displayed:
   1. Entering and Leaving chilled water temps
   2. Entering and Leaving condenser water temps
   3. Evaporator saturated refrigerant pressure
   4. condenser saturated refrigerant pressure
   5. Percent of 100% speed per compressor
   6. % rated load amps for entire unit

ii. In addition, a complete fault history shall be displayed and downloadable via a USB port drive.

iii. Chiller plant architecture software shall be used to display the chiller, piping, pumps and cooling tower

3. Acoustic Control (23 00 02)

3.1. All County facilities must be designed with the comfort of users and occupants in mind. Most often noise pollution inside and outside of the facilities are forgotten during the design and construction. It is the responsibilities of the design team to identify all noise generating sources, and noise sensitive areas and then create a chart to identify how design will resolve those issues.

3.2. The following considerations must be adhered to as minimum:

3.2.1. Facilities with "heavy" ventilation and air conditioning requirements are becoming too noisy for sustained occupancy. Thus, it is mandatory that careful attention be given to thorough acoustic management of all noise sources. Because of the complexity and the problems (e.g., structural transmission) it is recommended that computerized analyses be employed when there is reason to be apprehensive about acoustic control.

3.2.2. Mechanical rooms shall be designed to avoid transfer of sound and vibrations to the adjacent rooms.

3.2.3. Vibration isolators must be used for all noise generating mechanical equipment.

3.2.4. Floor isolators and vibration absorbing support shall be design for all floor mounted vibrating or noise making equipment.

3.2.5. Air handling units inside the building must have acoustical and sound dampening chambers.

3.2.6. Since use of fiberglass liners are not permitted in the duct works, perforated liners must be considered to reduce the transfer of sound into the facilities.

3.2.7. Location of chillers, cooling tower, emergency generator, air handlers and other noise generating equipment must be carefully studied to minimize sound transfer toadjacent properties. The db level at the property line must comply with county requirement.

3.2.8. If the heating system design calls for pulse boiler(s), mufflers must be provided on theair intake and boiler exhaust to attenuate the noise.

3.2.9. Conference rooms must be well sound isolated.

3.2.10. Elevator shafts must be sound isolated and not located adjacent to work spaces.

3.2.11. All windows must be double paned.

3.2.12. All doors must have noise silencer.

3.2.13. Close attention to design of duct work must be given to reduce the air noise. A/Emust present design ideas in this respect to the county.

3.2.14. Design of interior walls must be such to minimize sound transfer to adjacent rooms.

3.2.15. Ceilings in carpeted space shall have a Noise Reduction Coefficient (NRC) of not less than 0.55. Ceiling in offices, conference rooms, and corridors having resilient flooring shall have an NRC of not less than 0.65.

3.2.16. Ambient Noise from mechanical equipment shall not exceed Noise Criteria Curve (NC) 35 in accordance with ASHRAE in offices and NC 40 in corridors, cafeterias, lobbies, and toilets, and NC 50 in all other areas.

3.2.17. Rooms separated from the adjacent spaces by ceiling-high partitions (not including doors) shall not be less than the following Noise Isolation Class (NIC) standards in accordance with ASTM: Conference Rooms NIC-40 and Offices NIC-35.

4. Compressed Air (23 00 03)

4.1. Compressed air should be reduced to 30 psig or the minimum pressure needed as required by pneumatic equipment requiring compressed air before distribution within buildings. Occasionally there is a requirement for higher pressure air, which should be separatelyserved. (The pressure requirement should be carefully determined, the operating cost increases by 1% for every 2 psi pressure increase).

5. Insulation (23 00 04)

5.1. A vapor barrier jacket is required for chilled water piping, equipment, refrigerant suction piping, domestic cold-water piping, rain leader piping, air handling ducts and equipment with air temperatures of 55oF. or less.

5.2. Pipe insulation in utility tunnels, up to the building service header main valve, shall have a uniformly ribbed, 0.01-inch minimum thickness metallic casing with a vapor barrier lining.

5.3. Fittings, valves, and flanges shall have an insulation thickness no less than the adjacent piping but must be removable without damage for easy reapplication.

5.4. Demolition (removal) of carcinogenic insulation containing asbestos shall follow procedures outlined in the Asbestos Abatement chapters of OSHA/WISHA.

5.5. Pipe insulation in maintenance areas (mechanical rooms, accessible shafts, etc.) is subject to mechanical damage (crushing, abrasion and laceration) resulting from maintenance activities. Rigid insulation materials protected with appropriate casings and vapor barrier linings are required in these spaces.

5.6. Oversize Pipe Rings, Inserts, and Shields: Install the pipe insulation and jacket extending through the pipe hanger ring. Provide an extra high-density insulation insert and metal shield within each hanger, except where pipe covering protection saddles are welded to the pipe.

5.6.1. Insulating Inserts: Extra high density insulating inserts shall be the same thickness as pipe insulation, and shall be Pittsburgh-Corning "Foamglas" or Pipe Shields "Thermal Hanger Shield" and shall cover not less than the lower 40 percent of the circumference of the insulation; sizes of section, 6 inches minimum length up to 6 inch outside diameter, 8 inches minimum length for larger sizes. "Foamglas" shall not be used for high pressure steam. Install the insulating insert section to replace a cutout section of insulating material withinthe insulation jacket, with tightly fitted butt type joints. For pipe on trapeze channel hangers, provide Pipe Shield Model A3000 insulated pipe support which covers 100 percent of the circumference of the pipe.

5.6.2. Metal Shields: Except where pipe covering protection saddles are specified, provide outside of the jacket and inside of each hanger, a metal shield of 18 gage sheetmetal, minimum, covering lower 40 percent of the circumference of the insulation, length not less than that specified for cut-in section of high density insulating insert. On 6 inch and larger pipe, shields shall be 14 gage minimum, two pipe diameters in length.

5.7. All insulation, facings, coatings, adhesives and other accessories shall have a fire hazard rating not to exceed 25 for Flame Spread and 50 for Fuel Contributed and Smoke Developed; ratings determined by UL Standard No. 723, NFPA Standard No. 255, test results from the approved testing laboratory shall be available to indicate that fire hazard ratings for materials do not exceed the above amounts.

CIP Mechanical Plan Submission Requirements:

The requirements listed below are in addition to the building standards and CIP design manual.

1. A complete code analysis, including building type, use group, number of stories, suppression type, code edition and number of occupants must be included with all submitted mechanical drawings.
2. Require original seal and signature by a Maryland Professional Engineer, including professional statement with expiration date of license and contact information for that engineer.
3. Ductwork layout, duct sizes, air devices and air flow (CFM) at each air device.
4. Provide equipment schedule indicating total cooling/heating load, total supply air (CFM), outdoor air (CFM), entering/ leaving dry bulb and wet bulb temperatures through coil, basis of design and equipment installation details.
5. Equipment location(s) on the floor plan including labeling all equipment and identifying the space it serves.
6. HVAC roof plan showing all roof-mounted equipment.
7. HVAC piping floor plan (e.g., chilled water/heating, hot water/condenser water piping, refrigerant piping, condensate piping, steam piping, etc.)
8. HVAC piping riser diagrams indicating pipe sizes and pipe fittings.
9. Show combustion air provisions on the plans for the fuel-burning equipment. Size of openings and/or ducts and their points of termination should be indicated.
10. Show commercial cooking hood, exhaust ducts, and exhaust fan(s) on the floor plans including all dimensions for each item.
11. Show the make-up air unit and airflow rating on plans. Make-up air shall be approximately equal to the amount of the exhaust air.
12. Provide mechanical energy calculation certification per International Energy Conservation Code (IECC); the software may be downloaded at www.energycodes.gov.
13. Provide air balance diagram or table including the sequence of operation for all mechanical equipment.
14. An outdoor air schedule or calculation in accordance with International Mechanical Code (IMC) 2018 table 403.3.1.1 must be included with any renovation, new construction or existing HVAC system. (The occupant load must be per IMC-2018 Table 403.3.1.1, International Building Code IBC-2018 Table 1004.5 and arch. drawing. Where there is a conflict, the most stringent occupant load is used.)
15. A manufacturer's cut sheet must be provided for any domestic/commercial clothes dryer with an exhaust duct run greater

than 35 feet.

16. The drawings shall be sized to 24 x 36 (minimum) with a scale of 1/8 1 0 (minimum) and a text height of 1/8 . 18. Symbols and abbreviations list.

END OF THE DOCUMENT

PLUMBING STANDARDS FOR COUNTY BUILDINGS

2025

1. Plumbing System (22 00 00)

1.1. Cross contamination control in facilities is a critical concern. Consequently, two water distribution systems shall be provided within each facility; i.e., potable and non-potable/industrial water. The non-potable/industrial system shall serve make-up water requirements for cooling systems, etc. Distribution systems must be isolated from each other and the utility service to the building by backflow prevention devices. Dual back-flow prevention devices (or equivalent piping connections) must be provided since shutdowns are impossible to arrange for routine testing and maintenance of the devices. Generous space provisions must be allowed in such areas for proper testing and maintenance.

1.2. When incoming water pressure exceeds eighty (80) psig, provide a pressure reducing station with two PRV's (each sized at 2/3 of total flow) in parallel, each valved to operate independently. A minimum pressure of twenty five (25) psig should be provided at the highest point of the building. The assembly shall include appropriate valves, strainers, gauges, drains, etc. and include a bypass. All this should be in accordance with WSSC requirements and codes.

1.3. Each building service shall include a water meter. It is also recommended to submeter any large single uses of water within a building or facility.

1.4. The building non-potable water headers shall have reduced pressure back flow preventers.

1.5. The plumbing system should be divided into smaller systems with isolation valves separating them. This will allow a section of the building to be worked on without affecting the remainder of the building.

1.6. Provide booster heaters for dishwashers and other equipment requiring higher hotwater temperatures. Do not raise the temperature of the building system.

1.7. Provide dielectric unions whenever dissimilar piping materials are used.

1.8. Provide access doors for all plumbing system components that require maintenance. The access doors should be located on both the architectural and mechanical plans and coordinated.

1.9. Seismic bracing must be provided and coordinated with the structural engineer.

1.10. Water piping shall not be installed below slabs on grade except for trap priming lines.

1.11. The building water header shall be constructed type L copper pipe.

1.12. All building distribution piping shall be type L copper tubing.

1.13. Fittings on copper tubing shall be wrought copper or cast brass, solder pattern. All connectors 2-1/2” in diameter shall be Victaulic or equivalent.

1.14. Solder shall be 95-5 tin antimony or approved equal. No lead type solders shall be allowed on the job site.

1.15. Plumbing fixture partition stop connections, through the wall, shall be brass pipe.

2. Waste and Drains (22 13 02)

2.1. The minimum size of side sewers shall be six (6) inches.

2.2. All waste drains shall be gravity systems. Sump pumps and sewage pumps shall not be used without specific approval.

2.3. Waste piping and drainage systems under slabs on grade shall be extra heavy cast iron soil pipe.

2.4. Roof drains shall be cast iron or brass, with cast iron or brass high dome strainers. The first section of pipe below the drain must be cast iron or brass.

2.5. No PVC, CPVC, ABS or galvanized piping shall be used within the building envelope.

2.6. All pipes, valves, clean-outs, and particularly waste piping, must be accessible formaintenance. Those recessed in wall cavities must have access doors, removable panels, or other approved methods for access.

2.7. Food preparation and service areas require extensive piping. Access is extremely important. Such areas shall not be located on a slab on grade. Where located above a suspended ceiling, the ceiling must be 100% accessible.

2.8. Wastes and clean water drains shall be collected independently in each building and carried separately to the city sanitary sewer and storm drains respectively. If no storm drain exists within 200 feet of the building, connect clean water drains to sanitary sewers and provide for future connection to storm drains.

2.9. All footings shall have footing drains connected to the storm drain system. Footing drains shall not be connected to an interior sump pump.

2.10. All area drains, yard drains, window well drains, and the like shall be connected to the storm drain system.

2.11. Invert elevations of sanitary sewer lines leaving the buildings shall be of sufficient depth to permit future connection of a waste line from any point in the basement area.

2.12. Drains from transformer vaults having oil-filled transformers and shop areas where oil is present shall connect to sanitary sewers through a County approved oil interceptor.

2.13. Crosses shall not be used in waste piping.

2.14. Connections in waste piping for food service areas shall turn down with a 1/8 bend at the connection to the next branch.

2.15. Waste piping from garbage disposals shall be carried separately to a major waste pipe, with as few bends as possible and completely accessible clean outs.

2.16. Floor drains shall be connected to the sanitary sewer. Drains for fire sprinkler system shall be six (6) inches minimum and shall be connected to storm drains.

2.17. Mechanical rooms, pipe trenches, tunnels and other areas with piping shall be equipped with floor drains. Provide primed floor drains.

2.18. Avoid installing drain lines in complicated architectural work; if installed, use brass pipe with bronze fittings.

2.19. Provide trap primers for floor drains and funnel drains in mechanical rooms; and other places where traps may dry out. (Use timer type).

2.20. Waste and drainage piping crossing excavated areas shall be supported on precast concrete beams supported by the building structure and undisturbed earth.

2.21. Clean outs shall be the full size of the piping served.

2.22. Drainage from flammable or hazardous chemical/liquid storage rooms must not be connected to the sewer systems. Coordinate a special drainage system with the Fire Marshal.

2.23. P-traps for all fixtures other than lavatories and similar usage sinks shall have integral clean outs. Drum traps shall not be used.

2.24. Pipe bedding under floor slabs shall be Type IV.

END OF THE DOCUMENT

SECURITY BUILDING STANDARDS FOR COUNTY BUILDINGS

2025

1. Access Control Systems (27 00 04)

1.1. An integrated access control and alarm monitoring system with the capability of alarm graphics, integrated badging, and CCTV monitoring, using County's MS Windows Operating System (as approved by OIT) for multiple workstations is required. The system must be compatible with the existing County security system and must be configured for multiple site codes and multi-company configuration to allow segregated management at various locations including remote site support via Dial-up chains. Efficient alarm management with status and command from maps and comprehensive reporting capabilities including scheduled reports is required.

1.2. The PGC security system administrator shall develop the facility card roster and perform the initial (and all ongoing) database keyboard data-entry task of pre-populating all card holder database records for this facility. Security vendor will coordinate with PGC OCS, FOM regarding development of the new card access rights protocol and associated rosters.

1.3. Security vendor will provide and install new access control panels. These panels will connect to the existing PGC security head-end via the PGC IT network. Each panel will be configured to support the required card readers each with associated 12VAC & 24VDC power supplies plus other accessories to support the required card reader and electronic lock capacity. Electrical vendor to provide 20a dedicated circuit for each panel. PGC-OIT shall assign one (1) new static IP address and LAN switch port for each new access control panel. Building fire alarm service vendor to provide, install and test addressable fire alarm output modules, installed next to the access control panels on each floor. These modules shall provide a normally closed (open upon alarm) form-C relay contact that will automatically interrupt specified access-controlled doors and shall be installed directly adjacent to the access control panels.

1.4. Video Intercom Systems are to be provided at all building entrances and suite reception desk. Reception desk is to be equipped with hardwired video intercom systems' door stations that communicate directly with the master stations located inside the corresponding suites.

1.5. Exterior doors must be heavy duty full flush, hollow steel construction, solid core wood, or insulated tempered glass. Wood doors must be at least 1.75 inches thick. Exterior doors must be weather-tight, equipped with automatic door closers and open outward. Hinges, pivots, and pins shall be installed in a manner which prevents removal when the door is closed and locked. All Exterior doors to be equipped with panic hardware with an electric strike.

2. Closed Circuit Television (CCTV) Systems (27 00 05)

2.1. All cameras will be connected to and centrally powered from new POE network switches (all provided, installed and programmed by PGC-IT)
Where programmed, an integrated CCTV system with digital recording, fiber optic capability, internet viewing capability, fixed color cameras, color pan tilt cameras, motion detection, and ability to interface with the existing County system. Panic alarms and intrusion detection alarms shall be provided. The system must have the ability to print out clear, color CCTV photos of on-screen images. Systems will also include 21" color monitors, Internet viewing, fixed color cameras, and digital recording. The CCTV system must be designed to handle further expansion.

2.2. The IP video cameras will be connected to two (2) new network video recording systems [NVRs], based on the PGC standard Avigilon product line. The NVRs will be located within the security equipment rack room. It will also include a KVM switch and rack mount pull-out console monitor with keyboard and rack mounted 2200VAC UPS. PGC-OIT shall assign reserved IP addresses and LAN switch ports for the NVR (and two video workstations) as well as a dedicated VPN to support access from specified video display workstations, remote laptops or other approved devices.

2.3. Security vendor will provide and install two (2) video display workstations. Each workstation will include desktop computer, keyboard, mouse, one or two (1 or 2) desk-mounted video

monitors and 1500VA floor mounted UPS. Provide necessary duplex outlets for display workstations.

2.4. Security vendor will provide and install a building intrusion alarm system. Alarm system will be connected to the intrusion/duress alarm control panel with all associated accessories and power supplies. PGC-IT shall provide and maintain one (1) reserved / static IP address, dedicated network switch port and all necessary Internet connectivity for the intrusion / duress alarm control panel.

2.5. If required security vendor will provide and install duress alarm buttons and strobes. Duress buttons will be connected to both the onsite intrusion & duress alarm system (primary) as well as the access control system (secondary).

END OF THE DOCUMENT

Office of Information Technology

INSIDE PLANT CABLE AND INFRASTRUCTURE SPECIFICATIONS

August 2013

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1. Introduction

Facility cabling is one of the longest-lifetime components of an information technology and communications system. Adequate planning and management of the asset can potentially provide significant savings, improve network reliability, and support a more flexible infrastructure.

This document provides specifications for inside cable plant infrastructure for Prince George's County, Maryland government. It encompasses telecommunications and local area network cabling, and is designed for new facilities as well as moves, additions, and changes to existing facilities.

It specifies an infrastructure based on discussions with the Office of Information Technology concerning needs and goals. Also, it is designed to be consistent with code requirements of the County Department of Environmental Resources.

2. Purpose of Document

This document has the following purposes:

1. Highlights practices and requirements that are of critical significance in County facilities.

2. States County-specific requirements that may not be explicitly stated in industry standards.

3. Provides an overview guide for contractors and employees installing cabling infrastructure for the County.

4. Assists the County in selecting contractors to perform cable infrastructure supply and installation services.

The document is valid at the time of its adoption and is intended to be updated as the County's needs change.

The practices and requirements defined below address cable placement, horizontal and vertical runs, ingress and egress of cables, the grounding and bonding of equipment, and documentation.

3. Industry Standards

The County seeks conformance with industry standards as a general rule, in order to allow interoperability of the cabling infrastructure between vendors of cabling equipment, to maximize the lifetime and usefulness of the infrastructure, to maximize the ability of the cabling to work with the widest range of electronics, and to build in the functionality and performance that come from incorporating the best practices contained in the standards.

However, where the industry standards and the practices in this document are in conflict, this document shall govern. Where subjectivity exists, the interpretation of the County OIT project manager shall govern.

Twisted-pair (copper) cabling in County facilities is used both for local area network data (including power-over-Ethernet) and telecommunications applications. Code and standards are sometimes different for the two types of cabling. Therefore, the most stringent of the standards or code requirements will be applied for County twisted-pair cabling, making it usable for either application.

The County has adopted National Electrical Code (NEC) 2002 Edition, and all cabling and infrastructure must comply.

Contractors should be Building Industry Consulting Service International (BICSI) certified at a minimum, properly licensed, and capable of obtaining any permits required to complete the work.

All work is expected to be of the highest quality (plumb and true to structure).

All pathways should be firmly secured in place and properly supported.

All materials used should be new unless otherwise stated.

All labeling should be done with a mechanical device (printer, label maker).

Grounding and bonding practices must be in accord with ANSI/TIA/EIA J-STD-607-A. A qualified electrician or electrical engineer must ensure the building, equipment rooms, and telecom rooms comply with the standards.

Individuals installing cable infrastructure for the County are required to have familiarity with this document and the following standards, as demonstrated by certification with BICSI Registered Communications Distribution Designer (RCDD) or equivalent:

ANSI/TIA/EIA-569-B: (Commercial Building Standards for Telecommunications Pathways and Spaces)
Design Considerations
Service Entrance Pathways

Entrance Facilities
Equipment Rooms
Intra-building Backbone Pathways
Telecommunications Room
Horizontal Pathways
Consolidation Points and Multiuser Telecommunications Outlet Assemblies (MUTOAs)
Electromagnetic Interference
Firestops

ANSI/TIA/EIA-568-C: (Commercial Building Telecommunications Cabling Standard)
Building Entrance
Equipment Room
Backbone Cabling (Riser)
Telecommunications Room
Horizontal Cabling
Work Area
Channel and Permanent Link

Subsection 2 of ANSI/TIA/EIA-568-C:
Cabling and Components (UTP, Cat 5 – Cat 6, backbone and patch)

Subsection 3 of ANSI/TIA/EIA-568-C:
Optical Fiber Cabling (SM, MM, bend radius, backbone and patch)

ANSI/TIA/EIA-606: (Administration Standard for the Telecommunications Infrastructure of Commercial Buildings)
Administration Concepts (Identifiers, Telecommunication Records, Optional Linkages, Drawings, Work Orders, Identification Formats, and Circuit Example)
Administrative Labeling Map
Summary of Record Elements
Pathway and Space Administration
Wiring System Administration
Grounding and Bonding Administration (Label Text)
Label Color Coding

ANSI/TIA/EIA-607: (Commercial Building Grounding and Bonding Requirements for Telecommunications)
Design Considerations
Terms (Language Used)
Schematic Diagram (of Grounding/Bonding Network)

4. Cabling Specifications

4.1 Cabling Installation

1) All twisted-pair (copper) cabling shall be Category 6 cabling and shall be installed to the Category 6 standards.

2) Plenum cable shall be used where required by code.

3) Blue jacketed cable is used for data and data/voice cables. Green jacketed cables will be used for voice-only. Black jacketed cables will be for video-only cables.

4) If otherwise directed by the OIT project manager (for example, in small, leased facilities anticipated for temporary use), Category 5e-rated cabling may be used.

5) All cables should be run to minimize overhang (using correct lengths and storage methods). Cable will have a 10-foot slack loop at the data closet and a 12- to 18-inch slack loop at the work area.

6) Twisted-pair cable (or any other cable affected by 60-Hz induction) shall not be installed parallel with power circuits (ANSI/TIA/EIA-569-B) or in proximity to transformers, light fixtures, or other significant sources of radio frequency interference.

7) Cables shall not be placed directly on hung ceilings. In a hung ceiling cavity, cables must be placed in raceways or suspended through tie loops. Abandoned cables will be removed as specified by the NEC unless there is a specific plan to reuse them.

8) Cables shall not be secured in a manner that is likely to cause wear or damage (e.g., through improper use of staple guns). Cable bundles will use Velcro ties and will not be cinched so tight that it deforms the cable.

9) Cable will be bundled in a manner that allows for the most efficient use of the pathway. Bundles of more than 24 cables should be approved by the OIT project manager.

10) Cable lubricants are used to get cables through tight spots without damaging the cable or exceeding 25 pounds of force. The lubricant chosen should be compatible with the cable jacket material. A concentrated thin lubricant that evaporates quickly and does not affect the transmission qualities of the cable should be used.

11) Firestops must be installed to prevent the spread of fire between rooms and floors of a building. Firestops should use a fire retardant foam, putty, or caulk to block the advancement of fire through wire duct or access holes, as shown in ANSI/EIA/TIA/569- B (see Figure 1 and Figure 2, below).

12) The data jacks used to terminate the cabling shall be a dual-port RJ45-type wall plate. This will support existing data and voice connections as well as future needs. Additional

ports may be specified by the OIT project manager. The 568B wiring scheme shall be used.

13) The number of outlets in a room should be based on the number of cubicles located in a room, or on the number of subsections in a room (i.e., one dual plate per cubicle, one dual plate per subsection). If the room is not sub sectioned there shall be one dual plate at every 16-foot interval.

14) Jacks should be labeled with the wiring closet number, port number, room number, and jack number. The connection in the closet should have the same information in the labeling (see example below). Strict control should be placed over the relocation of cables if a port change is needed. The cabling should be logged, with fields for the name of the installer and the time and date of the installation of each connection, as well as future changes. The log should be a controlled document and should be consulted both before the change and after work has been signed off.

Example: Labeling for circuit from wiring closet C2/Port 13P to room 312/jack 10A:
Wiring closet label: C2-13P-312-10A (Origin Port – Termination Jack)
Station label: 312-10A-C2-13P (Origin Jack – Termination Port)

15) The routing of cable within modular furniture should be done according to the recommendations and guidelines of the manufacturer of the modular furniture.

16) Installation shall comply with manufacturers' specifications for bend radius.

17) Cabling for cable television shall be RG6 coaxial cable.

18) Where there is a standalone television or flat-panel monitor, there should be an additional dual-port twisted-pair outlet to support the device. The outlet must be behind the unit. Cabling shall make it possible for the television or monitor to be directly connected to the cabling or connected through a video-over-IP set-top converter.

19) Fiber cabling: Upon completion Contractor shall provide test results for review by the OIT project manager. Fiber testing should be done with an optical power meter. Attenuation shall comply with TIA/EIA 568-C.3 and shall be measured at 850 and 1300 nm for multimode fiber and at 1310 and 1550 nm for single mode fiber.

20) Twisted-pair cabling: Upon completion Contractor shall provide test results for review by the OIT project manager. Results shall comply with Permanent Link test model Category 6 standards and shall include results for continuity, frequency range, delay skew, and wire map. Results shall be measured at 1 MHz and 250 MHz for the following: attenuation, NEXT, power sum NEXT, ACR, power sum ACR, ELFEXT, power sum ELFEXT, return loss, and propagation delay.

21) All test equipment must have up-to-date calibration per requirements of the test equipment manufacturer.

4.2 Additional Requirements for Backbone Cabling

1) At a minimum, twelve strands of single mode, twelve strands of multimode and a 50 pair category 3 telephone cable should be installed between the main distribution frame and each intermediate distribution frame closets. The fiber should be terminated with LC connectors. The telephone cable should be terminated on a punch down block. The Multimode fiber should be 50-micron OM4 specifications.

2) All cables are to terminate in a backbone cross-connect panel in the equipment closet or data center (ANSI/TIA/EIA-568-C.1).

3) Backbone cross-connect cables should be separate from interconnect (non-backbone) cables.

    a. All backbone cables are to be labeled with “From” and “To” locations.

    b. Log entries for backbone cables should indicate that the OIT project manager must approve any changes.

Figure 1: Example of Riser Cable Ingress and Egress, Room to Room

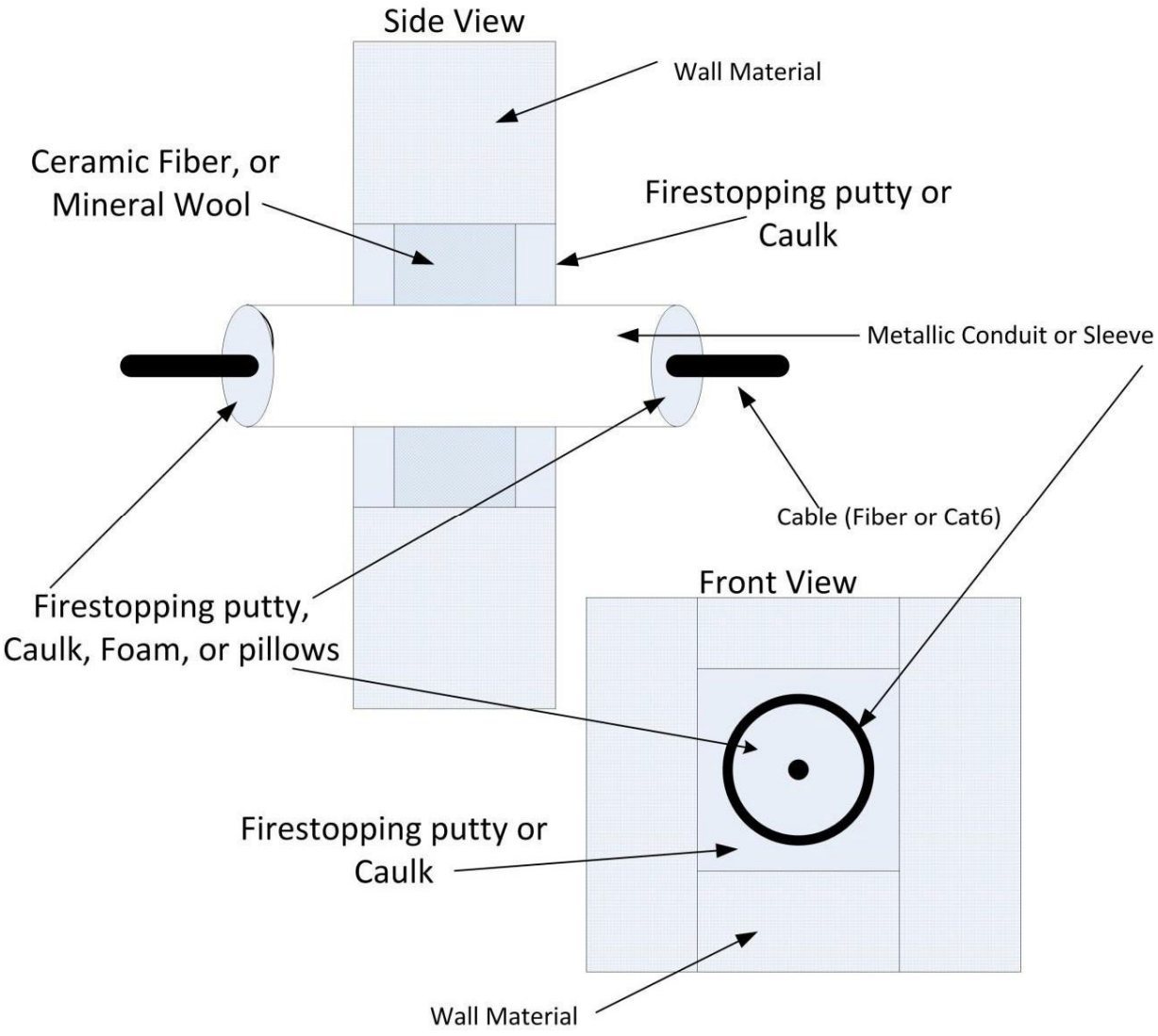
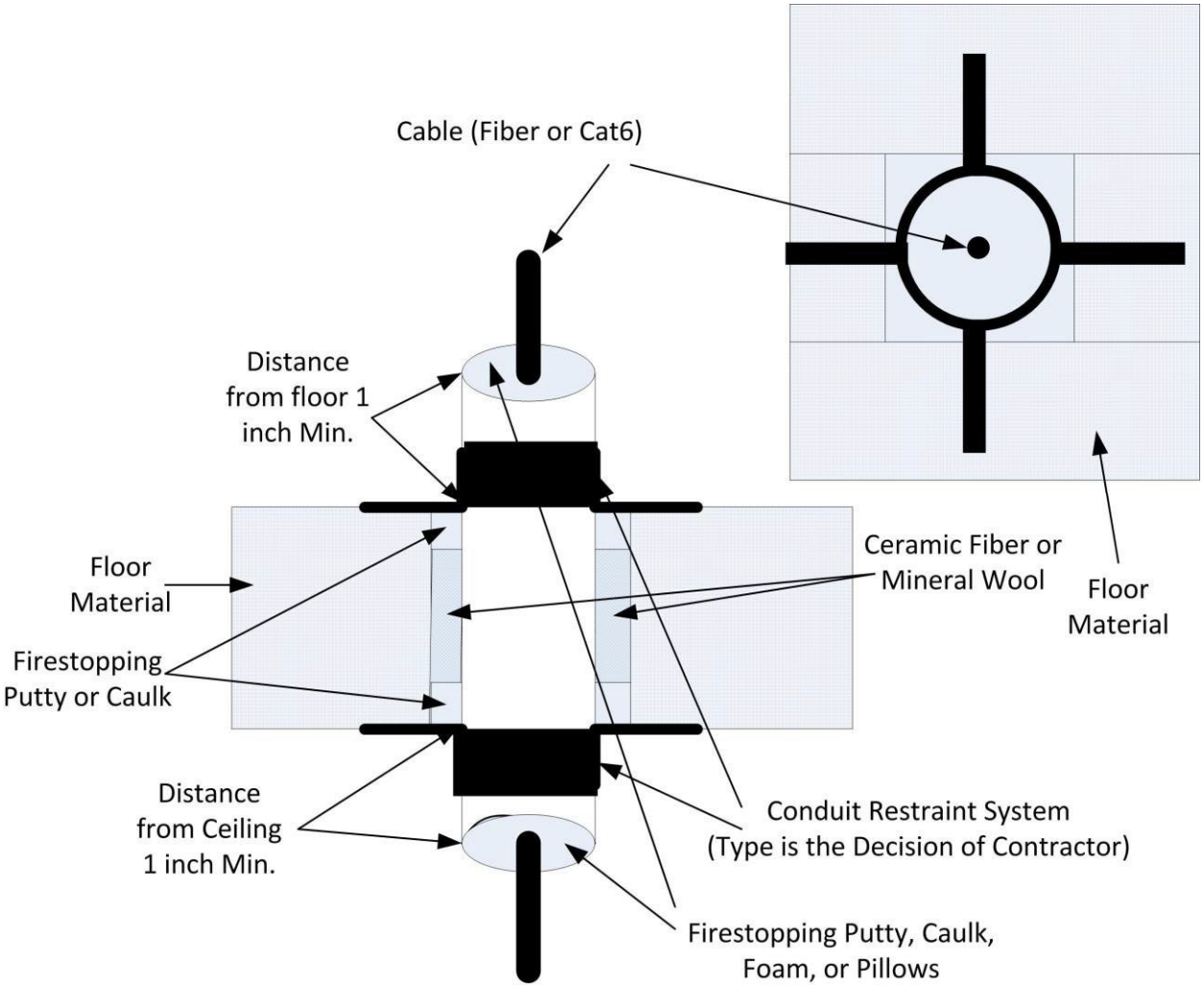


Figure 2: Examples of Riser Run with Fire-Stopping Materials in Place



4.3 Pathways Design and Installation

1) Installation and use of pathways shall be performed according to ANSI/TIA/EIA-569-B.

2) Pathways (Cable Trays, J hooks and Conduit) will be independently supported by the building structure and shall not use the ceiling grid support system.

3) Cable trays will be used for main runs wherever it is practical.

4) J hooks can be used for entrance into work areas where one or two cables are required.

5) J hooks shall be spaced at a maximum of five feet.

6) Cable Tray may consist of the following types: Channel, Ladder, Solid Bottom, Ventilated or Trough, Spine, or Wireway.

7) Cable tray can be located under floors or in the ceiling, in plenum or non-plenum space.

8) All new pathways will be designed for 50 percent additional capacity to allow for future growth.

9) The cable tray design shall not allow the minimum bend radius of the cabling to be exceeded.

10) Grounding per ANSI/TIA/EIA-607 is required for all metal pathways.

4.4 Equipment Closet Design and Wiring Installation

1) Equipment closets should be a minimum of 10'X10' and be restricted to OIT communications equipment. Access to the closets should be from common access hallways. OIT requires 24/7 access to the building and all closets.

2) Minimum power requirements for each data closet are (2) dedicated 240V 30amp circuits with L6-30 receptacles, (2) dedicated, non-switched quad 110v 20amp circuits. When possible, these circuits should be on emergency or generator power.

3) Grounding and bonding practices must be in accord with ANSI/TIA/EIA J-STD-607-A. A qualified electrician or electrical engineer must ensure the building, equipment rooms, and telecom rooms comply with the standards. In brief, all equipment racks in closets need to be connected to a grounding busbar; each of those busbars needs to be connected to a central telecommunications busbar; and the central busbar must be connected to the building grounding electrode system. These practices will ensure that electric surges or electric faults do not result in racks or electronic components becoming energized, which would create a risk of equipment damage and injury.

4) No other utilities (E.G., plumbing, piping, duct work) shall be located or pass through the equipment closet. This room shall not be shared with or used for any function other than legitimate telecommunication systems. Each room shall be designed and located to minimize the potential for water entry.

5) Proper and adequate lighting shall be available for maintenance and repair (ANSI/TIA/EIA-569-B).

6) The temperature and humidity shall be controlled to provide continuous operating ranges of 68° F to 77° F with 40% to 55% relative humidity.

7) Cabling shall comply with ANSI/TIA/EIA-568-C, ANSI/TIA/EIA-569-B, ANSI/TIA/EIA-606, and ANSI/TIA/EIA-607. Figure 3 provides an example of an acceptable layout.

8) Equipment such as termination panels and electronics shall be installed in racks in a safe manner, per manufacturers' specifications. Equipment and patch panels should be installed in a manner that allows for the most efficient routing of patch cords without affecting the overall reliability of the electronics.

9) Cabling shall be neat and orderly as to provide safe access to rack, equipment, and elements. There should be sufficient excess cable to enable racks to be moved within the closet. NEC 2002 770.8 contains requirements for fiber cable installation; similar practices should be used for twisted-pair cabling. Cable management systems shall be installed on each rack and between each patch panel.

10) The 568B wiring scheme shall be used on all wiring terminations.

11) All network patch cables shall be factory-terminated with molded boots. Patch cables shall be available in standard lengths (i.e. 3, 5, 7 and 10feet) and shall match the County's cabling color scheme. All patch cables shall comply with ANSI/EIA/TIA standards.

12) Maintenance and installation personnel must install or replace cables with care, consistent with the current layout.

13) A minimum two 4 post racks should be installed with 4" vertical cable management in between and on both sides. There shall be a minimum of 3 ft. clearance around all sides of the racks.

14) Racks shall be placed to allow for airflow and safe access to rear of rack unit. The design shall support the use of Power over Ethernet Plus (IEEE 802.3at).

15) Equipment in racks should be installed as follows:

    a. Power distribution (e.g., fuse panels, circuit breakers) on top of rack or horizontally on the back of the rack to prevent accidental contact by personnel.

    b. Equipment with modular power on bottom of rack. (Note: UPS is power supply, not power distribution.)

    c. Access panels (fiber) at non-ocular level (non-eye level) and level from top or bottom of cable (fiber) rack.

    d. Access panels (twisted pair) at ocular (eye) level in cable rack.

    e. Switches should be installed from bottom up.

    f. Routers should be installed from top down or, depending on size, installed in separate racks from the bottom up.

4.5 Data Center Design and Installation

1) Termination of cables on panels shall be as follows:

    a. Within a data center with interconnected electronics on different racks, cabling shall travel from electronics to a termination panel on the same rack.

    b. Cabling between racks shall travel from panel to panel. There shall not be cabling directly from electronics on one rack to electronics on another rack, as that would create a risk of damage and outages when devices or cabling are added or moved. In a data center, the impact of an outage may be substantial. Furthermore, wear and tear of cross-connects may lead to intermittent failures or diminished performance—again, with substantial impact.

2) Cross-connect pathways shall be as follows:

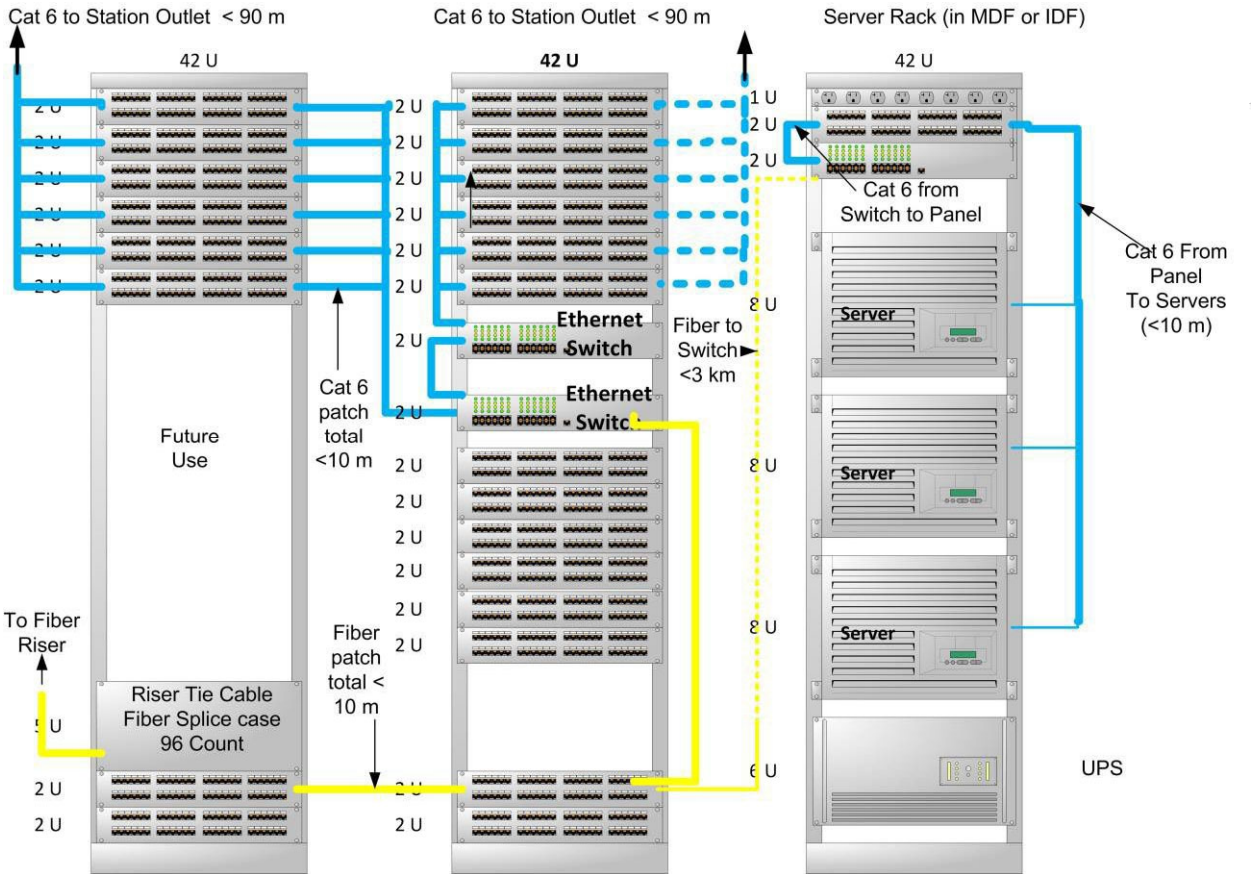
    a. Twisted-pair Ethernet cable should be installed in cable runways overhead.

    b. Fiber optic cross-connect cable should be located in fiber trays overhead.

3) Rack Grounding—All racks and metal trays should be bonded to facility ground.

Figure 3 provides an overview of connectivity between terminations in a data center and primary building closet locations (e.g., MDF).

Figure 3: Example Cable Layout for Large Facility



Note: The fiber and Cat 6 inter-rack patch connections are drawn between the racks and not in overhead trays for clarity of the drawing. Inter-rack patch connections must be in overhead trays and pathways.

5. Technician Methods and Procedures

The cabling specifications provide recommendations and practices to run and maintain the inside cable plant infrastructure. Technician methods and procedures must reinforce these practices.

1) Contractor and County staff accessing the equipment closets shall sign Closet Work Access Logs upon starting and finishing work.

2) Technicians performing installations, moves, or changes shall be given a Work Allowance form with an illustration of the project on it. Changes must be approved by the OIT project manager, and the edited drawing signed.

3) All technicians are required to understand and follow current ANSI/TIA/EIA-568-C, ANSI/TIA/EIA-569-B, ANSI/TIA/EIA-606, and ANSI/TIA/EIA-607 specifications.

4) Test results shall be provided to the OIT project manager upon completion and reviewed prior to approval.

5) The OIT project manager must review and approve all completed work.

6) Contractors must minimize disruption to regular operations when performing work.

7) All areas must be restored to their original condition. Areas must be clean, and all trash removed. Contractors are responsible for repairing any damage, including to ceiling tiles and walls.

Documentation

Documentation is critical to the quality and lifetime of the cabling. Facility cabling is potentially one of the longest-life portions of OIT's infrastructure. Lack of documentation wastes time and money and reduces the lifetime of this asset.

The following documentation is recommended:

1. Test data organized by circuit, including scanned originals of any paper test results or original data files from test equipment. Results should also be stored in the cabling database (Item 2 below).

2. Access or SQL database for each circuit, including names, endpoints, change history, approvals, and test data. For fiber, this should include where applicable the color and tube within the fiber cable.

3. Maps in Visio or other format, including building layout, closets, pathways, and jacks. These should be created for the buildings with detailed maps of data center and closet cabling. Network monitoring tools such as SolarWinds LAN scanner can create layer 2 and layer 3 maps, which can assist in beginning the cabling maps and identifying network changes.

QUADRARACK™ SERVER FRAME

KEY FEATURES

- Stability and strength of an enclosure in an open mounting system
- Provides easy access to equipment and cabling
- Quick assembly with one-piece top and bottom pan sets
- Easy to bay together to create multi-frame configurations
- Use with any CPI Cabling Section to manage cables
- Equipment mounting locations are marked on the mounting channels
- Square-punched mounting holes allow you to change equipment mounting hardware to meet the requirements of rack-mount server and data storage equipment
- Support large equipment on heavy-duty four-post fixed and sliding shelves

APPLICATIONS

- Use to support rack-mount server and data storage equipment in data centers or computer equipment rooms.
- Use with shelves to support large, heavy computer and data processing equipment.

RELATED ACCESSORIES

- Universal Horizontal Cable Manager
- Jumper Trays
- Fixed and Sliding Equipment Shelves
- LCD Monitor + Shelf
- Keyboard + Tray

USE WITH

- MCS Master Cabling Section
- CCS Combination Cabling Section
- VCS Vertical Cabling Section
- Global Vertical Cabling Section

The QuadraRack™ Server Frame provides a sturdy, cost-effective solution for supporting rack-mount computer servers and data storage equipment in data centers, computer equipment rooms and other facilities. The QuadraRack offers the strength and stability of an enclosure in an open mounting system that provides easy access to equipment and cabling.

The QuadraRack Server Frame will support up to 1,000 lb of equipment. The corner posts are C-shaped equipment mounting channels that that are fixed 29" apart to provide front and rear support for 19" rack-mount equipment or shelves. The channels surround and protect equipment. Each rack-mount space is marked on the channels making it easy to locate and position equipment. Mounting holes are square punched allowing mounting hardware (cage nuts) to change to match equipment requirements.

The QuadraRack Server Frame can be used in combination with CPI Standard Racks (two-post racks), Cabling Sections (vertical cable managers) and overhead Cable Runway (ladder rack) to support a wide range of equipment storage applications. You can attach 12" wide and 18" wide CPI Cable Runway (ladder rack) directly to the top pan with J-bolts or a Cable Runway Elevation Kit. CPI Cabling Sections bolt directly to the side of the frame, and the base of the frame is punched for easy floor attachment.

See reverse for product specifications and ordering information. Please contact CPI Technical Support for configuration assistance.

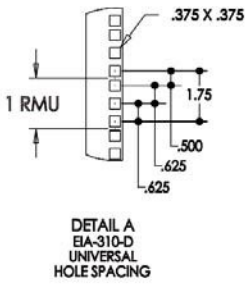
SPECIFICATIONS

- Four-post frame with square-punched mounting holes used to support 19" wide rack-mount computer server and data storage equipment and shelves.
- For indoor use only, in environmentally controlled areas; may not be used outdoors, in industrial or harsh environments, or in plenum spaces.
- Includes:
  - (1) top pan
  - (1) bottom pan
  - (4) mounting channels
  - (2) horizontal braces
  - (2) base angles
  - (2) top angles
  - Assembly hardware
  - Order cage nuts and installation hardware separately
- Available sizes:
  20.3" W x 84" H x 41" D
- Usable equipment space:
  19" W x 45 RMU x 29" D
- Equipment Support:
  - Front and rear pairs of C-shaped equipment mounting channels
  - Fixed in place, 29" apart front-to-rear 19" wide, EIA-310-D compliant hole pattern
  - 1-3/4" high rack-mount units (RMU)
  - Universal hole pattern, 5/8"-5/8"-1/2" vertical hole spacing
  - Square-punched .375" equipment mounting holes
  - RMU spaces are marked on the channels
- Load capacity:
  1000 lb of equipment
- Certifications:
  19"W, EIA-310-D compliant
- Material:
  Aluminum extrusion
  Aluminum and steel sheet
- Construction:
  Bolted assembly
  Ships unassembled
- Finish:
  Epoxy-polyester hybrid powder coat paint available in black, gray or computer white

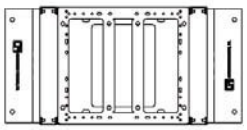
Accessories:

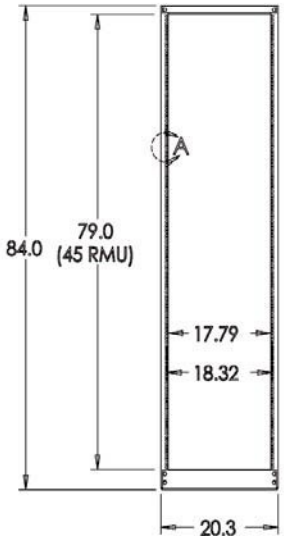
- Cable Management:
  Use vertical and horizontal cable managers, sold separately
- Power Distribution:
  Use vertical and rack-mount power strips, sold separately
- Ground and bonding:
  Use rack-mount bus bars or ground terminal lugs, sold separately
- Seismic Bracing:
  Use CPI bracing kits, sold separately

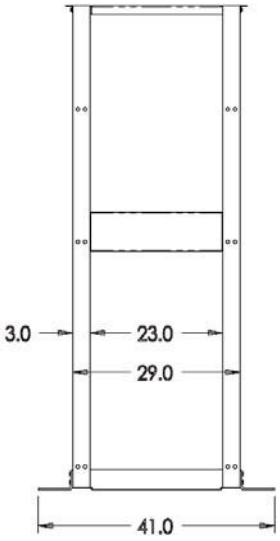
DIMENSIONS



DETAIL A
EIA-310-D
UNIVERSAL
HOLE SPACING







ORDERING INFORMATION

Part Number	Description	Shipping Weight
15053-X03	19"W x 29"D x 7'H	77 lb

x=color; 1=Gray, 2=White, 7=Black

Square-Punched Hardware Kits (sold separately)				
Part Number	**Nominal Size**	**Package Of**	**Finish**	**Shipping Weight**
12637-001	M-6	25	Gold Over Zinc	1 lb
12638-001	10-32	25	Zinc	1 lb
12639-001	12-24	25	Black	1 lb

CHATSWORTH PRODUCTS, INC.

MKT-60020-353 NB Rev. 2 12/06