

THE GEORGE

WASHINGTON

UNIVERSITY

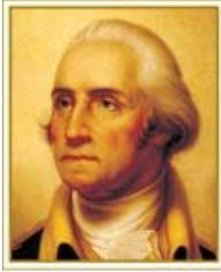
WASHINGTON DC

DESIGN STANDARDS

for New Construction and Major Renovations

Facilities Planning and Design Review

January 1, 2011

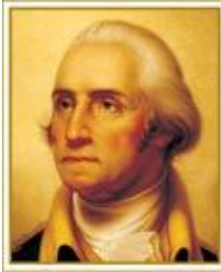


THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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NOTE TO REVIEWERS

The development of The George Washington University Design Standards will be an ongoing project, with periodic updates. To that end, there will likely be documents subject to revision at any given time as the University develops new Standards or revises existing Standards. Currently, there are sections that contain preliminary or draft information; work from previous efforts to develop design standards; or simple notes as a starting point. To distinguish such documents, they have the watermark "Draft". These "Draft" sections are to be used on an interim basis and are open for review and comment to aid in their development.



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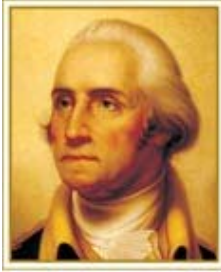
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END OF SECTION



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INTRODUCTION

HOW TO USE THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS AND DESIGN STANDARDS SUPPORTING DOCUMENTS

The George Washington University Design Standards establish the requirements for capital projects, including new and renovation projects, for all work at The George Washington University. At the time of writing, the bulk of major, foreseeable capital projects will happen on the Foggy Bottom Campus in the District of Columbia. This is the largest and most complex of three University campuses, which also include Mount Vernon Campus in the District of Columbia and Virginia Science and Technology Campus in Loudoun County, Virginia.

The primary goals of the Design Standards and Design Standards Supporting Documents are as follows:

1. To provide direction to architects, engineers, and University Project Managers to assist them in providing solutions that conform to the University's aesthetic and functional demands.
2. To the extent possible, to make Designers and University Project Managers aware of relevant resources and requirements that exist outside of this document, but remain relevant to Project requirements. Some such resources are available through The University, while others are State, Local, or Federal resources or requirements.

Designers are required to utilize and conform to these Design Standards and Design Standards Supporting Documents for all facility design work. Designers are further required to comply with all applicable zoning laws, environmental regulations, NFPA requirements, ASHRAE Guidebooks, and OSHA regulations, as well as all relevant Federal, State and Local codes, whether specifically identified herein or not. In the event that applicable codes and regulations are at variance with these Design Standards or Design Standards Supporting Documents, Consultant shall make The George Washington University Project Manager responsible for the Project aware of the discrepancy and comply with the more stringent requirements.

The Designer is required to submit any proposed deviations from these Design Standards in writing to the responsible Project Manager. Written approval from the Project Manager is required before the Designer may proceed with the proposed change(s). Any questions, comments, or suggestions to improve The George Washington University Design Standards should be submitted to the Director of Facilities Planning and Design Review, Nancy Giammatteo, giammatt@gwu.edu.

As codes, regulations, products, and preferences change, The George Washington University updates the Design Standards on an as-needed basis. The Designer is expected to maintain and work from the version of the standards current at

commencement of Project design.

In addition to this INTRODUCTION, the following sections are included in The George Washington University Design Standards:

- DESIGN STANDARDS SUPPORTING DOCUMENTS

These documents provide guidance that is largely procedural in nature, rather than directly related to design aspects for projects. It is geared not only for designers, but also University Project Managers.

- DESIGN STANDARDS BY BUILDING TYPE

These documents provide guidance that is applicable to a given building type. They are only to be used in conjunction with the Specification Guidelines.

- DESIGN STANDARDS - SPECIFICATION GUIDELINES, PART ONE

This section is to be developed by Construction Project Management.

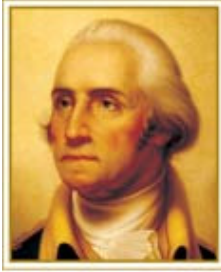
- DESIGN STANDARDS - SPECIFICATION GUIDELINES, PART TWO

These documents provide guidance that has generally been organized to conform to the 16-division version of MasterSpec, as developed by the American Institute of Architects. They may be used either in conjunction with Building Type standards or alone on small projects where applicable.

The information is intended for the Designer's use and, under no circumstance, shall it be misconstrued to be - nor used as - specifications for Contractor use. It remains the designer's responsibility to prepare project-specific Contract Drawings and Specifications, which conform to the Design Standards herein, for Contractor use.

As noted above, the development of The George Washington University Design Standards will be an ongoing project, with periodic updates. To that end, there will likely be documents subject to revision at any given time as the University develops new Standards or revises existing Standards. Currently, there are sections that contain preliminary or draft information; work from previous efforts to develop design standards; or simple notes as a starting point. To distinguish such documents, they have the watermark "Draft". Draft sections are to be used on an interim basis and are open for review and comment to aid in their development.

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DESIGN STANDARDS SUPPORTING DOCUMENTS CODES AND REGULATIONS

A. SUMMARY

In addition to these Design Standards, consultants must be aware of the most current, applicable versions of the codes and regulations noted in this section which further direct construction work at The George Washington University. The consultant bears the full responsibility of determining the applicability of these and any other codes that may govern the work.

B. CODES, ACTS, STANDARDS AND OTHER REGULATIONS

1. Federal Regulations and Authorities:

- a. Americans with Disabilities Act (ADA)
- b. U.S. Commission of Fine Arts (CFA) (www.cfa.gov)
 - i. Constructing public buildings in certain areas of the National Capital require review under the Shipstead-Luce Act. This applies to the Foggy Bottom campus only.

GW Buildings Requiring CFA Review	
• 1900 F St. - Thurston	• 2208 F St.
• 1925 F St. – Alumni House	• 514 19th St. - Mitchell
• 2031 F St. - JJ	• 520 22nd St.
• 2033-2037 F St.	• 522 22nd St.
• 2101 F St.	• 524 22nd St.
• 2109 F St.	• 526 22nd St.
• 2115 F St. - Guthridge	• 1957 E St.
• 2121 F St.	• 1959 E St.
• 2123 F St.	• 2021 F St. - Potomac House
• 2138 F St.	• 2025 F St. - Support Building
• 2140 F St.	• 2100 F St. - Dakota
• 2142 F St.	• 2119 F St.
• 2144 F St.	• 2141 F St. – Sq. 80 Res. Hall
• 2145 F St.	• 2201 Virginia Avenue
• 2148 F St.	• 600 22nd St. - Smith Ctr.
• 2150 F St.	• 607 23rd St. - Townhouse Row
• 2156 F St.	• 616 23rd St. - Ivory Tower

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- 2206 F St.

- c. National Register of Historic Places - National Park Service, U.S. Department of the Interior (<http://www.nps.gov/history/nr/>). The National Register of Historic Places, a program of the National Park Service, serves to preserve, protect, and share cultural heritage resources across the nation in partnership with states, local government, and nonprofit organizations. GW's Foggy Bottom Campus is largely part of the Foggy Bottom Historic District, a D.C. Landmark and a listing on the National Register of Historic Places.

National Register and DC Historic Sites Located on the Foggy Bottom Campus		
Resource	Address	Designation
F. David Fowler Graduate Career Center/Wetzel House	714 21st Street	DC Landmark, 1987 National Register, 1990
Corcoran Hall	725 21st	DC Landmark, 1987 National Register, 1991
Lenthall Houses	606-610 21st Street	DC Landmark, 1964 National Register, 1972
Lisner Auditorium	730 21st Street	DC Landmark, 1987 National Register, 1990
President's House	2003 G Street	DC Landmark, 1987 National Register, 1991
Red Lion Row	2000 Pennsylvania Ave	DC Landmark, 1977 National Register, 1991
Stockton Hall	720 20th Street	DC Landmark, 1987 National Register, 1991
Hattie M. Strong Residence Hall	620 21st Street	DC Landmark, 1987 National Register, 1991
Underwood House	2000 G Street	DC Landmark, 1979 National Register, 1976
Woodhull House	2033 G Street	DC Landmark, 1987 National Register, 1991
Alexander Ray House	1925 F Street	DC Landmark, 1964 National Register, 1990
Engine Company 23	2119 G Street, NW	DC Inventory of Historic Sites
Grant School	2130 G Street, NW	DC Inventory of Historic Sites
Concordia United Church of Christ	20th & G Street	DC Inventory of Historic Sites
St. Mary's Episcopal Church	730 23rd Street	DC Inventory of Historic Sites

- d. GW’s Historic Preservation Plan, included in the 2007 Foggy Bottom Campus Plan, proposes a potential historic district on the Foggy Bottom Campus as well as the landmark designation of several additional campus buildings beyond those already designated.

Additional Campus Resources Proposed to be Designated as Historic Landmarks	
Resource	Address
John J. Earley House and Studio	2131 G Street, NW
Madison Hall	736 22nd Street, NW
Kennedy Onassis Hall	2222 I Street, NW
Munson Hall	2212 I Street, NW
Burns Building	2150 Pennsylvania Avenue, NW
Fulbright Hall	2223 H Street, NW

- e. National Capital Planning Commission (www.ncpc.gov)
 - i. The National Capital Planning Commission (NCPC), through planning, policymaking, and plan review, defines and protects the federal government’s interest in the development of the National Capital Region.
- f. The United States Clean Air Act (CAA)(<http://www.epa.gov/air/caa/>)
 - i. The United States Clean Air Act is a federal law to control air pollution on a national level. Under this law, the Environmental Protection Agency (EPA) is required to develop and enforce regulations to protect the general public from exposure to materials deemed harmful to human health.
 - ii. Title V of the Clean Air Act requires each state to develop a comprehensive operating permit program for major industrial sources of air pollution such as burning fossil fuels. The Title V Operating Permit Program requires businesses to monitor, report, and certify compliance with the conditions of the permit.
 - iii. Title VI of the Clean Air Act regulates ozone-depleting substances such as refrigerants CFCs and HCFCs. Owners and operators of air conditioning and refrigerant systems are responsible for compliance with the program.

2. State and Local Codes, Regulations and Authorities:

- a. DC Green Building Act of 2006, DC Law 16-234, took effect March 8, 2007
- b. DC Clean and Affordable Energy Act of 2008; takes effect on private buildings in 2010. (Note: while this Act does not directly affect design choices, it should further reinforce the need for providing high performance buildings that will benchmark well in the required Energy Star Building portfolio efforts.)

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- c. NFPA 13 - Standard for the Installation of Sprinkler Systems
- d. NFPA 14 – Standard for the Installation of Standpipe and Hose Systems
- e. NFPA 20 – Standard for the Installation of Stationary Pumps for Fire Protection
- f. NFPA 72 – National Fire Alarm Code
- g. DC Office of Planning/Historic Preservation Review Board (HPRB)
 - i. External modifications to the following buildings must be submitted to DC HPRB for review and coordinated with GW's Office of Campus Planning.

Buildings Requiring Historic Review		
<ul style="list-style-type: none"> • 1900 F St. - Thurston • 1925 F St. - Alumni House • 2031 F St. - JJ • 2033-2037 F St. • 2101 F St. • 2109 F St. • 2115 F St. - Guthridge • 2121 F St. Unit 1, 2, 3 • 2123 F St. • 2138 F St. • 2140 F St. • 2142 F St. • 2144 F St. • 2145 F St. • 2148 F St. • 2150 F St. • 2156 F St. • 2206 F St. • 2208 F St. • 514 19th St. - Mitchell • 520 22nd St. • 522 22nd St. • 524 22nd St. • 526 22nd St. • 1920 G St. - United Church (leased) • 2000 Pennsylvania Avenue • 2000 G St. - Underwood House • 2000 H St. – Lerner • 2002 G St. • 2003 G St. 	<ul style="list-style-type: none"> • 2006 G St. • 2013 G St. - Stuart • 2021 H St. • 2023 G St. - Lisner • 2024 - 2026 G St. (rear) • 2029 G St. - Bell • 2033 G St. - Woodhull House • 2036 G St. - Quigley's • 2036 H St./729 21st St – Samson • 2100 H St./730 21st St. - Lisner Auditorium • 2106 G St. • 2108 G St. • 2110 G St. - Hortense Amsterdam House • 2112 G St • 2114 G St. • 2115 G St. - Monroe • 2116 G St. - Surface Parking • 2119 H St. - Crawford • 2121 H St. - Schenley • 2122 H St. - Kogan Plaza • 2124 I St. - West End • 2125 G St. • 2127 G St. • 2129 G St. • 2129 G St. rear • 2131 G St. • 2131 G St. rear • 2134 G St. - GSEHD 	<ul style="list-style-type: none"> • 2136 G St. • 2138 G St. • 2140 G St. • 2142 G St. • 2212 Eye St. - Munson • 2222 Eye St. - JBKO • 2223 H St. - Fulbright • 600 20th St. - FSK • 600-602 21st St. • 603 22nd St. • 605 21st St. • 605 22nd St. • 606 21st St. - Lenthall Hse. #2 • 607 21st St. • 607 22nd St. • 609 21st St. • 609 22nd St. • 610 21st St. - Lenthall Hse. #1 • 611 22nd St. • 613 22nd St. • 615 22nd St. • 617 22nd St. • 619 22nd St. • 620 21st St. - Strong • 710 21st St. – Gov't • 714 21st St. - Fowler Graduate Career Center (Wetzel House) • 716 20th St. - Burns Law Library • 720 20th St. - Stockton • 725 21st St. - Corcoran • 736 22nd St. - Madison

- h. DC Office of Planning/Historic Preservation Review Board (HPRB)
 - i. Window Repair and Replacement for Historic Properties (memo)
 - ii. Historic Preservation Review Board's Window Standards (DCMR Title 10A, Chapter 23) may be accessed at www.planning.dc.gov.
- i. District of Columbia Municipal Regulations, including but not limited to:
 - i. DCMR Title 11, Zoning
 - ii. DCMR Title 12, Construction Codes
 - Note: The Building Code at time of writing is as follows: International Code Council's International Building Code/2006, as amended by DC Construction Codes Supplement of 2008. IBC/2006 is comprised of the following:*
 - *International Building Code/ 2006 (as amended by Construction Codes Supplement 12A DCMR)*
 - *International Residential Code/2006 (as amended by the Construction Codes Supplement 12B DCMR)*
 - *NFPA National Electrical Code/2005 (as amended by the Construction Codes Supplement 12C DCMR)*
 - *International Fuel Gas Code/2006 (as amended by the Construction Codes Supplement 12D DCMR)*
 - *International Mechanical Code/2006 (as amended by the Construction Codes Supplement 12E DCMR)*
 - *International Plumbing Code/ 2006 (as amended by the Construction Codes Supplement 12F DCMR)*
 - *International Property Maintenance Code/2006 (as amended by the Construction Codes Supplement 12G DCMR)*
 - *International Fire Code/2006 (as amended by the Construction Codes Supplement 12H DCMR)*
 - *International Energy Conservation Code/2006 (as amended by Construction Codes Supplement 12I DCMR)*
 - *International Existing Building Code/2006 (as amended by the Construction Codes Supplement 12J DCMR)*
 - iii. Title 14, Housing
 - iv. Title 20, Environment
 - v. Title 22, Public Health and Medicine
- j. ICC/ANSI A117.1, Standard on Accessible and Usable Buildings and Facilities, as referenced and amended in DCMR 12A
- k. District of Columbia Department of Consumer and Regulatory Affairs (DCRA; <http://dcra.dc.gov>) – for building permits
 - i. Office of Zoning (<http://dcoz.dc.gov/>)
 - ii. Office of the Surveyor
 - iii. Permit Center
 - iv. Department of Public Works
 - v. Department of the Environment (DDOE) (ddoe.dc.gov/)

- I. District Department of Transportation (DDOT) (www.ddot.dc.gov)
 - i. Public Space permits
- m. Department of Health (DOH) (www.doh.dc.gov)
 - i. Community Hygiene Administration – for food vendor reviews
- n. Virginia Department of Conservation and Recreation (DCR),
Chesapeake Bay Local Assistance – Chesapeake Bay Preservation Act
 - i. The Chesapeake Bay Preservation Act, enacted by the Commonwealth of Virginia in 1988, requires the 84 Virginia communities which border on the tidal portions of rivers that drain into the Chesapeake Bay (Tidewater jurisdictions) to implement water quality protection measures to improve the declining condition of this resource and its tributaries. Projects that disturb land area greater than an acre or 2,500 sq ft must be registered with the Virginia Stormwater Management Program. A permit is required for the control of stormwater discharges from MS4s and construction activities. VA Science and Technology Campus is subject to this Act.
- o. Building Codes for Loudoun County Virginia
 - i. Virginia Uniform Statewide Building Code (USBC) is based on the ICC series of codes with state amendments. At the time of this writing, the 2006 editions are currently in effect:
 - *2006 International Building Code*
 - *2006 International Plumbing Code*
 - *2006 International Mechanical Code*
 - *2005 National Electrical Code*
 - *2006 International Fuel Gas Code*
 - *2006 International Energy Conservation Code*
 - *2006 International Residential Code*
 - *2006 International Fire Code*
 - ii. The Virginia amendments to the model codes include the following parts:
 - *The Virginia Construction Code (Part I of USBC)*
 - *The Virginia Rehabilitation Code (Part II of USBC)*
 - *The Virginia Maintenance Code (Part III of the USBC)*
 - *Virginia Statewide Fire Prevention Code*
- p. Loudoun County Department of Building and Development
 - i. Permit Issuance – Building, Electrical, Gas, Plumbing, Fire Suppression, Mechanical, Occupancy, Soils Report, Grading and Zoning
- q. Loudoun County Department of Health
 - i. Health Permit for food service facilities
- r. Virginia Department of Conservation and Recreation
 - i. Virginia Stormwater Management Program (VSMP) General Permit is required for the control of stormwater discharges from MS4s and construction activities.
- s. Utilities for approval, as required
 - i. Foggy Bottom and Mount Vernon Campuses:

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- a.) Water and Sewer: DC Water and Sewer Authority (DCWASA; www.dcwasa.com)
- b.) Electricity: Pepco (www.pepco.com) – Pepco must provide a load letter agreeing to the engineer’s calculated loads and that Pepco can serve the project
- c.) Natural Gas: Washington Gas Light (WGL; www.washgas.com)
- d.) No. 2 Fuel Oil: Griffith Energy Services (<http://griffithoil.com>)
- ii. VA Science and Technology Campus:
 - a.) Water and Sewer: Loudoun Water (www.loudounwater.org)
 - b.) Electricity: Dominion Virginia Power (www.dom.com)
 - c.) Natural Gas: Washington Gas Light (WGL; www.washgas.com)
 - d.) No. 2 Fuel Oil: Griffith Energy Services (<http://griffithoil.com>)

3. GW-Specific Requirements (acquire through the GW Project Manager – <S:\FACILITIES PLANNING\DESIGN STANDARDS\JAN ' 11 STANDARDS\Design Standards Supporting Documents>):

Requirement	Description	Last Known Revision Date <i>to be confirmed by project team</i>	GW responsible party
CFT Security and Access Standards		March 17, 2005	Art Bean, Construction Project Management
Standards for Annunciation of Fire Alarms		June 16, 2010	James Robinson, University Police Department
Standards for Fire Alarm System Tie-In-GWPD Monitoring		June 16, 2010	
George Washington University Door Hardware Specification Guideline (See also GW Design Standards Section 08710)		July 16, 2008	Terrence Branch, Facilities Lock Shop Supervisor
BICSI Telecommunications Distribution Methods Manual	Voice/Data/Telecom munications Network Cabling and Infrastructure		Brian Eveleth, Office of Technology Operations and Engineering/ Division of Information Technology

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Classroom Design Specifications <i>Referenced as "AT Standards" herein</i>	Standards for GW Classrooms. <i>Note: See Academic Buildings Standards for additional information and sections that apply.</i>	March 2010	GW Academic Technologies
Foggy Bottom Campus Plan 2006 - 2025 (20 year plan), includes the Streetscape Plan, the Historic Preservation Plan, and the Transportation Management Plan; 2007 Foggy Bottom Campus Plan	Foggy Bottom Campus Plan		
University Center Design and Development Guidelines	VA Science and Technology Campus	November 1, 1989	
2010 Mount Vernon Campus Plan	Mount Vernon Campus Plan		
Contractor Safety Manual www.gwu.edu/~riskmgnt/pdf/contractorsafetymanual.pdf	Environmental health concerns including asbestos, lead-based paint and mold		GW Office of Environmental Health and Safety
Insurance and claims management information: www.gwu.edu/~riskmgnt/program/insurance/insurance_claimsmanagement.cfm			GW Office of Risk Management
Plan Review and Construction Project Guidelines for GW, "FM Global," prepared by Factory Mutual Insurance Company http://www.gwu.edu/~riskmgnt/pdf/planreviewandconstructionprojectguidelines.pdf			GW Office of Risk Management

- a. Plan Review and Construction Project Guidelines for GW, "FM Global," prepared by Factory Mutual Insurance Company

- i. GW's insurance contract with FM requires that designs meet FM Research guidelines and, when possible, use FM Research-approved products. Contractors should submit plans to the Factory Mutual Global Plan Review Department and receive written acceptance prior to starting work. FM Global generally reviews plans for:
 - Structural (Roof, Damage-limiting construction, Fire Wall)
 - Roof Covering
 - Green Roof Systems
 - Site plans for new buildings or additions
 - Architectural drawings
 - Sprinkler drawings
 - Alarm system layout and wiring
 - Special protection systems (CO₂, Halon, Dry Chemical)
 - Fuel fired equipment (Boilers, Ovens, Furnaces)
 - Process equipment
 - Electrical power distribution

C. INDUSTRY & GOVERNMENT ORGANIZATIONS/STANDARDS

Where abbreviations and acronyms are used in GW Design Standards, they shall mean the recognized name of the entities in the following list:

1. American Architectural Manufacturers Association (AAMA)
2. American Association of State and Highway Transportation Officials (AASHTO)
3. Americans with Disabilities Act (ADA)
4. American National Standards Institute (ANSI)
5. American Society of Civil Engineers (ASCE)
6. American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
7. American Society of Mechanical Engineers (ASME)
8. American Society for Testing and Materials (ASTM International)
9. American National Standards Institute (ANSI)
10. ANSI/ASHRAE/IESNA, Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings
11. Brick Industry Association (The) (BIA)
12. Carpet and Rug Institute (The) (CRI)
13. Cool Roof Rating Council (CRRC)
14. Environmental Protection Agency (EPA)
15. Forestry Stewardship Council (FSC)
16. Glass Association of North America (GANA)
17. Green Seal (GS)
18. International Code Council (ICC)
19. Illuminating Engineering Society of North America (IESNA)
20. International Organization for Standardization (ISO)
21. Insulating Glass Certification Council (IGCC)
22. Leadership in Energy and Environmental Design (LEED)

- 23. North America Fenestration Standard (NAFS)
- 24. National Electric Manufacturers Association (NEMA)
- 25. National Fenestration Rating Council (NFRC)
- 26. National Fire Protection Association (NFPA)
- 27. National Roofing Contractor's Association (NRCA)
- 28. National Wood Window and Door Association (NWWDA)
- 29. Occupational Safety and Health Administration (OSHA)
- 30. Practical Guide to Seismic Restraint (ASHRAE)
- 31. Resilient Floor Covering Institute (RFCI)
- 32. Safety Glazing Certification Council (SGCC)
- 33. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
- 34. South Coast Air Quality Management District (SCAQMD)
- 35. Tile Council of America (TCA) (now TCNA)
- 36. Tile Council of North American (TCNA)
- 37. Underwriters Laboratories (UL)
- 38. US Department of Energy (DOE)
- 39. US Green Building Council (USGBC)

D. PERMITTING AND AGENCY APPROVALS

This section outlines the protocol for obtaining required permits for renovations, repairs, and new construction, as imposed by various federal, District of Columbia and Virginia governmental regulatory agencies. Full compliance with agency requirements listed below is prerequisite to renovation, repairs, new construction, and the use of and addition to existing buildings and spaces. The university policy is to obtain necessary permits for all work.

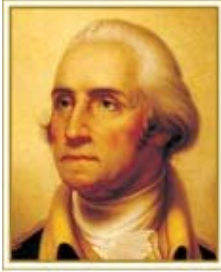
Table 1. Regulatory Agency Information

Jurisdiction	Agency	Departments within agency	Permit Issued	Other Reviews
Federal	National Planning Commission			
Federal	Commission of Fine Arts			Shipstead-Luce Act
Federal	US Environmental Protection Agency (EPA)/	Office of Air and Radiation (US EPA)		
District	District Department of the Environment (DDOE)	Air Quality Division (DDOE)	Title V Operating Permit	
District	Department of Consumer & Regulatory Affairs	Zoning	Building	
		Surveyor		
		Permit Center		
		Public Works		
		Department of Environment		

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

District	District Department of Transportation		Public Space	
District	Office of Planning Historic Preservation Office	Historic Preservation Review Board		Historic Buildings
District	Department of Health			Food vendors
District	DC Water & Sewer Authority (WASA)		Utilities approval	
District	Pepco		Utilities approval	
State	Virginia Department of Conservation and Recreation	Soil and Water Conservation	Virginia Stormwater Management Program (VSMP) General Permit	
County	Loudoun County Department of Building & Development		Building	
			Electrical	
			Gas	
			Plumbing	
			Fire Suppression	
			Mechanical	
			Occupancy	
			Soils Report	
			Grading	
County	Loudoun County Department of Health	Health	Health- Food Services Facilities	
County	Loudoun Water		Utilities approval	
County	Dominion Virginia Power		Utilities approval	
County	Washington Gas Light		Utilities approval	

END OF SECTION



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DESIGN STANDARDS SUPPORTING DOCUMENTS PERMITTING¹

A. DCRA PERMIT APPLICATION PROCESS AND REQUIREMENTS

1. Pre-application
 - a. DCMR zoning regulations
 - i. “Regulations controlling and restricting the height, bulk, number of stories, and size of buildings and other structures, the open spaces around them, the density of the population, and the uses of buildings, structures, and land in the District of Columbia, and for said purposes dividing the District of Columbia into zoning districts.”²
 - b. Office of the Surveyor documents may need to be submitted with the permit application.
 - c. New address issuance (if applicable)
 - d. Preliminary Design Review Meeting (PDRM): this meeting will provide applicants with a preliminary review of their building plans prior to filing.
 - e. Other pre-application meetings with WASA, DDOT and DOH may be beneficial to eliminate unforeseen obstacles during review of permit applications.
 - f. Environmental Review
 - i. This review is required to determine whether an Environmental Impact Statement is necessary. Permit applicants must submit an Environmental Intake Form with the building permit application.
 - g. Intake/Completeness Check
 - h. Plan Submittal
 - i. Plan Review
 - j. Permit Issuance
 - k. Inspections
 - i. Building inspections: plumbing, electrical, fire and construction inspections are conducted to assure the building has been constructed in accordance with the codes and approved plans.
 - l. Certificates of Occupancy
 - i. A C of O is required for occupancy of all buildings except single-family dwellings. Once granted, the certificate must be displayed onsite.

B. REQUIRED PERMITS

See Table 1. Web links to permits are provided in footnotes.

¹ From the DC Department of Consumer and Regulatory Affairs website, www.dkra.dc.gov.

² District of Columbia Municipal Regulations, Title 11, Chapter 1, 1-1.

Table 1: Types of work and required permits

Work Type	Zoning ³	Survey ⁴	Building Permit ⁵	Public Space Permit ⁶	DCWASA approval*	Supplemental Permit	C of O ⁷	DOH approval
New construction	•	•	•	•	•	(if applicable)	•	
Renovation of existing building- food venues		•	•			(if applicable)	•	•
Major repairs			•			(if applicable)	•	
Demolition			•					
Signage			•					
Awnings/Canopies		•	•					
Street/Alley closing		•						
Dumpsters in public space				•				
Sidewalks	•	•		•				
Streetscape				•				
Water or sewer lines					•			
Excavations (water meters and vaults)					•			
A/C & Refrigeration ⁸						•		
Plumbing fixture ⁹						•		
Electrical systems ¹⁰						•		
Gas appliances						•		

*In addition to obtaining approval, contractor must contact Miss Utility at 1-800-257-7777 at least two working days before digging to avoid damaging gas lines.

**This type of work requires a completed Application to Close a Street or Alley.¹¹

³ Summary of overlay districts: <http://www.dcoz.dc.gov/info/overlay.shtm>

⁴ Requirement information: <http://www.dcrd.dc.gov/dcrd/cwp/view,a.1343,q.602311,dcrdNav.1334081.asp>

⁵ Permit:

http://dcrd.dc.gov/dcrd/frames.asp?doc=/dcrd/lib/dcrd/information/forms_docs/pdf/bldg_permit_applic.pdf&group=1696&open=133448

⁶ Permit:

http://ddot.dc.gov/ddot/frames.asp?doc=/ddot/lib/ddot/services/permits/public_space_app.pdf&ddotNav=132397

⁷ Permit application:

http://dcrd.dc.gov/dcrd/frames.asp?doc=/dcrd/lib/dcrd/information/forms_docs/pdf/cofoapp.pdf&group=1696&open=133448

⁸ Permit:

http://dcrd.dc.gov/dcrd/frames.asp?doc=/dcrd/lib/dcrd/information/forms_docs/pdf/ac_permit.pdf&group=1696&open=133448

⁹ Permit:

http://dcrd.dc.gov/dcrd/frames.asp?doc=/dcrd/lib/dcrd/information/forms_docs/pdf/plumbinghansen2.pdf&group=1696&open=133448

¹⁰ Permit:

http://dcrd.dc.gov/dcrd/frames.asp?doc=/dcrd/lib/dcrd/information/forms_docs/pdf/electrical.pdf&group=1696&open=133448

¹¹ Application:

<http://www.dcrd.dc.gov/dcrd/frames.asp?doc=/dcrd/lib/dcrd/services/surveyor.pdf&group=1696&open=133448>

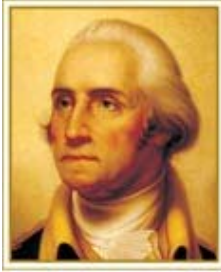
C. Third Party Reviews

1. Permit applicants may hire third parties to review drawings and have inspectors conduct inspections on electrical, plumbing, mechanical, construction, fire protection and elevators. These companies or individuals must be licensed and certified by the District of Columbia.

To request third party inspection:

- a. Select a certified inspector from the Certified Third Party Inspectors List on DCRA website
(<http://dcra.dc.gov/dcra/frames.asp?doc=/dcra/lib/dcra/services/third/tpi.pdf&group=1696&open=|33448|>)
- b. Complete and submit online User Request Form
(http://forms.dc.gov/lfservlet/COMM/3rd_party_request)

END OF SECTION



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DESIGN STANDARDS SUPPORTING DOCUMENTS DC “GREEN BUILDING ACT OF 2006” COMPLIANCE

A. SUMMARY

This section contains information related to the DC Green Building Act (DC Law 16-234), potentially relevant to many GWU projects.

B. GENERAL

George Washington University projects within the District of Columbia will often be subject to compliance with the Green Building Act of 2006 (DC Law 16-234), and any amendments to it. Consultant should be aware that a proposal has been made within the DC Council to increase the speed at which full compliance will be required. This Act will be phased in over time and the consultant must determine the current requirements. At the time of writing, the following information outlines basic requirements, but consultant must become familiar with and follow the full Law and any future modifications not reflected herein.

At the time of writing, the following contacts within the District of Columbia are considered potentially useful sources of information regarding this Law:

- DDOE: Stella Tarnay: (202) 535-2460; stella.tarnay@dc.gov

C. RELEVANT PROJECT TYPES AFFECTED:

Privately-owned buildings within the District of Columbia, with new construction or substantial¹ improvements of an existing project over 50,000 square feet of gross floor area.

D. PHASE REQUIREMENTS

Phase Requirement, based on date of initial building permit application	Requirements
January 1, 2009	Submit a USGBC LEED 2.2 Credit Checklist, documenting the green building elements that will be pursued in the project. Checklist should be submitted as part of the building construction permit package. Within 2 years of the receipt of a certificate of occupancy, project must be verified as having fulfilled or exceeded the LEED-NC 2.2 standard at the certification level.

January 1, 2012	Project must be verified as having fulfilled or exceeded LEED-NC 2.2 or LEED-CS 2.0 standard at the certification level.
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E. LEED STANDARDS

1. Project Manager should ensure that the Consultants have access to the GWU LEED Standards for all projects requiring compliance with the Green Building Act. The LEED Standards are geared towards achieving LEED Silver, so there may be flexibility to eliminate some credit requirements when the project is pursuing Certified level only.

F. ADDITIONAL INFORMATION

Project Managers should be aware of additional requirements of the Green Building Act, including the following:

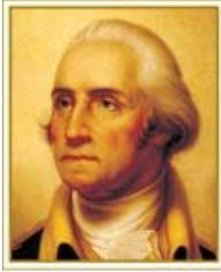
1. Performance Bond
 - a. For projects applying for building permits on January 1, 2012 or later, a performance bond will be required. Costs vary and should be verified when required. All or part of the performance bond may be forfeited for failure to meet requirements of the Green Building Act. In order to ensure a full return of the performance bond, verification of project compliance should be established within two years of receiving the first certificate of occupancy.
2. Incentive Grants
 - a. Incentive grants for high-performance projects may be available from the DC Green Building Fund. These grants should be of particular interest to GWU, as there will often be a requirement to achieve LEED Silver, thus qualifying for a grant.
 - b. There are two ways to exceed the Green Building Act and to, thus, be eligible for incentive grants:
 - i. October 1, 2009 through December 31, 2011: for building permit applicants for projects that will meet or exceed LEED-NC 2.2 at the Certified level.
 - ii. January 1, 2012 through December 31, 2015: for building permit applicants for commercial private buildings that will meet or exceed LEED-NC 2.2 at the Silver level.

END OF SECTION

ⁱ "Substantial improvement" has the same meaning as in section 202 of Title 12J of DCMR, copied below for reference:

Substantial Improvement. For the purpose of determining compliance with the flood provisions of this code, any repair, alteration, addition, or improvement of a building or structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either:

1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the code official and that are the minimum necessary to assure safe living conditions; or
2. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure



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DESIGN STANDARDS SUPPORTING DOCUMENTS THE GEORGE WASHINGTON UNIVERSITY LEED® GUIDELINES FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS BASED ON LEED v3.0

As a matter of course, The George Washington University strives to implement sustainable measures throughout campus life. In an effort to help quantify sustainable achievements in the built environment, all new construction and major renovation projects that are in excess of 50,000 square feet of gross floor area¹ are required to attain a minimum LEED v3.0 certification level of Silver. These LEED Guidelines were developed to assist design professionals in that endeavor. While there will be unforeseen project conditions, in general, projects should conform to the priorities established herein.

Each of the 110 possible points within LEED's certification structure was carefully considered with respect to the University's unique circumstances, needs, budget and general priorities. Compliance with each point has been weighted with a priority as described below:

- *Expected:* Compliance is fully expected based on prior experience.
- *Desirable:* Design professional shall demonstrate a genuine pursuit of the credit. Documentation proving considerations such as life cycle cost vs. first cost and operation and maintenance concerns shall generally be required if the point is not achieved.
- *Unlikely:* This is a credit we are unlikely to pursue. Design professional is not generally required to consider the point.

NOTES:

1. The priorities established herein relate specifically to the Foggy Bottom Campus. Adjustments may be required for projects located elsewhere. For example, Foggy Bottom's density and proximity to multiple modes and lines of transit lend themselves to pursuit of a number of related LEED credits, whereas projects located elsewhere may experience different challenges that must be considered on a case-by-case basis. On the other hand, projects sited on less dense property may more easily achieve credits, such as those for on-site water retention and treatment, via land-intensive strategies such as bioswales.

¹ In addition to the University's own sustainability goals, compliance with The DC Green Building Act of 2006 is required. In brief, projects subject to this law are as follows:
Privately-owned buildings within the District of Columbia, with new construction or substantial improvements of an existing project over 50,000 square feet of gross floor area

2. If the design professional or the University project manager believes that there are exceptional circumstances justifying the need to waive “expected” priority for any individual credit, or to waive the requirement of LEED certification for any specific project, documentation shall be provided to the Director of Facilities Planning and Design Review supporting such claim. If s/he is in agreement, the matter shall be forwarded to the Executive Director of Planning and Campus Development for final judgment.
3. Consultant shall develop specifications section 01352 “LEED Requirements,” to detail contractor and subcontractor requirements to ensure LEED certification success. For example, contracts should include provisions for contractors to track and document construction waste management, and items such as paint quantities and VOC levels, when appropriate.

**GEORGE WASHINGTON UNIVERSITY LEED V3.0
CREDIT COMPLIANCE PRIORITIES ARE AS FOLLOWS:**

Sustainable Sites

SS Prereq 1 Construction Activity Pollution Prevention

- *Required*

SS Credit 1 Site Selection

- *Expected*

The University expects compliance with this point except in the rarest circumstances. However, site selection is determined by the campus master plan and is not within the design professional's scope of work.

SS Credit 2 Development Density and Community Connectivity

- *Expected*

The University expects compliance with this point except in the rarest circumstances. However, site selection is determined by the campus master plan and is not within the design professional's scope of work.

SS Credit 3 Brownfield Redevelopment

- *Unlikely*

In general, the University does not foresee redeveloping any brownfield sites although the presence of asbestos in existing buildings meets LEED Brownfield criteria. For existing building renovation projects, if an ASTM E1903-97 Phase II Environmental Site Assessment will be documented and the asbestos remediated, the credit may be pursued.

General note regarding the following Sustainable Sites, Alternative Transportation Credits SS 4.1-4.4: Designer should reference LEED CIR SSc43 ruling, dated 9/25/2007, for the possibility of achieving an Innovation in Design credit for exemplary sustainable sites. Method described requires achieving at least 3 of the 4 Sustainable

Sites credits and developing/providing a comprehensive Transportation Demand Management Plan (TDMP). The University has such a plan, but it has not yet been verified through the LEED process to determine if credit would be guaranteed.

SS Credit 4.1 Alternative Transportation: Public Transportation Access

- Expected

The University expects compliance with this point except in the rarest circumstances. However, site selection is determined by the campus master plan and is not within the design professional's scope of work. There are numerous public bus stops at the University. Additionally, much of the University is within ½ mile of the Blue and Orange lines of WMATA at Foggy Bottom and/or Farragut West metro stops. Part of campus is also near the Red line at Farragut North.

Note: In many cases, designers should consider pursuing an Innovation in Design credit for exemplary access to public transportation, by documenting a doubled expected ridership over the base credit's requirement. Per LEED, this is accomplished by quadrupling the access to public transportation, as described in LEED CIR SSc41 ruling, dated 9/22/06.

SS Credit 4.2 Alternative Transportation: Bicycle Storage and Changing Rooms

- Desirable

The University has a history of providing bicycle storage on campus. However, storage has been under-utilized because the campus population often stores bicycles in alternate locations, such as residence hall bedrooms and private offices. The University will continue to provide bicycle storage, but will generally only provide them to the full extent required to achieve this credit when it is needed to reach the target LEED certification level.

SS Credit 4.3 Alternative Transportation: Low Emitting and Fuel Efficient Vehicles

- Expected

Most University projects include parking and, thus, allow for credit compliance via designating 5% of the total site parking capacity as preferred parking for low-emitting and fuel-efficient vehicles.

SS Credit 4.4 Alternative Transportation: Parking Capacity

- Desirable

This credit is very challenging when considering the campus plan. It also conflicts with a priority of generating revenue from parking.

SS Credit 5.1 Site Development: Protect or Restore Habitat

- Desirable

The University's building sites are usually previously developed, as opposed to existing open greenfield sites. While the University's urban building sites are generally extensively developed, whatever open space is provided should be designed to comply with this requirement. Typically 75% of the site will be developed, resulting in a requirement of ½ of the remaining space, or 12.5%, to be restored to native or adapted vegetation to attain this credit.

Note: Designers should consider this credit collectively with WE 1.1 and 1.2 and attempt to qualify for all three points with careful plant selection and water management planning.

SS Credit 5.2 Site Development: Maximize Open Space

- Unlikely

It is generally impractical and cost-prohibitive in the University urban environment to set aside the amount of green space required for this credit.

SS Credit 6.1 Stormwater Design: Quantity Control

- Desirable

The practicality of implementing strategies for this credit such as greywater recycling and bioswales vary considerably, depending on the project site and function. That said, a pending sewer tax to be implemented by DC WASA makes limiting the amount of water the University returns to the City's stormwater system a priority.

SS Credit 6.2 Stormwater Design: Quality Control.

- Desirable

See comments for SS 6.1.

SS Credit 7.1 Heat Island Effect: Non-Roof

- Desirable

The University's current design standards for exterior pavers and limited campus landscaping do not generally meet this credit's intent. However, where the campus plan allows, consider the use of light-colored concrete or brick pavers with SRI>29 to pursue this LEED requirement. Also, parking spaces are provided below grade in each major project. This would be the typical path to achieving this credit at the University.

Note: Because the University generally covers 100% of parking spaces - double the requirement for this credit - the designer should consider pursuing an Innovation and Design credit for exemplary performance in this area.

SS Credit 7.2 Heat Island Effect: Roof

- Expected

The University expects the use of high-albedo, Energy Star-rated roofs and/or vegetated roofs that comply with this credit.

Note: In the event that a project calls for a full vegetated roof, designers should consider pursuing an Innovation and Design credit for exemplary performance by doubling the threshold 50% coverage required by this credit, under Option 2.

SS Credit 8 Light Pollution Reduction.

- Desirable

While this credit is desirable, campus security lighting requirements shall not be compromised to comply.

Water Efficiency

WE Prereq 1 Water Use Reduction: Reduce by 20%

- Required

WE Credit 1, Option 1 Water Efficient Landscaping: Reduce by 50%

- Expected

Through careful plant selection and irrigation planning, if implemented, this credit is deemed achievable and important. Designers are encouraged to consider plant selections from the U.S. Fish & Wildlife Service's Native Plants for Wildlife Habitat and Conservation Landscaping - Chesapeake Bay Watershed when they are compatible with overall landscaping requirements. All plant selections must meet the approval of the University's Grounds & Pest Control division.

Note: Designer should be certain to pursue the synergistic nature between this credit, WE 1 Option 2 and SS 5.1.

WE Credit 1, Option 2 Water Efficient Landscaping: No Potable Water Use or No Irrigation

- Expected

Through careful plant selection and irrigation planning, if implemented, this credit is deemed achievable and important. LEED's allowance of one year of watering to help establish new plants should yield strong plant stock when native, drought tolerant species are selected. If plants do require water beyond the first year, designer may consider harvesting water from the University's stormwater cisterns, and synergies between this credit and water re-use requirements of SS Credit 6.1.

WE Credit 2, Option 1 Innovative Wastewater Technologies

- Unlikely

Although the University makes every reasonable and appropriate effort to reduce water consumption via low-flow plumbing fixtures, 50% reduction is currently perceived as an impractical goal. The University does not see an immediate opportunity to pursue onsite wastewater treatment.

WE Credit 2, Option 2 Innovative Wastewater Technologies

- Unlikely

The University does not see an immediate opportunity to pursue onsite wastewater treatment.

WE Credit 3 Water Use Reduction: 30% Reduction

- Expected

Current products and technology are readily available and reliable, making this an expected credit.

WE Credit 3 Water Use Reduction: 35% Reduction

- Desirable

If 35-40% water use reduction is the goal for achievement, alternative plumbing fixtures with more aggressive water conservation technologies should be considered. For

example, dual flush toilets: 1.1/1.6 gpf; waterless urinals; faucets: 0.25 gpm; and shower heads: 1.0gpm. At the time of writing, the University does not see an immediate opportunity to pursue alternate plumbing fixtures.

WE Credit 3 Water Use Reduction: 40% Reduction

- Desirable

See comments for WE Credit 3, Water Use Reduction, 35%.

Energy and Atmosphere

EA Prereq 1 Fundamental Commissioning of the Building Energy Systems

- *Required*

EA Prereq 2 Minimum Energy Performance

- *Required*

EA Prereq 3 Fundamental Refrigerant Management

- *Required*

EA Credits 1 Optimize Energy Performance (18% New Buildings/14% Existing Building Renovations)

- Expected

Optimizing energy performance is among the most important LEED goals for the University. Aesthetics, life cycle cost vs. initial cost and similar considerations are critical in determining the extent to which any individual project should pursue these credits. The University is firmly in support of lowering campus energy consumption to the fullest extent possible within the project's broader requirements.

EA Credits 1 Optimize Energy Performance (20% New Buildings/16% Existing Building)

- Desirable

See comments for EA Credit 1 above.

EA Credits 2 On-Site Renewable Energy

- Unlikely

The University does not perceive an immediate and reasonable opportunity to realize these credits.

EA Credit 3 Enhanced Commissioning

- Expected

EA Credit 4 Enhanced Refrigerant Management

- Expected

EA Credit 5 Measurement and Verification

- Desirable

Ensuring that the project's projected energy performance is actually achieved is clearly a high priority for the University. This credit serves as a tool to use to evaluate that.

However, the contract(s) and metering required to achieve this credit come at a financial cost and, thus, pursuit of the credit should consider the cost-benefits ratio.

EA Credit 6 Green Power

- Expected

The University acknowledges the long-term benefits of renewable energy sources and will purchase green power in the form of renewable energy certificates (RECs) to meet the credit requirements.

Materials and Resources

MR Prereq 1 Storage and Collection of Recyclables

- *Required*

MR Credit 1.1 Building Reuse: Maintain 55% of Existing Walls, Floors and Roof

- Desirable

This credit relates only to major renovation projects. Within that scope, programmatic and aesthetic decisions will govern the overall approach to building reuse. When compatible with the project's requirements, designer should pursue this credit to the extent possible.

MR Credit 1.1 Building Reuse: Maintain 75% of Existing Walls, Floors and Roof

- Desirable

See comments for MR 1, Maintain 55% of Existing Walls, Floors and Roof

MR Credit 1.1 Building Reuse: Maintain 95% of Existing Walls, Floors and Roof

- Desirable

See comments for MR 1, Maintain 55% of Existing Walls, Floors and Roof

MR Credit 1.2 Building Reuse: Maintain 50% of Interior Non-Structural elements

- Desirable

See comments for MR 1, Maintain 55% of Existing Walls, Floors and Roof

MR Credit 2 Construction Waste Management: Divert 50% from Disposal

- Expected

Consistent with the University's rigorous recycling program, construction waste management is a critical sustainability strategy and must be performed. The University prefers that salvaged materials go to DC-based non-profits, particularly DC public schools. Where this is not possible, preference is for the materials to go to other regional non-profits. Local non-profit organizations that may have an interest in building materials are listed in Appendix A at the end of these LEED Guidelines.

MR Credit 2 Construction Waste Management: Divert 75% from Disposal

- Expected

See comments for MR 2.1.

MR Credit 3 Materials Reuse: 5%

- Unlikely

Benefit is unlikely to justify the required effort.

MR Credit 3 Materials Reuse: 10%

- Unlikely

Benefit is unlikely to justify the required effort.

MR Credit 4 Recycled Content: 10% (post-consumer +1/2 pre-consumer)

- Expected

This credit is deemed critical and achievable, given the recycling content of common building materials used at the University.

MR Credit 4 Recycled Content: 20% (post-consumer +1/2 pre-consumer)

- Desirable

Careful design and planning by the architect and the contractor is required to realize this credit, which is generally viewed as achievable.

MR Credit 5 Regional Materials: 10% Extracted, Processed and Manufactured Regionally

- Expected

This credit is deemed achievable, given the University's proximity to many key manufacturing plants. Many manufacturers understand the importance of LEED and make this information readily available for project documentation.

MR Credit 5 Regional Materials: 20% Extracted, Processed and Manufactured Regionally

- Desirable

Careful design and planning by the architect and the contractor is required to realize this credit, which is generally viewed as achievable.

MR Credit 6 Rapidly Renewable Materials

- Unlikely

Current university design standards are unlikely to allow for incorporation of renewable materials to the extent required by this credit.

MR Credit 7 Certified Wood

- Desirable

The types of wood products we typically use in our buildings lend themselves to achieving this credit. Consultant is asked to look for opportunities to combine efforts and expense of achieving this credit, in conjunction with EQ Credit 4.4, Low-Emitting Materials, Composite Wood & Agrifiber products. In other words, look for products such as FSC plywood and particleboard with no added urea formaldehyde, which would contribute to both credits.

Indoor Environmental Quality

EQ Prereq 1 Minimum IAQ Performance

- Required

EQ Prereq 2 Environmental Tobacco Smoke (ETS) Control

- Required

EQ Credit 1 Outdoor Air Delivery Monitoring

- Expected/Desirable

Pursuit of this credit shall comply with any applicable code requirements. Where not required by code, pursuit of this credit shall be dependent on cost-benefits ratio.

EQ Credit 2 Increased Ventilation

- Unlikely

Air quality regulations are stringent enough to result in good air quality. This credit is perceived as an expense that would be better applied to other areas of sustainability.

EQ Credit 3.1 Construction IAQ Management Plan: During Construction

- Expected

This credit addresses both the health of building occupants as well as the operation of building systems and is, therefore, expected.

EQ Credit 3.2 Construction IAQ Management Plan: Before Occupancy

- Expected

This credit addresses the health of building occupants and is expected.

EQ Credit 4.1 Low-Emitting Materials: Adhesives and Sealants

- Expected

This is an important strategy in addressing the health and well being of building occupants. Current industry standards make this credit relatively easy to achieve.

EQ Credit 4.2 Low-Emitting Materials: Paints and Coatings

- Expected

See comments for EQ Credit 4.1.

EQ Credit 4.3 Low-Emitting Materials: Flooring Systems

- Expected

See comments for EQ Credit 4.1.

The strategy for achieving this credit involves specifying that all hard-surface flooring such as porcelain tile, resilient flooring and base, VCT, linoleum, and rubber, be certified by Resilient Floor Covering Institute's FloorScore program or meet the requirements of the California Dept. of Public Health Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers. Carpet shall be certified by Carpet and Rug Institute's Green Label Plus. Concrete, bamboo,

cork and wood floor sealer, stain and finish must meet EQ Credit 4.2. Tile settings, adhesives, grout must meet EQ Credit 4.1 requirements.

EQ Credit 4.4 Low-Emitting Materials: Composite Wood and Agrifiber Products

- Desirable

This is an important strategy in addressing the health and well being of building occupants. Current industry standards make this credit relatively easy to achieve. Also, see comments for MR Credit 7 Certified Wood.

EQ Credit 5 Indoor Chemical and Pollutant Source Control

- Desirable *for residence halls*
- Expected *for all other building types*

Careful design work should yield straightforward and relatively simple compliance with this credit, resulting in improved occupant health and comfort, and simplified building maintenance. A noted exception to this comment, however, is that this credit is currently unachievable for fan coil units, as frequently used in residence halls. The reason is that MERV 13 filters are not available for them.

EQ Credit 6.1 Controllability of Systems: Lighting

- Expected

Current design standards and careful design work should yield credit compliance.

EQ Credit 6.2 Controllability of Systems: Thermal Comfort

- Expected

See comments for EQ Credit 6.1.

EQ Credit 7.1 Thermal Comfort: Design

- Expected

Compliance with this credit should be a natural outcome of good design.

EQ Credit 7.2 Thermal Comfort: Verification

- Desirable

The survey, one of two requirements required to achieve this credit, shall be conducted in conjunction with the end-of-warranty systems performance evaluation, in part to assist in identifying any problems. Installation of a permanent monitoring system, the additional requirement to achieve this credit, comes at a financial cost and, thus, pursuit of the credit should consider the cost-benefits ratio.

EQ Credit 8.1 Daylight and Views: 75% of Spaces.

- Expected *for residence halls*
- Desirable *for all other building types*

Careful planning should make this credit easy to achieve in residence halls. This credit is strongly desired in other building types, but programming requirements may occasionally preclude the achievement.

EQ Credit 8.2 Daylight and Views: 90% of Spaces

- Desirable

Daylight and views substantially improve occupant well-being and should be provided to the maximum extent possible within the programmatic and budgetary confines of a specific project.

Innovation and Design Process

ID Credit 1.1-1.5 Innovation in Design

- Expected

Opportunities to achieve Innovation and Design Credits 1.1-1.5 vary, depending on the specific project. In the absence of more case-specific opportunities, the following approaches to credits are offered. For those that are noted as exemplary performance credits, look to the baseline credit within these guidelines for additional information. Designer is to establish whether strategy is appropriate and likely to be awarded for the specific project and, if not, develop an alternate credit path.

Exemplary Performance Credit Ideas:

- Sustainable Sites, Alternative Transportation: Designer should reference LEED CIR (Credit Interpretation Ruling) SSc43 ruling, dated 9/25/2007, for the possibility of achieving an Innovation and Design credit for exemplary sustainable sites. Method described requires achieving at least 3 of the 4 Sustainable Sites, Alternative Transportation credits (SS 4.1 – 4.4) and developing/providing a comprehensive Transportation Demand Management Plan (TDMP). The University has such a plan, but it has not yet been verified through the LEED process to determine if credit would be guaranteed.
- SS Credit 4.1, Alternative Transportation: Public Transportation Access: In many cases, designers should consider pursuing an Innovation and Design credit for exemplary access to public transportation by documenting a doubled expected ridership over the base credit's requirement. Per LEED, this is accomplished by quadrupling the access to public transportation, as described in LEED CIR SSc41 ruling, dated 9/22/06.
- SS Credit 7.1 Heat Island Effect: Non-Roof: Designer should pursue an ID credit for exemplary performance when 100% of the parking is covered in a compliant fashion, double the threshold requirement.
- SS Credit 7.2 Heat Island Effect: Roof In the event that a project calls for a full vegetated roof, designers should consider pursuing an ID credit for exemplary performance by doubling the 50% threshold coverage required by this credit, under Option 2.

Additional ID Credit Ideas:

- An active education and outreach program may be developed that would satisfy previous CIR rulings related to this concept. Generally, the program should include two of the following three elements: comprehensive permanent signage

package; manual, guideline, or case study that informs the design of future buildings, based on the lessons learned of this one; and/or an educational outreach program or guided tour focused on sustainable living.

- Green housekeeping methods are currently being implemented by the University. Consideration may be given to developing a plan that would qualify for an ID credit per CIR IDc11 ruling, dated 4/8/2004.
- Comply with LEED for Schools EQ Prerequisite 3 Minimum Acoustical Performance:
For Academic Buildings, classrooms and core learning spaces must achieve a maximum background noise level from heating, ventilating and air conditioning (HVAC) systems of 45 dBA. In addition, all classrooms and other core learning spaces must have sufficient sound-absorptive finishes for compliance with reverberation time requirements as specified in ANSI Standard S12.60-2002, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools. Designer shall consider the use of acoustical materials and sound-absorbent finishes to achieve this credit.
- Comply with LEED for Schools EQ Credit 4 Low-Emitting Materials, Option 5 – Furniture and Furnishings:
Designer should specify furniture and seating that is GREENGUARD Children and Schools-certified (Option 1) or complies with thresholds for chemical contaminant concentrations set by EPA calculation (Option 2) or ANSI calculation (Option 3).
- Comply with LEED for Schools WE Credit 3 Process Water Use Reduction:
Building shall not have kitchen or garbage disposals. A minimum of 4 process items (including clothes washers, dishwashers, ice machines, food steamers, prerinse spray valves) must demonstrate savings in water use from a benchmark or industry standard.
- Comply with LEED for Schools Low-Emitting Materials, Option 6 – Ceiling and Wall Systems:
All gypsum board, insulation, acoustical ceiling systems, and wall coverings, must comply with the “California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions”.
- Comply with LEED for Schools Credit 10 Mold Prevention:
In addition to achieving credits IEQ Credit 3.1 Construction IAQ Management Plan, During Construction, IEQ Credit 7.1 Thermal Comfort - Design, and IEQ Credit 7.2 Thermal Comfort Design - Verification, Designer should provide HVAC systems designed to limit relative humidity to $\leq 60\%$. In addition, an indoor air quality management program must be developed and implemented on an ongoing basis.
- Comply with LEED for Commercial Interiors Energy and Atmosphere Credit 1.4, Optimize Energy Performance, Equipment and Appliances:

For all ENERGY STAR-eligible equipment and appliances installed in the project, including appliances, office equipment, electronics, and commercial food service equipment (but excluding HVAC, lighting and building envelope products), 70%, by rated power, shall be ENERGY STAR qualified.

- Designers should follow-up on LEED's ongoing study regarding whether reduction or elimination of PVC-containing products may be eligible for an ID credit. Items that may be selected to contribute to this strategy may include window coverings, resilient flooring, and residence hall shower curtains. PVC is a prevalent material and there are many more opportunities to pursue this idea.

ID Credit 2 LEED Accredited Professional

- Expected

The inclusion of a LEED accredited professional in the design team is required.

Regional Priority

RPc1: Regional Priority

- Desirable

Regional Priority credits provide incentive for the achievement of credits that address geographically specific environmental priorities. A project may earn up to 4 bonus points out of 6 credits identified by the USGBC, in a database organized by zip code, on their website. RP credits are not new credits but should be given priority for consideration.

Regional Priority Credits Available for District of Columbia:

- SS Credit 5.1 Site Development: Protect or Restore Habitat (Desirable)
- SS Credit 6.1 Stormwater Management, Quantity Control (Desirable)
- WE Credit 2 Innovative Wastewater Technologies (Unlikely)
- EA Credit 1 Optimize Energy Performance, 40%/36% (Unlikely)
- EA Credit 2 On-Site Renewable Energy, 1% (Unlikely)
- MR Credit 1.1 Maintain Existing Floors, Walls & Roof, 75% (Desirable for major renovation projects)

END OF SECTION

Appendix A: Local Non-Profits that Accept Architectural Salvage Donations:

George Washington University prefers that salvaged materials go to District of Columbia non-profits, particularly DC public schools.

DC Public Schools

Office of Public Education Facilities Modernization

2400 East Capital Street, SE
Washington, DC 20003
Phone: (202) 698-7700
<http://opefm.dc.gov>

Where this is not possible, preference is for the materials to go to other regional non-profits.

Note: It is the project team's responsibility to determine whether any specific organization noted below accepts the type and quantity of salvage material being considered for donation.

Community Forklift

4671 Tanglewood Drive
Edmonston, MD 20781
Phone: 301-985-5180
<http://www.communityforklift.com>

Habitat for Humanity ReStore

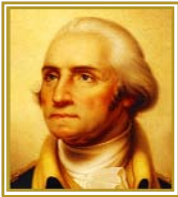
7770-G Richmond Hwy
Alexandria, VA 22306
Phone: 703-360-6700
<http://www.habitat.org/cd/env/restore.aspx>

Second Chance

1645 Warner St.
Baltimore, MD 21230
Phone: 410-385-1101
<http://www.secondchanceinc.org>

The Loading Dock

2 North Kresson Street
Baltimore, MD 21224
Phone: 410-558-DOCK (3625)
<http://www.loadingdock.org>



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DESIGN STANDARDS SUPPORTING DOCUMENTS THE GEORGE WASHINGTON UNIVERSITY LEED® GUIDELINES FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS BASED ON LEED-NC, VERSION 3.0 Points Checklist

Expected	Desirable	Unlikely	Project Totals (Pre-Certification Estimates)
51	30	29	Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80-110 points

Expected	Desirable	Unlikely	Sustainable Sites	26 Points
16	8	2	<i>(Category Credits Subtotal)</i>	
YES			Prereq 1	Construction Activity Pollution Prevention Required
1			Credit 1	Site Selection 1
5			Credit 2	Development Density & Community Connectivity 5
		1	Credit 3	Brownfield Redevelopment 1
6			Credit 4.1	Alternative Transportation, Public Transportation Access 6
	1		Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms 1
3			Credit 4.3	Alternative Transportation, Low-Emitting & Fuel Efficient Vehicles 3
	2		Credit 4.4	Alternative Transportation, Parking Capacity 2
	1		Credit 5.1	Site Development, Protect or Restore Habitat 1
		1	Credit 5.2	Site Development, Maximize Open Space 1
	1		Credit 6.1	Stormwater Design, Quantity Control 1
	1		Credit 6.2	Stormwater Design, Quality Control 1
	1		Credit 7.1	Heat Island Effect, Non-Roof 1
1			Credit 7.2	Heat Island Effect, Roof 1
	1		Credit 8	Light Pollution Reduction 1

Expected	Desirable	Unlikely	Water Efficiency	10 Points
6	2	2	<i>(Category Credits Subtotal)</i>	
YES			Prereq 1	Water Use Reduction, 20% Reduction Required
2			Credit 1	Water Efficient Landscaping, Reduce by 50% 2
2			Credit 1	Water Efficient Landscaping, No Potable Use or No Irrigation 2
		2	Credit 2	Innovative Wastewater Technologies 2
2			Credit 3	Water Use Reduction, 30% Reduction 2
	1		Credit 3	Water Use Reduction, 35% Reduction 1
	1		Credit 3	Water Use Reduction, 40% Reduction 1

Expected	Desirable	Unlikely	Energy & Atmosphere	35 Points
10	4	21	<i>(Category Credits Subtotal)</i>	
YES			Prereq 1	Fundamental Commissioning of the Building Energy Systems Required
YES			Prereq 2	Minimum Energy Performance Required
YES			Prereq 3	Fundamental Refrigerant Management Required
4	1	14	Credit 1	Optimize Energy Performance (2 points required): 1 to 19
				12% New Buildings / 8% Existing Building Renovations 1
				14% New Buildings / 10% Existing Building Renovations 2
				16% New Buildings / 12% Existing Building Renovations 3
				18% New Buildings / 14% Existing Building Renovations 4
				20% New Buildings / 16% Existing Building Renovations 5
				22% New Buildings / 18% Existing Building Renovations 6
				24% New Buildings / 20% Existing Building Renovations 7
				26% New Buildings / 22% Existing Building Renovations 8
				28% New Buildings / 24% Existing Building Renovations 9
				30% New Buildings / 26% Existing Building Renovations 10
				32% New Buildings / 28% Existing Building Renovations 11
				34% New Buildings / 30% Existing Building Renovations 12
				36% New Buildings / 32% Existing Building Renovations 13
				38% New Buildings / 34% Existing Building Renovations 14
				40% New Buildings / 36% Existing Building Renovations 15
				42% New Buildings / 38% Existing Building Renovations 16
				44% New Buildings / 40% Existing Building Renovations 17

			46% New Buildings / 42% Existing Building Renovations	18
			48% New Buildings / 44% Existing Building Renovations	19
		7	Credit 2 On-Site Renewable Energy	1 to 7
			1% Renewable Energy	1
			3% Renewable Energy	1
			5% Renewable Energy	1
			7% Renewable Energy	1
			9% Renewable Energy	1
			11% Renewable Energy	1
			13% Renewable Energy	1
2			Credit 3 Enhanced Commissioning	2
2			Credit 4 Enhanced Refrigerant Management	2
	3		Credit 5 Measurement & Verification	3
2			Credit 6 Green Power	2

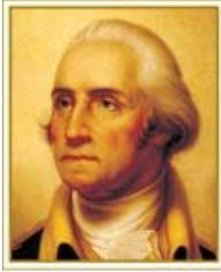
Expected	Desirable	Unlikely	Materials & Resources		14 Points
4	7	3	<i>(Category Credits Subtotal)</i>		
YES			Prereq 1	Storage & Collection of Recyclables	Required
	1		Credit 1.1	Building Reuse , Maintain 55% of Existing Walls, Floors & Roof	1
	1		Credit 1.1	Building Reuse , Maintain 75% of Existing Walls, Floors & Roof	1
	1		Credit 1.1	Building Reuse , Maintain 95% of Existing Walls, Floors & Roof	1
	1		Credit 1.2	Building Reuse , Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2.1	Construction Waste Management , Divert 50% from Disposal	1
1			Credit 2.2	Construction Waste Management , Divert 75% from Disposal	1
		1	Credit 3.1	Materials Reuse , 5%	1
		1	Credit 3.2	Materials Reuse , 10%	1
1			Credit 4.1	Recycled Content , 10% (post-consumer + 1/2 pre-consumer)	1
	1		Credit 4.2	Recycled Content , 20% (post-consumer + 1/2 pre-consumer)	1
1			Credit 5.1	Regional Materials , 10% Extracted, Processed & Manufactured	1
	1		Credit 5.2	Regional Materials , 20% Extracted, Processed & Manufactured	1
		1	Credit 6	Rapidly Renewable Materials	1
	1		Credit 7	Certified Wood	1

Expected	Desirable	Unlikely	Indoor Environmental Quality		15 Points
9	5	1	<i>(Category Credits Subtotal)</i>		
YES			Prereq 1	Minimum IAQ Performance	Required
YES			Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
1			Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan , During Construction	1
1			Credit 3.2	Construction IAQ Management Plan , Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials , Adhesives & Sealants	1
1			Credit 4.2	Low-Emitting Materials , Paints & Coatings	1
1			Credit 4.3	Low-Emitting Materials , Flooring Systems	1
	1		Credit 4.4	Low-Emitting Materials , Composite Wood & Agrifiber Products	1
	1		Credit 5	Indoor Chemical & Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems , Lighting	1
1			Credit 6.2	Controllability of Systems , Thermal Comfort	1
1			Credit 7.1	Thermal Comfort , Design	1
	1		Credit 7.2	Thermal Comfort , Verification	1
	1		Credit 8.1	Daylight & Views , Daylight 75% of Spaces	1
	1		Credit 8.2	Daylight & Views , Views for 90% of Spaces	1

Expected	Desirable	Unlikely	Innovation & Design Process		6 Points
6	0	0	<i>(Category Credits Subtotal)</i>		
1			Credit 1.1	Innovation in Design : Provide Specific Title	1
1			Credit 1.2	Innovation in Design : Provide Specific Title	1
1			Credit 1.3	Innovation in Design : Provide Specific Title	1
1			Credit 1.4	Innovation in Design : Provide Specific Title	1
1			Credit 1.5	Innovation in Design : Provide Specific Title	1
1			Credit 2	LEED® Accredited Professional	1

Expected	Desirable	Unlikely	Regional Priority		4 Points
0	4	0	<i>(Category Credits Subtotal)</i>		
	1		Credit 1.1	Regional Priority : Provide Specific Title	1
	1		Credit 1.2	Regional Priority : Provide Specific Title	1
	1		Credit 1.3	Regional Priority : Provide Specific Title	1
	1		Credit 1.4	Regional Priority : Provide Specific Title	1

Design Standards Supporting Documents
LEED Guidelines Checklist
Revision date: 7/1/10
Document date: 9/22/09



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DESIGN STANDARDS SUPPORTING DOCUMENTS THIRD PARTY COMMISSIONING REQUIREMENTS

The process of instituting green building features into the infrastructure from the earliest possible stages produces a reliable building that meets energy-saving standards, preserves building capacity to support a given function, and lowers the amount of waste produced during construction.

CONSULTANT shall perform both Fundamental and Enhanced Commissioning Services.

Fundamental Commissioning

Scope

CONSULTANT will work concurrently with the design team from the very beginning of a project's conception. CONSULTANT will review and comment on the Owner's Project Requirements and Basis of Design Documentation as each relates to the building systems included in the Commissioning Program.

CONSULTANT will develop a commissioning plan outlining all team member roles and responsibilities in the commissioning process. CONSULTANT will integrate the commissioning requirements into the contract documents through development of a commissioning specification.

CONSULTANT will verify proper installation and functional performance in accordance with the design intent of all building systems included in the Commissioning Program. Upon completion of functional testing, CONSULTANT will prepare a commissioning report and submit it to the owner once the commissioning plan has been fully executed.

Deliverables

- CONSULTANT will provide review comments on the Owner's Project Requirements and Basis of Design Documentation as each relates to the building systems included in the Commissioning Program.
- CONSULTANT will develop a Commissioning Plan outlining team member roles and responsibilities in the Commissioning Process.
- CONSULTANT will write a commissioning specification to ensure the commissioning requirements are included in the contract documents.
- CONSULTANT will provide and execute, with assistance from installation contractors, site acceptance tests verifying the building systems function in accordance with the design intent.

- CONSULTANT will prepare and submit to the Owner a final report documenting all commissioning activities.

Enhanced Commissioning

Scope

As part of Enhanced Commissioning, CONSULTANT will conduct a focused review of the construction documents during the Construction Document Development Phase and include the following:

- Commissioning Facilitation - Review to facilitate effective commissioning.
- Energy Efficiency - Review for adequacy of the effectiveness of building layout and efficiency of system types and components for building shell, HVAC systems and lighting systems.
- Control Systems and Control Strategy – Review HVAC strategies and sequences of operation for adequacy, efficiency and the ability of control systems to meet intent.
- O&M - Review for effects of specified systems and layout toward facilitating O&M equipment (accessibility, system control, etc.).
- Indoor Environmental Quality - Review to ensure that systems relating to thermal, acoustical, air quality and air distribution will maximize comfort and are in accordance with the Owner Objectives.
- O&M Documentation - Verify adequate building O&M documentation requirements.
- Training - Verify adequate operator training requirements.
- Commissioning Specifications - Verify that final construction documents adequately specify and integrate the building commissioning, including testing requirements by equipment type.
- Owner's Design Guideline or Standards – Verify that the design complies with the Owner's design guidelines and standards.
- Functionality - Ensure the design maximizes the functional needs of the occupants.

CONSULTANT will conduct a selective review of contractor submittal of commissioned equipment. The review shall include specification compliance, system installation and O&M documentation, system test certification, the test and balance plan, and manufacturer's startup requirements.

CONSULTANT will develop a systems manual containing the following information:

- Final version of the owner's project requirements (OPR) and basis of design (BOD).
- System single line diagrams.
- As-built sequences of operations for all equipment as provided by the design professionals and contractors with control drawings and initial set points.
- Ongoing operating instructions for integrated building systems.
- Recommended schedule of maintenance requirements and frequency, if not already included in the project O&M manuals.
- Functional performance tests results (benchmarks), blank test forms, and recommended schedule for retesting.
- Recommended schedule for calibrating sensors and actuators.

CONSULTANT will verify that requirements for training operating personnel and tenant space occupants are completed.

CONSULTANT will review building operation with O&M staff and occupants, 8 to 10 months after final acceptance and developing a plan to resolve outstanding commissioning related issues.

Deliverables

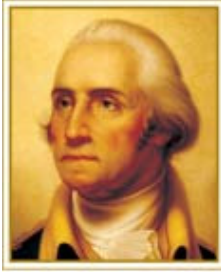
- CONSULTANT will provide CD design review comments to the Owner and Design Team.
- CONSULTANT will participate in one (1) one-day design review meeting at the Client Site for 100% CD Review
- CONSULTANT will participate in teleconferences as needed to discuss submittals.
- CONSULTANT will provide a Systems Manual requiring the information required by LEED.
- CONSULTANT will provide review of building operation with O&M staff and occupants within 8-10 months after substantial completion.

Note

If project will pursue LEED certification, GWU project manager shall include the following requirements in the scope of work when contracting with a third party commissioning agent:

- CONSULTANT will prepare and file electronic template documenting the LEED-NC Version 2.2 Fundamental Commissioning Pre-Requisite.
- CONSULTANT will prepare and file electronic template documenting the LEED-NC Version 2.2 Enhanced Commissioning Credit.

END OF SECTION



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DESIGN STANDARDS SUPPORTING DOCUMENTS ENERGY AND ENVIRONMENTAL MANAGEMENT OFFICE (EEMO) REQUIREMENTS

This document is primarily geared towards Construction Project Managers at The George Washington University, but it conveys requirements of the Energy and Environmental Management Office's (EEMO) for the Project Team as well. EEMO is within Facilities Services.

General

Energy and Environmental Management Office (EEMO) responsibilities include water and energy management and environmental compliance for GW's facilities. This means ensuring GW's 600 utility meters are read regularly, utility bills are paid on time, and that GW pays agreed-upon rates for its utilities. More recently, EEMO has been performing energy and water conservation projects in existing buildings. EEMO also arranges annual testing of backflow prevention devices, sand filters for storm water management, opacity testing for oil-fired boilers, and air permitting of GW's fuel-burning devices under requirements of its Clean Air Act Title V Operating Permit. To aid EEMO with this work, we request assistance from the construction team as outlined below.

EEMO is currently managed by Doug Spengel: 202-994-6067, dspengel@gwu.edu, Room 215D of the Support Building at 2025 F Street NW on the Foggy Bottom Campus. Please address any questions or comments for EEMO to Mr. Spengel.

Utilities

- If GW is paying utility bills for a development site during its construction, EEMO will help establish the temporary or permanent utility accounts if provided with the expected date that the construction team wants the utility companies (i.e., water, gas, and electric) to arrive.
 - What date will temporary power be needed?
 - What date will temporary power become permanent power?
 - What date will natural gas be needed?
 - What date will water be needed?
 - When will the first delivery of oil be made?

- If the construction team chooses to contact the utilities directly, please emphasize during these calls that GW is a non-profit organization that is not required to pay sales and use taxes and to send future utility bills to the following address for payment:

The George Washington University
Accounts Payable, Suite 265
44983 Knoll Square Drive
Ashburn, VA 20147-2692

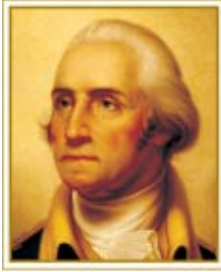
Please note that construction-related fees for permits or utility-related services are paid through GW's project construction manager and not directly through GW's Accounts Payable office.

- EEMO buys natural gas and electricity for GW on a long-term basis from suppliers other than the local utility companies. Therefore, EEMO needs the best engineering estimates of the future natural gas and electric (demand and kwhr) loads in the new facility well before these utilities are needed, including anticipated seasonal variations. Results of LEED energy models usually serve this purpose.
- Because GW buys natural gas and electric on a long-term basis, these contracts typically have clauses stating that 90 days advanced notice must be given to close an existing gas or electric account or else GW is subject to paying a penalty. EEMO can provide this notification if the project team keeps us informed of their plans to close an account due to the sale or demolition of a building.
- DC Water owns all of the water meters in DC, and configures them with an automated meter reading (AMR) system to be read remotely. All new water meters should be set in such a way as to allow a radio-signal-sending device to be located near a building's exterior wall or a manhole outside. EEMO can help the construction team acquire the meter, strainer, and AMR unit from DC Water.
- Similarly, DC Water used to conduct a calibration test on all newly installed water meters, although they may now be doing this in their own facilities prior to delivery of meters to the construction site. It is easier for this test to be conducted soon after the meter is installed than months down the road when the building is occupied. Therefore, assuming DC Water still does this, EEMO can help coordinate the execution of this meter test by DC Water with the construction team shortly after meter installation.
- Finally, one more DC Water issue relates to installation of their meters on the cooling tower, both the make-up line and the blowdown line, to obtain a sewer fee credit for water evaporated from the tower. Specifications for these meters are available.
- EEMO manages compliance with a DC requirement to annually test backflow prevention devices. When a new backflow prevention device is installed and tested onsite for the first time, EEMO needs the tester to complete a certification form stating the test date and results.

Environmental Requirements

- Information on all fuel-burning devices (gas or oil) must be submitted to both the DC Department of Consumer and Regulatory Affairs (DCRA) and the District Department of the Environment (DDOE) before installation. Generally, the construction team obtains the DCRA permits while EEMO files for the DDOE permits. EEMO needs particular details about each fuel-burning device no later than a month before installation (three months for emergency generators) is to begin to avoid being fined by DDOE, including the following:
 - Manufacturer name and model number;
 - Maximum firing rate (BTU/hour);
 - Exit gas temperature (°F);
 - Exit gas velocity (ft/s) and volume through stack (acfm); and
 - Stack inner diameter at exit (ft) and stack height above ground (ft).
- Similarly, if the construction team purchases fuel to run or test one of the permanent fuel-burning devices (e.g., boilers or emergency generators), EEMO needs copies of the specifications of that fuel and the amount of fuel delivered to report to DDOE. Emergency generators cannot use fuel containing more than 15 ppm (0.0015%) sulfur and either a minimum cetane index of 40 or a maximum aromatic content of 35 volume percent.
- Two other requirements of GW's Title V Operating Permit state that "GW must ensure that fugitive dust emission from any material handling or other industrial-type operation or process is prohibited" and "GW must comply with the engine idling requirements of DCMR 900." The engine-idling requirements basically state that no engine can idle for more than three minutes unless the engine is needed to operate other equipment such as a cement mixer or to provide heat when the outside temperature is below 32°F. Please help GW comply with these requirements, as GW can be fined up to \$10,000 per violation.
- EEMO maintains for GW a Spill Prevention Control and Countermeasures Plan that describes all onsite fuel tanks (including day tanks) on each campus. To update this plan, locations, capacities, and spill-control features of new fuel tanks are needed soon after installation.
- EEMO manages the maintenance of a growing number of storm water treatment devices commonly known as sand filters. EEMO would like to see the sand filter before the sand is installed, after the sand is installed, and would also like to meet with the DC inspector when he/she comes to inspect each filter.
- EEMO manages compliance with a Federal requirement for reporting use of refrigerants. When new equipment containing refrigerants is brought onsite, EEMO needs to know the quantity and type of refrigerant it contains.

END OF SECTION



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DESIGN STANDARDS AND SUPPORTING DOCUMENTS ROOM NUMBERING

A. SUMMARY

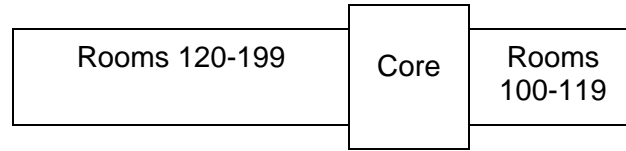
This section contains design standards for numbering rooms within a building. The room numbering system will allow better wayfinding within buildings by the University community, facilities maintenance personnel, and emergency personnel. In addition, the Building Automation System (BAS), Fire Alarm Panel, and space management inventory shall be coordinated with the room numbering system.

The room numbering system will be used for permanent signage for the building. Room number signage is by Owner, but Consultants shall adhere to these standards for consistency. Refer to Specification Guidelines, Section 10431 Signage, for basic information related to the Owner's standard room signage.

B. ROOM NUMBERING STANDARDS

1. When to Apply
 - a. The room numbering standards shall be applied to the following project types:
 - i. New buildings
 - ii. Major renovations and additions, including new wings and new floors, shall have the room numbering system described in the Design Standards.
 - iii. Minor renovations shall have a room numbering system as required to best fit the revised building configuration.
 - b. All rooms or spaces in a building shall have a room number assignment including break out rooms, storage rooms, pantries, copy rooms, service rooms, and support spaces such as housekeeping rooms, restrooms, and mechanical rooms.
2. Interpretation of Standards
 - a. For renovations and additions involving unusual circumstances or atypical design configurations, the Designer shall propose a room numbering scheme and consult with The University Project Manager and the Manager of the Property Information Resource Center (PIRC) for guidance.
3. Numbering System
 - a. Each room shall have a number to provide a *clear, consistent and logical method* to identify rooms by number.
 - i. The room numbering sequence shall start at the main entrance and progress consecutively in a CLOCKWISE direction.

- ii. In buildings with double-loaded corridors, the room numbering sequence shall also progress consecutively in a clockwise direction. **Rooms that are physically close shall be numerically close.**
 - iii. In buildings with perimeter spaces as well as a substantial number of interior spaces (such as systems work stations), perimeter spaces shall be numbered in a clockwise direction as indicated above. Once perimeter spaces are numbered, interior spaces shall be assigned a THREE-DIGIT number designating the floor with an UPPERCASE SUFFIX letter, for example, 100A, 100B, etc. The numbering sequence for interior spaces shall also progress in a clockwise direction.
4. Number of Digits
- a. Standard room numbers shall use a THREE-DIGIT number, with the first digit always referring to the floor, plus applicable prefixes. Refer to the following examples:
 - i. Basements shall be B101 through B199. B1 shall be used for the first level below ground with "B2", "B3", etc, assigned to descending levels within the building.
 - ii. Street / first floor shall be 100 through 199.
 - iii. Second floor rooms shall be 200 through 299 and so on.
 - iv. Mezzanines shall have the prefix M followed by a three-digit number (i.e. M101 for 1st Floor Mezzanine, M201 for 2nd Floor Mezzanine, etc.).
 - v. Rooftop spaces such as enclosed mechanical penthouse rooms shall have the prefix R followed by a three-digit number.
5. Suites
- a. For suites of rooms, the numbering of those suites shall have ONE number used for the MAIN room with the INTERIOR rooms using the main number with an UPPERCASE SUFFIX letter.
 - i. For a suite of rooms with an entrance from a main corridor, the entrance of the suite shall be numbered, with each room within the suite receiving a unique suffix letter. For example, Suite 101 would include rooms 101A, 101B, 101C, etc.
 - ii. Omit letters "I" and "O" to avoid confusion.
 - iii. For existing building renovation projects where the number of new rooms created within a space exceeds the suffix letter "Z", office numbering shall proceed as the following example: 101AA, 101AB, 101AC, etc. Signage, by Owner, shall omit the main suite number and indicate: "AA", "AB", "AC", etc.
6. Buildings with more than one distinct wing
- a. Where a building has a layout such as a central core and two distinct wings or pods of spaces, provide a break in numbering that corresponds to the wings. For example, Level One of the East wing may be assigned rooms 100-119, while the West wing may be assigned rooms 120-199. The room numbering sequence within each wing shall progress in a CLOCKWISE direction.



7. Large Buildings
 - a. Buildings where there may be more than 99 numbered rooms per floor, PREFIXES may be used to coordinate with the layout, wing, addition, etc. For example, a prefix for the NORTH addition might have room numbers with PREFIXES such as N101, N201, etc.
8. Residence Halls
 - a. The overall room numbering of Residence Halls shall follow the standard clockwise approach described earlier. For bedrooms within a main suite that open off of a common living room, such as apartment style housing, each bedroom shall have the main room number plus an UPPERCASE SUFFIX letter. For example, Room 115 with two individual bedrooms numbered 115A and 115B. This is the same room numbering approach of Suites, noted earlier. Where there are multiple bathrooms located inside of a suite, each bathroom shall also have a THREE-DIGIT number plus letter designation.
 - b. Individual bedrooms and bathrooms shall also be physically signed with the uppercase suffix letter identifier located on the top side of the door frame.
9. Parking
 - a. A prefix "P" shall be used to identify the parking deck.
 - b. Underground parking shall use "P1" for the first level below ground with "P2", "P3", etc, assigned to descending levels within the structure.
 - c. Surface parking shall use numerical digits assigned to spaces in the associated parking lot.
10. Corridors
 - a. Corridors/vestibules, stairs, and unenclosed lounges within corridors shall not be physically signed although they should be numbered on all drawings and identified in space management and Facilities FIXit systems in order to facilitate wayfinding for maintenance and operations.
11. Stairs (S), Corridors/vestibules (C), Elevators (EL), Unenclosed lounges within corridors (L):
 - a. All such spaces shall be identified with a single NUMBER designating the floor, the LETTER(S) indicated in parentheses above, and the NUMBER of the stair or location found on the drawings. For example:
 - i. Stairs on Level Three would be indicated: 3S1, 3S2, etc.
 - ii. Corridors on Level Two would be indicated: 2C1, 2C2, etc.
 - iii. An unenclosed lounge open to the first corridor on Level One would be indicated: 1C1L.
12. Restrooms (Men, Women, Unisex), Housekeeping, Mechanical, Electrical, and Telecommunications:
 - a. All such spaces shall be identified with the standard THREE-DIGIT number. Signage, by Owner, shall include text and Braille indicating the room function or building element.

13. Design Review and Approval

- a. The Designer shall utilize and conform to the room numbering standards, described herein, in the project documentation. Room numbering shall be indicated on drawings by the Design Development stage for review by the University Project Manager and the Manager of the Property Information Resource Center (PIRC). Each subsequent milestone drawing submission shall also be reviewed for compliance with room numbering standards.

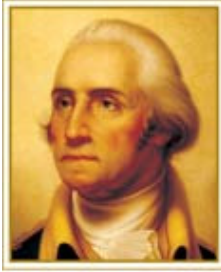
14. Construction Documents

- a. GW-approved room numbers shall be finalized on Construction Documents. In particular, the room numbering schedule must be included in Construction Documents. Room numbering shall be updated by the Architect on an ongoing basis throughout the construction process to reflect design changes through Final Completion.
- b. Final room numbering scheme must be fully coordinated with fire alarm devices, annunciator panels, and other items prior to building occupancy.
- c. Final room numbering scheme shall be approved by the Manager of PIRC prior to interior sign fabrication.

C. ROOM NUMBERING PROCESS

1. GW staff shall comply with The George Washington University's *Project Process for Room and Suite Assignments, Operations Division, December 3, 2010*.

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

This document provides design standards only, and is not intended for use, in whole or in part, as a specification. Consultants referencing this information must always meet all applicable state and local building codes as well as all barrier free design requirements. Consultants must also refer to the entire set of Design Standards for additional information. Refer questions and comments regarding the content and use of this document to the George Washington University Project Manager.

DESIGN STANDARDS SUPPORTING DOCUMENTS PROPERTY INFORMATION RESOURCE CENTER ARCHIVING REQUIREMENTS

A. SUMMARY

This section contains information related to required submittals from various parties participating in the design and construction of projects at The George Washington University. Requirements for delivery time, copies, and submittal format are included. GW Project Managers and Property Information Resource Center (PIRC) sorting and filing requirements are further established.

B. DEFINITIONS

1. **Project Manual** includes the Specifications.
2. **Bid Documents** consist of the Bidding Requirements; Agreement between the Owner and Contractor and related Contract Forms; Conditions of the Contract; Project Manual and Drawings prepared prior to bidding; and Addenda generated during bidding.
3. **GMP Pricing Documents** consist of the Specifications and Drawings prepared prior to pricing and Addenda generated during pricing.
4. **Addenda** are changes made to the Bid Documents or GMP Pricing Documents prior to execution of the Contract. They become a part of the Bid Documents or GMP Pricing Documents as they are issued.
5. **Issued for Construction Documents** consist of the Specifications and Drawings, updated and issued as soon after the execution of the Contract as possible. The documents reflect the scope of the Work at that point in time and serve as the baseline set the Contractor will use to perform the Work.
6. **Modifications** are changes to the Issued for Construction Documents. They may be any of the following:
 - a. Written amendment to the Contract signed by both parties
 - b. Change Order
 - c. Construction Change Directive
 - d. Written field order for a minor change in the Work issued by the Architect
7. **Conformed Documents** consist of the Specifications and the Drawings, updated by the Architect and Consultants on an ongoing basis to reflect all changes to those items through Final Completion, including but not limited to Addenda and Modifications. The Conformed Documents reflect the final design intent of the Work.
8. **Contractor's As-Built Documents** are the Contractor's field mark-ups of the Issued for Construction Documents. They include a legible graphic and written

record of all Modifications as defined above, as well as all field changes made by the Contractor.

9. **Record Documents** are the Conformed Documents plus all additional comments from the Contractor's As-Built Documents, produced electronically by the Architect and Consultants.

10. **Summary of project documents stages:**

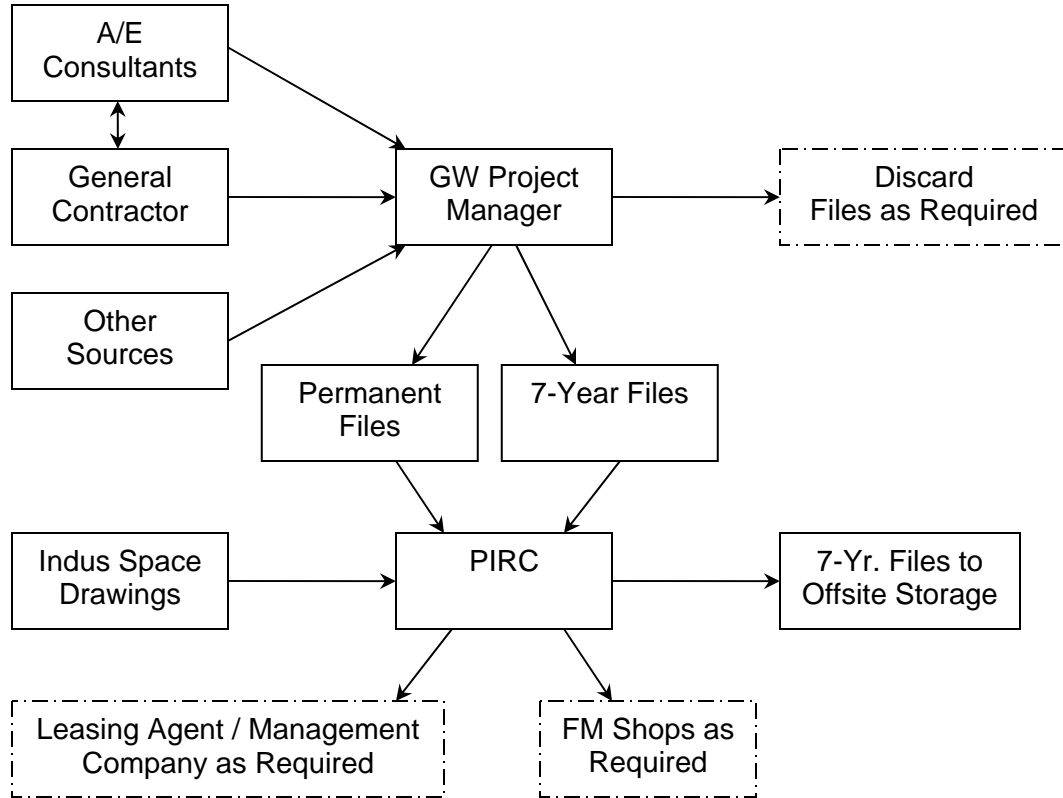
Bid Documents or GMP Pricing Documents
+ Addenda
= Issued for Construction Documents
+ Modifications
= Conformed Documents
+ Contractor As-Built Documents
= Record Documents

11. **Substantial Completion:**

- a. establishes a date that the Work or a designated portion thereof is substantially complete and can be used for the purpose intended;
- b. states the respective responsibilities of the Owner and the CM/Contractor for continued maintenance, utilities, security, insurance and damage to the Work from that point forward;
- c. and fixes the time within which the CM/Contractor shall complete all items listed therein. It is also the date that the Owner accepts responsibility for maintaining the warranty items within the scope of the Project.

12. **Project Closeout** is the managed and orderly transition of the Work from Substantial Completion to Final Payment.

C. CHART 1. SUMMARY OF CLOSEOUT / ARCHIVING PROCESS



1. Notes:

- a. A/E Consultants, General Contractor, Regulatory Agencies and others provide files as required to GW Project Manager. PM adds additional files to the collection. PM discards files not to be kept at least seven years. PM sorts the remaining files between those to be kept seven years and permanently. PM then provides clearly marked, sorted boxes to PIRC. PIRC also receives electronic space drawings and database information from Indus. PIRC shall always keep at least one copy of each permanent item, in each format, in safe storage. Additional copies may be distributed within the GW community as required.

D. TABLE 1. SUMMARY OF CLOSEOUT AND INTERNAL FILING REQUIREMENTS

1. Legend

- “H” = half-size when preceded by a number. For example, 1H indicates one half-size set of the item is required. Where no letter is provided, the count required is for full size hard copies.
- “ID” = Issue Date
- “N/A” = Not Applicable
- “SC” = Substantial Completion. Where SC is followed by “+” a number, the number represents months. For example, “SC+2” means the deliverable is due by two months past the Date of Substantial Completion.

- “T” = transmittal
2. Notes:
- a. It is often the case that the deliverable needed for PIRC is only a portion of the files covered by any specific GW Facilities Project Manager’s “Project Files Listing” code. For example, where not otherwise addressed herein, drafts and correspondence are not generally needed in the PIRC files and should be handled at the discretion of the PM.

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

A/E & Other Consultant Deliverables	Deliverable	Relevant GW Facilities PM Project Files Listing Code(s) (Codes listed at end for reference only)	Due to GW PM by	GW PM to deliver to PIRC by	Format and Copies Required			GW Internal Archiving			
					Electronic (Microsoft Word)	Hard Copy	Electronic (AutoCAD)	Electronic (Adobe PDF)	GW PM to Discard at Closeout	Discard at 7 years	Keep for permanent Record
	Review Documents (SD / DD)		ID	ID		1		1	X		
	Bid Documents (can be from the PM files)		ID	SC+6		1				X	
	GMP Pricing Documents (can be from the PM files)		ID	SC+6		1				X	
	Issued for Construction Drawings		ID	ID		1H	1	1			X
	Issued for Construction Specifications		ID	ID	1	1		1			X
	Periodically issued Construction Documents, Construction Change Directives, and Change Orders		ID	N/A					X		
	Record Drawings		SC+6	SC+6		1H; 1 full	1	1			X
	Record Specifications		SC+6	SC+6	1	1		1			X
	Final Finish Selections in Binder		SC	SC		1					X
	Final Furniture in Binder, where included in Contract		SC	SC		1					X
	Other project files not otherwise itemized herein		varies	SC+6		1				X	

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

	Deliverable	Relevant GW Facilities PM Project Files Listing Code(s) (Codes listed at end for reference only)	Due to GW PM by	GW PM to deliver to PIRC by	Format and Copies Required			GW Internal Archiving		
					Electronic (Microsoft Word)	Hard Copy	Electronic (AutoCAD)	Electronic (Adobe PDF)	GW PM to Discard at Closeout	Discard at 7 years
Contractor Deliverables	Final Inspections / Certifications	C.9 C.24.1	SC	SC+6		1				X
	Include all government/regulatory documentation.									
	Building location survey from DC Surveyor's Office		ID	SC+6		2				X
	Final approved Shop Drawings, Submittals and Product Data									
	<i>Note: the GW files for these items will originate from the Contractor, but Approved copies will be transmitted to GW via the Architect, as issued throughout the Project. Those are the copies that should be filed with PIRC during Closeout.</i>	C.11	ID	SC+6		1			X	
	Permits									
	Records should include, but are not limited to, the following: Main Construction Permits; Other Construction Permits; Refundable Deposits, Bonds and Letters of Credit	C.17	ID	SC+6		1		1		X
	Final Equipment Start-Up and Test Reports	C.24.5	SC	SC		3				X
	Training Record	C.24.6	SC	SC+6		3				X
	O&M Manuals including Warranties and a Separate Contractor-Prepared Warranty Log	C.24.7 C.24.8	SC	SC		3		1		X
Original Building Permit Documents and Permit Modifications Documents	C.24.9	SC	SC		1				X	
Contractor As-Built Documents										
<i>Note: One of the required sets is for PIRC, while the other will be provided to the Architect.</i>	C.24.10	SC+3	SC+3		2				X	

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

Spare Parts / Attic Stock Record	<i>Note: PIRC will only receive a record of the material received, while the actual material will convey from the Contractor to PM to Facilities Management.</i>	C.24.11	SC	SC+6		T				T	
	Contractor's Affidavit of Release of Liens	C.24.12	ID	SC+6		1					X
	Consent of Surety to Final Payment		ID	SC+6		1					X
	Sprinkler Drawings		ID	SC+6		1					X
	Coordination Drawings		ID	SC+6		1				X	
	Other project files not otherwise itemized herein		varies	SC+6		1				X	

Other Consultants, Regulatory Agencies, Utilities, Etc. Deliverables	Deliverable	Relevant GW Facilities PM Project Files Listing Code(s) (Codes listed at end for reference only)	Due to GW PM by	GW PM to deliver to PIRC by	Format and Copies Required				GW Internal Archiving		
					Electronic (Microsoft Word)	Hard Copy	Electronic (AutoCAD)	Electronic (Adobe PDF)	GW PM to Discard at Closeout	Discard at 7 years	Keep for permanent Record
	Project Directory / Contacts	A.0	ID	SC+6		1					X
	Project Fact Sheets	A.1	ID	SC+6		1					X
	Final Program	A3 A20.3.7	ID	SC+6		1					X
	Government/Regulatory Approvals										
	Include Zoning, Fine Arts, PUD Record Documents, and similar documentation.	A.5	ID	SC+6		1					X
	Final Signed Agreements with Exhibits										
	Include development agreement, window covenant, sidewalk covenant, land purchase, adjacent property and similar as available.	A.8	ID	SC+6		1					X
	Development Consultants' Documents										
	Include copies of Final Work Products that deal with existing conditions such as Traffic and Environmental Engineer Studies and Program Consultant work, as	A.20.1 A20.2 A20.3	ID	SC+6		1					X

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

appropriate.										
Environmental Impact Screening Form (EISF) Application and Approval	A.20.2	ID	SC+6		1					X
Design Contract and similar major contracts	B.3.2	ID	SC+6		1					X
Code Analysis and all related documentation that establishes basis of design	B.4.6	ID	SC+6		1					X
Final Work Product for Surveys, including Soil Borings, Site Surveys, and Utility Surveys	B.7	ID	SC+6		1					X
GW PM's Contract File with Construction Contract and GMP if applicable	C.3.4	ID	SC+6		1					X
Final Commissioning Reports	C.9.9	ID	SC+12		1					X
Copies of all notifications, user permits and related documentation including health department inspection, storm water structures, Title V, and Title VI	C.17 C.24	ID	SC+6		1					X
Bond Release – required for Loudoun County, VA projects only	C.17.4	SC+6	SC+6		1					X
Bond Release from LCSA (Loudoun County Sanitation Authority) – required for Loudoun County, VA projects only	C.17.4	SC+24	SC+24		1					X
Utility Agreements and As-Built Documents Include documentation for the following and any other similar utility files: electric, water/sewer, natural gas, telephone, and cable television.	C.21	ID	SC+6		1					X
Certificate of Occupancy and Application <i>Note: PIRC shall receive and store copies of the application (and all attachments) and the Certificate of Occupancy. The original C of O is sent to the Office of EVP&T. A transmittal of that conveyance is also to be stored with PIRC.</i>	C.24.3	ID	SC+6		1, T					X
A/V Final Selections in Binder(s)	D.4.1	SC	SC+6		1		1			X
FF&E Final Selections not procured through contractor or architect in Binder(s)		SC	SC+6		1		1			X
Utility Deposit and Refund		ID	SC+6		1					X

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

Documentation										
LEED Documentation		ID	SC+6		1		1			X
Other project files not otherwise itemized herein		varies	SC+6		1				X	

Indus Deliverables	Deliverable	Relevant GW Facilities PM Project Files Listing Code(s) (Codes listed at end for reference only)	GW PM to deliver Conformed Set backgrounds to PIRC by	To be uploaded and live on idrawings.com by	Format and Copies Required			GW Internal Archiving		
					Electronic (Microsoft Word)	Hard Copy	Electronic (AutoCAD)	Electronic (Adobe PDF)	GW PM to Discard at Closeout	Discard at 7 years
	Space Drawings (Measured Floor Plans of Completed Work), Based on Record Documents		SC+6	varies			X			X

END OF SECTION

(CURRENT FACILITIES PROJECT MANAGEMENT “PROJECT FILES LISTING” FOLLOWS FOR REFERENCE ONLY)

PROJECT FILES LISTING

The George Washington University
Project Management
Project: [Insert Project Name]
Rev. [Insert Date]

A. PROGRAM

- A.0 DIRECTORIES/CONTACTS
- A.1 FACT SHEETS
- A.2 GENERAL CORRESPONDENCE
- A.3 PROGRAM
 - A.3.1 [Insert Specific Program]
 - A.3.2 [Insert Specific Program]
- A.4 GRANTS
- A.5 ZONING / FINE ARTS (May contain Attorney Work Product)
 - A.5.1 Zoning
 - A.5.2 Fine Arts
- A.6 BUDGET
 - A.6.1 Initial Budget
 - A.6.2 Budget Revisions
 - A.6.3 Monthly Reports
- A.7 PROJECT MASTER SCHEDULE
- A.8 AGREEMENTS
 - A.8.1 [Insert Organization] Development Agreement
 - A.8.2 [Insert Organization] Window Covenant
 - A.8.3 [Insert Organization] Sidewalk Covenant
 - A.8.4 [Insert Agreements and Covenants]
- A.9 ANC/NEIGHBORHOOD CORRESPONDENCE
- A.10 PUBLICITY/PHOTOGRAPHY
- A.11 GENERAL COUNSEL CORRESPONDENCE (May contain Attorney Work Product)
- A.12 GWU REPORTS
- A.20 DEVELOPMENT CONSULTANTS
 - A.20.1 Traffic Engineer [Insert Name]
 - A.20.1.1 Solicitation
 - A.20.1.2 Limited Notices to Proceed and Contract
 - A.20.1.3 Revisions to the Contract
 - A.20.1.4 Requisitions
 - A.20.1.5 Correspondence
 - A.20.1.6 Transmittals
 - A.20.1.7 Work Product/Reports
 - A.20.2 Environmental Engineer [Insert Name]
 - A.20.2.1 Solicitation
 - A.20.2.2 Limited Notices to Proceed and Contract
 - A.20.2.3 Revisions to the Contract
 - A.20.2.4 Requisitions

- A.20.2.5 Correspondence
- A.20.2.6 Transmittals
- A.20.2.7 Work Product/Reports
- A.20.3 Program Consultant [Insert Name]
 - A.20.3.1 Solicitation
 - A.20.3.2 Limited Notices to Proceed and Contract
 - A.20.3.3 Revisions to the Contract
 - A.20.3.4 Requisitions
 - A.20.3.5 Correspondence
 - A.20.3.6 Transmittals
 - A.20.3.7 Work Product/Reports

B. DESIGN

- B.1 DESIGN TRANSMITTALS
- B.2 DESIGN PHASE CORRESPONDENCE
- B.3 DESIGN CONTRACT – [Insert A/E Name]
 - B.3.1 Solicitation (RFP, Proposal, etc.)
 - B.3.2 Limited Notices to Proceed and Contract
 - B.3.3 Revisions to the Contract
 - B.3.4 Requisitions
 - B.3.5 Correspondence
 - B.3.6 Transmittals
- B.4 ADDITIONAL GWU DESIGN CONSULTANTS
 - B.4.1 WATERPROOFING
 - B.4.2 FOOD SERVICE
 - B.4.3 ACOUSTICS
 - B.4.4 LIGHTING
 - B.4.5 PERMIT EXPEDITING
 - B.4.6 CODE ANALYSIS
 - B.4.7 COMMISSIONING
 - B.4.8 RENDERING
 - B.4.9 SIGNANGE
 - B.4.10 ELEVATORS
 - B.4.11 (please continue to list if needed)
- B.5 DESIGN MEETINGS
 - B.5.1 (if any subfolders begin list here)
- B.6 DESIGN FILE
 - B.6.1 ARCHITECTURAL
 - B.6.2 CIVIL / STRUCTURAL
 - B.6.3 MEP
 - B.6.4 COST ESTIMATE
 - B.6.5 SECURITY
 - B.6.6 SIGNAGE
 - B.6.6.1 (may have sub-files for interior signs, exterior signs, directories, GWU exterior identifier)
 - B.6.7 FM CONCERNS
 - B.6.8 TELECOM CONCERNS
 - B.6.9 PARKING SERVICES CONCERNS

- B.6.10 RISK MANAGEMENT CONCERNS
- B.6.11 ACADEMIC GROUP CONCERNS
- B.6.12 RESIDENT HALL CONCERNS
- B.6.13 LOCKS AND KEYING (may be sub-files based on user groups)
- B.7 SURVEYS
 - B.7.1 SOIL BORINGS
 - B.7.2 SITE SURVEYS
 - B.7.3 UTILITY SURVEYS
- B.8 DESIGN REVIEWS
 - B.8.1 DESIGN SIGN-OFFS
- B.9 REPORTS & ANALYSES
 - B.9.1 [Insert Report Name]
 - B.9.2 [Insert Report Name]
 - B.9.3 [Insert Report Name]
- B.10 SPECIFICATIONS
- B.11 VALUE ENGINEERING
- B.12 FM WORK REQUESTS

C. CONSTRUCTION

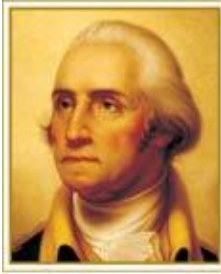
- C.1 CORRESPONDENCE AND TRANSMITTALS
 - C.1.1 FROM A/E
 - C.1.2 FROM PRIME CONTRACTOR
 - C.1.3 FROM OTHERS (NON-CONTRACTUAL)
- C.2 CORRESPONDENCE AND TRANSMITTALS
 - C.2.1 TO A/E
 - C.2.2 TO PRIME CONTRACTOR
 - C.2.3 TO OTHERS (NON-CONTRACTUAL)
- C.3 CONTRACT FILE- PRIME CONTRACTOR - [Insert Name]
 - C.3.1 SOLICITATION
 - C.3.2 ADDENDUM
 - C.3.3 PROPOSAL & ANALYSIS
 - C.3.4 LIMITED NOTICES TO PROCEED/CONTRACT/NTP
 - C.3.5 INSURANCE AND BONDS
- C.4 SUBCONTRACTORS
 - C.4.1 BIDDERS LIST
 - C.4.2 RECOMMENDATIONS TO AWARD
 - C.4.3 SUBCONTRACTOR CONTACT LIST
 - C.4.4 INSURANCE AND BONDS
 - C.4.5 SUBCONTRACTS
- C.5 CONSTRUCTION PLANS
 - C.5.1 SITE UTILIZATION/PHASING
 - C.5.2 TRAFFIC CONTROL
 - C.5.3 SAFETY
 - C.5.4 QUALITY CONTROL
 - C.5.5 ERECTION
- C.6 CONSTRUCTION SCHEDULES
 - C.6.1 CONTRACT SCHEDULE

- C.6.2 MONTHLY UPDATES
- C.7 MEETINGS
 - C.7.1 PRE-CONSTRUCTION
 - C.7.2 WEEKLY PROGRESS
 - C.7.3 SPECIAL TOPICS
- C.8 CONSTRUCTION REPORTS
 - C.8.1 MONTHLY PROGRESS
 - C.8.1 QUALITY CONTROL
- C.9 TEST / INSPECTION REPORTS/CERTIFICATES
 - C.9.1 MECHANICAL
 - C.9.2 ELECTRICAL
 - C.9.3 LIFE SAFETY SYSTEMS
 - C.9.4 MATERIALS INSPECTIONS
 - C.9.5 MATERIALS TEST RESULTS
 - C.9.6 ACOUSTICS
 - C.9.7 ELEVATORS
 - C.9.8 GENERAL BUILDING
 - C.9.9 COMMISSIONING
 - C.9.10 A/E INSPECTIONS
 - C.9.11 GW INSPECTIONS
- C.10 REQUESTS FOR INFORMATION
 - C.10.1 RFI LOG
 - C.10.1 PRIME CONTRACTOR
 - C.10.2 OTHERS
- C.11 SUBMITTALS AND SHOP DRAWINGS
 - C.11.1 SUBMITTAL REGISTER
 - C.11.2 SUBMITTALS (Filed by Division 00010 through 17999)
- C.12 CONSTRUCTION CHANGE DIRECTIVES
 - C.12.0 CCD LOG
 - C.12.1 CCD 1
 - C.12.2 CCD 2 (continue to list if necessary)
- C.13 OWNER DIRECTIVES
 - C.13.0 OD LOG
 - C.13.1 OD 1
 - C.13.2 OD 2 (continue to list if necessary)
- C.14 PROPOSED CHANGE ORDERS
 - C.14.0 PCO LOG
 - C.14.1 PROPOSED CHANGE ORDER 1
 - C.14.2 PROPOSED CHANGE ORDER 2
- C.15 CHANGE ORDERS
 - C.15.0 CHANGE ORDER LOG
 - C.15.1 CHANGE ORDER 1
 - C.15.2 CHANGE ORDER 2
- C.16 PRIME CONTRACTOR REQUISITIONS
 - C.16.1 [Insert Month 1]
 - C.16.2 [Insert Month 2]
- C.17 PERMITS
 - C.17.1 CONSTRUCTION PERMITS - MAIN

- C.17.2 OTHER CONSTRUCTION PERMITS
- C.17.3 REFUNDABLE DEPOSITS
- C.17.4 BONDS AND LETTERS OF CREDIT
- C.18 OTHER CONTRACTORS
 - C.18.1 [Insert Function] – [Insert Name]
 - C.18.1.1 SOLICITATION
 - C.18.1.2 NOTICES TO PROCEED/CONTRACT
 - C.18.1.3 REVISIONS TO THE CONTRACT
 - C.18.1.4 REQUISITIONS
 - C.18.1.5 CORRESPONDANCE/TRANSMITTALS
 - C.18.1.6 INSURANCE AND BONDS
 - C.18.2 [Insert Function] – [Insert Name]
 - C.18.2.1 SOLICITATION
 - C.18.2.2 NOTICES TO PROCEED/CONTRACT
 - C.18.2.3 REVISIONS TO THE CONTRACT
 - C.18.2.4 REQUISITIONS
 - C.18.2.5 CORRESPONDANCE/TRANSMITTALS
 - C.18.2.6 INSURANCE AND BONDS
- C.19 GWU CONSTRUCTION CONSULTANTS
 - C.19.1 TESTING AGENCY - [Insert Name]
 - C.19.1.1 SOLICITATION
 - C.19.1.2 NOTICES TO PROCEED/CONTRACT
 - C.19.1.3 REVISIONS TO THE CONTRACT
 - C.19.1.4 REQUISITIONS
 - C.19.1.5 CORRESPONDANCE/TRANSMITTALS
 - C.19.1.6 INSURANCE AND BONDS
 - C.19.2 [Other Consultant] - [Insert Name]
 - C.19.2.1 SOLICITATION
 - C.19.2.2 NOTICES TO PROCEED/CONTRACT
 - C.19.2.3 REVISIONS TO THE CONTRACT
 - C.19.2.4 REQUISITIONS
 - C.19.2.5 CORRESPONDANCE/TRANSMITTALS
 - C.19.2.6 INSURANCE AND BONDS
- C.20 GW FIELD SERVICES
 - C.20.1 FACILITIES MANAGEMENT
 - C.20.1.1 AGREEMENTS
 - C.20.1.2 CORRESPONDENCE/TRANSMITTALS
 - C.20.1.3 WORK ORDERS
 - C.20.2 GWORLD
 - C.20.2.1 AGREEMENTS
 - C.20.2.2 CORRESPONDENCE/TRANSMITTALS
 - C.20.3 ISS
 - C.20.3.1 AGREEMENTS
 - C.20.3.2 CORRESPONDENCE/TRANSMITTALS
 - C.20.4 TELECOMMUNICATIONS
 - C.20.4.1 AGREEMENTS
 - C.20.4.2 CORRESPONDENCE/TRANSMITTALS
 - C.20.5 RISK MANAGEMENT

- C.20.5.1 AGREEMENTS
- C.20.5.2 CORRESPONDENCE/TRANSMITTALS
- C.20.6 UNIVERSITY POLICE DEPARTMENT
 - C.20.6.1 AGREEMENTS
 - C.20.6.2 CORRESPONDENCE/TRANSMITTALS
- C.20.7 AUXILIARY SERVICES
 - C.20.7.1 AGREEMENTS
 - C.20.7.2 CORRESPONDENCE/TRANSMITTALS
- C.20.8 RESIDENTIAL PROPERTY MANAGEMENT
 - C.20.8.1 AGREEMENTS
 - C.20.8.2 CORRESPONDENCE/TRANSMITTALS
- C.20.9 PARKING
 - C.20.9.1 AGREEMENTS
 - C.20.9.2 CORRESPONDENCE/TRANSMITTALS
- C.20.10 DINING SERVICES
 - C.20.10.1 AGREEMENTS
 - C.20.10.2 CORRESPONDENCE/TRANSMITTALS
- C.21 UTILITIES
 - C.21.1 ELECTRIC
 - C.21.1.1 AGREEMENTS
 - C.21.1.2 CORRESPONDENCE/TRANSMITTALS
 - C.21.2 WATER/SEWER
 - C.21.2.1 AGREEMENTS
 - C.21.2.2 CORRESPONDENCE/TRANSMITTALS
 - C.21.3 NATURAL GAS
 - C.21.3.1 AGREEMENTS
 - C.21.3.2 CORRESPONDENCE/TRANSMITTALS
 - C.21.4 TELEPHONE
 - C.21.4.1 AGREEMENTS
 - C.21.4.2 CORRESPONDENCE/TRANSMITTALS
 - C.21.5 CABLE TV
 - C.21.5.1 AGREEMENTS
 - C.21.5.2 CORRESPONDENCE/TRANSMITTALS
- C.22 TENANTS
 - C.22.1 LEASE/AGREEMENTS [Insert Name]
 - C.22.2 LEASE/AGREEMENTS [Insert Name]
- C.23 ISSUE FILES
 - C.23.0 [Insert Issue Description]
 - C.23.1 [Insert Issue Description]
- C.24 CLOSEOUT
 - C.24.1 FINAL INSPECTIONS/CERTIFICATIONS
 - C.24.2 TITLE V APPLICATION/CERTIFICATES
 - C.24.3 CERTIFICATE OF OCCUPANCY
 - C.24.4 PUNCHLIST
 - C.24.4.1 CONTRACTOR COMPLETION LIST
 - C.24.4.2 A/E PUNCHLIST
 - C.24.5 FINAL TEST REPORTS
 - C.24.6 TRAINING

- C.24.7 OPERATIONS AND MAINTENANCE MANUALS
- C.24.8 WARRANTIES
- C.24.9 ORIGINAL PERMIT DRAWINGS
- C.24.10 AS-BUILT DRAWINGS
- C.24.11 SPARE PARTS \ ATTIC STOCK
- C.24.12 SUBCONTRACTOR FINAL RELEASES
- C.24.13 KEYS
- D. FURNISHINGS & EQUIPMENT
 - D.1 GWU CORRESPONDENCE/F&E TRANSMITTALS
 - D.2 VENDOR CORRESPONDENCE
 - D.3 F&E SPECIFICATIONS
 - D.4 EQUIPMENT
 - D.4.1 AUDIO / VISUAL
 - D.4.2 RESIDENCE FURNITURE
 - D.4.3 PUBLIC SPACE FURNITURE
 - D.4.4 ACADEMIC FURNITURE
 - D.4.5 RESIDENCE APPLIANCES
 - D.4.6 PARKING EQUIPMENT
 - D.5 SIGNAGE
 - D.6 FURNITURE/APPLIANCES PURCHASE
 - D.6.1 File for each P.O.)
 - D.7 F&E SUBMITTALS (file by division)
 - D.8 F&E SHOP DRAWINGS
 - D.9 MOVING
 - D.9.1 Contract / Invoices
 - D.10 BUILDING MANAGEMENT CORRESPONDENCE



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

This document provides design standards only, and is not intended for use, in whole or in part, as a specification. Consultants referencing this information must always meet all applicable state and local building codes as well as all barrier free design requirements. Consultants must also refer to the entire set of Design Standards for additional information. Refer questions and comments regarding the content and use of this document to the George Washington University Project Manager.

BUILDING TYPE DESIGN STANDARDS ACADEMIC BUILDINGS

A. SUMMARY

This section contains design standards for academic buildings. Refer to related divisions and sections for additional information.

B. BUILDING SPACE TYPES

Academic building spaces included herein, which are typical of many academic projects at GW, include:

- Entry Vestibule
- Lobby & Related Spaces
- Elevator
- Hallways & Corridors
- Recycling & Waste Station, Built-In
- Classroom, Computer Lab, Lecture Hall
- Office
- Office Suite Reception Area
- Break-Out Room, Conference Room, Lounge, Study Room
- Public Restroom
- Pantry
- Housekeeping Closet
- Mail, Files, Copy, Storage & Similar Spaces
- Fire Stair
- Electrical, Security, Telephone Closet
- Mechanical Room

C. GENERAL ACADEMIC BUILDING STANDARDS

1. The information in this section is provided for general guidance for this building type. Refer to individual academic building space standards, such as classrooms and offices, for additional information. Refer to all related sections, such as door hardware, lighting, plumbing fixtures, and various finishes for additional information, as well.
2. Doors, frames, and hardware: unless otherwise noted, required by fire ratings, accessibility requirements, or other code reasons:
 - a. Doors: solid, flush wood
 - b. Dimensions

- i. Interior and exterior steel doors, and interior, flush, solid core, wood doors: nominal dimensions, 36" wide, 7'-0" high, and 1-3/4" thick, typical
 - c. Frames: steel
 - d. All doors to group education spaces and all doors opening into a means of egress must have a vision panel or glass side lite(s). This is required to prevent injury when opening the door and to allow visual access to determine if the space is in use.
 - e. Door hardware shall comply with
 - i. "The George Washington University Door Hardware Specification Guide"
 - ii. GW "CFT Security & Access Standards"
 - f. See design standards as well as door and door hardware sections for additional information.
- 3. Windows
 - a. Unless otherwise noted, do not provide insect screens.
 - b. Window treatments shall be limited to one of the following: 1" horizontal louver blinds or fabric roller shades, either manual or motorized.
 - i. Offices shall have 1" horizontal louver blinds.
 - ii. Tiered classrooms and lecture halls shall have motorized fabric roller shades.
 - iii. Other spaces shall be as required by the specific project.
- 4. Finishes
 - a. Painted wood wall paneling and painted wood base are generally undesirable finishes, as they tend to show wear prematurely.
 - b. Flooring and base:
 - i. High traffic areas as well as areas that have a direct connection to the outdoors shall have terrazzo or agglomerate tile flooring with terrazzo base.
 - ii. Unless noted otherwise herein, flooring in other areas may be carpet as appropriate to meet budgetary, acoustical and aesthetic requirements.
 - a.) Carpet may be either broadloom or carpet tile throughout academic buildings, with the exception of offices, where broadloom is highly preferred.
 - b.) Where carpet is specified, stained wood or resilient base shall be provided, as appropriate.
- 5. Public Entrances
 - a. All building entries serving the public and directly connected to the outdoors shall contain a permanently installed entryway floor mat system. The system shall be at least 6'-0" long in the direction of travel and the full width of the entry door(s), minimum. See 12484 Entry Mat for additional requirements. Also see "Entry Vestibule" below for primary entrance requirements.
- 6. Signage for individual rooms is by owner. Designer to coordinate work with owner-provided signage standards and locations.
- 7. Bulletin boards, tack strips and other tackable surfaces shall conform to 10125 Bulletin Boards.
- 8. Interior Life Safety
 - a. Fire Protection: Sprinklers and fire alarms shall comply with all applicable building codes and regulations, including NFPA, as well as FM Global.
 - b. Refer to Division 13 for additional information.
- 9. Thermal Comfort

- a. HVAC: Refer to Division 15 for additional information.
- 10. Voice, Data, CATV
 - a. Wireless network coverage shall exist throughout each building. Coverage shall also extend to outdoor gathering areas immediately adjacent to the building. Typical interior coverage shall be as follows unless otherwise required:
 - i. Data/Video Drop: Typically, 3 dedicated data/video drops per standard classroom; Academic Technologies to confirm for each project
 - ii. Voice: one direct dial phone per classroom
 - b. CATV, Voice and Data station outlets shall all be comprised of a 4" by 4" back box, with a 2 x 4 plaster ring, cover plate, and a minimum 3/4" EMT or equal-sized raceway with pull string that extends back to the main communications horizontal distribution pathway, or to an accessible ceiling that provides a route to the main communications horizontal distribution pathway. Provide junction boxes, as required, to allow cable to be pulled through from the communications closet to the station outlet. Refer to AT Standards for additional information.
- 11. Power Supply, Lighting, and Controls
 - a. Refer to Division 16 for additional information including standard lamps and lamp colors as well as controls such as occupancy sensors and manual switches.
 - b. Colors and Materials:
 - i. Unless otherwise required, all switches and receptacles shall be white with stainless steel cover plates.
 - ii. Receptacles on circuits dedicated to computers and specific equipment shall be orange with stainless steel cover plates.
 - iii. Where switches are co-located and where receptacles are co-located, provide ganged cover plate.
 - c. Mounting Height:
 - i. Unless otherwise required, locate the following as noted:
 - a.) Receptacles at 18" AFF
 - b.) Thermostats at 48" AFF
 - c.) Lighting controls at 48" AFF
 - a. Lighting: Light levels shall comply with Illuminating Engineering Society of North America (IESNA) current recommendations. Examples of current IESNA lighting levels include: a) offices, classrooms, and laboratories: 30-50 foot candles (depending on specific work tasks) on desks and table tops; b) hallways; 5-8 foot candles; c) stairwells: 5-8 foot candles; d) restrooms: 5-8 foot candles. Refer to the most current issue of the IESNA Lighting Handbook to verify required illumination levels.
 - b. Lighting Controls (applicable to all academic building spaces unless specifically noted otherwise)
 - i. Public access to lighting controls shall not be provided in public spaces such as corridors, hallways, and lobbies.
 - ii. Energy-conserving lighting control strategies such as photocells and occupancy sensors that step down or turn off lighting when it is not needed, such as after-hours or when the space is unoccupied, are required in most spaces throughout academic buildings.

- iii. Consultant should be aware that housekeeping is typically performed after-hours in academic buildings. To that end, lighting design shall provide for illumination as required afterhours while still automatically powering down after occupants have vacated the space.

D. SPACE STANDARDS BY TYPE

Entry Vestibule

1. Primary entry vestibules shall be designed as air locks, with two sets of doors: exterior doors and doors between the entry vestibule and the building lobby. This design provides for increased energy efficiency and improved dirt and particulates control. The vestibule shall also be designed with a permanently installed entryway floor mat system, each at least 7'-0" long in the direction of travel. The floor mat system shall be provided at all building entries serving the public and directly connected to the outdoors. The floor system shall be the full width of the vestibule. See 12484 Entry Mat for additional requirements.
2. Each primary entrance vestibule shall include one barrier-free entry with assistive door opener(s).
3. Door hardware: self closing
4. Finishes: to match adjacent lobby

Lobby & Related Spaces

1. General: Lobby finishes and fixtures shall typically be upgraded from other building spaces. While most academic floors and support spaces tend to be somewhat repetitive and heavily programmed, lobbies and related spaces offer an opportunity to introduce and develop a building's individuality. This section is applicable to primary entrance lobbies on the main floor, including elevator lobbies. However, it may often be appropriate to maintain an aesthetic connection between the public spaces of the main floor and the lobbies and primary corridors on upper floors.
2. Finishes:
 - a. Walls: combination of painted gypsum board and upgraded wood paneling and trim
 - b. Flooring: terrazzo or terrazzo tile
 - c. Base: terrazzo or stained wood to complement surrounding finishes
 - d. Ceiling: painted gypsum board or painted gypsum board with acoustical ceiling tile
3. Lighting and Controls
 - a. Lighting may include specialty fixtures as long as the required lamps are within the standard selection as established in Division 16.
4. Lobby shall include a pair of water fountains, one of which is barrier-free, and bottle filling stations. See section 15415 Drinking Fountains for additional information.

Elevator

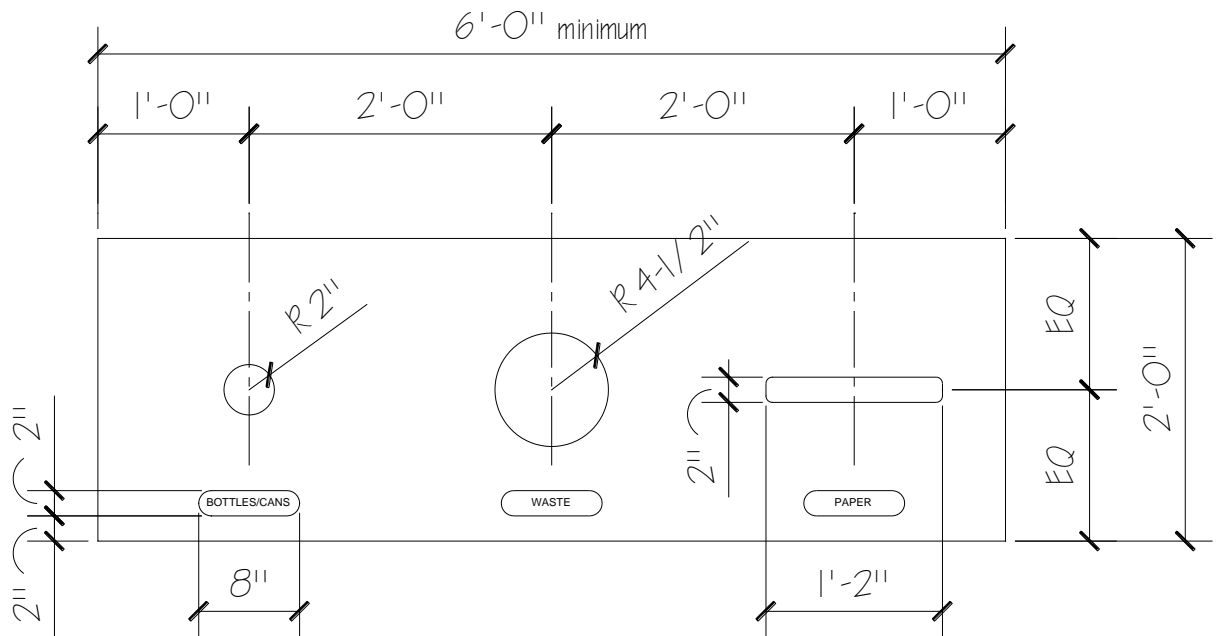
1. General

- a. See Division 14, Conveying Systems, for additional elevator requirements.
- b. Elevators, whether passenger or freight, shall be finished with highly durable hard surfaces. Carpet shall not be provided in elevator cabs.
 - i. Passenger & Freight Elevator Cab Finishes, Typical
 - a.) Doors: Stainless steel cladding
 - Finish: No. 4, satin, directional polish. Apply directional finishes in long direction of each component.
 - b.) Return panels: Stainless steel cladding; finish: No. 4 satin, directional polish. Apply directional finishes in long direction of each component.
 - c.) Side and rear panels
 - Plastic laminate cladding with stainless steel trim and reveals (Passenger elevator)
 - Patterned stainless steel cladding, Rimex 5-SM or approved equal (Freight elevator)
 - d.) Ceiling/Canopy
 - Stainless steel finish, with fluorescent downlights
 - e.) Base: stainless steel; finish: No. 4 satin, directional polish. Apply directional finishes in long direction of component.
 - f.) Flooring: agglomerate or terrazzo tile
 - g.) Handrails
 - Stainless steel; round tube 1-1/2 inch diameter, with closed ends
 - Provide for rear and side walls
 - Acceptable product and manufacturer: Equivalent to DH 154 by Otis
 - b.) Provide blanket studs on cab walls and padded blankets for each elevator

Recycling & Waste Station, Built-In

1. General: While GW offers a number of recycling collection variations, a standard built-in recycling & waste station shall be located in each primary lobby on the first floor. They may also be required in additional locations throughout the building, such as primary circulation paths. Consultant to coordinate locations with Owner. At a minimum, stations shall provide the following: paper recycling; bottle and can recycling; waste disposal; and bulletin board space. Depending on the space and occupant load, it may sometimes be appropriate to provide more than one receptacle of one or more types. Optionally, stations may also include campus newspaper stacks and shelves.
2. Primary lobby locations: To maximize recycling potential, when located in a primary lobby, the recycling and waste station shall be easily seen and physically accessed from the entry. It shall be open to the space, with a bulletin board above.
3. Minimum Requirements:
 - a. Station shall be 6'-0" wide, minimum, with a continuous solid surface counter top, backsplash, and sidesplashes and with a base cabinet below. Counter shall be 36" AFF. Station shall be surrounded on sides and back with a gypsum board niche, unless alternate material is approved. Provide a soffit at approximately 7'-0" above at station alcove, with two recessed downlights in soffit ceiling to illuminate the recycling/waste area and the bulletin board.

- b. A minimum 48" high, full-width, continuous, self-healing, neutral-colored bulletin board shall be located above the countertop on the back wall. Preference is for product/colors that allow for full width and no seams. If seams are necessary, they shall run vertically and sections should be sized equally. See 10125 Bulletin Boards for additional information.
 - c. Counter shall be approximately 24" deep with 3 labeled apertures for bins below. The apertures shall be centered front to back, and located approximately 24" on center lengthwise, leaving 12" from the center of each end aperture and the adjacent wall. Edges of apertures shall be eased.
 - d. Each aperture shall have a plaque identifying the collection. The plaque for each aperture shall be 8" long x 2" deep with rounded corners. It shall be mounted with 2" clear from the front of the counter top. Plaque shall be aluminum with block capital letters, approximately 5/8" high.
 - e. Facing the station, from the left to right, the apertures shall be:
 - i. left: 2" radius hole with "BOTTLES/CANS" plaque
 - ii. center: 4-1/2" radius hole with "WASTE" plaque
 - iii. right: 14" long x 2" deep slot with rounded corners and "PAPER" plaque
 - f. See 06400 Architectural Woodwork for cabinet construction requirements. Shelves and drawers shall not be provided. Integrated finger pulls shall be provided in the door construction, in lieu of metallic pulls. Additionally, doors and face frame may be wood, rather than laminate, if appropriate for the surrounding space.
 - g. One full-height door per receptor bin shall be provided. All doors shall be equally-sized. Doors shall typically be wood panel with hardwood edges, an exception to the requirements of 06400 Architectural Woodwork. Doors shall have piano hinges.
 - h. Consultant shall be responsible for specifying and designing millwork to accommodate a readily available heavy duty waste/recycling receptacle model to be used under each aperture in the cabinet. The selected receptacle model and cabinet design should work to maximize the station's collection capacity. Design shall allow for unencumbered access to pull receptacle straight out from the front for routine maintenance.
 - i. Owner-recommended bin: 35-gallon Rubbermaid, model 3958.
 - i. Finishes:
 - i. Toekick, ceiling/soffit, wing walls, and the like shall be as required to coordinate with balance of primary adjacent space.
4. Plan View of Counter Top:



Hallways & Corridors

1. General: Buildings will usually require multiple quality grades for the various corridors and hallways within. The consultant shall use best judgment and coordinate with owner to determine what level is required by specific spaces. In order to provide some measure of guidance, the following comments are offered:
 - a. Corridors and/or hallways directly connected to, and associated with, main and elevator lobbies often demand an upgraded finish schedule over that noted below in order to achieve aesthetic continuity with the primary lobby.
 - b. Corridors and/or hallways that serve utility and maintenance spaces, often located in basements, may require a diminished quality level than that listed below. Coordination with the Owner should provide clear direction. Examples of resulting finishes may include painted structure for walls and ceilings, or resilient floor instead of carpet, terrazzo, or tile.
 - i. Walls in areas with high traffic activity that serve utility, maintenance, and receiving spaces shall have corner guards.
 - ii. Hallways and corridors that service loading dock and receiving areas shall have 6" high resilient base.
 - c. There will also often be corridors and/or hallways that are "typical" and deserving of a quality level similar to that of classrooms and offices. These spaces should be confirmed with the Owner and then conform to the standards below.
 - i. Finishes
 - a.) Walls: painted gypsum board
 - b.) Flooring selection shall generally be carpet, terrazzo or terrazzo tile. Selection shall reflect consideration of traffic loads, budget,

- aesthetics, and acoustical requirements. Generally, office suites and hallways serving offices shall be carpet.
- c.) Base with carpet: resilient
- d.) Base with terrazzo or terrazzo tile flooring: terrazzo, 4" high
- e.) Ceiling: painted gypsum board or acoustical ceiling tile

Classroom, Computer Lab, Lecture Hall

1. General: The Office of Academic Planning's Academic Technologies has developed a document, "Classroom Design Specifications," a set of standards the consultant shall use in the design of academic facilities for GW. This document is referred to as AT Standards herein. Four categories of basic classrooms, as well as lecture halls and computer labs, are described in depth in that document. For reference only, the spaces covered are noted here:
 - a. Classroom Categories:
 - i. Seminar and Traditional Classrooms
 - ii. Standard Classrooms
 - iii. High Tech Classrooms
 - iv. Multi-Media Classrooms
 - v. Auditoriums/Lecture Halls
 - vi. Student Computer Labs

It should be noted that many of the tangible differences between various categories of classrooms relate to pedagogy and teaching style, instructional technology, and variations related to fixed versus moveable furniture as well as tiered versus flat floors. The consultant is responsible for coordinating the GW Design Standards with the AT Standards and remedying any conflicting requirements directly with the Owner.

2. Specific sections of the March 2010 AT Standards that shall be considered in the design of new classrooms, as well as major renovations of existing classrooms are as follows:
 - a. Chapter 1: Facility Design Elements
 - b. Chapter 2: Audio Visual (A/V) and IT Equipment
 - c. Chapter 3: Seminar/Traditional Classroom
 - d. Chapter 4: Standard Classroom
 - e. Chapter 5: High Tech Classroom
 - f. Chapter 6: Multi Media Classroom
 - g. Chapter 7: Lecture Hall Layout
 - h. Chapter 8: Computer Labs
 - i. Exceptions:
 - a.) Surface materials should be consistent with The George Washington University Design Standards, including but not limited to: walls, floors, and ceilings.
 - b.) ADA Guidelines shall follow the most current in force at the time of the Project and shall not be limited by any guidance provided within the AT Standards.

- c.) Windows shall be considered in lecture halls as appropriate and always in conjunction with appropriate lighting control strategies. (Reference AT Standards 7.5 Windows.)
 - d.) Incandescent lighting shall not be provided. (Reference AT Standards 7.10.1 Note-Taking / Dimmable Lighting.)
 - i. Chapter 8: Computer Labs
- 3. Programming: space allocation per student shall meet AT Standards.
- 4. In large lecture halls, the use of an entry vestibule is desirable to control external noises and light.
- 5. Finishes:
 - a. Flooring: carpet
 - b. Base: resilient
 - c. Steps in tiered classrooms:
 - i. Tread: carpet
 - ii. Nosing: rubber
 - d. Handrails as required by code
 - e. Ceiling: painted gypsum board or acoustical ceiling tile
 - f. Walls: painted gypsum board, custom fabric-covered acoustical panels, or wood paneling
 - g. Chair rail to be provided when deemed appropriate in classrooms where furniture is moveable rather than fixed. It shall be not provided on the instructional/presentation wall.
- 6. Door and Door Hardware
 - a. Door:
 - i. Solid, flush wood
 - ii. Minimum 36" wide
 - iii. Vision panel in door and/or adjacent full-height side lite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to classroom occupants by activities outside the room.
 - b. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
- 7. Lighting and Controls:
 - a. The notes under general lighting and controls at the beginning of this document apply to classrooms. However, special care must be given to ensure that occupants are able to appropriately and fully control the lighting for a variety of possible uses including multi-media presentation.
 - b. Light levels shall comply with Illuminating Engineering Society of North America (IESNA) current recommendations. Examples of current IESNA lighting levels include: a) offices, classrooms, and laboratories: 30 -50 foot candles (depending on specific work tasks) on desks and table tops; b) hallways; 5 -8 foot candles; c) stairwells: 5-8 foot candles; d) restrooms: 5-8 foot candles. Refer to the most current issue of the IESNA Lighting Handbook to verify required illumination levels.

- c. Refer to Specification Guidelines Divisions 16500 Lighting and 16570 Lighting Controls for additional information.
 - d. General: Lighting and controls for classrooms vary primarily based on whether it is a flat-floor or tiered classroom. Unless otherwise required, classrooms for up to fifty students shall be flat-floor, while those with more than fifty occupants shall be tiered. See below for distinguishing lighting and control features.
 - e. All Classrooms
 - i. With the exception of emergency/egress lighting:
 - a.) All classroom lighting and manual controls of the lighting shall be initially enabled via an occupancy sensor as required in 16570 Lighting Controls. Which specific lights are to illuminate may vary with the specific design, as long as enough light is provided for safe entry and access to manual controls of lighting.
 - b.) After the room is vacated, occupancy sensor shall switch all lighting off.
 - ii. Egress lighting on emergency back-up power supply, whether required by code or not, shall be provided to ensure safe exit from all points in tiered classrooms in the event of a power failure. Egress lighting shall be controlled by either the occupancy sensor and/or manual controls. Such lighting shall typically be one fixture in the overall general lighting layout. The fixture location shall be selected so as to allow for optimum visibility during instruction. It should always be removed from the projection screen. Ideally, it should also be removed from student seating and the primary presentation area.
 - iii. Locations for controls
 - a.) Provide manual controls for all lighting convenient to the presentation area. Do not *integrate* lighting controls into the A/V system, to prevent complications between the systems.
 - f. Flat-floor Classrooms:
 - i. General lighting: 2' x 2' or 2' x 4' lay-in fluorescent fixtures with 3 or 4 lamps each. Provide inboard/outboard switching.
 - ii. Front row lighting in each classroom shall be switched separately from the general lighting. Front row lighting shall also illuminate the marker board area.
 - g. Tiered Classrooms
 - i. General lighting shall be dimmable and further controlled by programmable lighting control system once enabled via occupancy sensor. Fixture styles shall typically be made up of a combination of the following types:
 - 2' x 2' or 2' x 4' lay-in fluorescent fixtures with 3 or 4 lamps each.
 - 4' or 8' long pendant fixtures with 3 or 4 lamps each.
 - Recessed downlights
 - ii. Front row lighting in each classroom shall be independently switched. Front row lighting shall also illuminate the marker board area.
8. Equipment:
- a. Projection Screens: location and size: per program requirements, AT Standards, and as approved by the Office of Academic Planning. Also see 11132 Projection Screens.

- b. The following audio/visual equipment shall be provided or accommodated as required by the AT Standards: lectern; ceiling-mounted projectors; 'assistive' listening devices; TV/VCR/DVD; 35 mm slide projectors; and document cameras. Consultant to provide for any additional equipment that may be required for special applications.
 - c. An A/V equipment control closet shall be provided for each Standard classroom, High Tech rooms, Lecture Hall and Auditorium spaces. Refer to AT Standards for additional information on requirements.
 - i. A/V equipment closet flooring shall be VCT; anti-static.
9. Furniture:
- a. Desks shall be fixed or movable, dependant upon the program requirements.
 - b. Seating shall be moveable.
10. Specialties:
- a. Marker Boards
 - i. Framed in extruded, clear anodized aluminum and conforming to 10101 Visual Display Surfaces
 - ii. Provide a continuous tack strip, conforming to 10125 Bulletin Board, and approximately 2" wide, above all required marker boards.
 - iii. Provide map hooks attached to each tack strip or to the top of each marker board.
 - iv. Locations shall be as per the program requirements and approved by the Office of Academic Planning.
11. HVAC
- a. Independent temperature controls shall be provided for each classroom, computer lab, and lecture hall. Controls should be made unavailable to students.
12. Power and Data
- a. Power shall be provided to each seat only in computer labs and tiered classrooms.
 - b. Data jacks shall be provided in computer labs or as required by the program requirements.
 - c. All A/V equipment including Lecterns, Projectors, and Equipment Control Closets shall be connected to outlets that have a connection to an isolated ground bar in the panelboard.
 - d. Provide separate circuits for the following: A/V equipment, podium, and projector.
 - e. Wireless infrastructure shall be provided as required by the following University organizations: Information Systems and Services (ISS); Center for Innovative Teaching and Learning (CITL) and Academic Technologies.

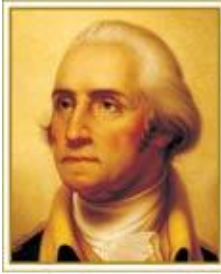
Office

- 1. Finishes
 - a. Walls: painted gypsum board
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling: acoustical ceiling tile
- 2. Door and Door Hardware

- a. Door
 - i. Doors: flush wood with a vision panel
 - ii. Vision panel
 - a.) General: Vision panel is required in office doors to provide visibility and security for occupants within, balanced with privacy for assigned faculty or staff.
 - b.) Doors may have full glazing or full height vision panel to maximize interior daylighting from perimeter spaces and/or to support an open plan concept that fosters interaction/collaboration.
 - c.) Glass shall be 50% obscured by fritting or sandblasting.
 - b. Door hardware to include
 - i. Office lock set
 - ii. Stop
3. Provide a satin finish cast brass or stainless steel hat and coat hook at 6'-0" AFF on the back of the door, unless lower height is required for barrier-free office.
 - a. Acceptable models:
 - i. Ives 571
 - ii. Rockwood 802
 4. Lighting and Controls
 - a. General Lighting: 2' x 2' or 2' x 4', lay-in fluorescent fixtures
 - b. Light control to be 4'-0" AFF and by entry.
 - c. Occupancy sensor to have manual on/auto off capability.
 5. Thermostat to be 4'-0" AFF, by the entry and co-located with lighting control.
 6. Furniture & Specialties: Owner-provided and installed
 7. Owner-Provided Furniture & Furnishings (for design information only)
 - a. Office furniture, such as desk and bookcases, as required
 - b. Waste bin, Rubbermaid Commercial 2956 (28 quart), typical
 - c. Recycling bin, Rubbermaid Commercial 2955 (13 quart), typical
 8. Space Allocation:

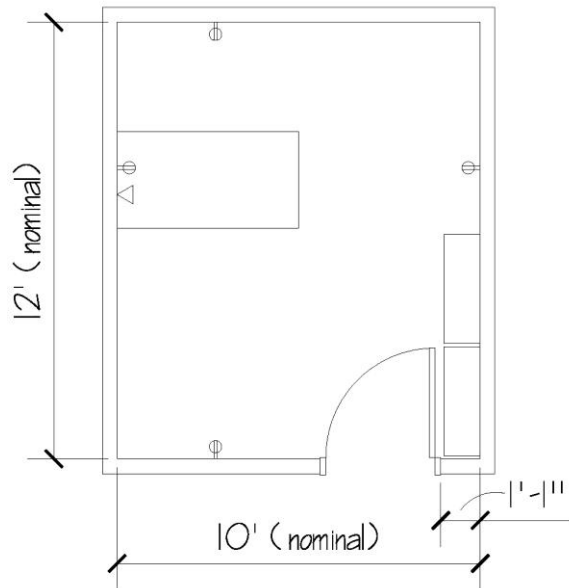
Position / Space Type	Space Allocation*
Dean's Office	180-200
Chairperson / Dept. Head / Director's Office	150
Faculty / Staff Office	125
Faculty / Staff (open) Workstation	110-125
Secretarial Work Station	60-80
Graduate Student Work Station	48
	*Assignable Square Feet

9. Typical layout for Faculty / Staff Office:



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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- a. Locate door frame 1'-1" from adjacent wall to allow placement of bookcases behind door.
- b. Provide a duplex receptacle and one drop with one data and one phone jack at the desk. Provide additional duplex receptacles as shown.

Office Suite Reception Area

1. General: Office suite reception areas are typically upgraded from the offices they serve. They include seating for guests and a high counter at the reception desk where guests are received. It is common to include an accent wall and accent lighting.
2. Finishes:
 - a. Walls: painted gypsum board, typical; with optional glass entry wall
 - b. Flooring: carpet
 - c. Base: resilient or stained wood
 - d. Ceiling: painted gypsum board or acoustical ceiling tile
3. Furniture:
 - a. Reception desk shall be moveable furniture, not built-in, to accommodate future flexibility in the space.
4. Door and Door Hardware
 - a. Door shall contain a large amount of glass.
 - b. Door shall not be self-latching.
 - c. Door hardware to include:
 - i. Closer
 - ii. Stop
 - d. Lock access shall be at a normal operating height. Location near floor level is unacceptable due to a history of operational difficulty by some occupants.

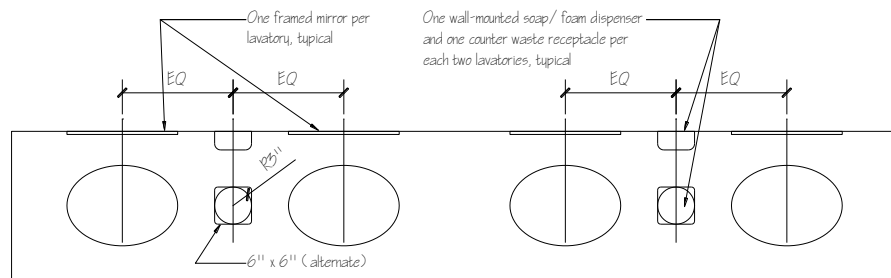
Break-Out Room, Conference Room, Lounge, Study Room

1. Finishes
 - a. Walls: painted gypsum board
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling: painted gypsum board or acoustical ceiling tile
2. Lighting:
 - a. General Lighting: ceiling-mounted, recessed or semi-recessed fluorescent fixtures. Lighting may be direct or direct/indirect, as appropriate.
 - b. Accent lighting by recessed compact fluorescent fixtures in gypsum board or acoustical ceiling tile ceiling may also be appropriate in certain applications.
3. Door and Door Hardware
 - a. Door to be one of the following, typical
 - i. Flush wood with 50% obscured vision panel
 - ii. Door within interior glazing system
 - b. Door hardware to include:
 - i. Classroom lock set
 - ii. Stop

Public Restroom

1. Finishes:
 - a. Flooring: ceramic mosaic tile
 - b. Walls: ceramic mosaic tile, floor to ceiling or tile up to 6 feet min. above finished floor. Top of tile to be fully coordinated with toilet accessories and toilet compartment.
 - c. Thresholds: marble
 - d. Ceiling: painted gypsum board or acoustical ceiling tile
2. Door and Door Hardware
 - a. Door: flush wood
 - b. Single-occupant restroom door
 - i. To be self-latching
 - ii. Hardware to include
 - a.) Privacy set
 - b.) Stop
 - c. Multi-occupant restroom door
 - i. Not to be self-latching
 - ii. Hardware to include
 - a.) Push plate
 - b.) Pull
 - c.) Surface mount closer
 - d.) Kick plate
 - e.) Stop
3. Toilet compartments and urinal screens, where required for multi-occupant restrooms, shall comply with requirements in 10150 Toilet Compartments.
4. Lighting
 - a. Multi-occupant restroom

- i. General lighting: 2' x 2' or 2' x 4' recessed or semi-recessed fluorescent fixtures and/or recessed compact fluorescent fixtures
- ii. Lighting above lavatories, mirrors, toilets, and urinals: Recessed linear fixture. Provide ½"-cell eggcrate louver on lighting above mirrors.
- b. Single-occupant restroom, selection as required by space
 - i. 2' x 2' or 2' x 4' recessed or semi-recessed fluorescent fixtures
 - ii. recessed compact fluorescent fixtures
 - iii. surface-mounted linear fluorescent fixture above mirror at vanity
- 5. Plumbing Fixtures: *See 15410 Plumbing Fixtures section for additional requirements on all items.*
 - a. Toilets to be wall-hung.
 - b. Urinals to be wall-hung.
 - c. Lavatory
 - i. Where only one lavatory is provided, it shall be wall-hung vitreous china.
 - ii. Where multiple lavatories are provided and adjacent, they shall be provided as either a continuous, solid surface lavatory top with integral bowls or as undermount, stainless steel lavatories with solid surface counter. Back-/side-splashes shall be solid surface.
 - a.) Provide a continuous, barrier-free solid surface apron at bottom of counter top, minimum 4" high, recessed 1" minimum from the front edge of counter. Apron shall run along front and any exposed ends of lavatory counter.
 - b.) Counter shall have one or more 3" radius or 6" x 6" square apertures, with edges eased. Each aperture shall allow convenient waste disposal to a floor-standing waste bin, minimum 13-gallon capacity, below the counter. Dependant on the number of lavatories provided, each sink shall typically have one adjacent counter aperture. Aperture shall be centered between two adjacent sinks. Apertures shall not be located at the end of the counter, beyond the last lavatory. In the case of an *odd* number of lavatories, this will result in the center lavatory either having no adjacent aperture, or having an adjacent aperture on both the right and the left side.



- c.) Provide wall-mounted or under-counter stainless steel brackets to locate each floor-standing bin in alignment with the aperture above, thus reducing the chance of it being displaced.

- d.) Consultant shall coordinate the thickness of the solid surface counter, the height of the apron, and the waste bin(s) provided to allow unencumbered access to pull bin straight out from the front for routine maintenance. Typically, counter top shall be 34" above finish floor and ¾" thick. Apron height shall further limit clearance below counter.
 - e.) Consultant shall ensure that barrier-free access to at least the minimum number of required lavatories is achieved, considering the spacing of the lavatories and the location of the under-counter waste bin(s). Consideration shall include both vertical and horizontal clearances.
- d. Lavatory faucet to be touchless and integrate a water-saving auto-sensor.
 - e. Lavatory plumbing pipes shall be insulated to comply with barrier-free requirements. For aesthetics and ease of maintenance, front panel skirting shall not be provided unless specifically required.
6. Non-lavatory counters, backsplashes and sidesplashes, where provided, shall be solid surface material.
7. Contractor-Provided Accessories:
- a. General: Refer to 10800 Toilet & Bath Accessories for additional information.
 - b. Provide one framed mirror above each lavatory.
 - c. Waste bins: refer to lavatory standards above and within this section for waste bin style selection and quantity guidance. In general, they should be floor-standing under solid surface counters with lavatories or floor-standing and lidded when used in conjunction with a wall-hung lavatory.
 - i. In a single-occupant restroom, provide one floor-standing lidded, self-closing stainless steel waste bin, with minimum 13-gallon capacity.
 - ii. In a multi-occupant restroom, provide under-counter, open top stainless steel waste bins. Selection shall conform to the lavatory requirements in this section and in 10800.
 - d. Provide one stainless steel or cast aluminum coat hook per toilet.
 - i. In a single-occupant restroom, mount hook on inside face of entry door.
 - ii. In a multi-occupant restroom, provide one hook on the inside face of each toilet stall door.
 - iii. Hooks on inward-swinging stall doors shall have a rubber bumper.
 - e. Provide one folding utility shelf in every toilet compartment, regardless of gender.
 - f. Sanitary napkin disposal:
 - i. Provide one dedicated or partition-shared disposal per toilet compartment. Single-occupant restrooms do not require one.
 - ii. Mounting: wall or partition
 - g. Hand dryer(s); provide count as appropriate.
8. Owner-Provided, Contractor-Installed Accessories:
- a. Refer to 10800 Toilet & Bath Accessories for additional information, including required locations and current models for Owner-Provided, Contractor-Installed Accessories as listed below.
 - i. Soap/foam dispensers
 - ii. Toilet seat cover dispensers
 - iii. Toilet tissue dispensers

Pantry

1. Finishes:
 - a. Walls: painted gypsum board
 - b. Flooring: resilient tile
 - c. Toekick at base cabinets: either plastic laminate or resilient
 - d. Base: resilient
 - e. Ceiling: either painted gypsum board or acoustical ceiling tile
2. Door and Door Hardware
 - a. Door: flush wood with optional vision panel
 - b. Door hardware to include:
 - i. Classroom lock set
 - ii. Stop
3. Lighting and Controls:
 - a. General Lighting: Ceiling-mounted, 2' x 2' or 2' x 4' recessed or semi-recessed fluorescent fixtures with T-8 lamps.
 - b. Under-cabinet lighting shall not be provided.
 - c. Provide occupancy sensor to control general lighting in each closed kitchen. Refer to Division 16 for additional information.
4. Cabinets shall comply with 06400 Architectural Woodwork.
5. Counters, backsplashes, and sidesplashes shall be finished with plastic laminate.
 - a. Counters shall have 90-degree angles at all face transitions between counter, backsplash, sidesplash and front.
6. Accessories, Owner-Provided, Contractor-Installed (see 10800 Toilet and Bath Accessories for additional information)
 - a. Provide one per pantry
 - i. soap/foam dispenser
 - ii. paper towel dispenser
 - b. Recycling bin, green (bottles/cans), Lidded Rubbermaid Commercial Slim Jim 3540-07 (23-gallon) with Rubbermaid lid (2692-88), typical
 - c. Waste bin, Lidded Rubbermaid Commercial Slim Jim 3940 (23-gallon), typical
7. Sink to be stainless steel with chrome plated, lever style faucet and waste disposal, complying with 15410 Plumbing Fixtures.
8. Appliances to be provided
 - a. refrigerator
 - i. Size shall be dependent on the number of occupants sharing it.
 - a.) under counter: 1-10 occupants
 - b.) small-size: 11-25 occupants
 - c.) mid-size: 26-50
 - d.) full-size: 51 or more occupants
 - b. microwave
 - c. ice-maker, optional – confirm with owner

Housekeeping Closet

1. Finishes:

- a. Flooring: ceramic tile
- b. Threshold: marble
- c. Walls and base shall be one of the following:
 - i. Painted concrete block walls with 4" high ceramic tile base
 - ii. Painted water-resistant gypsum board with ceramic tile to 4 feet above finished floor
- d. Ceilings shall be exposed structure, either painted or unpainted
2. Lighting shall be T-8 lamps, protected by lens, wire cage, or similar
3. Provide service basin, faucet, and mop hanger. See 15410 Plumbing Fixtures for additional information.
4. Door and Door Hardware
 - a. Door: flush wood
 - b. Door: self-latching
 - c. Door hardware to include:
 - i. Classroom lock set
 - ii. Surface mount closer
 - iii. Stop
 - iv. Kick plate

Mail, Files, Copy, Storage and Similar Spaces

1. Finishes:
 - a. Walls: painted gypsum board
 - b. Flooring: resilient tile
 - c. Base: resilient
 - d. Toekick at base cabinets: either plastic laminate or resilient base
 - e. Ceiling: either painted gypsum board or acoustical ceiling tile
2. Door and Door Hardware, where applicable
 - a. Door: flush wood with vision panel
 - b. Door hardware to include:
 - i. Classroom lock set
 - ii. Closer if required by Owner
 - iii. Kick plate if required by Owner
 - iv. Stop
3. General Lighting: 2' x 2' direct/indirect, recessed or semi-recessed fluorescent fixtures. Parabolic may be appropriate in some applications.
4. Any required cabinets and counters shall comply with 06400 Architectural Woodwork. Specific program shall dictate requirements for open cabinets, doors, and drawers use.

Fire Stair

1. Finishes:
 - a. Walls: painted concrete masonry units or gypsum board
 - b. Floors: raised rubber
 - c. Stair treads: resilient
 - d. Risers: resilient
 - e. Ceilings: painted structure or gypsum board
2. Lighting and Controls, unless otherwise noted:

- a. Ceiling-mounted light fixtures are preferred where mounting height is less than 12' AFF to allow for ladder access, but wall-mounted are acceptable as appropriate to the design.
3. Door where provided
 - a. Doors to include vision panels
4. Note: in contrast to fire stairs, open and monumental stairs shall typically have finishes to complement the surrounding public spaces, often including pre-cast terrazzo treads and risers.

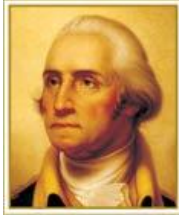
Electrical, Security, Telecommunications Closet

1. Finishes
 - a. Flooring: resilient
 - b. Base: resilient
 - c. Walls: painted CMU or GWB
 - d. Ceilings: exposed structure, unpainted
2. Electrical and Telecommunications Closets Only
 - a. Flooring: resilient, white
 - b. Walls: On gypsum board partition, add fire-resistant plywood, painted white, 8' high
3. Lighting: strip lighting with T-8 lamps, protected by wire cage
4. Door Hardware
 - a. storage room lock set
 - b. stop where appropriate
5. Telecommunications Room Only
 - a. Provide minimum one per floor, stacked.
 - b. Comply with GW ISS requirements.
 - c. Telephone, data, and CATV distribution hub for floor.
6. Electrical Closet Only
 - a. Provide minimum one per floor, stacked.
 - b. Security conduit riser can run through closet.
 - c. May be a shallow closet opening to corridor with double doors.

Mechanical Room

1. Finishes
 - a. Flooring: sealed concrete
 - b. Walls: painted CMU
 - c. Ceilings: exposed structure, unpainted
2. Lighting: strip lighting with T-8 lamps, protected by wire cage
3. Door Hardware
 - a. storage room lock set
 - b. stop
 - c. closer
 - d. kick plate where appropriate for layout

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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BUILDING TYPE DESIGN STANDARDS LABORATORY BUILDINGS

A. SUMMARY

This section contains design standards for laboratory buildings. Refer to related divisions such as Academic Building Type Standards and specification guideline sections for additional information.

B. REFERENCE STANDARDS

In addition to local and national codes, reference standards and guidelines for laboratory facilities shall include, but not be limited to, the following:

1. Laboratories for the 21st Century (Labs21)
2. NIH Guidelines on Optimization of Laboratory Hood Containment
3. National Research Council (NRC) Guide for the Care and Use of Laboratory Animals
4. Americans with Disabilities Act Accessibility Guidelines (ADAAG)
5. ANSI
6. The National Institutes of Health (NIH) and Centers for Disease Control (CDC) Design Policy and Guidelines, including "Biosafety in Microbiological and Biomedical Laboratories", 5th Edition
7. ANSI Z358.1 Emergency Eyewash and Shower Equipment, January 2004
8. Instrument Society of America (ISA) Applicable Recommended Practices and Standards
9. Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) Standards
10. NIH Office of Laboratory Animal Welfare (OLAW) Guidelines
11. Occupational Safety and Health Administration Regulations
12. ACGIH Industrial Ventilation - A Manual of Recommended Practice (the latest edition)
13. ANSI/ASHRAE 110-1999 – Standard for Testing Performance of Fume Hoods
14. NSF Standard 49 – Bio-Safety Cabinets
15. ASHRAE Standard 62-2004 Ventilation for Acceptable Indoor Air Quality
16. FM Global requirements
17. IEEE - Institute of Electrical and Electronics Engineers
18. IESNA - Illuminating Engineering Society of North America
19. NECA - National Electrical Contractors Association
20. NEMA - National Electrical Manufacturers Association
21. UL - Underwriters Laboratories

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22. GW Environmental Health and Safety – Lab Safety and Research

Energy-efficiency focused recommendations for laboratory facilities include but are not limited to the following:

1. Occupational Safety and Health Administration (OSHA) - 29 CFR - Part 1910.1450 Occupational Exposures to Hazardous Chemicals in Laboratories
2. "American National Standard for Laboratory Ventilation." ANSI/AIHA Z9.5 2003 Laboratory Ventilation Standard
3. American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE), 2003 HVAC Applications Handbook. Atlanta, GA
4. Industrial Ventilation: A Manual of Recommended Practice - 24th Edition. 2001.
5. ASHRAE Laboratory Design Guide

C. BUILDING SPACE TYPES

Laboratory building spaces included herein, which are typical of laboratory projects at GW, include, but are not limited to, the following:

- Entry Vestibule
- Lobby & Related Spaces
- Elevator
- Hallways & Corridors
- Lab, Typical
- Tissue Culture Room
- Procedure Room
- Life Cycle/Tropical Life Cycle, Micro-Bio Culture, PCR Type I, ELISA
- Physiology, PCR
- Radioactive Chemical Type I, II, and III
- Microscope Room
- Darkroom
- Equipment Room, Freezer Room
- Autoclave/Glasswash Room
- Controlled Environment Rooms
- Vivarium Facilities
- Nano/Clean Room

D. GENERAL LABORATORY BUILDING STANDARDS

1. The information in this section is provided for general guidance for this building type. Refer to individual laboratory space standards for additional information. Refer to all related specification guideline sections, such as door hardware, lighting, plumbing fixtures, and various finishes for additional information, as well.
2. GW's laboratory standards shall be based upon Laboratories for the 21st Century (Labs21). Labs21, a joint program of the EPA and DOE, supports the development of high performance, energy-efficient, and sustainably-designed laboratories from a whole building approach to design (<http://www.labs21century.gov/>). Consultants shall strive to achieve the highest energy efficiency and water conservation possible within the parameters of

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budget, safety, operability, reliability, and function. Consultants shall adopt the Labs21 approach and utilize the program's resources, such as the Tool Kit, to support the planning, design, and construction of labs at The George Washington University. Resources contained in the Labs21 Tool Kit include the following items:

- Labs21 Sustainable Design Programming Checklist: During the programming and conceptual design phases, architect/lab planner shall consider using the programming checklist to help identify sustainable design objectives and strategies.
- Labs21 Design Guide and the Labs21 Design Process Manual: The project shall adopt strategies, where appropriate, as outlined in the design guide and design process manual. These resources are available online at <http://www.labs21century.gov/toolkit/index.htm>.
- Labs21 Environmental Performance Criteria: In addition to meeting GW LEED guidelines, consultants shall strive to meet Labs21 Environmental Performance Criteria (EPC) which is based on the LEED rating system. Labs21 EPC contains additional credits above and beyond LEED credits. For example, under the LEED-NC rating system, Sustainable Sites category, credits SS-1 through SS-8 remain the same. In addition to those credits, Labs21 EPC proposes SS-9, Safety and Risk Management for a potential two points. Therefore, Labs21 EPC shall be considered jointly with LEED-NC v3.0. At the time of writing of this document, the following are EPC additional criteria to LEED:

EPC additional criteria to LEED:

Sustainable Sites		Points
Credit 9.1	Safety and Risk Management, Air Effluent	1
Credit 9.2	Safety and Risk Management, Water Effluent	1
Water Efficiency		
Prereq 1	Laboratory Equipment Water Use	Required
Credit 4.1	Process Water Efficiency, Document Baseline	1
Credit 4.2	Process Water Efficiency, 20% Reduction	1

Energy & Atmosphere		Points
Prereq 2	Minimum Energy Performance	Required
Prereq 4	Assess Minimum Ventilation Requirements	Required
Credit 1	Optimize Energy Performance	1-19
Credit 2	On-Site Renewable Energy	1-7
Credit 7	Energy Supply Efficiency	1-5
Credit 8	Improve Laboratory Equipment Efficiency	1
Credit 9.1	Right-size Laboratory Equipment Load: Measure Comparable Lab	1

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Credit 9.2	Right-size Laboratory Equipment Load: Metering Provision	1
Materials & Resources		
Prereq 2	Hazardous Material Handling	Required
Credit 8	Chemical Resource Management	1
Indoor Environmental Quality		
Prereq 3	Laboratory Ventilation	Required
Prereq 4	Exterior Door Notification System	Required
Credit 9.1	Indoor Environmental Safety, Airflow Modeling	1
Credit 9.2	Indoor Environmental Safety, Fume Hood Commissioning	1
Credit 9.3	Indoor Environmental Safety, Alarm Systems	1

3. Indoor air quality shall be an important consideration in laboratory environments. HVAC systems shall be designed such that supply and return air do not come in direct contact with fiber based insulation materials. All the laboratory areas shall be served by 100% outside air systems to maintain good air quality. Offices, conference rooms, and other non-laboratory spaces shall be served by a dedicated recirculating air system with appropriate amount and control of outside air to maintain a balance between energy use and indoor air quality.
4. Plug Loads: Energy Star qualified equipment shall be selected, to the greatest extent possible, in office and kitchen/pantry spaces including computers, monitors, printers, refrigerators and dishwashers. Energy Star qualified laboratory equipment shall be specified (this will only apply when there is a choice of functionally equivalent equipment). If Energy Star ratings are not available for the equipment under consideration, energy consumption shall be used as one of the selection criteria when comparing options.
5. Labs and offices shall be arranged so that sub-groups of researchers with close collaborations can be situated in proximity to each other.
6. Labs shall be planned on a regular module with flexible systems such as flexible casework and utility distribution utilizing overhead service carriers (vertical drops or horizontal carriers) or by means of ceiling connection points, to enhance efficiency and to maximize the ability to reconfigure lab modules to suit future research needs. Furniture systems shall accommodate convenient changes of location, configuration, and services throughout the life cycle of the laboratory.
7. Lab benches shall have modified epoxy resin tops. Countertops should incorporate a lip to help prevent run-off onto the floor.
8. Laboratory Module Configuration:
 - a. Aisle widths in laboratories shall not be greater than 5'-0".
 - b. Laboratory benches shall be freestanding suspended casework system at island locations and/or traditional fixed casework for perimeter benches as required by program. Freestanding suspended systems shall be considered for easy reconfiguration for varying work heights and work surface locations. These systems also allow sections to be removed and left open for equipment, or replaced with a different table/cabinet arrangement.
9. Specialty Gas Systems:

Comment [nra1]: At the time of writing of this document, Energy Star does not have ratings for laboratory equipment. EPA is working with Lawrence Berkeley National Laboratory (LBNL) to develop list of Energy Star lab equipment

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

- a. Gas cylinders, manifolds, and switchover assemblies shall be supplied locally to lab areas requiring such gases.
- 10. Emergency Safety Equipment:
 - a. Comply with the following: American National Standards Institute (ANSI), Z358.1; Emergency Eyewash and Shower Equipment; National Fire Protection Association - Health Care Facilities, Handbook 99, Chapter 10-6, Emergency Shower
 - b. Emergency eyewashes and safety showers shall be provided at each lab module and shall be easily accessible from all areas of the lab.
- 11. Doors, frames, and hardware: unless otherwise noted, required by fire ratings, accessibility requirements, or other code reasons:
 - a. Doors:
 - i. solid, flush wood
 - b. Dimensions
 - i. Typical laboratory interior doors: Flush, solid core, wood doors - nominal dimensions, 3'-6" wide, 8'-0" high, and 1-3/4" thick, typical
 - a.) 3'-6" wide doors allow for passage of large laboratory equipment such as biosafety cabinets.
 - ii. Non-laboratory interior doors: Flush, solid core, wood doors - nominal dimensions, 3'-0" wide, 8'-0" high, and 1-3/4" thick, typical
 - c. Frames: steel
 - d. All doors to lab spaces and all doors opening into a means of egress must have a vision panel or glass sidelite(s). This is required to prevent injury when opening the door and to allow visual access to determine if the space is in use. Vision panel at lab perimeter walls shall consist of fire-rated glazing.
 - e. Provide tempered glass at all areas requiring safety glazing. Clear fully tempered float glass shall be provided at non-fire rated doors. Clear annealed or fully tempered float glass shall be provided at other borrowed lights to suit application.
 - f. Door hardware shall comply with specification guidelines sections of GW Design Standards and the following:
 - i. "The George Washington University Door Hardware Specification Guide"
 - ii. GW "CFT Security & Access Standards"
- 12. Windows
 - a. Window treatments shall be limited to one of the following: 1" horizontal louver blinds or fabric roller shades, either manual or motorized.
 - i. Offices shall have 1" horizontal louver blinds.
 - ii. Tiered classrooms and lecture halls shall have motorized fabric roller shades.
 - iii. Other spaces shall be as required by the project-specific program requirements.
- 13. Finishes
 - a. Painted wood wall paneling and painted wood base are generally undesirable finishes, as they tend to show wear prematurely.
 - b. Flooring and base:
 - i. High traffic areas as well as areas that have a direct connection to the outdoors, such as lobbies and vestibules, shall have terrazzo or agglomerate terrazzo tile flooring with terrazzo base.
 - ii. Floors in labs and lab support spaces and corridor areas shall typically be resilient flooring with resilient base.

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- iii. Floors in Autoclave/Glasswash shall be broadcast type epoxy resin.
 - iv. Floors in laboratories containing biological and radioactive materials shall be non-pervious, one piece, and with covings to the wall and cabinets or casework to ensure that spills cannot penetrate beneath floors/cabinets.
 - v. Flooring in storage areas for corrosive liquids shall be of liquid-tight construction.
 - vi. Flooring in offices shall be broadloom. Carpet tile to be utilized in office support spaces. Where office support spaces are in direct connection with labs, resilient flooring shall be used.
 - a.) Stained wood or resilient base shall be provided, as appropriate.
14. Lab Casework
- a. Wherever possible, casework shall be mobile to maximize flexible use of space by allowing labs to be more easily reconfigured and adaptable to changes in research procedures.
 - b. Locked drawers and cabinets shall be individually keyed.
 - c. Lab casework shall be sustainable and reduce impact on the environment through incorporating the following features where budget allows:
 - i. metal elements with recycled content
 - ii. bench top materials with recycled content
 - iii. rapidly renewable casework substrates such as wheat straw fiberboard
 - iv. FSC-certified and formaldehyde-free wood substrates, veneers, and solids
 - v. low-emitting paints and coatings
 - vi. low-emitting and formaldehyde-free composite wood and agrifiber products
 - vii. alternative casework materials
 - d. All counter tops shall incorporate a lip to prevent run-off onto the floor.
 - e. Work Surface Material (benches and table tops):
 - i. Modified epoxy resin
 - ii. Thickness: 1"
 - iii. Epoxy resin work surfaces and backsplashes shall be factory molded of modified epoxy resin with smooth polished finish at exposed surfaces. Backsplashes shall not be integral with countertops.
 - iv. Color(s): Black, Dark gray, Light gray
 - v. Provide drip grooves under exposed edges.
 - vi. Edge profile: Provide 1/4" radius or 1/8" bevel for exposed upper edges and corners
 - vii. Sink Mounting:
 - a.) Under-mounted sink cut-outs: Cut-outs shall be smooth and uniform without saw marks with a uniform radius of approximately 1/8" on the top edge conforming to the sink shape. The bottom edge of sink openings shall be finished smooth.
 - b.) Drop-in sink cut-outs: Profile shall provide support for the sink and ensure that the rim of the installed sink is 1/8" below the surrounding work surface level or bottom of drain grooves, if applicable. Form top edge of the cut-out with 1/8" bevel and without gaps between the installed sink rim and work surface
 - viii. Cut drain boards into work surface adjacent to sinks as needed. Grooves shall be 18" long and 1/2" diameter cut 1/4" into epoxy material.

Comment [nra2]: To be verified: Do particular types of casework require a lock?

Comment [nra3]: GW should have a campus standard for bench; See Ross Hall (75% CD 1/2011) and SEC (final spec will not be available until 1/2012).

Comment [nra4]: To be verified: Designer to choose color or make black the standard?

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- ix. Provide all holes and cut-outs as required for built-in equipment, mechanical and electrical service fixtures.
- f. Fume hood work surfaces shall be 1-1/4" overall with 1/4" marine edge
 - i. Acceptable manufacturers, or equal (epoxy resin work surfaces, sinks, troughs):
 - a.) Durcon Company, Inc.
 - b.) Epoxyn Products
 - c.) Laboratory Tops, Inc.
 - d.) Kewaunee Scientific Corporation
 - g. Alternate Work Surface Material (bench tops and table tops): Thermoset Resin
 - i. Acceptable Manufacturers:
 - a.) Trespa TopLab or equal
 - b.) Thickness: 3/4"
 - c.) Other requirements as described for epoxy resin work surface material
 - h. Mobile Lab Tables
 - i. 3/4" thick
 - ii. Work surface: Modified epoxy resin
 - iii. Tables shall have an incremental adjustment of the work surface height from 27" to 36".
 - iv. Lab service utility outlets shall be integrated with the design of the lab table. Utility lines from the table to the ceiling interface panel shall be provided by the lab table vendor. Electrical outlets shall be provided at a minimum density of one duplex outlet per two feet to table width, with at least two circuits per table.
 - v. Acceptable products and manufacturers, or equal:
 - a.) Distinction Laboratory Bench System by Fisher-Hamilton, Inc.
 - b.) E3 Adaptable Lab System by Collegedale Casework, Inc.
 - c.) Enterprise Adaptable Movable Workstations by Kewaunee Scientific
 - d.) Bravo by AT Villa USA
 - i. Fixed Wood Casework
 - i. Construction materials and methods shall comply with recommended practices for laboratory casework by Scientific Equipment and Furniture Association (SEFA).
 - ii. Casework shall be flush overlay design.
 - iii. Chemical-resistant finish shall be applied to unstained surface or over stain or selected color. Stain and finish shall have zero or low VOC content.
 - iv. Casework substrate shall be 3/4", 7 ply marine grade plywood or particle board. Substrate and adhesives shall have zero urea-formaldehyde content. Exposed solid hardwood shall be maple. Exposed veneer shall be quarter sawn maple with matched veneers oriented in vertical direction. Hardwood and veneers shall be FSC-certified.
 - v. Glass in framed doors shall be 7/32" laminated glass and in wall cases shall be 1/8" float glass.
 - vi. Cabinet shelves shall be 3/4" thick full depth, 7 ply veneer core plywood for spans up to 36" and 1" thick full depth, 9-ply veneer core plywood for spaces over 36".

Comment [nra5]: GW to have campus standard for bench; See Ross Hall (75% CD 1/2011) and SEC (final spec will not be available until 1/2012).

Comment [nra6]: SEC specs call for epoxy resin or thermoset resin. Investigate the difference between the two materials? Pros? Cons? Durability? Program by lab type a factor?

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- vii. All fixed benches shall be 36" high. Accommodation for ADA access at fixed benches and sinks shall be provided.
- viii. Acceptable manufacturers, or equal:
 - a.) Fisher Hamilton, Inc.
 - b.) Collegedale Casework, Inc.
 - c.) Kewaunee Scientific.
 - d.) AT Villa USA.
- 15. Island Benches: Lab bench design shall aim for fewer under-floor utilities, such as plumbing, and target more overhead utility distribution - electrical, data cabling, vacuum, and compressed air would be piped down from the ceiling to allow benches to be reconfigured with minimal impact to the flooring (see Option B below). Island bench design to be one of two options:
 - a. Option A: Lab bench design with 6" fixed flexible core modular system with suspended work black epoxy counters, suspended under counter cabinets and overhead adjustable open shelving; utilities to be extended down to the benches through a chase from the ceiling overhead and then distributed along the length of the benches (in raceway mounted on shelving supports)
 - b. Option B: "Plug and Play" method of providing services consisting of overhead adjustable shelving modules that are pre-piped and pre-wired service carriers where utility services are all located at the ceiling and connected to benches via quick disconnect type flexible devices.
- 16. Flammable/Solvent Storage Cabinets
 - a. Comply with requirements of OSHA, NFPA 30, and (if vented) NFPA 39.
 - b. Comply with GW Environmental Health and Safety program for lab safety and research.
 - c. Provide double-walled metal cabinet designed for the storage of flammable, combustible, and solvent liquid.
 - d. Metal Finish: After cleaning and pre-treating, final finish shall be laboratory casework manufacturer's standard chemical resistant finish to comply with surface finish tests of SEFA 8.
 - e. Locks: None
 - f. Label: "FLAMMABLE – KEEP FIRE AWAY" lettering to be silkscreened on cabinet in a conspicuous location.
 - g. Floor pan: Provide a 2" deep liquid-tight pan to cover the entire bottom of the cabinet to contain leaks and spills.
 - h. Shelves: Provide heavy-duty steel shelves with reinforced edges and underside.
 - i. Venting: Coordinate cabinet opening required for pipe vent connection.
 - j. Electrical grounding: Flammable/solvent storage cabinets shall be provided with electrical grounding.
- 17. Corrosives Storage Cabinets
 - a. Provide purpose-designed metal cabinet completely lined with acid and corrosion-resistant liner in polyresin or one-piece molded polypropylene.
 - b. Metal Finish: After cleaning and pre-treating, final finish shall be laboratory casework manufacturer's standard chemical resistant finish to comply with surface finish tests of SEFA 8.
 - c. Shelf: Removable corrosion-resistant shelf.
 - d. Locks: None
 - e. Label: "CORROSIVES" lettering to be silk-screened on cabinet in conspicuous location on front of cabinet.

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- f. Venting
 - i. Cabinets below or adjacent to fume hoods:
 - a.) Provide 1-1/2" flexible polyolefin vent tubing to extend behind hood and tap into fume hood exhaust riser above hood.
 - ii. Cabinets not below or not adjacent to fume hoods:
 - a.) Provide 2" PVC vent pipe to run horizontally in the chase behind the casework to the nearest pipe drop enclosure and rise vertically to 6" above the ceiling level. Connect to exterior ductwork.
- 18. Mobile Storage Units
 - a. Provide mobile storage units to fit under movable tables to be provided by casework manufacturer with same construction requirements as fixed wood casework. Provide medium-duty stainless steel locking swivel casters with ball-bearing mechanisms and rubber treads.
- 19. Wire Shelving System
 - a. Provide stainless steel shelf system with floor-mounted and/or wall mounted post supports.
- 20. Lab Utilities Ceiling Interface Panels (CIP)
 - a. Stainless steel panel suspended from structure at exposed ceiling conditions or by ceiling suspension grid at suspended ceiling conditions.
 - b. Accommodates quick disconnect fittings for the following lab utility services, to service mobile lab tables or Owner-Provided lab equipment in lieu of lab tables:
 - i. 110V power
 - ii. 208V power
 - iii. Emergency power
 - iv. Tele/data
 - v. Cold water
 - vi. Hot water
 - vii. Pure water
 - viii. Natural gas
 - ix. Compressed air
 - x. Vacuum
 - xi. Specialty gases
 - c. Utility lines from the ceiling interface panel that serve outlets integral with the design of mobile lab tables shall be provided by the lab tables vendor. All exposed utility lines shall be white, except natural gas which shall be braided steel. Lab casework manufacturer shall comply with all codes regarding suitability of their materials for their intended use.
- 21. Adjustable Shelving Assemblies
 - a. Heavy duty stainless steel support brackets supported by stainless steel support tracks, wall-mounted or integrated with the design of mobile lab tables.
 - b. 3/4" thick X 12" deep thermo-set resin shelf units with stainless steel wire edge restraints and stainless steel stiffening channels at bottom of shelf.
 - c. Stiffening channels designed to accept mounting of under-shelf task lighting unit.
 - d. Stainless steel hardware to secure shelf to support bracket.
- 22. Lattice Rod Assemblies
 - a. Rack Assembly:

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- i. Rods: 1/2" diameter solid extruded aluminum rods, 12" on center, horizontally and vertically.
 - ii. Rod Clamps: Lab-Line Instruments, Inc. Model 7054 or equal, rod clamp with Allen head set screws.
 - iii. Frame foot: Lab-Line Instruments, Inc. Model 7051, or equal
 - b. Approved Manufacturer or equal:
 - i. Lab-Line Instruments, Inc.
- 23. Bench-mounted Support Rods:
 - a. Support rod socket: Aluminum burette socket for recessed mounting for use with 3/4" diameter rods and adapters.
 - b. Approved product or equal:
 - i. Water Saver Model AAP100.
- 24. Drying Racks
 - a. Drying rack body: One piece design of stainless steel with holes to accommodate size and peg arrangement indicated on drawings. Each rack to have an integral, full-width trough with stainless steel drain tube and stainless steel wire mesh screen insert. Provide clear hose of proper length to drain from drain tube to sink.
 - b. Pegs: Injection-molded white polypropylene pegs designed to fit holes in rack body snugly and be easily removable without tools.
 - c. Provide a wall hanger for each rack designed to enable the removal of the entire rack without the use of tools. Configuration of hanger/rack interface to assure stability.
- 25. Cylinder Restraint Assemblies
 - a. Cylinder rack assembly:
 - i. Frame members: 2" X2: X 1/8" square steel tube
 - ii. Construction: All welded. Weld cover plates to close exposed tube ends.
 - iii. Provide 1/4" diameter steel retainer rods with turned-down ends.
 - iv. Approved manufacturer or equal:
 - a.) Safe-T-Rack Systems, Inc.
 - b. Cylinder chain assembly:
 - i. Provide top and bottom restrainers of 5/16" diameter, zinc plated, grade 30 proof coil steel chain fitted with spring or trigger snap shackles.
 - ii. Provide plastic end caps at all exposed ends of channels.
 - iii. Approved manufacturer or equal:
 - a.) Unistrut No. P-1000 wall bracket with two P-1026, or equivalent angle supports
 - c. Finish painting of cylinder restraint components prior to assembly.
- 26. Lab Carts
 - a. Designated storage space shall be provided for lab carts. Location must not reduce width of corridors or aisles to less than code-required widths.
- 27. Laboratories shall incorporate Americans with Disabilities Act (ADA) accessible workstations.
- 28. Lab Seating: Laboratory chairs and stools provided shall have non-fabric coverings and be easily cleaned and disinfected. Materials that are easily cut or damaged shall not be specified.
- 29. Laboratory Equipment (Contractor-Provided, Contractor-Installed):
 - a. Specify energy efficient lab equipment such as EnergyStar equipment, where applicable.
 - b. Glassware Washers

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- i. Manufacturer and model or equal:
 - a.) Steris/Amsco Reliances Glassware Washer Model 400, with chemical pumps, air compressor, and barrier flange accessories
 - c. Under-counter Glassware Washers
 - i. Manufacturer and model or equal:
 - a.) Meile/Professional Model G7704, with basket nos. O188, U874, E329, E109, and A11
 - d. Sterilizers (Autoclaves)
 - i. Manufacturer and model or equal:
 - a.) Getinge/Model 522LS with single manual operation door, use of house steam, biological sealing flange, and cross contamination barrier
 - e. Ice Makers
 - i. Manufacturer and model or equal:
 - a.) Scotsman/Model AFE424
- 30. Public Entrances
 - a. All building entries serving the public and directly connected to the outdoors shall contain a permanently installed entryway floor mat system. The system shall be at least 10'-0" long in the primary direction of travel and the full width of the entry door(s), minimum. See 12484 Entry Mat for additional requirements. Also see "Entry Vestibule" below for primary entrance requirements.
- 31. Signage for individual rooms including emergency response signage for labs is by provided and installed by GW. Designer to coordinate work with Owner-Provided signage standards and locations.
- 32. Bulletin boards, tack strips and other tackable surfaces shall conform to 10125 Bulletin Boards.
- 33. Interior Life Safety
 - a. Fire Protection: Sprinklers and fire alarms shall comply with all applicable building codes and regulations, including NFPA, as well as FM Global.
 - b. Refer to Division 13 for additional information.
- 34. Plumbing
 - a. General plumbing fixtures shall be low-flow. Refer to GW Design Standards Specification Guidelines 15410 for additional information on requirements.
 - b. Laboratory Compressed Air:
 - i. Oil-free instrument grade compressed air shall be provided at laboratory benches, fume hoods, and equipment requiring compressed air.
 - c. Laboratory Vacuum System:
 - i. Laboratory vacuum shall be supplied to laboratory outlets where required.
 - d. Pure Water System:
 - i. Pure water system shall be provided. Demand shall be based on the number of fixtures and equipment requiring such water, multiplied by a 50% use factor, for a 14 hour shift, with a gallon per hour usage for each lab user.
 - ii. Treatment train shall include: a reverse osmosis (1 megohm) unit, storage tanks, duplex distribution pump set, exchangeable mixed bed deionizers, an Ultraviolet Sterilizer to kill bacteria and destroy ozone, sub-micron final filters, and system control panel.
 - e. Natural Gas System:
 - i. Natural gas shall be provided to supply lab outlets.

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- f. Specialty Gas System:
 - i. Gas cylinders, manifolds, and switchover assemblies shall be supplied locally to lab areas requiring such gases.
 - g. Lab design shall aim to reduce process water use through the following:
 - i. Refrigeration equipment using once-through cooling with potable water shall not be specified
 - ii. Reduced water use for glasswashers and ice machines
 - h. Sinks: Each laboratory shall contain a sink for handwashing. The sink shall be located near the egress door. Laboratory sinks shall have lips that protect sink drains from spills.
 - i. Laboratory utility and hand-wash sinks shall be epoxy resin in color to match bench top.
 - ii. Provide stainless steel strainer, outlet, overflow standpipe, and stopper for all utility and hand-wash sinks.
 - iii. Provide tailpieces compatible with waste piping for all sinks
 - iv. Acceptable manufacturers or equal (epoxy resin sinks):
 - a.) Durcon/Laboratory Tops, Inc.
 - b.) Prime Industries
 - c.) Epoxyn
 - i. Laboratory Emergency Plumbing Fixtures:
 - i. Emergency plumbing fixtures shall comply with requirements of ANSI Z358.1.
 - ii. All emergency plumbing fixtures shall comply with ADA requirements, state and local accessibility requirements.
 - iii. Acceptable manufacturers or equal:
 - a.) Broen Lab, Inc.
 - b.) WaterSaver Faucet Co.
 - c.) Haws Drinking Faucet Co.
35. HVAC
- a. Ventilation Rates: The minimum ventilation (outdoor air) rates will be as follows:
 - i. Offices, Conference and Administrative Support Area:
 - a.) Comply with ASHRAE 62.1
 - ii. Laboratory and Laboratory Support Areas:
 - a.) Occupied: 4 air changes per hour, minimum
 - b.) Unoccupied: 2 air changes per hour, minimum
 - iii. Cold Rooms: 20 cfm per person
 - b. Pressure Relationships:
 - i. Pressure relationships shall be maintained by offsets between supply and exhaust airflow rates. Relative pressures to adjacent spaces will be as follows:

Space Area	Relationship to Adjacent
Kitchen	Negative
Corridor	Positive to Laboratory
Laboratory	Negative
Laboratory Support	Negative
Toilets, Housekeeping Closets, Lockers	Negative
Building	Positive to Ambient
Vivarium	Negative

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Clean Rooms	Positive
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- c. A separate vivarium/cage wash exhaust system shall be provided.
- d. Noise Control:
 - i. Noise-producing equipment (for example, freezers, refrigerators, incubators and centrifuges) shall be moved from the laboratory to a dedicated equipment room where possible.
 - ii. Compressors for controlled-temperature rooms shall have a remote location.
- 36. Fume Hoods
 - a. Applicable Codes and Regulations
 - i. U.S. EPA Energy Star
 - ii. U.S. DOE
 - iii. ASHRAE 90.1
 - b. Location
 - i. Fume hood locations in alcoves shall be reviewed for containment and cross-drafts. Fume hoods shall have adequate space in front of the hood (5' optimal, width of the hood minimum), and space from the wall (6" minimum). Avoid placement of fume hoods against the wall as they tend not to perform well.
 - ii. Specify high performance low-flow fume hoods when appropriate.
 - c. Fume Hood Exhaust Rate
 - i. Exhaust air requirements for fume hoods shall be based on high efficiency/ low flow fume hoods expected to maintain a face velocity of 50 fpm through the open sash with the sash at full open position.
 - d. Fume Hood Density
 - i. Building mechanical systems shall be designed to accommodate the fume hood density per project area.
 - ii. Fume hood shall be distributed on the floor plate and not concentrated in a single room or single enclosed area.
 - e. Fume Hood Units
 - i. Compliance: ASHRAE 110-1995.
 - ii. Depth of fume hood shall not exceed 34".
 - iii. Paint finish to match metal of lab casework.
 - iv. Epoxy worksurfaces to match lab table worksurfaces.
 - v. Where providing a glass-sided fume hood, with glass on all four sides, provide manufacturer's glass-walled, high performance fume hood that matches the glazing design of the Fisher Hamilton, Horizon Fume Hood.
 - vi. Approved manufacturers and models or equal:
 - a.) Labconco, Protector XStream
 - b.) Waldner, SecuFlow
 - c.) Fisher Hamilton, Pioneer
 - d.) Flow Safe, Vortex II
 - f. Fume Hood Service Fixtures:
 - i. Fume hood service fixtures shall be front-loaded valve type fixtures with access to all working components from outside the fume hood and a visible integrated shut-off valve.
- 36. Voice, Data, CATV
 - a. Typical quantities of devices or outlets shall be the following:

Comment [nra7]: Verify: GW standard 4', 5', or 6' fume hood?

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Area Description	Quantity
Typical Lab Bench Area	1 data per seat
Typical Lab Tech Seat	1 data/1 voice
Typical Lab Support Area	2 data/voice
Typical Teaching Lab	1 data per seat
Typical Teaching Location	2 data/1 voice
Typical Cage Rack Room	1 data per rack
Elevator/Emergency Phone	1 voice per phone
Wall Phone	1 voice per phone

- b. Wireless network coverage shall exist throughout the building. Coverage shall also extend to any outdoor gathering areas immediately adjacent to the building.
- 37. Electrical and Data Services
 - a. Electrical and data services shall be provided to the perimeter of labs via wall-mounted stainless steel two-cell raceways.
 - i. At research labs, electrical and data services shall be provided via ceiling interface panels to lab tables which are not against a wall.
 - ii. At teaching labs, electrical and data services shall be provided via recessed floor boxes to lab tables which are not against a wall.
- 38. Power Supply, Lighting, and Controls
 - a. Refer to Division 16 for additional information including standard lamps and lamp colors as well as controls such as occupancy sensors and manual switches.
 - b. Outlets shall be provided along perimeter in labs and above and below sinks (below sink for auto-on functions - soap, water dispensers, etc).
 - c. Electrical outlets located within six feet of sinks, safety showers, or other sources of water shall be Ground Fault Circuit Interrupter (GFCI) outlets/circuits.
 - d. Colors and Materials:
 - i. Unless otherwise required, all switches and receptacles shall be white with stainless steel cover plates.
 - ii. Receptacles on circuits dedicated to computers and specific equipment shall be orange with stainless steel cover plates.
 - iii. Where switches are co-located and where receptacles are co-located, provide ganged cover plate.
 - e. Mounting Height:
 - i. Unless otherwise required, locate the following as noted:
 - a.) Receptacles at 18" AFF
 - b.) Thermostats at 48" AFF
 - c.) Lighting controls at 48" AFF
 - f. Lighting:
 - i. Light levels shall follow the recommendations of the IESNA Lighting Handbook and meet ASHRAE 90.1 lighting power density requirement (LPD). At the time of writing, laboratories are limited to 1.4 w/sf.
 - ii. In addition, to assist with meeting LEED energy conservation goals, Design Team shall strive to exceed ASHRAE 90.1 guidelines by required percentage.

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- iii. The task/ambient approach to lighting shall be utilized to provide the highest illumination possible at each task location in the most energy efficient manner.
 - a.) Bench top and work surface light levels in laboratories shall be 70-80 fc achieved by a combination of 40 - 50 fc of ambient lighting provided by ceiling-mounted fixtures with additional illuminance provided by undercabinet/under shelf task lighting and re-locatable articulated-arm task lights in a few locations for high illuminance tasks.
 - b.) 30-40 fc for all other areas
- iv. For new construction, minimum lab ceiling height shall be 9'-6" to optimize use of daylight and indirect electrical lighting.
- v. Typical Laboratory Lighting
 - a.) Ambient lighting for labs shall consist of the following:
 - a) 4' or 8' long recessed or pendant light fixtures with direct-indirect distribution. Fixtures shall be arranged in continuous rows, parallel to and positioned above the edge of lab benchtops.
 - b) Lighting for lab support spaces with ceilings less than 9'-6" will generally consist of fully recessed 1'X4' or 2'X4', 2-lamp fluorescent light fixtures.
 - b.) Task lighting shall be provided by under cabinet task light, mounted under bottom shelf of lab benches.
 - c.) Additional task lighting shall be provided by articulating arm task light.
 - d.) A combination of fixed undercabinet and articulating arm task lighting shall be used in labs and lab support spaces, as determined by program. Consider connecting task lighting to occupancy sensor control or consider light fixtures with integral occupancy sensor if energy savings may be achieved.
- vi. Photosensitive Rooms:
 - a.) Lighting for these spaces shall consist of 1 fully recessed, three-compartment safelight, installed over each workbench, capable of accepting two filter types to accommodate flexibility of changing medium. White light and filtered light will be independently switched at the room entrance. The switch for the light shall be located 72" above finished floor to prevent accidental "on" during tests. An "In Use" signage light shall be located outside the room entrance and switched with the interior filtered fixtures.
- vii. Hazardous Storage:
 - a.) The lighting for hazardous storage shall consist of fully recessed or surface-mounted (in spaces with no ceiling plenum) 2-lamp fluorescent, sealed and gasketed light fixtures that are UL-listed for hazardous locations. All electrical connections shall meet classifications for explosion proof environment. Switch with pilot light shall be located outside the room at the entrance door.
- viii. Temperature Control Rooms:
 - a.) These spaces shall have lighting that is integral to the unit and provided by the equipment manufacturer.
- ix. Microscope Rooms:
 - a.) Lighting for microscope rooms shall consist of fully recessed 2'X4'; 2-lamp fluorescent luminaires with dimming ballasts. Luminaires shall

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- be spaced no more than 8'-0" on center. Lighting control shall consist of a manual dimmer switch.
- x. Animal Holding Rooms:
 - a.) Animal holding rooms require a two-level lighting arrangement. Since most laboratory animals are nocturnal, a night cycle of 0–1 foot-candles and a day cycle generally of 30–50 foot-candles with a wide-spectrum fluorescent light source and a cleaning cycle with 70–100 foot-candles are required. Night levels should be as low as possible, with as few light leaks as possible from corridors or adjacent rooms.
 - xi. Cold Rooms:
 - a.) Cold rooms shall be provided with integral illumination rated for intended application.
 - xii. Teaching Labs/Classrooms:
 - a.) Front row lighting in each teaching lab or classroom shall be switched separately from the general lighting. Locate front row lighting to include coverage of board area. Select light fixtures that reduce spill light.
 - g. Lighting Controls (applicable to all laboratory building spaces unless specifically noted otherwise):
 - i. General lighting shall be dimmable and further controlled by programmable lighting control system once enabled via occupancy sensor.
 - ii. Laboratories:
 - a.) Occupancy sensors, dual technology type, with manual override, shall be provided to control overhead lighting.
 - b.) Rocker switches on wall to control lamps in pendant fixtures, so overhead lighting can be adjusted manually to 50% or 100%; stepped dimming
 - c.) Full dimmable capability – 0% - 100%
 - iii. Public access to lighting controls shall not be provided in public spaces such as corridors, hallways, and lobbies.
 - iv. Energy-conserving lighting control strategies such as photocells and occupancy sensors that step down or turn off lighting when it is not needed, such as after-hours or when the space is unoccupied, are required in most spaces throughout academic buildings.
 - v. Daylight sensors for daylight-based dimming shall be considered for daylight perimeter zones (15' in from window).
 - vi. The lighting control for the animal rooms shall be on a computer-controlled system. The reason for this is to ensure a central control point for all rooms to provide accurate logs for documentation purposes.
 - vii. Consultant should be aware that housekeeping is typically performed after-hours in academic buildings. To that end, lighting design shall provide for illumination as required afterhours while still automatically powering down after occupants have vacated the space.
 - viii. Refer to Specification Guidelines sections 16570 for additional information.

Comment [nra8]: Need to verify what type of dimming levels are required.

E. SPACE STANDARDS BY TYPE

Entry Vestibule

1. Primary entry vestibules shall be designed as air locks, with two sets of doors: exterior doors and doors between the entry vestibule and the building lobby. This design provides for increased energy efficiency and improved dirt and particulates control. The vestibule shall also be designed with a permanently installed entryway floor mat system, each at least 7'-0" long in the direction of travel. The floor mat system shall be provided at all building entries serving the public and directly connected to the outdoors. The floor system shall be the full width of the vestibule. See 12484 Entry Mat for additional requirements.
2. Each primary entrance vestibule shall include one barrier-free entry with assistive door opener(s).
3. Door hardware: self closing
4. Finishes: to match adjacent lobby

Lobby & Related Spaces

1. General: Lobby finishes and fixtures shall typically be upgraded from other building spaces. While most academic floors and support spaces tend to be somewhat repetitive and heavily programmed, lobbies and related spaces offer an opportunity to introduce and develop a building's individuality. This section is applicable to primary entrance lobbies on the main floor, including elevator lobbies. However, it may often be appropriate to maintain an aesthetic connection between the public spaces of the main floor and the lobbies and primary corridors on upper floors.
2. Finishes:
 - a. Walls: combination of painted gypsum board and upgraded wood paneling and trim
 - b. Flooring: terrazzo or terrazzo tile
 - c. Base: terrazzo or stained wood to complement surrounding finishes
 - d. Ceiling: painted gypsum board or painted gypsum board with acoustical ceiling tile
3. Lighting and Controls
 - a. Lighting may include specialty fixtures as long as the required lamps are within the standard selection as established in Division 16.
4. Lobby shall include a pair of water fountains with bottle filling stations, one of which is barrier-free. See section 15415 Drinking Fountains for additional info.

Elevator

1. General
 - a. See Division 14, Conveying Systems, for additional elevator requirements.
 - b. Elevators, whether passenger or freight, shall be finished with highly durable hard surfaces. Carpet shall not be provided in elevator cabs.
 - i. Passenger & Freight Elevator Cab Finishes, Typical
 - a.) Doors: Stainless steel cladding
 - Finish: No. 4, satin, directional polish. Apply directional finishes in long direction of each component.

- b.) Return panels: Stainless steel cladding; finish: No. 4 satin, directional polish. Apply directional finishes in long direction of each component.
- c.) Side and rear panels
 - Plastic laminate cladding with stainless steel trim and reveals (Passenger elevator)
 - Patterned stainless steel cladding, Rimex 5-SM or approved equal (Freight elevator)
- d.) Ceiling/Canopy
 - Stainless steel finish, with fluorescent downlights
- e.) Base: stainless steel; finish: No. 4 satin, directional polish. Apply directional finishes in long direction of each component.
- f.) Flooring: agglomerate or terrazzo tile
- g.) Handrails
 - Stainless steel; round tube 1-1/2 inch diameter, with closed ends
 - Provide for rear and side walls
 - Acceptable product and manufacturer: Equivalent to DH 154 by Otis
- b.) Provide blanket studs on cab walls and padded blankets for each elevator

Hallways & Corridors

1. General: Buildings will usually require multiple quality grades for the various corridors and hallways within. The consultant shall use best judgment and coordinate with owner to determine what level is required by specific spaces. In order to provide some measure of guidance, the following comments are offered:
 - a. Corridors and/or hallways directly connected to, and associated with, main and elevator lobbies often demand an upgraded finish schedule over that noted below in order to achieve aesthetic continuity with the primary lobby.
 - i. Finishes
 - a.) Walls: painted gypsum board; varies
 - b.) Flooring selection shall generally be epoxy resin terrazzo or terrazzo tile. Selection shall reflect consideration of traffic loads, budget, aesthetics, and acoustical requirements.
 - c.) Base with terrazzo or terrazzo tile flooring: terrazzo, 4" high
 - d.) Ceiling: painted gypsum board or acoustical ceiling tile
 - b. Corridors serving labs and lab support spaces shall have impervious finishes so that they are easy to clean and maintain. Bumper/wall guards and corner guards shall be used to protect walls and doors from heavy, abusive traffic. *Carpet shall not be specified for main corridors serving lab and lab support spaces.*
 - i. Finishes
 - a.) Walls: painted gypsum board
 - b.) Flooring selection shall generally be vinyl composition tile or approved resilient flooring equal.
 - c.) Base with vinyl composition tile: resilient
 - d.) Ceiling: acoustical ceiling tile
 - c. Generally, office suites and hallways serving offices shall be carpet with resilient base unless offices are directly connected to lab and lab support spaces in which case flooring shall be resilient.

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- d. Corridors and/or hallways that serve utility and maintenance spaces, often located in basements, may require a diminished quality level than that listed below. Coordination with the Owner should provide clear direction. Examples of resulting finishes may include painted structure for walls and ceilings, or resilient floor instead of terrazzo or tile.
 - i. Walls in areas with high traffic activity that serve utility, maintenance, and receiving spaces shall have bumper/wall guards and corner guards.
 - ii. Hallways and corridors that service loading dock and receiving areas shall have 6" high resilient base.

Typical Lab Module:

- 1. Finishes:
 - a. Flooring: Vinyl composition tile
 - b. Base: resilient
 - c. Ceiling: acoustical ceiling tile
 - d. Walls: painted gypsum board
- 2. Door(s) and Door Hardware
 - a. Door(s):
 - i. Solid, flush wood, in painted hollow metal frames
 - ii. Minimum 3'-6" wide
 - iii. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to classroom occupants by activities outside the room.
 - b. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
- 3. Equipment:
 - a. Fume Hood
 - i. 4-ft chemical fume hood in fume hood alcoves
 - b. Emergency Safety Equipment:
 - i. Comply with the following: American National Standards Institute (ANSI), Z358.1; Emergency Eyewash and Shower Equipment; National Fire Protection Association - Health Care Facilities, Handbook 99, Chapter 10-6, Emergency Shower
 - ii. Emergency eyewashes and safety showers shall be provided at each lab module.
 - c. Audio/Visual Equipment for Teaching Labs: Basic classroom presentation capability is recommended for teaching labs.
 - i. The following audio/visual equipment shall be provided or accommodated as required by GW depending upon the curriculum taught in each lab: lectern; ceiling-mounted video projector; projection screen, audio system, assistive listening devices; TV/VCR/DVD; 35 mm slide projector; and document cameras. Connections shall be available for an instructor PC at

Comment [nra9]: Verify. One standard size or TBD per lab program requirements?

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- a designated lab bench or lectern. Design Team shall provide for any additional equipment that may be required for special applications.
- ii. Projection Screens: location and size: per program requirements, Classroom Design Specifications, and as approved by the Office of Academic Planning. Also see 11132 Projection Screens.
4. Casework:
 - a. Provide casework configuration in layout as needed to best suit lab module dimension. The following is an example configuration that suits a two-module lab (approximately 625 nsf):
 - i. 20' long island benches; 12' for research work (6' per work station); 8' for write-up desk space (4' per station); painted metal freestanding suspended casework system
 - ii. 12' deep adjustable metal shelves above bench at work and write-up areas
 - iii. Perimeter benches with sinks (1 sink per every 1.5 two-module lab); (fixed, painted steel base cabinets)
 5. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
 6. Specialties:
 - a. Biosafety Cabinet: Provide as needed per program.
 7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
 8. Utilities, General
 - a. Lab Vacuum, CO₂, Gas, Comp Air
 9. Utilities, Fume Hood
 - a. Cold water, gas, comp air, lab vacuum, two (2) duplex GFI receptacles and one (1) light switch
 10. Utilities, Sink
 - a. Hot and cold mixed water, drench hose unit, reverse osmosis (1 megohm) water where required, eye wash(es), emergency shower(s)
 11. Plumbing
 - a. Sinks
 - i. 25"L x 15"W x 10"D, modified epoxy resin
 - ii. 30"W x 36"H drying rack at each sink
 12. Power and Data
 - a. Data infrastructure shall be provided in labs or as required by the program requirements.
 - b. Wireless infrastructure shall be provided as required by the following University organizations: Information Systems and Services (ISS); Center for Innovative Teaching and Learning (CITL) and Academic Technologies
 - c. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 13. NC Level: Maximum allowable background noise level (NC) 40 -45

Tissue Culture, Type I (Small) and Type II (Large):

1. Finishes:
 - a. Flooring: Welded seam sheet vinyl

Comment [nra10]: Is there a green option for this that meets lab requirements? PVC-free, GW standard is Armstrong sheet linoleum w/ NaturCote coating or Forbo Marmoleum

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- b. Base: Integral with floor covering
- c. Ceiling: Painted gypsum board, eggshell finish
- d. Walls: Painted gypsum board, eggshell finish
- 2. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - iii. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to lab occupants by activities outside the room. Vision panel, if provided, shall have UV protection.
 - b. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
- 3. Equipment:
 - a. Emergency eyewashes and emergency showers
- 4. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
- 5. Benchtop:
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
- 6. Specialties:
 - a. Biosafety Cabinet: Type I Rooms: (1); Type II Rooms (2); 4-ft and/or 6-ft. biosafety cabinets(s), re-circulation through HEPA-filters
- 7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
- 8. Utilities, General Room
 - a. Lab Vacuum, CO₂, Gas, Comp Air
- 9. Utilities, Sink
 - a. Hot and cold mixed water, reverse osmosis (1 megohm) water where required, eye wash(es)
- 10. Plumbing
 - a. Sinks
 - i. 25"L x 15"W x 10"D, modified epoxy resin, 30" W X 36" H drying rack
- 11. Power and Data
 - a. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 - b. Data jacks shall be provided in labs or as required by the program requirements.

Procedure Type I and II:

- 1. Finishes:
 - a. Flooring: Welded seam sheet vinyl

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- b. Base: Integral with floor covering
- c. Ceiling: Painted gypsum board
- d. Walls: Painted gypsum board
- 2. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - b. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to lab occupants by activities outside the room.
 - c. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
- 3. Equipment:
 - a. Fume Hood
 - i. Type I Rooms: (0); Type II Rooms: (1); 4-ft chemical fume hood
 - b. Emergency eyewashes and emergency showers
- 4. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
- 5. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
- 6. Specialties:
 - a. Biosafety Cabinet: Type I Rooms and Type II Rooms: (1); 4-ft and/or 6-ft biosafety cabinet, recirculating through HEPA filters
- 7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
- 8. Utilities, General Room
 - a. Lab Vacuum, CO₂, Gas, Comp Air
- 9. Utilities, Fume Hood
 - a. Cold water, gas, comp air, lab vacuum, two (2) duplex GFI receptacles and one (1) switch
- 10. Utilities, Sink
 - a. Hot and cold mixed water, drench hose unit, reverse osmosis (1 megohm) (1 megohm) pure water where required, eye wash
- 11. Plumbing
 - a. Sinks
 - i. 25"L x 15"W x 10"D, modified epoxy resin; 30" W X 36" H drying rack
- 12. Power and Data
 - a. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 - b. Data jacks shall be provided in labs or as required by the program requirements.

Comment [nra11]: Verify

Life Cycle, Tropical Life Cycle, Micro-Bio Culture, PCR Type I, and ELISA:

1. Finishes:
 - a. Flooring: Welded seam sheet vinyl
 - b. Base: Integral with floor covering
 - c. Ceiling: Painted gypsum board
2. Walls: Painted gypsum board
3. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - b. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to classroom occupants by activities outside the room.
 - c. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
4. Equipment:
 - a. Emergency eyewash
5. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
6. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
7. Specialties:
 - a. Biosafety Cabinet N/A
8. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
9. Utilities, General Room
 - a. Lab Vacuum, CO₂, Gas, Comp Air
10. Utilities, Sink
 - a. Hot and cold mixed water, drench hose unit, reverse osmosis (1 megohm) (1 megohm) pure water where required, eye wash
11. Plumbing
 - a. Sinks
 - i. 25"L x 15"W x 10"D, modified epoxy resin; 30" W X 36" H drying rack
12. Power and Data
 - a. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 - b. Data jacks shall be provided in labs or as required by the program requirements.

Physiology, PCR (Type II):

1. Finishes:
 - a. Flooring: Welded seam sheet vinyl
 - b. Base: Integral with floor covering
 - c. Ceiling: Painted gypsum board
 - d. Walls: Painted gypsum board
2. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - b. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to lab occupants by activities outside the room.
 - c. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
3. Equipment:
 - a. Emergency eyewash
4. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
5. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
6. Specialties:
 - a. Biosafety Cabinet: (1); 4-ft and/or 6-ft biosafety cabinet, re-circulating through HEPA filters
7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
8. Utilities, General Room
 - a. Lab Vacuum, CO₂, Gas, Comp Air
9. Utilities, Sink
 - a. Hot and cold mixed water, drench hose unit, reverse osmosis (1 megohm) pure water where required, eye wash
10. Plumbing Fixtures
 - a. Sinks
 - i. 25"L x 15"W x 10"D, modified epoxy resin, 30" W X 36" H drying rack
11. Power and Data
 - a. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 - b. Data jacks shall be provided in labs or as required by the program requirements.

Comment [nra12]: Is there a green option for this that meets lab requirements? PVC-free, GW standard is Armstrong sheet linoleum w/ NaturCote coating or Forbo Marmoleum

Radioactive Chemical Type I, II & III:

1. Finishes:
 - a. Flooring: **Welded seam sheet vinyl**
 - b. Base: Integral with floor covering
 - c. Ceiling: Washable lay-in acoustic tile
 - d. Walls: Painted gypsum board
2. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - b. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to classroom occupants by activities outside the room.
 - c. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
3. Equipment:
 - a. Fume Hood
 - i. Type I Rooms: (0); Type II and Type III Rooms: (1) 4-ft chemical fume hood
 - b. Emergency eyewash
4. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
5. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
6. Specialties:
 - a. Biosafety Cabinet: Type I and Type II Rooms (0) & Type III Rooms: (1); 4-ft and/or 6-ft biosafety cabinet, re-circulating through HEPA filters
7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
8. Utilities, General Room
 - a. Lab Vacuum, CO₂, Gas, Comp Air
9. Utilities, Fume Hood
 - a. Gas, comp air, lab vacuum, two (2) duplex GFI receptacles and one (1) light switch
10. Utilities, Sink
 - a. Hot and cold mixed water, drench hose unit, reverse osmosis (1 megohm) pure water, drench hose, eye wash
11. Plumbing
 - a. Sinks
 - i. 25"L x 15"W x 10"D, modified epoxy resin, 30" W X 36" H drying rack

Comment [nra13]: Is there a green option for this that meets lab requirements? PVC-free, GW standard is Armstrong sheet linoleum w/ NaturCote coating or Forbo Marmoleum

12. Power and Data
 - a. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 - b. Data jacks shall be provided in labs or as required by the program requirements.

Microscope Room

1. Finishes:
 - a. Flooring: Vinyl composition tile
 - b. Base: Resilient
 - c. Ceiling: Washable lay-in acoustic tile
 - d. Walls: Painted gypsum board
2. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - b. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to lab occupants by activities outside the room.
 - c. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
3. Lighting:
 - a. Overhead fluorescent recessed and sealed lights, 40 - 60 fc; dimmable
4. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
5. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
6. Specialties: N/A
7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
8. Utilities, General Room: N/A
9. Utilities, Sink: N/A
10. Plumbing: N/A
11. Power and Data
 - a. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 - b. Data jacks shall be provided as required by the program requirements.

Darkroom:

1. Finishes:
 - a. Flooring: Vinyl composition tile
 - b. Base: Resilient
 - c. Ceiling: Washable lay-in acoustic tile
 - d. Walls: Painted gypsum board
2. Door(s) and Door Hardware
 - a. Door:
 - i. ADA-compliant revolving darkroom door unit
3. Lighting:
 - a. Overhead fluorescent recessed and sealed lights, 40 -60 fc, red lamp
4. Equipment:
 - a. Emergency eyewash
5. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
6. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable.
7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust; exhaust trunk for film processing equipment
8. Utilities, General Room: N/A
9. Utilities, Sink
 - a. Hot and cold mixed water, drench hose unit, eye wash
10. Plumbing
 - a. Sinks
 - i. 28"L x 15"W x 12"D, modified epoxy resin; 30" W X 36" H drying rack
11. Power and Data
 - a. Surface-mounted raceway with 110v duplex outlets at 2'-0" o.c.
 - b. Data jacks shall be provided as required by the program requirements.

Equipment Rooms, Freezer Rooms:

1. Finishes:
 - a. Flooring: Vinyl composition tile
 - b. Base: Resilient
 - c. Ceiling: Washable, lay-in acoustic tile
 - d. Walls: Painted gypsum board
2. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - b. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to lab occupants by activities outside the room.

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3. Equipment: TBD
4. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust.
5. Utilities: N/A
6. Plumbing
 - a. One (1) indirect waste, one (1) cold water for ice machine
7. Power and Data
 - a. 110/120v outlets and 208v 3-PH for equipment at 3'-0" o.c.
 - b. Data jacks shall be provided in labs or as required by the program requirements.

Autoclave/Glasswash Rooms

1. Finishes:
 - a. Flooring: Epoxy resin
 - b. Base: Integral with flooring; coved
 - c. Ceiling: Epoxy painted gypsum board
 - d. Walls: Epoxy painted gypsum board
2. Door(s) and Door Hardware
 - a. Door:
 - i. Solid, flush wood with transparent finish in painted hollow metal frame
 - ii. Minimum 3'-6" wide
 - b. Vision panel in door and/or adjacent full-height sidelite must be provided to allow people to determine if a room is occupied without opening the door. Glass may be clear, sandblasted, or fritted, as appropriate to accommodate the required vision, while limiting distractions to classroom occupants by activities outside the room.
 - c. Door hardware:
 - i. Classroom lock set
 - ii. Kick plate on push side
 - iii. Closer
 - iv. Stop
 - v. Self-latching
3. Equipment:
 - a. Emergency eyewash
4. Casework:
 - a. Painted metal base and wall cabinets
 - b. Shelves
5. Benchtops
 - a. Modified epoxy resin
 - b. Seating shall be moveable
6. Specialties: N/A
7. HVAC
 - a. 100% outside air, 4 air changes/hour (minimum), negative pressure relative to surrounding areas and corridors, variable volume supply/exhaust, overhead canopy exhaust
8. Utilities, General Room – N/A
9. Utilities, Sink

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- a. Hot and cold mixed water, drench hose unit, reverse osmosis (1 megohm) pure water, drench hose unit, eye wash
- 10. Plumbing Fixtures
 - a. Sinks
 - i. 28"L x 15"W x 12"D, modified epoxy resin, 30" W X 36" H drying rack
- 11. Power and Data
 - a. 208v 3-PH for autoclaves and glass wash equipment
 - b. Data jacks shall be provided in labs or as required by the program requirements.

Controlled Environment Room:

- 1. Finishes:
 - a. General: Pre-finished metal and foam insulation interlocking sandwich panels with built-in ramp at door; entry ramp shall be heavy gauge aluminum with non-skid surface and shall not exceed 1:12 in slope.
 - b. Base: N/A
 - c. Ceiling: Pre-finished metal and foam insulation interlocking sandwich panels
 - d. Walls: Pre-finished metal and foam insulation interlocking sandwich panels
 - e. Door:
 - i. Pre-finished metal and foam insulation with seals and heated window
- 2. Lighting:
 - a. Overhead fluorescent sealed and surface mounted, 40 – 60 fc
- 3. Equipment: N/A
- 4. Casework:
 - a. Stainless steel wire shelving racks
- 5. Benchtops
 - a. Stainless steel counter on legs
 - b. Seating shall be moveable.
- 6. HVAC
 - a. Water cooled compressor; equipment mounted above box enclosure; ventilation air to be provided at a rate of 40 cfm
- 7. Utilities: N/A
- 8. Power and Data
 - a. Data jacks shall be provided in labs or as required by the program requirements.

Vivarium Facilities:

Vivarium facilities shall include the following spaces: Animal Holding Rooms, Procedure Rooms, Quarantine/Isolation, Clean Cage Storage, Feed/Bedding Storage, Equipment Storage Room, Entry/Exit/Gowning/DeGowning, Break Area, Administrative Office, and Corridor.

- 1. Finishes – Animal Holding Rooms, Procedure Rooms, Clean Cage Storage, Feed/Bedding Storage, Toilet Rooms/Locker Rooms, and Corridor:
 - a. Flooring: Resinous Flooring
 - i. Acceptable product and manufacturer or equal:
 - a.) Stonekote GS4/GS7, ¼" thick, by Stonehard
 - b. Base: Integral base

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- i. Acceptable product and manufacturer, or equal:
 - a.) Stonekote GS4/GS7, 6" high, by Stonehard
 - c. Ceiling: Moisture-resistant gypsum board, latex paint or high-build coating, and sealant at intersections with walls and openings to ensure air and water tightness.
 - d. Walls: Epoxy painted gypsum board
 - 2. Finishes – Quarantine/Isolation:
 - a. Flooring: Epoxy flooring
 - b. Base: Integral Cove
 - c. Walls: Epoxy-painted CMU
 - d. Ceiling: Epoxy painted gypsum board
 - 3. Bumper/Wall Guards and Corner Guards:
 - a. Bumper/wall guards and corner guards shall be provided throughout the animal facility regardless of the wall construction to minimize impact related wall damage by mobile equipment of various sizes.
 - 4. Door:
 - a. Door assembly shall prohibit the growth of vermin or bacteria, have an easily cleanable and maintainable surface, and have solid construction with no voids in the top and bottom rails, the jambs and the strike.
 - b. Pre-finished metal
 - c. Minimum 3'-6" wide; door opening dimension shall accommodate cage and rack size to be utilized
 - 5. Owner-Provided Equipment:
 - a. Lab animal cages, cage-change stations at holding rooms, animal transfer stations, biosafety cabinets, and other lab equipment at procedure rooms shall be provided by GW.
 - 6. Contractor-Provided Equipment
 - a. Vivarium: Rack/Cagewash Equipment
 - i. Design Team shall consider specifying sustainably designed cage and rack washers that reuse final rinse water for the initial three cycles. Other options include programmable controls, reduced heating temperatures, increased insulation, noise controls, reduced detergent concentrations, detergent solution reuse, high-efficiency motors, a closed-loop cooldown system, drain-water heat recovery, improved spray nozzles, airtight door gaskets and robotic control. Water usage and steam can be reduced, lowering operating costs.
 - b. Acceptable manufacturers and models or equal subject to compliance with requirements:
 - i. Cage Rack System
 - a.) Alternative Design/Modular Animal Caging System (MACS)
 - a) 10 high cage stack
 - b) Combination of wall-mounted and mobile double-sided frames shall suit holding room layout
 - ii. Air Control System
 - a.) Alternative Design/Modular Animal Caging System (MACS)
 - a) In-room rack-mounted supply and exhaust fans with programmable positive/negative pressure adjustment
 - iii. Cage and Rack Washer
 - a.) Lynx/Model 410LX
 - a) Pit mounting configuration

Comment [nra14]: Verify.

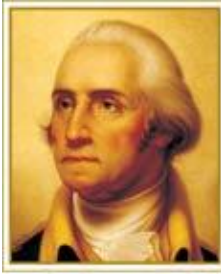
Comment [nra15]: Verify equipment provided by GW vs. equipment to be provided by GC.

- b) Pass-through unit design
- iv. Bedding Dispenser
 - a.) Lynx/Model 710LX
 - a) Dust collection system
- v. Steam Sterilizer
 - a.) Getinge/Model 833LS

Nano/Clean Room:

- 1. Finishes:
 - a. Flooring: Sheet rubber
 - b. Base: N/A
- 2. Clean Room Wall and Ceiling Systems:
 - a. Systems shall be engineered and fabricated to meet the specific requirements of the installation context.
 - b. Approved manufacturer and model or equal:
 - i. Plascore/Semiconductor System F2550
 - c. Ceiling: The ceiling system shall be a suspended aluminum grid with supports plenum panels and removable face screens. The plenum panels support supply fans and bottom loaded HEPA filters. Lighting is integral to the suspension grid.
 - d. Walls: Wall panels shall be an aluminum honeycomb core sandwiched between two aluminum skins. The system shall consist of pre-fabricated head tracks, floor tracks, posts, corners, battens, doors and frames, and windows and frames. Glazing panels shall be from 4'-0" to 8'-0" above the floor.
 - e. Wall and ceiling components shall be prefabricated for simple and clean assembly on-site.

END OF SECTION



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This document provides design standards only, and is not intended for use, in whole or in part, as a specification. Consultants referencing this information must always meet all applicable state and local building codes as well as all barrier free design requirements. Consultants must also refer to the entire set of Design Standards for additional information. Refer questions and comments regarding the content and use of this document to the George Washington University Project Manager.

BUILDING TYPE DESIGN STANDARDS RESIDENCE HALL – DORMITORY RESIDENCE FLOORS

A. SUMMARY

This section contains design standards for dormitory residence halls. Refer to related divisions and sections for additional information.

B. GENERAL

Dormitory style residence halls typically offer double occupancy rooms. Two such rooms typically share a single full bath, accessible from the interior of each dormitory room. The rooms are secure from the corridor, but the bathrooms allow free passage between the two adjoining dormitory rooms. This residence hall standard typically applies to freshmen housing only.

C. STANDARDS HEREIN

1. Spaces which are typical of many residence hall floors within dormitories are discussed herein. These include:
 - Hallways & Corridors
 - Dormitory Bedroom (Sleeping Area and Entryway)
 - Dormitory Bathroom

For additional spaces found throughout residence halls, refer to the design standard, "Residence Hall – Common Spaces," which is also applicable to apartment style residence halls.

D. BARRIER FREE DESIGN

1. A doorbell shall be provided for each barrier-free dormitory room. Signaling shall be both audible and visible.

E. STANDARDS

General

1. The information in this section is provided for general guidance for this building type. Refer to individual dormitory space standards, such as bedrooms and bathrooms, for additional information. Refer to all related sections, such as door

- hardware, lighting, plumbing fixtures, and various finishes for additional information, as well.
2. Finishes
 - a. Painted wood wall paneling and painted wood base are generally undesirable finishes, as they tend to show wear prematurely.
 - b. Flooring and base:
 - i. Areas that have a direct connection to the outdoors shall typically have terrazzo or agglomerate tile flooring with terrazzo base.
 - ii. Carpet to be carpet tile unless specifically noted as broadloom
 - a.) Where carpet is specified, stained wood or resilient base shall be provided, as appropriate.
 - c. Ceiling Finish
 - i. Where exposed concrete ceilings are provided, finish shall be smooth to receive paint. Textured ceilings will not be allowed, including for the purpose of concealing surface imperfections.
 3. Bulletin boards, display cases, tack strips and other tackable surfaces shall conform to 10125 Bulletin Boards and Bulletin Board Cabinets.
 4. Doors, frames, and hardware: unless otherwise noted, required by fire ratings, accessibility requirements, or other code reasons:
 - a. Doors: solid, flush wood
 - i. Provide stain grade maple doors along corridors, typical
 - ii. Provide paint grade birch doors within spaces, typical
 - b. Door nominal dimensions: 36" wide, 6'-8" high, and 1-3/4" thick
 - c. Frames: steel
 - d. Door hardware shall comply with
 - i. "The George Washington University Door Hardware Specification Guide"
 - ii. GW "CFT Security & Access Standards"
 - e. See design standards as well as door and door hardware sections for additional information.
 5. Signage for individual rooms is by owner. Designer to coordinate work with owner-provided signage standards and locations.
 6. Windows
 - a. Windows readily accessible from outside shall include glass break detectors per GW "CFT Security & Access Standards."
 - b. Window treatment shall be 1" deep aluminum mini-blinds, color to match Bali #112, Alabaster.
 - c. Window sills shall be metal clad, with the color coordinated to match window frames. When the budget allows, solid surface sills are preferred.
 - d. Operable Windows
 - i. Provide limiter device to restrict sash opening to 6 inches. Operation past this point to be by use of a tool or removable key only. Furnish two such tools for each floor of building.
 - ii. Provide removable glass fiber insect screen in charcoal color on the inside of each operable sash.
 7. Interior Life Safety
 - a. Fire Protection: Sprinklers and fire alarms shall comply with all applicable building codes and regulations, including NFPA, as well as FM Global.
 - b. Refer to Division 13 for additional information.
 8. Thermal Comfort

- a. HVAC: Refer to Division 15 for additional information.
- 9. Voice, Data, CATV
 - a. Wireless network coverage shall exist throughout each building in resident apartments and suites; student gathering areas such as, lounges, study rooms, TV rooms; and student laundry/kitchen facilities. Coverage will also extend to outdoor gathering areas immediately adjacent to the building.
 - b. CATV, Voice and Data station outlets shall all be comprised of a 4" by 4" back box, with a 2 x 4 plaster ring, cover plate, and a minimum 3/4" EMT or equal-sized raceway with pull string that extends back to the main communications horizontal distribution pathway, or to an accessible ceiling that provides a route to the main communications horizontal distribution pathway. Provide junction boxes, as required, to allow cable to be pulled through from the communications closet to the station outlet.
 - c. Provide the following infrastructure as per "ISS Residential Standards 2008", as applicable to dormitories, or per the most current ISS Standards available
 - i. Residential Living Spaces
 - a.) 1 Voice (located within the common area)
 - b.) 1 Data per bed
 - c.) 1 CATV per bedroom and 1 per Living Room
 - ii. Common Areas and Lounges
 - a.) 1 CATV per room
 - b.) 1 Voice per room or nearby in corridor
 - iii. Exercise Rooms
 - a.) 1 CATV per 500 square feet
 - b.) 1 Voice per room
- 10. Power Supply, Lighting, and Controls
 - a. Light levels shall comply with Illuminating Engineering Society of North America (IESNA) current recommendations. Examples of current IESNA lighting levels include: a) offices, classrooms, and laboratories: 30 -50 foot candles (depending on specific work tasks) on desks and table tops; b) hallways; 5 -8 foot candles; c) stairwells: 5-8 foot candles; d) restrooms: 5-8 foot candles. Refer to the most current issue of the IESNA Lighting Handbook to verify required illumination levels.
 - b. Refer to Division 16 for additional information including standard lamps and lamp colors as well as controls such as occupancy sensors and manual switches.
 - c. Colors and Materials:
 - i. Unless otherwise noted, all switches and receptacles shall be white with factory-painted white, metal cover plates.
 - ii. Receptacles on circuits dedicated to computers and specific equipment shall be orange with stainless steel cover plates.
 - iii. Where switches are co-located and where receptacles are co-located, provide ganged cover plate.
 - d. Mounting Height:
 - i. Unless otherwise required, locate the following as noted:
 - a.) Receptacles at 18" AFF
 - b.) Thermostats at 48" AFF
 - c.) Lighting controls at 48" AFF
 - e. Bedroom

- i. A coordinated design effort should result in a bedroom design that has severely limited opportunities for furniture re-arrangement. With that in mind, all switches and wall receptacles shall be placed at heights and locations such that they are visible, accessible and cannot be blocked by furniture.
 - ii. Duplex receptacles shall be located as required by program.
 - iii. One duplex receptacle shall be located above each desktop, located 42" AFF for typical units, or as required in barrier-free units.
 - iv. MicroFridge (combination microwave and refrigerator unit), where provided, requires a dedicated duplex receptacle in a fixed location within each bedroom.
- f. Bathroom
- i. Two GFI duplex receptacles shall be located above the vanity inside the bathroom.

Hallways & Corridors

1. General: This section refers to common hallways and corridors that serve dormitory rooms. Standards for common hallways and corridors serving alternate residence hall functions such as laundry and multi-purpose rooms, are established in the "Residence Hall – Common Spaces" standards.
2. Finishes
 - a. Walls: painted, abuse- and impact-resistant gypsum board, floor to ceiling
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling: acoustical ceiling tile
3. Lighting and Controls
 - a. Lay-in, 2' x 2' or 2' x 4' fluorescent fixtures with T-8 lamps
 - b. Corridor/hallway shall be provided with ceiling-mounted occupancy sensors. Sensors shall be located such that lights switch on early enough to prevent dangerous conditions such as dark corridors at a turn. See Division 16 for additional requirements.
 - i. Occupancy sensors shall not be provided in freshman residence hallways and corridors.
 - c. Manual controls for lighting shall not be provided in the hallway/corridor space.

Dormitory Bedroom (Sleeping Area and Entryway)

1. Finishes
 - a. Walls: painted gypsum board
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling shall typically be a combination of painted exposed concrete slab and a dropped ceiling of painted gypsum board, only where necessary to provide for systems and air delivery. Generally, the entry area would contain the dropped ceiling, while the sleeping area would be painted exposed concrete slab. These standards are a result of maximizing floors per building and limited floor-to-floor building height.

2. Lighting and Controls
 - a. Fixtures selected are to be surface-mounted or recessed, as appropriate to the specific design and with the goal of maximizing clearances. As the typical bedroom ceiling will be painted concrete, the fixture will usually be surface-mounted. Alternately, recessed lighting should generally be provided when a dropped ceiling is provided.
 - b. Lighting for different zones to be switched separately.
3. Door and Door Hardware
 - a. Entry door shall be flush, stain grade wood
 - b. Door hardware (See Door Hardware Section for additional information):
 - i. Mortise Lock
 - ii. Security lockout deadbolt
 - iii. Doorstop
 - iv. Viewer
 - a.) Standard rooms shall have a viewer at 42" above finish floor.
 - b.) Accessible rooms shall have 2 viewers; one at 42" above finish floor and the other to meet ADA requirements.
4. Window
 - a. Each bedroom shall have an operable exterior window.
 - b. See general window requirements above for additional information.
5. Closets
 - a. Each occupant shall be provided with built-in closet space. Where bedroom is designed for more than one occupant and code requires closets to be sprinklered, occupant closet spaces shall be adjoined and designed to share a single sprinkler head by stopping the dividing wall short of the ceiling.
 - b. The closet space provided to each occupant shall have minimum dimensions of 30" wide x 24" deep x 66" high.
 - c. The closet space shall include a 12" deep, full-width washable plastic laminate shelf above a full-width clothing rod. Additional blocking that provides the option of double stacking hanging rods is preferred. This would accommodate typical user flexibility as well as barrier-free use.
 - i. Clothing rod: stainless steel-clad steel tubing or steel tubing with bright chrome finish; 1-1/16" outside diameter, with full round matching end brackets pre-punched for fasteners. Provide in single lengths (non-telescoping) for each location.
 - a.) Approved manufacturers and products, or equal:
 - Knape & Vogt No. 660 SS
 - Knape & Vogt No. 770 1
 - d. Finishes for built-in closets: to match those of the bedroom, except that the ceiling may be either painted gypsum board or painted exposed concrete.
 - e. Door, Frame and Hardware:
 - i. Door: painted flush wood, 24" wide x 6'-8" high
 - ii. Door frame: flush metal or wood frame (as part of pre-hung door)
 - iii. Door hardware:
 - a.) Passage set
 - b.) Doorstop
6. Owner-Provided Furniture & Furnishings for each bedroom (for design information only)

- a. MicroFridge MF-3TP Series (combination microwave and refrigerator unit); color: black; overall dimensions of current model are approximately 44 1/8"H x 18 5/8"W x 20 1/8"D. Refer to power sections for additional information.
- b. Recycling bin – Cans and Bottles, Rubbermaid Commercial 2956-06 GRN; 2 bins are recommended for rooms with more than 2 occupants
7. Owner-Provided Furniture & Furnishings for each Occupant (for design information only)
 - a. Wood bed frame and mattress. Coordinate size with GW Residential Property Management. Maximum mattress size to consider: 38" x 90". Frame size must also be accommodated.
 - b. Wood desk, 48" wide x 24" deep x 30" high.
 - c. Dresser, 5 stacked drawers, minimum 24" wide x 24" deep, with varying height.
 - d. Waste bin, Rubbermaid Commercial 2956 (28 quart), typical
 - e. Optional book shelf may be provided, at Owner's discretion, for barrier free bedrooms in lieu of box shelf over desk surface to meet reach limits. Coordinate book shelf size with GW Residential Property Management.
8. Contractor-Provided Millwork/Casework for each Occupant, where applicable
 - a. A box shelf, 48" wide x 12" deep x 12" high, shall be wall-mounted above each desk surface at a height not less than 24" for typical units and not more than 12" for barrier-free units, to allow for computer monitor. Provide plywood backing at shelf to ensure strong installation when weighed down with books.
 - b. See 06400 Architectural Woodwork for additional construction requirements.

Dormitory Bathroom

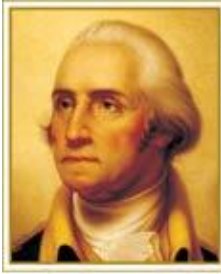
1. Bathrooms have three use zones: shower, lavatory and toilet. Regardless of the number of doors leading to the bathroom and regardless of whether or not the bathroom is designed to be barrier-free, there are two general bathroom designs to consider for use at GWU:
 - a. *Un-compartmentalized*, in which the toilet, shower and lavatory share one open space, with no privacy measures for any use zone. This type of bathroom offers a single user access to the entire bathroom at once. When more than three residents share a bathroom, demand may be too high to provide this bathroom layout. Barrier-free bathrooms should always be un-compartmentalized and have a floor drain in the main bathroom, in addition to the shower unit floor drain.
 - i. The primary advantage to this style of bathroom is economy. Thoughtful design offers the opportunity to share overhead features such as exhaust fan, general lighting, and sprinkler head. Additionally, there is no need for a separate dressing area or toilet enclosure.
 - b. *Compartmentalized*, in which the toilet is in a separate, secured compartment. The shower area should provide a private dressing area, separated from the rest of the bathroom by a second shower curtain.
 - The primary advantage to this style of bathroom is that it accommodates privacy for the shower and toilet, while offering simultaneous access to the lavatory, enabling use of each fixture by a different occupant.
 - Designer should evaluate options to provide privacy between use zones that do not require duplicating ceiling features. Generally, this approach

- may indicate a need for stopping partitions and/or the toilet door short of the ceiling.
2. Finishes
 - a. Walls: painted, water-resistant gypsum board
 - b. Flooring: ceramic mosaic tile
 - c. Base: ceramic mosaic tile
 - d. Thresholds: marble
 - e. Ceiling: painted gypsum board
 3. Lighting, Controls, Exhaust Fan and Related Items
 - a. General: Where both a general ceiling-mounted light and an exhaust fan are called for in the same enclosed space, they may be combined into a single unit, or they may be two separate items. For maintenance, separate units are preferred. However, care should be given to coordinate styles and colors of ceiling-mounted items to provide a positive aesthetic.
 - b. Lamps: 13 watt or 26 watt, 4- pin base fluorescent bulbs
 - c. Light fixture and exhaust fan locations to be provided in the following locations:
 - i. Un-compartmentalized:
 - a.) Wall- or ceiling-mounted light fixture above the lavatory mirror
 - b.) Ceiling-mounted light fixture to provide general lighting for the entire bathroom
 - c.) Ceiling-mounted exhaust fan to serve shower and toilet.
 - ii. Compartmentalized:
 - a.) Wall- or ceiling-mounted light fixture above the lavatory mirror
 - b.) Ceiling-mounted light fixture to provide general lighting to shower and lavatory. Fixture may also serve toilet, depending on design.
 - c.) Ceiling-mounted exhaust fan to serve shower. Fan may also serve toilet, depending on design.
 - d.) Ceiling-mounted light fixture in the toilet compartment if not served by the general overhead fixture
 - d. Controls:
 - i. Un-compartmentalized bathroom:
 - a.) A single switch shall control the overhead light and exhaust fan, such that the fan and light are always on/off together.
 - b.) Lavatory fixture: provide independent switch at bathroom door(s)
 - ii. Compartmentalized bathroom:
 - a.) A single switch shall control the general ceiling-mounted lighting and shower exhaust fan, such that they are always on/off together.
 - b.) Lavatory fixture: provide independent switch at bathroom door(s)
 - c.) A single switch within the toilet compartment shall control the light
 - e. Exhaust fan(s)
 - i. Housing: white
 - ii. Shower exhaust fan shall be sized to provide a minimum of 12 air changes per hour within the shower and dressing area.
 - f. Central exhaust fans and outside air makeup systems shall be sized with the assumption that only a specified percentage of the shower exhaust fan is running at any given time.
 4. Door and Door Hardware
 - a. Door

- i. Bathroom door:
 - a.) Dimensions:
 - Barrier-free design: 6'-8" high and minimum 2'-10" wide, or as required to meet barrier-free requirements
 - All other doors: 6'-8" high and minimum 2'-6" wide
 - b.) Material and Finish: flush wood, painted
 - c.) Provide one double robe/towel hook per occupant on the bedroom side of door (in addition to additional hook requirements inside the bathroom as noted herein).
 - b. Door hardware
 - i. Un-compartmentalized bathroom:
 - a.) Privacy set
 - b.) Doorstop
 - ii. Compartmentalized bathroom:
 - a.) General door:
 - Passage set
 - Doorstop
 - b.) Toilet compartment door:
 - Privacy set
 - Doorstop
 - c. Spring hinges shall be used where there are space constraints.
5. Lavatory Area
- a. Lavatory faucet shall be single lever, barrier-free, manual operation, with a chrome plate finish.
 - b. Lavatory
 - i. Typical Units:
 - a.) The lavatory top shall be a residential, cultured marble countertop with integral sink.
 - b.) A lavatory base cabinet with 2 doors and optional false drawer front at sink shall be provided, compliant with 06400 Architectural Woodwork.
 - ii. Barrier-free units shall be one of the following, with a preference for the cultured marble option, as it provides some usable counter space:
 - a.) The lavatory shall be either a white, wall-hung, vitreous china fixture or a cultured marble countertop with integral sink. Piping shall be insulated below. No base cabinet or storage shall be provided.
 - c. Provide one recessed, mirrored medicine cabinet above the lavatory and to serve up to two occupants. Provide one additional medicine cabinet per each two additional occupants within the bathroom. Provide at least one barrier-free medicine cabinet in each restroom required to meet barrier-free design requirements.
 - d. Provide one minimum 24" wide x 6" deep wall-mounted stainless steel shelf below medicine cabinet at lavatory.
 - e. Provide one 18" long heavy duty towel bar per occupant.
6. Shower area
- a. Refer to 15410 Plumbing Fixtures for requirements for shower enclosure, shower mixing valve, shower faucet, and shower head. Refer to 10800 Toilet & Bath Accessories for additional information regarding shower rod, curtain, and hooks.
 - b. Shower curtain, rod, and hooks to be provided for each shower unit:

- i. One heavy duty stainless steel curtain rod
 - ii. One shower curtain
 - iii. One full set of curtain hooks
 - c. Shower rod shall be mounted at a height that allows a standard 72" high shower curtain to drape into the shower floor $\frac{1}{2}$ " – 1" to prevent water from escaping the enclosure.
 - d. One 24" wide x 6" deep, minimum, wall-mounted stainless steel shelf.
 - i. Consultant should consider locating the shelf above the toilet where barrier-free requirements aren't compromised. Alternate locations should reflect an effort to minimize the risk of occupants bumping into sharp shelf corners.
 - e. Minimum of one double robe/towel hook per occupant
7. Toilet area
- a. Finishes of toilet zone, including toilet compartment, if provided, shall match that of the balance of the bathroom unless otherwise noted.
 - b. Toilet shall be tank style. Refer to Specification Guidelines Part 2, Division 15410 for additional information.
 - c. Stainless steel or chrome, single roll, open loop residential style toilet paper holder shall be provided for each toilet.

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

This document provides design standards only, and is not intended for use, in whole or in part, as a specification. Consultants referencing this information must always meet all applicable state and local building codes as well as all barrier free design requirements. Consultants must also refer to the entire set of Design Standards for additional information. Refer questions and comments regarding the content and use of this document to the George Washington University Project Manager.

BUILDING TYPE DESIGN STANDARDS RESIDENCE HALL – APARTMENT STYLE RESIDENCE FLOORS

A. SUMMARY

This section contains design standards for apartment style residence halls. Refer to related divisions and sections for additional information.

B. GENERAL

Apartment style housing shall be designed to offer upperclassmen enhanced living space over freshmen dormitories. These residence halls may be designed for single- or double-occupant bedrooms. Apartments include a common living room and typically house 4-6 students. Bathrooms are provided at a ratio of 1 per every 2-3 occupants. Apartments may optionally include a kitchen, laundry closet, or a common coat closet.

C. STANDARDS HEREIN

1. Spaces which are typical of many apartment style residence hall floors are discussed herein. These include:
 - Hallways & Corridors
 - Apartment, General
 - Bedroom
 - Bathroom
 - Living Room
 - Kitchen
 - Laundry Closet
 - Common Closet

For additional spaces found throughout residence halls, refer to the design standard, "Residence Hall – Common Spaces," which is also applicable to dormitory style residence halls.

D. BARRIER FREE DESIGN

1. A doorbell shall be provided for each barrier-free apartment door. Signaling shall be both audible and visible and in the common space as well in each barrier-free bedroom.

E. INTERIOR STANDARDS

General

1. The information in this section is provided for general guidance for this building type. Refer to individual apartment space standards, such as bedrooms and bathrooms, for additional information. Refer to all related sections, such as door hardware, lighting, plumbing fixtures, and various finishes for additional information, as well.
2. Finishes
 - a. Painted wood wall paneling and painted wood base are generally undesirable finishes, as they tend to show wear prematurely.
 - b. Flooring and base:
 - i. Areas that have a direct connection to the outdoors shall typically have terrazzo or agglomerate tile flooring with terrazzo base.
 - ii. Carpet to be carpet tile unless specifically noted as broadloom
 - a.) Where carpet is specified, stained wood or resilient base shall be provided, as appropriate.
 - c. Ceiling Finish
 - i. Ceiling finishes throughout apartments generally vary between painted exposed concrete slabs above (to maximize ceiling height) and dropped painted gypsum board ceilings. The gypsum board is generally located to provide for systems and air delivery. Bathroom ceilings shall always be painted gypsum board. These ceiling standards address the dual challenges of maximizing number of floors per building and the resulting limited clear height between the floors.
 - a.) Where exposed concrete ceilings are provided, finish shall be smooth to receive paint. Textured ceilings will not be allowed, including for the purpose of concealing surface imperfections.
3. Bulletin boards, tack strips and other tackable surfaces shall conform to 10125 Bulletin Boards and Bulletin Board Cabinets.
4. Doors, frames, and hardware: unless otherwise noted, required by fire ratings, accessibility requirements, or other code reasons:
 - a. Doors: solid core, flush wood
 - i. Provide stain grade maple doors along corridors, typical
 - ii. Provide paint grade birch doors within spaces, typical
 - b. Door nominal dimensions: 36" wide, 6'-8" high, and 1-3/4" thick
 - c. Frames: steel
 - d. Door hardware shall comply with
 - i. "The George Washington University Door Hardware Specification Guide"
 - ii. GW "CFT Security & Access Standards"
 - e. See design standards as well as door and door hardware sections for additional information.
5. Signage for individual rooms is by owner. Designer to coordinate work with owner-provided signage standards and locations.
6. Windows
 - a. Windows readily accessible from outside shall include glass break detectors per GW "CFT Security & Access Standards."

- b. Window treatment shall be 1" deep aluminum mini-blinds, color to match Bali #112, Alabaster.
- c. Window sills shall be metal clad, with the color coordinated to match window frames. When the budget allows, solid surface sills are preferred.
- d. Operable Windows
 - i. Provide limiter device to restrict sash opening to 6 inches. Operation past this point to be by use of a tool or removable key only. Furnish two such tools for each floor of building.
 - ii. Provide removable glass fiber insect screen in charcoal color on the inside of each operable sash.
- 7. Interior Life Safety
 - a. Fire Protection: Sprinklers and fire alarms shall comply with all applicable building codes and regulations, including NFPA, as well as FM Global.
 - b. Refer to Division 13 for additional information.
- 8. Voice, Data, CATV
 - a. Wireless network coverage shall exist throughout each building in resident apartments and suites; student gathering areas such as, lounges, study rooms, TV rooms; and student laundry/kitchen facilities. Coverage will also extend to outdoor gathering areas immediately adjacent to the building.
 - b. CATV, Voice and Data station outlets shall all be comprised of a 4" by 4" back box, with a 2 x 4 plaster ring, cover plate, and a minimum 3/4" EMT or equal-sized raceway with pull string that extends back to the main communications horizontal distribution pathway, or to an accessible ceiling that provides a route to the main communications horizontal distribution pathway. Provide junction boxes, as required, to allow cable to be pulled through from the communications closet to the station outlet.
 - c. Provide the following infrastructure as per "ISS Residential Standards 2008", as applicable to dormitories, or per the most current ISS Standards available
 - i. Residential Living Spaces
 - a.) 1 Voice (located within the common area)
 - b.) 1 Data per bed
 - c.) 1 CATV per bedroom and 1 per Living Room
 - ii. Common Areas and Lounges
 - a.) 1 CATV per room
 - b.) 1 Voice per room or nearby in corridor
 - iii. Exercise Rooms
 - a.) 1 CATV per 500 square feet
 - b.) 1 Voice per room
- 9. Power Supply, Lighting, and Controls
 - a. Refer to Division 16 for additional information including standard lamps and lamp colors as well as controls such as occupancy sensors and manual switches.
 - b. Light levels shall comply with Illuminating Engineering Society of North America (IESNA) current recommendations. Examples of current IESNA lighting levels include: a) offices, classrooms, and laboratories: 30 -50 foot candles (depending on specific work tasks) on desks and table tops; b) hallways: 5 -8 foot candles; c) stairwells: 5-8 foot candles; d) restrooms: 5-8 foot candles. Refer to the most current issue of the IESNA Lighting Handbook to verify required illumination levels.

- c. Colors and Materials:
 - i. Unless otherwise noted, all switches and receptacles shall be white with factory-painted white, metal cover plates.
 - ii. Receptacles on circuits dedicated to computers and specific equipment shall be orange with stainless steel cover plates.
 - iii. Where switches are co-located and where receptacles are co-located, provide ganged cover plate.
- d. Mounting Height:
 - i. Unless otherwise required, locate the following as noted:
 - a.) Receptacles at 18" AFF
 - b.) Thermostats at 48" AFF
 - c.) Lighting controls at 48" AFF
- e. Bedroom
 - i. A coordinated design effort should result in a bedroom design that has severely limited opportunities for furniture re-arrangement. With that in mind, all switches and wall receptacles shall be placed at heights and locations such that they are visible, accessible and cannot be blocked by furniture.
 - ii. One duplex receptacle shall be located above each desktop, located 42" AFF for typical units, or as required in barrier-free units.
 - iii. One duplex receptacle shall be located between the two beds, located at 18" AFF, under the window.
- f. Bathroom
 - i. Two GFI duplex receptacles shall be located above the vanity inside the bathroom.

Hallways & Corridors

- 1. General: This section refers to common hallways and corridors that serve apartments. Standards for hallways within apartments are established under the Apartment heading. Standards for common hallways and corridors serving alternate residence hall functions such as laundry and multi-purpose rooms are established in the "Residence Hall – Common Spaces" standards.
- 2. Finishes
 - a. Walls: painted, abuse- and impact-resistant gypsum board, floor to ceiling
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling: acoustical ceiling tile
- 3. Lighting and Controls
 - a. Lay-in, 2' x 2' direct/indirect T-8 fluorescent fixtures.
 - b. Corridor/hallway shall be provided with ceiling-mounted, dual technology (passive infrared plus ultrasonic) occupancy sensors. Sensors shall be located such that lights switch on early enough to prevent dangerous conditions such as dark corridors at a turn.
 - c. Manual controls for lighting shall not be provided in the hallway/corridor space.

Apartment, General

1. The apartment layout should group all provided common spaces, such as living room, kitchen, laundry closet, and common closet, in the central area of the apartment. These spaces should be readily accessible to the entry door. The layout should strive to spread the bedrooms out from the common areas to reduce congestion and enhance privacy. One recommended strategy to accomplish this is to place half of the bedrooms and bathrooms on one side of the common areas and the other half on the opposite side.
2. Finishes for open common space (excluding bedrooms and bathrooms):
 - a. Walls shall be painted gypsum board.
 - b. Floor & Base: shall be a mix of carpet and resilient tile with resilient base
Note: See space descriptions herein for additional information
 - c. Ceiling: typically a combination of painted exposed concrete and painted gypsum board
3. Lighting and Controls
 - a. Rooms should generally be switched separately from one another.
 - b. Accent lighting, where provided, shall be switched independently from other lighting.
4. Door and Door Hardware
 - a. Entry door shall be flush, stain grade wood.
 - b. Door hardware (See Door Hardware Section for additional information):
 - i. Mortise Lock
 - ii. Security lockout deadbolt
 - iii. Doorstop
 - iv. Viewer
 - a.) Apartment doors shall have a viewer at 42" above finish floor.
 - b.) Accessible apartment entry doors shall have 2 viewers; one at 42" above finish floor and the other to meet barrier-free requirements.
Individual bedroom doors in apartments do not require viewers.
5. Owner-Provided for each Apartment (for design information only)
 - a. Recycling bin – Cans and Bottles, Rubbermaid Commercial 2956-06 GRN; 2 bins are recommended for apartments with more than 2 occupants

Bedroom

2. Finishes
 - a. Walls: painted gypsum board
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling shall typically be a combination of painted exposed concrete slab and a dropped ceiling of painted gypsum board, only where necessary to provide for systems and air delivery. Generally, the entry area would contain the dropped ceiling, while the sleeping area would be painted exposed concrete slab. These standards are a result of maximizing floors per building and limited floor-to-floor building height.
3. Lighting and Controls
 - a. Fixtures selected are to be surface-mounted or recessed, as appropriate to the specific design and with the goal of maximizing clearances. As the typical

- bedroom ceiling will be painted concrete, the fixture will usually be surface-mounted. Alternately, recessed lighting should generally be provided when a dropped ceiling is provided.
4. Door and Door Hardware
 - a. Bedroom door shall be flush wood, paint grade.
 - b. Door hardware:
 - i. Entrance lock set
 - ii. Doorstop
 5. Provide one double robe/towel hook per occupant on the bedroom side of door.
 6. Window
 - a. Each bedroom shall have an operable exterior window.
 - b. See general window requirements above for additional information.
 7. Closet
 - a. Each occupant shall be provided with built-in closet space. Where bedroom is designed for more than one occupant and code requires sprinklers for closets, occupant closet spaces shall be adjoined and designed to share a single sprinkler head. In this case, the closet space may be open at the top to accommodate the requirement.
 - b. The closet space provided to each occupant shall have minimum dimensions of 30" wide x 24" deep x 66" high.
 - c. The closet space shall include a 12" deep, full-width washable plastic laminate shelf above a full-width clothing rod.
 - i. Clothing rod: stainless steel-clad steel tubing or steel tubing with bright chrome finish; 1-1/16" outside diameter, with full round matching end brackets pre-punched for fasteners. Provide in single lengths (non-telescoping) for each location.
 - a.) Approved manufacturers and products, or equal:
 - Knape & Vogt No. 660 SS
 - Knape & Vogt No. 770 1
 - d. Finishes for built-in closets: to match those of the bedroom, except that the ceiling may be either painted gypsum board or painted exposed concrete.
 - e. Door, Frame and Hardware
 - i. Door shall be flush wood, paint grade, 24" wide x 6'-8" high
 - ii. Door frame: flush metal
 - iii. Door hardware:
 - a.) Passage set
 - b.) Doorstop
 8. Owner-Provided Furniture & Furnishings for each Occupant (for design information only)
 - a. Wood bed frame and mattress. Coordinate size with GW Residential Property Management. Maximum mattress size to consider: 38" x 90". Frame size must also be accommodated.
 - b. Wood desk, 48" wide x 24" deep x 30" high.
 - c. Dresser, 5 stacked drawers, minimum 24" wide x 24" deep, with varying height.
 - d. Waste bin, Rubbermaid Commercial 2956 (28 quart), typical
 - e. Optional book shelf may be provided, at Owner's discretion, for barrier free bedrooms in lieu of box shelf over desk surface to meet reach limits. Coordinate book shelf size with GW Residential Property Management.

9. Contractor-Provided Millwork/Casework for each Occupant, where applicable
 - a. A box shelf, 48" wide x 12" deep x 12" high, shall be wall-mounted above each desk surface at a height not less than 24" for typical units and not more than 12" for barrier-free units, to allow for computer monitor. Provide plywood backing at shelf to ensure strong installation when weighed down with books.
 - b. See 06400 Architectural Woodwork for additional construction requirements.

Apartment Bathroom

1. Bathrooms have three use zones: shower, lavatory and toilet. Regardless of the number of doors leading to the bathroom and regardless of whether or not the bathroom is designed to be barrier-free, there are two general bathroom designs to consider for use at GWU:
 - a. *Un-compartmentalized*, in which the toilet, shower and lavatory share one open space, with no privacy measures for any use zone. This type of bathroom offers a single user access to the entire bathroom at once. When more than three residents share a bathroom, demand may be too high to provide this bathroom layout. Barrier-free bathrooms should always be un-compartmentalized.
 - i. The primary advantage to this style of bathroom is economy. Thoughtful design offers the opportunity to share overhead features such as exhaust fan, general lighting, and sprinkler head. Additionally, there is no need for a separate dressing area or toilet enclosure.
 - b. *Compartmentalized*, in which the toilet is in a separate, secured compartment. The shower area should provide a private dressing area, separated from the rest of the bathroom by a second shower curtain.
 - The primary advantage to this style of bathroom is that it accommodates privacy for the shower and toilet, while offering simultaneous access to the lavatory, enabling use of each fixture by a different occupant.
 - Designer should evaluate options to provide privacy between use zones that do not require duplicating ceiling features. Generally, this approach may indicate a need for stopping partitions and/or the toilet door short of the ceiling.
2. Finishes
 - a. Walls: painted, water-resistant gypsum board
 - b. Flooring: ceramic mosaic tile
 - c. Base: ceramic mosaic tile
 - d. Thresholds: marble
 - e. Ceiling: painted gypsum board
3. Lighting, Controls, Exhaust Fan and Related Items
 - a. General: Where both a general ceiling-mounted light and an exhaust fan are called for in the same enclosed space, they may be combined into a single unit, or they may be two separate items. For maintenance, separate units are preferred. However, care should be given to coordinate styles and colors of ceiling-mounted items to provide a positive aesthetic.
 - b. Lamps: 13 watt or 26 watt, 4- pin base fluorescent bulbs
 - c. Light fixture and exhaust fan locations to be provided in the following locations:
 - i. Un-compartmentalized:

- a.) Wall- or ceiling-mounted light fixture above the lavatory mirror
 - b.) Ceiling-mounted light fixture to provide general lighting for the entire bathroom
 - c.) Ceiling-mounted exhaust fan to serve shower and toilet
 - ii. Compartmentalized:
 - a.) Wall- or ceiling-mounted light fixture above the lavatory mirror
 - b.) Ceiling-mounted light fixture to provide general lighting to shower and lavatory. Fixture may also serve toilet, depending on design.
 - c.) Ceiling-mounted exhaust fan to serve shower. Fan may also serve toilet, depending on design.
 - d.) Ceiling-mounted light fixture in the toilet compartment if not served by the general overhead fixture
 - d. Controls:
 - i. Un-compartmentalized bathroom:
 - a.) A single switch shall control the overhead light and exhaust fan, such that the fan and light are always on/off together.
 - b.) Lavatory fixture: provide independent switch at bathroom door(s)
 - ii. Compartmentalized bathroom:
 - a.) A single switch shall control the general ceiling-mounted lighting and shower exhaust fan, such that they are always on/off together.
 - b.) Lavatory fixture: provide independent switch at bathroom door(s)
 - c.) A single switch within the toilet compartment shall control the light.
 - e. Exhaust fan
 - i. Housing: white
 - ii. Shower exhaust fan shall be sized to provide a minimum of 12 air changes per hour within the shower and dressing area.
 - f. Central exhaust fans and outside air makeup systems shall be sized with the assumption that only a specified percentage of the shower exhaust fan is running at any given time.
4. Door and Door Hardware
- a. Door
 - i. Bathroom door:
 - a.) Dimensions:
 - Barrier-free design: 6'-8" high and minimum 2'-10" wide, or as required to meet barrier-free requirements
 - All other doors: 6'-8" high and minimum 2'-6" wide
 - b.) Material and Finish: flush wood, painted
 - c.) Provide one double robe/towel hook per occupant on the bedroom side of door (in addition to additional hook requirements inside the bathroom as noted herein).
 - ii. Door hardware
 - i. Un-compartmentalized bathroom:
 - a.) Privacy set
 - b.) Doorstop
 - ii. Compartmentalized bathroom:
 - a.) General door:
 - Passage set
 - Doorstop
 - b.) Toilet compartment door:

- Privacy set
- Doorstop
- c. Spring hinges shall be used where there are space constraints.
- 5. Lavatory Area
 - a. Lavatory faucet shall be single lever, barrier-free, manual operation, with a chrome plate finish.
 - b. Lavatory
 - i. Typical Units:
 - a.) The lavatory top shall be a residential, cultured marble countertop with integral sink.
 - b.) A lavatory base cabinet with 2 doors and optional false drawer front at sink shall be provided, compliant with 06400 Architectural Woodwork.
 - ii. Barrier-free units shall be one of the following, with a preference for the cultured marble option, as it provides some usable counter space:
 - a.) The lavatory shall be either a white, wall-hung, vitreous china fixture or a cultured marble countertop with integral sink. Piping shall be insulated below. No base cabinet or storage shall be provided.
 - c. Provide one recessed, mirrored medicine cabinet above the lavatory and to serve up to two occupants. Provide one additional medicine cabinet per each two additional occupants within the bathroom. Provide at least one barrier-free medicine cabinet in each restroom required to meet barrier-free design requirements.
 - d. Provide one minimum 24" wide x 6" deep wall-mounted stainless steel shelf below medicine cabinet at lavatory.
 - e. Provide one 18" long heavy duty towel bar per occupant.
- 6. Shower area
 - a. Refer to 15410 Plumbing Fixtures for requirements for shower enclosure, shower mixing valve, shower faucet, and shower head. Refer to 10800 Toilet & Bath Accessories for additional information regarding shower rod, curtain, and hooks.
 - b. Shower curtain, rod, and hooks to be provided for each shower unit:
(For retrofit projects, shower curtain and hooks to be Owner-Provided, Owner-Installed)
 - i. One heavy duty stainless steel curtain rod
 - ii. One shower curtain
 - iii. One full set of curtain hooks
 - c. Shower rod shall be mounted at a height that allows a standard 72" high shower curtain to drape into the shower floor ½" – 1" to prevent water from escaping the enclosure.
 - d. One 24" wide x 6" deep, minimum, wall-mounted stainless steel shelf.
 - i. Consultant should consider locating the shelf above the toilet where barrier-free requirements aren't compromised. Alternate locations should reflect an effort to minimize the risk of occupants bumping into sharp shelf corners.
 - e. Minimum of one double robe/towel hook per occupant
- 7. Toilet area
 - a. Finishes of toilet zone, including toilet compartment, if provided, shall match that of the balance of the bathroom unless otherwise noted.
 - b. Toilet shall be tank style.

- c. Stainless steel or chrome, single roll, open loop residential style toilet paper holder shall be provided for each toilet.

Living Room

1. Finishes
 - a. Ceiling: typically a combination of painted exposed concrete and painted gypsum board.
 - b. Floor: carpet
 - c. Base: resilient
 - d. Walls: painted gypsum board
2. Owner-Provided Furniture & Furnishings (for design information only):
 - a. Coordinate specific list with Owner, but typical furnishings may include sofas, love seats, coffee tables, end tables, TV stand, and side chairs.
 - b. Recycling bin, Rubbermaid Commercial 3540-07, Green for Bottles/Cans (28 quart), with lid Rubbermaid Commercial 2692-88

Kitchen (Optional)

1. Finishes
 - a. Ceiling: painted gypsum board
 - b. Floor: resilient tile
 - c. Base: resilient
 - d. Toekick at base cabinets: either plastic laminate or resilient
 - e. Walls: painted gypsum board
2. Lighting and Controls
 - a. General lighting typically to be one of the following:
 - i. Ceiling-mounted, 24" x 24" lay-in fluorescent fixtures with T-8 lamps
 - ii. Ceiling-mounted, low profile round fixtures with CFL lamps
 - a.) Model, or approved equal: Vision Lighting Low Profile Round Cloud QR-LR Series with Smooth White Finish; model 1-QR-LR-3-26E-17
 - b. Under-cabinet lighting shall not be provided unless otherwise noted.
3. Cabinets shall comply with 06400 Architectural Woodwork.
4. Counters, backsplashes, and sidesplashes shall be finished with plastic laminate.
 - a. Counters shall have continuously rolled backsplash and counter with integral drip edge at front.
5. Sink to be stainless steel with chrome plated, lever style faucet and waste disposal complying with 15410 Plumbing Fixtures.
6. Appliances to be provided
 - a. refrigerator
 - i. Size shall be dependent on the number of occupants sharing it.
 - a.) small-size: up to 4 occupants
 - b.) mid-size: 5-8 occupants
 - c.) full-size: 9 or more occupants
 - b. range
 - c. exhaust hood
 - d. microwave
 - e. dishwasher

- f. Refer to 11450 Residential Appliances for additional information.
- 7. Owner-Provided Furniture & Furnishings for common space (for design information only) – for information only
 - a. 36”-diameter dining table with 4 armless chairs

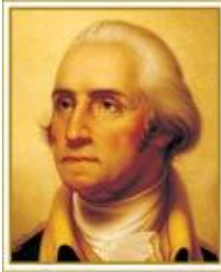
Laundry Closet (Optional)

- 1. Typical units shall provide an appropriately-sized laundry closet, housing a stacking washer and dryer. Barrier free units have a larger laundry closet, housing a washer and dryer, side by side.
- 2. Finishes
 - a. Ceiling: painted gypsum board or painted exposed structure
 - b. Floor: resilient tile
 - c. Base: resilient
 - d. Walls: painted gypsum board
- 3. Door and Door Hardware
 - a. Door shall be louvered, flush wood, paint grade
 - b. Door to be 6’-8” high; width as required
 - c. Door hardware
 - i. Passage set
 - ii. Doorstop

Common Closet (Optional)

- 1. Closet to be 24” deep, minimum. Provide a 12” deep, minimum, full-width washable plastic laminate shelf above a full-width clothing rod. Additional blocking that provides the option of double stacking clothing rods is preferred. This would accommodate typical user flexibility as well as barrier-free use.
 - a. Clothing rod: stainless steel-clad steel tubing or steel tubing with bright chrome finish; 1-1/16” outside diameter, with full round matching end brackets pre-punched for fasteners. Provide in single lengths (non-telescoping) for each location.
 - i. Approved manufacturers and products, or equal:
 - a.) Knappe & Vogt No. 660 SS
 - b.) Knappe & Vogt No. 770 1
- 2. Finishes to match adjacent room or as follows:
 - a. Ceiling: painted gypsum board or painted exposed structure
 - b. Floor: resilient tile
 - c. Base: resilient
 - d. Walls: painted gypsum board
- 3. Door and Door Hardware
 - a. Door shall be flush wood, paint grade, 24” wide x 6’-8” high, typical.
 - d. Door hardware
 - i. Passage set
 - ii. Doorstop

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

This document provides design standards only, and is not intended for use, in whole or in part, as a specification. Consultants referencing this information must always meet all applicable state and local building codes as well as all barrier free design requirements. Consultants must also refer to the entire set of Design Standards for additional information. Refer questions and comments regarding the content and use of this document to the George Washington University Project Manager.

BUILDING TYPE DESIGN STANDARDS RESIDENCE HALL – COMMON SPACES

A. SUMMARY

This section contains design standards for residence hall buildings. Refer to related divisions and sections for additional information.

B. BUILDING SPACE TYPES

This section contains design standards for residence hall common spaces, including support spaces. It is generally applicable to both dormitory style and apartment style residence halls. Refer to the relevant residence hall design standards for additional information. Items addressed within this section include:

- Entry Vestibule
- Lobby & Related Spaces
- Elevator
- Recycling & Waste Station, Built-in
- Hallways & Corridors
- Mail Room
- Laundry Room, Common
- Trash and Recycling Room
- Housekeeping Closet
- Housekeeping Suite
- Restroom, Public (Single Occupant)
- Kitchen / Pantry, Common
- Office
- Break-Out Room, Conference Room, Lounge, Study Room
- Electrical, Security, Telecommunications Closet
- Mechanical Room

C. STANDARDS

General

1. Finishes
 - a. Painted wood wall paneling and painted wood base are generally undesirable finishes, as they tend to show wear prematurely.
 - b. Flooring and base:

- i. Areas that have a direct connection to the outdoors shall typically have terrazzo or agglomerate tile flooring with terrazzo base.
 - ii. Carpet to be carpet tile unless specifically noted as broadloom
 - a.) Where carpet is specified, stained wood or resilient base shall be provided, as appropriate.
 - c. Ceiling Finish
 - i. Where exposed concrete ceilings are provided, finish shall be smooth to receive paint. Textured ceilings will not be allowed, including for the purpose of concealing surface imperfections.
- 2. Doors, frames, and hardware: unless otherwise noted, required by fire ratings, accessibility requirements, or other code reasons:
 - a. Doors: solid, flush wood
 - i. Provide stain grade maple doors along corridors, typical
 - ii. Provide paint grade birch doors within spaces, typical
 - b. Door nominal dimensions: 36" wide, 6'-8" high, and 1-3/4" thick
 - c. Frames: steel
 - d. Door hardware shall comply with
 - i. "The George Washington University Door Hardware Specification Guide"
 - ii. GW "CFT Security & Access Standards"
 - e. See design standards as well as door and door hardware sections for additional information.
- 3. Signage for individual rooms is by owner. Designer to coordinate work with owner-provided signage standards and locations.
- 4. Bulletin boards, display cases, tack strips and other tackable surfaces shall conform to 10125 Bulletin Boards and Bulletin Board Cabinets.
- 5. Public Entrances
 - a. All building entries serving the public and directly connected to the outdoors shall contain a permanently installed entryway floor mat system. The system shall be at least 6'-0" long in the direction of travel. See 12484 Entry Mat for additional requirements. Also see "Entry Vestibule" below for primary entrance requirements.
- 6. Windows
 - a. Windows readily accessible from outside shall include glass break detectors per The University's Security and Access Standards.
 - b. Window treatment shall be 1" deep aluminum mini-blinds, color to match Bali #112, Alabaster.
 - c. Window sills shall be metal clad, with the color coordinated to match window frames. When the budget allows, solid surface sills are preferred.
 - d. Operable Windows
 - i. Provide limiter device to restrict sash opening to 6 inches. Operation past this point to be by use of a tool or removable key only. Furnish two such tools for each floor of building.
 - ii. Provide removable glass fiber insect screen in charcoal color on the inside of each operable sash.
- 7. Interior Life Safety
 - a. Fire Protection: Sprinklers and fire alarms shall comply with all applicable building codes and regulations, including NFPA, as well as FM Global.
 - b. Refer to Division 13 for additional information.
- 8. Thermal Comfort

- a. HVAC: Refer to Division 15 for additional information.
- 9. Voice, Data, CATV
 - a. Wireless network coverage shall exist throughout each building in resident apartments and suites; student gathering areas such as, lounges, study rooms, TV rooms; and student laundry/kitchen facilities. Coverage will also extend to outdoor gathering areas immediately adjacent to the building.
 - b. CATV, Voice and Data station outlets shall all be comprised of a 4" by 4" back box, with a 2 x 4 plaster ring, cover plate, and a minimum 3/4" EMT or equal-sized raceway with pull string that extends back to the main communications horizontal distribution pathway, or to an accessible ceiling that provides a route to the main communications horizontal distribution pathway. Provide junction boxes, as required, to allow cable to be pulled through from the communications closet to the station outlet.
 - c. Provide the following infrastructure as per "ISS Residential Standards 2008", as applicable to dormitories, or per the most current ISS Standards available
 - i. Residential Living Spaces
 - a.) 1 Voice (located within the common area)
 - b.) 1 Data per bed
 - c.) 1 CATV per bedroom and 1 per Living Room
 - ii. Common Areas and Lounges
 - a.) 1 CATV per room
 - b.) 1 Voice per room or nearby in corridor
 - iii. Exercise Rooms
 - a.) 1 CATV per 500 square feet
 - b.) 1 Voice per room
- 10. Power Supply, Lighting, and Controls
 - a. Refer to Division 16 for additional information including standard lamps and lamp colors as well as controls such as occupancy sensors and manual switches.
 - b. Light levels shall comply with Illuminating Engineering Society of North America (IESNA) current recommendations. Examples of current IESNA lighting levels include: a) offices, classrooms, and laboratories: 30 -50 foot candles (depending on specific work tasks) on desks and table tops; b) hallways; 5 -8 foot candles; c) stairwells: 5-8 foot candles; d) restrooms: 5-8 foot candles. Refer to the most current issue of the IESNA Lighting Handbook to verify required illumination levels.
 - c. Public access to lighting controls shall not be provided in common spaces such as corridors, hallways, and lobbies.
 - d. Energy-conserving lighting control strategies such as photocells and occupancy sensors that step down or turn off lighting when it is not needed, such as after-hours or when the space is unoccupied, are required in most common spaces throughout.
 - e. Colors and Materials:
 - i. Unless otherwise noted, all switches and receptacles shall be white with factory-painted white, metal cover plates.
 - ii. Receptacles on circuits dedicated to computers and specific equipment shall be orange with stainless steel cover plates.
 - iii. Where switches are co-located and where receptacles are co-located, provide ganged cover plate.

- f. Mounting Height:
 - i. Unless otherwise required, locate the following as noted:
 - a.) Receptacles at 18" AFF
 - b.) Thermostats at 48" AFF
 - c.) Lighting controls at 48" AFF

Entry Vestibule

1. Primary entry vestibules shall be designed as air locks, with two sets of doors: exterior doors and doors between the entry vestibule and the building lobby. This design provides for increased energy efficiency and improved dirt and particulates control. The vestibule shall also be designed with a permanently installed entryway floor mat system, each at least 7'-0" long in the direction of travel. The floor mat system shall be provided at all building entries serving the public and directly connected to the outdoors. The floor system shall be the full width of the vestibule. See 12484 Entry Mat for additional requirements.
2. Each primary entrance vestibule shall include one barrier-free entry with assistive door opener(s).
3. Door Hardware: doors shall be self closing; all hardware to conform to GWU CFT Security & Access Standards.
4. Finishes: to match adjacent lobby

Lobby & Related Spaces

1. General: Lobby finishes and fixtures shall typically be upgraded from other building spaces. Lobbies and related spaces offer an opportunity to introduce and develop a building's individuality. This section is applicable to primary entrance lobbies on the main floor, including elevator lobbies. However, it may often be appropriate to maintain an aesthetic connection between the public spaces of the main floor and the lobbies and primary corridors on upper floors.
2. Finishes:
 - a. Walls: combination of painted gypsum board and upgraded wood paneling and trim
 - b. Flooring: terrazzo or terrazzo tile
 - c. Base: terrazzo
 - d. Ceiling: painted gypsum board or painted gypsum board with acoustical ceiling tile
3. Lighting and Controls
 - a. Lighting may include specialty fixtures, as long as the required lamps are within the standard selection.
 - b. Manual controls for lighting shall not be provided in the lobby.
4. Lobby shall include a pair of water fountains, one of which is barrier-free. See Division 15000 for additional information.

Elevator

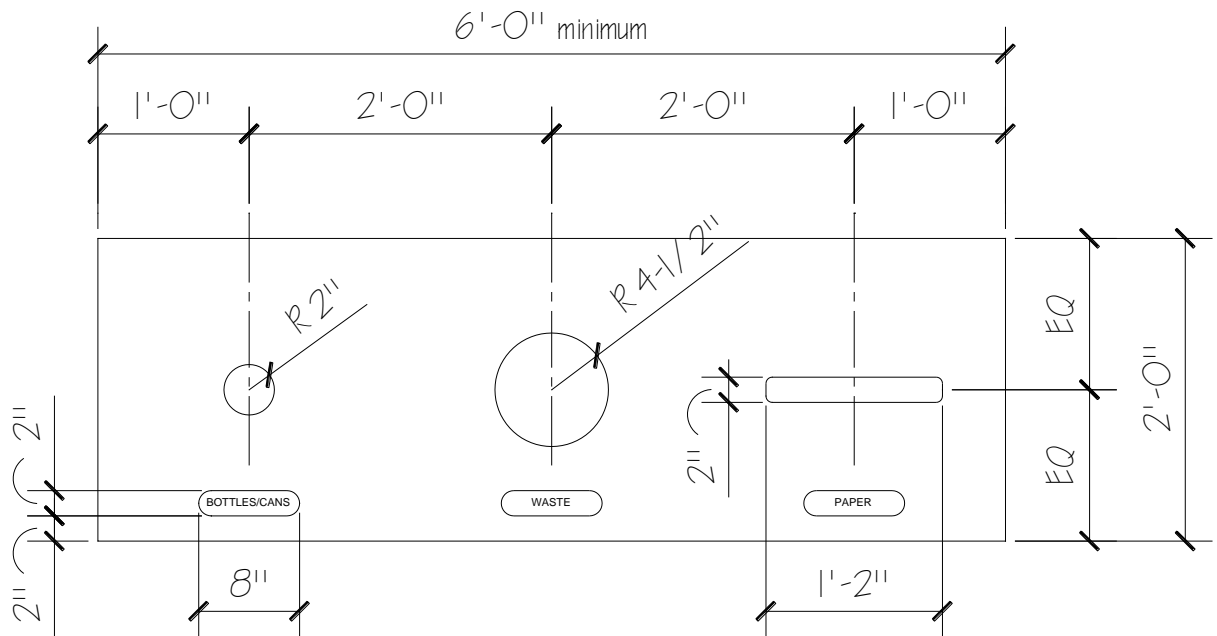
1. General
 - a. See Division 14, Conveying Systems, for additional elevator requirements.

- b. Elevators, whether passenger or freight, shall be finished with highly durable hard surfaces. Carpet shall not be provided in elevator cabs.
 - i. Passenger & Freight Elevator Cab Finishes, Typical
 - a.) Doors: Stainless steel cladding
 - Finish: No. 4, satin, directional polish. Apply directional finishes in long direction of each component.
 - b.) Return panels: Stainless steel cladding; finish: No. 4 satin, directional polish
 - c.) Side and rear panels
 - Patterned stainless steel cladding, Rimex 5-SM or approved equal, with stainless steel trim and reveals
 - d.) Ceiling/Canopy
 - Stainless steel finish, with fluorescent downlights
 - e.) Base: stainless steel; Finish: No. 4, satin, directional polish
 - f.) Flooring:
 - a) Existing Building Renovations: raised rubber flooring (coin or circle top textured rubber)
 - b) New Construction: agglomerate terrazzo tile/hard surface material or raised rubber flooring shall be selected at the discretion of the Designer to complement adjacent lobby flooring and overall lobby design
 - g.) Handrails
 - Stainless steel; round tube 1-1/2 inch diameter, with closed ends
 - Provide for rear and side walls
 - Acceptable product and manufacturer: Equivalent to DH 154 by Otis
 - b.) Provide blanket studs on cab walls and padded blankets for each elevator

Recycling & Waste Station, Built-In

1. General: While GW offers a number of recycling collection variations, a standard built-in recycling & waste station shall be located in each primary lobby on the first floor. They may also be required in additional locations throughout the building, such as primary circulation paths. Consultant to coordinate locations with Owner. At a minimum, stations shall provide the following: paper recycling; bottle and can recycling; waste disposal; and bulletin board space. Depending on the space and occupant load, it may sometimes be appropriate to provide more than one receptacle of one or more types. Optionally, stations may also include campus newspaper stacks and shelves.
2. Primary lobby locations: To maximize recycling potential, when located in a primary lobby, the recycling and waste station shall be easily seen and physically accessed from the entry. It shall be open to the space, with a bulletin board above.
3. Minimum Requirements:
 - a. Station shall be 6'-0" wide, minimum, with a continuous solid surface counter top, backsplash, and sidesplashes and with a base cabinet below. Counter shall be 36" AFF. Station shall be surrounded on sides and back with a gypsum board niche, unless alternate material is approved. Provide a soffit at

- approximately 7'-0" above at station alcove, with two recessed downlights in soffit ceiling to illuminate the recycling/waste area and the bulletin board.
- b. A minimum 48" high, full-width, continuous, self-healing, neutral-colored bulletin board shall be located above the countertop on the back wall. Preference is for product/colors that allow for full width and no seams. If seams are necessary, they shall run vertically and sections should be sized equally. See 10125 Bulletin Boards for additional information.
 - c. Counter shall be approximately 24" deep with 3 labeled apertures for bins below. The apertures shall be centered front to back, and located approximately 24" on center lengthwise, leaving 12" from the center of each end aperture and the adjacent wall. Edges of apertures shall be eased.
 - d. Each aperture shall have a plaque identifying the collection. The plaque for each aperture shall be 8" long x 2" deep with rounded corners. It shall be mounted with 2" clear from the front of the counter top. Plaque shall be aluminum with block capital letters, approximately 5/8" high.
 - e. Facing the station, from the left to right, the apertures shall be:
 - i. left: 2" radius hole with "BOTTLES/CANS" plaque
 - ii. center: 4-1/2" radius hole with "WASTE" plaque
 - iii. right: 14" long x 2" deep slot with rounded corners and "PAPER" plaque
 - f. See 06400 Architectural Woodwork for cabinet construction requirements. Shelves and drawers shall not be provided. Integrated finger pulls shall be provided in the door construction, in lieu of metallic pulls. Additionally, doors and face frame may be wood, rather than laminate, if appropriate for the surrounding space.
 - g. One full-height door per receptor bin shall be provided. All doors shall be equally-sized. Doors shall typically be wood panel with hardwood edges, an exception to the requirements of 06400 Architectural Woodwork. Doors shall have piano hinges.
 - h. Consultant shall be responsible for specifying and designing millwork to accommodate a readily available heavy duty waste/recycling receptacle model to be used under each aperture in the cabinet. The selected receptacle model and cabinet design should work to maximize the station's collection capacity. Design shall allow for unencumbered access to pull receptacle straight out from the front for routine maintenance.
 - i. Owner-recommended bin: 35-gallon Rubbermaid, model 3958.
 - i. Finishes:
 - i. Toekick, ceiling/soffit, wing walls, and the like shall be as required to coordinate with balance of primary adjacent space.
4. Plan View of Counter Top:



Hallways & Corridors

1. General: Buildings will generally require multiple quality grades for the various corridors and hallways within. The consultant shall use best judgment and coordinate with owner to determine what level is required by specific spaces. In order to provide some measure of guidance, the following comments are offered:
 - a. Corridors and/or hallways directly connected to, and associated with, main and elevator lobbies often demand an upgraded finish schedule over that noted below in order to achieve aesthetic continuity with the primary lobby.
 - b. It may be appropriate to provide finishes with diminished quality or lower maintenance requirements in corridors and/or hallways that serve utility and maintenance spaces, than those finishes listed below. Coordination with the Owner should provide clear direction. Examples of resulting finishes may include painted structure for walls and ceilings, or resilient floor instead of terrazzo.
 - c. There will also often be corridors and/or hallways that are “typical” and deserving of a quality level similar to that of the residence hall floors. These spaces should be confirmed with the Owner and then conform to the standards below.

Note: Actual resident floors within residence halls shall be governed by the hallway and corridor standards directly associated with the residential units and found in: *Residence Hall - Apartment* and *Residence Hall - Dormitory*.

 - i. Finishes
 - a.) Walls: painted gypsum board
 - b.) Flooring selection shall generally be carpet, terrazzo or agglomerate tile. Selection shall reflect consideration of traffic loads, maintenance, budget, aesthetics, and acoustical requirements.

- c.) Base with carpet: resilient
- d.) Base with hard surface flooring: same as floor material, 4" high; stained wood base may occasionally be appropriate, as well
- e.) Ceiling: painted gypsum board or acoustical ceiling tile
- ii. Lighting and Controls
 - a.) Recessed or semi-recessed fluorescent fixtures
 - b.) Manual controls for lighting shall not be provided in the hallway/corridor space.

Mail Room

- 1. General
 - a. Residence hall mail rooms shall typically be open to the lobby and, therefore, finished in the same manner. Enclosed mail rooms are also sometimes appropriate.
 - b. Mail room access shall be strictly limited to building residents.
- 2. Mailbox allocation
 - a. Dormitory-style: one mailbox per room
 - b. Apartment-style: one mailbox per student
- 3. Mailbox style and design
 - a. Shall be secured with an integral combination lock
 - b. Finish: silver in color

Laundry Room, Common

- 1. Finishes
 - a. Flooring: resilient tile
 - b. Base: resilient
 - c. Wall finish shall be paint. Material will be according to specific design.
 - d. Ceiling: acoustical ceiling tile
- 2. Lighting and Controls
 - a. Fixtures & Lamps: Ceiling-mounted, 2' x 2' or 2' x 4' lay-in fixtures with T-8 lamps
 - b. Provide ceiling-mounted, dual technology (passive infrared plus ultrasonic) occupancy sensors.
 - c. Manual controls for lighting shall not be provided in the laundry room.
- 3. Door and Door Hardware
 - a. Door: flush wood with vision panel
 - b. Door hardware to include
 - i. storage room lock set
 - ii. stop
 - iii. closer
 - iv. kick plate where appropriate
- 4. General Space Requirements:
 - a. GW's laundry vendor, Caldwell and Gregory, LLC, will provide the laundry equipment layout or the Architect shall propose a layout for review and approval by Caldwell and Gregory, LLC. Refer to 11450 Residential Appliances, for additional information on laundry equipment requirements.

Common laundry room appliances are Owner Provided, Owner Installed, for information only.

- i. The standard ratio for washer and dryers is 1 of each per 32 students.
- b. Provide a floor drain.
- c. In addition to laundry clothes equipment, the following amenities shall be accommodated in the common laundry room, as space allows:
 - i. A utility sink shall be provided.
 - ii. A folding board/table shall be provided by GW's laundry vendor.
 - iii. Trash Container - Rubbermaid 2655 BRUTE Container without Lid, 55 Gallon, Gray; Recycling Container - Rubbermaid Slim Jim Recycling Container RCP 3540-07, Green

Trash and Recycling Room

1. General
 - a. Provide one common trash and recycling room on each residence hall floor, stacked with same on each floor, unless otherwise required. Trash is to be deposited down a trash chute to a common collection point on a lower level or in the basement. Collection point may be simple collection bins or a compactor, which is typically preferred.
 - b. Provide floor space for three or four large wheeled recycling bins, typically approximately 50-gallon capacity each. Refer to Specification Guidelines Section 12460 for additional information.
 - c. It is often preferable to locate the trash chute and recycling room near the housekeeping closet.
 - d. Adjacency to "service" elevator desirable.
 - e. Provide floor drain.
2. Finishes
 - a. Flooring: resilient tile or sealed concrete
 - b. Threshold: marble
 - c. Base: resilient
 - d. Walls: painted concrete block or painted, water-resistant gypsum board
 - e. Ceilings: exposed structure, painted
3. Lighting: strip lighting with T-8 lamps, protected by wire cage
4. Trash chute: See 14560 Chutes for additional information.
5. Door Hardware
 - a. classroom lock set
 - b. stop
 - c. closer with hold-open feature
 - d. kick plate on push side

Housekeeping Closet

1. General
 - a. Provide one housekeeping closet per floor of each residence hall.
 - b. It is often preferable to locate the trash chute and recycling room near the housekeeping closet.
2. Finishes
 - a. Flooring: ceramic tile

- b. Threshold: marble
- c. Walls and base shall be one of the following:
 - i. Painted concrete block walls with 4" (four inch) high ceramic tile base
 - ii. Painted water-resistant gypsum board with ceramic tile to 4' (four feet) above finished floor
- d. Ceilings: exposed structure, painted or unpainted
- 3. Lighting: strip lighting with T-8 lamps, protected by wire cage
- 4. Provide service basin, faucet, and mop hanger. See 15410 Plumbing Fixtures for additional information.
- 5. Door Hardware
 - a. storage room lock set
 - b. stop where appropriate
 - c. closer where appropriate
 - d. kick plate where appropriate

Housekeeping Suite

- 1. General:
 - a. Provide reducer strip at transition between corridor and housekeeping suite.
- 2. Bathroom with lockers
 - a. See "Public Restroom (Single Occupant)" herein
 - b. Provide lockers as required
- 3. Break-out room / Lounge
 - a. See "Break-Out Room, Conference Room, Lounge, Study Room" herein
- 4. Office
 - a. See "Office" herein
- 5. Pantry
 - a. See "Kitchen / Pantry, Common" herein

Restroom, Public (Single Occupant)

- 1. Finishes:
 - a. Flooring: ceramic mosaic tile
 - b. Base: ceramic mosaic tile
 - c. Walls: painted gypsum board
 - d. Thresholds: marble
 - e. Ceiling: painted gypsum board
- 2. Door and Door Hardware
 - a. Door: flush wood
 - b. Door to be self-latching
 - c. Door hardware to include
 - i. Privacy set
 - ii. Stop
- 3. Lighting shall be a combination of the following fixture types as the space demands
 - a. 2' x 2' or 2' x 4' recessed or semi-recessed fluorescent fixtures
 - b. recessed compact fluorescent fixtures
 - c. fluorescent fixture at vanity

4. Plumbing Fixtures: *See 15410 Plumbing Fixtures section for additional requirements on all items.*
 - a. Toilet: tank style or as appropriate
 - b. Lavatory: wall-hung vitreous china
 - c. Lavatory faucet to be touchless and integrate a water-saving auto-sensor.
 - d. Lavatory plumbing pipes shall be insulated to comply with barrier-free requirements. For aesthetics and ease of maintenance, front panel skirting shall not be provided unless specifically required.
5. Contractor-Provided Accessories:
 - a. General: Refer to 10800 Toilet & Bath Accessories for additional information.
 - b. Provide one framed mirror above each lavatory.
 - c. Provide one floor-standing lidded, self-closing stainless steel waste bin, with minimum 13-gallon capacity.
 - d. Provide one stainless steel or cast aluminum coat hook on inside face of entry door.
 - e. Provide hand dryer.
6. Owner-Provided, Contractor-Installed Accessories:
 - a. Refer to 10800 Toilet & Bath Accessories for additional information, including required locations and current models for Owner-Provided, Contractor-Installed Accessories as listed below.
 - i. Soap/foam dispenser
 - ii. Paper towel dispenser
 - iii. Toilet seat cover dispenser
 - iv. Toilet tissue dispenser

Kitchen / Pantry, Common

1. Finishes
 - a. Walls: painted gypsum board
 - b. Flooring: resilient tile
 - c. Toekick at base cabinets: either plastic laminate or resilient
 - d. Base: resilient
 - e. Ceiling: either painted gypsum board or acoustical ceiling tile
 - f. Door and Door Hardware, typical for dedicated common kitchen/pantry spaces. If space is open to other functions, another door style and hardware set may be more appropriate.
 - i. Door: flush wood with vision panel
 - ii. Door hardware to include:
 - a.) Classroom lock set
 - b.) Stop
2. Lighting and Lighting Controls
 - a. General lighting typically to be one of the following
 - i. Ceiling-mounted, 2' x 2' or 2' x 4' recessed or semi-recessed fluorescent fixtures with T-8 lamps.
 - ii. Ceiling-mounted, low profile round fixtures with CFL lamps
 - a.) Model, or approved equal: Vision Lighting Low Profile Round Cloud QR-LR Series with Smooth White Finish; model 1-QR-LR-3-26E-17
 - b. Under-cabinet lighting shall not be provided.
 - c. Occupancy Sensors

- i. An occupancy sensor to control general lighting shall be provided in each closed kitchen. Refer to Division 16 for additional information.
 - ii. Open-space common kitchens, such as those associated with community rooms in residence halls, may have other design requirements and should be evaluated on an individual basis. Where the space can be matched to an appropriate occupancy sensor technology and location, installation is required.
 3. Cabinets shall comply with 06400 Architectural Woodwork.
 4. Counters, backsplashes, and sidesplashes shall be finished with plastic laminate.
 - a. Counters shall have continuously rolled backsplash and counter with integral drip edge at front.
 5. Accessories, Owner-Provided, Contractor-Installed (see 10800 Toilet and Bath Accessories for additional information)
 - a. Provide one each at each sink
 - i. soap/foam dispenser
 - ii. paper towel dispenser
 - iii. recycling bin, Lidded Rubbermaid Commercial Slim Jim 3940 (23-gallon), typical
 - iv. waste bin, Lidded Rubbermaid Commercial Slim Jim 3940 (23-gallon), typical
 6. Sink to be stainless steel with chrome plated, lever style faucet and waste disposal complying with 15410 Plumbing Fixtures.
 7. Appliances to be provided
 - a. refrigerator
 - i. Size shall be dependent on the number of occupants sharing it.
 - a.) small-size: up to 10 occupants
 - b.) mid-size: 11 or more occupants
 - b. range (provide in Kitchen; do not provide in Pantry)
 - c. exhaust hood (provide in Kitchen; do not provide in Pantry)
 - d. microwave
 - e. Refer to 11450 Residential Appliances for additional information.

Office

1. Finishes
 - a. Walls: painted gypsum board
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling: acoustical ceiling tile
2. Door and Door Hardware
 - a. Door
 - i. Doors: flush wood with a vision panel
 - ii. Vision panel
 - a.) General: Vision panel is required in office doors to provide visibility and security for occupants within, balanced with privacy for assigned faculty or staff.
 - b.) Glass shall be 50% obscured by fritting or sandblasting.
 - b. Door hardware to include:
 - i. Office lock set

- ii. Stop
- 3. Provide a satin finish cast brass or stainless steel hat and coat hook at 6'-0" AFF on the back of the door, unless lower height is required for barrier-free office.
 - a. Model, or approved equal:
 - i. Rockwood 806
- 4. Lighting and Controls
 - a. General Lighting: 2' x 2' or 2' x 4', lay-in fluorescent fixtures
 - b. Light control to be 4'-0" AFF and by entry.
- 5. Thermostat to be 4'-0" AFF, by the entry and co-located with lighting control.
- 6. Furniture & Specialties: Owner-provided and installed
- 7. Owner-Provided Furniture & Furnishings (for design information only)
 - a. Office furniture, such as desk and bookcases, as required
 - b. Waste bin, Rubbermaid Commercial 2956 (28-quart), typical
 - c. Recycling bin, Rubbermaid Commercial 2955 (13-quart), typical

Break-Out Room, Conference Room, Lounge, Study Room

- 1. Finishes
 - a. Walls: painted gypsum board
 - b. Flooring: carpet
 - c. Base: resilient
 - d. Ceiling: painted gypsum board or acoustical ceiling tile
- 2. Lighting
 - a. General Lighting: ceiling-mounted, recessed or semi-recessed fluorescent fixtures. Lighting may be direct or direct/indirect, as appropriate.
 - b. Accent lighting by recessed compact fluorescent fixtures in gypsum board or acoustical ceiling tile ceiling may also be appropriate in certain applications.
- 3. Door and Door Hardware
 - a. Door to be one of the following, typical
 - i. Flush wood with 50% obscured vision panel
 - ii. Door within interior glazing system
 - b. Door hardware to include:
 - i. Classroom lock set
 - ii. Stop

Electrical, Security, Telecommunications Closet

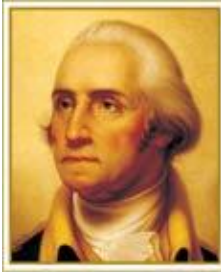
- 1. Finishes
 - a. Flooring: resilient
 - b. Base: resilient
 - c. Walls: painted CMU or GWB
 - d. Ceilings: exposed structure, unpainted
- 2. Electrical and Telecommunications Closets Only
 - a. Flooring: resilient, white
 - b. Walls: On gypsum board partition, add fire-resistant plywood, painted white, 8' high
- 3. Lighting: strip lighting with T-8 lamps, protected by wire cage
- 4. Door Hardware
 - a. storage room lock set

- b. stop where appropriate
- 5. Telecommunications Room Only
 - a. Provide minimum one per floor, stacked.
 - b. Obtain the most current issue of GW ISS "Bluebook" Manual for specific requirements.
 - c. Telephone, data, and CATV distribution hub for floor.
- 6. Electrical Closet Only
 - a. Provide minimum one per floor, stacked.
 - b. Security conduit riser can run through closet.
 - c. May be a shallow closet opening to corridor with double doors.

Mechanical Room

- 1. Finishes
 - a. Flooring: sealed concrete
 - b. Walls: painted CMU
 - c. Ceilings: exposed structure, unpainted
- 2. Lighting: strip lighting with T-8 lamps, protected by wire cage
- 3. Door Hardware
 - a. storage room lock set
 - b. stop
 - c. closer
 - d. kick plate where appropriate for layout

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

This document provides design standards only, and is not intended for use, in whole or in part, as a specification. Consultants referencing this information must always meet all applicable state and local building codes as well as all barrier free design requirements. Consultants must also refer to the entire set of Design Standards for additional information. Refer questions and comments regarding the content and use of this document to the George Washington University Project Manager.

BUILDING TYPE DESIGN STANDARDS PARKING STRUCTURES

A. SUMMARY

This section contains design standards for parking structures. Refer to related divisions and sections for additional information.

B. GENERAL

Parking structures will typically be below-grade concrete structures with occupied campus facilities above grade. Parking attendants, where required, generally use that building's facilities such as restrooms and water fountains, rather than providing dedicated services in the parking area. When this is not the case, refer to the relevant building type standard (such as residence hall or academic building) for restroom guidelines, offices, or other space types.

Vehicular entrances shall typically be configured in the following order: card swipe or transponder; overhead door; gate arm. In the event configuration will not allow for this order, gate arm may precede overhead door.

Parking facilities may be either permit-only or mixed-use (permit and visitor) parking. Facility equipment provided depends, in part, on the user/payment options available. Currently, the following are payment options:

1. Permit (or Contract) Parking
 - a. Card Swipe
 - i. GWorld debit card
 - ii. Other permit card
 - b. Credit card
 - c. Windshield-mounted Transponder
2. Visitor (or Public) Parking
 - a. Cash
 - b. Check
 - c. GWorld debit card
 - d. Validation
 - e. Credit card

A. STANDARDS HEREIN

1. Features which are typical of most parking structures are discussed herein. These include:

- Owner-Provided Parking Equipment
- Owner-Provided Security Equipment
- Personal Security
- Physical Space
- Property Protection Components
- Property Protection
- Doors and Door Hardware
- Overhead Doors
- Concrete Protection
- Coatings and Sealants
- Parking Space Designations
- Painting
- Signage
- Freeze Protection and Air Quality
- Fire Protection
- Water Supply and Stormwater Control
- Power Supply
- Lighting

B. OWNER-PROVIDED PARKING EQUIPMENT

1. Parking equipment is installed by Owner's independent contractor but information is included herein to assist the designer in related layout and utility requirements. Whitaker Parking Systems of Rockville, MD is the contractor and they also represent Amano McGann equipment noted below.
2. Parking access, revenue controls, and software shall be manufactured by Amano McGann unless otherwise noted or required by Owner. Models or current update shall be as follows:
 - a. Ticket Dispenser (for use in all but permit-only facilities):
 - b. Parking Gate with standard or folding gate arm as required (for use in all entrances)
 - c. Card Readers (for use in all facilities)
 - d. Transponder and reader (for permit-only facilities that lack the space required for a card reader, which is preferred):
SIRIT IDentity FleX system
 - e. Proximity Reader
 - f. Attendant Booth (for all but permit-only facilities)
 - i. Attendant booths are not typically provided at permit-only facilities, but they are always provided at mixed-use facilities.
 - ii. Attendant booths shall
 - a.) provide work space for one person and freedom to move and face any direction within that space

- b.) be accessed through a door located *other* than on customer side of booth to ensure safe attendant exit
 - c.) be prefabricated unless otherwise approved
 - d.) be primarily constructed of metal, with a 360 degree view through transparent glass from both a seated and standing position within
 - e.) include durable metal flooring
 - f.) be heated and air conditioned by a ceiling-mounted unit
 - g.) include security camera(s) and panic button(s) as required by The George Washington University CFT Standards
 - h.) contain a fee computer, validator, and remote fee indicator
 - i.) contain network connections for features including card reader, space count and phone
- g. Fee Computer and Validator (for use in all but permit-only facilities):
 - i. Fee Computer
 - ii. Automatic Mag-stripe ticket reader/validator
 - h. Remote Fee Indicator (for use in all but permit-only facilities). Unit to be located at attendant booth, displaying change owed, fee, and time to customer.
 - i. Lane availability indicator at multi-lane exits (red/green light, mounted on attendant booth, typical)

C. OWNER-PROVIDED SECURITY EQUIPMENT

- 1. Provide security cameras and panic alarms, conforming to The George Washington University's *CFT Security and Access Standards*.

D. PERSONAL SECURITY

- 1. Design shall not create hiding places within the parking structure.
- 2. Ground level pedestrian access should be restricted to designated entry points by well-placed walls, guardrails, or similar.
- 3. Designers shall carefully consider the function and necessary security measures for any attached structures and plan discharge from parking structure via vertical circulation accordingly. For example, elevators and stairs would typically need to discharge into public lobbies or the exterior, and never directly into secure building functions such as residence hall living floors.

E. PHYSICAL SPACE

- 1. When located where space above slab is heated, all overhead features, including piping, should be at least 6" below the ceiling to allow for insulating work where required. Ceiling deck shall be insulated with 4", minimum, of glass fiber semi-rigid board with reinforced white facing complying with ASTM C612.
 - a. Acceptable products and manufacturers, or equal:
 - i. Commercial Board Insulation CB300 ASJ by CertainTeed
 - ii. Insul-SHIELD 300 PSK by Johns Mansville
 - iii. 703 ASJ-Faced by Owens Corning
- 2. Clearance
 - a. First level to be 8'-2" clear from floor to lowest hanging elements, typical.

- b. Other levels to be 7'-0" minimum clear per code
3. Rooms and cages located in the parking area, such as utility or electrical rooms and bike storage cages, with the exception of fuel rooms:
 - a. Shall be on 6" high raised slab.
 - b. Any sensitive equipment, such as electrical equipment, shall be located on an additional 6" slab within the space. Provide ramp up to space from parking deck floor outside entrance.
 - c. Design area surrounding space entrances to ensure adequate access and maneuverability necessary for the space, without hindrance from parked cars.
4. Bike storage cages shall typically be corrosion-resistant chain link fence framed in rigid panel sections and a minimum of 10'-0" high. Cages to be secured and access restricted to building occupants unless otherwise required.
5. Fuel rooms located in the parking area shall be at same finish floor level as adjacent parking area, but surrounded by a continuous 12" high, 12" wide curb designed to contain any leaked fuel.
6. Provide 14" high continuous curb, minimum 12" wide, on both sides of ramp at parking structure entrance/exit.
7. Concrete entry/exit ramp:
 - a. Entry/exit ramps with slopes greater than 12%, or otherwise designated steep slopes, and other areas vulnerable to freezing, shall implement ice control measures that have minimal physical effects on the concrete. Measures shall include providing linear drain troughs at the top and bottom of the ramp and providing inslab radiant heating at the entry/exit ramp.

F. PROPERTY PROTECTION COMPONENTS

1. Bollards, typical:
 - a. 6" diameter steel, concrete-filled
 - b. top of bollard typically 42", minimum, above driving surface, but height is ultimately dependent on property being protected
 - c. design to resist failure upon design vehicle impact
 - d. paint traffic yellow
2. Steel corner angles
 - a. Embed (cast in place) in concrete
 - b. 2-1/2" steel angle, typical
 - c. minimum 24" long, typical
 - d. locate to best protect against design vehicle bumper height
3. Concrete islands and curbs
 - a. 8" - 12" high, typical, unless otherwise noted
 - b. top edge painted traffic yellow a minimum of 4" wide and entire face painted traffic yellow
4. Clearance bars
 - a. 6" diameter, typical
 - b. to extend at least 75% of the full width of the relevant space
 - c. suspended from ceiling, typical
5. Steel pipe guards
 - a. 24" high, minimum
 - b. paint yellow

G. PROPERTY PROTECTION

1. All parking equipment, including attendant booths, ticket dispensers, gates, and card readers, shall be located on concrete islands and further protected by bollards. Designers to consider traffic moving in both directions when locating protective elements.
2. Provide bollards to protect the following:
 - a. CMU wall corners
 - b. Any columns angled inwards, towards the driving aisle
 - c. Overhead rolling door frames
3. Provide bollards or steel corner angles to protect, at a minimum, the following:
 - a. Critical column corners, including those exposed at turns within the parking area
 - b. Building equipment such as low supply/exhaust fans
 - c. Walls and columns at the bottom of entry ramp to protect against runaway vehicles. Provide bollards at a minimum and additional steel corner angles as may be appropriate.
4. Provide clearance bars:
 - a. as necessary to protect property
 - b. to alert drivers of reduced clearance in a portion of an overall zone designated at a higher clearance. For example, if there is a parking space with 6'-4" clearance within a 6'-8" zone, that space will require a clearance bar.
5. Provide concrete wheel stops only as necessary to protect property.
6. Fuel piping
 - a. Provide protection from impact with 2-1/2", minimum, steel angle bracing or similar, vertical and horizontal runs. Confirm adequacy of protection with FM Global.
7. Provide steel pipe guards at all exposed vertical pipe locations

H. DOORS AND DOOR HARDWARE

1. Doors, frames, and hardware: unless otherwise noted, required by fire ratings, accessibility requirements, or other code reasons:
 - a. Doors: hollow metal
 - b. Nominal Dimensions
 - i. 36" wide, 7'-0" high, and 1-3/4" thick, typical
 - c. Frames: steel
 - d. Door hardware shall comply with
 - i. "The George Washington University Door Hardware Specification Guide"
 - ii. GW "CFT Security & Access Standards"
 - e. See design standards as well as door and door hardware sections for additional information.

I. OVERHEAD DOORS

1. Overhead door shall be constructed of lightweight metal to minimize wear on the mechanics of the system.
2. Features

- a. Doors for Contract/Permit-Only Parking
 - i. Provide high speed operation to accommodate the need for open/close cycles with every vehicle
 - ii. Provide adjustable timer for overhead door closure after vehicle passes through.
- b. Doors for Visitor Parking
 - i. High speed operation is not required as the cost premium is generally not justifiable, as the doors to these facilities remain open throughout the day.
 - ii. Provide manual open/close switch
 - iii. Provide keyed power on/off switch on inside and outside of door, located beside the door.
- c. Doors for Loading Docks
 - i. When located adjacent to other door(s), aesthetic shall match. High speed operation is not necessary on loading dock doors.
- 3. Door selection should reflect consideration of potential downtime related to maintenance and repair of damaged doors.
- 4. Provide doors by the following or approved equal:
 - a. Rapid Roll 3000 by Albany Door Systems
 - b. Overhead Door Corporation
 - c. Where specific model information is provided, Architect shall specify the most current model to ensure that the latest technology will be in place at the time of project completion.

J. CONCRETE PROTECTION

- 1. Concrete entry/exit ramp
 - a. Treat driving surface with continuous silane coating or waterproof membrane and treat adjacent curbs the same, 6"-8" up, on sides exposed to traffic.
 - i. Recommended application
 - a.) New construction: silane coating
 - b.) Renovation: treatment is dependent on slab condition and test results. When slab is in good condition, silane may be appropriate. When condition is further deteriorated, waterproof membrane, may be required.
 - c.) Waterproof Membrane
 - a) Resistant to Vehicular Traffic
 - i) Primer: Waterproofing manufacturer's solventless primer, for concrete
 - ii) Elastomeric Coating: Solvent-free, 100% solids, polyurethane for liquid application
 - iii) Aggregate: Uniformly graded, washed silica sand of particles sizes, shape, and minimum hardness recommended in writing by traffic coating manufacturer
 - iv) Acceptable Product and Manufacturer, or equal:
 - a. Autogard, with 7430 Urethane II HB by Neogard
 - b) Resistant to Pedestrian Traffic
 - i) Primer: Waterproofing manufacturer's solventless primer, for concrete

- ii) Elastomeric Coating: Solvent-free, 100% solids, polyurethane for liquid application
 - iii) Aggregate: Uniformly graded, washed silica sand of particles sizes, shape, and minimum hardness recommended in writing by traffic coating manufacturer
 - iv) Acceptable Product and Manufacturer, or equal:
 - a. Pedagard M with FC7510/FC7961 Series Topcoat by Neogard
 - c) Equivalent products and manufacturers, subject to compliance with requirements:
 - i) General Polymers Corp.
 - ii) Tremco.
 - iii) Watson Bowman
- 2. Concrete driving surfaces throughout the parking structure
 - a. Treat with corrosion inhibitor as follows or approved equal:
 - i. DCI Corrosion inhibitor ASTM C494 Type C by Grace Concrete Products
 - b. Provide epoxy-coated rebar and wire mesh exclusively

K. COATINGS AND SEALANTS

- 1. Joint Sealants:
 - a. Vertical surfaces:
 - i. non-sag, 2-part, polyurethane sealant
 - ii. acceptable product or equal: Sonneborn NP2 sealant with Sonolastic Primer 733 by Sonneborn
Note: product may also be used for horizontal surfaces.
Note: ready-mixed 1-part sealant, such as Sonneborn NP1, may be appropriate for use in minor repair work.
 - iii. Color: to match adjacent material/finish
 - b. Horizontal Surfaces:
 - i. self leveling, 2-part, polyurethane sealant
 - ii. acceptable product or equal: Sonneborn SL 2 with Sonolastic Primer 733 by Sonneborn
Note: ready-mixed 1-part sealant, such as Sonneborn SL 1, may be appropriate for minor repair work.
 - iii. Color to match adjacent material/finish

L. PARKING SPACE DESIGNATIONS

- 1. Parking structures will typically have a variety of parking space types called out. The following will typically be used. Except as noted below, wall signage at each space, indicating the designation is adequate.
 - a. "VAN ONLY" (tall, high, wide)
 - b. "ADA" – provide stencil in space in addition to signage on wall in front of space
 - c. "ADA VAN"
 - d. "COMPACT"
 - e. "L.E.V/F.E.V." (low emission vehicle/fuel efficient) – provide stencil in space in addition to signage on wall in front of space

- f. "E" (electric vehicle/hybrid)

M. PAINTING

- 1. Traffic Markings and Parking Spaces
 - a. Reflective paint is not required.
 - b. Paint shall be compatible with traffic coating.
 - c. Paint all markings with straight, sharply defined, parallel edges.
 - d. Stripes: 4" wide, typical
 - e. Typical paint, color, and use as follows:
 - i. White Striping Paint: striping, hatching, and stenciling, unless otherwise required or noted
 - ii. Yellow Striping Paint: curbs
 - iii. Handicap Blue Paint (typically tinted White Striping Paint): accessibility symbol and striping in handicap space
 - iv. Black: parking space number on wall
 - v. White: parking space number in space where there is no wall space
 - f. Stencil parking space number on each parking space when Project requires as follows:
 - i. Color: white
 - ii. Number size: 8" high
 - iii. Center number near approach end of space
 - iv. Number spaces as per Architectural Drawings.
 - g. Stencil parking space number on wall at each parking space when Project requires as follows:
 - i. Color: black
 - ii. Number size: 6" high
 - iii. Center number 48" AFF to the top of each number at each space. Where wall is less than 54" high, locate top of number 6" below top of wall.
 - iv. Number spaces as per Architectural Drawings.
 - h. Stencil special parking designations, other than standard spaces, as indicated on the drawings and in accordance with requirements of authorities having jurisdiction.
 - i. Text example is are the following:
 - a.) "COMPACT CARS ONLY"
 - ii. Color: white
 - iii. Font size: 6" high, typical
- 2. Striping Paint:
 - a. Low VOC Acrylic
 - b. Acceptable product or equal: Setfast Low VOC Acrylic Traffic Marking Paint by Sherwin Williams
 - c. Color: white, yellow, blue, or as required
 - d. Locations: all painting on driving surface and curbs, and as additionally required
- 3. Other acceptable paint types:
 - a. Types:
 - i. Alkyd resin, factory-mixed, quick drying and nonbleeding; comply with AASHTO M248, Type N
 - ii. Acetone Traffic Paint

4. Paint for all non-driving surfaces including ceilings, soffits, columns, and walls:
 - a. Generic Type: Acrylic Emulsion
 - b. Acceptable product and manufacturer or equal: Tnemec Series 180 (flat, smooth texture) by Tnemec
 - c. Color: white (if using Tnemec Series 180, color: Crete)
5. Columns
 - a. Select columns shall provide parking level information on all four sides for customer orientation. *Varying colors* noted below are required for Visitor Parking facilities, but optional for Permit-only Parking facilities. The actual information is required in all cases. Columns requiring the following treatment to be indicated on drawings.
 - i. Where information on column is limited to parking level identification:
 - a.) Paint 5'-0" band around top of each column indicated. Treatment is required in Visitor Parking facilities and optional for Permit-only Parking. See below for color.
 - b.) Stencil parking level ("P1" for example) in 24" high lettering, centered in 5'-0" high color band noted above in Visitor Parking facilities. While color band is not required for Permit-only Parking, the stenciled parking level is required and should be located similar to columns with color bands. Top of stencil shall be at least 6'-0" AFF if ceiling height allows. See below for color.
 - ii. Where parking level and *additional* information is to be provided on column:
 - a.) Stencil parking level ("P1" for example) in 18" high lettering. Below, stencil additional information ("EAST" for example) in 6" high lettering, typical, and centered in a 1'-0" high color band.
Note: color band is not required for Permit-only Parking.
 - iii. Colors: Column color band, where provided, to be unique to each parking level. Stenciled parking level color shall be legible with good contrast against color band. Stencil colors may also vary between floors. The first choices for color bands should be GW Blue and GW Buff. If there are more than two floors, additional colors should be used.

N. SIGNAGE

1. Designer must coordinate signage requirements with Owner-provided signage standards and locations.
2. Owner-provided signage:
 - a. Exterior facility name with parking type (contract only or visitor parking) indicator signs.
 - b. Room signs
 - c. All other signage to be included in contract, including, but not limited to: clearance bars, parking space signs, directional signs, and entry/exit signs.
3. See 10431 Signage for additional information.

O. FREEZE PROTECTION AND AIR QUALITY

1. Parking structures shall not be heated with the exception of the underside of slabs adjacent to occupied space which should be heated. Parking structures should not have ceilings with heated plenums. Experience with heated plenums on campus has repeatedly resulted in unsatisfactory results such as ceilings getting wet and stained; and ceiling portions being removed and not replaced when plenum access is needed.
2. Carbon Monoxide Monitoring and Action
 - a. Provide carbon monoxide monitors, spaced as per manufacturer's recommendations for space, and installed by the building controls contractor. Monitors to operate under a dual set point system. Carbon monoxide (CO) thresholds - concentration of CO measured in ppm (parts per million) - for activating and deactivating the ventilation system, shall meet code.
 - i. Low levels of carbon monoxide shall trigger supply and exhaust fans to improve air on that parking level.
 - ii. High levels of carbon monoxide shall sound an alarm.
3. Supply fans
 - a. typically propeller style that move a high volume of air at low pressure drop
4. Circulating fans
 - a. Provide small circulating fans to prevent areas of stagnant air as required. A typical approach may be as follows:
 - i. Run one third of the fans during low/no-use night hours.
 - ii. Run all fans during the lunch hour and morning and evening rush hours.
 - iii. Run two thirds of the fans during all other times.

P. FIRE PROTECTION

1. Sprinkler systems to be dry pipe as parking garages are not to be heated unless otherwise noted.
2. Pipes to be galvanized steel, typical.

Q. WATER SUPPLY AND STORMWATER CONTROL

1. Provide full length trench drains in the following locations:
 - a. outside overhead door
 - b. inside overhead door
 - c. at bottom of entrance ramp
2. Hose Bibs and Wall Hydrants (for maintenance)
 - a. Provide one every 150' of drive aisle distance (measured at the center of the drive aisle) starting within 75' of the garage door. This layout will comfortably accommodate a 100' hose.
 - b. Locate in non-traffic area.
 - c. Freeze proof, 3/4" wall hydrant with 1/2" diameter insulated copper pipe supply and vacuum breaker. Provide with loose key stop.
3. Condensate pipe
 - a. Where condensate pipe has a break in a vertical run, provide collar in lower section to ensure continuous collection and drainage.

R. POWER SUPPLY

1. GFI duplex receptacles
 - a. Provide one every 150' of drive aisle distance (measured at the center of the drive aisle) starting within 75' of the garage door. This spacing is the same as for hose bibs, though they need not be co-located.
 - b. Mount 24" AFF.
 - c. Provide each receptacle with a weatherproof cover that maintains rating with cord plugged into receptacle.
2. Electric Vehicle Charging Stations
 - a. Provide electric vehicle charging stations; minimum number required to meet LEED requirement.

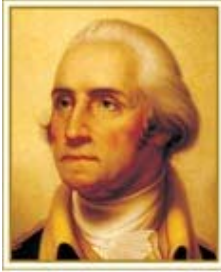
S. ELECTRICAL WIRING

1. Conduit
 - a. Conduit shall be exposed. Concealing conduit in slabs is not acceptable due to the potential for leaks.

T. LIGHTING

1. Lighting to operate at 100%, twenty-four hours per day.
2. Refer to 16500 Lighting for additional information, including recommended light levels, specific lamps, and fixtures to use.
 - a. Light levels shall comply with IESNA G-1-03 Guideline on Security Lighting for People, Property and Public Spaces publication. Lighting levels of 5 footcandles shall be provided in gathering areas such as stairs, elevators and ramps while 6 footcandles shall be provided on pavement.
 - b. Light energy usage shall comply with ASHRAE/IESNA 90.1 energy standards.

END OF SECTION



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01781

CONTRACTOR AS-BUILT DOCUMENTS

A. SUMMARY

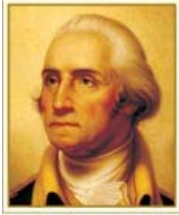
This section contains general design standards for Contractor project documents, including Contractor As-Built Documents. Refer to "PIRC Archiving Requirements" for definitions as well as additional and related information.

B. STANDARDS

1. Maintenance
 - a. Maintain at the jobsite one copy of all drawings, specifications, addenda, approved shop drawings, change orders, field orders, other contract modifications, and other approved documents submitted by the Contractor in compliance with various sections of the specifications.
 - b. Store Contractor As-Built Documents in suitable files and/or racks in the field office, apart from all other documents used for construction.
 - c. Maintain the Contractor As-Built Documents in a clean, dry, legible condition. Do not use for construction purposes. The documents shall be available at all times for inspection by the Architect.
2. Recording
 - a. During construction keep an accurate record of all deviations in the work between that shown on the drawings and its actual installation. These records shall include, but not be limited to, all Modifications and items noted below.
 - i. Record on a set of black line drawings all changes made and the location of all mechanical equipment, piping, wiring and ductwork as it is installed.
 - ii. Marking devices: Use a red pencil for all graphic work and red ink for all written work.
 - iii. Clearly mark each document in 2-inch high red ink letters with the legend "CONTRACTOR AS-BUILT DOCUMENTS."
 - iv. Keep all documents current at all times as the work progresses and changes occur.
 - v. Do not permanently conceal any work until all of the required information has been recorded.
 - b. Legibly mark the Contractor As-Built Documents to record actual construction features including the following:
 - i. The horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.

- ii. The location of all internal utilities and appurtenances concealed in construction and referenced to visible and accessible features of structure.
- iii. All field changes of dimension or detail.
- iv. Changes made by Change Order.
- v. Details not included in the Issued for Construction Documents.
- vi. Upon completion of the work, transfer all information recorded during the progress of the work to a set of drawings furnished by the Owner for this purpose. Label these drawings "CONTRACTOR AS-BUILT DRAWINGS."
- c. Specifications and addenda: Legibly mark each specification section and addenda to record the following data:
 - i. The name of the manufacturer, the trade name and catalog number or other identifying notation, and the name of the supplier of each product and item of equipment actually installed.
 - ii. All Modifications to the Issued for Construction Documents.
- d. Shop drawings and product data: Maintain as record documents one copy of each approved shop drawing or product data sheet, legibly noted to record changes made after shop drawing review.

END OF SECTION



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01782

OPERATION AND MAINTENANCE DATA

A. SUMMARY

This section contains standards for Operation and Maintenance Data to assist the continued instruction of operating and maintenance personnel and to provide a source of information regarding the products incorporated in the project.

B. GENERAL

1. 12/16/08 conversation with Harold... he specifically mentioned the following needs for O&Ms to cover – including cut sheets and such:
 - a. generator
 - b. boiler
 - c. chiller
 - d. large exhaust fans
 - e. fire alarm – details – panel specs – cut sheets
 - f. paint – ACTUAL base paint used (like if BM was spec'd but they matched something else) – color, sheen, etc
2. Operation and Maintenance Data manuals shall be issued prior to training which shall be scheduled to occur prior to building occupancy.
3. For requirements relating to delivery time, copies, and submittal format of O&M GW, refer to Design Standards Supporting Documents - Property Information Resource Center (PIRC).

C. SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

The type of O&M data needed for any product, system, or piece of equipment depends upon the complexity of that item. For example, architectural items such as acoustic ceiling panels, ceramic tiles, or a carpeting system, with simple and specific requirements, would require a simpler O&M data package whereas a complex piece of mechanical equipment with an extensive sequence of operation would require a more detailed and extensive O&M data package.

The following data shall be provided as the product, system, or equipment warrants:

1. Operating Instructions
2. Safety Precautions
3. Operator Prestart
4. Startup, Shutdown, and Post-Shutdown Procedures

Comment [nra1]: This section needs to be reviewed with FS

Check against Potomac House and/or Square 80 O&M manuals

5. Normal Operations
6. Emergency Operations
7. Operator Service Requirements
8. Environmental Conditions
9. Preventive Maintenance
10. Lubrication Data
11. Preventive Maintenance Plan and Schedule
12. Cleaning Recommendations
13. Corrective Maintenance (Repair)
14. Troubleshooting Guides and Diagnostic Techniques
15. Wiring Diagrams and Control Diagrams
16. Maintenance and Repair Procedures
17. Removal and Replacement Instructions
18. Spare Parts and Supply Lists
19. Product Submittal Data
20. Manufacturer's Instructions
21. O&M Submittal Data
22. Parts Identification
23. Warranty Information
24. Personnel Training Requirements
25. Testing Equipment and Special Tool Information
26. Testing and Performance Data
27. Contractor Information

D. EQUIPMENT CONTROLS O&M DATA PACKAGES

1. Include the following data:
 - a. Narrative description on how to perform and apply all functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.
 - b. Full as-built sequence of operations.
 - c. Copies of all checkout tests and calibrations performed by the Contractor (not Cx tests).
 - d. Full points list. A listing of rooms shall be provided with the following information for each room:
 - i. Floor
 - ii. Room number
 - iii. Room name
 - iv. Air handler unit ID
 - v. Reference drawing number
 - vi. Air terminal unit tag ID
 - vii. Heating and/or cooling valve tag ID
 - e. Full size print out of all schedules and set points after testing and acceptance of the system.
 - f. Full size as-built print out of software program.
 - g. Electronic copy on disk or CD of the entire program for this facility.
 - h. Marking of all system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

E. SUBMISSION OF OPERATION AND MAINTENANCE DATA PACKAGES

1. Package Quality
2. Package Content, Each Volume
3. Changes to Submittals

Comment [NA2]: Move to General section?

**F. REVIEW AND APPROVAL
THIRD PARTY COMMISSIONING**

1. A third party Commissioning Authority (CxA) shall review all commissioned systems and O&M documentation including equipment submittals. The CxA shall also be involved in reviewing the operation of the building with operations and maintenance (O&M) staff and occupants.
2. The CxA shall verify that all systems and equipment meet the requirements on the Contract documents and design intent within the parameters of energy and water performance, sustainability, cost, maintainability, indoor environmental quality, and local environmental impact.
3. The CxA shall recommend strategies for improvement and correction, where system deficiencies are found.
4. The work of the CxA will be performed in addition to normal review process for O&M data.
5. An independent, third-party CxA review of contractor submittals for commissioned systems and equipment, as generally described above, contributes to LEED Credit 3: Enhanced Commissioning.
6. Refer to GW Design Standards, Supporting Documents, Section D. LEED Guidelines and section E. Third Party Commissioning Requirements for additional information on Fundamental and Enhanced Commissioning requirements for the project.

G. OPERATION AND MAINTENANCE DATA CONTENTS, EACH VOLUME

1. Provide a table of contents with title of project; names, addresses, and telephone numbers of Architect, Sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
2. For each product or system, list names, address and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
3. Product data cut sheets shall clearly identify specific products and component parts, and data applicable to installation.
4. Drawings to supplement product data shall illustrate relationships between component parts of equipment and systems, and show control and flow diagrams.
5. Project record documents shall not be used as maintenance drawings.
6. Text shall provide logical sequence of instructions for each procedure and incorporate manufacturer's written instructions as specified.
7. Warranties shall be included.
8. Bonds shall be included.

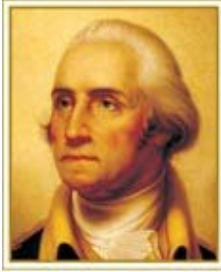
H. MANUAL FOR MATERIALS AND FINISHES

1. Building products, applied materials, and finishes include product data, with catalog number, size, composition, and color and texture designations.
2. Provide information for reordering custom manufactured products.
3. Instructions for care and maintenance include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
4. Moisture protection and weather-exposed products include product data listing applicable reference standards, chemical composition, and details of installation.
5. Provide recommendations for inspections, maintenance, and repair.
6. Additional requirements as specified in individual product specification sections.
7. Provide a listing in table of contents for design data, with tabbed flysheet and space for insertion of data.

I. MANUAL FOR EQUIPMENT AND SYSTEMS

1. For each item of equipment and each system include description of unit or system, and component parts identifying function, normal operating characteristics, and limiting conditions.
2. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
3. Panelboards circuit directories provide electrical service characteristics, controls and communications by label machine.
 - a. Include color-coded wiring diagrams as installed.
4. Operating procedures include:
 - a. Startup, break-in, and routine normal operating instructions and sequences.
 - b. Regulation, control, stopping, shut-down, and emergency instructions.
 - c. Summer, winter, and any special operating instructions.
5. Maintenance Requirements include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
6. Provide servicing and lubrication schedule, and list of lubricants required.
7. Include manufacturer's printed operation and maintenance instructions.
8. Include sequence of operation by controls manufacturer.
9. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
10. Provide control diagrams by controls manufacturer as installed.
11. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.
12. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
13. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
14. Additional Requirements as specified in individual product specification sections.
15. Provide a listing in table of contents for design data, with tabbed dividers and space for insertion

END OF SECTION



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02780 UNIT PAVERS

A. SUMMARY

This section contains general standards for paver units.

1. Reference Standards:
 - a. Comply with applicable provisions of the District of Columbia Department of Transportation (DDOT) "Standard Specifications for Highways and Structures", 2009.
 - b. Comply with applicable provisions of The Brick Industry Association Technical Notes on Brick Construction 14, "Paving Systems Using Clay Pavers" and 14A "Paving Systems Using Clay Pavers on a Sand Setting Bed".

B. GENERAL

1. Setting bed, base and subbase design for pavers shall comply with reference standards.
2. Paved areas shall comply with the applicable campus master plan. Paved areas at the Foggy Bottom Campus shall comply with the Foggy Bottom Campus Streetscape Plan.
3. Wherever possible, Architect shall select pavers with a Solar Reflective Index (SRI) greater than 29, per LEED Sustainable Sites Credit 7.1, as a strategy to reduce urban heat island effect.
4. For sidewalk repair in renovation projects, available and suitable old pavers shall be used in addition to any new pavers required to complete the work.

C. PRODUCTS

1. Granite Stair Pavers
 - a. Approved Product and Manufacturer, or approved equal:
 - i. Academy Black by Cold Spring Granite, Cold Spring, MN; flame finish
 - b. Finish: Thermal finish, uniform throughout, with no evidence of lines or swirl.
 - c. For granite subject to foot traffic, provide minimum abrasion resistance of 12.0.
 - d. Abrasive strips:
 - i. Saw cut parallel grooves in stone for stone steps, to provide multiple abrasive strip configurations as indicated on Drawings.

- ii. Set strips in grooves with epoxy adhesive, to finish just above adjoining stone surface.
- e. Sizes: Dimensions, thickness and configurations shall be indicated on Drawings
- f. Installation: cement mortar setting bed with grouted joints at entrance steps
- 2. Precast Concrete Pavers
 - a. General: Solid paving units made from normal-weight aggregates. Precast concrete pavers shall be installed in patterns and sizes as shown on the Drawings.
 - i. Provide units complying with ASTM C936, with average compressive strength of 8500 psi, and absorption less than 5% with no unit greater than 7% when tested in accordance with ASTM C140.
 - b. Surface Characteristics: Slip-resistant finish
 - c. Edges: Beveled
 - d. Texture and color: Sandblasted finish; Buff
 - e. Sizes: 24" square (score lines); nominal 2" thick
 - f. Acceptable Product and Manufacturer, or equal that complies with requirements:
 - i. Prest Pavers, Tudor finish, by Hanover Architectural Products, Hanover, PA.
 - g. Installation shall comply with reference standards. Paving shall have appropriate slope to prevent ponding.
 - i. 1" max. sand/cement setting bed over 4" thick concrete base (4000 psi concrete) over 6" compacted aggregate base (per DDOT standards).
- 3. Cobble Stones (Foggy Bottom Streetscape Plan)
 - a. Material: Tumbled concrete paver
 - b. Pervious Joints: Cobble stones shall create a pervious surface that allows local catchment of stormwater.
 - c. Recommended Size: 4"x4"
 - d. Texture: To accommodate ADA access
 - e. Color: Buff color on N/S city streets to compliment concrete sidewalks
- 4. Brick Pavers
 - a. Comply with ASTM C902, Class SX, Type II, Application PS
 - b. Surface characteristics: Slip-resistant with abrasive content.
 - c. Color: Red (Foggy Bottom Campus)
 - d. Size: Nominal 4"x 8" x 2-1/4" thick (nominal)
 - e. Pattern per individual project design
 - f. Bricker pavers to have handtight, mortarless joints of maximum width 1/8"; All joints to be sand swept
 - g. Acceptable Manufacturer, or equal that complies with requirements:
 - i. Pine Hall Brick Co., Inc., Winston-Salem, NC (*The predominant brick paver colors at the Foggy Bottom Campus are Pathway Full Range, Pathway Red, or Cocoa FR by Pine Hall Brick Co.; Please note that these pavers do not meet LEED SS Credit 7.1 SRI >29 requirements*)
 - h. Installation shall comply with reference standards. Brick shall be laid on concrete slab, with sufficient slope to prevent ponding, and to avoid heaving from tree roots.
 - i. 1" max. sand/cement setting bed over 4" thick concrete base (4000 psi concrete) over 6" aggregate base (per DDOT standards).

5. Granite Curbs
 - a. Provide material, sizes and profiles complying with paragraph 609.02 of DDOT standards.
 - b. Type and Fabricator: White Mount Airy Granite by North Carolina Granite Corp., or equivalent product acceptable to DDOT
6. Brick for Gutters
 - a. General: Comply with DDOT standards.
 - b. Size: 7-1/2" x 3-1/3" x 3-1/2"
 - c. Acceptable Product and Manufacturer, or equal acceptable to DDOT:
 - i. Code 421 (from former Richtex Corp.), as required to comply with referenced standard(s), by Hanson Brick., Charlotte, NC
7. Mortar Setting Bed and Grout Materials
 - a. Portland Cement: Comply with ASTM C150, Type I, from one source only, non-staining and non-air-entraining
 - b. Lime: Hydrated lime; standard manufacture; Comply with ASTM C207, Type S
 - c. Sand for mortar and setting bed: Comply with ASTM C144 with fineness module of 2.25, plus or minus 0.10, clean, washed and free from iron and impurities
 - d. Colored aggregates: Natural sand, ground granite or other sound stone, color as required for grout, well-graded
 - e. Water: Clean, clear, nonalkaline and free of salts and other harmful elements; Potable
 - f. Grout:
 - i. Color: Match paver; Architect's selection from manufacturer's full range of colors
 - ii. Latex-Portland Cement Grout: ANSI A118.6, composed as follows:
 - iii. Factory-Prepared Dry-Grout mixture of Portland cement; dry, latex additive and other ingredients to produce sanded and unsanded grout mixture for joints
 - g. Liquid latex additive:
 - i. Setting bed and grout: Equivalent to Laticrete Liquid 3701
 - ii. Bond coat: Equivalent to Laticrete Liquid 4237
8. Cement/Sand Setting Bedding and Joint Mixture:
 - a. Portland Cement: Comply with ASTM C150, Type I, natural color
 - b. Sand:
 - i. General: Comply with ASTM C33, washed, clean, and free from iron and impurities; gap-graded and free-draining
9. Sand for Joints: Stabilized sand manufactured specifically for filling joints between pavers.
 - a. Polymeric Sand for Pavement Joints by Techni-Seal
 - i. Color: Grey; Tan is not acceptable
10. Brick pavers shall have handtight mortarless joints.
 - a. All joints to be sand swept
11. Provide jointing and bedding sand as follows:
 - a. Clean, well-graded, free-draining sand free from soluble salts, irons, and other damaging matter or impurities. Sand shall be natural silica sand or sand manufactured from crushed rock.

- b. Bedding sand shall comply with ASTM C33 and the specification shall exclude all stone screenings or dust that does not conform to the grading requirements of ASTM C33.
 - c. Do not use mason's sand, or sand conforming to ASTM C144 for bedding sand. Joint sand shall not be used for bedding sand.
 - d. Where pavers are subject to vehicular traffic, utilize sands that are as hard as practically available.
12. Aggregate Setting-Bed and Joint Sand Material
- a. Lightweight Aggregate for Paver Base: Expanded shale, clay or slate (ESCS) produced by the rotary kiln process and meeting the standards of the Expanded Shale, Clay and Slate Institute and the requirements of ASTM C330. Size as recommended by the supplier for the intended use.
 - i. Acceptable Product or Equal: Stalite by the Carolina Stalite Company, Salisbury, NC
 - b. Sand for Leveling Course: Fine, sharp nonplastic aggregate complying with ASTM C33
13. Materials for Drainage of Paved Areas
- a. Drain Bodies and Assemblies: Provide as required.
 - b. Separation Geotextile: Woven geotextile fabric.
 - i. Acceptable Product or Equal: Mirafi Filterweave FW 402 by Ten Cate Nicolon, Pendergrass, GA
 - c. Drainage Composite:
 - i. Acceptable Product or Equal: Mirafi G200N by Ten Cate Nicolon, Pendergrass, GA

D. MIX DESIGNS

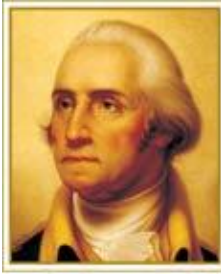
- 1. Mix designs for setting beds, joints, and grout shall comply with requirements of reference standards and manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, and other mixing procedures required to produce materials of uniform quality and optimum performance characteristics. Mix designs include the following:
 - a. Cement Grout:
 - i. One part Portland cement and two parts colored aggregates with sufficient quantity of liquid latex additive to bring grout to proper consistency
 - ii. Color: Match paver
 - b. Cement/Sand Joint Mixture: Dry mixture of 1 part Portland cement to 4 parts sand, thoroughly mixed
 - c. Latex-Modified Portland Cement Setting-Bed Mortar.
 - i. Mortar shall be composed of one part Portland cement, 3 parts fine aggregate by volume and hydrated lime in an amount equal to 10 per cent of Portland cement by weight. Mix shall include liquid latex additive to bring bed to proper consistency for placing.
 - ii. Amount of gauging liquid and consistency of setting bed to comply with latex additive manufacturer's written instructions as necessary to produce stiff mixture with moist surface when bed is ready to receive stone.

- iii. Latex-Modified Cement Bond Coat: Mix of Portland cement and liquid latex additive shall comply with latex additive manufacturer's written instructions.

E. ACCESSORIES

1. Isolation and Expansion Joints: Cork Joint Filler – Preformed strips complying with ASTM D 1752, Type II.
2. Cleaner: Provide stone cleaners specially formulated for stone types, finishes and applications required per design as recommended by stone manufacturer, and if a sealer is specified, by the sealer manufacturer.
3. Sealer: Provide colorless, slip- and stain-resistant sealer not affecting color or physical properties of stone surfaces, as recommended by stone manufacturer for application.
4. Edge Restraints
 - a. Provide aluminum edge restraints for perimeter of concrete paving area, as required, and in compliance with manufacturer's written instructions.
 - b. Material: ASTM B 221 (ASTM B 221M), Aluminum 6063 alloy, T-6 hardness

END OF SECTION



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02870

SITE FURNISHINGS

A. SUMMARY

This section contains design standards for site furnishings.

B. BENCHES

1. Provide "Hyde Park" teak benches, no exceptions.
 - a. Length: as required, but 4', 5' and 6' lengths are typically a better value than 8' lengths which may also require a minimum order and long lead time.
 - b. Procurement: Benches are often ordered through the GW Grounds Operations and Pest Control Manager, currently Noel Gasparin. They are usually purchased from Park Place in DC, which currently does not have a retail location. Contact information is as follows:
Contact Person: Phil Mitchell
Email: philm@parkplacedc.com
Phone: 202-686-8686
Fax: 202-686-5258
Mail:
Park Place
PO Box 9953
Washington, DC 20016
 - c. Benches shall have "The George Washington University" engraved into the top center of the front of the bench. Requests for engraving work shall be made to GW Sign Shop who performs the work in-house.

C. TABLES AND CHAIRS

1. Provide metal tables with attached seating by Landscapeforms as follows:
 - a. Model: Carousel
 - b. Table surface: Steelhead (perforated)
 - c. Seating: backless or with back, as appropriate
 - d. Seating count, including wheelchair access: as required
 - e. Umbrella hole: optional, as required by site conditions and sun exposure

D. WASTE AND RECYCLING RECEPTACLES

1. All orders shall be coordinated with the GW Grounds Operations and Pest Control Manager, currently Noel Gasparin.

2. For information only and unless otherwise arranged with GW authority noted above, metal waste and recycling receptacles shall be as follows:
 - a. Model: Victor Stanley Ironsites S-424, 36-gallon capacity
 - b. Coating: powder coating
 - c. Waste receptacle:
 - i. Color: custom, RAL 5011, "Steel Blue"
 - ii. Lid: Standard tapered formed lid
 - d. Recycling receptacle:
 - i. Color: "VS Green"
 - ii. Lid: to be a concave shape. Coordinate specific design/model with GW authority noted above.

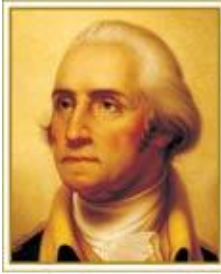
E. CIGARETTE BUTT RECEPTACLES

1. Where required, provide the following:
 - a. "No Butts Tower Bin – Pyramid Top – Black Colored Body" by No Butts Bin Co.

F. BUILDING-MOUNTED BANNERS, POLES AND BRACKETS

1. Unless otherwise required, these items are Owner-Provided, Owner-Installed after building completion. However, Consultant should be aware that University buildings do display them and should coordinate the design to accommodate them.
 - a. Building-mounted banner brackets will be provided at 45 degrees.
 - b. Banner, pole, and bracket size and style shall be coordinated with Owner.

END OF SECTION



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02871 BICYCLE RACKS

A. SUMMARY

This section contains standards for bicycle rack requirements.

1. Reference Standards:
 - a. DDOT Bicycle Facility Design Guide
 - b. DDOT Design and Engineering Manual, Chapter 28, Bicycle Facilities and Shared Paths
 - c. Association of Pedestrian and Bicycle Professionals (APBP) Bicycle Parking Guidelines.

B. PRODUCTS

Bicycle Rack for Exterior Courtyard:

1. Type:
 - a. The approved design is the inverted-U rack style. Each inverted U rack will count as two bicycle parking spaces.
2. Rack Elements:
 - a. Secure bike anchorage
 - b. Heavy-duty, tamper-resistant construction
 - c. Provide support to the bicycle frame in at least 2 places, allowing the frame and wheel to be locked by a cable or U-lock
 - d. Prevent the wheel of the bike from overturning
 - e. Accommodate front-in or back-in parking
 - f. Not damaging to the bicycle frame
3. Anchoring: Surface-mounted
4. Construction:
 - a. Materials: 1-1/2" schedule 40 pipe, hot-dipped galvanized finish after fabrication
5. Finishes:
 - a. Coating:
 - i. Rubberized PVC dip
 - b. Color: Black
6. Quantity and Capacity: As indicated on Drawings. If project is targeting LEED-related credit under Sustainable Sites, Credit 4.2 Alternative Transportation, Bicycle Storage and Changing Rooms, quantity to comply with LEED requirements.
7. Approved bicycle rack manufacturers:
 - a. Basis of Design:

- i. Dero (Model: Hoop Rack)
 - ii. Equivalent products and manufacturers approved by DDOT
8. Installation Methods:
- a. Free-standing, rail-mounted racks are preferred over in-ground mounting for their cost benefits, easier installation, easier removal of snow and debris, and portability.

Bicycle Rack for Bike Storage Rooms:

- 1. Type: Floor-mounted units, designed to store bicycles vertically at staggered heights
- 2. Construction:
 - a. Materials: Steel tube, pipe, shapes, and bent bars
 - b. Cross bars: Hot-dipped galvanized after fabrication
- 3. Dimensions: Approximately 62 inches and 50 inches alternating bicycle-mounting heights, on 16 inch wide horizontal spacing between bicycle hangers. Refer to manufacturer's product brochure for additional information.
- 4. Anchoring: Floor-mounted
- 5. Finish:
 - a. Manufacturer's standard factory-applied polyester powder coat paint finish
 - b. Color: Black
 - c. Hanger Rods: Rubber-coated
- 9. Quantity and Capacity: As indicated on Drawings, in Bike Storage Room. As indicated on Drawings. If project is targeting LEED-related credit under Sustainable Sites, Credit 4.2 Alternative Transportation, Bicycle Storage and Changing Rooms, quantity to comply with LEED requirements.
- 6. Approved bicycle rack product and manufacturers:
 - a. Basis of Design:
 - i. Dero (Model: Space Saver, Double Sided)

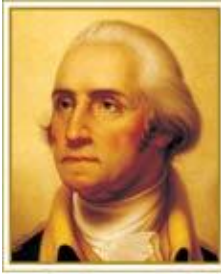
C. ANCHORS AND FASTENERS

- 1. Provide fasteners recommended by accessory manufacturer, appropriate for proper attachment to supporting substrates
- 2. Provide theft-resistant fasteners or anchor security caps for exposed mountings
- 3. Match finish of fastenings to finish of bike racks.

D. WHEEL STOPS

- 1. Description: Precast concrete wheel stops/bumpers
- 2. Quantity and locations: As indicated on Drawings
- 3. Finish: Manufacturer's standard smooth form finish
- 4. Provide with ¾ inch diameter hot-dipped galvanized steel dowels, minimum 2 per wheel stop, for securing wheel stops to slab

END OF SECTION



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02930

VEGETATED ROOF COVERING

A. SUMMARY

This section contains general standards for green roof systems for flat roof surfaces. Refer to related sections for additional information.

B. REFERENCE STANDARDS

Reference standards include but are not limited to the following:

1. ASTM E 2400-06, Standard Guide for Selection, Installation, and Maintenance of Plants for Green Roof Systems
2. ASTM E 2399-05, Standard Test Method for Maximum Media Density for Dead Load Analysis on Green Roof Systems
3. ASTM E 2398-05, Standard Test Method for Water Capture and Media Retention of Geocomposite Drain Layers for Green Roof Systems
4. ASTM E 2369-05, Standard Test Method for Saturated Water Permeability of Granular Drainage Media (Falling Head Method) for Green Roof Systems
5. System Provider's standard and specific technical specifications and recommendations
6. Methods of Soil Analysis, American Society of Agronomy (1996) "MSA".
7. Test Methods for the Examination of Composting and Compost (latest version) "TMECC".
8. Recommended Chemical Soil Testing Procedures, North Central Region Publication #221 "RCSTP".
9. USDA Handbook #60

C. SUSTAINABILITY

1. Sustainability is among the highest priorities at GW. Green roofs provide the following environmental benefits and thus shall be considered for all projects unless a cool roof is to be installed:
 - a. Reduced stormwater runoff quantities
 - b. Improved water quality of stormwater runoff
 - c. Reduced urban heat island effect through reduction in roof surface temperature
 - d. Extended lifespan of the roofing system by protecting membrane from direct sunlight and extreme temperatures
 - e. Increased insulation R-values for roof system

- f. Cooling effect from evapotranspiration of plants
- g. Provides wildlife habitat for biodiversity
- h. Aesthetics & roof garden amenity
- 2. The green roof surface area shall aim to comply with LEED Sustainable Sites Credit 7.2, Heat Island Effect – Roof.
 - a. Install a "green" (vegetated) roof that covers at least 50% of the roof area.
OR
 - b. Install a combination of high albedo and vegetated roof that collectively covers 75% of the roof area per LEED requirements.

$$\frac{\text{Area of High Reflective Roof Meeting Minimum SRI}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.5} \geq \text{Total Roof Area}$$

Roof Type	Slope	SRI
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	≥ 2:12	29

- 3. A/E team shall determine the most appropriate amount of green roof coverage of the entire roof area. Stormwater management goals shall be weighed against grey water reuse needs.

D. SYSTEM REQUIREMENTS

- 1. Fire Resistance Ratings
 - a. Provide labeled materials which have been tested and listed by UL in the Roofing Materials and Systems director for application indicated, with Class A rated materials/system for roof slopes indicated.
 - b. Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL for indicated assembly.
- 2. Interface With Other Systems
 - a. Coordinate roofing work with work of other trades.
 - b. Coordinate water source with plumbing and confirm adequate water pressure of not less than 50 psi.

E. PERFORMANCE REQUIREMENTS

- 1. The vegetated roof cover system shall:
 - a. Support a living and healthy vegetated ground cover unbroken by areas of bare soil or exposed system components.
 - b. Provide efficient drainage of moisture that is in excess of that required for the vigorous growth of the installed vegetation.
 - c. Protect roof waterproofing materials from damage caused by exposure to ultraviolet radiation, physical abuse, and rapid temperature fluctuations.
 - d. Retain moisture at Maximum Water Capacity, in accordance with ASTM E-2399 standards.

- e. The dead weight and the saturated dead weight of the vegetated roof cover system shall not exceed the guidance weights per ASTM E-2397.

F. GENERAL

1. Green Roof Type: The green roof shall be the extensive type, sedum mat system, and 90% pre-grown. The system shall consist of the standard mix of pre-planted and pre-grown vegetation. Refer to Green Roof Systems Component section below for additional information. The green roof system shall include all components specified as directed by the green roof system provider, landscaper, or project engineer. The work shall include installation of edge treatments, pavers, decorative ballast, and slip-sheet, if specified.
2. The green roof system is intended to be used without major irrigation.
 - a. A wall hydrant shall be provided for periodic irrigation and maintenance.
3. Proof of Structural Load Bearing Capacity: An engineer's report shall confirm that the load bearing capacity of the structure is compatible with the green roof system.
 - a. For retrofits of existing buildings, the capacity of the existing structure to carry the additional load must be confirmed. In addition, the quality of the existing waterproofing needs must be assessed before placing the green roof system on top.
4. The entire roof assembly shall comply with FM Global requirements. Green roof systems shall comply with FM Global green roof requirements. Refer to FM Global Data Sheet 1-35 "Green Roof Systems". All submittals for new roof, re-roof, and re-cover projects shall be submitted to FM Global for review and approval. Refer to FM Global's "Plan Review and Construction Project Guidelines for The George Washington University, Washington, DC" for additional information.
6. The roofing system shall meet all applicable code requirements and requirements of testing agencies including Underwriters Laboratories and FM Global, as required.
7. The roof system shall be accessible to allow for inspection and maintenance. Ease of maintenance shall be an important consideration in the roof design.
8. Waterproofing Membrane:
 - a. Coordination with Waterproofing Provider: Before commencement of the waterproofing installation, the waterproofing installer and the green roof system provider shall meet with Owner's representative to discuss project sequence and methods for protecting and controlling access to the work and to review shop drawings to establish compliance with the specifications. Coordination meeting will determine how the waterproofing will be protected between the time it is certified by the Waterproofing Provider as watertight and the time that installation of the vegetated cover system can begin.
 - b. Waterproofing membrane components and accessories must be obtained as a single-source from the waterproofing provider to ensure total system compatibility and integrity.
 - c. Waterproofing membrane performance shall be verified for meeting the green roof manufacturer's specifications prior to installation of green roof system.
 - d. The waterproofing membrane shall be compatible with the electronic leak detection system (EFVM) so as not to interfere with low voltage transmission.

- e. The waterproofing membrane manufacturer shall approve the green roof system for use on their waterproofing product. Any components such as root protectors, protection layers, etc required by the waterproofing manufacturer for their warranties shall be specified by the waterproofing membrane manufacturer.
- f. The waterproofing membrane shall be covered by a separate warranty issued by the waterproofing membrane manufacturer.
- 9. Accessories:
 - a. All components or accessories related to the green roof shall be approved by the roof membrane manufacturer for compatibility with their system.

G. GREEN ROOF SYSTEM COMPONENTS

- 1. Green roof system components shall include, but are not limited to, the following components: foundation/protection layer; drain conduit; geocomposite drainage layer; separation fabric; growth media layer; plants; wind protection; metal edge restraint; ballast/precast concrete pavers; drain access chambers, and miscellaneous accessories as required for complete installation. All components or accessories shall be approved by the green roof system manufacturer for compatibility with their roof system.
 - a. Plants - Pre-grown sedum mats:
 - i. Sedum mats shall be 90% covered when delivered to the project.
 - ii. Sedum mats shall be suitable for climate and application and composed of sedum varieties that are appropriate plantings for the project's micro-climate (exposure to wind, light, shade, drainage, etc) thus proven successful on extensive living roofs in the mid-Atlantic region.
 - iii. Base sedum varieties shall be supplemented with accent plants to support diversity in the micro habitat and add visual appeal.
 - iv. Vegetation shall be installed in accordance with the landscape design.

H. PAVERS

- 1. Precast concrete pavers shall be used to provide the green roof with vegetation and growth-free border zones around the building perimeter, roof-mounted equipment and any roof-top structures per FM Global green roof systems requirements "FM Global Property Loss Prevention Data Sheets 1-35 Green Roof Systems".
 - a. Pavers shall meet LEED Sustainable Sites Credit 7.2 Heat Island Effect – Roof requirement of SRI > 78.
 - b. Size: Nominal 24" square by 2" thick
 - c. Weight: 22 psf minimum to 25 psf maximum
 - d. Colors and finishes:
 - i. Color: Glacier White
 - ii. Finish: Tudor or Diamond, as needed
 - e. Acceptable product and manufacturer or equal:
 - i. Prest Roof and Plaza Pavers by Hanover Architectural Products, Inc.

I. INSTALLATION

1. General:
 - a. Green roof installation shall be performed by a green roof system provider such as a landscape company that specializes in vegetated roof assembly installation work.
 - b. The green roof system provider shall provide a quality control specialist to observe critical aspects of the installation.
 - c. Only products and methods acceptable to membrane roofing manufacturer shall be utilized.
2. A thorough inspection of the membrane and flashings must be completed and approved before the “vegetative overburden” is installed over the waterproofing membrane system.
3. Environmental Requirements:
 - a. General: Proceed with planting work only when existing and forecasted weather conditions will permit work to be performed, when beneficial and optimum results may be obtained, and in accordance with manufacturer’s specifications and warranty requirements.
 - b. Follow plant supplier’s recommendations regarding planting requirements and optimum conditions.
4. Electronic Field Vector Mapping (EFVM)/Leak Detection:
 - a. Prior to green roof module installation, comprehensive roof leak detection shall be performed to confirm water-tightness. Module installation shall be performed only after appropriate waterproofing system with the proper taper to allow for drainage, has been installed and tested.
 - b. Technician shall be certified in EFVM testing method and have a minimum of 1 year experience providing testing for projects of similar scale and scope.
 - c. Provide a second test one year after the entire system has been installed.
5. All drains shall be fitted with inspection/maintenance boxes and grilles, built up to ensure access at roof surface.

J. QUALITY ASSURANCE

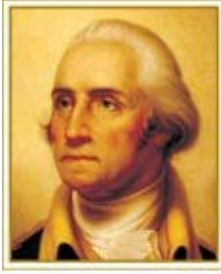
1. All specified and required items directly or indirectly related to the green roof are to be provided by one system manufacturer and one installation contractor. Items include paths and walkways, patios and railing systems, irrigation, and pavers (or ballast).
2. Manufacturer’s technical representative shall conduct inspections prior to, during and at completion of installation.
3. Contractor shall carry out recommendations of manufacturer’s representative.
4. Written reports of inspections shall be provided to Owner.

K. WARRANTY

1. Manufacturer shall warrant that the green roof system will perform its function of containing plant growth media for a period of twenty (10) years from the date of substantial completion.

- a. The warranty shall guaranty 80% foliage cover after a period of two years so long as the vegetated cover assembly is maintained according to the green roof provider's requirements. Bare areas shall be reseeded as necessary.
 - b. The warranty shall include provisions to repair or replace specified materials or work that has failed within the warranty period. System failures covered by the warranty shall include, but are not limited to, the following:
 - i. Failure of the vegetated cover system to support a robust ground cover
 - ii. Loss of soil permeability
 - iii. Development of anaerobic conditions in the profile
 - iv. Loss of drainage capacity
 - v. Development of soil pathogens
 - vi. Deleterious changes in pH
 - vii. Slope related instability of the vegetated cover system
 - viii. Wind or water erosion of the vegetated cover system
 - c. In the event of a leak, the warranty shall require the green roof provider to pay for the cost of removing the vegetated cover, exposing and repairing the membrane, and restoring the vegetated cover provided:
 - i. The green roof provider approves the method and technician for leak location.
 - ii. A representative of the green roof provider is present to observe the removal of the vegetated cover.
 - iii. The leak is attributed to physical damage caused by activities of a Vegetated Roof System Contractor licensed by the green roof provider, or agents or representatives of the System Provider (either during construction or subsequent maintenance).
2. The green roof system shall have a two-year workmanship warranty. The warranty shall include green roof maintenance visits to ensure proper plant root establishment, plant coverage and general maintenance of the vegetated roof system via feeding, weeding, and monitoring conditions for long-term viability. Maintenance-related activities and components shall be redone, removed or replaced if determined to be defective within two years after substantial completion.
 3. Temporary spray irrigation will be required during the first full growing season. The design and implementation of temporary irrigation is the responsibility of the green roof system installer.

END OF SECTION



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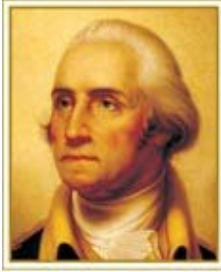
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05521 PIPE AND TUBE RAILINGS

A. GENERAL

All exterior railings shall be stainless steel or aluminum, with either a satin or brushed finish, unless otherwise approved. Painted railings are unacceptable due to ongoing maintenance requirements.

END OF SECTION



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06066

PLASTIC LAMINATE

A. SUMMARY

This section contains general standards for plastic laminate requirements. Refer to space standards and related sections for additional information.

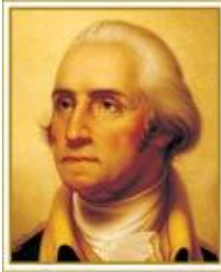
B. GENERAL

1. Requirements herein apply to high pressure plastic laminates used for items including, but not limited to, cabinets, shelves, and countertops.
2. Plastic laminate shall be GreenGuard Indoor Air Quality Certified.
3. Laminate color to be selected from manufacturer's standard color palette.
4. Approved manufacturers, or approved equal:
 - a. Wilson-Art Plastics Company
 - b. Formica Corporation
 - c. Nevamar Corporation
5. Adhesive
 - a. Clear-drying type recommended by laminate manufacturer
 - b. Must comply with VOC limits established by the South Coast Air Quality Management District (SCAQMD), Rule #1168

B. INSTALLATION

1. Plastic laminate installation shall follow manufacturer's specifications including, but not limited to, instructions for joints and seams.

END OF SECTION



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06400

ARCHITECTURAL WOODWORK

A. SUMMARY

This section contains standards for architectural woodwork including, but not limited to, the following cabinetry items, as are common in pantries, kitchens, bathrooms, mail rooms, and supply rooms:

- Open cabinets with no doors
- Cabinets with plastic laminate doors/drawers
- Cabinets with wood doors/drawers

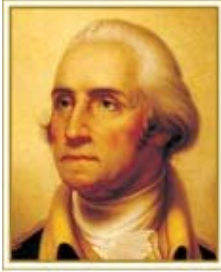
B. GENERAL

1. Unless otherwise noted, all cabinets share the same construction requirements. Variables to consider include counter surface, door/drawer material, cabinet pulls, color, barrier-free access where required, and toekick material. All colors shall be selected from manufacturer's standard color palette. See specific space standard and related sections for additional requirements.
2. Cabinet and drawer warranty: 5 years, minimum
3. Core material for use under plastic laminate or melamine:
 - a. Particleboard, agricultural board, or plywood. Formaldehyde-free and FSC-certified substrate is preferred where project budget can accommodate. 100% recovered and recycled wood fiber content is preferred.
4. Wood Paneling:
 - a. Wood Species and Cut for Transparent Finish: White Maple, Quarter Sawn.
 - b. Wood Species for Opaque Finish: Any closed-grain hardwood
5. Cabinets and drawer box:
 - a. Cabinet and drawer box
 - i. Exterior finish: plastic laminate
 - ii. Interior finish: melamine
 - b. Shelves
 - i. Shelf finish: plastic laminate
 - ii. Shelves shall be adjustable.
 - c. Surface and edge treatment
 - i. On all but concealed conditions, surfaces and edges shall be finished. Concealed surfaces and edges are those that are not visible after installation and they include tops of cabinets, 78-inches or more AFF*, and bottoms of cabinets less than 30-inches AFF. Thus, all other edges, including, but not limited to, cabinet body and shelves made visible when drawers and doors are open, shall be finished.

** Note: if top of cabinet 78-inches or more AFF is made visible by an upper floor or staircase, it will not be considered concealed and shall, thus, be finished.*

- d. Door & drawer front, unless otherwise noted:
 - i. Academic Pantries, Mail Rooms, Storage and Similar: plastic laminate finish
 - ii. Residence Hall (Dormitory) Bathroom & Kitchen: plastic laminate finish
 - iii. Residence Hall (Apartment Style) Bathroom & Kitchen: plastic laminate finish or solid wood
- e. Hardware:
 - i. Hinges for overlay doors:
 - a.) Lifetime warranty
 - b.) Concealed, self-closing
 - c.) Opening: minimum 95 degrees
 - d.) Finish: manufacturer's bright nickel
 - e.) Acceptable product or equivalent:
 - Duomatic Hinges by Hafele America Co.
 - ii. Drawer slides:
 - a.) Ball bearing slides preferred
 - b.) Side-mounted
 - c.) Load capacity:
 - Kitchen drawers: 75 pounds/pair, minimum; ¾ extension, minimum; ball bearing slides preferred
 - Desk drawers: 100 pounds/pair, minimum; full extension; ball bearing slides
 - Bins and file drawers: 150 pounds/pair, minimum; full extension; ball bearing slides
 - d.) Finish: manufacturer's standard electro-plated zinc
 - e.) Acceptable products:
 - Kitchen drawers: equivalent to 7434 by Accuride
 - Desk drawers: equivalent to 7434 by Accuride
 - Bins & File drawers: equivalent to 4034 by Accuride
 - iii. Pulls:
 - a.) Style: 4" wire pulls
 - b.) Material: brass or bronze
 - c.) Finish: ANSI/BHMA finish 626/US26D, Satin Stainless Steel or ANSI/BHMA finish 630/US32D, Satin Chrome Plated Steel
 - d.) Acceptable products:
 - Equivalent to 4484 by Stanley Hardware
- 6. Adhesives:
 - a. As recommended by product manufacturer
 - b. Field-applied adhesives must comply with VOC limits established by the South Coast Air Quality Management District (SCAQMD), Rule #1168

END OF SECTION



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06415 SOLID SURFACING

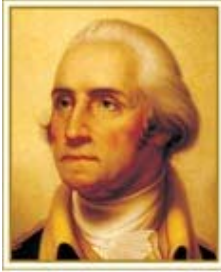
A. SUMMARY

This section contains general standards for solid surfacing requirements. Refer to space standards and related sections for additional information.

B. GENERAL

1. Requirements herein apply to solid surfacing used for items including, but not limited to, countertops and window sill stools/aprons.
2. Homogenous, mineral-filled acrylic and polymer resin
3. Thickness for counters: $\frac{3}{4}$ " , unless otherwise required
4. Thickness for window sill stools: $\frac{1}{2}$ " unless otherwise required
5. Adhesive
 - a. As recommended by solid surface material manufacturer
 - b. Adhesive must comply with VOC limits established by the South Coast Air Quality Management District (SCAQMD), Rule #1168
6. Color to be selected from manufacturer's standard color palette.
7. Approved products, or approved equal
 - a. Corian by DuPont
 - b. Fountainhead by Nevamar
 - c. Surell by Formica Corporation

END OF SECTION



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06650 CULTURED MARBLE

A. SUMMARY

This section contains general standards for cultured marble countertops with cultured marble integral sinks and backsplashes. Refer to space standards and related sections for additional information.

B. GENERAL

1. Requirements herein apply to cultured marble used for bathroom vanity countertops in residence halls.
2. Material: Cast, filled polymer
3. Performance Requirements:

Property	Requirement	Method
Color fastness	No change - 200 hours	ANSI Z-124
Wear and Cleaning	Passes	ANSI Z-124
Impact resistance	No cracks or chips	ANSI Z-124
Stain resistance	Passes	ANSI Z-124
Chemical resistance	Passes	ANSI Z-124
Drain Fitting Connection	Passes	ANSI Z-124.3
Loads on lavatory tops	Passes	ANSI Z-124.3
Thermal shock resistance	Passes	ANSI Z-124.3
Cigarette burn test	Passes	ANSI Z-124.3

4. System Requirements:
 - a. Performance Standards: Cultured marble countertop shall comply with ANSI Z-124.1, 2, 3, 4 /ANSI A -112.19.7 and 82 and applicable building codes.
5. Vanity Tops With Integral Backsplashes:
 - a. Cast polymer cultured marble; 3/4" thick; using adhesives suitable for cast polymer products
 - b. Vanity top and backsplash shall be one piece, without joints
 - c. Vanity Top Dimensions: As indicated on drawings
 - d. Backsplashes: 4" high

- e. Sidesplashes: To be provided at all adjoining walls, 4" high
- f. Edge: Dripless edge, with approximately 1/8" rise
- g. Color to be selected from manufacturer's standard color palette
- 6. Integral Sinks:
 - a. Cast polymer cultured marble
 - b. Large, recessed bowl with overflow; Oval, 20" X 17"
- 7. Allowable Tolerances:
 - a. Variation in component size: $\pm 1/4$ "
 - b. Location of openings: $\pm 1/8$ " from indicated position
- 8. Acceptable Manufacturers: Subject to compliance with requirements, products of a member of the International Cast Polymer Association shall be specified.
- 9. Acceptable products and manufacturers, or approved equal:
 - a. Equivalent to Solid White 103 by Virginia Marble Manufacturers, Inc.

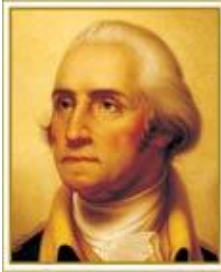
C. ACCESSORIES

- 1. General: Provide accessories required for complete installation, including trim strips, mildew-resistant sealant, and adhesive.

D. INSTALLATION

- 1. Cultured marble countertop system shall be fully coordinated with installation of vanity cabinets and plumbing.
- 2. Provide concealed blocking and anchor securely to walls.

END OF SECTION



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07500 MEMBRANE ROOFING

A. SUMMARY

This section contains general standards for membrane roofing for flat roofs. Refer to related sections for additional information.

B. EXCEPTIONS TO REQUIREMENTS HEREIN

1. Retrofit Projects: There may be retrofit projects involving re-roof and re-cover where a membrane roof system should not be applied or may not provide the most feasible solution.
 - a. GW's campuses, in particular Foggy Bottom, are comprised of buildings that vary distinctly in architectural character resulting in different roofing systems and sloped roof designs including standing-seam copper, slate, and asphalt shingle. In keeping with GW's commitment to maintaining the diversity of building fabric on campus, these roofs shall retain their original character unless otherwise required by project program. Consultants shall strive to select a roofing finish that retains the original character of such buildings within the parameters of energy efficiency and sustainability, project budget, function, and ease of maintenance. **Renovation of designated historic properties must be approved by DC's Historic Preservation Review Board.**
 - b. Each project will require analysis as well as approval of roofing system selection from GW.
 - c. For projects involving the replacement of standing-seam copper roofs, a non-lead coated copper alternative shall be used.
 - d. Re-roof or re-cover roofing systems shall correct any thermal deficiencies and contribute towards achieving a high-performance building envelope.
 - e. Existing roof elements shall be removed or preserved according to the project program.

C. GENERAL

1. The roof system shall adhere to the following principles:
 - a. The roof design shall provide slope to ensure rapid and dependable drainage to prevent ponding of water for prolonged periods and minimize potential interior damage in the event of a roof leak. Minimum roof slope shall comply with code.

- b. The roofing membrane shall have a durable surface and high puncture resistance. The insulation should have high compressive strength.
 - c. The roofing system and all other components (i.e., mechanical equipment and wall assemblies) shall be designed to allow for reroofing in the future.
 - d. Ease of maintenance shall be an important part of the roofing design. The roofing system shall be accessible in order to allow for proper inspection and maintenance.
 - e. The roofing system shall be designed based on the planned activities and equipment scheduled directly beneath the roof.
 - f. The entire roof assembly shall comply with FM Global requirements. All submittals for new roof, re-roof, and re-cover projects shall be submitted to FM Global for review and approval. Refer to FM Global's "Plan Review and Construction Project Guidelines for The George Washington University, Washington, DC" for additional information.
2. For new construction and major renovation of buildings with flat roofs, the following membrane roofing systems are acceptable:
- a. SBS-modified bituminous membrane roofing system; two-ply or three-ply (three ply system may be considered if budget allows).
 - b. Ketone Ethylene Esther (KEE)/Ethylene Interpolymer (EIP) Membrane Roofing
 - i. Alternate high performance thermoplastic membrane roofing system such as PVC with KEE additive may be considered.
 - c. Hot Fluid-Applied Rubberized Asphalt Membrane System
 - i. This system must be protected by appropriate overlay thus shall not be used as a permanent exposed surface.
 - d. TPO and EPDM roofing systems are not acceptable.
 - e. Other roofing systems not described herein may be considered as required to best suit specific conditions of retrofit projects.
 - f. Architect shall submit proposed roofing membrane system specifications to GW for review and approval.
3. The roofing system shall meet all applicable code requirements and requirements of testing agencies including Underwriters Laboratories and FM Global.
4. Waterproofing membrane components and accessories must be obtained as a single-source from the waterproofing provider to ensure total system compatibility and integrity.
5. Adhesives and sealants shall comply with VOC limits of California South Coast Air Quality Management District (SCAQMD) Rule #1168.
6. Warranty:
- a. Roofing manufacturer warranty shall be 20 years minimum, no dollar limit, including wind speed coverage up to 90 mph peak gusts, covering inspection and service necessary to correct roof leaks resulting from normal wear and tear, faulty materials or improper workmanship for warranty period.
 - b. The entire roof assembly is to be covered by the manufacturer's warranty including, without limit, the insulation and any cover board, the roofing material, the flashings, any through-penetration systems or fabrications, equipment mounting curbs, etc. Roof warranties shall cover the installed system, not simply the roofing materials.
 - c. Installer's warranty shall follow manufacturer's warranty requirements.

7. The roofing contractor shall be certified with the Roof Consultants Institute (RCIA).
8. Inspections:
 - a. Inspections by roofing system manufacturer's technical representative shall be conducted prior to, during, and at completion of installation to evaluate roofing application.

D. PERFORMANCE REQUIREMENTS

1. Provide installed roofing system and base flashings that remain watertight; do not permit water infiltration; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
2. Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by the roofing manufacturer based on testing and field experience.
3. The roofing system shall be successfully tested by a qualified testing and inspection agency to resist uplift pressures and must comply with all applicable requirements in FM Approvals.
4. The roofing system shall meet all fire resistance rating requirements.
5. The roofing system design shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressures according to industry reference standards including ASCE 7.
6. FMG Approvals Listing: Roofing assembly materials including roofing membrane, base flashings, and component materials shall be identified with FMG Approvals markings.
7. All materials shall be from one manufacturer.

E. SUSTAINABILITY

1. Sustainability is among the highest priorities at GW. Cool roofs provide the following environmental benefits and thus shall be used for all major roof replacements and new roof construction unless a green roof is to be installed:
 - a. Reduced urban heat island effect through reduction in roof surface temperature
 - b. Reduced energy use for cooling during the summer season.
 - c. Extended life span of the roofing system by protecting roof against extreme temperatures swings.
2. The roof surface material shall comply with LEED Sustainable Sites Credit 7.2, Heat Island Effect – Roof.
 - a. Roof surface materials must have a Solar Reflectance Index (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof surface:

Roof Type	Slope	SRI
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	≥ 2:12	29

OR

- b. Install a "green" (vegetated) roof that covers at least 50% of the roof area.

OR

- c. Install a combination of high albedo and vegetated roof that collectively covers 75% of the roof area per LEED requirements.

$$\frac{\text{Area of High Reflective Roof Meeting Minimum SRI}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.5} \geq \text{Total Roof Area}$$

Roof Type	Slope	SRI
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	≥ 2:12	29

- d. Refer to LEED 2009 Edition Reference Guide for additional information and SRI calculation standards.
3. The roof and insulation system shall comply with ASHRAE 90.1 energy requirements.
 4. The roof surfacing product shall be Energy Star-qualified and certified by the Cool Roof Rating Council (CRRC) www.coolroofs.org.
 5. Consider the use of flat roofs for stormwater retention. Captured rainwater may be reused on-site for toilet flushing or irrigation.

F. PRODUCTS

1. SBS-Modified Bitumen Roofing Membrane System
 - a. General Description: Roof membrane assembly consisting of a minimum of two plies of a prefabricated, polyester and/or glass fiber-reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) modified asphalt sheet, applied over a prepared substrate including vapor retarder and polyisocyanurate board roof insulation.
 - i. Roof assembly shall include base sheet, base sheet flashing, cap sheet with granular top surface, and cap sheet flashing, all provided by the selected roofing system manufacturer.
 - ii. Cap sheet granule color shall be white. Cap sheet or roof coating shall have a minimum SRI value of 78. Refer to the Roof Coating section herein for additional requirements.
 - b. Provide auxiliary roofing membrane accessories recommended by the roofing system manufacturer for intended use and compatible with roofing membrane.
 - c. Acceptable Manufacturers, or equal subject to compliance with requirements:
 - i. Henry Company
 - ii. GAF Materials Corporation
 - iii. Firestone Building Products
 - iv. Johns Manville, Inc.
 - v. Siplast

2. Ketone Ethylene Esther (KEE)/Ethylene Interpolymer (EIP) Membrane Roofing
 - a. Ketone ethylene ester or ethylene interpolymer (EIP) alloy, reinforced with knitted polyester fabric roofing membrane system. Other materials shall include, but are not limited to, vapor retarder, polyisocyanurate insulation, protection board, and felt underlayment. Roof insulation components shall be manufactured or approved by KEE membrane roofing manufacturer.
 - b. Roofing membrane shall be a heat-weldable, 0.045" thick membrane.
 - c. KEE Sheet: ASTM D6754, fabric reinforced and fabric backed
 - d. Exposed Face Color: White
 - e. A slip sheet or separation layer shall be provided as required by the system selected, surface texture of the substrate, environmental and/or fire classification requirements of the project roof assembly.
 - f. Accessories:
 - i. Provide membrane accessory materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing. Accessories to include but not limited to sheet flashing, bonding adhesive, sealers, metal termination bars, and expansion joint fillers.
 - ii. Provide miscellaneous accessories including but not limited to t-joint covers, termination reglets, cover strips, and other accessories as required for installation of roofing system.
 - iii. Flashing:
 - a.) Sheet flashing: Same material as roof membrane
 - b.) Penetrations and Corners: Unreinforced, uncured sheet, nominal 0.055 inch (1.4mm)
 - c.) Metal flashing, sheet metal and fasteners: Provide in accordance with membrane manufacturer's specifications.
 - g. Acceptable Product and Manufacturers or equal subject to compliance with requirements:
 - i. FiberTite XT by Seaman Corporation
3. Hot Fluid Applied Rubberized Asphalt Membrane Roofing System
 - a. Horizontal membrane waterproofing system shall include a primer and 2-ply hot, fluid applied, reinforced rubberized asphalt membrane. System materials shall include membrane, insulation, filter fabric, and precast concrete pavers as required.
 - b. Fabric Reinforcement: Polyester fabric reinforcement sheet, an inorganic spun bonded polyester fabric sheet with sufficient porosity, shall be provided to allow good interply bonding between layers of waterproofing membrane.
 - c. The hot fluid applied rubberized asphalt membrane product shall contain an inert clay filler to enable the product to be resistant to acids (fertilizers, building washes and acid rain).
 - d. Accessories:
 - i. Provide all required accessories including, but not limited to, flashing, reinforcing sheet, primer, protection/separation sheet, drainage board and paver pedestals.
 - ii. Provide quantity of paver pedestals, and thicknesses and quantity of leveling plates, as required to provide level installation of top surface of pavers.

- iii. Miscellaneous accessories shall include, but are not limited to, joint tapes, adhesives, splicing cement and other as recommended by membrane manufacturer.
- e. Acceptable Products and Manufacturers:
 - i. 790-11EV by Henry Company
 - ii. Monolithic Membrane 6125 by American Hydrotech
- f. Equal products from the following manufacturers are acceptable subject to compliance with requirements:
 - i. American Permaquik
 - ii. Barrett Company
 - iii. Carlisle Coatings & Waterproofing, Inc.

G. ROOF COATING

- 1. General: Architect shall specify a high reflective roof surface complying with the following:
 - a. Solar reflectivity and thermal emittance in accordance with ASTM E903, ASTM E408, and ASTM C1371.
 - b. LEED requirements for Sustainable Sites Credit 7.2, Heat Island Effect - Roof - compliant with reflectivity (ASTM E-903) and emissivity (ASTM E-408); SRI value = 78 minimum.
 - a. Radiative property values that are rated by a laboratory accredited by the Cool Roof Rating Council (CRRC).
 - b. U.S. EPA Energy Star-qualified.
 - c. Comply with accelerated weathering test conditions per ASTM D4798.
- 2. Elastomeric coatings are preferred over other cool roof surface products such as white single ply membranes for their longer term performance.
- 3. Thermoplastic Membrane Roofing: Architect shall select a membrane with a white surface color with roof coating criteria aforementioned, without need for application of an additional coating.
- 4. Roof edges, seams, and corners shall also have roof coating.
- 5. Types:
 - a. Elastomeric Coating: Comply with ASTM D6083; Water-based acrylic latex, elastomer emulsion coating formulated for use on SBS modified bituminous roof cap sheet; coating and underlying roof membrane must be compatible.
 - i. Top Coat Color: White
 - ii. Coating shall be applied as two-coats. Roof top coat and base coat shall be as manufactured or recommended by roofing membrane manufacturer.
 - iii. For existing roofs with water ponding tendencies, depressions where ponded water accumulates must first be treated prior to application of coatings. Architect shall specify use of manufacturer's recommended products to create positive drainage in those areas.
 - iv. Acceptable Products and Manufacturers, or equal subject to compliance with requirements:
 - a.) #291 Premium Elastomeric Base Coat and HE280DC White Elastomeric Roof Coating by Henry Company
 - b.) TopCoat Base Coat and TopCoat EnergyCote Elastomeric Coating by GAF.

- a) In lieu of a site-applied cool roof coating, Architect may specify the following SBS-modified cap sheet system which includes a factory-applied layer of TopCoat EnergyCote: Ruberoid Energy Cap SBS system includes a factory-applied layer of TopCoat EnergyCote elastomeric coating.
- c.) Acrylic Base Coat and AcryliTop PC-100 White by Firestone Building Products
- d.) TopGard 4000/TopGard 5000 by Johns Manville
 - a) In lieu of a site-applied cool roof coating, Architect may specify one of the following SBS-modified bitumen cap sheet systems which include a factory-applied white, acrylic cool roof coating. Architect shall specify one of the following systems as appropriate to application techniques and manufacturer's recommendations:
 - i) DynaKap FR CR SBS-modified bitumen cap sheet (composite fiber glass/polyester-reinforced mat) includes a white, acrylic cool roof coating.
 - ii) DynaGlas FR CR SBS-modified bitumen cap sheet (fiberglass-reinforced mat) includes a white, acrylic cool roof coating.
 - iii) DynaLastic FR CR SBS-modified bitumen cap sheet (polyester-reinforced mat) includes a white, acrylic cool roof coating.
 - b. Synthetic Chip Embedment on Cap Sheet: Reflective synthetic chips fused to modified bitumen on the finish ply surface
 - i. Acceptable Products and Manufacturers or equal: Equivalent to Paradiene 30 CR FR by Siplast, Inc. or approved equal product/manufacturer subject to compliance with requirements

H. ROOF INSULATION

1. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses as required.
 - a. Rigid insulation shall not be manufactured with or contain CFC or HCFC agents.
 - b. Comply with current ASHRAE 90.1 requirements for the minimum required prescriptive R-value for roof insulation.
2. Polyisocyanurate Board Insulation:
 - a. Insulation board consisting of rigid closed-cell polyisocyanurate foam core bonded to top and bottom layers of non-asphaltic fiber glass mat, complying with ASTM C 1289, Type II, Class I, Grade 2.
3. Tapered Insulation:
 - a. Provide in thicknesses, slopes, and configurations only where required to create positive slope to drainage locations where roof structure is not sloped.
 - b. Factory-tapered insulation board consisting of rigid, closed-cell polyisocyanurate foam core bonded to top and bottom layers of non-asphaltic fiber glass mat; complying with ASTM C1289, Type II
4. Saddles, crickets, edge strips and other:

- a. Provide preformed saddles, crickets, tapered edge strips, and other insulation in shapes and thicknesses as required for sloping to drains.
5. Insulation Accessories:
 - a. Roof insulation accessories shall be recommended by insulation manufacturer for intended use and compatible with membrane roofing.

I. COVER BOARD

1. Cover Board shall be a high density, prefabricated board manufactured for use as a recover board over insulation and be compatible with the membrane roofing system; one of the following types:
 - a. Asphaltic board: Fiberglass-faced asphalt board; smooth faces
 - b. Insulation board with reinforced perlite core and asphalt emulsion coating on top surface
 - c. Glass-mat reinforced gypsum board
2. Acceptable Products and Manufacturers, or equal:
 - i. DensDeck by Georgia-Pacific Gypsum, LLC.
 - ii. Re-Cover Board s/s by Henry Company
Duraboard by Johns Mansville/Invinsa Roof Board by Johns Manville

J. PRECAST CONCRETE PAVERS

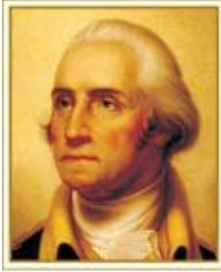
1. Pavers shall have a minimum SRI value of 78 to meet requirements of LEED Sustainable Sites Credit 7.2, Heat Island Effect – Roof.
2. Colors and finishes:
 - a. Color: Glacier White
 - b. Size: Nominal 24” square by 2” thick; 22 psf minimum to 25 psf maximum
 - c. Finish: Tudor or Diamond, as needed
3. Acceptable Product and Manufacturer, or equal:
 - a. Prest Roof and Plaza Pavers by Hanover Architectural Products, Inc.

K. WALKWAYS

1. Walkway Pads: Provide walkway pads in locations where needed to create a complete traffic path to and from roof access door and window washing anchors and completely surround roof-mounted mechanical equipment. Walkway pad shall be slip-resistant, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer.
 - a. SBS-Modified Bitumen Roof System: Mineral-granule-surfaced, reinforced asphaltic composition, slip-resisting pads, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, 3/8 inch thick, minimum.
 - b. KEE Membrane: Provide factory-formed, nonporous, heavy-duty, slip-resistant, surface-textured walkway pads or rolls, approximately 20-mils thick.
 - c. Pad Size: Manufacturer’s standard
Color: To be selected by Architect from manufacturer’s full standard color range; visible color, not black.

END OF SECTION

DRAFT



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07920 JOINT SEALANTS

A. SUMMARY

This section contains design standards for joint sealants necessary to properly seal and weatherproof all interior and exterior joints such as perimeter of door, window and louver frames; expansion and control joints in masonry and concrete; exterior insulation and finish system; between plumbing fixtures and walls; around penetrations in walls, ceilings, and floors; and any other work as required.

For related work refer to the following specification guidelines for additional information:

- 06400 Architectural Woodwork
- 08110 Steel Doors and Frames
- 08410 Aluminum Entrances and Glazed Aluminum Curtain Walls
- 08515 Aluminum Windows
- 08800 Glass and Glazing
- 09250 Gypsum Board

B. GENERAL

1. General Material Requirements:
 - a. Provide specific materials recommended by the manufacturer for the particular application or condition of use in each case as required to fulfill system requirements.
 - b. The hardness or consistency of elastomeric sealants shall be determined in consultation with the manufacturer and consider joint movement and weather exposure for joint size indicated.
 - i. Sealant characteristics must be consistent with exposure to wear, abrasion, and vandalism.
 - ii. Sealants exposed to traffic shall have strength and elasticity characteristics to resist damage from traffic and indentation by stiletto heels.
 - c. Back-up materials or joint filler shall be installed as required or detailed.
 - d. Joint filler materials shall comply with manufacturer specifications and consider joint conditions, movement, and proposed sealants.
 - e. Joint sealants containing toxic or hazardous substances are not permitted.

- f. VOC content of interior sealants and sealant primers shall comply with the following limits for VOC content when calculated per 40 CFR 59, Part 59, Subpart D (EPA Method 24):
 - i. Architectural Sealants: 250 g/L.
 - ii. Sealant Primers for Nonporous Substrates: 250 g/L
 - iii. Sealant Primers for Porous Substrates: 775 g/L
- g. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- 2. Performance Requirements:
 - a. Design, manufacture, and install joint sealants to establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.
 - b. Stain-Test-Response Characteristics: Sealant shall be non-staining to porous substrates when tested in accordance with ASTM C1248.
 - c. Compatibility and Adhesion: Provide only joint sealants, primers, and other substances which are compatible with each other and joint surfaces and will adhere to joint surfaces.
 - d. Range of Hardness: In general, sealants shall have range of hardness suitable for degree of movement and weather exposure in particular application.
- 3. Color Requirements:
 - a. Architect shall make final color selection.
 - b. Sealant materials exposed to view shall match colors of adjacent surfaces.
 - i. Provide custom colors to match Architect's samples.
 - c. Provide custom-blended colors as needed for color matching as follows:
 - i. Sealant Joints in Masonry: Match mortar color
 - ii. Joints in Cast Stone: Match color of matrix
 - iii. Joints Around Doors, Windows, and Openings: Match color of adjacent wall material
 - iv. Joints in Tile: Match grout color
 - v. Joints in Floors: Match control sample provided by Architect
 - d. Fully concealed joints:
 - i. As selected by Architect from manufacturer's full color range which has best overall performance characteristics required for application

C. PRODUCTS

Subject to compliance with system requirements, joint sealants that shall be incorporated in the Project include, but are not limited to, the following:

- 1. Silicone Sealant
 - a. One part, nonsag, neutral cure, silicone sealant, capable of $\pm 50\%$ joint movement complying with ASTM C719, ASTM C920, Type S, Grade NS,
 - b. Acceptable products and manufacturers or equal:
 - i. 795 Silicone Building Sealant; Dow Corning Corp.
 - ii. Silpruf SCS2000; GE Silicones
 - iii. 864; Pecora Corp
 - iv. Spectrum 3; Tremco, Inc.
 - c. Locations: Typical exterior joints in vertical surfaces and in horizontal non-traffic surfaces

2. Polyurethane Sealant
 - a. Multi-component, polyurethane-based elastomeric sealant, self-leveling and with compatible non-sag sealant for use on slopes, capable of $\pm 25\%$ joint movement complying with ASTM C719, ASTM C920, Type M, Grade P, Class 25. Uses T, M, A, and as applicable to joint substrates indicated, O.
 - b. Acceptable products and manufacturers or equal:
 - i. Urexpan NR-200; Pecora Corp.
 - ii. SL 2 Sealant; Sonneborn Building Products Div., ChemRex Inc.
 - iii. THC 900/901; Tremco, Inc.
 - c. Locations: Typical exterior and interior horizontal traffic joints
3. Mildew-Resistant Silicone Joint Sealant
 - a. One part, non-sag, elastomeric silicone sealant containing fungicide for mildew resistance complying with ASTM C920, Type S, Grade NS, Class 25
 - b. Acceptable products and manufacturers or equal:
 - i. 786 Mildew Resistant; Dow Corning Corp.
 - ii. Sanitary 1700; GE Silicones
 - iii. 898 Silicone Sanitary Sealant; Pecora Corp.
 - iv. Tremsil 200; Tremco
 - c. Locations: Interior use in wet locations, and all toilet and shower rooms, plumbing fixtures, lavatory countertops, etc.
4. Latex Joint Sealant
 - a. Latex acrylic emulsion compound, permanently flexible, non-staining and non-bleeding, paintable, conforming to ASTM C834.
 - b. Acceptable products and manufacturers or equal:
 - i. AC-20 Acrylic Latex; Pecora Corporation
 - ii. Sonolac; Sonneborn Building Products Div, ChemRex, Inc.
 - iii. Tremflex 834; Tremco, Inc.
 - c. Locations: Typical interior joints in vertical surfaces and in horizontal non-traffic surfaces, except as otherwise noted; paintable
5. Acoustical Sealant
 - a. Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834. Product shall effectively reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - b. Acceptable products and manufacturers or equal:
 - i. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corporation
 - ii. Sheetrock Acoustical Sealant; USG Corporation
 - c. Locations: Interior acoustically sealed joints exposed or exposed above ceilings
6. Acoustical Sealant for Concealed Joints
 - a. Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
 - b. Acceptable products and manufacturers or equal:
 - i. BA-98; Pecora Corporation
 - ii. Tremco Acoustical Sealant; Tremco

- c. Locations: Concealed interior acoustically sealed joints at metal stud tracks
- 7. Expanding Foam Sealant
 - a. Manufacturer's standard preformed, precompressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water-based polymer-modified acrylic emulsion; factory-produced in precompressed sizes and in roll or stick form to fit joint widths indicated, depth as recommended by manufacturer for size of joint:
 - b. Properties: Permanently elastic, mildew-resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants
 - c. Density: Manufacturer's standard
 - d. Acceptable Product and Manufacturer or equal:
 - i. Backerseal (Greyflex); Emseal Corp.
 - ii. Polytite B; Dayton Superior Corp.
 - iii. Willseal 600; Illbruck Sealant Systems

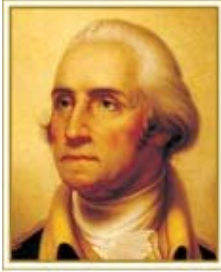
D. ACCESSORIES

- 1. Joint Fillers
 - a. Backer Rod
 - i. Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding flexible plastic foam rod; compatible with joint substrates, sealants, and primers; of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance complying with ASTM C1330
 - ii. Locations: Provide for bond breaker and support for elastomeric sealants and elsewhere as indicated and required by sealant manufacturer for proper application of sealant

E. INSTALLATION

- 1. Joint sealant installation shall be in strict accordance with manufacturer's instructions.

END OF SECTION



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08110 STEEL DOORS AND FRAMES

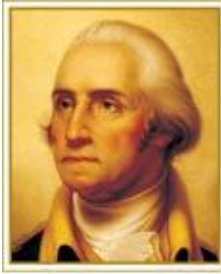
A. SUMMARY

This section contains design standards for steel doors and frames. Refer to building type design standards for additional information.

B. STANDARDS

1. Doors
 - a. Dimensions, interior and exterior: as indicated in building type design standards
 - b. All U/L labels shall be intact and clearly visible.
 - c. To be shop-finished
 - d. Provide vision panel as appropriate.
2. Frames, unless otherwise noted, required by fire ratings, accessibility requirements, or other code requirements:
 - i. Interior: 16 gauge or .053", minimum thickness
 - ii. Exterior: 14 gauge or .067", minimum thickness; galvanized
 - iii. For openings greater than 4' wide, provide frames at least .014" thicker than indicated above
 - iv. Standard 2" frame facing
 - v. Knock-down frames are not acceptable.
 - vi. One-piece, fully welded with mitered and reinforced corners
 - vii. Welds on exposed faces to be ground smooth and flush as required to provide seamless faces and edges
 - viii. Jamb anchors: provide 3 per jamb up to 7'-0" high; provide 4 per jamb over 7'-0" high
3. Provide piano hinges for heavy use doors.

END OF SECTION



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08210

FLUSH WOOD DOORS

A. SUMMARY

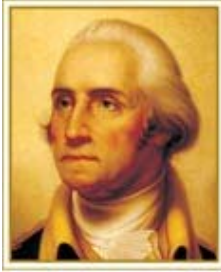
This section contains design standards for flush wood doors. Refer to building type design standards for additional information.

B. STANDARDS

1. Unless otherwise noted, required by fire ratings, accessibility requirements, or other code requirements:
 - a. Door properties
 - i. Dimensions: as indicated in building type design standards
 - ii. Construction
 - a.) Solid core, non-fire-rated: hot press 5-ply construction, solid core bonded to stiles and rails with waterproof glue. Provide agricultural board core in lieu of particle board core where budget allows. Cross band: manufacturer's standard hardwood veneer or engineered composite.
 - b.) Solid core, fire-rated: hot press 5-ply construction, solid mineral core as required by rating. Cross band: manufacturer's standard fire-retardant-treated hardwood veneer or engineered composite. All U/L labels shall be intact and clearly visible.
 - c.) Hollow core doors are not acceptable.
 - iii. Finish and Material
 - a.) For natural or stained wood doors: flush, stain grade, solid maple with minimum two coats of shop-applied polyurethane.
 - b.) For painted wood doors: flush, paint grade solid birch, primed and painted in the shop.
 - b. Vision panel, where required, shall meet the following requirements unless otherwise noted:
 - i. Vision panel placement shall comply with barrier-free design and visual access.
 - ii. Option 1:
 - a.) Doors proximate to perimeter fenestration may have full glazing or full height vision panel to maximize interior daylighting in order to contribute towards optimum indoor environmental quality and LEED requirements.
 - iii. Option 2:
 - a.) Maximum area: 100 square inches

- b.) Vision panel to begin 6" from door's leading edge and 42" AFF, maximum, and run up to 62" AFF, minimum.
- iv. Unless otherwise noted, vision panel glazing shall be clear, 6 mm or 1/4" thick; float or tempered glass, as required by code.
- v. Refer to design standards for possible requirements for partially limiting visibility via sandblasting or fritting the glass.

END OF SECTION



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08410

ALUMINUM ENTRANCES AND GLAZED ALUMINUM CURTAIN WALL

A. SUMMARY

This section contains design standards for storefront entrance doors, exterior and interior aluminum-framed storefronts, aluminum framing for glass, and curtain wall systems.

Refer to building space standards and related specification guideline sections including the following for additional information:

- 07920 Joint Sealants
- 08110 Steel Doors and Frames
- 08710 Door Hardware
- 08800 Glass and Glazing

B. GENERAL

1. Reference Standards:
 - a. AAMA "Aluminum Curtain Wall Design Guide Manual"
 - b. NAAMM "Metal Finishes Manual"
 - c. The Aluminum Association, Inc., "Specifications for Aluminum Structures"
 - d. CPSC 16CFR 1201 Safety Standard for Architectural Glazing Materials
2. Glass entrances, storefronts, and glazed aluminum curtain wall systems shall comply with all reference standards, regulatory requirements, applicable codes, testing criteria, and manufacturer's specifications.
3. Electronically-operated locking devices at egress openings shall comply with all regulatory requirements, applicable codes and related GW standards including GW CFT Security and Access Standards. Electronically operated locking devices and security devices shall be connected to building fire alarm system so that when smoke/heat detectors are activated, the electric locking mechanisms will be disengaged and allow free, unrestricted egress through opening.

C. SYSTEM REQUIREMENTS

1. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:
 - a. Structural loads.
 - b. Seismic movements.
 - c. Thermal movements.

- d. Movements of supporting structure including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
 - e. Dimensional tolerances of building frame and other adjacent construction.
 - f. Failure includes the following:
 - i. Deflection exceeding specified limits.
 - ii. Thermal stresses transferred to building structure.
 - iii. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
 - iv. Glazing-to-glazing contact.
 - v. Noise or vibration created by wind and thermal and structural movements.
 - vi. Loosening or weakening of fasteners, attachments, and other components.
 - vii. Sealant failure.
 - viii. Failure of operating units to function properly.
 - g. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminum-framed systems without failing adhesively or cohesively. Provide sealant that fails cohesively before sealant releases from substrate when tested for adhesive compatibility with each substrate and joint condition required.
 - h. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 - i. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.
2. Design Factor of Safety: Structural components including members, glazing stops, or gaskets, connection adhesives and sealants shall be designed and fabricated with factor of safety in accordance with ASTM E330.
3. Thermal Break Construction:
- a. Provide system tested to demonstrate resistance to thermal conductance and condensation and tested to show adequate strength and security of glass retention.
 - b. Provide aluminum components with integrally concealed low conductance thermal barrier, located between exterior materials and window members exposed on interior, eliminated direct metal-to-metal contact.
4. Systems shall be designed, fabricated, and installed to prevent leakage of water or air into the building under specified test conditions and specified performance requirements. Comply with ASTM E331; ASTM E283.
5. All-Glass Entrance Doors:
- a. All-glass entrances shall be designed to withstand all loads resulting from heavy traffic condition using selected hardware, without permanent measurable deflections. Deflections shall be limited to normal extent of strength required to avoid glass breakage, air filtration and other negative results of excessive flexibility. Entrances shall withstand building movements including thermal movement, loading deflections, shrinkage and other movements.
6. Curtain wall systems shall be designed, fabricated, and installed to withstand design wind pressures with other design loads in compliance with ASCE 7 times design factor for safety and tested in accordance with ASTM E330.
7. Curtain wall system drainage shall be zone drained, i.e. collect water that penetrates the glazing within the glazing pocket and weep it to the exterior

through weepholes in the horizontal sill frame sections. Drainage design shall prevent migration of water into the vertical mullions.

8. Sealant Compatibility: Sealants specified shall be verified for compatibility with intended finishes and coatings through testing procedures in accordance with sealant manufacturer.

D. MATERIALS

1. Aluminum Extrusions:
 - a. Provide custom extrusions for aluminum framing and cladding systems to fulfill performance requirements but not less than 1/8" thick
2. Aluminum Sheets and Plates:
 - a. Provide sizes and shapes as required to fulfill performance requirements.
 - b. Provide alloy and temper recommended by manufacturer and suitable for type of use and finish as designed
3. Glazing Systems:
 - a. Glazing: As specified in Division 08800 Section "Glass and Glazing."
 - b. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
 - c. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

E. COMPONENTS

1. Aluminum Framing System:
 - a. Provide glazing channel with minimum clearance for thickness and type of glass indicated per GANA requirements or manufacturer's recommendations
 - b. Design framing system to accommodate components including operable doors
 - c. Framing Anchors:
 - i. Provide anchors with adjustment options to accommodate fabrication and construction tolerances
 - ii. Use materials and protective coating recommended by manufacturer
 - d. Flashing: Provide corrosion-resistant, non-staining, non-bleeding and compatible with adjoining materials
 - e. Finish: Fluoropolymer coating
2. Glass Entrance Doors
 - a. Swinging doors shall be 1/2" thick, fully tempered, clear glass; ASTM C1048. Provide doors with continuous rails at top and bottom of door; satin polish stainless steel finish
 - b. Swinging doors shall be provided with center-hung pivots, floor closers, full-height vertical push/pull bars, manufacturer's standard weather seals, and stainless steel saddle thresholds. Provide doors with low kinetic energy power door operator system consisting of electrically powered floor closers to provide easy access.
 - c. Weatherstripping for exterior doors shall be continuous at head, jambs, and door bottoms.
3. Curtain Wall
 - a. The curtain wall system shall be designed by the Architect in conjunction with an acceptable curtain wall manufacturer to ensure consistency with the manufacturer's design standards. The Architectural design must clearly

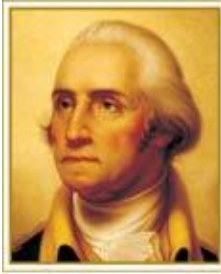
- define all support and attachment points, and perimeter flashings at the head, jamb, and sills.
- b. Curtain wall system shall be a self-supporting unitized façade with external structural glazing, without externally visible frame profiles. Anchors and connections shall be provided in compliance with manufacturer's specifications.
 - c. Curtain wall system shall utilize 1", dual pane insulated glass, fully tempered; manufacturer's thermal barrier system. Glazing gaskets shall be silicone compatible elastomeric extrusions complying with ASTM C864.
 - d. Framing shall provide for flush glazing on all sides.
 - e. Face dimensions shall be 2-1/2" nominal with depth as needed to fulfill performance requirements.
 - f. The A/E shall specify that a fabricator/erector shall have a minimum of 5 years successful experience in fabrication and installation of work.
 - g. Provide 3 coat metallic aluminum finish as noted herein.
4. Aluminum Finish:
- i. Exposed aluminum surfaces shall receive an architectural finish conforming to AA DAF-45
 - ii. 3-coat metallic fluoropolymer coating complying with high performance requirements of AAMA 2605 and NAAM Metal Finishes Manual, section AMP 501. Provide a thermocured system consisting of specially formulated inhibited primer, a fluoropolymer color coat, and a clear fluoropolymer topcoat. Both color and clear coat shall contain not less than 70% fluoropolymer resin by weight and be manufactured by one of the following:
 - a.) Kynar 500 by Arkema Group
 - b.) Hylar 5000 by Ausimont USA
 - iii. Colors as selected by Architect.
 - iv. Aluminum finish shall be one of the following:
 - a.) Akzo – Trinar TMC
 - b.) PPG – Duranar XL
 - c.) Valspar – Fluropon Classic
5. Acceptable Manufacturers, or equal:
- a. All-Glass Entrances:
 - i. ACI Distribution
 - ii. Blumcraft of Pittsburgh
 - iii. Dorma Glass
 - iv. Guardian Glass Industries
 - v. Virginia Glass Products Corporation.
 - b. Glazed Aluminum Curtain Walls:
 - i. EFCO
 - ii. Kawneer
 - iii. Oldcastle
 - iv. Wausau Metals Corporation
 - v. YKK AP America, Atlanta, GA
 - vi. Vistawall
6. Hardware shall comply with GW Design Standards Specification Guideline sections 08710, 08711, and be approved by GW Locksmith. Include the following components:
- a. Custom pulls

- b. Overhead concealed closers
- c. Automatic power operators, push-button operated, as required
- d. Pivot sets
- e. Floor-mounted stops
- f. Exit devices
- g. Weatherstripping
- h. Security hardware per GW CFT Security and Access Standards
- i. Finish: Satin chrome

F. ACCESSORIES

1. Provide fasteners for attachment of components to structural supports and for connecting components as recommended by component manufacturer and selected to prevent any galvanic action with components fastened.
2. Provide insulating materials as required.
3. Provide joint sealants at perimeter of aluminum-framed systems, or as otherwise required, as specified in Division 7 Section "Joint Sealants."
4. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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08520 ALUMINUM WINDOWS

A. SUMMARY

This section contains design standards for fixed and operable aluminum-framed windows including hardware and related components. While there may occasionally be special circumstances that require a historic approach not covered herein, most windows on campus shall be aluminum-framed and with the qualities noted below.

1. Where windows on a historic building are to be replaced, Architect shall ensure that replacement windows are in character with the building architecture and comply with requirements set forth by the District of Columbia Office of Planning and the Historic Preservation Office (HPRB). Window standards for historic buildings and historic districts may be accessed at www.planning.dc.gov (DCMR Title 10A, Chapter 23 Standards for Window Repair and Replacement. GW seeks to avoid the use of wood windows wherever possible due to maintenance issues thus Architect shall seek to specify a comparable aluminum window that meets the approval of HPRB.

Refer to building type design standards and the following related specification guideline sections for additional information.

- 07920 Joint Sealants and Caulking
- 08800 Glass and Glazing

B. GENERAL

1. Reference Standards include but are not limited to the following:
 - a. AAMA/NWWDA 101/I.S.-2/NAFS "Voluntary Specifications for Aluminum, Vinyl, and Wood Windows and Glass Doors"
 - b. NAAMM "Metal Finishes Manual"
 - c. Insulating Glass Certification Council
2. All aluminum windows must be AAMA-certified with attached label, heavy commercial grade, high-performance units of types required by the design or required to match existing window units.
3. All window assembly components shall be metal. Plastic materials are not acceptable. All screws and other miscellaneous fastening devices incorporated in the window unit shall be concealed within the window assembly.
4. Detailing shall provide for drainage, weepage, flashing, etc. for a weather tight installation.

5. Window assembly shall stop both air and water infiltration and prevent interior surface condensation.
6. Residence Halls shall have operable windows.
7. Sustainable Design:
 - a. The components, processes, and assemblies described herein and specified by Architect shall contribute towards applicable credits for LEED certification in accordance with USGBC's LEED for New Construction and Major Renovation. In particular, Architect shall consider credits such as EA Credit 1: Optimize Energy Performance for overall U-factor and solar heat gain coefficient (SHGC), MR Credit 4.1 and 4.2: Recycled Content for aluminum framing, MR Credit MR 5.1 and 5.2: Regional Materials, EQ Credit 4.1 and 4.2: Low-Emitting Materials (adhesives, sealants / paints and coatings), and EQ Credit 8.1 and 8.2: Daylight and Views.

C. SYSTEM REQUIREMENTS

System requirements shall include the following:

1. Design Requirements:
 - a. Drawings shall indicate design concept, size, shape, and location of various components.
 - b. Design modifications:
 - i. May be proposed by manufacturer to satisfy performance requirements.
 - ii. Conform to design and specified durability and strength
 - iii. Maintain profiles and alignments shown
2. Performance Requirements:
 - a. Aluminum windows shall comply with requirements of AAMA/NWWDA - 101/I.S.2 and 101/I.S. 2/NAFS for specified window performance classes and grades, and with the following performance requirements where they exceed requirements of the referenced standard.
 - b. Structural Performance Requirements: All aluminum windows shall comply with the most stringent structural performance requirements:
 - i. Uniform load structural test: Window unit shall be tested at 1.5X design pressure and in compliance with ASTM E330. There shall be no glass breakage or permanent damage to any member including fasteners and hardware or permanent deformation of main frame or sash section on excess of 2% of its span.
 - ii. Uniform load deflection test: Window unit shall be tested at design pressure in compliance with ASTM E330. There shall be no glass breakage or permanent damage to any member and no deflection of any unsupported span more than 1/175 of its span or 3/4", whichever is less.
 - c. Thermal Movements: Components shall withstand thermal expansion and contraction forces resulting from a surface temperature range of minus 30°F to plus 180°F, without buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.
3. Air Leakage and Water Penetration Performance Requirements:
 - a. Window assemblies, including joints between windows and other work, shall effectively prevent leakage of water and air into building under any combination of performance requirements when tested in accordance with ASTM E283, ASTM E331 and ASTM E547.

- b. System shall be designed so that gutters and weeps drain water to the exterior face of windows.
- 4. Condensation-Resistance Factor (CRF): Provide high-performance condensation resistance factor for glass and frame according to AAMA 1503.
- 5. Thermal Break System Requirements:
 - a. Window systems shall be tested to demonstrate resistance to thermal conductance and condensation, and tested to show adequate strength and security of glass retention.
 - b. Provide aluminum components with integrally concealed low conductance thermal barrier, located between exterior materials and window members exposed on interior, eliminating direct metal-to-metal contact.
- 6. Thermal Transmittance: Provide aluminum windows with a whole-window, U-value not to exceed 0.50 Btu/sq.ft./hr/° F at 15 mph exterior wind velocity, when tested according to AAMA 1503.
- 7. Forced Entry Resistance: Window units shall be designed, fabricated, and installed to comply with requirements for Performance Level 10 when tested in accordance with ASTM F588.
- 8. Sealant Compatibility Requirements: Sealants shall be compatible with intended finishes and coating through adhesion and peel testing in collaboration with sealant manufacturer.

D. MATERIALS

- 1. Aluminum Extrusions:
 - a. Shapes and sizes as required to fulfill performance requirements; not less than 0.125" thick for principal frame and sash members
- 2. Aluminum Sheets and Plates
 - a. Sizes and minimum gages as required to fulfill performance requirements
 - b. Suitable alloy for forming and fabrication requirements with adequate temper and structural characteristics and suitable for finishing
- 3. Carbon Steel: High strength, low alloy products or structural steel as required to fulfill performance requirements
- 4. Glass: Refer to Section 08800 Glass and Glazing.

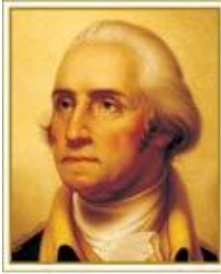
E. PRODUCTS

- 1. Window Units:
 - a. Types:
 - i. Fixed
 - ii. Single-Hung
 - iii. Casement
 - b. Designations: Provide units of performance complying with requirements as described in AAMA/NWWDA 101/I.S-2.
 - c. Frames: Provide thermally broken frame, depth as required
 - d. Provide simulated divided lite window units, as appropriate on architectural style, as follows:
 - i. Exterior: Extruded profiles, forming grilles independent of glass lites
 - ii. Interior: Flat bar adhered to glass surface
 - e. Window sills shall be aluminum, with the color coordinated to match window frames. When the budget allows, solid surface sills are preferred for residential windows.

- f. Systems by the following manufacturers, or equal, are acceptable, subject to compliance with performance and finish requirements and design profile limitations:
 - i. Wausau Windows and Doors, Wausau, WI
 - ii. EFCO Corporation, Monett, MO
 - iii. TRACO, Cranberry Township, PA
 - iv. Skyline Windows, Bronx, NY
 - v. Kawneer, An Alcoa Company, Harrisonburg, VA
- 2. Aluminum Finish:
 - a. Exposed surfaces of aluminum windows shall have a fluoropolymer finish (high-performance, thermoplastic, organic coating) which shall comply with AAMA 2605 and with the coating manufacturer's written instructions.
 - b. Color and gloss shall be selected from the manufacturer's standard color range by Architect
 - i. Coating Quantity: Manufacturer's standard 3 coat application.
- 3. Glazing System:
 - a. Provide manufacturer's standard gasket glazing system as required to fulfill performance requirements
 - b. Provide setting blocks, spacers, and other glazing accessories as required for complete installation.
 - c. Factory-glaze units
- 4. Glass:
 - a. 1" thick, clear, high-performance, low-e insulating glass, certified CBA level by IGCC
 - b. Refer to Section 08800 Glass and Glazing for requirements
- 5. Insect Screens (Residence Halls only):
 - a. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Locate screens on outside of window and provide for each operable exterior sash or ventilator.
 - b. Aluminum Insect Screen Frames: Provide manufacturer's standard aluminum alloy complying with SMA 1004. Provide tamper-resistant fasteners, operable by Facilities Maintenance staff only.
 - i. Extruded-Aluminum or Aluminum Tubular Framing Sections and Cross Braces: Not less than 0.050-inch wall thickness.
 - ii. Finish: Match finish system and color of aluminum interior window members.
 - iii. Aluminum Wire Mesh Fabric: 18-by-16 aluminum wire mesh
 - a.) Mesh fabric shall comply with ASTM D 3656.
 - b.) Wire-Fabric Finish: Charcoal gray
- 6. Security Screens shall be provided at ground floor installations. Units shall be capable of resisting vandalism, including thrown rocks and bottles; tool and determined effort required for break-in. Refer to GW "CFT Security and Access Standards" for additional information. Provide tamper-resistant fasteners, operable by Facilities Maintenance staff only.
- 7. Windows readily accessible from the outside shall include glass break detectors. Refer to GW "CFT Security and Access Standards" for additional information.
- 8. Hardware:
 - a. Provide manufacturer's standard design for type of installation and operation.

- b. Hardware shall have corrosion-resistant material compatible with aluminum, window members and designed to operate smoothly, tightly close, and securely lock window and sized to accommodate sash weight and dimensions.
- c. Hardware shall be white metal or match the window frame.
- d. Sash locks
- e. Single-Hung Windows: Provide the following operating hardware:
 - i. Sash Balances: Two per sash.
 - ii. Handles: Applied sash lift bar on bottom rail of forward-placed operating sash; two per sash.
 - iii. Sash Lock
 - iv. Removable Lift-Out Sash: Design windows and provide with tamperproof hardware to permit removal of sash from inside for cleaning.
 - i. Stops/Limiter Device - Operable windows in Residence Halls shall be provided with a limiter device to restrict sash opening to 6 inches. Operation past this limit shall be by use of a tool or removable key only. Furnish two such tools for each floor of building.
- 9. Fasteners:
 - a. Provide fasteners for attachment of components to structural supports and for connecting components as recommended by component manufacturers and selected to prevent galvanic action with components fastened.
 - b. Fasteners shall be concealed wherever possible.
 - c. Provide tamper-resistant fasteners.
 - d. Where use of exposed fasteners, provide tamper-resistant fasteners that match finish of member or hardware being fastened.
- 10. Weatherstripping:
 - a. Provide full-perimeter weather stripping for each operable sash and ventilator.
- 11. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.
- 12. Weep Holes:
 - a. Provide weep holes and internal passages to conduct infiltrating water to exterior.
- 13. Miscellaneous trims and closures shall be provided as required for complete installation.

END OF SECTION



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08710 DOOR HARDWARE

A. SUMMARY

This section contains design standards for door hardware. Refer to building type design standards for additional information.

B. GENERAL

1. Door Hardware shall conform to The George Washington University's *CFT Security and Access Standards*.
2. Door Hardware shall conform to the *George Washington University Door Hardware Specification Guideline*. This document is maintained and updated as required by the Facilities Lock Shop Supervisor, currently Terrence Branch. The latest version at the time of writing is July 16, 2008.
 - a. Exceptions to the July 16, 2008 version of the *George Washington University Door Hardware Specification Guideline* are as follows:
 - i. For new construction and major renovation when the bulk of levers are to be new, provide Best lever style 14, curved with return.
 - ii. For renovations where the bulk of levers are to remain and are Best lever style 15, angled with return, provide same to match existing.
3. New locksets shall be mortise in all building types except as noted in Residence Halls. Existing cylinder locksets may be replaced by cylinder locksets, as appropriate.
4. For security reasons, exterior door hardware, including panic bars, shall not be a style that provides a closed loop that would allow someone to chain the doors shut, denying normal access.
5. Piano hinges shall be provided for heavy use doors.
6. Unless otherwise noted, or required by code or accessibility requirements:
 - a. Doors shall be provided with silencers.
 - b. Door stops, where required, shall be floor-mounted where space permits. Spring stops are unacceptable.
 - c. Provide only 7-pin interchangeable cores (I/C) and cylinders by Best Access System, except as required herein.
 - i. Residence Hall living unit locks, whether cylinder or mortise, must be provided with Best MX8 PATD (patented) cores. Other spaces in the residence halls, such as study lounges, common laundry rooms, common restrooms, and kitchens do not require PATD cores.
 - d. All strikes shall be ANSI strikes.
 - e. Levers to be stainless steel or zinc alloy.

- f. Hardware Finish
 - i. Best Access products shall be ANSI/BHMA finish 626/US26D.
 - ii. Visible hardware including, but not limited to, cylinders, deadbolts, hinges, stops, viewer, push plates, kick plates, closers, and levers, shall have ANSI/BHMA finish 626/US26D, Satin Stainless Steel or ANSI/BHMA finish 630/US32D, Satin Chrome Plated Steel, unless otherwise noted.
- g. Doors along residence hall corridors shall have spring hinges.
- 7. Installation Process: Project Manager shall follow typical process for installation as noted below:
 - a. The GC purchases all door hardware and related accessories including cores and keys.
 - b. Door hardware cores and keys are provided to the GW Lock Shop to be logged in.
 - c. The GC installs the cores.
 - d. GW Lock Shop issues keys.
 - e. Coordinate the steps noted above with GW Locksmith, Terry Branch.

C. STANDARDS FOR MISCELLANEOUS HARDWARE

Doorstops

- 1. Due to their superior installation strength, floor-mounted stops shall be selected over wall-mounted stops wherever suitable. For most applications, model selections shall conform to one of the following standards:
 - a. Floor-mounted: Cast brass, dome style floor stop with removable riser
 - i. Model, or equal: Rockwood 441CU
 - b. Wall-mounted: Cast brass with convex bumper
 - i. Model, or equal: Rockwood 400
- 2. Installation location:
 - a. Locate stops for maximum degree of door opening allowed by conditions of installation.
 - b. Locate floor stops so as not to create a tripping hazard.
 - c. Locate wall stops centered on spindle of lever handles.

Viewer

- 1. One-way viewer
- 2. Model: Ives U698 or equal

Kick Plate

- 1. Height: 8"-10"
- 2. Width
 - a. Single door: door width less 2"
 - b. Double doors: door width less 1"
- 3. Beveled on all sides
- 4. Installed with screws to match finish
- 5. Model: Hager Companies #194S or equal

Push and Pull Plates

1. Dimensions, unless otherwise required:
 - a. Height: 16"
 - b. Width: 6"-8"

Closers

1. Closers, whether concealed or surface mounted shall:
 - Be of heavy duty cast iron construction
 - Have arms of heavy duty, solid forged steel
 - Have full rack and pinion, independent closing speed and latch speed regulating valves, and adjustable back check
 - Allow for 180 degree door opening where partition construction will permit
2. Where closer is surface mounted, it shall be located on the least conspicuous door face (side opposite the public view).

Delayed Egress Lock

1. To conform with GWU Security and Access Standards
2. Manufacturer and Series: Chexit by Von Duprin, Indianapolis, IN, no exceptions
3. Comply with ANSI/BHMA A156.24
4. Description: self-contained, delayed egress system with key bypass; allowing delayed exiting after pushing on door.
 - a. Operation:
 - Applying 15-pounds or less pressure to device sends remote signal to security system, triggers unlocking sequence and sounds audible alarm.
 - Fifteen seconds after pushing on device, system releases to allow exiting. System automatically relocks after 45 seconds. System can be activated and de-activated by built-in key switch. Manufacture delayed egress locks to accept Best Access Systems Small Format Interchangeable Cores.
 - When delayed egress system is activated, delayed egress lock shall automatically disable alarm and unlock receipt of valid signal from access control system.
 - When delayed egress system is activated, delayed egress lock shall automatically unlock upon activation of fire and heat/smoke alarm system. Coordinate with installation and operation of fire and heat/smoke alarm system.
 - When delayed egress systems are installed on adjacent door leaves (e.g. pairs or banks of doors), devices shall be wired in sequence so that activation of one lock causes all devices in row to unlock.
 - Provide fail-safe application so that system unlocks in event of power failure.
5. Furnish with a satin stainless steel door-mounted sign with block capital letters 1-inch in height, reading, "PUSH UNTIL ALARM SOUNDS. KEEP PUSHING DOOR; DOOR CAN BE OPENED IN 15 SECONDS." Sign shall be located above and within 12" of the actuation device.

D. STANDARDS FOR LATCHSETS AND LOCKSETS

***Classroom, Computer Lab, Lecture Hall
Break-Out Room, Conference Room, Lounge, Study Room
Kitchen
Pantry
Mail, Files, Copy, Storage, and Similar Spaces
Laundry Room, Common
Trash and Recycling Room***

Mortise Style

for all new construction and replacement of existing mortise locksets

1. Required functions:

- Latch operated by: rotating inside lever; rotating the outside lever only when unlocked by key; or turning the key in the outside cylinder. (Note: The latchbolt is deadlocked with an auxiliary deadlatch.)
- Outside lever is locked by turning the key in outside cylinder.
- Outside lever is unlocked by turning the key in outside cylinder.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 45H-7-R-14H (see below). No alternate model will be accepted without approval.

Best Series: 40H

Pins: 7

Best Series Function Code: R ("Classroom")

ANSI Function Code: F05

Lever Style: 14

Trim Style: H

Cylinder Style

for use only when replacing existing cylinder locksets

1. Required functions:

- Latch operated by: rotating the inside lever; turning the key in the outside lever; or rotating the outside lever when not locked by key
- Outside lever locked by: turning the key in outside lever.
- Outside lever unlocked by: turning the key in outside lever.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 93K-7-R-14D (see below). No alternate model will be accepted without approval.

Best Series: 9K

Pins: 7

Best Series Function Code: R ("Classroom")

ANSI Function Code: F84

Lever Style: 14

Trim Style: D

Office

Mortise Style

for all new construction and replacement of existing mortise locksets

1. Required functions:

- Latch operated by: rotating inside lever; rotating the outside lever only when the inside locking toggle is in unlocked position; or turning the key in the outside cylinder. (Note: The latchbolt is deadlocked with an auxiliary deadlatch.)
- Outside lever is locked by placing locking toggle in locked position
- Outside lever is unlocked by placing locking toggle in unlocked position
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 45H-7-A-14H (see below). No alternate model will be accepted without approval.

Best Series: 40H

Pins: 7

Best Series Function Code: A ("Office")

ANSI Function Code: F04

Lever Style: 14

Trim Style: H

Cylinder Style

for use only when replacing existing cylinder locksets

1. Required mechanical cylinder lock functions:

- Latch operated by: rotating the inside lever; rotating the outside lever— only when the inside push button is out; or turning the key in the outside lever.
- Outside lever is locked by: pushing the inside button; pushing and turning the inside button. Turning the button keeps the outside lever locked until the button is turned back.
- Outside lever is unlocked by: turning the key in the outside lever, (only when the button is not turned); rotating the inside lever, (only when the button is not turned); or closing the door (only when the button is not turned).
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 93K-7-AB-14D (see below). No alternate model will be accepted without approval.

Best Series: 9K

Pins: 7

Best Series Function Code: AB ("Entrance")

ANSI Function Code: F109

Lever Style: 14

Trim Style: D

***Public Restroom (Single Occupant)
Uncompartmentalized Bathroom (Apartments and Dormitories)
Toilet Compartment (Apartment or Dormitory Bathroom)***

Mortise Style

for all new construction and replacement of existing mortise locksets

1. Required functions:

- Latch operated by: rotating inside lever; or rotating the outside lever only when the deadbolt is retracted.
- Deadbolt operated by: turning the emergency key or turning inside turn lever. (Rotating inside knob/lever retracts deadbolt and latch simultaneously.)
- Outside lever is locked by: turning inside turn lever; or turning the emergency key.
- Outside lever is unlocked by: turning inside turn lever; rotating inside lever retracts latch and deadbolt simultaneously; or turning the emergency key.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 45H-0-L-14H (see below). No alternate model will be accepted without approval.

Best Series: 40H

Pins: 0

Best Series Function Code: L ("Privacy")

ANSI Function Code: F19

Lever Style: 14

Trim Style: H

Cylinder Style

for use only when replacing existing cylinder locksets

2. Required functions:

- Latch operated by: rotating inside lever or rotating the outside lever only when the inside push button is out
- Outside lever locked by: pushing the inside button
- Outside lever unlocked by: rotating the outside slotted button; rotating the inside lever; or closing the door
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 93K-0-L-14D (see below). No alternate model will be accepted without approval.

Best Series: 9K

Pins: 0

Best Series Function Code: L ("Privacy")

ANSI Function Code: F76

Lever Style: 14

Trim Style: D

Bedroom Closet
Compartmentalized Bathroom (Apartments and Dormitories)
Laundry Closet (Apartments and Dormitories)
Common Closet (Apartments and Dormitories)

Mortise Style

for all new construction and replacement of existing mortise locksets

1. Required functions:

- Latch operated by: rotating inside lever or rotating outside lever
- Outside lever is always unlocked and cannot be locked.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 45H-0-N-14H (see below). No alternate model will be accepted without approval.

Best Series: 40H

Pins: 0

Best Series Function Code: N ("Passage")

ANSI Function Code: F01

Lever Style: 14

Trim Style: H

Cylinder Style

for use only when replacing existing cylinder locksets

1. Required functions:

- Latch operated by: rotating inside lever or rotating outside lever.
- Outside lever is always unlocked and cannot be locked.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 93K-0-N-14D (see below). No alternate model will be accepted without approval.

Best Series: 9K

Pins: 0

Best Series Function Code: N ("Passage")

ANSI Function Code: F75

Lever Style: 14

Trim Style: D

Electrical, Security, Telecommunications Closets
Mechanical Room
Housekeeping Closet

Mortise Style

for all new construction and replacement of existing mortise locksets

1. Required functions:

- Latch operated by: rotating inside lever; or turning key in outside cylinder. (Note: The latchbolt is deadlocked with an auxiliary deadlatch.)
- Outside lever is always locked and cannot be unlocked.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 45H-7-D-14H (see below). No alternate model will be accepted without approval.

Best Series: 40H

Pins: 7

Best Series Function Code: D ("Storeroom")

ANSI Function Code: F07

Lever Style: 14

Trim Style: H

Cylinder Style

for use only when replacing existing cylinder locksets

1. Required mechanical cylinder lock functions:

- Latch operated by: turning key in outside lever or rotating inside lever
- Outside lever is always fixed and cannot be unlocked.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 93K-7-D-14D (see below). No alternate model will be accepted without approval.

Best Series: 9K

Pins: 7

Best Series Function Code: D ("Storeroom")

ANSI Function Code: F86

Lever Style: 14

Trim Style: D

Auxiliary Lock for Multi-Occupant Public Restrooms

Mortise Style

1. Required functions:

- Deadbolt operated by: turning the outside key; or rotating the inside thumb turn cylinder assembly retracts the deadbolt, but will not project it.

Approved model at time of writing: 48H-7-R

Best Series: 48H

Pins: 7

Best Series Function Code: R-"Cylinder Deadlock"

ANSI Function Code: E06091

Auxiliary Lock for Residence Hall Living Units on Corridors

Tubular Style

1. Required functions:

- Deadbolt operated by: turning the key in the outside cylinder; or turning the inside turn lever.

Approved model at time of writing: Best 83T-7-K

Best Series: 83T

Pins: 7

Best Series Function Code: K (“Turnknob”)

ANSI Function Code: E2151; E2152

Residence Hall Living Units on Corridors

Mortise Style

for all new construction and replacement of existing mortise locksets

1. Required mechanical mortise lock functions:

- Latch operated by: rotating inside lever or turning key in outside cylinder. (Note: The latchbolt is deadlocked with an auxiliary deadlatch. Confirm requirement with GW)
- Deadbolt operated by: turning inside turn lever; rotating inside lever retracts deadbolt and latch simultaneously; or turning key in outside cylinder.
- Outside lever is always locked and cannot be unlocked.
- Inside lever is always unlocked and cannot be locked.

Best Series: 40H

Pins: 7

Best Series Function Code: TD (“Dormitory”)

ANSI Function Code: No equivalent ANSI code noted

Lever Style: 14

Trim Style: H

Core: Best MX8 PATD or current replacement

Cylinder Style

for use only when replacing existing cylinder locksets

2. Required mechanical cylinder lock functions:

- Latch operated by: turning key in outside lever or rotating inside lever
- Outside lever is always fixed and cannot be unlocked.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 93K-7-D-14D (see below). No alternate model will be accepted without approval.

Best Series: 9K

Pins: 7

Best Series Function Code: D (“Storeroom”)

ANSI Function Code: F86

Lever Style: 14

Trim Style: D

Core: Best MX8 PATD or current replacement

Residence Hall Bedroom Doors Within Apartments

Cylinder Style

for all new construction and replacement of existing cylinder locksets

1. Required mechanical cylinder lock functions:

- Latch operated by: rotating inside lever; rotating outside lever only when the push button is out; or turning the key in outside lever.
- Outside lever is locked by pushing inside button; or pushing and turning inside button. Turning button keeps outside lever locked until button is turned back.
- Inside lever is unlocked by turning key in outside lever only when button is not turned; rotating inside lever only when button is not turned; or closing door only when button is not turned.
- Inside lever is always unlocked and cannot be locked.

Approved model at time of writing is Best 93K-7-AB-14D (see below). No alternate model will be accepted without approval.

Best Series: 9K

Pins: 7

Best Series Function Code: AB ("Entrance")

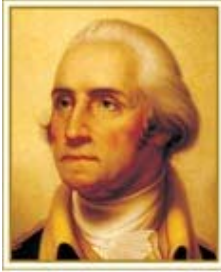
ANSI Function Code: F109

Lever Style: 14

Trim Style: D

Core: Best MX8 PATD or current replacement

END OF SECTION



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08711

DOOR HARDWARE REQUIREMENTS

A. SUMMARY

This section contains door hardware for specific spaces. For ease of use, each relevant building type and its included spaces are grouped together within this document. Refer to building type design standards as well as 08710 Door Hardware for additional information.

B. REQUIREMENTS FOR SPECIFIC SPACES

1. ACADEMIC BUILDINGS

a. Entry Vestibule

- i. Each primary entrance vestibule shall include one barrier-free entry with assistive door opener(s).
- ii. Door hardware: self closing
- iii. Locks on all vestibule exit doors (both sets) shall fail safe on fire alarm.

b. Classroom, Computer Lab, Lecture Hall

- i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
- ii. Kick plate on push side
- iii. Closer
- iv. Doorstop

c. Office

- i. Office lockset (Best 40H series mortise, A “Office” function or Best 9K series cylinder, AB “Entrance” function)
- ii. Doorstop

d. Office Suite Reception Area

- i. Closer
- ii. Doorstop

Note: Lock style may vary. Lock access shall be at a normal operating height. Location near floor level is unacceptable due to a history of operational difficulty by some occupants.

e. Break-Out Room, Conference Room, Lounge, Study Room

- i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
- ii. Doorstop

- f. Public Restroom, Single-Occupant
 - i. Privacy set (Best 40H series mortise, L “Privacy” function or Best 9K series cylinder, L “Privacy” function)
 - ii. Doorstop

- g. Public Restroom, Multi-Occupant
 - i. Auxiliary lock, mortise style deadbolt (Best 48H series, R “Cylinder Deadlock” function)
 - ii. Push plate
 - iii. Pull
 - iv. Surface mount closer
 - v. Kick plate
 - vi. Doorstop

- h. Pantry
 - i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
 - ii. Doorstop

- i. Housekeeping Closet
 - i. Storeroom lockset (Best 40H series mortise, D “Storeroom” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Surface mount closer
 - iii. Doorstop

- j. Mail, Files, Copy, Storage and Similar Spaces
 - i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
 - ii. Closer if required by Owner
 - iii. Kick plate if required by Owner
 - iv. Doorstop

- k. Fire Stair
 - i. (Door hardware as per code and The George Washington University’s *CFT Security and Access Standards*.)

- l. Electrical, Security, Telecommunications Closet
 - i. Storeroom lockset (Best 40H series mortise, D “Storeroom” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Doorstop where appropriate

- m. Mechanical Room
 - i. Storeroom lockset (Best 40H series mortise, D “Storeroom” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Doorstop

- iii. Closer
- iv. Kick plate where appropriate

2. LABORATORY BUILDINGS

- a. (To be created)

3. PARKING STRUCTURES

- a. (To be created)

4. RESIDENCE HALL – DORMITORY RESIDENCE FLOORS

- a. Dormitory Bedroom (Sleeping Area and Entryway)
 - i. Dormitory/Storeroom lockset (Best 40H series mortise, TD “Dormitory” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Auxiliary tubular deadlock (Best 83T series, K “Turnknob” function)
 - iii. Doorstop
 - iv. Viewer
 - a.) Standard rooms shall have a viewer at 42” above finish floor.
 - b.) Accessible rooms shall have 2 viewers; one at 42” above finish floor and the other to meet ADA requirements.

- b. Dormitory Bedroom Closets
 - i. Passage set (Best 9K series cylinder, N “Passage” function)
 - ii. Doorstop

- c. Dormitory Bathroom
 - i. Un-compartmentalized bathroom:
 - a.) Privacy set (Best 9K series cylinder, L “Privacy” function)
 - b.) Doorstop
 - ii. Compartmentalized bathroom:
 - a.) General door:
 - Passage set (Best 9K series cylinder, N “Passage” function)
 - Doorstop
 - b.) Toilet compartment door:
 - Privacy set (Best 9K series cylinder, L “Privacy” function)
 - Doorstop

Note: Spring hinges shall be used where there are space constraints.

5. RESIDENCE HALL – APARTMENT STYLE RESIDENCE FLOORS

- a. Apartment, General
 - i. Dormitory/Storeroom lockset (Best 40H series mortise, TD “Dormitory” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Auxiliary tubular deadlock (Best 83T series, K “Turnknob” function)
 - iii. Doorstop
 - iv. Viewer
 - a.) Apartment doors shall have a viewer at 42” above finish floor.
 - b.) Accessible apartment entry doors shall have 2 viewers; one at 42” above finish floor and the other to meet barrier-free requirements. Individual bedroom doors in apartments do not require viewers.
- b. Bedroom
 - i. Entrance lockset (Best 9K series cylinder, AB “Entrance” function)
 - ii. Doorstop
- c. Bedroom Closet
 - i. Passage set (Best 9K series cylinder, N “Passage” function)
 - ii. Doorstop
- d. Apartment Bathroom
 - i. Un-compartmentalized bathroom:
 - a.) Privacy set (Best 9K series cylinder, L “Privacy” function)
 - b.) Doorstop
 - ii. Compartmentalized bathroom:
 - a.) General door:
 - Passage set (Best 9K series cylinder, N “Passage” function)
 - Doorstop
 - b.) Toilet compartment door:
 - Privacy set (Best 9K series cylinder, L “Privacy” function)
 - Doorstop
- e. Laundry Closet (Optional)
 - i. Passage set (Best 40H series mortise, N “Passage” function or Best 9K series cylinder, N “Passage” function)
 - ii. Doorstop
- f. Common Closet (Optional)
 - i. Passage set (Best 40H series mortise, N “Passage” function or Best 9K series cylinder, N “Passage” function)
 - ii. Doorstop

Note: Spring hinges shall be used where there are space constraints.

2. RESIDENCE HALL – COMMON SPACES

- a. Entry Vestibule
 - i. Each primary entrance vestibule shall include one barrier-free entry with assistive door opener(s).
 - ii. Door Hardware: doors shall be self closing; all hardware to conform to GWU CFT Security & Access Standards.

- b. Laundry Room, Common
 - i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
 - ii. Doorstop
 - iii. Closer
 - iv. Kick plate where appropriate

- c. Trash and Recycling Room
 - i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
 - ii. Doorstop
 - iii. Closer with hold-open feature
 - iv. Kick plate on push side

- d. Housekeeping Closet
 - i. Storeroom lockset (Best 40H series mortise, D “Storeroom” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Doorstop where appropriate
 - iii. Closer where appropriate
 - iv. Kick plate where appropriate

- e. Restroom, Public (Single Occupant)
 - i. Privacy set (Best 40H series mortise, L “Privacy” function or Best 9K series cylinder, L “Privacy” function)
 - ii. Doorstop

- f. Kitchen / Pantry, Common
 - i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
 - ii. Doorstop

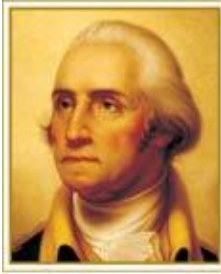
- g. Office
 - i. Office lockset(Best 40H series mortise, A “Office” function or Best 9K series cylinder, AB “Entrance” function)
 - ii. Doorstop

- h. Break-Out Room, Conference Room, Lounge, Study Room
 - i. Classroom lockset (Best 40H series mortise, R “Classroom” function or Best 9K series cylinder, R “Classroom” function)
 - ii. Doorstop

- i. Electrical, Security, Telecommunications Closet
 - i. Storeroom lockset (Best 40H series mortise, D “Storeroom” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Doorstop where appropriate

- j. Mechanical Room
 - i. Storeroom lockset (Best 40H series mortise, D “Storeroom” function or Best 9K series cylinder, D “Storeroom” function)
 - ii. Doorstop
 - iii. Closer
 - iv. Kick plate where appropriate for layout

END OF SECTION



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08800 GLASS AND GLAZING

A. SUMMARY

This section contains design standards for glass and glazing for the following products and applications:

1. Windows
2. Doors
3. Glazed curtain walls
4. Glazed entrances
5. Interior borrowed lites
6. Storefront glazing
7. Mirror glazing for public restrooms

Refer to building space standards and related sections including the following for additional information:

- 07920 Joint Sealants
- 08110 Steel Doors and Frames
- 08520 Aluminum Windows

B. GENERAL

1. Glazing Publications: Comply with the written guidelines and recommendations of glass product manufacturers and organizations, unless otherwise required to comply with regulatory requirements and codes.
 - a. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual"
 - b. AAMA "TIR-A Glazing Guidelines"
 - c. IGMA TM-3000 "Glazing Guidelines for Sealed Insulating Glass Units"
2. Glass and glazing systems shall comply with all reference standards and applicable codes.
3. Architect's selection of glass and glazing systems shall be based on careful analysis of thermal performance, weather tightness, durability and maintenance, appearance, project budget, sustainability/LEED requirements and end-user comfort.
4. Glazing products shall be considered for each orientation. Special consideration shall be given to minimize solar heat gain through exposed glazing, especially south and west facing glass. Higher efficiency glazing and solar shading shall be utilized on those facades with the greatest solar exposure.

5. The components, processes, and assemblies described herein and specified by Architect shall contribute towards applicable credits for LEED certification in accordance with USGBC's LEED for New Construction and Major Renovation. In particular, Architect shall consider credits such as EA Credit 1: Optimize Energy Performance for overall U-factor and solar heat gain coefficient (SHGC) and EQ Credit 8.1 and 8.2: Daylighting and Views.
6. Wire glass shall only be used when needed at fire-rated doors and partitions.
7. Glass used in door assemblies and wall assemblies shall be tempered safety glass.
8. Manufacturer of insulation glass units shall be a member of IGMA (Insulating Glass Manufacturers Alliance).
9. Low-iron glass is preferred for increased light transmission and reduced color distortion especially in laminated conventional clear float glass as the laminate thickness increased.

C. GLASS PRODUCTS, GENERAL

1. General: Provide glazing systems capable of withstanding normal thermal movement, wind, snow, and impact loads (where applicable) without failure, including loss or glass breakage due to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
2. Glazing channel dimensions shall provide necessary minimum bite on glass, minimum edge tolerances and adequate sealant and/or gasket thickness within required tolerances.
3. Glazing systems shall be coordinated with glazing channels to assure proper installation of systems.
4. Thickness: Provide glass lites in thicknesses as determined by Contractor or glass manufacturer as required to fulfill performance requirements. Confirm glass thicknesses by analyzing project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required meet or exceed the following criteria:
 - a. Minimum glass thicknesses shall comply with ASTM E 1300, according to requirements for all loads (including snow and wind), probability of breakage for vertical and sloped glazing, and maximum lateral deflection.
 - b. Minimum Glass Thickness for Exterior Lites: Not less than 1/4" unless otherwise required.
5. Compatibility and Adhesion: Provide glazing sealants, gaskets, and glazing accessories which are compatible with each other and with glass and glass framing members, and which will adhere to joint surfaces.
6. Provide watertight and airtight installation of glass.
7. Interface with Other Systems: Provide primary and secondary seals on insulating units that are compatible with sealant used for structural glazing.
8. Safety Glazing Products: Comply with testing requirements of CPSC 16 CFR, Part 1201, Consumer Product Safety Commission Standard on Architectural Glazing Materials.

9. Fire Resistance Ratings: For fire-resistant wire glass and fire-resistant glazing products, provide glazing products identical to those tested in accordance with the following and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Fire-resistant glazing products for door assemblies: NFPA 252
 - b. Fire-resistant glazing products for interior framing assemblies: NFPA 257
 - c. Fire-resistant glazing products for exterior window assemblies: NFPA 257, ASTM E119, UL 263
10. Thermal Movements: Provide glazing that allows for thermal movements resulting from the maximum change range in ambient and surface temperatures acting on glass framing members and glazing components.
11. Thermal and Optical Performance Properties: Provide glass with thermal and optical performance properties (U-Factors, Solar Heat Gain Coefficient and Visible Transmittance, Visible Reflectance) specified based on manufacturer's published test data.

D. GLASS PRODUCTS

Clear Float Glass

1. Clear float glass shall be used at interior storefronts, transoms, sidelights, and interior windows:
 - a. ASTM C1036, Type I, Class 1, Quality q³
 - b. Assembly Description: ¼" clear float glass
 - a. Heat-strengthened at storefront
 - b. Tempered where required by code
 - c. Decorative screening in select locations

Heat-Treated Glass

1. Fully tempered glass
 - a. ASTM C1048, Kind FT, of color and type as designed
 - b. Provide fully tempered glass certified by SGCC or other recognized certification agency, acceptable to authorities having jurisdiction; Comply with requirements of CPSC 16CFR, Part 1201 for Category II materials.
 - c. Provide as required to comply with referenced standards and as required by Code
2. Heat-strengthened glass
 - a. ASTM C1048, Kind HS, of color and type indicated
 - b. Heat strengthen glass by manufacturer's standard heat treatment process
 - c. Provide Kind HS (heat-strengthened) where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements
 - a. Provide as indicated, as required to comply with referenced standards and as required for conditions of glass application and intended use

Low-Emissivity Coated Glass

1. Float glass coated with neutral transparent coating to reduce reradiation of infrared wavelengths, deposited by manufacturer's standard process.
2. Low-e coating is required for all exterior glazing.
3. See "Insulating Glass" in this section for acceptable products and manufacturers.

Mirror Glass

1. ASTM C1503, Mirror Select Quality; with silvering, electro-plated copper coating, and protective organic coating.
2. Minimum thickness: 1/4"

Etched Glass

1. Provide clear float glass units with patterned acid-etched surface to provide patterned panel
 - a. Provide custom glass panel with etched text
2. Temper glass panel after etching.

Sandblasted Glass

1. Provide clear float or tempered glass units, as required by Code with patterned sandblasted surface to provide patterned panel
2. Pattern Types:
 - a. 1/4" glass with sandblasted pattern in alternating 1/8" clear and solid horizontal lines, 1/4" o.c.
 - b. 1/4" glass with solid sandblasted finish and unfinished pattern

Spandrel Insulated Glass

1. Spandrel glass shall be used where curtain wall passes in front of floor construction.
 - a. ASTM C1048, Kind HS or FT as required to comply with performance requirements, Condition B, Type 1, Class 1, Quality q³.
 - b. Assembly Description: Clear, heat-strengthened, low-e coated glass or tempered glass as required by code with opaque ceramic frit applied to interior surface of spandrel glass unit
 - i. 1/4" clear with low-e on #2 surface, 1/2" argon interspace, 1/4" clear with ceramic frit on #4 surface
 - c. Frit Color shall be selected by Architect from manufacturer's standard color range or custom color as designed

Insulating Glass Unit

1. General: Thermal double pane glazing units, with air space between. The units must include a dual sealing system, spacer, desiccant, and corner reinforcement. Glass thicknesses and heat strengthening must be determined by manufacturer for all loading conditions. Units shall be certified by the Insulating Glass Certification Council (IGCC) and comply with ASTM E773 and ASTM E774. Units shall adhere to the certification program of SIGMA.
 - a. Select product with visible light transmittance and solar energy transmittance characteristics suitable for building orientation; either indirect or full sun exposure.
 - b. Insulating glass units shall have both lites heat-strengthened, except as needed to satisfy requirements for safety glazing materials
 - c. Sealing System: Dual seal, with primary and secondary sealants as follows:
 - i. Manufacturer's standard sealants.
 - d. Provide a ten (10) year minimum warranty on insulated glass units.

- e. Spacer Specifications: Provide manufacturer's standard spacer material and construction.
- f. Vision glass shall have clear appearance from interior and exterior, 1" thick, with low emissivity coating on the #2 surface
- g. Approved Product and Manufacturer or approved equal:
 - i. Guardian-Sun-Guard SuperNeutral 68
 - ii. Viracon – Solarscreen
 - iii. Old Castle Glass - Solarban Series by PPG Industries, Inc.

Laminated Glass

- 1. Provide units certified by SGCC or other recognized certification agency, as complying with requirements of CPSC 16CFR, Part 1201
- 2. Provide laminated glass complying with requirements of ASTM C1172.
- 3. Adhesive laminating film (exterior units):
 - a. Material: Polyvinyl butyral plastic sheet interlayer or or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written recommendations
 - b. Thickness:0.060
 - c. Color: Clear
 - d. Acceptable Product and Manufacturer or equal:
 - i. Equivalent to Saflex Interlayer, Clear or White by Solutia Inc.

Clear Wired Glass

- 1. Glass shall comply with ASTM C1036, Type II, Class I, Form 1, Quality q⁸, mesh m² (square).
- 2. Wire configuration: Mesh m² (square)
- 3. Each individual glazing unit shall be permanently identified with a listing mark per Code, visible after installation
- 4. Minimum thickness: ¼"

Fire-Resistant Glazing

- 1. Clear fire-rated and impact safety laminated ceramic, 5/16 inch thick, tested to withstand thermal shock
- 2. Provide product certified by SGCC or other recognized certification agency.
- 3. Acceptable Product and Manufacturer, or equal:
 - a. FireLite Plus by Technical Glass Products, Nippon Electric Glass Co. Ltd.

Fritted Glass

- 1. Glass shall comply with ASTM C1048, King FT, Condition B, Type 1, Class 1, Quality q³
- 2. Color: White, match color and sheen of specified product
- 3. Pattern: Lines, 1/8" wide horizontal fritted lines on ¼ " centers
- 4. Acceptable product and manufacturer: Equivalent to custom pattern, High Opacity White V175 by Viracon

E. LOCATIONS OF GLASS TYPES

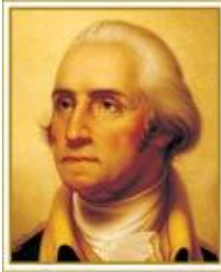
- 1. Exterior Windows: low-e reflective, clear insulating glass

2. Door Lights: tempered glass (non-rated), wire glass (rated) or other approved fire-rated glass.
3. Interior Windows (rated openings) wire glass or other approved fire-rated glass.
4. Interior Windows (requiring safety glass) clear, tempered glass.
5. Interior Windows (non-safety) clear, plate glass
6. Exterior Canopies: structural laminated glass
7. Interior Guardrails: structural laminated glass

F. GLAZING MATERIALS

1. All glazing materials including sealants, tapes, neoprene gaskets, felt, and other accessories shall be recommended by product manufacturer, tested to demonstrate conformance with all requirements, and have a proven record of compatibility with surfaces and other materials contacted in installation.
2. Select colors from manufacturer's standard color range.
3. Cleaners, primers, and sealers shall be as recommended by sealant or gasket manufacturer.

END OF SECTION



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09250 GYPSUM BOARD

A. SUMMARY

This section contains design standards for gypsum board and steel partition framing. Refer to space standards for additional information.

B. PRODUCTS

1. GENERAL

- a. Acceptable Manufacturers, or approved equal:
 - i. National Gypsum Company
 - ii. USG
 - iii. G-P Gypsum
 - iv. CertainTeed

2. GYPSUM BOARD (TYPICAL)

- a. Product
 - i. ASTM C1396, regular type except where Type X or Type C fire-resistant type is indicated or required to meet UL assembly types.
 - ii. Edges: Tapered
 - iii. Thickness: minimum 5/8," typical. Provide 1/4" for curved applications, typical.

3. ABUSE- AND IMPACT-RESISTANT GYPSUM BOARD

- a. Product
 - i. Abuse- and Impact-resistant, Type X fire-resistant type gypsum-based panels.
 - a.) Exposed face: Gypsum and cellulose fibers
 - b.) Core: Perlite
 - c.) Unexposed face: glass fiber mesh scrim embedded in gypsum and cellulose fibers
 - ii. Edges: Tapered
 - iii. Thickness: 5/8"
- b. Locations
 - i. Full-height installation (floor to ceiling) is required for common corridor walls of residential floors in residence halls only. *Due to budget considerations, unless otherwise approved by the Owner, impact-resistant gypsum board shall not be provided elsewhere, including residential units along corridors with the product.*

- c. Acceptable product and manufacturer, no exceptions:
 - i. Fiberock VHI (Very High Impact) Abuse-Resistant Gypsum Fiber Panels by USG
- 4. WATER-RESISTANT GYPSUM BOARD
 - a. Product
 - i. ASTM C1396, regular type except where Type X or Type C fire-resistant type is indicated or required to meet UL assembly types.
 - ii. Edges: Tapered
 - b. Locations
 - i. Public restrooms, bathrooms, janitor's closets, laundry rooms, and other partitions to receive ceramic tile.
 - ii. Due to frequent joist spacing required, not typically appropriate for ceiling applications at The George Washington University.
- 5. SHAFTWALL
 - a. Liner boards
 - i. ASTM C442, Type X or as otherwise required
 - ii. Edges: Beveled
 - iii. Thickness: as required
 - b. Face boards
 - i. ASTM C1396, Type X or as otherwise required
 - ii. Thickness: as required

C. TYPICAL GYPSUM BOARD PARTITION WALL FOR LEASED SPACES AND ADMINISTRATIVE BUILDINGS

- 1. Extend partition to underside of suspended ceiling:
 - a. 2-1/2" steel studs to suspended ceiling
 - b. 1/2" gypsum board on each side; extend to suspended ceiling
 - c. Provide 2 1/2" sound attenuation insulation between studs and 1/8" neoprene gasket between top runner and acoustical tile ceiling.

D. TYPICAL GYPSUM BOARD PARTITION WALL FOR SOUND-SENSITIVE LOCATIONS SUCH AS CLASSROOMS, OFFICES, CONFERENCE ROOMS, RESTROOMS, AND RESIDENCE HALLS (CORRIDOR/SLEEPING ROOM, SLEEPING/SLEEPING ROOM, and SLEEPING ROOM/TOILET ROOM)

- 1. Extending partition to structure is preferred
 - a. Design where partition extends to structure:
 - i. 3-5/8" steel studs to structure
 - ii. 5/8" gypsum board on each side; extend to structure
 - iii. Provide continuous batt insulation between wall studs
 - b. Design where partition does not extend to structure:
 - i. 3-5/8" steel studs
 - ii. 5/8" gypsum board on each side, extend 6" minimum above ceiling
 - iii. Provide continuous batt insulation between wall studs

- iv. Provide continuous 24"-wide batt insulation on top of ceiling, next to all walls, on both sides of walls
- 2. Non sound-sensitive locations such as Copy Rooms, Closets, and Storage Rooms do not require batt insulation

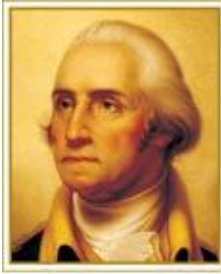
E. ACCESSORIES

- 1. Typical Trim
 - a. Provide extruded aluminum or galvanized steel, 26 gauge minimum, with screw holes for attachment. Vinyl and plastic trim is not acceptable. Finish trim with joint compound.
 - b. Corner trim
 - i. Acceptable product and manufacturer, or equivalent:
 - a.) Dur-A-Bead No. 103 by USG
 - c. Casing / Edge beads
 - i. Acceptable product and manufacturer, or equivalent:
 - a.) No. 200A or No. 200B by USG
- 2. Gypsum Board Screws
 - a. Self-drilling, self-tapping steel screws
- 3. Sound Attenuation Blankets
 - a. For fire-rated construction: mineral fiber
 - b. For non-fire-rated construction: unfaced glass fiber

F. FINISHING

- 1. General
 - a. Provide gypsum board finish level for locations as follows, in accordance with ASTM C840.
 - i. Level 1: Ceiling plenum and concealed areas, except where higher finish level is required for acoustical and/or fire ratings.
 - ii. Level 2: Below tile, except remove tool marks and ridges.
 - iii. Level 4: Gypsum board surfaces, except where an alternate finish is required.
 - b. Sand using 150 grit or finer sandpaper.

END OF SECTION



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09310 TILE

A. SUMMARY

This section contains design standards for tile. Refer to space standards for additional information.

1. Reference Standards
 - a. Comply with applicable recommendations of Tile Council of America (TCA) and ANSI.
2. Description of Work:
 - a. Ceramic Mosaic Tile
 - b. Quarry Tile
 - c. Agglomerate Tile
 - d. Accessories

B. GENERAL

1. FloorScore-certified products or products that meet the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers (CA/DHS/EHLB/R-174) are preferred.
2. Tile settings, adhesives, and grout must meet LEED EQ 4.1 Low-Emitting Materials Adhesives and Sealants requirements.
3. Select products from a local or regional manufacturer to meet LEED MR 5 Regional Materials requirements.

C. CERAMIC MOSAIC TILE

1. Product
 - a. Ceramic mosaic tile flooring and wall shall be porcelain body, cushion edged, impervious, and frost-proof.
 - i. Specifications shall note special requirements for installation and execution of larger sized tile.
2. Performance Requirement:
 - a. Coefficient of Friction/Anti-slip Surface: Tile floors shall have 0.6 wet/dry slip resistant finish per ASTM C1028.
3. Installation
 - a. Transition between tile floor and tile wall or base shall be cove tile.

- b. Where tile does not extend the full height of the wall, tile base shall be ceramic mosaic tile, at least 4" high, comprised of whole, uncut tiles, except to accommodate length of wall. Otherwise, base shall be either a manufactured built-up base up to 6" high, or approved equal.
 - c. Grout lines of floor shall align with grout lines of base or wall.
 - d. The exposed top or edge of all tiles shall have a bullnose profile.
 - e. Marble thresholds should be used at each restroom flooring transition.
4. Approved manufacturers, or approved equal:
- a. American Olean Tile Company, Lansdale; PA
 - b. Dal-Tile Corporation; Dallas, TX
 - c. Stone Peak Ceramics; Crossville, TN

D. QUARRY TILE

1. Unless otherwise required, provide tile with the following properties:
- a. Unglazed, vitreous body, non-slip finish
 - b. Grind four sides after firing
 - c. Size: approximately 6" x 6" square or 8" x 8" square, nominal facial dimensions
2. Approved manufacturer, or approved equal:
- a. American Olean Tile Company, Lansdale, PA
 - b. Dal-Tile Corporation; Dallas, TX
 - c. Metropolitan Ceramics, Canton, OH
3. Colors, Textures, and Pattern:
- a. As selected by Architect from manufacturer's full range.

E. AGGLOMERATE (TERRAZZO) TILE & ACCESSORIES

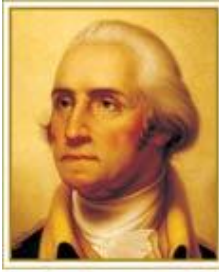
1. Resinous marble agglomerate tiles, with optional additional aggregate chips such as Mother of Pearl and recycled glass
2. Dimensions: as required
3. Depth: 3/8", minimum
4. Approved product, or approved equal:
- a. Terrazzo Tile by Wausau Tile, Wausau, WI
5. Accessory: Metal Strips
- a. Termination strips: white, corrosion-resistant metal such as extruded aluminum with anodized finish, white zinc alloy, or stainless steel
 - b. Edge Strips: edge profile with 1/8" top surface equivalent to Schlüter-SCHIENE by Schlüter Systems, Plattsburgh, NY
 - c. Divider Strips: decorative profile with 1/4" top surface equivalent to Schlüter-DECO by Schlüter Systems, Plattsburgh, NY

F. ACCESSORIES

1. Marble thresholds
- a. Natural marble with polished finish.
 - b. Color/Pattern: Architect shall select one from the following options to best match the color scheme of the restroom:

- i. Uniform, fine to medium-grained white stone with gray veining or gray with no veining
- ii. Beige Travertine
- iii. Black Granite
- c. Thickness: $\frac{3}{4}$ "
- d. Slope to comply with ADA Accessibility Guidelines.
- e. Location: restroom doors

END OF SECTION



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09401 PORTLAND CEMENT TERRAZZO FLOORING

A. SUMMARY

This section contains design standards for Portland cement terrazzo flooring. Refer to space standards for additional information.

1. Reference Standards
 - a. Comply with applicable provisions and recommendations of National Terrazzo and Mosaic Association, Inc. (NTMA).
2. Description of Work
 - a. Precast terrazzo stair units
 - b. Accessories

B. GENERAL

1. In order to meet LEED IEQ Credit 4.3 Low-Emitting Materials – Flooring Systems, site-applied adhesives, grouts, finishes, and sealers must meet FloorScore standards.

C. STANDARDS

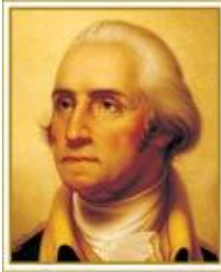
1. Terrazzo Materials
 - a. Portland Cement
 - i. ASTM C150, Type 1 as modified to comply with NTMA requirements
 - b. Aggregates
 - i. Flooring: ASTM C33 sand
 - ii. Precast: as recommended by fabricator for proper strength and durability for conditions of installation and support
 - c. Marble Chips
 - i. Natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements for mix indicated
 - ii. Minimum abrasive-hardness value when tested according to ASTM C241: Ha 10
 - iii. Maximum 24-hour absorption rate: 0.75%
 - d. Water
 - i. Clean and free of oil, soluble salts or other deleterious substances
 - e. Colorants
 - i. Pure mineral or synthetic pigments, resistant to alkalis and non-fading
2. Mixes
 - a. Terrazzo Topping Mix

- i. One type of terrazzo will be required as indicated on Architect's drawing and as required to match Architect's samples
 - ii. Composition of mixes and strength and durability shall be as required to match Architect's sample and as required for conditions of installation and use.
 - iii. Comply with applicable NTMA standards for proportions. Marble chips to be blended in shop.
 - 3. Accessories
 - a. Anchoring Devices
 - i. Provide anchoring devices as recommended by fabricator for anchoring and support of units for conditions of installation and support
 - b. Reinforcement: Provide as recommended by fabricator as required for conditions of installation and support.
 - c. Steel Plate: Provide integral steel plate, thickness as required by installation and support conditions
 - d. Curing Materials: Liquid membrane, ASTM C309
 - e. Cleaner: Liquid, neutral chemical cleaner, with pH factor between 7 and 10, of formulation recommended by manufacturer for type of terrazzo used, and complying with NTMA requirements
 - f. Sealer
 - i. Provide slip- and stain-resistant, penetrating-type sealer that is chemically neutral with pH factor between 7 and 10; does not affect color or physical properties of terrazzo; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated
 - g. Abrasive Insert Strips for Stair Treads
 - i. Aluminum oxide grit in epoxy-resin matrix
 - ii. Color: As selected by Designer from manufacturer's full color palette
 - iii. Style: Two continuous 1 inch wide strips, for each stair tread, extending to within 2 inches of end of stair tread
 - iv. Length: As indicated
 - v. Depth: As required by terrazzo thickness
 - vi. Approved product, or approved equal: Pattern No. 24 by Romoco, Mainheim, PA

D. PRODUCTS

- 1. Approved product and manufacturer, or approved equal:
 - a. Custom precast cementitious terrazzo by Wausau Tile

END OF SECTION



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09402

INTERIOR EPOXY RESIN MATRIX TERRAZZO FLOORING

A. SUMMARY

This section contains design standards for epoxy resin terrazzo flooring. Refer to space standards for additional information.

1. Reference Standards
 - a. Comply with applicable provisions and recommendations of National Terrazzo and Mosaic Association, Inc. (NTMA).
2. Description of Work
 - a. Thinset epoxy terrazzo flooring
 - b. Accessories
 - c. Acceptable products and manufacturers

B. GENERAL

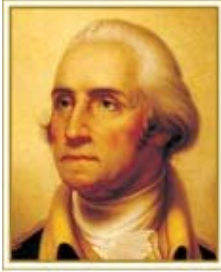
1. In order to meet LEED IEQ Credit 4.3 Low-Emitting Materials – Flooring Systems, site-applied adhesives, grouts, finishes, and sealers must meet FloorScore standards.

C. STANDARDS

1. Terrazzo Materials
 - a. Epoxy resins: to consist of 100% solids complying with performance requirements
 - b. Colorants: non-fading and factory dispersed
 - c. Primer: 100% solids primer for epoxy resin terrazzo, as recommended by system manufacturer
 - d. Marble chips: natural, sound, and crushed without excessive flats or flakes, size No. 1 and No. 2, complying with NTMA requirements
 - e. May contain metal, Fibrel plastic, glass, Mother of Pearl, stone chips and stone dust.
 - f. Polyester resins and polyacrylate resin systems are not acceptable.
 - g. Grout: epoxy resin grout; cement grouts are not acceptable
2. Accessories
 - a. Divider and control joint strips: white zinc alloy
 - i. Divider strips: Angle type
 - ii. Control Joints: Double L-type angles, positioned back to back

- b. Anchoring Devices: Provide mechanical anchoring devices for divider and control joint strips as required for secure attachment to substrate
 - c. Anti-Fracture Membrane:
 - i. Self-curing liquid epoxy, 100% solids, as recommended by epoxy flooring manufacturer, to serve as anti-fracture or waterproofing membrane
 - ii. Provide with glass cloth reinforcement as recommended by terrazzo manufacturer for conditions of installation
 - d. Cleaner:
 - i. Liquid, neutral chemical cleaner, with pH factor between 7 and 10
 - ii. Free from crystallizing salts and water-soluble alkaline salts; biodegradable and phosphate-free
 - iii. Formulation recommended by system manufacturer
 - e. Sealer
 - i. Provide acrylic sealer, colorless, slip- and stain-resistant, penetrating-type sealer that is chemically neutral with a pH factor between 7 and 10; and does not affect color or physical properties of terrazzo; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated
 - ii. All terrazzo installation shall comply with low VOC limits per LEED requirements
 - iii. Sealer shall not decrease slip resistance of unsealed terrazzo
3. Acceptable Products and Manufacturers
- a. Morricite Epoxy Terrazzo by Master Terrazzo Technologies, Hockessin, DE
 - b. General Polymers Corporation, Cincinnati, OH
 - c. TEC Inc./H.B. Fuller, Palatine, IL

END OF SECTION



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09512

ACOUSTICAL PANEL CEILINGS

A. SUMMARY

This section contains design standards for acoustical ceiling tiles and suspension grids. Refer to building type standards for additional information.

B. GENERAL

1. Layout and installation of acoustical ceiling tiles shall be coordinated with other systems including light fixtures, fire and smoke detection system, HVAC equipment, and partition system.
2. Selection and installation shall be such that full product warranty is maintained. Included in this requirement, but not to the exclusion of other concerns, is that the ceiling tile and the grid must be from the same manufacturer, resulting in single source responsibility.
3. Minimum warranties required:
 - a. Warranty against manufacturing defects: 30 years
 - b. Suspension system to be free from the occurrence of 50% red rust, as defined by ASTM D610 testing, from the installation date: 30 years
 - c. Warranty against visible sagging: 30 years
4. Description of Work
 - a. Acoustical Panels
 - b. Suspension Systems
5. Installation, general:
 - a. Support in moist locations: provide stainless steel hanger wires to prevent deterioration from the elements.
 - b. Each utility system (such as ductwork, electrical conduit, heating or plumbing lines) and the ceiling grid system shall be a separate installation. Each shall be independently supported from the building structure. Provide trapeze type hangers or other suitable supports for each system where interferences occur.

C. STANDARDS

1. Acoustical Ceiling Tiles, General:
 - a. All acoustical ceiling tiles shall have the following properties:
 - i. Texture: Fine
 - ii. Color: White
 - iii. Size: 2' x 2' or 2' x 4"

- iv. Edge profile: 9/16" beveled tegular (if not available, provide square tegular)
- v. Flame Spread Classification: Class A
- vi. Light reflectance: minimum .85
- vii. Recycled content: minimum 65%
- viii. Where performance can be met otherwise, products with no added formaldehyde are highly preferred
- b. Acoustical Ceiling Tile Types, as referenced in Space Standards herein:
 - i. Type ACT-1
 - a.) In addition to the properties common to all acoustical ceiling tiles, the following properties shall be integral:
 - Material: mineral fiber
 - Classification per ASTM E1264: Type III, Form 1, Pattern E I
 - Minimum NRC for Class A tiles: .70, per ASTM E1264
 - Minimum CAC: 35, per ASTM E1264
 - Acceptable Product and Manufacturer: Cirrus by Armstrong or approved equal by USG, Chicago Metallic, or other
 - ii. Type ACT-2
 - a.) In addition to the properties common to all acoustical ceiling tiles, the following properties shall be integral:
 - Material: mineral fiber
 - Classification per ASTM E1264: Type IV, Form 2, Pattern E
 - Minimum NRC for Class A tiles: .70, per ASTM E1264
 - Minimum CAC: 35, per ASTM E1264
 - Acceptable Product and Manufacturer: Ultima by Armstrong or approved equal by USG, Chicago Metallic, or other
 - iii. Type ACT-3
 - a.) In addition to the properties common to all acoustical ceiling tiles, the following properties shall be integral:
 - Material: fiberglass
 - Acoustically transparent membrane
 - Classification per ASTM E1264: Type XII, Form 2, Pattern E
 - Minimum NRC for Class A tiles: .90, per ASTM E1264
 - Acceptable Product and Manufacturer: Optima by Armstrong or approved equal by USG, Chicago Metallic, or other
 - iv. Type ACT-4
 - a.) In addition to the properties common to all acoustical ceiling tiles, the following properties shall be integral:
 - Material: mineral fiber
 - Classification per ASTM E1264: Type IV, Form 2, Pattern E
 - Minimum NRC for Class A tiles: .50, per ASTM E1264
 - Minimum CAC: 40, per ASTM E1264
 - Fire Resistance/Flamespread: Class A
 - Acceptable Product and Manufacturer: Clean Room VL (Product No. 868) by Armstrong or approved equal by USG, Chicago Metallic, or other

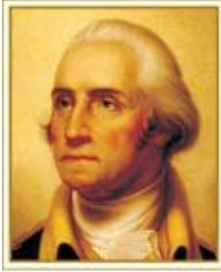
2. Suspension Systems
 - a. Exposed
 - i. Description: ASTM C635, intermediate duty
 - ii. Grid face: 9/16" wide with 1/8" or 1/4" wide center reveal, interlocking components
 - iii. Material: hot-dipped galvanized steel
 - iv. Color: White
 - v. Recycled content: minimum 25%
 - vi. Acceptable Products and Manufacturers
 - a.) Silhouette XL by Armstrong
 - b.) Donn Fineline by USG Interiors
 - c.) Chicago Metallic Ultraline 3500
 - d.) Approved equal by other
 - b. Exposed (ACT-4 only)
 - i. Description: ASTM C635, intermediate duty/heavy duty
 - ii. Grid face: 15/16" wide
 - iii. Material: hot-dipped galvanized steel
 - iv. Color: White
 - v. Recycled content: minimum 25%
 - vi. Acceptable Product and Manufacturer: Prelude by Armstrong or approved equal by USG Interiors, Chicago Metallic, or other

D. LOCATIONS

1. General
 - a. Life safety issues shall supersede any other standards herein.
 - b. Acoustical requirements and budget shall dictate selections between ACT-2 and ACT-3, where one is not specifically required. Typically, but dependent on other considerations such as other sound-absorptive or reflective surfaces in the spaces as well as whether walls extend to structure, the following are some common best practice applications for ACT-2 and ACT-3.
 - i. ACT-1 and ACT-2 are well-suited for private offices, conference rooms, and classrooms.
 - ii. ACT-3 is well-suited for open plan offices and multi-purpose rooms.
 - iii. ACT-3 with CAC backing is well-suited for auditoriums, music rooms, and gymnasiums.
 - c. From an aesthetic viewpoint, it is acceptable to use both ACT-2 and ACT-3 in the same building and in adjacent spaces, although not within the same room.
 - d. ACT-4 shall be specified for areas that require high scrubbability/high washability and soil resistance such as kitchens, food preparation areas, and laboratories.
2. Residence Halls
 - a. ACT-1 to be used throughout residence halls where acoustical ceiling tiles are called for in the space standards.

- b. There may be exceptional common spaces, such as lobbies, where an upgraded ceiling tile (ACT-2 or ACT-3) would be appropriate when approved by the Owner.
3. Academic Buildings:
- a. Where acoustical ceiling tile is called for in academic buildings, it shall be ACT-2 or ACT-3. ACT-1 is not acceptable.

END OF SECTION



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09650 RESILIENT FLOORING

A. SUMMARY

This section contains design standards for resilient flooring. Refer to space standards for additional information.

B. GENERAL

1. Match tile color and pattern by using tile from cartons in the same sequence as manufactured and packaged.
2. For environmental and human health reasons, PVC-free resilient flooring products are preferred over products containing PVC. While PVC (polyvinyl chloride) products tend to have a lower upfront cost, required maintenance for alternate resilient flooring is often less, potentially resulting in a lower life cycle cost.
3. FloorScore-certified products or products that meet the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers (CA/DHS/EHLB/R-174) are preferred.
4. Where resistance to indentation is a critical concern, consider products with higher static load limits as established by ASTM F 970.
5. Select flooring color from manufacturer's standard color palette.
6. Warranty against material defects and for installation integrity per manufacturer's recommendations shall be 5 years, minimum.

C. STORAGE AND MATERIAL HANDLING

1. Store and handle materials in the manner recommended by the manufacturer or as follows, whichever is more conservative.
2. Install resilient materials after other finishing operations, including painting, have been completed.
3. Maintain minimum temperature of 65°F in spaces to receive materials for at least 48 hours prior to installation, during installation and for not less than 48 hours after installation.
4. After installation, maintain minimum temperature of 55°F in areas where work is completed.
5. Store materials in spaces where they will be installed for at least 48 hours before beginning installation.

D. INSTALLATION

1. Install in accordance with manufacturer's instructions.
2. Apply adhesive to provide continuous bond between resilient material and substrate. Do not allow adhesive to bleed through joints.
3. Cut units to length; provide straight and tight butt joints.
4. Fit materials tightly so each unit is in contact with surrounding units and joints in proper alignment.
5. Scribe, cut, and fit exposed edges of units which adjoin other Work and neatly abut with tight joint.

E. RESILIENT FLOORING PRODUCTS

1. Resilient Sheet Floor, PVC-Free
 - a. Approved Products:
 - i. Armstrong sheet linoleum with NaturCote coating
 - ii. Forbo Marmoleum Global 3
 - b. Color and Patterns: To be selected by the Architect
2. Resilient Tile Floor, PVC-Free
 - a. Approved Products, or Approved Equal:
 - i. Migrations BioBased Tile by Armstrong; static load limit: 250 psi
 - ii. Marmoleum Composition Tile (MCT) by Forbo; static load limit: 125/250 psi
 - iii. StoneWalk by Mohawk; static load limit: 2000 psi
 - b. Color and Patterns: To be selected by the Architect
3. Resilient Tile Floor, Vinyl Composition Tile (VCT):
 - a. Product:
 - i. Non-asbestos formulated
 - b. Approved Products, or Approved Equal:
 - i. Azrock by Tarkett; static load limit: 125-800 psi
 - ii. Excelon by Armstrong World Industries; static load limit: 125 psi
 - iii. Resilient VCT Tile by Mannington Commercial; static load limit: 125 psi
 - c. Color and Patterns: To be selected by the Architect

F. RESILIENT BASE

1. Product
 - a. Resilient base shall be thermoset vulcanized rubber (type TS). Vinyl is unacceptable.
 - b. Base shall be continuous coils. Individual lengths are unacceptable.
 - c. Height: 4"
 - d. Thickness: 1/8"
 - e. Profile: cove
2. Approved manufacturers:
 - a. Burke Flooring Products
 - b. Flexco Company
 - c. Johnson Rubber Products – Johnsonite

- d. Roppe Corporation

G. REDUCER STRIPS

- 1. Product:
 - a. 1" – 1-1/2" wide x thickness required to abut flush to resilient tile
 - b. Material: extruded, homogeneous rubber composition
 - c. Edge: tapered or bullnose
- 2. Approved manufacturer, or approved equal:
 - a. Burke Flooring Products
 - b. Flexco Company
 - c. Johnson Rubber Products – Johnsonite
 - d. Roppe Corporation

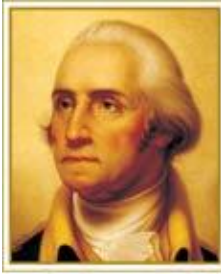
H. STAIR COMPONENTS

- 1. General
 - a. Material: thermoset vulcanized rubber (type TS); vinyl is unacceptable
 - b. Surface pattern: raised circular design
- 2. Treads/Risers
 - a. Color: black, or as required, with abrasive nose strip in contrasting color at top and bottom treads to assist the visually impaired
 - b. Style to be one of the following:
 - i. One-piece tread/risers; full width and depth of tread; thickness 1/4" minimum
 - a.) Approved product, or approved equal:
 - Johnsonite RTR-RD & VIRTR-RD (Visually Impaired), Roundel Raised Disk Pattern Rubber Stair Tread with Integral Riser
 - ii. Tread only; full width and depth of tread; thickness 1/4" minimum
 - a.) Approved product, or approved equal:
 - Johnsonite RH-RD & VIRH-RD (Visually Impaired), Roundel Raised Disk Pattern Rubber Stair Tread
- 3. Stair Landing Tile:
 - a. Color: to match treads
 - b. Thickness: 1/8", minimum
 - c. Surface pattern: to match treads
 - d. Size: manufacturer's standard
 - e. Approved Products, or Approved Equal:
 - i. Johnsonite RT-RD Roundel Tile Raised Disk Pattern

I. ACCESSORIES

- 1. Adhesive
 - a. Provide premium type recommended by manufacturer
 - b. Adhesive must comply with VOC limits established by the South Coast Air Quality Management District (SCAQMD), Rule #1168

END OF SECTION



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09680 CARPET

A. SUMMARY

This section contains design standards for commercial carpet. Refer to space standards for additional information.

B. GENERAL

1. All carpet, whether broadloom or carpet tiles, must have the following properties:
 - a. Carpet shall be CRI Green Label Plus Certified.
 - b. Carpet shall be entirely free of virgin PVC content. Recycled PVC content is acceptable.
 - c. Carpets eligible for manufacturer's reclamation and recycling program at the end of life cycle are preferred. Furthermore, products that can be separated as necessary and each composite material recycled back into the same material, rather than downcycling into a lower product, are preferred.
 - d. NSF-140-2007 Silver, Gold, or Platinum-Certified carpets are preferred. Higher levels are preferred where budget can accommodate.
 - e. Face fiber: 100% nylon 6 or nylon 6-6
 - f. Dying method: product must be 100% solution dyed
 - g. Construction: tufted
 - h. Appearance: In consideration of stain removal, solid colors shall not be provided for other than Executive or Dean's Offices. Color/design shall always be selected from manufacturer's standard selection. Selections shall give strong preference for patterns that hide soiling well. For example, organic patterns are often superior to geometric patterns in this regard.
 - i. Warranties; all in effect for 15 years, minimum, unless otherwise noted:
 - i. Warrant against any edge ravel, zippering, shrinking, and stretching
 - ii. Warrant against delamination of backing from face
 - iii. Warrant loss of no more than 10% of face fiber, by weight
 - iv. Warrant against static electricity build-up in excess of 3.5 kv per AATCC 134
 - v. Tuft bind: average of 8 pounds per ASTM D 1335-67, "Tuft Bind of Pile Floor Coverings" or for lifetime of product
 - j. Density: per Table 1 below
 - i. Average Pile Yarn Density (APYD) as determined by $D = 36 W / T$ where W = average pile yarn weight in ounces/ square yard; T = either the tuft height as determined by ASTM D-5823 or the average pile thickness computed in accordance with ASTM D-419 (section 10 or 11)

- k. Carpet must meet at least one of the following criteria:
 - i. Carpet must be fully manufactured and at least 75% of its component materials, by weight, must be harvested/recovered/extracted within a 500 mile radius of the project site.
 - ii. Weighted recycled content for entire product assembly by weight as determined by formula below must be minimum 35% for carpet tile and minimum 30% for broadloom carpet:

$$\frac{\begin{array}{c} \text{(post-consumer recycled material weight} \\ + \\ \text{.5 x pre-consumer recycled material weight)} \end{array}}{\text{total product weight}}$$

For example, if a single carpet tile weighs 20 oz. and is composed of 2 oz. of post-consumer recycled material, 8 oz. of pre-consumer recycled material and 10 oz. from virgin sources, then the weighted recycled content of the carpet tile is as follows:

$$\frac{(2 \text{ oz.} + .5 \times 8 \text{ oz.})}{20 \text{ oz.}} = 30\% \text{ weighted recycled content, which falls short of the 35\% threshold required for carpet tile}$$

Note the following definitions established by the USGBC and applicable for projects at The George Washington University:

- **Post-consumer material** is waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.
- **Pre-consumer material** is material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

Specifications must require - and Contractor submittals must provide - manufacturer's documentation proving the recycled content threshold is met, as indicated in the calculation above. Statements claiming a certain percentage of either post-consumer or pre-consumer recycled content in the yarn or in the backing will not be acceptable, as the requirement is a percentage of the *entire* product by weight, which necessitates factoring in the percentage of product weight that each component offers.

C. TABLE 1: CARPET CLASS BY LOCATION

The following table is provided for carpet class guidance where specified. There are occasions where an alternate surface material will be required in spaces noted below and this chart is not applicable in those cases.

Class I (Light-Moderate)	Class II (Heavy)	Class III (Extra Heavy)
• Density (APYD) > 4500	• Density (APYD) > 5500	• Density (APYD) > 6500
<ul style="list-style-type: none"> • private offices • board rooms • small computer rooms • library special collection areas 	<ul style="list-style-type: none"> • clerical areas • cashier windows • lounges • residential units • conference rooms • seminar rooms • art gallery • bookstores • TV/study rooms • athletic training rooms • classrooms • computer rooms • copier & A/V rooms • dressing rooms in performance venues • stairs 	<ul style="list-style-type: none"> • corridors • lobbies • dining rooms • recreation rooms • study lounges • jogging tracks • weight rooms • locker rooms • lounges • library reference and return areas

D. CARPET TILE

1. Product
 - a. Pile type: level loop or multi-level loop only; cut loop is unacceptable
 - b. Minimum face weight
 - i. 17 oz. per sq. yd.
 - c. Density as required by Table 1
2. Approved manufacturers or equal:
 - a. InterfaceFlor
 - b. The Mohawk Group (Bigelow or Lees)
 - c. Shaw Industries (Shaw Contract or Patcraft)
3. Backing
 - a. Backing: synthetic
 - b. Approved backing (current compliance to be confirmed by Consultant), no alternates accepted unless specifically approved by the Owner:
 - i. Glasbac RE backing by InterfaceFlor

- ii. UltraSet RC backing by The Mohawk Group (Bigelow or Lees)
- iii. Ecoworx backing by Shaw
- 4. Adhesive
 - a. Releasable, pressure-sensitive adhesive, cured properly and to manufacturer's recommendations before carpet is installed to allow for removal and to prevent permanent bond with carpet backing
 - b. Premium type recommended by carpet manufacturer for the specific carpet line/backing selected
 - c. Low/no-VOC and compliant with the current South Coast Air Quality Management District (SCAQMD) Rule #1168 or 50 g/L (less water), whichever is most restrictive
 - d. CRI Green Label Plus Certified

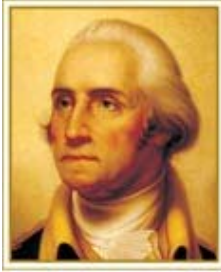
E. BROADLOOM CARPET

- 1. Product
 - a. Pile type: level loop or multi-level loop only; cut loop is unacceptable
 - b. Minimum face weight
 - i. Class I: 24 oz. per sq. yd.
 - ii. Class II: 26 oz. per sq. yd.
 - iii. Class III: 28 oz. per sq. yd.
 - c. Density as required by Table 1
 - d. Backing: performance
- 2. Approved manufacturers and backing or equal (current compliance with noted requirements herein to be confirmed by Consultant)
 - a. Shaw Industries (Shaw Contract or Patcraft); backing: EcoWorx Performance Broadloom or Ultraloc Pattern BL
 - i. Approved equals by the following are also acceptable:
 - a.) Beaulieu Commercial (Bolyu line)
 - b.) The Mohawk Group (Bigelow or Lees lines)
- 3. Adhesive
 - a. Direct glue-down
 - b. Premium type recommended by carpet manufacturer for the specific carpet line selected
 - c. Low/no-VOC and compliant with the current South Coast Air Quality Management District (SCAQMD) Rule #1168 or 50 g/L (less water), whichever is most restrictive
 - d. CRI Green Label Plus Certified

F. INSTALLATION

- 1. Install in accordance with manufacturer's instructions and recommendations.

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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09771

FABRIC WRAPPED PANELS

A. SUMMARY

This section contains design standards for fabric wrapped panels, trims, and accessories.

B. GENERAL

1. Stretched fabric panel systems are preferred over direct glue fabric wrapped panel systems since their installation does not make use of adhesives and sealants. This benefits indoor air quality due to the fact that there are no VOC's added to the building from chemicals that are typically associated with installation of wall coverings.
2. For environmental and health reasons, PVC-free fabric materials are preferred over products containing PVC.
3. Panel system components including face fabric, core material and extrusions with a high degree of recycled content are preferred.
4. Installation adhesives shall have low VOC content per LEED Credit EQ 4.1 Low-Emitting Materials: Adhesives and Sealants. Adhesives shall comply with South Coast Air Quality Management District (SCAQMD) Rule #1168.
5. Manufacturer's fiberboard shall have bonding agents that have low formaldehyde or contain no urea-formaldehyde resins per LEED Credit EQ 4.4 Low-Emitting Materials: Composite Wood and Agrifiber Products.
6. Coordinate layout and installation of tackable panels and attachment system components with other surrounding work in walls and ceilings, and with adjacent wood and gypsum board panels.
7. Fabrics shall comply with fire resistance rating requirements.

C. FABRIC WRAPPED PANELS

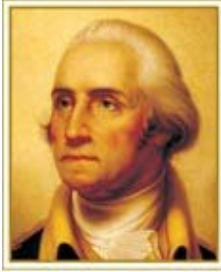
1. Fabric-Wrapped Panels:
 - a. Core Material:
 - i. Mineral-Fiber Board:
 - a.) With maximum flame-spread and smoke-developed indexes of 15 and 5, respectively.
 - b.) Product: Subject to compliance with requirements, provide "Micore" by United States Gypsum Company
2. Fabric Facing Materials:

- a. Fabric must meet all performance requirements including fire rating and flame retardancy, acoustical performance, durability, yarn content, fabric weight, and transparency.
 - i. Acceptable Fabric Products and Manufacturers:
 - a.) Standard of quality is based on Xorel by Carnegie
 - ii. Equivalent products by the following are acceptable:
 - a.) Designtex
 - b.) Maharam
- b. Fabric shall be provided from the same dye lot, color, and pattern as that selected by the Architect from Manufacturer's full range, as indicated on the Drawings and matching the samples approved by the Architect for use in the Work.
- a. Fabric Treatment:
 - i. Fire Retardant Treatment: Provide manufacturer's recommended chemical treatment which does not discolor fabric, compatible with stain-repellant treatment, if used on fabric
 - ii. Stain Repellant Treatment: Provide manufacturer's recommended chemical treatment which does not discolor fabric, compatible with fire retardant treatment
 - iii. Fabric shall have single coat, upholstery grade acrylic backing when required for proper installation.
- 3. Panel Core: Provide the following core material interspersed with wood nailing strips
 - a. Not less than 20-lb/cu. ft. (320-kg/cu. m) nominal density and 3/4-inch (19-mm) nominal core thickness.
 - b. Surface: Sanded
- 4. Panel Width and Height: Shall be as indicated on Drawings
- 5. Panel Edge and Frame: Extruded-aluminum or zinc-coated, rolled-steel shape attached to the core
 - a. Edge and Corner Detail: Square
- 6. Accessories
 - a. Mounting Devices: Concealed on back of panel, recommended to support weight of panel, and as follows:
 - i. Metal "Z" Clips: Two-part panel clips, with one part of each clip mechanically attached to back of panel and the other part to wall substrate, designed to allow for panel removal, unless otherwise indicated

D. INSTALLATION

- 1. Panels shall be installed in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and accurately fitted to adjoining work at borders and at penetrations.
- 2. Comply with fabric-wrapped panel manufacturer's written instructions for installation of panels using type of concealed mounting accessories indicated or, if not indicated, as recommended by manufacturer. Panels shall be securely anchored to supporting substrate.
- 3. Match and level fabric pattern and grain among adjacent panels.

END OF SECTION



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09772

STRETCHED FABRIC WALL SYSTEMS

A. SUMMARY

This section contains design standards for stretched fabric wall systems, trims, and accessories.

B. GENERAL

1. Stretched fabric panel systems are preferred over direct-glue fabric panel systems since their installation does not make use of adhesives and sealants. This benefits indoor air quality due to the fact that there are no VOC's added to the building from chemicals that are typically associated with the installation of wall coverings.
2. For environmental and health reasons, PVC-free fabric materials are preferred over products containing PVC.
3. Panel system components including face fabric, core material, and extrusions with a high degree of recycled content are preferred.
4. Coordinate layout and installation of panel systems and attachment system components with other surrounding work in walls and ceilings, and with adjacent wood and/or gypsum board panels.
5. Fabrics shall comply with fire resistance rating requirements.

C. STRETCHED FABRIC WALL SYSTEMS

1. Stretched Fabric Panel Systems:
 - a. Description: Perimeter framework with acoustical core, and field-stretched fabric covering mechanically fastened to framework without use of adhesives, nails, tacks, screws, or tapes.
 - b. Framework:
 - i. Manufacturer's standard rigid vinyl locking channels; UL-approved for fire-retardancy.
 - ii. Edge Profile: Square.
 - c. Tackable Core: Core material shall be tackable, impact-resistant, high density board.
 - i. Mineral-fiberboard, with maximum flame-spread and smoke-developed indexes of 15 and 5, respectively.
 - ii. Thickness: 5/8"

- iii. Product and manufacturer: Equivalent to “Micore” by United States Gypsum Company
 - d. Finish: Fabric-wrapped
 - e. Flame spread: ASTM E84 unadhered, 0-25
 - f. Noise-reduction coefficient (NRC range): ASTM C423, 0.85
 - g. Acceptable Products and Manufacturers:
 - i. Standard of quality is established by products manufactured by Novawall by Novawall Systems, Inc.
 - ii. Equivalent products by the following are acceptable:
 - a.) Stretch Wall Products, Inc.
2. Fabric Facing Materials:
- a. The fabric shall meet performance requirements for a stretched fabric system application and must be approved by the panel system manufacturer for systems compatibility.
 - b. The fabric shall be constructed with a plain weave from durable fibers. Fabrics with nylon or rayon content, fabrics with an open, loose weave, and fabrics that are too thick or thin are usually not well suited to stretched fabric panel applications.
 - c. The fabric shall have self-healing characteristics.
 - d. Subject to compliance with requirements, provide fabric from one of the following:
 - i. Acceptable Fabric Manufacturers, or equal:
 - a.) Knoll Textiles
 - b.) Carnegie
 - c.) Maharam
 - d.) Designtex
 - e. Fabric style and color shall be selected by Architect from manufacturer’s full color range, as indicated on Drawings and matching the samples approved by the Architect
 - f. Fabric Treatment:
 - i. Fire Retardant Treatment: Provide manufacturer’s recommended chemical treatment which does not discolor fabric, compatible with stain-repellant treatment, if used on fabric
 - ii. Stain Repellant Treatment: Provide manufacturer’s recommended chemical treatment which does not discolor fabric, compatible with fire retardant treatment.
 - iii. Fabric shall have single coat, upholstery grade acrylic backing when required for installation.
3. Panel Width and Height: Shall be as indicated on Drawings
4. Mid-Wall Configuration: Butt joint
5. Accessories
- a. Provide concealed clips, fasteners, and items required for complete concealed attachment installation
 - b. Perimeter trim shall be extruded aluminum, of profiles and dimensions indicated on Drawings
 - i. Finish: Clear anodized, satin finish
 - ii. Trim shall be installed around panels where indicated on Drawings

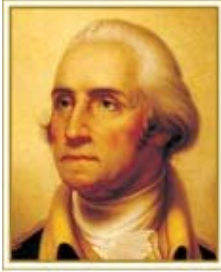
D. INSTALLATION

- 1. Panels shall be installed in locations indicated with vertical surfaces

and edges plumb, top edges level and in alignment with other panels, faces flush, and accurately fitted to adjoining work at borders and at penetrations.

2. Installation of panels shall follow stretched fabric panel system manufacturer's written instructions. Panels shall be securely anchored to supporting substrate.
3. Match and level fabric pattern and grain among adjacent panels.

END OF SECTION



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09912 INTERIOR PAINTING

A. SUMMARY

This section contains general standards for paint and finish requirements. Refer to space standards for additional information.

B. GENERAL

All interior paints and coatings applied at The George Washington University shall be low-VOC and shall meet or exceed Green Seal's 1993 Environmental Standard for Paints and Coatings, GS-11.

C. INTERIOR PAINT STANDARDS

1. All painted surfaces shall receive one prime and two finish coats.
2. Primers shall be 100% acrylic latex.
3. In accordance with Facility Maintenance's bulk pricing arrangements, all paints used at The George Washington University shall be one of the following lines, no exceptions. The color shall be of the manufacturer's standard colors in one of the following paint lines. No exceptions, alternates, equals, or "to match" will be allowed:
 - a. Harmony Interior Latex by Sherwin-Williams Company
 - i. Flat: Interior Latex Flat B5 Series
 - ii. Eggshell: Interior Latex Eg-Shel B9 Series
 - iii. Semi-Gloss: Interior Latex Semi-Gloss B10 Series
 - b. Tempo by McCormick
 - i. Flat: Interior Flat Vinyl Acrylic Wall Paint 11 Series
 - ii. Eggshell: Interior Eggshell Acrylic Enamel 34 Series
 - iii. Semi-Gloss: Interior Semi-Gloss Acrylic Enamel 18 Series
4. Paint sheen shall always be either flat or semi-gloss except that conference rooms and private offices only may be eggshell.
5. All paint colors and sheens shall be identified in the O&M manual with corresponding paint draw-down.
6. While all paints listed above comply with the Green Seal Reference Standard, where a specific color is not called for herein and the budget allows, Sherwin Williams Harmony paints are preferred due to their lower VOCs content when compared to McCormick Tempo paints.
7. For renovation work, where existing paint is oil-based, prepare and prime surface then apply latex paint as required.

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

Location-specific paint sheen and color requirements are as follows:

RESIDENCE HALL		
Location	Sheen	Line/Color
Ceilings as follows:		
<ul style="list-style-type: none"> • Housekeeping Closet • Kitchen • Mechanical / Electrical Room • Private Bathroom • Public Restroom • Stairway • Trash / Recycling Room 	semi-gloss	Sherwin Williams Harmony Extra White SW7006 or McCormick Tempo White Shadow 01
<ul style="list-style-type: none"> • Apartment • Bedroom • Corridor, Hallway • All others 	flat or semi-gloss	Sherwin Williams Harmony Extra White SW7006 or McCormick Tempo White Shadow 01
Walls as follows:		
<ul style="list-style-type: none"> • Housekeeping Closet • Kitchen • Mechanical / Electrical Room • Private Bathroom • Public Restroom • Stairway • Trash / Recycling Room 	semi-gloss	Sherwin Williams Harmony Extra White SW7006 or McCormick Tempo White Shadow 01

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

<ul style="list-style-type: none"> • Apartment • Bedroom • Corridor, Hallway • Public Space • All others 	<p>semi-gloss</p>	<p>Line and color per design except where wall is white, provide</p> <p>Sherwin Williams Harmony Extra White SW7006</p> <p>or</p> <p>McCormick Tempo White Shadow 01</p>
<p>Doors & door frames</p>	<p>semi-gloss</p>	<p>Line per design; color per design and same for doors and frames, but to contrast wall color</p>
<p>ACADEMIC/ADMINISTRATIVE</p>		
<p>Location</p>	<p>Sheen</p>	<p>Line/Color</p>
<p>Ceilings as follows:</p>		
<ul style="list-style-type: none"> • Housekeeping Closet • Mechanical / Electrical Room • Pantry • Public Restroom • Stairway • Trash / Recycling Room 	<p>semi-gloss</p>	<p>McCormick Tempo White Shadow 01</p> <p>or</p> <p>Sherwin Williams Harmony SW 7012 Creamy or Extra White SW7006</p>

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

<ul style="list-style-type: none"> • Break-Out Room, Study Room, Lounge • Hallway, Corridor • Classroom, Computer Lab, Lecture Hall • Entry Vestibule • Lobby & Related Spaces • Mail, Files, Copy, Storage & Similar Spaces • Office Suite Reception Area • Recycling & Waste Station, Built-In • All others 	flat or semi-gloss	McCormick Tempo White Shadow 01 or Sherwin Williams Harmony SW 7012 Creamy or Extra White SW7006
Walls as follows:		
<ul style="list-style-type: none"> • Housekeeping Closet • Mechanical / Electrical Room • Pantry • Public Restroom • Trash / Recycling Room 	semi-gloss	McCormick Tempo White Shadow 01 or Sherwin Williams Harmony SW 7012 Creamy or Extra White SW7006
<ul style="list-style-type: none"> • Break-Out Room, Study Room, Lounge • Circulation (Hallway, Corridor, Stair) • Classroom, Computer Lab, Lecture Hall • Entry Vestibule • Lobby & Related Spaces • Mail, Files, Copy, Storage & Similar Spaces • Recycling & Waste Station, Built-In 	semi-gloss	Line and color per design except where wall is white, provide McCormick Tempo White Shadow 01 or Sherwin Williams Harmony SW 7012 Creamy or Extra White SW7006

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

<ul style="list-style-type: none"> • Office Suite Reception Area • Office • Conference Room 	flat or semi-gloss or eggshell ¹	Line and color per design except where wall is white, provide McCormick Tempo White Shadow 01 or Sherwin Williams Harmony SW 7012 Creamy or Extra White SW7006
Doors and door frames	semi-gloss	Line per design; color per design and same for doors and frames, but to contrast wall color

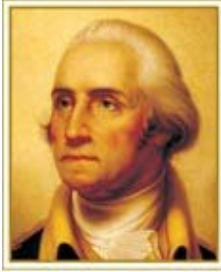
GENERAL REQUIREMENTS UNLESS NOTED OTHERWISE ABOVE

Location	Sheen	Line/Color
Ceilings, U.N.O.	flat or semi-gloss	varies
Interior trim, U.N.O.	semi-gloss	varies
Interior wood, U.N.O.	semi-gloss	varies
Interior ferrous metal, U.N.O.	semi-gloss	varies
Interior CMU, U.N.O.	semi-gloss	varies

Note:

1. While offices should be painted in eggshell finish for new construction and major renovations, when renovation occurs adjacent to existing spaces to remain, provide paint sheen to match existing. The University maintains offices (and all other academic spaces except conference rooms) with semi-gloss paint. Where semi-gloss is already present, provide semi-gloss for newly renovated offices in lieu of eggshell.

END OF SECTION



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10101 VISUAL DISPLAY SURFACES

A. SUMMARY

Refer to Academic Building space standards and AT Standards for additional information regarding markerboards.

B. GENERAL

1. Location shall be as per program requirements and approved by Academic Technologies.
2. Boards shall be a fixed style or a vertical or horizontal sliding style where required by program and approved by Academic Technologies.
3. Boards shall be mounted at 3'-0" AFF to the bottom of each board.

C. FIXED MARKERBOARD ASSEMBLIES

1. Porcelain Enamel Markerboard Assembly: Provide balanced, high- pressure, factory-laminated porcelain enamel markerboard assembly of 3-ply construction consisting of face sheet, core material, and backing
 - a. Gloss finish: Low gloss; dry-erase markers wipe clean with dry cloth or standard eraser, and suitable for use as projection screen.
 - b. Materials: Porcelain-Enamel Face Sheet shall be manufacturer's standard steel sheet with porcelain enamel coating fused to steel; uncoated thickness indicated. Steel alloy shall be suitable for application of architectural porcelain enamel employing continuous coil process, properly pre-cleaned and treated.
 - i. Gage: As recommended by manufacturer but not less than 24 gage
 - ii. Finish: Writing surface finish should be applicable for markers; equivalent to LCS porcelain enamel finish, color No. 32 LCS White by Claridge.
 - a.) Porcelain enamel finish, type A acid-resistant or better
 - b.) Color: White
 - c.) Gloss Finish: Low reflective; dry-erase markers wipe clean with dry cloth or standard eraser
 - iii. Core: Provide the manufacturer's standard 3/8 inch thick particleboard core material complying with the requirements of ANSI A208.1, Grade 1 M 1.
 - iv. Backing Sheet: 0.015" thick Aluminum sheet

- c. Laminating Adhesive: Provide the manufacturer's standard moisture resistant thermoplastic type adhesive
- d. Mounting
 - i. Marker boards should be mounted at 3'-0" AFF to the bottom of the board.
 - ii. Marker boards should have no less than 3'-0" vertical sections for writing surfaces.
- e. Location in classrooms
 - i. Marker board location shall be as per the program requirements and approved by Academic Technologies.
- f. Acceptable Products and Manufacturers, or approved equal:
 - a.) Claridge Products and Equipment, Inc., Harrison, AR
 - b.) Best-Rite Manufacturing (MooreCo, Inc.), Temple, TX
 - c.) American Visual Display Products, LLC., Wetumpka, Alabama

D. SLIDING MARKERBOARD ASSEMBLIES

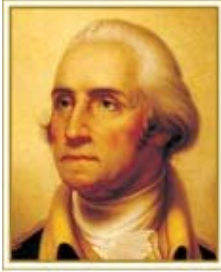
- 1. Horizontal Sliding Panels: Where required by program, provide horizontal sliding markerboards including fixed back panel. Panels shall be manually-operated. Each sliding panel shall be equipped with manufacturer's standard horizontal sliding hardware consisting of overhead extruded aluminum track with nylon ball bearing rollers and channel shaped bottom guides. Hardware shall be designed and fabricated to produce smooth and easy operation without rattles.
- 2. Vertical Sliding Panels: Where required by program, provide vertical sliding markerboards including fixed back panel. Panels shall be manually-operated. Units and housing shall have standard components of the size, thickness, and design required to provide sufficient strength for support of panels independently of support from walls. Each sliding panel shall be equipped with manufacturer's standard vertical sliding hardware designed and fabricated to produce smooth and easy operation without rattles.

E. MARKERBOARD ACCESSORIES

- 1. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch thick, of size and shape indicated
 - a. Factory-Applied Trim: Manufacturer's standard
 - b. Clear, anodized satin finish
- 2. Marker Tray: Manufacturer's standard, cantilever arm type, continuous.
 - a. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
 - b. Clear, anodized satin finish
 - c. Provide one box, 4 colors minimum, of liquid felt tip markers for each individual markerboard installed
- 3. Display Rail:
 - a. Provide 2" extruded satin anodized aluminum, continuous display rail, with tackable cork inset strip
 - a. End Stops: Locate at each end of display rail.

- b. Display Hooks: Provide two map hooks for every 48 inches of display rail or fraction thereof.

END OF SECTION



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10125

BULLETIN BOARDS AND BULLETIN BOARD CABINETS

A. SUMMARY

Bulletin boards are typically located above built-in recycling/waste stations in both academic and residence hall buildings. They are also frequently found in corridors, office suites, and elevator lobbies. Coordinate locations with Owner. Refer to space standards for additional information.

Bulletin board cabinets or display cases shall be provided for all residence halls and are typically located in entry lobbies, or directly related spaces, on the main floor. Coordinate locations with Owner. Three bulletin board cabinets shall be provided for each residence hall, one for each of the following: 1) University Police Department (UPD); 2) Office of Risk Management; and 3) Green Living.

B. PRODUCTS

BULLETIN BOARDS

1. Material: linoleum-cork with burlap/jute backing
2. Fully washable finish
3. Fully biodegradable
4. Thickness: ¼", minimum
 - a. Color: through-body and selected from manufacturers' standard color
 - b. Residence Halls: Color to be best match interior design scheme
 - i. Note: Consider using Pantone 302 ("GWU Blue") if appropriate. If Forbo brand Bulletin Board is selected, the best match to GWU Blue is color 2205. At the time of writing, some Forbo colors are available in 4' widths (including 2205); others are in 6' widths. Consultant is asked to consider waste and color palette and recommend a different selection if appropriate.
 - c. Academic buildings: Color shall typically be neutral and to complement the surrounding finishes.
5. Provide as one of the following
 - a. wall-to-wall with clean joints
 - b. framed in clear, anodized, extruded aluminum frame
 - c. framed in material to coordinate with surrounding finishes
6. Approved product, or approved equal:
 - a. Bulletin Board by Forbo Linoleum, Inc., Hazelton, PA

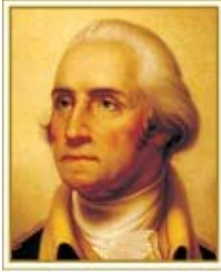
BULLETIN BOARD CABINETS

1. Description: Bulletin board cabinet with glass door
2. Door: 3/16" tempered glass door with continuous piano-type hinge; Flat key tumbler lock
3. Dimensions: 24"h x 36" w X 1 3/4" deep (including trim and housing)
4. Cork back panel color: 1100 TAN
5. Perimeter Trim: 1" x 3" hollow tube aluminum with satin anodized finish
6. Hanging Device: Z-Bar Hangers
7. Approved product, or approved equal:
 - a. Claridge Cork Bulletin Board Cabinets - Model 541VF

C. INSTALLATION

1. Bulletin Boards:
 - a. Installation method shall be such that the full depth of tackable material, whether the product alone, or it with a backing, allows for full-depth embedment of standard thumbtacks.
 - b. Frame, where required: extruded, clear anodized aluminum
2. Bulletin Board Cabinets:
 - a. Bulletin board cabinets shall be installed in drywall only.
 - b. Install cabinets in locations and mounting heights as indicated and in accordance with manufacturer's instructions, keeping assembly straight, plumb, and level.

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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10150

TOILET COMPARTMENTS

A. SUMMARY

This section contains general standards for toilet compartments. Refer to space standards and related sections for additional information. Work included in this section, but not necessarily limited to, includes:

1. Floor-mounted and overhead-braced solid resin toilet compartments
2. Urinal screens
3. Accessories

B. GENERAL

Requirements herein apply to toilet accessories found in both academic buildings and residence halls.

Stainless steel accessories and trim throughout bathrooms shall be satin or brushed stainless steel, unless otherwise noted. Among others, these items may include, the following: towel bars, grab bars, folding shower seat supports, toilet tissue holders, metal shelves, medicine cabinets, mirror frames, robe hooks, shower rods, shower curtain hooks. If provided in stainless steel, cabinet hardware should match accessories.

C. TOILET PARTITIONS

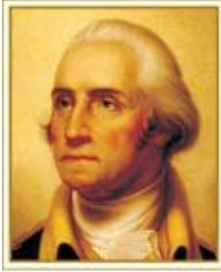
1. Mounting: floor-mounted
2. Panels, doors, and pilasters:
 - a. Material: Panels should be solid high-density polyethylene (HDPE) or high-density polypropylene (HDPP) formed under pressure and heat into solid homogeneous sheets; non-laminated, non-absorbent.

Note: A number of manufacturers' standard HDPE lines contain 20%-70% post-industrial (pre-consumer) recycled HDPE. Maximizing the amount of post-consumer content is preferred where the budget allows. Scranton Products (parent company of Comtec, Santana, and Capitol Partitions) have a line of partitions made of 100% post-consumer recycled HDPE. 3Form (line: "100 Percent") and Yemm & Hart (line: "Origins") also make 100% post-consumer recycled HDPE partition panel material.

- b. 1" thick, minimum

- c. Graffiti-resistant
- 3. Height: top of panel walls to be 69", typical
- 4. Panel color: to be selected from manufacturer's full standard color range
- 5. Hardware
 - a. Manufacturer's heavy-duty fastenings and fittings should be provided.
 - b. Hinges: continuous self-closing stainless steel or aluminum
 - c. Door latch: slide-type or lever latch and keeper with bumper. Thumbturn-type latches are not acceptable.
 - d. Each door to provide a combination coat hook/bumper. For coat hook/bumper guideline specifications, refer to 10800 Toilet and Bath Accessories, Section D.
 - e. Door pulls should be on both faces of door for wheelchair-accessible compartments.
 - f. Finishes should be manufacturer's standard cast alloy base metal (except as noted), US26 polished chrome finish.
- 6. Brackets, Fittings, and Fastenings:
 - a. Brackets: continuous, extruded aluminum
 - b. Shoes: stainless steel or aluminum
 - c. Headrails: continuous, extruded aluminum
 - d. Provide continuous, extruded aluminum channel on bottom of panels
 - e. Exposed material finishes to match hardware
- 7. Doors
 - a. Typical stall doors to be 24" wide, minimum.
 - b. Barrier-free stall doors to be as required.
- 8. Approved manufacturers or approved equal:
 - a. Bradley Corporation, Menomonee Falls, WI
 - i. Mills Partitions - Bradmar Partitions
 - b. Scranton Products, Scranton, PA
 - i. Capitol Partitions, Inc., Columbia, MD
 - ii. Santana Products/Hiny Hiders, Scranton, PA
 - iii. Comtec Industries
 - c. Sanymetal, a Crane Plumbing Company, Somerset, KY

END OF SECTION



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10410 DIRECTORIES

A. SUMMARY

This section contains general standards for illuminated and non-illuminated directories. Refer to design standards and related sections for additional information.

B. GENERAL

1. Copy requirements shall be determined by GW.
2. Directory locations shall be approved by GW.

C. PRODUCTS

1. Illuminated Directories:
 - a. General: Provide manufacturer's standard assembly consisting of perimeter frame, back, removable name strips, and frameless openable transparent cover, with concealed fluorescent illumination of name strips.
 - b. Frame: Extruded aluminum, depth as indicated with reinforced corners, for fully recessed mounting
 - c. Cover:
 - i. Frameless
 - ii. Provide with concealed hinges and door latching mechanism
 - d. Header Panel: 4" high with text as indicated on Drawings
 - e. Side panels: Provide side panel on both sides of directory with building name on one side and building map on the other side, as required
 - f. Size and Format: Custom, as indicated on Drawings
 - g. Directory Format:
 - i. Black nylon carriers support and retain film negative graphic strips. Seal carriers to prevent light leakage
 - ii. Film carriers are retained by aluminum frame, which also supports translucent white acrylic diffuser panels in front of fluorescent lamps
 - h. Directory Name Strips:
 - i. Provide ship-lapped glow-through graphic strips, 3/8" X length required for size and format of directory
 - ii. Strips interlock to prevent light leakage
 - iii. Number or columns and strips to be determined by GW
 - i. Type style, size, position, color, and copy to be determined by GW
 - j. Acceptable Product and Manufacturer: Equivalent to Visulite by Apco, custom size as required

- k. Locations: First floor entrance lobbies, typical (Academic and Administrative buildings)
- 2. Non-Illuminated Directories:
 - a. General: Provide manufacturer's standard assembly consisting of frame, back, removable name strips, header panel, and hinged transparent cover
 - b. Aluminum Perimeter Frame: Extruded aluminum with clear anodic finish.
 - i. Perimeter Frame Shape: Square.
 - ii. Perimeter Frame Corners: Square.
 - c. Letterboard: Manufacturer's standard panel material, with grooves spaced at 1/4 inch (6 mm) o.c. to receive changeable letters.
 - i. Color: As selected by Architect from full range of industry colors.
 - d. Letters: Molded plastic with tabs for engaging grooves in letterboard. Provide manufacturer's standard assortment of not less than 300 letters for each size, style, color, and case required; include letters, numbers, and characters. Package letters in compartmentalized carrying box.
 - i. Height: 1/2 inch (13 mm) to top of capitals.
 - ii. Style: As selected by Architect.
 - iii. Color: As selected by Architect from full range of industry colors.
 - iv. Case: Capitals and lowercase
 - e. Header Panel: Non-illuminated; with opaque, acrylic sheet panel set within overall perimeter frame; with matching frame that separates header panel from letterboard.
 - i. Graphic Content and Style: Provide header panel copy that complies with requirements indicated on Drawings for size, style, spacing, content, height, location, material, and colors.
 - ii. Color: As selected by Architect from full range of industry colors.
 - iii. Width: As indicated on Drawings
 - iv. Height: As indicated on Drawings
 - f. Acceptable Products and Manufacturer: Equivalent to Directory Series S560 Printed Panel Directory, as manufactured by InPro Signscape; or an equivalent product by one of the following:
 - i. Claridge Products & Equipment, Inc.
 - ii. Marsh Industries, Inc.
 - g. Locations: At each elevator lobby and main lobby of first floor (Academic and Administrative Buildings)

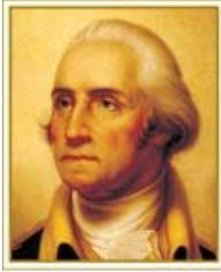
D. ACCESSORIES

- 1. Provide concealed fasteners and other accessories as recommended by manufacturer and as required for proper and secure mounting to substrates.

E. INSTALLATION

- 1. For surface-mounted directories, secure both top and bottom of directories to walls.
- 2. Mounting height shall be as indicated on Architect's drawings.

END OF SECTION



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10431 SIGNAGE

A. SUMMARY

This section contains general standards for exterior and interior signage. Refer to building type design standards, Room Numbering standards, and related specification guideline sections including 10410 Directories and 16700 Digital Signage for additional information.

B. GENERAL

1. Exterior signage affixed to the building is typically contract work included in the construction contract and installed when the building is constructed.
2. Alterations to the exterior of a designated landmark building within the Foggy Bottom Historic District will be subject to the Historic Preservation Maintenance Guidelines as well as review and approval by the Historic Preservation Review Board prior to alterations being made.
3. Interior signage orders must be placed through GW's Sign Shop which produces and installs all signage for projects. A Facilities Maintenance Work Request must be completed to start the process. *For specialized, custom signage an outside vendor may need to be engaged for fabrication and installation.*
4. Signage shall comply with ADA requirements.
5. All exterior signage, building and campus identifying elements shall comply with campus master plans. Exterior signage for projects at the Foggy Bottom Campus must comply with the Foggy Bottom Campus Streetscape Plan.
6. Exterior building signage shall be vandal-proof and theft-resistant.

C. BUILDING IDENTIFICATION/PEDESTRIAN SCALE BY OWNER (PROVIDED FOR INFORMATION ONLY)

1. Building Identifier: A building identifier shall be provided at prominent building entrances in compliance with the Foggy Bottom Streetscape Plan.
 - a. Types:
 - i. Free Standing Pylon to be located in the Planting or Setback zone per the Foggy Bottom Streetscape Plan
 - ii. Pole-mounted signage with directional arrow to be located in the Furnishing Zone per the Foggy Bottom Streetscape Plan
 - b. Free Standing Pylon:
 - i. Color: GW Blue

- ii. Dimensions: 24" X 72"
- iii. Graphics, in order from top to bottom of sign:
 - a.) GW Word Mark
 - b.) Building Name (if the building has a name)
 - c.) Street Address
 - d.) GW Logo Medallion

D. INDIVIDUAL PIN-MOUNTED LETTERS

- 1. The following standards apply whether pin letters are for interior or exterior application.
 - i. Font: Requiem
 - ii. All capital letters
 - iii. Letters individually mounted using concealed pins
 - iv. Letter size: 6-12 inches high, depending on the space available
 - v. Material: brushed stainless steel
 - vi. Mount with ¼ inch offset from face of wall.

E. INTERIOR SIGNAGE BY OWNER (PROVIDED FOR INFORMATION ONLY)

- 1. Room Identification Signage
 - a. Residential unit signs
 - i. GW Blue
 - ii. 3" high x 6" wide with a 2.5" diameter gold-colored semicircle extending below the rectangle
 - b. All other room signs
 - i. GW Blue
 - ii. One layer of acrylic; ¼" thick
 - iii. All type and Braille raised 1/32" minimum
 - iv. 6" x 6" square with a 2.5" diameter gold-colored semicircle extending below the square
- 2. Directional and Specialty Signage: Custom signs, of materials and design as needed
 - a. Directional Signage
 - i. Located in areas such as elevator lobbies and corridors, which include department names and arrows to assist building occupants find their destination; Signage size varies per program requirements
 - b. Informational Signage
 - i. Located in areas such as elevator lobbies and corridors, which include information for building occupants; Signage size varies per program requirements
 - c. Die-Cut Decal and Silk-Screen Signage
 - i. Decal or silk-screen signage with an etched glass appearance is preferred over true etched glass work as decals can be changed more easily thus offering greater flexibility.
 - ii. Mounted on front or back of glass
 - iii. Size varies
 - iv. Custom design per program requirements

F. FIRE EVACUATION SIGNAGE BY OWNER (PROVIDED FOR INFORMATION ONLY)

1. Fire evacuation signage is handled by GW's Office of Environmental Health and Safety.

G. EMERGENCY RESPONSE SIGNAGE BY OWNER (PROVIDED FOR INFORMATION ONLY)

1. All laboratories and workshops across GW shall have Emergency Information Signs describing the types of materials present within the space. This signage is also provides information that assists the emergency response team. Emergency Response Signage is managed by GW's Office of Environmental Health and Safety.

H. EXTERIOR ACCESSIBILITY SIGNAGE

1. Wheelchair-accessible parking signs
 - a. Description: Aluminum sheet minimum 0.080 inch thick, with silk-screened painted graphics as indicated on Drawings.
 - b. Graphics:
 - i. Letters: Helvetica.
 - ii. Symbols: Universal graphic symbol for Handicapped.
 - iii. Height of letters and graphics: Minimum 3 inches high.
 - iv. Provide reflective blue graphics and border, on reflective white background.
 - c. Sign size: 12 inches wide x 18 inches high.
 - d. Mounting: Provide galvanized fasteners for mounting to concrete walls and structure.
 - e. Quantity: Provide one sign for each accessible parking space.
 - f. Provide product and manufacturer complying with above and acceptable to Architect.

I. CAMPUS IDENTIFICATION (PROVIDED FOR INFORMATION ONLY)

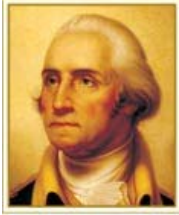
1. Banners:
 - a. Building Mounted Banners/Flags:
 - i. Mounted above building entrances
 - ii. Material: Marine boat cover fabric; water-resistant, UV-resistant
 - a.) Approved Manufacturer: Sunbrella, Glen Raven, NC
 - iii. Colors: Captain Navy, White, Yellow
 - iv. Sizes:
 - a.) Small – 30" wide X 38" long on one side - 68" long on other side (78" long including bottom "V"-shaped hem) X 42" long on top angled pole sleeve
 - b.) Medium - 42" wide X 72" long on one side -115" long on other side (132" long including bottom "V"-shaped hem) X 61" long on top angled pole sleeve
 - v. Colors: Navy, White, Yellow

- vi. Top Pole Sleeve: 45° angle, 7" pole sleeve
- vii. Bottom Angled Hem: 2"
- viii. Special angle mounting hardware shall be provided; Finish to match banner pole
- b. Street Banners include pedestrian, vehicular, and thematic banners, typically mounted on street light poles at various locations across campus per the Foggy Bottom Streetscape Plan.
- 2. Campus Map: Campus maps shall be provided to enhance wayfinding for the university community, visitors, and residents. Campus maps shall occupy prominent locations such as near transit entrances, bus stops, and parking garages.
 - a. Description: Freestanding display panel with framed campus map insert
 - b. Size: 2'-6" X 7'-6"

J. ACCESSORIES

- 1. Mounting Methods: Use fasteners or adhesives from materials that are not corrosive to sign material and mounting surface.
- 2. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance.
- 3. Provide concealed fasteners or adhesives as recommended by manufacturers and as required for permanent and secure mounting to substrates in each condition.

END OF SECTION



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10520

FIRE PROTECTION SPECIALTIES

Comment [nra1]: All inherited; To be further developed

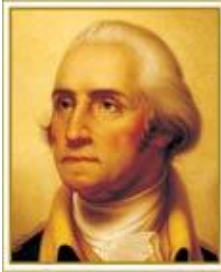
A. SUMMARY

This section contains general standards for fire protection specialties.

B. STANDARDS

1. Classrooms
 - a. Fire extinguishers shall be provided as required by code.
2. Fire Extinguishers
 - a. Per the GWU Office of Risk Management, the University uses the following types of fire extinguishers:
 - i. Water (Class A)
 - ii. Carbon Dioxide (Class BC)
 - iii. Multipurpose Dry Chemical (Class ABC)
 - iv. Dry powder (Class D)
3. Products must conform to the following standards:
 - a. National Fire Protection Association: **NFPA 10** requirements
 - b. **Americans with Disabilities Act – ADA**
 - c. **Uniform Federal Accessibility Standards – UFAS**
4. Acceptable Products and Manufacturers
 - a. Larsen's Manufacturing Co.
 - b. J. L. Industries
 - c. Potter-Roemer, Inc.
5. Fire Extinguisher Cabinets
 - a. All cabinets should be fabricated to house one fire extinguisher.
 - b. Units should be installed fully recessed with trim concealed by door.
 - c. Cabinet door should be a single, flat panel with vertical vision panel that is factory glazed with clear glass.
 - d. Cabinet door hardware should be manufacturer's standard with a surface mounted handle to match door finish, a roller latch, and any exposed hinges should match door finish.
 - e. Hinges should allow door a full 180° opening.
 - f. Mounting height should not exceed 5'-0" A.F.F. when measured to top of cabinet.

END OF SECTION



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10550 POSTAL SPECIALTIES

A. SUMMARY

This section contains design standards for mailboxes and accessories for Residence Halls. Refer to space standards for additional information.

B. GENERAL

1. Mail for the entire GW campus is delivered and distributed from a central location by GW Mail Services staff (The USPS does not provide delivery services). GW Mail Services requires the keys for all locks once mailboxes are installed.
2. Mail drop boxes shall not be provided for Residence Halls. Postal counter service is provided by GW Mail Services which is located on campus.
3. A misdirect mailbox shall be provided. Refer to the requirements provided below.
4. A key drop box shall be provided. Refer to the requirements provided below.

C. PRODUCTS

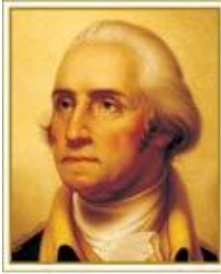
1. Mailboxes
 - a. Description:
 - i. Front-loading, horizontally stacked modules consisting of multiple compartments with fixed, solid compartment backs; Entire assembly enclosed within a recessed wall box
 - ii. Material: Polycarbonate doors with 22-gauge galvanized steel housing
 - iii. Provide access to entire group of compartments for distributing incoming mail from front of unit by unlocking master locks and swinging side-hinged master door open; Master door panel secured by two control locks
 - b. Compartments:
 - i. Quantity and layout of compartments, as required to accommodate the number of residents, as directed by Owner
 - ii. Compartment Dimensions (interior): 3-5/8" min. W X 6.25"H X 15"D
 - c. Compartment Doors:
 - i. Each compartment door shall have lock, tenant identification, and concealed, full-length hinge on one side
 - ii. Tenant Identification:
 - a.) Identification: Residential Unit Number indicated on face of compartment door within cardholder (name slot and clear cover)

- b.) Provide blank cardholder identification tabs for printing a room number.
 - c.) Owner to coordinate numbering.
 - d. Compartment door locks:
 - i. Three-digit, single-dial, combination lock with spring latch and automatic throw-off. Each compartment shall have a different combination.
 - ii. Approved Manufacturer and Product, or approved equal:
 - a.) Postal Products Unlimited, Inc., - Guardian Series Model N1023960
 - e. Approved Manufacturers and Products, or approved equal:
 - i. Postal Products Unlimited, Inc., - Guardian Module Model N1021244
 - ii. Salisbury Industries, Los Angeles, CA
 - iii. Florence Manufacturing, A Gibraltar Industries Company
2. Misdirected Mail Box
- a. Description: Standard recess-mounted letter box with 11-1/2" W x 3/4" H mail slot; Front door for private access for collection via key
 - i. Box Material: Heavy duty sheet and extruded aluminum
 - ii. Door Material: Heavy duty 1/4" thick aluminum
 - b. Overall Mail Box Dimensions: 15" W x 19" H x 7-1/2" D
 - c. Finish: Powder coated; Color: Aluminum
 - d. Approved Manufacturer and Product, or approved equal:
 - i. Salsbury Industries – Model # 2245AP (Recess-mounted)
3. Key Drop Box (Depository Safe)
- a. Description: Heavy duty, high-security key drop box (safe) for deposited key storage. The box shall have a front drop slot large enough to accept keys. The front access door shall be hinged with key-retaining lock and door handle. The key box shall be accommodated in a custom recess-mounted installation.
 - i. Dimensions: 14" H x 10"W x 10"D exterior
 - ii. Door: 1/4" thick steel door; 8 gauge thick steel body
 - iii. L Bar on hinge side to prevent opening by destruction of hinges
 - b. Door Hardware: Key operated mortise cylinder deadlock
Acceptable Products and Manufacturers, or equal:
 - i. The New England Safe Co. – Model # IC-1KS, Boston, MA

D. INSTALLATION

- 1. Mailboxes:
 - a. Mailboxes shall be installed with center of tenant-door lock cylinder not more than 67 inches above finished floor and bottom of lowest compartment not less than 28 inches above finished floor.
 - b. Arrange compartments in groups as indicated on Drawings.
- 2. Misdirected Mail Box:
 - a. Misdirected mail box shall be installed in accordance with box manufacturer's directions, in location directed by Owner.

END OF SECTION



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10800 TOILET AND BATH ACCESSORIES

A. SUMMARY

This section contains general standards for toilet accessories. Refer to design standards and related sections for additional information.

B. GENERAL

Requirements herein apply to toilet accessories found in both academic buildings and residence halls.

Stainless steel accessories and trim throughout bathrooms shall be satin or brushed stainless steel, unless otherwise noted. Among others, these items may include the following: towel bars, grab bars, folding shower seat supports, residential style toilet tissue holders, metal shelves, medicine cabinets, mirror frames, robe hooks, shower rods, shower curtain hooks. If provided in stainless steel, cabinet hardware should match accessories.

C. OWNER-PROVIDED, CONTRACTOR-INSTALLED ACCESSORIES FOR PUBLIC RESTROOMS AND PANTRIES ONLY *(Applicable to all building types)*

1. Owner-Provided, Contractor-Installed Accessories:
 - a. Wall-mounted soap/foam dispenser, Touchless
 - i. Restroom: Provide one per every two sinks. Mount on wall between lavatory mirrors.
 - ii. Pantry: Provide one per sink.
 - b. Wall/partition-mounted disposable toilet seat cover dispenser
 - i. Restroom: Provide one dispenser per toilet. Locate above toilet, except as may be otherwise required by barrier-free requirements.
 - c. Touchless paper towel dispenser
 - i. Pantry: Provide one per pantry.
 - d. Wall/partition-mounted toilet tissue dispenser
 - i. Restroom: Provide one per toilet.
 - e. Shower soap dispenser (Smith Center/Athletic Facilities)
 - i. Shower: Provide one per shower unit

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

Manufacturer & Product Type	Product Name	Color (Model)	Size
Kimberly-Clark Professional <i>toilet seat cover dispenser</i>	Reflections - or - In-Sight	Stainless Steel (09512) - or - Smoke Grey (09506)	17" – 17-1/2" W 2-1/2" – 3-1/4" D 12-1/4" – 13-1/4" H
Reliable <i>soap / foam dispenser</i>	Touch-Free Luxury Foam Dispenser	Charcoal (423111)	5-3/4" W 4" D 10" H
Georgia Pacific <i>paper towel dispenser</i>	enMotion Paper Towel Dispenser	Translucent Smoke (59462)	15" W 9-3/4" D 16-3/4" H
Reliable <i>shower soap dispenser</i>	Luxury Foam High Traffic Soap Dispenser, 2000ml	Dove Gray (444015)	6.813" W 11.875" L 5.125" H
Georgia Pacific <i>toilet paper dispenser</i>	Compact Tissue Dispenser	Translucent Smoke (56744)	11-3/4" W 7" D 13-1/4" H

D. CONTRACTOR-PROVIDED, CONTRACTOR-INSTALLED ACCESSORIES

(Applicable to restrooms and bathrooms in all building types, as called for in the building type standards)

1. SHOWER CURTAINS, RODS AND HOOKS

- a. Provide heavy duty, 1-1/4" diameter stainless steel curtain rod; satin finish. Rod needs to be permanently attached to walls, not adjustable. Blocking must be installed to ensure that all items are secure at time of installation.
- b. Shower curtain to be provided for each shower unit with the following properties:
 - i. Opaque white
 - ii. Minimum 8-gauge weight
 - iii. Top shall be reinforced. Where curtain material has potential to fray, sides and bottom shall be hemmed.
 - iv. Mold and mildew resistant
 - v. Biodegradable, chlorine-free and VOC-free
 - vi. Material: PEVA (polyethylene vinyl acetate), EVA (ethylene vinyl acetate) or approved equal
Material shall not be PVC; no exceptions. PVC has been linked to numerous health and environmental problems.

- vii. Dimensions of shower curtain must provide full coverage for the entire shower. Shower curtains shall be 72" high. Where shower opening is up to 48" wide, curtain shall be 6" wider than opening, minimum; where opening exceeds 48" wide, curtain shall be 12" wider than opening, minimum.
 - viii. Grommets shall be nonferrous metal
 - c. A full set of stainless steel or alternate silver-colored, metallic, non-rusting, wire curtain hooks shall be provided. Number to match number of shower curtain grommets. Hook size to suit shower curtain rod diameter and shower curtain grommets. Hook design to provide integrated closure; open hook style is not acceptable.
2. TOWEL BAR, HEAVY DUTY
- a. 1" diameter bar
 - b. Length: 18"
 - c. Mounting: surface with wood blocking
 - d. 18-gauge, type-304 stainless steel, satin finish
 - e. Concealed mounting with snap flange
 - f. Withstands 900-lb, minimum, downward pull when properly installed
 - g. Model, or approved equal: Bobrick B-530 x 18
3. STAINLESS STEEL SHELF
- a. Length: 24", minimum
 - b. Depth: 6"
 - c. Mounting: surface with wood blocking
 - d. Shelf: 18-gauge, type-304 stainless steel, satin finish
 - e. Brackets: 16-gauge stainless steel, welded to shelf
 - f. Shelf edges to be hemmed or rolled for safety
 - g. Model, or approved equal: Bobrick B-296 x 24
4. MEDICINE CABINET
- a. Construction: one-piece, injection-molded polystyrene construction
 - b. Polystyrene shelves (adjustable or fixed) depending upon selected cabinet model
 - c. Cabinet: Reversible for left-hand or right-hand door opening; Butt hinges
 - d. Glass mirror shall have full surround stainless steel frame with tab, clip, or screw closure
 - e. Mirror frame finish: stainless steel
 - f. Mirror Glass Thickness: 3/32"
 - g. Overall Depth: 3-3/4"– 4½ "
 - h. Model, or approved equal:
 - a.) NuTone Styleline Series Model 407ADJ
5. MIRROR, RESIDENCE HALL UNIT BATHROOMS
- a. Note: Provide only in exceptional circumstances and with Owner approval. Preference is for medicine cabinet to also serve as mirror above lavatory.
 - b. Frame: stainless steel with bright polished or satin finish to match medicine cabinet mirror frame
 - c. Concealed theft-resistant wall hangers

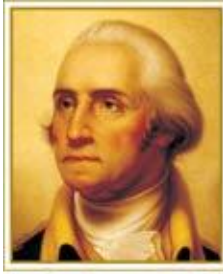
- d. Mounting: Surface
 - e. Size: 24" wide x 36" high
 - f. Model, or approved equal:
 - i. Bobrick B-165 2436 (no shelf)
 - ii. Bobrick B-166 2436 (integral shelf)
6. LAVATORY MIRROR, PUBLIC RESTROOMS (ALL BUILDING TYPES)
- a. Frame: stainless steel with bright polished finish
 - b. Concealed theft-resistant wall hangers
 - c. Size: 18" wide x 36" high, minimum.
 - d. Mounting: Surface
 - e. Model, or approved equal: Bobrick B-165-1836
7. ROBE/TOWEL HOOK
- a. Robe/towel hook to be institutional grade, barrier-free, satin stainless steel unless otherwise noted.
 - b. Model, or approved equal:
 - i. Double: Bobrick B-76727
 - ii. Single: Bobrick B-6717
8. UTILITY SHELF
- a. Style: Folding. Shall self-return to upright, folded position when not in use
 - b. Mounting: wall or partition
 - c. Material: stainless steel or zinc with chrome plate finish
 - d. Dimensions: minimum 14-1/2" long x 5-1/2" wide
 - e. Model, or approved equal:
 - i. Bobrick B-287
 - ii. American Specialties 0698
 - iii. Bradley 790
9. SANITARY NAPKIN DISPOSAL
- a. Removable keyed receptacle with self-closing access door and 1.2 gallon leakproof rigid polyethylene receptacle liner.
 - b. Stainless steel, fabricated with seamless beveled edge.
 - c. Model, or approved equal:
 - i. Partition-mounted (serves two toilet compartments): Bobrick Model B-354
 - ii. Wall-mounted (recessed): Bobrick Model B-353
10. COAT HOOK
- a. Provide one stainless steel or cast aluminum coat hook on inside face of each toilet partition door. Provide with rubber bumper on in-swinging doors. Provide same or similar without rubber bumper for all out-swinging doors.
 - i. Approved model, or equal: Bobrick B-212
11. GRAB BAR
- a. Material: stainless steel, 18 gauge or better
 - b. Finish: satin
 - c. Diameter: 1-1/4" to 1-1/2"
 - d. Projection from wall: 1-1/2"

- e. Mounting: surface with wood blocking
 - f. Minimum force to withstand: 250 pounds
 - g. Snap-on flanges for concealed attachment are required. Exposed mounting is unacceptable.
 - h. Model, or approved equal:
 - i. Bobrick B-5806 Series (1-1/4" diameter straight bar)
 - ii. Bobrick B-6806 Series (1-1/2" diameter straight bar)
 - iii. Bobrick B-68137 Series (1-1/2" diameter L bar; 36" x 54")
12. FLOOR-STANDING OPEN-TOP WASTE RECEPTACLE
- a. Coordinate selection with lavatory countertop design, including information found in space standards for public restrooms.
 - b. Model, or approved equal, only where required clearance is available:
 - i. American Specialties 0811 (13-gallon; 13" x 13" x 22"h)
 - ii. American Specialties 0813 (19-gallon; 13" x 14" x 30"h)
 - iii. Bobrick B-2260 (13-gallon; 12-1/2" x 12-1/2" x 22"h)
 - iv. Bradley 377-37 (13-gallon; 13" x 22" x 29"h)
13. FLOOR-STANDING WASTE RECEPTACLE WITH LIDDED TOP
- a. Provide a self-closing, 13-gallon minimum capacity, 22-gauge stainless steel, satin finish, floor-standing waste receptacle with vinyl bumpers to protect wall and base.
 - i. Approved models, or approved equal:
 - a.) American Specialties 0810 (13-gallon; 13" x 13" x 29"h)
 - b.) American Specialties 0812 (19-gallon; 13" x 14" x 37"h)
 - c.) Bobrick B-2250 (13-gallon; 12-1/2" x 12-1/2" x 29-1/2"h)
 - d.) Bradley 377 (13-gallon; 13" x 22" x 29"h)
 - e.) Bradley 377-36 (21-gallon; 15" x 30" x 38"h)
 - f.) Bradley 377-38 (36-gallon; 19" x 29" x 39"h)
14. HAND DRYER
- a. Provide a high speed, energy efficient hand dryer, automatic type. Recess mount unit as required to meet ADA requirements.
 - i. Approved model, no exceptions:
 - a.) Xlerator by Excel Dryer
 - a) White Epoxy Painted Cover, Model # XL-W
 - b) Dimensions: 11-3/4" W X 12-11/16" H X 6-11/16" D

E. INSTALLATION

- 1. Anchor securely to supporting construction, using concealed fasteners wherever possible.

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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11010 WINDOW WASHING SYSTEMS

A. SUMMARY

This section contains design standards for tieback anchor systems and davit assemblies to support exterior window washing.

B. GENERAL

1. GW predominantly utilizes roof and wall anchors for suspended access support for exterior window washing. There are exceptions such as Ross Hall, the School of Business, and Marvin Center (atrium portion) which have davit systems. Architect shall select the window washing system as required to best suit the project's roof design and configuration. Where special building features necessitate other access equipment, those systems shall be specified and provided according to applicable codes, regulatory requirements, and reference standards.
2. Regulatory Requirements: Window washing system layout, roof plan, and details shall comply with all applicable requirements of OSHA, authorities having jurisdiction, and manufacturer:
 - a. Safety anchor system shall comply with ANSI/IWCA I-14.1-2001 Window Cleaning Safety Standard for fall arrest and suspended maintenance.
 - b. Window washing system shall comply with all codes and reference standards in addition to safety standards of authorities having jurisdiction including ANSI/ASME A120.1, OSHA standards and regulations including 1910.28, 1910.66, and US Dept. of Labor Memorandum to Regional Administrators for Descent Control Devices.
 - c. Electric components and wiring shall comply with standards of NEMA (National Electrical Manufacturers Association) and the National Electrical Safety Code, as applicable.
 - d. Welding shall comply with AWS D1.1 and shall be performed by welders qualified to work in jurisdiction where project is located.
 - e. Comply with AISC publications:
 - i. Load and Resistance Factor Design for Structural Steel Buildings
 - ii. Specifications for the Design of Cold-Formed Steel Structural Members
3. Interface With Other Systems: Installation of window washing system shall be coordinated with roofing manufacturer's requirements.
4. System shall be installed by manufacturer, or by a firm approved by the manufacturer. Manufacturer is responsible for designing system including

anchorage to structural system and necessary modifications to meet special requirements to maintain visual design concepts.

5. Approved Manufacturers and Products, or approved equal:
 - a. Summit Anchor Company, Inc., Frederick, MD (*Note: Summit Anchor currently provides anchor systems for many buildings on the Foggy Bottom campus. For additional information regarding existing building renovation projects, consult GW Facilities Services, Bill Hendrick, PM Amenities.*)
 - b. Spider Staging Co., Laurel, MD
 - c. Pro-Bel Enterprises, Ltd., Ontario, Canada

C. TIEBACK ANCHOR SYSTEM

1. Design Requirements:
 - a. Safety anchor system design shall comply with current OSHA, ANSI, and local regulations pertaining to window cleaning and fall protection.
 - b. Anchor system shall provide independent fall arrest anchorages in addition to suspension line anchorages for each descent location as required by OSHA and ANSI requirements.
 - c. System shall be designed to be compatible with current window cleaning industry standard equipment such as rope descent systems, swing stages, and transportable suspension devices).
2. Structural Requirements:
 - a. Anchorage shall be capable of sustaining a minimum ultimate load of 5,000 lbs., in any direction the load may be applied, without fracture or failure.
 - b. Anchorage shall be capable of sustaining a minimum proof load of 2,500 lbs., in any direction the load may be applied, without permanent deformation or damage to anchorage.
 - c. Anchorages shall be designed with a minimum 1,250 lb. working load, in any direction the load may be applied.
 - d. Parapet or guardrails subject to direct loading by workers' ropes, possibly cables, shall be designed to withstand such loading (typically 1,800 lbs) without damage to either the structure of the rigging component in contact with it.
3. Primary support and fall arrest anchors shall be located to coincide with areas on the façade of the building needing to be serviced. Consideration shall be given to the type of suspension equipment that will be used at the building and conditions such as workers' reach, rigging methods, and roof edge conditions. Anchorages shall be unobstructed and located behind and in line with equipment or portion of building they are intended to service. Refer to manufacturer's specifications for anchor spacing and layout.
4. Products:
 - a. Provide wall- and/or roof-mounted anchor assembly as required.
 - b. Description: Drop forged eye welded directly to pipe or to cap plate on steel tube base
 - i. Capable of withstanding 5,000 lbs. (2268kg) in any direction without permanent deflection.
 - ii. Anchor eye size: Not less than ¾ inch (20 mm) diameter material with 2 ¼ in (60 mm) eye opening.

- iii. Anchor eye metals:
 - a.) Forged, 1030 quenched and tempered per ASTM 576-90-b, 72ksi minimum
 - b.) Forged Stainless steel, type 304, solution annealed, 35 ksi minimum
- c. Cast in place equipment:
- d. A minimum of two cast-in-place steel studs are required for concrete embedded anchors.
- e. Structural Components:
- f. All steel components shall be hot-dip galvanized finish.

D. DAVIT ASSEMBLY

- 1. General:
 - a. Davit arm assembly shall be provided as required to clear building elements such as parapets, cornices, overhangs, decorative railings, or sloped glazing that are not designed to bear sufficient loads for suspended maintenance and to access areas beyond these elements which are difficult to reach.
 - b. Davits shall be properly designed to match with socket type, fixed or mobile, indicated for each building location.
- 2. Design Requirements:
 - a. Locate davits to support suspended maintenance during swing stage operations. Spacing of davits and placement of supports shall conform to project roof configuration and be in accordance with manufacturer's layout. Consideration should be given to operating other equipment that may be required for access.
 - b. Davits shall be capable of supporting an ultimate load of not less than 4 times the rated load.
 - c. Manufacturer shall provide engineer's calculations and test report to verify that davit will support load requirements.
- 3. Provide independent anchorages for personal fall protection when using davits.
- 4. Each aluminum davit assembly shall be equipped with an adjustable scaffold support to allow for various building conditions.
- 5. Provide a davit assist winch if davit assembly exceeds 75 pounds.
- 6. Products:
 - a. Custom demountable davit arm assembly, on fixed davit base on roof
 - b. Davit bases and sockets:
 - i. Steel shapes, tubes and plates of welded construction; hot-dip galvanized after fabrication to resist corrosion
 - ii. Mill finish aluminum, designed to fit into sockets
 - iii. Sockets: Allow 360° rotation of davit assembly
 - iv. Pier Height: Not less than 10" above finished roof surface to allow proper fit up with adaptor.
 - v. Provide manual winch, with cable and pulley, for raising and lowering of load
- 7. Winch:
 - a. Mounting:
 - i. Frame assembly bolted to permanent base with bolts sized as required

- ii. Provide weatherproof housing
- b. Power
 - i. 115V, 19 amp
 - ii. Hardwired with switch
- c. Acceptable manufacturer, or approved equal:
 - i. My-te Products, Inc., Indianapolis, IN

E. INSTALLATION

1. Window washing system shall be installed in compliance with manufacturer's instructions. Equipment installation shall be tightly fitted and flush to adjacent surfaces as needed for proper installation.
2. Window washing system installation shall be coordinated with roofing installation to ensure a watertight and warrantable condition of the roofing. Tieback anchors shall be directly flashed into roofing in a manner compatible with roofing system and anchors.
3. When components come into contact with dissimilar metals, surfaces shall be kept from direct contact to prevent corrosion.
4. No wall anchors shall be installed through membrane roofing system without specification detailing such from the architect or waterproofing company warranting the roof.

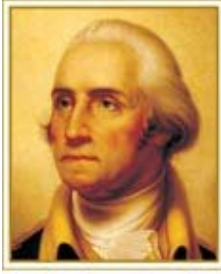
F. CONTRACT CLOSE-OUT SUBMITTALS

1. Operation and Maintenance
 - a. A safety inspection logbook shall be provided for yearly inspections. The log book shall include a certification of compliance letter. The certification of compliance shall state that access system is in compliance with current OSHA regulations and ANSI/IWCA I-14.1-2001 Window Cleaning Safety Standard.

G. SITE TESTS

1. All equipment shall be tested on site in accordance with manufacturer's recommendations, under the supervision of a professional engineer, and ANSI/IWCA I-14.1-2001 Window Cleaning Safety Standards, before being placed in service.
2. Equipment shall be tested under the supervision of a professional engineer with experience with suspended maintenance equipment and manufacturers guidelines.

END OF SECTION



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11132

PROJECTION SCREENS

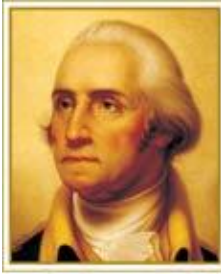
A. SUMMARY

This section contains design standards for projection screens. Refer to related design standards, divisions, and sections for additional requirements.

B. PROJECTION SCREENS

1. Mounting: extruded aluminum housing with white paint finish, recessed in the ceiling
2. Operation: low voltage electric motor. Switch to be located by lectern or per AT Standards.
3. Viewing Surface
 - a. Finish: matte
 - b. Color: white
 - c. Washable surface
 - d. Flame & Mildew resistant
4. Viewing area: per AT Standards
5. Model, or approved equal:
 - a. Draper Access V series

END OF SECTION



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11450 RESIDENTIAL APPLIANCES

A. SUMMARY

This section contains design standards for residential appliances including, but not limited to, refrigerators, microwaves, ranges, range hoods, dishwashers, washers, and dryers. Refer to the relevant residence hall or academic building design standards and related divisions and sections for additional requirements.

B. GENERAL

1. Color
 - a. Kitchen appliances shall match within each space and they shall be white, unless approved otherwise.
 - b. Washers and Dryers shall be white.
2. Energy Star qualification is required for the following eligible appliance types:
 - a. Refrigerator
 - b. Dishwasher
 - c. Washer (Required, regardless of configuration. While clothes dryers are not eligible for the Energy Star program, washers are, whether independent or combined with a dryer.)
3. Note: A combination microwave/refrigerator by MicroFridge is provided by owner for each dormitory room. See this section and Residence Hall - Dormitory space standards for additional information.
4. Note: Clothes washers and dryers for common laundry rooms are provided by Owner and are included herein for information only.
5. Consultant shall evaluate all approved models noted below for compliance with all requirements, including barrier-free ones. Should models fall short, consultant shall recommend similar models meeting all of the requirements.
6. Appliance standards provided below apply to apartment style residence suites and Resident Director apartments.
7. Where appliance product models have been discontinued by manufacturer, Architect shall propose the most comparable replacement model.

C. APPLIANCE STANDARDS

1. Refrigerators
 - a. Energy Star qualified
 - b. No-frost (frost-free)
 - c. Top- mount freezer (if applicable). No side-by-side models.

- d. Enclosed condenser coils that do not require cleaning
 - e. Provide without built-in ice-maker
 - f. Provide without built-in water dispenser
 - g. Reversible door hinge
 - h. Warranty: 1 year, minimum
 - i. Special circumstances
 - i. There are some existing spaces that use alternate refrigerator capacities than those noted below, including 10 cubic feet and 15-18 cubic feet. In the event the project requires replacing these models in kind, refer to the general requirements above, which are applicable to all refrigerators and comply with them.
 - j. Refrigerator types, as required in the design standards. Capacities noted are approximate and will vary, depending on actual model selected. Freezer space is required unless noted otherwise. Freezer capacity should be approximately 25-35% of total capacity.
 - i. Full-size
 - a.) Capacity: 22 – 26 cubic feet
 - b.) Adjustable humidity vegetable/fruit crispers
 - c.) Approved model, or equal: GE GBSC3HBXWW or GE GDSC3KCYWW
 - ii. Mid-size
 - a.) Capacity: 16 – 21 cubic feet
 - b.) Adjustable humidity vegetable/fruit crispers
 - c.) Approved model, or equal: Frigidaire FRT15HB3JW
 - iii. Small-size
 - a.) Capacity: 10 – 15 cubic feet
 - b.) Adjustable humidity vegetable/fruit crispers
 - c.) Approved model, or equal: Whirlpool ETOMSRXTQ
 - iv. Undercounter
 - a.) Optional freezer (Note: Energy Star qualified undercounter refrigerators-with-freezer selection is very limited, but would still be required)
 - b.) Capacity: dependent on number of users, but when in a common pantry with a number of users, 5-6 cubic feet is recommended.
 - c.) Model: *Consultant is advised to refer to the Energy Star website (www.energystar.gov) to find possible “compact” models that meet the project’s specific criteria.*
2. Microwave, countertop model
- a. Countertop model
 - i. Capacity: approximately 1.0 cubic foot and 1100 watts
 - ii. Warranty minimums: 5 years on magnetron; 1 year on balance of unit
 - iii. Approved Model, or equal: Whirlpool MT4110SPQ
 - b. Over range model (Where approved by GW to increase counter area without sacrificing cabinet space)
 - i. Capacity: 1.6 cubic foot and 1000 watts
 - ii. Approved Model, or equal: Amana AMV1160VAW
3. Ice-maker (independent of refrigerator)
- a. Provide unit as required by project; ice dispenser should be included in unit

- b. Energy Star qualification required if unit is commercial style and, thus, eligible for the program
- c. Provision:
 - i. is optional for Academic pantries
 - ii. for Residence Halls must receive prior approval by Owner as this would be an exceptional case
- 4. Range
 - a. Freestanding
 - b. Heating elements: two 6-inch diameter and two 8-inch diameter
 - c. Removable one-piece drip pans
 - d. Width: 30"
 - e. Warranty: 1 year, minimum
 - f. Model, or approved equal: Frigidaire FEF326FS
- 5. Range exhaust hood
 - a. Vented range hood with removable, cleanable grease filter
 - b. Provide for rectangular or round duct
 - c. 160 CFM vertical exhaust, minimum
 - d. Rotary or rocker control with 2 or 3-speed fan; maximum 7 sones top or rear exhaust rating
 - e. Width: 30"
 - f. Provide with filter
 - g. Provide with lamp as required; preferably fluorescent if compatible.
 - h. Warranty: 1 year, minimum
 - i. Approved Model, or equal:
 - i. Ducted range hood: Broan 403001, white
 - ii. Non-ducted range hood: Broan 413001, white
- 6. Dishwasher
 - a. Energy Star qualified
 - b. Slide-in, undercounter model
 - c. 24" wide
 - d. Sound insulation for 57 dBA, maximum
 - e. Provide with food disposer
 - f. Integral Warranty: 1 year, minimum
 - g. Approved model, or equal: Frigidaire FDB1100RHS
- 7. Residential Laundry, Typical (does not apply to commercial laundry appliances)
 - a. Washer and Dryer, Stacked
 - i. Energy Star qualified washer
 - ii. Configuration: Where barrier free design is not provided, washer and dryer set shall be stacked. Options as follows:
 - a.) The washer and dryer may be mechanically attached, with the dryer positioned above the washer, and often called a "laundry center."
 - b.) The washer and dryer may be separate items, which are both front-loading and stacked together, but not attached.
 - c.) *Note: All-in-one washer/dryer combos where laundry is washed and dried in the same tub are unacceptable.*
 - iii. Washer unit to integrate a lock-out mechanism to prevent door from being opened and water escaping the unit while in use.
 - iv. Width: 24" width is preferred for both washer and dryer for space reasons. However, at the time of writing, qualifying Energy Star washers have very

limited availability. Thus, 27" may also be acceptable. Consultant to consider available models and resultant competitive bidding when sizing the laundry closet and door.

- v. Washer must be positioned above a floor drain, in case of overflow
 - vi. Power source: electric
 - vii. Warranty: 1 year, minimum
 - viii. Approved model, or equal:
 - a.) Laundry center: Whirlpool LTE5243DQ
 - b.) Separate, stackable configuration:
 - Washer: Whirlpool WFW9150WW
 - Dryer: Whirlpool LDR3822PQ
8. Residential Laundry, Barrier-Free (does not apply to commercial laundry appliances)
- a. Washer & Dryer
 - i. Energy Star qualified washer
 - ii. Width: 27"
 - iii. Front-loading
 - iv. Capacity:
 - a.) Washer: approximately 3.5 cubic feet
 - b.) Dryer: approximately 6 cubic feet
 - v. Washer must have a pan and be positioned above a floor drain, in case of overflow.
 - vi. Power source: electric
 - vii. Warranty: 1 year, minimum
 - viii. Model, or approved equal:
 - a.) Washer: GE WSSH300GWW
 - b.) Dryer: GE DBLR333EGWW
9. Combination microwave and refrigerator/freezer unit (Provided by Owner for each dormitory room)
- a. MicroFridge MF-3TP Series
 - i. Color: Black
 - ii. Dimensions: Overall unit dimensions of current model are approximately 44 1/8" H X 18 5/8"W X 20 1/8" D
 - iii. Electrical Requirements: 120 Volt, 2-Wire, 60 Hz, Single Phase, 1.2 KW, 15 amp electrical supply
 - iv. Minimum Clearances: 1" on each side, 2" in back, 1" on top

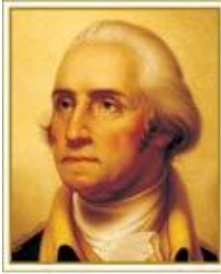
D. COMMERCIAL LAUNDRY ROOM EQUIPMENT - OWNER PROVIDED, OWNER INSTALLED, FOR INFORMATION ONLY

- 1. General:
 - a. Laundry equipment selection for common laundry rooms and final room layout indicating equipment locations shall be reviewed and approved by GW Campus Services through their vendor, Caldwell and Gregory, LLC.
 - b. The standard ratio for washers and dryers is 1 of each per 32 students.
 - c. Gas dryers shall be used if gas is available to the project. Refer to product cut sheets for gas dryer requirements.
 - d. Where rooms have space constraints, stacked units shall be used in the equipment layout.

- e. At least one washer and one dryer shall be provided at floor level to meet ADA requirements.
- 2. Verify current equipment specifications with Caldwell and Gregory, LLC. At the time of writing of this document, the following equipment shall be accommodated:
 - a. Clothes Washer – Maytag Commercial Energy Advantage High Efficiency Front Load Washers MAH22PD
 - i. Dimensions: 44.67” H X 27” W X 29” D
 - ii. Capacity: 2.99 cubic feet
 - iii. Electrical Rating: Voltage 120V/60Hz
 - iv. Breaker/Fuse Requirement: 15 amps
 - v. Inlet Hose: 4 feet
 - vi. Drain Hose: 6 feet
 - b. Clothes Dryer, Stack Type – Maytag Commercial Single Load Super Capacity Stack Dryer MLE/MLG24PD
 - i. Dimensions: 76.75” H X 27” W X 29” D
 - ii. Capacity: 7.4 cubic feet
 - iii. Electrical Requirement:
 - a.) MDE model – voltage 240V/60Hz
 - b.) MDG model – voltage 120V/60Hz
 - iv. Heater Element Ratings: Domestic Model (per pocket): 5,600 watts
 - v. Breaker/Fuse Requirements:
 - a.) Electric model (each drying chamber) – 30 amps
 - b.) Gas models, all versions (one power cord per stack) – 15 amps
 - vi. Exhaust Duct Diameter: 4”
 - c. Clothes Dryer, Floor Type 1 – Maytag Commercial Super-Capacity Dryer MDE/MDG22PD
 - i. Dimensions: 44.67” H X 27” W X 29” D
 - ii. Capacity: 6.7 cubic feet
 - iii. Electrical Requirements:
 - a.) MDE model – voltage 240V/60Hz
 - b.) MDG model – voltage 120V/60Hz
 - iv. Approximate Overall Draw: 6,000 watts
 - v. Breaker/Fuse Requirements:
 - a.) MDE model – 30 amps
 - b.) MDG model – 15 amps
 - vi. Exhaust Duct Diameter: 4”, left or right side location
 - d. Clothes Dryer, Floor Type 2 – Maytag Commercial Super-Capacity Dryer MDE/MDG17PD
 - i. Dimensions: 36” H X 27” W X 29 1/4” D
 - ii. Capacity: 7.4 cubic feet
 - iii. Electrical Requirements:
 - a.) MDE model – voltage 240V/60Hz
 - b.) MDG model – voltage 120V/60Hz
 - iv. Approximate Overall Draw: 6,000 watts
 - v. Breaker/Fuse Requirements:
 - a.) MDE model – 30 amps
 - b.) MDG model – 15 amps
 - i. Exhaust Duct Diameter: 4”, left or right side location

- e. Speed Queen Commercial Heavy Duty Stack Washer/Dryer STE77
(combined unit)
 - i. Dimensions: 76 5/8" H X 27" W X 28" D
 - ii. Capacity: 7.4 cubic feet
 - iii. Electrical Specifications - Washer:
 - a.) 120/ 240V/60/1 – 30 amps
 - b.) 120/208/60/1 – 30 amps
 - iv. Electrical Specifications – Dryer:
 - a.) 120/ 240V/60/1 – 30 amps
 - b.) 120/208/60/1 – 30 amps
 - v. Dryer Capacity: 7.0 cubic feet

END OF SECTION



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12355 RESIDENTIAL CASEWORK

A. SUMMARY

This section contains standards for manufactured cabinets for residential unit kitchens and bathrooms and related accessories. Refer to specification guideline sections including 06400 Architectural Woodwork, 06650 Cultured Marble, and 11450 Residential Appliances for related work.

B. PRODUCTS

1. MATERIALS

- a. Particleboard:
 - i. ANSI A208.1, mat-formed particleboard, Grade M-2; 50 pcf density
 - ii. Formaldehyde emissions:
 - a.) Less than 0.3 parts per million, for raw particleboard
 - b.) Comply with ANSI A208.1 and with HUD rule on Manufactured Home Construction and Safety Standards, 24CFR Part 3280
- b. Plastic Laminate Overlay:
 - i. Cabinet manufacturer's plastic laminate melamine, resistant to water and household chemicals and abrasives
 - ii. Finish: Matte
 - iii. Color and patterns:
 - a.) Exterior cabinet surfaces: Wood grain, to match color range and graining of wood veneer for door center panels
 - b.) Interior cabinet surfaces: White
 - iv. Adhesive: Clear drying type recommended by laminate manufacturer
- c. Laminate Linings:
 - i. Cabinet manufacturer's standard laminate linings, resistant to water and household chemicals and abrasives
 - ii. Provide in minimum thickness per manufacturer's specifications
 - iii. Color:
 - a.) Kitchen cabinets: Printed wood grain, to match species and finish of exposed surfaces
 - b.) Bathroom vanities: White
 - iv. Adhesive: Clear drying type recommended by manufacturer

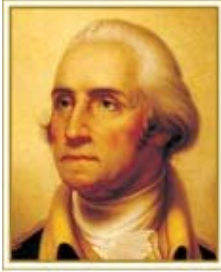
2. UNITS

- a. Construction: Framed, with recessed panel doors
- b. Wood Species: Maple
- c. Wood Finish: Transparent/Clear/Natural

- d. Components and thicknesses:
 - i. Frames: ¾" thick solid wood
 - ii. Wall, base and bath cabinet end panels shall be minimum 3/8" thick, 48 pcf density particleboard, with moisture- and stain-resistant laminate with printed wood grain, covering both sides
 - iii. Base cabinet bottoms: ½" thick, 48 pcf density particleboard, with moisture- and stain-resistant laminate with printed wood grain, covering both sides
 - iv. Wall cabinet tops and bottoms: ½" thick, 48 pcf density particleboard, with moisture- and stain-resistant laminate with printed wood grain, covering both sides
 - v. Cabinet back panels: 1/4" thick, 50 pcf density particleboard, with moisture- and stain-resistant laminate with printed wood grain, covering interior side only
 - a.) Reinforce wall cabinet backs with ½" thick rails at top and bottom
 - b.) Reinforce base cabinet backs with 11/16" thick rail at top
 - vi. Drawer sides: 3/8" thick, 48 pcf density particleboard
 - vii. Drawer bottoms: ¼" thick, 50 pcf density particleboard, with moisture- and stain-resistant, laminate with printed wood grain, covering interior side only
 - viii. Shelves: ¾" thick, 48 pcf particleboard, with moisture- and stain-resistant, laminate with printed wood grain matching cabinet interior, covering both sides
 - ix. Doors: Frame and Panel, with veneered center panel
 - a.) Rails and Stiles: ¾" thick solid wood
 - b.) Panel: 5/32" thick plywood with plain sliced maple face veneer both sides
 - x. Drawer Fronts: ¾" thick glue-up solid maple
 - xi. Provide manufacturer's standard edge banding, of material, color, and finish compatible with cabinet finish, on exposed edges of cabinet components
 - e. Product and Manufacturer, or equal:
 - i. Classic, Portrait, by Merillat Industries, Inc.
3. HARDWARE
- a. Provide manufacturer's standard hardware units of type, size, and finish indicated, complying with ANSI A156.9.
 - i. Hinges shall be manufacturer's standard, fully concealed, self-closing nickel-plated hinges, with minimum 105° opening; adjustable
 - ii. Rubber bumpers shall be provided at doors.
 - iii. Drawer slides shall be Epoxy-coated steel; 75 lb. capacity
 - iv. Shelf supports shall be manufacturer's standard.
 - v. Pulls:
 - a.) HP112, Satin Aluminum Boat Cleat Transitional Pull, by Merillat
 - b.) Provide for each door and each drawer.
4. ACCESSORIES
- a. Provide fasteners, clips, anchors, brackets, adhesives, and other miscellaneous items as required for complete installation.
 - b. Provide filler strips as needed with finish to match exposed cabinet surfaces.
5. ADHESIVES:
- a. As recommended by product manufacturer

- b. Field-applied adhesives must comply with VOC limits established by the South Coast Air Quality Management District (SCAQMD), Rule #1168

END OF SECTION



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12460

WASTE AND RECYCLING RECEPTACLES

A. SUMMARY

This section contains general standards for decorative, freestanding waste and recycling receptacles for public spaces and receptacles for residence hall trash and recycling rooms.

Refer to building type design standards and related specification guideline sections for additional information. Refer to 10800 Toilet and Bath Accessories for waste receptacles in public restrooms.

B. GENERAL

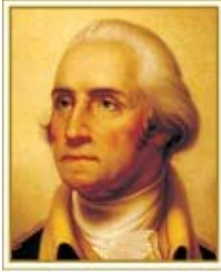
1. Requirements herein apply to waste and recycling receptacles in public spaces for both academic buildings and residence halls.
2. Stainless steel accessories and trim shall be satin or brushed stainless steel, unless otherwise noted.
3. Built-in recycling and waste stations are preferred. Refer to building type space standards for built-in station requirements.
4. Powder-coated finishes, electrostatically-applied, may be added to stainless steel receptacles as needed to suit application. For example, a receptacle for recycling bottles and cans may have a green powder coating while a receptacle for recycling mixed paper may have a blue powder coating.
5. Recycling Labels: Labels indicating "Trash", "Mixed Paper", "Bottles & Cans", shall be added to receptacles. GW Wordmark label shall also be added to receptacles. Recycling top label, "RECYCLABLES"/"GW Recycles" with universal recycling logo shall be applied to receptacle as best fits. Labels are created by GW Sign Shop.

C. WASTE AND RECYCLING RECEPTACLES, PROVIDED BY OWNER

1. RESIDENCE HALLS – TRASH AND RECYLING ROOM RECEPTACLES
 - a. Trash Receptacle with Wheels:
 - i. Capacity: 50 gallon
 - ii. Color: Gray
 - iii. Dimensions: 36.75" H X 23.5" W X 29" D
 - iv. Approved model, or equal: Rubbermaid 9W2700 Gray
 - b. Recycling Receptacle with Wheels – Mixed Paper:
 - i. Capacity: 50 gallon
 - ii. Color: Blue

- iii. Dimensions: 36.75" H X 23.5" W X 29" D
 - iv. Approved model, or equal: Rubbermaid 9W27-06
 - c. Recycling Receptacle with Wheels – Bottles and Cans
 - i. Capacity: 68 gallon
 - ii. Color: Forest Green
 - iii. Dimensions: 42" H x 25 1/4" W x 26 1/4" D
 - iv. Approved model, or equal: MSD 68 by Multi-System Design
2. PUBLIC SPACES - FREESTANDING, DECORATIVE TRASH AND RECYCLING RECEPTACLES
- a. Trash: Stainless Steel Base (partially perforated) with Black Powder-Coated Top
 - i. Capacity: 51 gallon
 - ii. Dimensions: 25" Diameter x 35.5" H
 - iii. Contents shall contain over 30% recycled content, 100% post-consumer recyclable
 - iv. Approved Manufacturer and Product, or equal:
 - a.) United Receptacle S55SSTBKPL
 - b. Recycling: Bottles and Cans - Stainless Steel Base (partially perforated) with Black Powder-Coated Top
 - i. Capacity: 25 gallon
 - ii. Dimensions: 18" Diameter x 35.5" H
 - iii. Contents shall contain over 30% recycled content
 - iv. Approved Manufacturer and Product, or equal:
 - a.) United Receptacle S3SSSGBKPL
 - c. Recycling: Paper - Stainless Steel Base (partially perforated) with Black Powder-Coated Top
 - i. Capacity: 25 gallon
 - ii. Dimensions: 18" Diameter x 35.5" H
 - iii. Contents shall contain over 30% recycled content, 100% post-consumer recyclable
 - iv. Approved Manufacturer and Product, or equal
 - a.) United Receptacle S3SSSGPBKPL
3. Conference Rooms: Perforated Stainless Steel, Half-Round Shape, Open Top
- a. Trash/Recycling Paper/Recycling Bottles and Cans (1 set of three per conference room shall be provided)
 - i. Capacity: 12 gallon
 - ii. Dimensions: 18" W X 32" H X 9" D
 - iii. Contents shall contain over 30% recycled steel, 100% post-consumer recyclable
 - iv. Finish: Stainless Steel or Silver Metallic

END OF SECTION



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12484 ENTRY MAT

A. SUMMARY

This section contains design standards for entry mats, typically located at all building entries serving the public and directly connected to the outdoors. Refer to space standards for additional information.

B. ENTRY MAT (METAL)

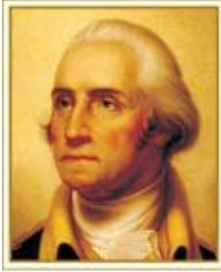
1. Product
 - a. General: Entry mat shall be a grill, grate or slot design that captures particulates below and allows for cleaning, thus reducing the migration of allergens and debris into the building.
 - b. Material: aluminum or stainless steel, approximately 50% open, is preferred. *Products utilizing carpet or vinyl in the rails should only be provided with Owner's approval. Vinyl is of particular concern due to environmental issues.*
 - c. Minimum live load support: 300 pounds/square foot
2. Approved products, or approved equal:
 - a. KD98 by Kadee Industries, Walton Hills, OH
 - b. Ultra Track by Mats, Inc., Stoughton, MA

C. ENTRY MAT (FIBER)

1. Product
 - a. General: Fiber entry mats shall be used for surface-mounted applications only in cases where the existing flooring and/or structure cannot accommodate the slab depression required for the grill/grate/slot mat type.
 - b. Material: Product: 100% solution-dyed UV-stabilized polypropylene carpet fiber with rubber backing; Include aluminum framing, where necessary, as recommended by manufacturer
 - c. Roll out carpet/mat system shall be installed either as loose lay with nosing, or direct glue-down, as required to suit specific vestibule or lobby space configuration
 - d. Fibered entry mats shall be CRI GreenLabelPlus or FloorScore certified.
 - e. For direct glue-down application, adhesives shall be low/no-VOC and comply with SCAQMD Rule 1168 or 50 g/L (less water) whichever is most restrictive
 - f. Performance: Entry mat shall comply with requirements for surface flammability, ASTM D2859, and smoke density, ASTM E662.
2. Approved Products and Manufacturers, or approved equal:

- a. Berber (Roll Goods) by Mats, Inc., Stoughton, MA
- b. Eco Berber by The Anderson Company., Dalton, GA

END OF SECTION



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12490

WINDOW TREATMENTS

A. SUMMARY

This section contains design standards for horizontal louver binds (mini-blinds), vertical blinds, and shades. Refer to space standards for additional information.

B. GENERAL

1. Products and materials shall be GreenGuard Indoor Air Quality-certified.
2. All fittings shall be corrosion proof.
3. All exposed plastic shall be of high ultra-violet resistant material.
4. All components shall be manufactured to exact tolerances for a precision fit.

C. HORIZONTAL LOUVER BLINDS (MINI-BLINDS)

1. Product
 - a. Material: aluminum
 - b. Depth: 1"
 - c. Color:
 - i. Residence Halls: off-white, to match Bali #112, Alabaster; no exceptions
 - ii. Academic: to complement balance of design
 - d. Description
 - i. Horizontal blind systems should consist of head channel, tilting mechanism, tilt rod, cord lock, drum and cradles, end braces, installation brackets, intermediate brackets, slat support braided ladders, slats, bottom rail, lift cord and other accessories as required for complete installation.
 - e. Components:
 - i. Headrail should be a u-shaped channel of phosphatized steel, minimum 0.025 inch (0.635 mm) thick. All hardware should be enclosed in headrail.
 - ii. Slats should be nominally 1 inch (25 mm) wide x nominal 0.0060 (0.152 mm) inch thick after coating. Blinds should be fabricated with at least **14.2** slats per foot (per 305 mm).
 - iii. Bottom rail should be phosphatized steel, minimum 0.031 inch thick (0.787 mm). Color-coordinated snap-on plastic end caps should be provided.
 - iv. Lift cord should be braided polyester cord of sufficient length to properly control raising and lowering with pull ring. Cord should be located 1-1/2

- inches (38 mm) from jamb edge. Cord should be capable of removal and reattachment.
- v. Ladders should be braided polyester cord. Spacing between ladders should not exceed 24 inches (600 mm), nor 7 inches (175 mm) between end ladder and end of slat.
- vi. Tilting mechanism should be a worm gear type.
- vii. Tilt rod should be transparent with round fluted cross section.
- f. Features
 - i. Tilting mechanism should automatically disengage when blind reaches fully closed position.
 - ii. Tilter should have a sector cam and stop to permit operation only between 2 established limits, allowing ¼ inch (6 mm) minimum clear space between slats when closed, approximately 60° from horizontal.
 - iii. Lock device should be provided with free hanging cord and ring pull which will limit blind operation to only two positions: fully raised or fully lowered.
 - iv. Removable valance should be provided at head channel.
- 2. Approved manufacturers
 - a. Levolor Corporation, High Point, NC
 - b. Hunter Douglas, Los Angeles, CA
 - c. Bali Blinds (a Brand of Spring Window Fashions) Middleton, WI

D. VERTICAL BLINDS (*Applies only to retrofit projects of Residence Halls with existing vertical blinds to be replaced*)

- a. Material:
 - i. Aluminum (*Aluminum louver blinds shall be specified for sliding glass doors to maintain consistency in a space with aluminum slat horizontal louver blinds at windows*)
- b. Color:
 - i. Off-white or Aluminum Alabaster by Hunter Douglas
- c. Description:
 - i. Vertical blind systems should consist of a progression of hung vertical louvers supported by a cord and chains and a headrail and bottom rail system that moves the queued vanes back and forth across the glazed opening and that can rotate each vane at least 180 degrees. The vane angle shall be infinitely adjustable from perpendicular to parallel to the face of the glazing. Additional accessories shall be provided as required for complete installation.
 - ii. Provide a valance for appearance, light control, and reduced maintenance of the headrail. Valance finish shall match exposed track and vane materials.
- d. Components:
 - i. Louvers:
 - a.) 2" or 3 ½" wide
 - b.) Material: Heat-treated extruded aluminum, dip coated with baked polyester coating
 - ii. Headrail: Standard extruded aluminum; painted. Internally fit with .24" diameter heavy-duty extruded aluminum tilt rod, engineered thermal plastic carrier trucks, end caps and components required for specified performance and designed for smooth, quiet, trouble free operation.

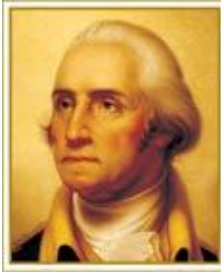
- iii. Wheeled carriers shall be specified for vertical blinds as they operate more smoothly, are quieter and more durable than non-wheeled carriers.
 - iv. Traversing: Stretch resistant, non-fraying, and lint free lock nit polyester cord provide traversing capabilities for side, center, and off-center draws.
 - v. Mounting Hardware: Manufacturer's standard L- bracket with clip (outside mounts) & clip only (inside mounts) provide required support.
 - vi. Rotation Controls shall consist of #6 nickel-plated steel bead chain provides 180 degrees direct rotation; Shall be located on either side of individual blind unit as per Architect's request.
- 2. Approved Manufacturers, or approved equal:
 - a. Hunter Douglas, Poway, CA
 - 3. Installation:
 - a. Architect shall provide details and specifications including but not limited to support blocking with the capacity to support the weight of the blinds.
 - b. Specify blinds be mounted no closer than 2" from glass to prevent heat build-up.

E. SHADES

- 1. Products: Shades to be either manual or motorized operation, dependent on design requirements. Consideration shall be given to limiting access to controls where tampering may be a concern.
 - a. Motorized window shade systems should consist of shade fabric, electric motor system, electrical switching and control systems, hardware and other accessories as required for complete installation.
 - b. Manual window shade systems should consist of shade fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube, mounting hardware, and other accessories as required for complete installation.
 - c. Fabric:
 - i. Non-directional basket-weave shade cloth, with 5% openness factor and uniform scrim effect at window.
 - ii. Color to be selected from manufacturer's standard palette.
 - iii. Acceptable product and manufacturer:
 - a.) ThermoVeil Basket Weave Series 1300 ShadeCloth by MechoShade or approved equal.
 - b.) When budget allows, PVC-free shade cloth is preferred. Acceptable products and manufacturers, or approved equal:
 - a) EcoVeil by MechoShade
 - b) GreenScreen by Nysan Solar Control Systems, (A Hunter Douglas Contract Company)
 - d. Electric Motor System:
 - i. Switches:
 - a.) Adjustable limit switches for travel in both raised and lower positions with micro switches to provide circuit braking at end of run
 - ii. Brake:
 - a.) Solenoid-activated disc brake mechanism holds shade in position and automatically disengages when motor is running
 - iii. Motor:

- a.) Asynchronous motor with built-in reversible capacitor start-and-run, thermally protected, totally enclosed, maintenance free.
- e. Hardware - Motorized Shade System:
 - i. Shade roller:
 - a.) Extruded aluminum tube with internal keyway and integral channels
 - b.) Mounting spline: extruded vinyl
 - ii. Brackets:
 - a.) End: Steel, 1/8" thick
 - b.) Center: as required to suit span, weight and indicated mounting
 - iii. Shade weights:
 - a.) Mill finished Aluminum hem tub
- f. Hardware – Manual Shade System
 - i. Manual Chain Operator:
 - a.) Type: Gear reduction operating hardware manufactured with precise inertial braking mechanism to stop shade at any desired point of travel
 - a.) Drive Chain: Adjustment-free continuous qualified #10 stainless steel ball chain rated to 90 lbs. minimum breaking strength and pulley clutch operating system
 - b.) Provide right hand or left hand or dual left and right operating systems as needed to best suit window condition
 - ii. Shade Tube Assembly: Extruded aluminum tube
 - a.) Size: As determined by shade manufacturer
 - b.) Finish: Anodized clear
 - iii. Shade Components:
 - c.) Aluminum Fascia: Extruded aluminum
 - a) Size: 4" X 3", or to best suit design configuration
 - b) Wall Thickness: 0.063"
 - c) Finish: Painted, color to match adjacent surface finish
 - d.) Pocket Closure Plate: Steel
 - d) Size as needed to suit installation
 - e) Finish: Painted, color to match adjacent surface finish
 - e.) Hem Bar: Shaped steel profile
 - f) Size: As determined by shade manufacturer based on unit size and fabric
 - g) Wall Thickness: Engineered to match weight requirements
- 2. Acceptable Products and Manufacturers:
 - a. Motorized Shade System:
 - i. Equivalent to ElectroShade System Model #4123 by MechoShade Systems, Inc., Long Island City, NY
 - b. Manual Shade System:
 - i. Equivalent to Mecho/5 by MechoShade Systems, Inc., Long Island City, NY

END OF SECTION



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13852

FIRE ALARM AND DETECTION SYSTEMS

A. SUMMARY

This section contains design standards for fire alarm and detection systems. Refer to related design standards and related specification guideline sections for additional information.

B. GENERAL

1. The fire alarm system shall meet the latest revision of all applicable Federal, State and Local codes and references including but not limited to NFPA 70, NFPA 72, NFPA 101, UL, NEC, and ADA guidelines.
2. Refer to “Standards for Annunciation of Fire Alarms” and “Standards for Fire Alarm Tie-In-GWPD Monitoring” for the GW University Police Department (UPD) guidelines and requirements.
3. The fire alarm system for new construction and major renovation projects shall be addressable.
4. The complete fire alarm system design, equipment, and associated devices must be UL listed and each component labeled and installed accordingly.
5. Shop drawings and submittals must be reviewed and approved by FM Global. For information on FM Global submittal requirements, refer to supporting standard document “Plan Review and Construction Project Guidelines for The George Washington University, Washington, DC” prepared by FM Global.
6. Shop Drawings shall comply with “Documentation” section of the “Fundamentals of Fire Alarm Systems” chapter of NFPA 72. Sequence of Operations symbols indicated in drawings shall conform to NFPA 72 standards.
7. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site.
8. GW Campus Monitoring System Interface:
 - a. At GW, the fire alarm systems for most buildings on campus are interfaced with and monitored by the UPD Fire Alarm Monitoring System. Output monitoring relays are used by UPD’s system to monitor the fire alarm system status (fire alarm, trouble, and supervisory signals; room smoke detectors; water flow switches and any other devices identified in the project’s security review). The UPD monitoring system performs the primary and secondary

call-out. The dispatcher's station at UPD receives the primary notice and coordinates notice and response to the local Fire Department.

C. SUBMITTALS

Submittals shall include, but are not limited to, the following:

1. Provide copies of all requirements:
 - a. System Acceptance 100% Test
2. NFPA 72 Completion Documents 4.5.2
 - a. Record of Completion
 - b. Owner's manual and installation instructions
 - c. Record Drawings
 - d. Software Based Systems: A copy of site specific software

D. SYSTEM OPERATIONAL DESCRIPTION

1. Fire alarm signal initiation shall be by one or more of the following devices and systems: manual stations; heat detectors; smoke detectors; verified automatic alarm operation of smoke detectors; automatic sprinkler system water flow or pressure alarm; heat detectors; and fire standpipe system.
2. System Performance Requirements:
 - a. Actuation of any alarm initiating device shall automatically cause the following operations where applicable:
 - i. Continuously operate alarm notification appliances; identify alarm at fire alarm control panel and remote annunciators; transmit the alarm signal to UPD Fire Alarm Monitoring System; activate the emergency voice/alarm communication system; unlock electric door locks in designated egress paths; release fire and smoke doors held open by magnetic door holders; recall elevators to primary or alternate floor; switch HVAC equipment controls to fire mode; activate stairwell pressurization; close smoke dampers in air ducts of designated air-conditioning duct systems; record events in system memory, and record events by system printer.
 - b. Supervisory signal shall be initiated by fire-protection system valve tamper, fire alarm AC power failure, elevator shunt trip supervision, standby generator set trouble signal, duct smoke detector in air handling system, and initiated residential unit smoke detectors: Alarm shall sound the local alarm in the fire alarm control panel (FACP), light the annunciator panel and send the supervisory signal to UPD.
 - c. Latching Supervisory: The supervisory point shall be latching; the supervisory signal shall remain on the control panel until the panel is reset by UPD.
 - d. Any breaks in initiating circuits or power wiring in the fire alarm system shall be annunciated as a trouble condition on the building fire alarm control panel or annunciator. Activation of multiple station smoke detectors in residence units shall also initiate the trouble signal on the system.
 - e. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire alarm control panel and remote

annunciators. Record the event on system printer and transmit to UPD Fire Alarm Monitoring System.

D. FIRE ALARM CONTROL PANEL

1. The fire alarm control panel shall provide power, annunciation, supervision and control for the detection and alarm system.
 - a. Fire alarm systems that are replaced in existing townhouses and small buildings must have a fire control panel capable of managing alarm initiating devices such as manual pull stations, smoke detectors, heat detectors and water flow switches.
 - b. New construction and major renovation projects must have an addressable system with a fire control panel capable of managing addressable initiating devices for manual pull stations, smoke detectors, heat detectors and water flow switches. An emergency communication system with a live public address function shall be included.
2. For high rise buildings, the fire alarm control panel should be located in the Fire Command Center.
3. The fire alarm control panel and remote fire alarm control units shall be located in areas protected by a smoke detector.
4. Alphanumeric Display and System Controls: The annunciator shall have an alphanumeric display and system controls arranged for use by human operator at the fire alarm control unit and system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
 - a. Display alarm, supervisory, and component status messages and the programming and control menu
 - i. Annunciator and Display: Liquid-crystal type, 2 line(s) of 80 characters minimum
 - ii. Component status message shall indicate the floor, device location/room location, and type of alarm.
5. Emergency Power: Where an emergency generator is present to provide standby power for the building, the fire alarm control panel and all secondary panels, where applicable, shall be connected to the emergency circuit.
6. Stairwell Pressurization: Provide an output signal using an addressable relay to start the stairwell pressurization system. The signal shall remain on until alarm conditions are cleared and fire-alarm signal is reset. Signal shall not stop in response to alarm acknowledge or signal silence commands.
7. Water Flow: Provide an output relay at the fire control panel that addresses water flow throughout the building. This relay shall be tied into UPD's monitoring system.
8. Elevator Recall:
 - a. Smoke detectors located in the following locations shall initiate automatic elevator recall.
 - i. Elevator lobby detectors, except the lobby detector on the designated floor.
 - ii. Smoke detector in elevator machine room.
 - iii. Smoke detectors in elevator hoistway.

- b. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
- 9. Voice/Alarm Signaling Service:
 - a. A central emergency communication system with preamplifiers, amplifiers, and tone generators shall be provided. When activated, the system shall automatically generate tones and digitally recorded audio messages to occupants within the building or allow a public address function for live voice announcements by a central control microphone. Live voice instructions shall be used to communicate to all of the building's occupants for any type of emergency.
 - b. A public address function shall be provided only for buildings over three stories.
 - c. The system shall be designed and installed to provide speech intelligibility throughout all areas of the building being served whether automatic messages or live voice transmission.
 - d. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
 - e. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.
- 10. Printout of Events:
 - a. Upon receipt of signal, alarm, supervisory, and trouble events shall be printed. Zone, device, and function shall be indicated. Printout shall provide type of signal (alarm, supervisory, trouble) and date and time of occurrence. Alarm signals shall be differentiated from other information. Printout shall also indicate system reset event.
- 11. Firefighter Two-Way Telephone Communication System:
 - a. Provide dedicated, two-way, supervised, telephone voice communication links between fire alarm control panel and remote firefighters' telephone stations.

E. BUILDING SPECIFIC STANDARDS

Building specific standards shall comply with governing codes and references noted in this section and include but are not limited to the following requirements:

- 1. GW Categories of Buildings for Fire Alarm Systems:
 - a. Townhouses: Residential, Administrative
 - b. Low Rise Buildings: Buildings 3 stories and below
 - c. High Rise Buildings:
- 2. Townhouses
 - a. Townhouse, General
 - i. A fire control panel to control the status of the system shall be provided. The control panel must be capable of managing alarm initiating devices such as manual pull stations, smoke detectors, heat detectors and water flow switches. A fire alarm signaling system shall be provided. A voice system shall not be included.
 - ii. An annunciator panel and LED display shall be provided and located near the main entrance.

- iii. Provide an additional relay at the fire control panel that activates when smoke detectors go to alarm. This relay shall be tied into UPD's monitoring system.
 - iv. One smoke detector shall be provided on every floor in the lobby and the common landing area on each level.
 - v. Manual pull stations shall be provided at exit doors and other locations as defined by Code.
 - vi. Alarm Notification Devices: Visible and audible notification appliances shall be provided in all public and common areas as required by applicable codes.
 - b. Townhouse, Residential
 - i. In addition to the general requirements for townhouses noted above comply with the following:
 - ii. Single/Multi-Station Smoke Detectors: Provide interconnected smoke detectors, operating at 120-volt ac, connected to the emergency power circuit. The smoke detectors shall not be battery-powered. Addressable monitor and relay modules shall be provided for smoke detectors to allow for monitoring and reporting smoke alarms in each room to UPD.
 - ii. Provide an output relay at the fire control panel that addresses water flow throughout the building. This relay shall be tied into UPD's monitoring system.
 - iii. Provide tandem connection of number of indicated detectors; the alarm on one detector shall actuate notification on all connected detectors.
 - iv. Detection of smoke by a second smoke detector, located in a different dwelling unit shall initiate a general building fire alarm signal.
 - v. Alarm Notification Devices: Comply with NFPA and ADA guidelines.
 - a.) Typical Student Suites: Both audible and visual notification appliances shall be provided in the main area of the suite.
 - b.) ADA Accessible and Hearing Accessible Suites: Both audible and visual alarm notification appliances shall be provided in the main area of the suite. In addition, a visual alarm notification appliance shall be provided in each individual bedroom of the suite (apartment style residence halls).
5. Low Rise
- a. A fire control panel to control the status of the system shall be provided. The control panel must be capable of managing alarm initiating devices such as manual pull stations, smoke detectors, heat detectors and water flow switches. A fire alarm signaling system shall be provided. A voice system shall not be included.
 - b. An annunciator panel and LED display shall be provided and located near the main entrance.
 - c. Smoke detectors shall be provided in common and public areas per Code. The detectors shall initiate a general building alarm and notify UPD Fire Alarm Monitoring System.
 - d. Residential Halls:
 - i. Provide single/multi-station smoke detectors; interconnected, operating at 120-volt ac, connected to the emergency power circuit. The smoke detectors shall not be battery-powered.

- ii. Addressable monitor and relay modules shall be provided to allow for monitoring and reporting of smoke alarms in each suite and to activate the sounder bases upon general fire alarm evacuation signals.
 - iii. Where more than one smoke detector is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke detectors to sound.
 - iv. Detection of smoke by a second smoke detector, located in a different dwelling unit shall initiate a general building fire alarm signal
 - e. Alarm Notification Devices: Visible and audible notification appliances shall be provided in all public and common areas in compliance with NFPA and ADA guidelines.
 - i. Typical Student Suites: Audible and visual notification appliances shall be provided in the main area of the suite per NFPA and Code.
 - ii. Accessible Suites: Audible and visual alarm notification appliances shall be provided in the main area of the suite. In addition, a visual alarm notification appliance shall be provided in each individual bedroom of the suite where applicable (apartment style residence halls).
 - i. Visual Notification Appliances: The number, location, spacing, flash rate and synchronization of strobes lights shall comply with NFPA 72 and ADA.
6. High Rise Buildings, General
In addition to general requirements for fire alarm systems described herein, comply with the following:
 - a. The fire alarm system shall be addressable and have a central emergency communication system with a public address function.
 - b. Addressable smoke detectors located in common/public areas will initiate a full building fire alarm and notify UPD's monitoring station. GW prefers to evacuate an entire building.
 - c. Alarm Notification Devices: Comply with NFPA and ADA guidelines.
 - i. Visible and audible notification appliances shall be provided in all public and common areas.
 - ii. Visual Notification Devices: The number, location, spacing, flash rate and synchronization of strobe lights shall comply with NFPA 72 and ADA.
 - d. Elevator Machine Rooms: In general, smoke detectors shall be installed in these rooms.
 - e. A fire control room shall be provided and equipped with the following remote status/control panels:
 - i. Buildings electrical distribution system.
 - ii. Building fire pump
 - iii. Elevator status and control panel.
 - iv. Building emergency communication system
 - v. CCTV system monitors and keyboard.
7. High Rise - Residence Halls
In addition to the general requirements for fire alarm systems described herein and the general requirements for high rise buildings, comply with the following:
 - b. Smoke detectors in residence halls shall be self-restoring, photoelectric type.
 - c. Single/Multi-Station Smoke Detectors: Provide interconnected smoke detectors, operating at 120-volt ac, connected to the emergency power

circuit. The smoke detectors shall not be battery-powered and shall be self-restoring. Self-restoring detectors shall not require resetting or readjustment after actuation to restore them to normal operation.

- d. Smoke detectors in residence halls rooms will sound locally and initiate a supervisory fire trouble alarm to UPD's monitoring system. Two room smoke detectors that alarm at the same time will cause a general fire alarm. A general fire alarm should alarm all floors and not just the floor above and the floor below the alarm floor.
- e. Tandem Connection: All smoke detectors within a residential unit shall be interconnected. Where more than one smoke detector is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke detectors to sound. The building fire alarm system shall also annunciate a supervisory signal at the control panel. A latching supervisory point shall be provided so that the signal remains on the control panel until it is reset by UPD to clear the supervisory condition. The location of the device shall print out at the control panel and appear on the annunciator display.
- f. Detection of smoke by a second smoke detector, located in a different dwelling unit shall initiate a general building fire alarm signal.
- g. Addressable monitor and relay modules shall be provided to allow for monitoring and reporting of smoke alarms in each suite to UPD's monitoring system and to activate the sounder bases upon general fire alarm evacuation signals.
- h. Alarm Notification Appliances:
 - i. Typical Student Suites: Audible and visual notification appliances shall be provided in the main area of the suite per NFPA and Code.
 - ii. Accessible Suites: Audible and visual alarm notification appliances shall be provided in the main area of the suite. In addition, a visual alarm notification appliance shall be provided in each individual bedroom of the suite where applicable (apartment style residence halls).
 - iii. Visual Notification Devices: The number, location, spacing, flash rate and synchronization of strobes lights shall comply with NFPA 72 and ADA.

F. DEVICES

The fire alarm system shall include the following devices where applicable:

- 1. Addressable Initiating Devices: For addressable fire alarm systems all initiating, monitoring, and control devices shall have the addressability function built into the associated device.
- 2. Manual Pull Stations: Locations of manual pull stations shall be per Code.
 - a. Manual pull stations shall be a double-action mechanism requiring two actions to initiate an alarm, pull-lever type;
 - b. Manual pull stations installed in areas subject to damage, vandalism, and/or false alarms shall have a protective shield.
- 3. System Smoke Detectors - Digital, Addressable Type:
 - a. General Requirements:
 - i. System smoke detectors shall comply with UL 268.
 - ii. Integral Addressable Module: Arranged to communicate detector status to fire alarm control unit.

- iii. Base-Mounting: Detector and related electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 - iv. Provide audible and visual notification appliance as required by NFPA and ADA.
 - v. Self-restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
 - vi. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
 - vii. Remote Control:
 - a.) Smoke detectors shall be individually monitored at the fire alarm control unit for calibration, sensitivity, and alarm condition.
 - b.) Each sensor shall be individually adjustable for multiple levels of detection sensitivity
4. Non-System Smoke Detectors - Single/Multi-Station Type:
- a. Single/multi-station smoke detectors shall comply with UL 217; suitable for NFPA 101; operating at 120-volt ac.
 - b. Provide auxiliary relays.
 - c. Provide audible and visual notification appliance as required by NFPA and ADA.
 - d. Test Switch: Push to test; simulates smoke at rated obscuration
 - e. Tandem Connection: Provide tandem connection of a number of indicated detectors. The alarm on one detector shall activate notification on all connected detectors.
 - f. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 - g. Self-restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
 - h. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status
 - i. Addressable monitor and relay modules shall be provided monitoring and reporting smoke alarms to UPD's monitoring system.
5. Duct Smoke Detectors:
- a. Duct smoke detectors shall be provided as required by the Life Safety Code and for fan shutdown and damper closure. Detectors shall be connected to the fire alarm control panel.
 - b. Addressable System: Detector address shall be accessible from fire-alarm control panel and shall be able to identify the detector's location within the system and its sensitivity setting.
 - c. Each sensor shall have multiple levels of detection sensitivity.
6. Notification Appliances: Provide audible and visual notification devices with layout and installation complying with acoustic requirements, local codes, NFPA 72, ADA, and local fire department criteria.
- a. Combination Devices: Provide factory-integrated audible and visible device in a single mounting assembly as required. Provide white faceplate.
 - b. Audible Notification Appliances: Tone with voice message capability from the control panel preferred.

- c. Visual Notification Appliances: Xenon strobe lights with clear or nominal white polycarbonate lens mounted on an aluminum faceplate; Comply with UL 1971
 - i. Strobes shall be wall-mounted unless otherwise indicated.
 - ii. Mounting faceplate shall be factory-finished, white.
- d. Voice/Tone Notification Appliances: Comply with UL 1480 and shall be listed by an NRTL
 - i. Provide a combination of visual device and speaker as required.
 - ii. Devices shall be flush-mounted.
 - iii. Ceiling mounted speakers shall be white.
 - iv. High range units shall be located in penthouse mechanical room.
- 7. Heat Detectors:
 - a. Heat detectors, combination type, shall be actuated by either a fixed temperature of 135°F or a rate of rise that exceeds 15°F per minute as required.
 - b. Detectors used in elevator machine rooms and hoistways shall have a higher sensitivity than the sprinkler heads in those spaces.
 - c. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
 - i. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.
- 8. Magnetic Door Holders:
 - a. Magnetic door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire alarm system. The doors shall fail-safe, “unlock” or “drop out” in the event of a fire.
 - b. Units shall be equipped for wall or floor mounting as required and be complete with matching doorplate.
 - i. Wall-mounted units shall be flush-mounted unless otherwise indicated.
 - c. Material and finish shall match door hardware.
- 9. Remote Annunciator:
 - a. Provide only when design is such that the main fire alarm control panel cannot be located near the designated entrance to provide all required annunciation or more than one annunciator is required.
 - b. The annunciator shall be a fully functional control panel with functions matching those of the fire alarm control panel for alarm, supervisory, and trouble indications.
 - i. Annunciator Unit: Provide an LED-indicating light located on the floor plan for each zone. Mark zone boundaries on the annunciator floor plan.
 - ii. Provide an LED-indicating light located on the floor plan for each device indicating type of device and floor on which a signal was actuated.
 - iii. Provide individual LED indicators for each alarm and supervisory and a LED to indicate system trouble. Additional LEDs indicated normal power and emergency power modes for the system.
 - iv. Enclosure: The annunciator enclosure shall be a recessed, weatherproof cabinet with brushed stainless steel or aluminum faceplate engraved with the approved plan. The lobby annunciator shall be brushed stainless steel or aluminum faceplate engraved with the approved plan. Key and lock shall be common to all secured fire alarm system enclosures.

10. Addressable Interface Device: Microelectronic monitor module with integral relay to initiate elevator recall and to initiate operation of circuit breaker shunt-trip for power shutdown.
11. System Printer: Provide a system printer to record all alarm, supervisory, and trouble conditions without loss of any signal or signals. Printout shall be by circuit, device, and function as provided in the control panel.
12. Extra Materials: Furnish extra materials of all installed field devices and that are packaged with protective covering for storage and identified with labels describing the content. Extra devices include but are not limited to smoke detectors, pull stations, horns/strobes or speakers/strobes, any control/monitoring modules and the following:
 - a. Lamps for Strobe Units: Quantity equal to 10% of amount installed but no fewer than 1 unit
 - b. Smoke Detectors, Fire Detectors: Quantity equal to 10% of amount of each type installed but no fewer than 1 unit of each type
 - c. Detector Bases: Quantity equal to 2% of amount of each type installed but no fewer than 1 unit of each type
 - d. Keys and Tools: One extra set for access to locked and tamperproofed components
 - e. Audible and Visual Notification Appliances: Two of each type installed
 - f. Fuses: Three of each type installed in the system

G. FIRE ALARM WIRING

1. Class A Wiring: All initiating, signal and notification circuits of the fire alarm system shall be Class A.
2. Fire alarm raceway, junction boxes, and devices shall be red in color.
 - a. Raceway
 - i. Where fire alarm raceway will be exposed, raceway to be red EMT (electrical metal conduit)
 - ii. Where fire alarm raceway will be concealed, raceway to be red MC (metal clad cable)
3. Grounding:
 - a. Ground fire alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire alarm control unit.
 - b. Provide surge protection on all circuits exiting the facility including exterior devices.

H. FIRE ALARM SYSTEM FIRMS

1. Subject to compliance with project requirements, acceptable fire protection firms are the following:
 - a. BFPE International, Hanover, MD
 - b. ARK Systems, Inc., Columbia, MD
 - c. Antronnix, Silver Spring, MD

I. MANUFACTURERS

1. Fire Alarm Control Panel and Equipment:
 - a. Acceptable Manufacturers; No exceptions:
 - i. Notifier
 - ii. Edwards
 - iii. Other manufacturers and products may be incorporated into a project, provided they are approved by GW and comply with the requirements noted in this section.

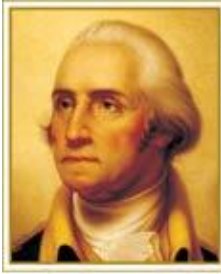
J. INSTALLATION

1. General:
 - a. Installer Certification: All installation work on fire alarm systems must be performed by personnel certified by NICET as a fire-alarm Level III technician.
 - b. Install wall-mounted equipment, with tops of cabinets not more than 72 inches above the finished floor.
 - c. Heat detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
 - d. Smoke – or Heat–Detector Spacing:
 - i. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
 - ii. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
 - iii. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.

H. TESTING

1. Require 100% testing of ALL fire alarm and fire protection systems prior to acceptance.

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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13900 FIRE SUPPRESSION SYSTEMS

A. SUMMARY

This section contains design standards for fire suppression systems. Refer to related design standards and related specification guideline sections for additional information.

B. GENERAL

1. All new construction and major renovation projects shall be equipped with a fire suppression system.
2. For most buildings, the system will be a hydraulically designed, wet pipe, automatic sprinkler system.
3. The fire suppression system shall be designed and installed in compliance with the latest edition of NFPA standards including NFPA 13, "Standard for the Installation of Sprinkler Systems," NFPA 14 "Standard for the Installation of Standpipes and Hose Systems" (as well as NFPA 20, "Standard for the Installation of Centrifugal Fire Pumps."
4. The sprinkler system shall be designed and installed in accordance with the current edition of applicable building codes, FM Global requirements, and ADA.
5. The sprinkler system design, and the contractor submittals, including all layout drawings and installation details, equipment and material data, specifications, occupancy details, and hydraulic calculations shall be submitted to FM Global for their review and approval. For additional information on FM Global requirements, refer to "Plan Review and Construction Project Guidelines for The George Washington University, Washington, DC".
6. All sprinklers, valves, devices, and fittings should be FMG Approved.
7. It shall be the Contractor's responsibility to develop a complete set of shop drawings for the installation of the system. These Drawings shall be approved by the D.C. Fire Marshall's office and FM Global prior to any fabrication and/or installation.
8. Sprinkler Coordination: Layout and installation of fire protection piping and sprinkler heads shall be coordinated with other construction so as not to interfere with the work of other trades. Sprinkler Contractor shall cooperate in the preparation of coordination drawings, when they are required on a specific project.

C. SUBMITTALS

Submittals shall include, but are not limited to, the following:

1. Sprinkler System:
 - a. Provide copies of all requirements:
 - i. System Acceptance 100% Test
 - b. NFPA 13 Acceptance Requirements 10-2
 - i. Contractor's Material and Test Certificate
 - c. NFPA 13 Instructions 10-4
 - i. All literature and instructions of any equipment and devices installed
 - d. NFPA 13 Hydraulic Design Information Signs 10-5
2. Fire Pumps:
 - a. Provide copies of all requirements:
 - i. System Acceptance 100% Test
 - b. NFPA 20 Acceptance Testing Chapter 14
 - i. 14.1.2 Hydrostatic Test
 - ii. 14.2.4 Certified Pump Curve
 - iii. 14.2.5.4 Measurement Procedure

D. SYSTEM DESCRIPTION

1. Design and Performance Requirements, General:
 - a. Refer to FM Global requirements for recommended sprinkler system design criteria including coverage requirements, guidance on sprinkler temperature ratings, water supply, and hydraulic calculation procedures.
 - b. Hydraulically design the sprinkler system using an area-density procedure acceptable to FM Global.
 - c. Safety Factor: Provide a 10 psi hydraulic safety factor.
 - d. Hydraulic Calculations: FM Global allows the hose stream allowance in hydraulic calculations to be taken at the street hydrant. For residential areas of buildings, FM Global allows a hydraulic area to be defined taken as the sprinkler heads within an apartment unit, less those in small closet rooms, combined with the four closest heads in the corridor along the path of egress. Confirm current requirements with FM Global.
 - e. Standard Piping System Component Working Pressure: Listed for at least 175 psig minimum working-pressure rating, unless otherwise required
 - e. Sprinklers in areas of high ambient temperatures will be provided with either intermediate or high temperature heads as required by NFPA 13 and FM Global.
2. Water Supply:
 - a. Design team shall request or perform necessary tests to establish available water pressure and flow. Owner shall reimburse for the cost of pre-approved testing services. Provide Owner with documentation of the results of water supply tests, such as flow and fire pump tests.
 - b. The domestic water system shall be protected from contamination by water flowing back out of the sprinkler system. A minimum of a double check valve shall be installed or additional equipment as required by local authorities.
 - c. Fire pumps shall be provided only as required to meet the sprinkler and/or

- standpipe system demands in accordance with the codes and standards. The fire pump shall be capable of operation from both normal utility and emergency backup power sources.
- d. The fire pump/booster pump, fire pump controller, and all associated, applicable components shall be FM- Approved.
3. Supervision of the Automatic Sprinkler and Standpipe System:
 - a. The operating status, and controller general fault alarms for jockey pump, fire pumps, dry pipe valves, and air compressors; as well as standpipe and sprinkler system water flow switches, preaction valves, and valve tamper switches shall be supervised by the building fire alarm system.
 - b. Each sprinkler zone shall be supplied by a single zone control and test valve assembly.
 - c. Building standpipe system, and each individual standpipe riser, shall be provided with a flow switch monitored by the fire alarm system. All shut-off valves shall be equipped with valve position tamper switches monitored by the fire alarm system. For renovation work, comply with the University's "Red Tag" permit system for all work that disables operation of any portion of a fire suppression system. Fire department hose connections shall be distributed in accordance with code requirements and installed in locations approved by the local fire department.
 4. Residence Halls:
 - a. Sprinkler heads in residence halls shall be concealed, and shall be actuated by means of fusible links. Actuators employing glass vials or tubes filled with a thermally active fluid are not acceptable.
 5. System Piping:
 - a. Sprinkler and standpipe piping shall be schedule 40 black steel pipe. Fittings shall be cast iron, black, screwed, except where flanged fittings are required. Flanged fittings shall be 150 pound class American Standard. Drain piping for waste, test valve, main drain, etc., shall be schedule 40. Piping 2-1/2" and over may be shop-welded with weld fittings. Welded joints shall be made in accordance with procedure outlined in the A.S.A. Piping Code and each welder shall be certified by National Certified Pipe Welding Bureau, or by other reputable testing laboratory or agency. Use approved fittings at standpipes.
 - i. Only piping under 2" may be threaded standard weight.
 - b. All sprinkler piping shall be concealed in ceilings, walls or soffits to the extent possible.
 - c. Piping/Sprinkler Hose Fittings: Flexible/braided piping shall not be used.
 - d. Pipe couplings utilizing grooved pipe ends may be used in lieu of thread or welded joints. Pipe couplings which depend on a compressed gasket to hold and seal the joint will not be permitted.
 6. Sleeves
 - a. Provide steel pipe sleeves for pipes passing through masonry walls, floors, and ceilings. Sleeves shall extend completely through construction and, in case of floors, extend three (3) inches above floor. Location of sleeves through structural members shall be approved by Architect before installation.
 - b. Where pipes pass under footings and exterior concrete walls, and through exterior walls, sleeves shall be of galvanized steel pipe and shall be not less than 4 inches larger than the pipe being sleeved.

- c. Sleeves shall be made watertight where passing through waterproofed surfaces, exterior wall below grade and floor slabs on grade.
- 7. Escutcheons
 - a. Wall and Ceiling Escutcheon Plates: Provide for sprinkler and standpipe piping passing through walls and ceilings approved type, one-piece or split type escutcheon plates. Secure plates in place with set screws or other approved positive means.
- 8. Fire Protection Valves:
 - a. Control valves shall be approved by a nationally recognized testing laboratory; UL listed or FM approved. Provide necessary appurtenances at control valve. Valves in the system shall have supervisory contacts to indicate anything other than full open position. Double contact flow switches and tamper switches shall be installed at each floor take off and at main sprinkler connection.
- 9. Provide backflow prevention where fire protection system connects to public or potable water supplies.
- 10. The elevator machine room shall have automatic sprinkler protection where the elevators are provided with a recall control sequence, activated by heat detectors located adjacent to each sprinkler head, and where power can be shut off via a shunt trip breaker.
- 11. Protection for Mechanical Shafts
 - a. Sprinklers shall be required in all shafts where the shaft construction or contents are combustible or where the shaft is accessible by personnel. Is this also a code requirement?
 - b. Trash chutes shall be protected by sprinkler heads at the top and every other floor level. The trash chute heads shall be supplied from a dedicated sprinkler control zone assembly monitored by the fire alarm system.

E. SPRINKLERS

- 1. Sprinkler heads shall be automatic, conventional (spray) type and approved by the Factory Mutual Research Corporation (FM). Each head shall have orifice of minimum 1/2 inch diameter. Use chrome plated, small profile type recessed pendent heads where piping is installed above a hung ceiling. Recessed or protected type sprinklers are required in Residence Halls for their tamper-proof, dust-free design. Sprinkler heads shall have 165 degree F. rating.
 - a. Sprinkler Applications:
 - i. Rooms without ceilings: Upright sprinklers with appropriate temperature ratings
 - ii. Rooms with suspended ceilings: Pendent, recessed, flush and concealed sprinklers
 - iii. Wall Mounting: Sidewall sprinklers
- 2. Sprinkler heads shall be actuated by means of a fusible link (Residence Halls, Gymnasiums, Other areas subject to impact damage). Heads that actuate by means of glass bulb sprinklers are not acceptable.
- 3. Provide dry pipe sprinkler systems in areas subject to freezing.
- 4. Provide sprinkler finishes and coatings required per project design.
- 5. Acceptable Manufacturers: Sprinkler heads shall be FM approved.

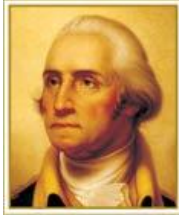
F. PRODUCTS

1. Corrosion protective encasement for piping, as needed per project design
2. Sprinkler specialty fittings: FM approved
3. Listed Fire Protection Valves: FM approved
4. Specialty Valves:
 - a. Sprinkler system control valves, FM approved
5. Fire Department Connections shall be provided as required per project design:
6. Pipe Hangers: FM approved
7. Extra Materials: Provide the larger of 1 head, or 10%, spare heads for every type of sprinkler head used on the project.

G. INSTALLATION

1. Contractor shall be responsible for all measurements at site and checking correctness of same as related to project work.
2. Contractor shall be responsible for project work and equipment until finally inspected, tested, and accepted; work shall be protected against theft, injury, or damage, materials stored carefully, and equipment received on site which are not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obtrusive material.
3. Contractor shall provide all sidewalk and street repairs due to the installation of the siamese connections and new fire service to the buildings.
4. If at any time deficiencies in the work are discovered which result from work not in accordance with Contract documents, Contractor shall be held liable for replacement or correction, regardless of the time limit on the guarantee.
5. Drains and test connections shall be extended to spill over floor drains.
6. Location and Spacing of Sprinklers:
 - a. Space and locate sprinklers in accordance with NFPA 13 and as indicated on reflected ceiling plans and applicable shop drawings. In rooms and spaces with suspended grid ceilings, sprinkler heads shall be installed on center line of corridors and at midpoint of ceiling tiles when possible.
 - b. Sprinkler head location shall be in accordance with the manufacturer's recommendations to maintain FM listing.
 - c. Provide uniform spacing of sprinklers on branch lines.
7. Protection of Sprinkler Heads:
 - a. Wire-cage type sprinkler guards shall be provided for sprinklers in all stair areas, telecommunications rooms, mechanical rooms, elevator machine rooms, electrical rooms, janitor's closets and in any other areas where the activity in the space could result in accidental damage to sprinkler heads.

END OF SECTION



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14210

ELECTRIC TRACTION ELEVATORS

Comment [nra1]: Charlie James and John H. to review this section!

A. SUMMARY

This section contains the standards for passenger and freight elevators including cars, entrances, controls, safety equipment, hoistway equipment, and elevator machinery. Refer to building space standards for additional information.

B. GENERAL

1. Reference Standards:
 - a. Safety Code for Elevators and Escalators ASME A17.1, including errata, interpretations and revisions, as adopted by the District of Columbia and all modifications to ASME A17.1 contained within all applicable District of Columbia Ordinances, Interpretations and Revisions.
 - b. Inspectors' Manual for Electric Elevators- ASME A17.2.1.
 - c. American National Standard, Accessible and Usable Buildings and facilities- CABO/ANSI A117.1 and Accessibility Guidelines for Buildings and Facilities, issued July 26, 1991 by the United States Architectural and Transportation Barriers Compliance Board as adopted by the American with Disabilities Act (ADA), including clearances, control and jamb signage, locations for signal equipment, door timing cycles, and similar provisions. The more stringent code on the issue shall be reinforced.
 - d. Requirements for Elevator and Escalator Electrical Equipment - CAN/CSA-B44.1/ASME-A17.5.
 - e. Qualification of Elevator Inspectors - QEI-1.
 - f. National Electrical Code - ANSI/NFPA 70.
 - g. National Fire Alarm Code - ANSI/NFPA 72.
 - h. Installation of Sprinkler Systems - ANSI/NFPA 13.
 - i. Life Safety Code - ASME/NFPA No. 101.
 - j. Requirements of the local Fire Authority.
 - k. Requirements of the BOCA National Building Code and any other code, ordinance, or law applicable within the Governing Jurisdiction.
 - l. American Welding Society (AWS) - D1.1 - Structural Welding Code - Steel.
 - m. National Electrical Manufacturers Association (NEMA).
 - n. Underwriters Laboratories Inc. (UL).
2. Protective Blanket Lining: Full-height, heavy cotton duck, padded and quilted, removable, with brass grommets. Provide permanent hooks in car.
3. Provide ventilation when a hoistway serves 4 or more stories.

THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

4. Elevator Control Room: The controller shall be located adjacent to hoist way at the lowest landing. Coordination of final placement by elevator manufacturer and subcontractor.

C. ELEVATORS

1. Elevator Description, General: Provide elevator schedule to accommodate project program criteria. Typical passenger elevator as follows:
 - a. Rated Load: 3,500lbs - 4,000 lbs
 - b. Rated Speed: 150 fpm - 200 fpm
 - c. Operation System: Selective-collective automatic operation
 - d. Auxiliary Operations:
 - i. Battery-powered lowering
 - ii. Automatic dispatching of loaded car
 - iii. Loaded-car bypass
2. Hoistway Entrances:
 - a. Frames: Satin stainless steel, No. 4 finish
 - b. Doors: Satin stainless steel, No. 4 finish
3. Security Features – Residence Halls: Card-reader operation
4. Hall Fixtures: Satin stainless steel, No. 4 finish
5. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
 - b. Provide hooks for protective pads and complete set(s) of full-height protective pads.

D. OPERATION PERFORMANCE

1. The control system shall provide smooth acceleration and deceleration with 1/8" leveling accuracy at all landings, from no load to full rated load in the elevator, under normal or unloading conditions. The self-leveling shall, within the zone, be entirely automatic and independent of the operating device and shall correct for overtravel and undertravel. The car shall remain at the landing irrespective of load. Clearance between the car sill and the hoistway shall not exceed 1-1/4".
2. Noise and Vibration Control:
 - a. Airborne Noise: Measured noise level at elevator equipment and its operation shall not exceed 60 dbA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed. Limit noise level in the machine room relating to elevator equipment and its operation to no more than 80dBA.
 - b. Vibration Control: All elevator equipment and their support shall be mechanically isolated from the building structure and electrically isolated from the building power supply and to each other to minimize the possibility of objectionable noise and vibrations being transmitted to occupied areas of the building.

E. TRACTION SYSTEMS

1. Elevator Machines: Variable-voltage, variable frequency, ac-type hoisting machines and solid-state power converters.
2. Fluid for Hydraulic Buffers: If using hydraulic buffers, use only fire-resistant fluid.
3. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work.
4. Machine Beams: Provide framing to support elevator hoisting machine and deflector sheaves from the building structure.
5. Car Frame and Platform: Bolted- or welded-steel units.
6. Guides: Roller guides or polymer-coated, non-lubricated sliding guides. Provide guides at top and bottom of car and counterweight frames.

F. OPERATION SYSTEMS

1. General: Provide manufacturer's standard microprocessor operation systems as required.
2. Auxiliary Operations: In addition to primary operation system features, provide the following operational features:
 - a. Single-Car Battery-Powered Lowering: If power fails and car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it is lowered to the next floor below, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
 - b. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors begin closing.
 - c. Governor must be self-resetting.
3. Diagnostic Tools: Provide diagnostic tools for servicing elevator equipment for the elevator controller and hoisting means.
4. Security Operation:
 - a. Provide connection to a card reader or proximity reader, wall-mounted proximate to the call buttons for call button activation. Security readers to be provided by Owner.
 - b. GWorld Card Reader: The insertion of magnetic card reader or indication of a proximity reader card activates the designated floor car call. Pressure on the designated floor car button illuminates and registers a call. The elevator proceeds to the designated floor, completes its operation and awaits next demand.
5. Car Top Inspection Operation: Provide car top controls, lighting and inspection station in accordance with Code requirements.
6. Fire Service Emergency Recall Operation: Provide operation and equipment per Code requirements.
7. Standby Power Panel and Operation:
 - a. Elevator Contractor shall provide all control wiring for automatic emergency power operation of the elevator at contract speed.
 - b. Include all software, relays, auxiliary contacts for emergency operation control as part of the onboard features of the control system.

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- c. Emergency operation shall be arranged such that the elevator system shall receive a signal of loss of normal power at the controller.
 - d. Provide key switch and illuminated "Emergency Power Operation" signal for each elevator at designated landing. Design elevators for emergency operation of one elevator at a time at contract speed. Incorporate main lobby faceplate.
8. Fire Room Annunciator Monitor: Provide the necessary software, communications hardware and associated inter-connections and wiring to allow for the annunciation of the elevators position and status to be transmitted and monitored remotely in the Fire Control Room. Locate all necessary equipment in the Fire Control Room, as required.
 9. Provide elevator control circuitry that automatically shuts off the interior car lighting and fan the elevator is not in use. Control circuitry shall comply with ASME A17.1.

G. DOOR OPENING DEVICES

1. Infrared Reopening Device: Black, fully enclosed device with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to minimum height of 7'-0" above finished floor. De-speed shall prevent doors from closing and reverse doors at normal opening nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open.
2. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time interval (min. 20.0 – 25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.

H. CAR ENCLOSURES

1. Provide manufacturer's standard steel car enclosure with access doors, power door operators, and ventilation.
 - a. Provide standard railings on car tops where required.
2. Materials and Finishes, Passenger and Freight, Typical:
 - a. Subfloor:
 - b. Floor Finish: Agglomerate terrazzo tile or equal hard, highly durable surface
 - c. Wall Panels: Stainless-steel; flush hollow metal construction; fabricated from stainless steel sheet
 - i. Return Panels: Stainless steel cladding
 - ii. Side and Rear Panels:
 - a.) Residence Halls: Patterned stainless steel cladding, Rimex 5-SM or approved equal
 - b.) Academic and Administrative Buildings: Plastic laminate cladding with stainless steel trim and reveals
 - d. Base: Stainless steel
 - e. Car shall be fabricated with recesses and cutouts for signal equipment.

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- f. Car door frame shall be integral with front wall of car.
- g. Doors: Stainless steel; manufacturer's standard
 - i. No. 4, satin, directional polish. Apply directional finishes in long direction of each component
- h. Sills: Extruded metal, with grooved surface, ¼" thick
- i. Ceiling: Stainless steel suspended ceiling with round fluorescent downlights.
- j. Handrails:
 - i. Stainless steel, round tube 1-1/2 inch diameter, with closed ends
 - ii. Provide for rear and side walls
 - iii. Acceptable product and manufacturer: Equivalent to Otis DH 154 by Otis

I. HOISTWAY ENTRANCES

- 1. Hoistway entrance assemblies: Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills and accessories. Frame size and profile shall accommodate hoistway wall construction.
- 2. Entrances shall bear fire labels from a nationally recognized testing laboratory approved within the governing jurisdiction.

J. SIGNALING EQUIPMENT

- 1. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life lamps and acrylic or other permanent, non-yellowing translucent plastic diffusers or LEDs.
- 2. Car Control Stations: Provide manufacturer's standard semi-recessed car-control stations. Mount in return panel adjacent to car door unless otherwise required.
 - a. Mark buttons and switches shall utilize both tactile symbols and Braille.
 - b. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics required per local jurisdiction.
- 3. Emergency Communication System: Two-way voice communication system, vandal-resistant, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- 4. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- 5. Hall Push-Button Push Stations: Provide one hall push-button at each landing.
- 6. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide manufacturer's standard wall-mounted units, for mounting above entrance frames.
- 7. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
 - a. At manufacturer's option, audible signals may be placed on cars.

Comment [nra2]: To be verified.

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8. Hall Position Indicators: Provide illuminated, digital-display-type position indicators, located above each hoistway entrance.
9. Jurisdictional Compliance: Provide all accessories and items required by jurisdiction.

K. PRODUCTS AND MANUFACTURERS

1. General: Acceptable manufacturers must have sales, service, and technical support readily available to the University. Due to issues with quality and technical support for equipment troubleshooting experienced by GW with proprietary equipment and to allow the University to maintain an independent service contractor, specifications shall be non-proprietary equivalent to Motion Control Engineering Inc. (MCE), including, but not limited to, software, tools, manuals, interfaces, etc.
2. Standard of quality for elevators is established by products installed by the following:
 - a. Motion Control Engineering Inc. (MCE) – MRL (machine room-less)
 - b. Avery Elevator Co.
 - c. Delta Elevator Co.
 - d. ELCON Elevator Co.
 - e. Fujitec America, Inc.
 - f. Kone
 - g. Otis Elevator Co.
 - h. Quality Elevator Co.
 - i. Schindler Elevator Co.
 - j. ThyssenKrupp Elevator Co.
 - k. Warfield and Sanford

Comment [nra3]: Charlie James to provide comment on which of these manufacturers are preferred.

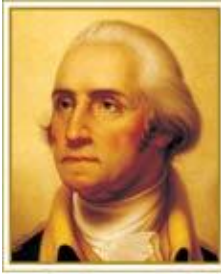
L. DEMONSTRATION

1. A factory-authorized service representative shall train Owner's maintenance personnel to operate, adjust, and maintain elevator (s).
2. Operation of elevator(s) shall be verified with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period. Operation systems and devices shall be determined to be functioning properly.

M. TESTING/COMMISSIONING

1. Require loaded operation of building elevators for 8 hours/day for 4 days in AUTO prior to acceptance.
2. Ensure submittals are reviewed by reliable third party elevator expert.

END OF SECTION



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14560 CHUTES

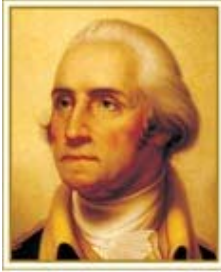
A. SUMMARY

This section contains design standards for trash chutes. See design standards by building type for additional information.

B. GENERAL

1. Trash chute
 - a. Chute opening should be 24" x 24" or 30" diameter; aluminized steel; minimum 16 gage.
 - b. Factory spray chute components with sound dampening material
 - c. Provide fire sprinklers as required per NFPA 13. Sheet metal for chute construction shall overlap from top to bottom such that if sprinklers are set off, water stays within the chute rather than escaping the seams between sections.
 - d. Automatic flush and sanitizing unit shall not be provided.
 - e. A plumbing access door is not required.
2. Intake Doors:
 - a. Manufacturer's standard ASTM A240/A240M, Type 304 stainless steel, self closing units with positive latch and latch handle with 1-1/2 hr fire-rated construction with frame suitable for enclosing chase construction
 - b. Door size and type: 15" W X 18" H, bottom hinged, hopper type
 - c. Finish: Manufacturer's standard stain directional polish finish
3. Discharge:
 - a. Aluminized steel, minimum 16 gage; Type A open end chute discharge rolling steel door with fusible link hold-open on inclined steel track at bottom of chute to close automatically at temperature threshold per code.
 - b. Door size: 26-1/2" X 50-1/2"
4. Roof Vent:
 - a. Provide a relief vent at the top of the chute extending above roof per NFPA and as required per manufacturer's specifications.
 - b. Roof vent shall extend to 48" above roof with full-diameter, screened vent and metal safety cap or glass explosion-release cap.

END OF SECTION



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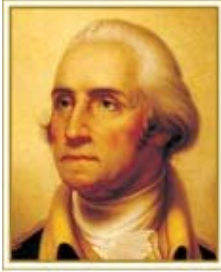
15145 TRAP SEAL PRIMER VALVES

A. GENERAL

Provide MIFAB MR-500 trap seal primer valve or equal in unattended traps where water may otherwise evaporate and allow sewer gas to escape. Floor drains in areas that are not mopped regularly shall have a trap seal primer. Example locations are the following:

1. floor drains in dorm room bathrooms (to prevent problems while students are away, such as summer breaks)
2. area floor drains in mechanical rooms
3. area floor drains in laundry rooms
4. area floor drains in lower levels of parking garages

END OF SECTION



THE GEORGE WASHINGTON UNIVERSITY DESIGN STANDARDS

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15410 PLUMBING FIXTURES

A. SUMMARY

This section contains design standards for plumbing fixtures. Refer to space standards for additional information.

B. EXCEPTIONS TO REQUIREMENTS HEREIN

1. There are retrofit projects where the plumbing fixture standards herein, as well as in the building type standards should not be strictly applied. Different scenarios will require careful analysis as well as approval from the Director of Planning and Environmental Management. The following notes address some of the most common to be encountered:
 - a. Where wall hung toilets are to be replaced, they shall typically be replaced by wall-hung toilets in order to limit the plumbing work required in relocating the waste pipes. Floor-mounted toilets shall also be replaced with floor-mounted toilets for the same reason.
 - b. Existing floor-mounted toilets may be replaced with either flush valve or flapper/tank style toilets, as appropriate.
2. Where new residence hall bathrooms provide three or more toilets, it will often be advisable to install either wall-mounted or floor-mounted flush valve toilets, rather than the tank style required in more typical single-toilet private bathrooms. Flush valve toilets are more durable and capable of withstanding abuse than the residential tank style toilets. Wall-mounted toilets are more difficult to install than floor-mounted, but they offer a valuable housekeeping advantage when cleaning floors.

C. GENERAL

1. Vitreous china fixtures shall be manufacturer's standard white color unless otherwise approved.
2. Faucets, levers, sensors, and the like shall be chrome-plated.
3. Tank style toilets shall have shut-off valves. Shut-off valves shall be operated by a handle and not a key.
 - a. For new construction, rigid supply tubing shall be used for the connection between the stop valve and the toilet fixture.
 - b. For renovation projects, flexible tubing shall be used for the connection between the stop valve and the toilet fixture.

4. When installed with accompanying aerators, flush valves and related components, target water consumption for new construction fixtures are as follows (2008 DC Plumbing Code; EAct 1992; WaterSense limits in parentheses):
 - a. Toilets, residential/tank style: 1.28 gpf (1.28 gpf; 1.6 gpf; 1.28 gpf)
 - b. Toilets, commercial/wall-hung with flushometer: 1.28 gpf (1.6 gpf; 1.6 gpf; N/A)
 - c. Urinals: .125 gpf (.5 gpf; 1.0 gpf; N/A)
 - d. Residential lavatory faucets: .5 gpm (1.5 gpm @ 60psi; 2.2 gpm @ 60psi; 1.5 gpm @ 60 psi max/.8 gpm at 20 psi min)
 - e. Commercial lavatory faucets, metering: .5 gpm (.25 g per cycle; 2.2 gpm @ 60psi; N/A)
Note: IPC and local code may supersede the EAct and WaterSense restrictions.
 - f. Sink faucets: 1.5 gpm (2.2 gpm; 2.5 gpm @ 80 psi; N/A)
 - g. Shower heads: 1.5 gpm (2.0 gpm @ 80psi; 2.5 gpm @ 80 psi; N/A)

D. TOILET, TANK STYLE

1. Water consumption: 1.28 gpf; Material: vitreous china; Bowl Shape: elongated
2. Approved models follow:
 - a. Toto Eco Drake Close Coupled Toilet; Color: #01, Cotton
 - i. Barrier free: CST744EL
 - ii. Typical: CST744E
 - b. American Standard Cadet 3 FloWise Series; Color: White
 - i. Barrier free: American Standard Cadet 3 FloWise, 2832.128
 - ii. Typical: American Standard Cadet 3 FloWise Right Height, 2835.128
 - c. Kohler Cimarron Class 6 Comfort Height; Color: 0, White
 - i. Barrier free and Typical: K-3609
3. Toilet seat: Elongated seat, closed back, closed front, commercial class, solid white polypropylene, with cover, with stainless steel, self-sustaining check hinge.
 - a. Model, or approved equal:
 - i. Church 380TC

E. TOILET, WALL-HUNG

1. Material: vitreous china
2. Color: white
3. Water usage: 1.28 gpf, no exceptions without approval
4. Top spud inlet
5. Bowl Shape: elongated
6. Approved porcelain manufacturers/models, or approved equal:
 - a. Toto USA CT708E
 - b. Kohler Kingston K-4325
 - c. American Standard 3351.128
7. Toilet touchless flush device and valve:
 - a. Provide 1.28 gpf toilet flush valve. Valve shall be quiet, exposed, and suitable for either right or left hand actuator installation.

- b. Provide battery-operated, touchless infrared sensor-activated actuator with manual override
- c. All metallic parts to be chrome plated finish.
- 8. Approved toilet-plus-valve systems follow, or approved equal:
 - a. Toto wall-hung flushometer toilet, model CT708E, with 1.28 gpf Toto EcoPower Sensor High Efficiency Toilet (HET) Flush Valve, piston style, model TET1LN32#CP
 - b. Kohler Kingston K-4325 toilet with 1.28 gpf Kohler K-10673 (“Wave”: touchless manual design) or K-10956 (touchless automatic style) exposed flush valve
 - c. American Standard AfWall FloWise Elongated flushometer toilet, model 3351.128, with 1.28 gpf American Standard Selectronic FloWise Toilet Flush Valve, model 6065.121.002
- 9. Toilet seat: Elongated seat, closed back, open front, commercial class, solid white polypropylene, less cover, with stainless steel, self-sustaining check hinge.
 - a. Model, or approved equal:
 - i. Church 9400C

F. URINAL, WALL-HUNG

- 1. Material: vitreous china
- 2. Color: White
- 3. Water usage: .125 gpf; no exceptions without approval
- 4. Top spud inlet
- 5. Urinal autoflush device and valve:
 - a. Provide .125 gpf urinal flush valve. Valve shall be quiet, exposed, and suitable for either right or left hand actuator installation.
 - b. Provide battery or solar-operated, automatic infrared sensor-activated actuator with manual override
 - c. All metallic parts to be chrome plated finish.
- 6. Approved urinal manufacturers, or approved equal:
 - a. American Standard Washbrook FloWise .125 gpf Ultra High Efficiency Pint Urinal System
 - b. Sloan High Efficiency Urinal System
 - c. Zurn EcoVantage Z5798 (or alternate model from “The Pint” line)

G. LAVATORY FAUCET, TOUCHLESS WITH AUTO-SENSOR

- 1. Cast brass construction, with polished chrome finish
- 2. Touchless, automatic sensor, thermal mixing style
- 3. Flow rate: .5 gpm
- 4. Shall allow setting for automatic cut-off after 10-15 seconds of continuous discharge. Faucet shall also cease discharge within one second of detecting user has moved away.
- 5. Manufacturer’s stated battery life shall be three years, minimum.
- 6. Manufacturer’s warranty shall be a minimum of three years.
- 7. Model, or approved equal:
 - a. Toto Self-Generating EcoPower System Sensor Faucet, standard spout, TEL5LSC-10

- b. Technical Concepts Milano AutoFaucet with Surround Sensor Technology with Technical Concepts part number 401190, .5 gpm vandal-resistant aerator

H. LAVATORY FAUCET, MANUAL OPERATION (RESIDENTIAL USE ONLY)

- 1. Single lever, manual operation
- 2. Cast brass construction, with polished chrome finish
- 3. Maximum flow rate shall be 2.2 gpm
 - a. Provide vandal-resistant .5 gpm aerator
- 4. Style to be 4" centerset, deck-mounted
- 5. Unless otherwise approved by owner, including housing facilities, model to be Moen Chateau ADA Single-Handle Lavatory Faucet, Model L4621. *The Moen 1225 cartridge design of this model is favored by housing facilities for its proven reliability and simplicity of maintenance.*

I. LAVATORY – PUBLIC RESTROOMS (ALL BUILDING TYPES)

- 1. Lavatory shall be wall-hung vitreous china; undermount stainless steel with solid surface counter and back-/side-splashes; or solid surface lavatory top with integral bowl
 - a. Wall-hung vitreous china (Single-Occupant Use)
 - i. Dimensions: approximately 20" L x 18" W; barrier-free depth
 - ii. Provide without integral backsplash (tiled wall is required)
 - iii. Provide without soap bar depression
 - iv. Complete and proper installation is critical for strength and durability, including proper installation of concealed wall hanger on studs.
 - v. Model, or approved equivalent:
 - a.) Kohler Soho wall-mount lavatory, model K-2084-0
Note: Unless otherwise required, faucet will be touchless, requiring only a single hole. In this case a single-hole lavatory is required.
 - b. Stainless steel lavatory
 - i. 20-gauge or better
 - ii. Satin finish
 - iii. Bowl shape: oval
 - iv. Mounting: undercounter (*See space standards for counter information*)
 - v. No faucet holes (works with wall- or counter-mounted faucet); Interior bowl dimensions: 18" L x 13" W; barrier-free depth
 - vi. Model, or approved equivalent:
 - a.) Kohler Rhythm, model K-2602-S
 - c. Lavatory top (Multiple-Occupant Use)
 - i. Solid surface countertop with integral oval bowl, approximately 18" L x 13" W

J. LAVATORY – RESIDENCE HALLS

- 1. PRIVATE bathrooms in residence halls
 - a. Typical units:

K. SHOWERS

1. Shower mixing valve shall be a concealed pressure balancing water mixing valve with a metal single lever handle with chrome finish. Unless approved by Owner, model shall be Powers Series 410, Pressure Balancing Mixing Valves, Type P413 (3 port). Note: for renovation work, Powers P417 (4 port) may be used at existing bathtubs. *These selections have been made to accommodate ease of maintenance and minimizing related water shut-off requirements.*
2. Shower faucet shall be cast brass body. Spray pattern shall be adjustable.
 - a. Typical units: shower head shall be fixed with a ball joint adjuster.
 - b. Barrier free units: shower head shall be hand-held, on a metal hose and on a 24" wall-mounted slide-bar.
3. Shower head shall be 1.5 gpm and chrome finish. Model shall be Niagara Conservation N2915CH or approved equal.
4. Shower enclosures that are supported with a terrazzo base may be considered in special circumstances depending upon project conditions. Confirm with GW.
5. Shower enclosures shall be one-piece, molded fiberglass, smooth wall finish, textured slip-resistant floor finish, center floor drain, with at least two integral soap/shampoo shelves. Bathtubs shall not be provided in new construction.
 - a. Barrier-free: 36" x 60", minimum, with hinged shower seat and grab bars, as required
 - i. Model, or approved equal:
 - a.) Lasco Freedomline 6036-BFSC
 - b.) Lasco Freedomline 6036-CFS
 - b. Typical: 36" x 36", minimum, with 4"-high integral curb, unless removable curb is required for future barrier-free conversion.
 - i. Model, or approved equal:
 - a.) Lasco 1363-C
 - b.) Lasco 1363-CM
 - c.) Lasco 1363-CNT

L. KITCHEN SINK

1. Provide one kitchen sink in each residence hall apartment kitchen or common kitchen, and in each pantry in academic buildings, unless otherwise required. See Kitchen Faucet and Waste Disposal below for additional requirements.
 - a. 18 gauge stainless steel, type 302 or 304.
 - b. Sound dampening must be one of the following or equal:
 - i. Fully undercoated
 - ii. Kohler/Sterling's "Silent Shield" sound-deadening system
 - c. Provide 1- or 3-hole faucet option, centered on sink. Where 1-hole is provided, provide faucet less escutcheon. Where 3-holes are provided, provide escutcheon to match faucet finish.
 - d. 3-1/2" drain opening per bowl, centered
 - e. Mounting: self-rimming
 - f. Depth:
 - i. Typical: 7-1/2" to 9"
 - ii. Barrier-free: 6" to 6-1/2", maximum

- g. Sink(s) to be either single or double bowl. Typically, single bowl is preferred so that required waste disposal is effective in keeping the drain clear of clogs. Provide one of the following:
 - i. Single rectangular bowl; dimensions: 25" x 21"
 - a.) Model, or approved equal:
 - Typical: Elkay LR2521; 8" deep
 - Barrier-free: Elkay LRAD2521; 6-1/2" deep
 - ii. Double bowl style, equally-sized bowls; overall dimensions: 29" x 22"
 - a.) Model, or approved equal:
 - Typical: Elkay LR2922; 7-1/2" deep
 - Barrier-free: Elkay LRAD2922; 6-1/2" deep

M. KITCHEN FAUCET

- 1. Sink Faucet, all but common or private student kitchens
 - a. Chromium-plated cast brass kitchen-style faucet
 - b. Barrier-free lever style handle with pull-out sprayer. No side sprayers should be provided.
 - c. Deck mount
 - d. Maximum faucet flow rate 2.2 gpm
 - i. Provide vandal-resistant 1.5 gpm aerator
 - e. Model, or approved equal:
 - i. Moen 87316C
 - ii. Kohler Forte K-10433
 - iii. American Standard Reliant 4205.100.002
- 2. Sink Faucet, Common or Private Kitchens in Residence Halls
 - a. Chromium-plated cast brass kitchen-style faucet
 - b. Barrier-free lever style handle without sprayer.
 - c. Deck mount
 - d. Maximum flow rate 2.2 gpm
 - i. Provide vandal-resistant 1.5 gpm aerator
 - e. Model, or approved equal:
 - i. Moen 7425

Note: At this time, the only exceptions that will be considered are similar Moen faucets using the 1225 cartridge or other faucets where the case can be made that the simplicity and reliability of the Moen faucets can be matched. Owner approval must include Facilities Management plumbing personnel.

N. WASTE DISPOSAL

- 1. Provide one waste disposal at every kitchen sink unless otherwise required.
- 2. Model, or approved equal:
 - a. InSinkErator Badger 5XP (3/4 hp)

O. SERVICE BASIN, FAUCET, AND MOP HANGER

- 1. Service Basin
 - a. Shape: Square

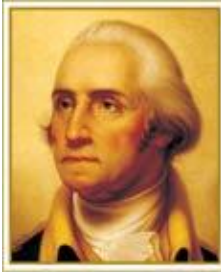
- b. Material: terrazzo or approved equal
Note: plastics are not acceptable due to housekeeping issues.
 - c. Size: 24" x 24"
 - d. Depth: 6" – 10"
 - e. Mounting: floor
 - f. Drain: removable stainless steel combination dome strainer with lint basket; NP3 outlet
 - g. Approved manufacturers:
 - i. Crane Plumbing / Fiat Products
 - ii. Florestone Products Co.
 - iii. Stern-Williams Co., Inc.
 - iv. Acorn Engineering Co.
2. Service Faucet
- a. Wall-mounted, chromium-plated faucet with integral stops, vacuum break, runner hose, bucket/pail hook, and wall hook.
 - b. Approved products:
 - i. Delta 28T9 and 28T911
 - ii. Fiat 830-AA
 - iii. Florestone MR-371 and MR-370
 - iv. Moen 8124
 - v. Stern-Williams T-15-VB and T-35
3. Mop Hanger
- a. 24" long x 3" wide
 - b. 18-gauge stainless steel
 - c. Approved products, or equal:
 - i. Delta 28T910
 - ii. Fiat 889-CC
 - iii. Florestone MR-372
 - iv. Stern-Williams T-40

P. LAUNDRY TRAY

- 1. Description: Stand-mounting, plastic laundry tray
 - a. Size: 20 ¼" X 17 ¼" X 13 inches
 - b. Color: White
 - c. Supplies: NPS ½ chrome-plated copper with stops
 - d. Drain: Grid with NPS 1-1/2 outlet
 - e. Drain Piping: NPS 1-1/2" chrome-plated, cast brass P-trap; 0.045 inch thick tubular brass waste to wall; and wall escutcheon
 - f. Stand: White baked enamel, angle legs
 - g. Subject to compliance with requirements, provide a product by one of the following manufacturers:
 - i. Crane Plumbing, L.L.C./Fiat Products
 - ii. Florestone Products Co., Inc.
 - iii. Gerber Plumbing Fixtures LLC
 - iv. Mustee, E.L. & Sons, Inc.
 - v. Swan Corporation
 - vi. Zurn Plumbing Products Group., Light Commercial Operation
- 2. Laundry Tray Faucet: Include hot- and cold- water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture

- a. Body Material: Commercial, solid brass
- b. Finish: Polished chrome plate
- c. Maximum Flow Rate: 2.5 gpm
- d. Mixing Valve: Two-lever handle
- e. Backflow Protection Device for Hose Outlet: Required
- f. Backflow Protection Device for Side Spray: Required
- g. Mounting: Deck, concealed
- h. Handle: Lever
- i. Spout Type: Swing, round tubular
- j. Spout Outlet: Aerator
- k. Operation: Compression, manual
- l. Subject to compliance with requirements, provide a product by one of the following manufacturers:
 - i. Bradley Corporation
 - ii. Chicago Faucets
 - iii. Delta Faucet Company
 - iv. Elkay Manufacturing Co.
 - v. Fisher Manufacturing Co.
 - vi. Grohe America, Inc.
 - vii. Kohler Co.
 - viii. Moen, Inc.
 - ix. Royal Brass Mfg. Co.
 - x. Sayco; A Briggs Plumbing Products, Inc. Co
 - xi. Speakman Company
 - xii. T&S Brass and Bronze Works, Inc.
 - xiii. Zurn Plumbing Products Group; Commercial Brass Operation

END OF SECTION



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15415 DRINKING FOUNTAINS

A. SUMMARY

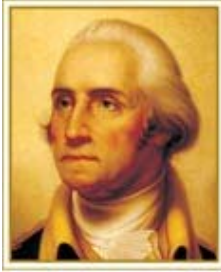
This section contains design standards for drinking fountains. Refer to space standards for additional information.

B. DRINKING FOUNTAINS

1. General:
 - a. Drinking fountains shall not deliver electrically refrigerated water (water cooler). They shall be provided in hi-lo pairs, one of which is barrier-free.
 - b. There are two standard University approaches for drinking fountains, each suitable for different applications:
 - i. Fountain with integrated glass/bottle filler
 - ii. Fountain with sculpted bowls co-located with in-wall recessed bottle filling station
2. Fountain with Integrated Glass/Bottle Filler Requirements
 - a. Controls: manual
 - b. Finish: polished or satin stainless steel or polished chrome, to complement the surrounding finishes
 - c. Mounting: wall
 - d. Bubbler: polished chrome-plated brass. Flexible bubbler guard is preferred, but not required.
 - e. Provide stainless steel back plate to protect wall from water splash damage where appropriate
 - f. Approved model, or approved equal:
 - i. Elkay Soft Sides EDFP217C with Glass Filler LK1110 or co-locate with a separate bottle filling station EZH20 In-Wall Kit, LZWSMDK (Refer to Section #4)
3. Fountain with Sculpted Bowls Requirements (pair with glass/bottle filling station – refer to Section #4 for glass/bottle filling station information)
 - a. Controls: manual
 - b. Finish: polished or satin stainless steel or polished chrome, to complement the surrounding finishes
 - c. Basin: round or oval sculptured
 - d. Mounting: wall
 - e. Bubbler: polished chrome-plated brass. Flexible bubbler guard is preferred, but not required.

- f. Provide stainless steel back plate to protect wall from water splash damage where appropriate
- g. Approved models, or approved equal:
 - i. 1011 by Haws Corporation
 - ii. OVL II Series by Halsey Taylor
 - iii. Radii Series by Oasis or Sunroc, subsidiaries of Tri Palm International, Columbus, OH
- 4. Bottle Filling Station
 - a. Bottle filling station shall be in-wall recessed and non-refrigerated option.
 - b. Approved models, or approved equal:
 - i. HTHB-LR Hydroboost Bottle Filling Station by Halsey Taylor
 - ii. EZH20 In-Wall Kit, LZWSMDK by Elkay

END OF SECTION



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15900

HVAC INSTRUMENTATION AND CONTROLS

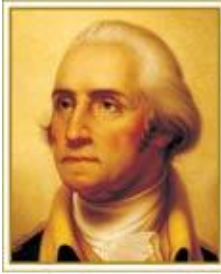
A. SUMMARY

This section contains design standards for HVAC control systems. Refer to space standards for additional information.

B. GENERAL

Energy efficiency is among the highest priorities at the University. Consultants shall always strive to achieve the highest energy efficiency possible within the parameters of campus security, project budget and function. Selection of HVAC systems shall always reflect this priority. Additionally, consultant shall give strong consideration to providing occupancy sensor-based HVAC controls. In other words, spaces such as dormitory rooms and private offices are typically provided with individual thermostats for occupant comfort. Consultant shall pursue systems that allow setback thresholds when the space is not occupied, with full comfort levels achieved upon occupancy. If it is possible and cost effective to coordinate this occupancy sensor approach with that for lighting controls, that is also encouraged.

END OF SECTION



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16500 LIGHTING

A. SUMMARY

This section contains design standards for lamps and fixtures. Refer to space standards for additional information.

B. GENERAL

1. Special consideration to maintenance access shall always be given. This includes ensuring fixtures can be reached via practical measures for routine lamp and ballast replacement.
2. In order to facilitate servicing, recessed “can” compact fluorescent light fixtures shall be of a design where the ballast is not remote from the lamp. Maintenance staff has undue difficulty replacing ballasts when they are remote.
3. For interior application, ceiling-mounted light fixtures are generally preferred, but wall-mounted are acceptable as appropriate to the design.
4. Light levels shall comply with Illuminating Engineering Society of North America (IESNA) current recommendations. Examples of current IESNA lighting levels include: a) offices, classrooms, and laboratories: 30 -50 foot candles (depending on specific work tasks) on desks and table tops; b) hallways: 5 -8 foot candles; c) stairwells: 5-8 foot candles; d) restrooms: 5-8 foot candles. Refer to the most current issue of the IESNA Lighting Handbook to verify required illumination levels.
5. Lighting power densities shall be based on ASHRAE/IES 90.1 current edition. Individual rooms may exceed the target lighting power density values as long as the total connected lighting load for the building does not exceed the total lighting allowance for the building as outlined in ASHRAE/IES 90.1. To assist with LEED energy conservation goals, architect shall strive to exceed ASHRAE/IES guidelines.
6. For ease of maintenance and lamp storage requirements, the lighting design shall utilize a minimum number of different lamp and fixture types to meet space and program requirements.
7. Program-start type ballasts shall be utilized.
8. Installation:
 - a. All ceiling fixtures to be independently supported off the drop ceiling grid by hanger wire securely fastened to the building structure and the fixture in at least two opposite corners.

C. INTERIOR LAMPS

1. The University maintenance department stocks the lamps noted below. Fixtures requiring alternate lamps shall not be provided unless specifically approved in writing by the Owner.
2. Interior lamps for new construction shall have the following properties:
 - a. Color: 4100K, cool white
 - b. Low mercury
 - c. Conform to one of the sets of standards in the chart below:

Interior Fluorescent Lamp Schedule				
W	Desc.	CRI	Rated Life, Hours (min)	Length (in.) or base
17W	T8	80-85	24,000	24" or 48" / 2-pin
25W	T8	80-85	24,000	24" or 48" / 2-pin
28W	T8	80-85	24,000	24" or 48" / 2-pin
32W	T8	80-85	24,000	24" or 48" / 2-pin
TBD	T5 twin ¹	80-85	24,000	22.5" / 2G11
13W	CFL ²	78-85	10,000	4-pin
26W	CFL ²	78-85	10,000	4-pin

Notes:

1. **The T5 twin lamp is to be used only in special circumstances to be approved by GW.** This lamp style is sometimes referred to as a "40/30" or "Biax". It is not commonly thought of as a T5, though it technically is one. A sample model of this lamp style is GE F40/30BX/SPX41.
2. For CFLs, coordinate lamp selection with fixture to ensure lamp length is appropriate to the fixture. For dimming applications, 4-pin base CFL or 2-pin T8 lamps shall be used. Ensure that specifications for the lamp, ballast, and controls of the dimming system are compatible.
3. The University is phasing out U-lamp type fixtures.

3. Consider incorporating LED lighting for accent or specialty applications or in locations where technology can be appropriately applied and where budget allows. LED driver to be located within luminaire or within plug.

D. OUTDOOR LIGHTING

1. Fixtures shall be low intensity, shielded, full cut-off fixtures to prevent light spill over to adjacent properties and to prevent any illumination projection skyward. Minimize use of non-essential lighting for landscape and architectural purposes.

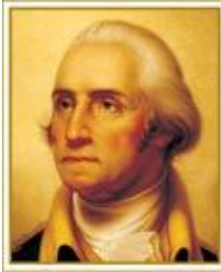
E. PARKING GARAGE LIGHTING

1. Lighting Requirements:
 - a. Light levels shall comply with IESNA G-1-03 Guideline on Security Lighting publication. Minimum lighting levels of 5 footcandles shall be provided in gathering areas such as stairs, elevators and ramps while 6 footcandles shall

be provided on pavement. Walkways around garages shall have a 5 footcandle range. Entrances shall have 10 footcandles of lighting or twice the level of lighting in the surrounding area to make it stand out and increase visibility.

2. Products:
 - a. Provide vapor tight fixtures as required to achieve target illumination level.
 - i. Housing: all aluminum; non-rusting
 - ii. Reflector: white glossy enamel paint or equivalent
 - iii. Electronic Ballast: High Output
 - iv. Battery back-up is not required. Lighting is connected to emergency power.
 - v. Consultant is asked to consider the following two illumination approaches:
 - a.) 2-lamp fixtures used with a bare concrete ceiling and, thus, not dependent on reflection from the ceiling
 - b.) 3-lamp fixtures with white-painted ceiling, allowing reflection of light from the ceiling and, thus, a smaller number of fixtures than as required by 2-lamp fixtures
 - vi. Model, or approved equal:
 - a.) 2-lamp configuration
 - b.) VCT-23248-WA-H by US Energy Sciences
 - c.) 3-lamp configuration
 - d.) VCT-33248-WA-H by US Energy Sciences
 - b. Lamps:
 - i. 32 watt T8 (28 watt T8 is also acceptable)
 - ii. Length: 48"
 - iii. Cool White (4100 K)
 - c. Design to withstand temperature of 32 degrees Fahrenheit or higher when garage is below grade. Lamps may be required to withstand lower temperatures for open, exposed, above-grade parking structures.

END OF SECTION



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16570 LIGHTING CONTROLS

A. SUMMARY

This section contains design standards for lighting control systems. Refer to space standards for additional information.

B. GENERAL

Energy efficiency is among the highest priorities at the University. Consultants shall always strive to achieve the highest energy efficiency possible within the parameters of campus security, project budget and function. Selection of occupancy sensors, photo cells, and other lighting controls shall reflect this priority. Where manual override is provided, a device that returns to its automated settings after a pre-determined time period of space vacancy is preferred.

C. EXTERIOR LIGHTING CONTROL

1. The University prefers Intermatic K4200 Stem and Swivel Mounting series photo cells for exterior lighting control, for its durability.
2. The photocell mounting location should be conducive to maintenance access.

D. INTERIOR LIGHTING CONTROLS

1. Time Switch
 - a. Timers shall generally be provided in large mechanical spaces and storage spaces with large obstructions. Emergency lighting that allows for safe exiting shall always be provided in the event that general lighting switches off with an occupant inside.
 - b. Timer shall have settings for flashing the room lights and making an audible noise well before lights time out to give occupants a chance to reset the timer or safely exit the space.
 - c. Typical timer model, or approved equal by Hubbell, Intermatic, or Sensor Switch:
 - i. Watt Stopper TS-400
2. Interior Occupancy Sensors
 - a. Manufacturers and technologies to use at the University
 - i. Three basic occupancy sensing technologies:
 - a.) Passive infrared (PIR): senses motion by tracking body heat

- b.) Ultrasonic (US): responds to changes in sound waves emitted and returned to the sensor device, due to motion or vibration
- c.) Microphonics (MP; trademarked microphonic technology by Sensor Switch only): responds directly and solely to perceived sound
- ii. Technology combinations currently available by the following three approved manufacturers for commercial grade wall- and ceiling-mounted occupancy sensors:
 - a.) **Watt Stopper**: PIR only; US only; dual technology (PIR and US)
 - b.) **Hubbell**: PIR only; US only; dual technology (PIR and US)
 - c.) **Sensor Switch**: PIR only; dual technology (PIR and MP)
- b. Sensors to provide an adjustment range of approximately five to twenty minutes, energizing lights for the set time period after sensing the presence of an occupant.
- c. Select and locate sensors to avoid false triggers.
- d. The chart below outlines general University occupancy sensor guidelines for new construction. Similar strategies are appropriate for renovations, but are dependent on current wiring design. The designer must coordinate this information with the balance of the standards, including standard lamps and space-specific lighting requirements. Note that wherever a wall-mount sensor is noted, it may instead be a ceiling-mount sensor if appropriate and cost effective. However, the reverse is not true. Ceiling mounts are more tamper-proof than wall-mounts and are necessary in many spaces. Also note that the Suggested Solutions noted below are a minimum threshold. Therefore, if a single technology is noted, but dual technology is warranted and approved in a specific space, it will be acceptable.

Space Function	Notes	Suggested Solution
		<i>US=Ultrasonic</i>
		<i>PIR=Passive Infrared</i>
		<i>MP=Microphonics</i>
		<i>DT=Dual Technology</i>
Breakout Room / Conference Room / Seminar Room / Study Room	Small space	DT Wall-mount with manual on/off switch
	Large space	DT Ceiling-mount with manual on/auto off switch
Classroom	Multiple uses, such as	DT (provide with light

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	chalk or white board, projector use, note-taking, class presentations	level sensor and/or photo cell in spaces with abundant natural light)
		Ceiling-mount with manual on/auto off switch
Computer Lab	Lights are typically on when space is in use	DT (PIR and US)
		Ceiling-mount with manual on/auto off switch
Dining Spaces, Public		DT
		Ceiling-mount
Electrical Room / Mechanical Room	Large space, where occupant may be out of view from various points in the space, due to obstructions	Timed switch with both audible and visual warning before timing out.
Telecom Room/ Security Room	Small, generally unobstructed space	PIR
		Wall-mount
Gymnasium or Fitness Center	Constant movement in space	DT (provide with light level sensor and/or photo cell in spaces with abundant natural light)
		Ceiling-mount
Hallways and Corridors, Residential and Academic ¹	Occupants passing through, creating constant movement	DT
		Ceiling-mount
Health Care Exam Rooms		DT
		Wall-mount
Housekeeping closet	Small, unobstructed space	PIR
		Wall-mount

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Laundry Room, shared	Large open room with frequent noises, even when unoccupied	US or DT (PIR and US)
		Ceiling-mount
Library Reading Areas		DT (PIR and US)
		Ceiling-mount
Library Stacks		DT (PIR and US)
		Ceiling mount
Lobby		PIR – where installed, but installation is space-dependent
		Ceiling mount
Locker Room / Restroom, Public	Single-Occupant	DT
		Wall-mount
	Multiple-occupants, partitioned	DT
		Ceiling-mount
Mail Room	Enclosed space	DT
		Wall-mount
	Open or undefined space	Space-dependent
		Ceiling-mount
Media-Rich Space	Space where media noise from television, radio or similar is played, whether occupied or not	DT (PIR and US)
		Ceiling mount
Office, Open	Partitioned work stations	DT (PIR and US)
		Ceiling-mount

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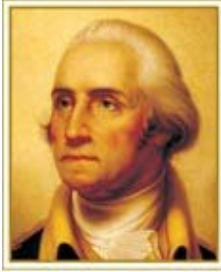
Office, Private	Available natural or borrowed light	PIR with light level sensor and/or photocell and manual on/auto off switch
		Wall-mount
	No alternate light source available	PIR with manual on/auto off switch
		Wall-mount
Pantry	Shared kitchen area	PIR
		Wall-mount
Residence Hall Apartments	Kitchen	DT
		Wall-mount
Reception Areas		DT
		Ceiling-mount
Storage	Large space, where occupant may be out of view from various points in the space, due to obstructions	US
		Ceiling -mount
	Small, generally unobstructed space	PIR
		Wall-mount
Work Room	Open area; Shared copy, files, and similar work space	PIR
		Wall-mount
	Partitioned space	DT
		Wall-mount

Note:

- Occupancy sensors shall not be provided in hallways and corridors of freshman residence halls.

3. Ballast Type
Program-start type ballasts shall be used for lighting controlled via occupancy sensor.
4. Photo Cells
Where a space is appropriate in terms of cost and function for lighting control via the use of photo cells, such practice is encouraged. Photo cells may be incorporated into an occupancy sensor, or provided as a separate item. They prevent lights from being on, even when the space is occupied, when there is enough daylight or borrowed light from adjacent spaces for the space's intended function. Timer controls have historically been unsuccessful at The University due to afterhours housekeeping staff schedules.
5. Space-Specific Lighting Controls
 - a. Classrooms, Conference Rooms, Seminar Rooms (capacity greater than 10)
 - i. Provide ceiling-mounted, dual technology occupancy sensors.
 - ii. Provide means to control the front row of light independently from general room lighting. Front row of light shall also illuminate the teaching wall area.
 - iii. Override switches on the wall should provide the instructor with the ability to reduce lighting levels to 50% or off, when the room needs to be darkened for presentations. This should be achieved by controlling a row or two of lights at a time rather than a checkerboard pattern, such as darkening the last two rows of lights in the room.
 - b. Private Offices
 - i. Provide ceiling-mounted light fixtures.
 - ii. Provide fixtures and controls that accommodate reduced light level as desired or when additional light source is available. Occupancy sensors with manual override shall always be provided.
 - c. Large public or semi-public rooms; such as Lounges, Reception Areas, Libraries
 - i. Lights shall be circuited to allow 50% reduction of lighting level, uniformly across the space.
 - ii. Lights shall be controlled by either wall or key switches:
 - a.) Wall switches must be mounted in locations not readily accessible to the general public.
 - b.) Key switches must be mounted in readily accessible locations.
 - c.) Provide 2-prong key switches in Residence Halls.

END OF SECTION



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16700

DIGITAL SIGNAGE BY OWNER (PROVIDED FOR INFORMATION ONLY)

A. SUMMARY

This section contains general standards for digital signage displays.

B. GENERAL

1. Content displays shall be LCD (plasma displays are prone to burn-in with static content).
2. Displays are required to support a 720P (1366 X768) resolution.
3. Content Management uses a software application called CoolSign which facilitates content manipulation, remote uploads, timing sequences, etc.
4. All digital signs must be connected to a PC (usually a small form factor) to run the CoolSign software. A dedicated network drop and power outlet is required near a sign.
5. PCs are typically mounted behind the signs. Other implementations can be considered if there is conduit running from the sign to the PC location. It is preferred that the PC and sign locations are close to each other.
6. Mounting details shall be specific to the size of the display and implementation of where it is to be used.
7. Displays should be “pro” models and not “consumer” grade models.
 - a. Acceptable Manufacturer and Product:
 - i. Samsung DX by Samsung

END OF SECTION