General

Welcome

The Facilities Design Standard (FDS) is a collaboration between UW Facilities and various campus Process Partners, and it is intended for use by design, construction, and maintenance professionals to facilitate the design, construction, and maintenance of University facilities and assets. These standards represent proven systems that are based on life cycle cost analysis, and provide functional facilities and systems that satisfy the University's Best Practice requirements for efficient operation and maintenance.

These design standards and standard specifications are to be adhered to and incorporated into all project and maintenance contracts, for all types of contract delivery methods. Any deviations to these standards shall be vetted through a documented resolution process, prior to the completion of project design documents or maintenance contracts.

FDS Organization and Use

Each FDS section contains Design and Standard Drawing concepts; standard specifications are included when a specific system and/or product is preferred because of spare parts inventories, prior experiences of the University, staff training on sophisticated equipment and/or to match existing systems, just to name a few. Standard Detail Drawings are intended to be used as shown or with slight modifications, modifications should be reviewed with the University Representative or Engineering Services prior to implementing. Implementation of the FDS is a collaborative process where flexibility, openness, and forward thinking are encouraged.

FDS Disclaimer

These standards are not intended to replace codes, other design standards, the services of a professional design team, or professional design analyses. Consultants shall conduct their own independent evaluations and are liable for the final design. This document is copyrighted by the University of Washington. Use of this document for University of Washington official business is permitted, contact Engineering Services to request approval for any other purposes. Do not reproduce any part of this document that contains the University name or logo.

Sustainability

The University of Washington is a leader in sustainability and committed to implementing best practices through environmentally responsible construction for every new building and major

capital renovation, projects greater than $5M. The UW Green Building Standard was established and following performance requirements were developed for the facilities.

- LEED Gold certified is the minimum target using the most current LEED standard.
- Design to reduce energy use with a minimum threshold of 15% more efficient than local city code.
- Using current code as a baseline, design to achieve at least 50% reduction for indoor and outdoor potable water use.
- Additional energy performance criteria can be found under the Energy Conservation and other discipline sections of the Design Standard.

The University is committed to sustainability at a leadership and policy level as stated in the following -

- Climate Action Plan, 2009
- Executive Order No.13, 2012
- Campus Master Plan, 2019
- Sustainability Action Plan 2020
- STARS Reporting Ongoing *(developed by the national Association for the Advancement of Sustainability in Higher Education)*

The State of Washington established greenhouse gas (GHG) emission reduction goals for state agencies and requires GHG reduction by 15% from 2005 levels by 2020; and reduction by 45% from 2005 levels by 2030. The University also participates in, or is a member of a variety of organizations. Please refer to the following website for more information: https://green.uw.edu/dashboard/awards, which design should take into consideration. For more information about what organizations' designs should be in alignment, please contact UW Sustainability (sustainability@uw.edu), or a University Representative.

Record Drawings

The University maintains a record drawing system, the Facilities Information Library (F.I.L.), that documents the overall utilities, as-built drawings of the individual systems, and building connection points, just to name a few. This record drawing library can be accessed online, and access to this system is granted through the UW Project Manager for the duration of individual projects. The website has many helpful how-to documents, including a document contained in Section G4 of the online help system within F.I.L. that has hyperlinks to the most common and the most up-to-date record drawings.

Engineering Services can assist with navigation of F.I.L. once full access is granted. Contact the UW PM for access rights to the drawings needed.

Utility Locates

All projects are to include drawing and specification notes to indicate that the Contractor shall notify the Utility Notification Center (811) at least two (2) to ten (10) full working days before digging. Note that the University maintains records online for designers to research the University utility system at their leisure and generally from their office. This is intended to limit the use of the 811 system for design purposes. See the "record drawings" section for an explanation of this system and how to gain access.

Coordination

The Design Standard has been organized by discipline and responsible department in an effort to aid the Design Professionals with implementing the University's performance criteria into the project. There may be times where the information one is seeking is not in an area you might suspect - please review all sections.

Closeout Documents

At the end of a project ensure that the documents on the Project Closeout Documents Checklist are submitted within one month of substantial completion.

Organization of the UW Design Standard

Facilities

- Engineering Services working with Central Utilities and Operations
    - Civil
    - Architectural
    - Structural
    - Mechanical
    - Electrical
    - Conveyance
    - Tunnels
    - CAD and BIM Standards
- Building Maintenance Services
- Campus Automated Access System CAAMS
- Space Guidelines
- Sustainability
- Exterior Improvements
- Transportation

Additional University Design Standards

1. Academic Technologies Audiovisual Systems Integration
2. Classroom Support Services design guide
3. Environmental Health & Safety Facility design guides (including fire safety, lab safety, safe access, environmental protection, hazardous materials, and more)
4. Police Department Risk Mitigation & Security Services
5. Emergency classroom locking devices (ECLD)
6. UW-IT Design Guide

UW Locations

1. Bothell
2. Tacoma

Revision History

Design Information

1. Facilities Design Information 1970
2. Facilities Design Information 2007
3. Facilities Services Design Guide 2012-2018
4. Facilities Design Standard 2020

Requirements Common to All Disciplines

A. Equity

1. **Accessibility and ADA Compliance**

   Contact Engineering Services Architect

2. **IT Accessibility**
3. **Gender Neutral**

   Contact Engineering Services Architect

B. Coordination

The following are some common examples of coordination needs on a project. Please note that this list is not exhaustive, and Design and Construction Professionals shall evaluate what types of coordination may be needed on a project during the design and construction phases.

1. **Architectural with All Trades:** e.g. envelope details and repair/replacement strategy; curtain walls containing electrical / mechanical equipment; provide base line for the City of Seattle (COS) Building Tune-Up Ordinance
2. **Structural with All Trades:** e.g.: penetrations of structural components by other trades; fall protection; roof hoist for buildings without elevators; equipment ramps for curbs on roofs
3. **Civil and Mechanical:** e.g.: backwater valve required due to height of next upstream manhole; point of connection elevations for water, storm and fire protection testing
4. **Civil and Electrical:** e.g.: exterior gravity drainage for site features that may transmit water into a building or downstream devices
5. **Mechanical and Electrical:** e.g. short-circuit current ampacity rating of mechanical equipment; sizing of transformers serving devices commanded to start at the same time by building automation system; specialty fire protection systems; harmonic mitigation for systems with vfds; floor drainage/protection for electrical rooms that may be compromised by mechanical system leakage; permanent wiring labeling; metering system accuracy from field device to the Smart Metering cloud
6. **Internet of Things (IOT):** Record all systems that collect data. Evaluate: storage location; data collection devices; storage amount required; responsible party for maintenance.

C. Preferred Vendor List

The latest technologies generate numerous options, many levels of sophistication and life cycle limitations. In order to predict service expectations for equipment and continuing education, Engineering Services has summarized a Preferred Vendors and Products list. Refer to the sections below.

Architectural

Electrical

Mechanical

Exterior Improvements

Environmental Health & Safety

D. On Which Systems Must You Train Us?

The following are some common examples of coordination needs on a project. Please note that this list is not exhaustive, and Design and Construction Professionals shall evaluate what types of coordination may be needed on a project during the design and construction phases.

1. Worker Safety

a. Access for equipment above fixed equipment/furniture – demonstrate with equipment used for installation.
b. Contractor Lockout Tagout Procedures
c. Removal of large or heavy equipment through designed pathways.
d. Sampling of structural design elements – e.g. removal of rooftop membrane and heavy equipment mounted on the roof; fall protection pull test; fall protection means for future PV installations.

2. Equipment

a. Demonstrate equipment location as-builts – fire dampers; room lighting controllers; critical BAS sensors
b. Demonstrate baseline Building Tune-Up verification.
c. Building Automation System
d. Lighting Control System

E. What We Expect for System Redundancies

1. Research Buildings

a. Redundant mechanical and electrical equipment

b. Redundant sources to meet UW lockout / tagout requirements

2. Classroom / Office Buildings

a. Ability to meet mechanical and electrical programming needs for each department.
b. Redundant sources to meet UW lockout / tagout requirements

Preferred Vendors and Products - Architectural

Product	Manufacturer A	Manufacturer B	Manufacturer C	Manufacturer D	Remarks
Masonry Repair Anchors	Helifix	Blok-Lok	Simpson Strong Tie		No Substitutions / Or approved equal for helical stainless steel anchor only.
Wedge anchors	Heckman				No Substitutions / Or approved equal for galvanized steel wedge anchor only.
Wall Ties	Dur-O-Wall	Homann & Barnard			No Substitutions / Or approved equal for adjustible, two-piece, stainless steel anchor only.
Flexable Flashing	W. R. Grace	Henry			No Substitutions / Or approved equal for self-adhesive sheet flashing only.
Damp Proofing	Sonoborne	Karnak	W. R. Meadows, Inc.		Or approved equal.
Sealers	ProSoCo				No Substitutions / Or approved equal for solvent-borne siloxane sealer only.
Sheathing	Densglas				Or approved equal.
Water Barrier	Henry				Or approved equal.
Torch Applied Built-Up Roofing	Siplast	Durbigum			No Substitutions / Or approved equal for mod bit roofing only
Cover Board	USG Securock				No Substitutions / Or approved equal for cement roof board only.
Membrane, Liquid	Hydrotech 6125	Carlisle CCW-500R	American Permaquik		No Substitutions / Or approved equal for hot rubberized asphalt only.
Membrane, Sheet	CETCO Voltex DS				No Substitutions / Or approved equal for self bonding bentonite only.
Damp Proofing	W. R. Grace	Meadows	Karnak		Or approved equal.
Sealers	ProSoCo				Or approved equal.
45, 60 & 90 Minute Doors	Algoma Hardwoods	Eggers Industries	Vancouver Door	VTI Industries	No Substitutions
Cylinders	Medeco				No substitutions
Butts	Stanley	McKinney			Or approved equal.
Electric Transfer Hinge	Von Duprin				Or approved equal.
Key Switch	Von Duprin				Or approved equal.
Exit Device	Von Duprin	Corbin			No Substitutions
Locksets & Latches	Corbin	Schlage	Medeco		No Substitutions
Closers	LCN				No Substitutions
Closer 180°	Norton				No Substitutions
Astragal	Pemko				Or approved equal.
Door Stops	Glen Johnson				Or approved equal.
Push/Pull	Builders Brass				Or approved equal.
Kickplates	Builders Brass				Or approved equal.
Thresholds & Weatherstripping	Pemko				Or approved equal.
Door Operators (ADA)	Record Doors				No Substitutions
Auto-Door Sensors (ADA)	B. E. A.				No Substitutions
Door Actuator (ADA)	Largo				Or approved equal.
Door Position Switch (CAAMS)	Sentrol				Or approved equal.
Door Holders	Rixon				Or approved equal.

Preferred Vendors and Products - Architectural

Product	Manufacturer A	Manufacturer B	Manufacturer C	Manufacturer D	Remarks
Floor Leveling Compoound	Ardex				Or approved equal.
Fire Extinguisher	Amerex	J. L. Industries	Larsen		No Substitutions
FE Cabinet	J. L. Industries	Larsen			No Substitutions
CAAMS Micro Control Panel	Casi-Rusco				No Substitutions
Input/Output Modules	Casi-Rusco				No Substitutions
Card Reader	Casi-Rusco				No Substitutions
Power Supply	Alarm-Saf				Or approved equal.
CAAMS Contractor/GE/UTC Picture Perfect	RFI Electronics				No Substitutions
Keys	Chicago Lock				No Substitutions
Governor	Hollister - Whitney				No Substitutions
Car Exhaust Fan	Nylube				Or approved equal.
Operating Panel	EPCO				No Substitutions
Telephone Cabinet	Ramtel Corp. (model RR733-942M)				No Substitutions
Intercom	J. Phillips LLC				Or approved equal.
Emergency Car Lighting	Nylube (mod EL-SS)				No Substitutions
Alarm Bell	Nylube (model ELB-6)				No Substitutions
Solid-State Power Supply	Motion Control E.S.				No Substitutions
Harmonic Filter	Myron Zucker Co				Or approved equal.
(Electric Traction Elev) Solid State Power Supply and Logic Control	I-Box Motion Control engineering System 12	CEC/Swift Futura	O.Thompson Ultra 2000		No Substitutions
(Hydraulic Elevators) Solid State Logic Control	Motion Control E.S. PHC 1000	O. Thompson Microflight Series 90 2000-H			No Substitutions
Hall Buttons	EPCO				No Substitutions
Car Direction Lantern & Sound Signals	C. E. Electronics				No Substitutions
Hall Direction Lantern & Sound Signals	C. E. Electronics				No Substitutions
Door Hangers and Tracks	MAC	GAL			Or approved equal.
Door Operators	MAC	GAL			Or approved equal.
Door Edge Protective Device	Janus Elev Products				Or approved equal.
Hoistway Access Switch	EPCO				No Substitutions
Custodial hardware	Bobrick				

Preferred Vendors and Products - Electrical

Product	Manufacturer A	Manufacturer B	Manufacturer C	Manufacturer D	Remarks
CMCS system	Allen Bradley PLC-based	Allen Bradley IAS			No substitutions
generators 175kw and larger	Caterpillar				No substitutions
generators smaller than 175kw	Caterpillar	Onan	Kohler		Or approved equal.
transformers	ABB	Square D	GE	Siemens	Or approved equal.
TV monitor and camera backbox	Steel City #H2-BD-3/4 1 and #2-GC				Or approved equal.
MV connections & terminations	Raychem HVT	3M Quick Term series 5600			Or approved equal.
Splices other than cold shrink	OZ Gedney Series SPKJR	G&W #E74	Adalet 3AS (PLM)		Or approved equal.
MV connections & terminations	3M	Elastimold			Or approved equal.
Approved manufacturers	ASCO-Delta	Russelectric	Cutler Hammer		Or approved equal.
Power circuit breaker	Cutler Hammer Vacuum Breakers (VCP-W) no exceptions				No substitutions
Electrical Vaults	Utility VaultCo	Renton Concrete Products	Fog-tite	Quasizte	Or approved equal.
Primary Switch	S & C				No substitutions
Transformers	ABB	Square D	GE	Siemens	Or approved equal.
Local Data Collection Controller	SEL 3505-3				No substitutions
Service Meter	Electro Industries - Nexus 1262	Electro Industries Shark 270 with V3 switch			No substitutions
Sub-Meter	Electro Industries Shark 200-S	Electro Industries Shark MP200	Eaton PXMP	GE EPM 4600	No substitutions
SCADA - Multi-Channel Isolated Digital I/O Modbus TCP Module	Advantech e.g. ADAM-6050				No substitutions
test block	GE type PK-2 #6422120G3; type PK-2 #6422420G4	Marathon 1500	Buss #15149-3		No substitutions
Switchboards	GE	Siemens	Cutler Hammer		Or approved equal.
Network Relays	Electronic Technology Inc (ETI)	Cutler Hammer MPCV	Other manufacturers shall be approved during the design phase		No substitutions
Breakers	GE MicroVersaTrip PM	CH OPTIM 1050	or approved equal		Or approved equal.

Preferred Vendors and Products - Electrical

Product	Manufacturer A	Manufacturer B	Manufacturer C	Manufacturer D	Remarks
Panelboards	CH	GE	Siemens		Or approved equal.
cabinet locks	Corbin TEU-1	GE 75			Or approved equal.
Transfer switches - for UW Class E1 & E2 emergency services	Russoelectric				No substitutions
Transfer switches - for UW Class E3 & E4 emergency services & outlying campuses	Russoelectric				No substitutions
Features and Accessories part #	18 specific Russelectric Items				No Subsitutions
Switchboards	CH	GE	Siemens		Or approved equal.
					See FSDG Section 15G in "Mechanical" sheet.
Switching Systems					No Subsitutions
Centralized	Creston	Douglas	Lutron		No Subsitutions
Clocks	Simplex cat# 6310-9231				No substitutions
Bells	Simplex cat# 2902-9501 buzzers				No substitutions
Intercom	3M	Pamex	Valcom		Or approved equal.
Nurse call systems	shall match existing and / or approved by UWMC ops & maintenance				No substitutions
Paging	TOA	Dukane			Or approved equal.
Room Control System	AMX				Or approved equal.
audio mixers / ampliers	TOA 900 preferred by classroom services				Or approved equal.
Electrical Engineering Firm for Power System Studies	Power Systems Engineering	Siemens Technical Services	Washington Group International, Inc.	Electrotest Inc.	Or approved equal.
Software for short circuit study	SKM Power Tools for Windows				No substitutions
Software for coordination study	SKM Power Tools for Windows				No substitutions
Electrical Testing Contractor	Siemens Technical Services	Sigma 6	Electrotest, Inc.		Or approved equal.

Preferred Vendors and Products - Mechanical

Product	Manufacturer A	Manufacturer B	Manufacturer C	Remarks
CCW Coils & Heat Exchangers	Delta P Valves			No substitutions
Bypass Relief Valve	Cash Acme	Kunkel		Or approved equal.
Freeze Protection	Dowtherm HD			Or approved equal.
CCW valves	TYCO, Vanessa	Weir, Trientric	QUADAX VALVES Inc.	No substitutions
Steam Valves	TYCO, Vanessa	Weir, Trientric	QUADAX VALVES Inc.	No substitutions
VFDs	Allen Bradeley Powerflex 70	Danfoss VLT 20X	Yaskawa GPD 506	No substitutions
Steam Condensate	Central Station Steam Co. Cadillac Magnetic Flow Meter			No substitutions
CCW BTU	Onicon Inc. System-10	Central Station Steam Co. - Cadillac Heatx-2	Spire Metering Technology - SpireMag T-Mag Full Bore Sensor	No substitutions
CCW Chilled Water Insertion	Onicon Inc. - F-3500	Spire Metering Technology - Spire T-Mag		No substitutions
Deduct Water - Cooling Tower, Grey Water	Badger - ModMAG / Itron comm (tf)			No substitutions
Deduct Water - Irrigation	Sensus - AccuMAG / Itron comm (tf)			
Natural Gas - Main Utility, 2" and Larger	American Meter	Dresser Measurement		
Natural Gas - Main Utility, up to 1.5"	American Meter AL-1000 or approved equal			No substitutions
Natural Gas - Submeter	Onicon Inc. - F-5100 Series	~~Sierra Instruments - Quadra-Therm 640i/780i~~		No substitutions
Water Treatment Controller	Nalco 3DTRASAR			No substitutions
DDC control	Siemens Landis Division	Johnson Controls (Bothell)	Alerton by ATS Automation	Sole sourced/No substitution.
Wall sensors mounting hardware	Allen	Bristol		Or approved equal.
Actuated dampers	American Warming and Ventilation	Ruskin	Greenheck	Or approved equal.
Refrigeration Leak Detection - Control Pnl	Honeywell 301EM control panel			No substitutions
Refrigeration Leak Detection - Control Pnl	Honeywell 301EMRP-20 remote pnl			No substitutions
Refrigeration Leak Detection - Sensor	Honeywell 301IRFS gas detector			No substitutions
Gas Monitors - CO and NO2 sensors for Park	Honeywell E3Point			No substitutions

Preferred Vendors and Products - Exterior Improvements

Product	Manufacturer A	Manufacturer B	Manufacturer C	Remarks
Central Control system	Rainmaster			No substitutions
Controllers	Rainmaster			No substitutions
Controller enclosure Exterior	Strongbox			Or approved equal.
Controller enclosure Interior	PWM			Or approved equal.
Pressure reducing Valves	Watts	Febco		Or approved equal.
Double check valve assembly	Febco	Watts		Or approved equal.
Reduced pressure backflow preventor	Watts			Or approved equal.
Master Valve	Superior			No substitutions
Flow sensors	Rainmaster	Badger/Data Industrial		Or approved equal.
Sub-meters	Sensus accuMag			No substitutions
Zone valves	RainBird			No substitutions
Ball Valves	KBI			Or approved equal.
Pop-Up spray, stream spray, bubbler sprinklers	Rainmaster			No substitutions
Short range sprinklers	Hunter	Toro	MP	Or approved equal.
Medium Range Sprinklers	Hunter	MP	Toro 300	Or approved equal.
Long range sprinklers	Hunter			Or approved equal.
Alternate water delivery	DRIWATER			Or approved equal.
Swing joints 1/2" - 3/4"	Hunter w/ marlex			Or approved equal.
Swing joints 1"	Lasco			Or approved equal.
Quick coupler valves swing joint	Dura			Or approved equal.
Drip Zone filters	Amiad			Or approved equal.
Drip Line	Toro	dripline/microline		Or approved equal.
Air relief valve	AVP			Or approved equal.
Flush Valve	Toro			Or approved equal.
Temp tree driplines	Buckner	Toro		Or approved equal.
Check valves	Hunter			Or approved equal.
In-Line PRV	Rainbird			Or approved equal.
Quick coupler valves	Buckner	Rainbird		Or approved equal.
Shielded flow sensor cable	Rainmaster	Houston Wire		Or approved equal.
Splice Kit	3M			Or approved equal.
Filters, dedicated zone	Amiad			Or approved equal.
Filters, Primary	Amiad			Or approved equal.
Valve Boxes	Carson			Or approved equal.
Drain Valves	RainBird			Or approved equal.
Fire hydrant	Kennedy Model K81A	Mueller Super Centurion 250	Waterous Pacer	No substitutions
Exterior below grade pipe penetrations	Link-Seals			Or approved equal.
Stormwater treatment rechargeable, media-filled cartridges	Contech Engineered Solutions			
Exterior below grade pipe penetrations	Link-Seals			Or approved equal.
Exterior below grade pipe penetrations	Link-Seals			Or approved equal.

Preferred Vendors and Products - EH&S

Product	Manufacturer A	Manufacturer B	Manufacturer C	Manufacturer D	Remarks
Fire Extinguisher	Amerex	J. L. Industries	Larsen		No Substitutions
FE Cabinet	J. L. Industries	Larsen			No Substitutions
Fire Alarm Control Panel (Seattle, Bothell, and Tacoma Campuses)	Simplex 4100U/4100ES				Sole source/No substitutions.
Cabinet locks	Lock & Corbin Cat. #30 Key				No Substitutions
Dry Pipe Valve, size 2-1/2" through 6"	TYCO DPV-1				No Substitutions
Pre-Action Deluge Valve, size 1-1/2" through 8"	TYCO DV-5				No Substitutions
Cabinet locks	Lock & Corbin Cat. #30 Key				No Substitutions
Class II Type A-2	Baker SterilGARDe series	Labconco Logic Series	Nu-Aire LabGard and CellGard Series	Thermo Scientific 1300 series	No substitutions
Class II Type B-1	Baker models NCB-D Series	Nu-Aire NU-427 Series			No Substitutions
Class II Type B-2	Baker BiochemGARDe series	Nu-Aire NU-430 Series			No substitutions
Conventional Flow	Kewaunee Supreme Air	Labconco Protector models	Mott Sigma Pro		No Substitutions
Low Flow	Kewaunee Supreme Air LV	Labconco Xstream			No Substitutions