WASHINGTON STATE UNIVERSITY

TECHNOLOGY INFRASTRUCTURE DESIGN GUIDE

June 24, 2015

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1 Preface

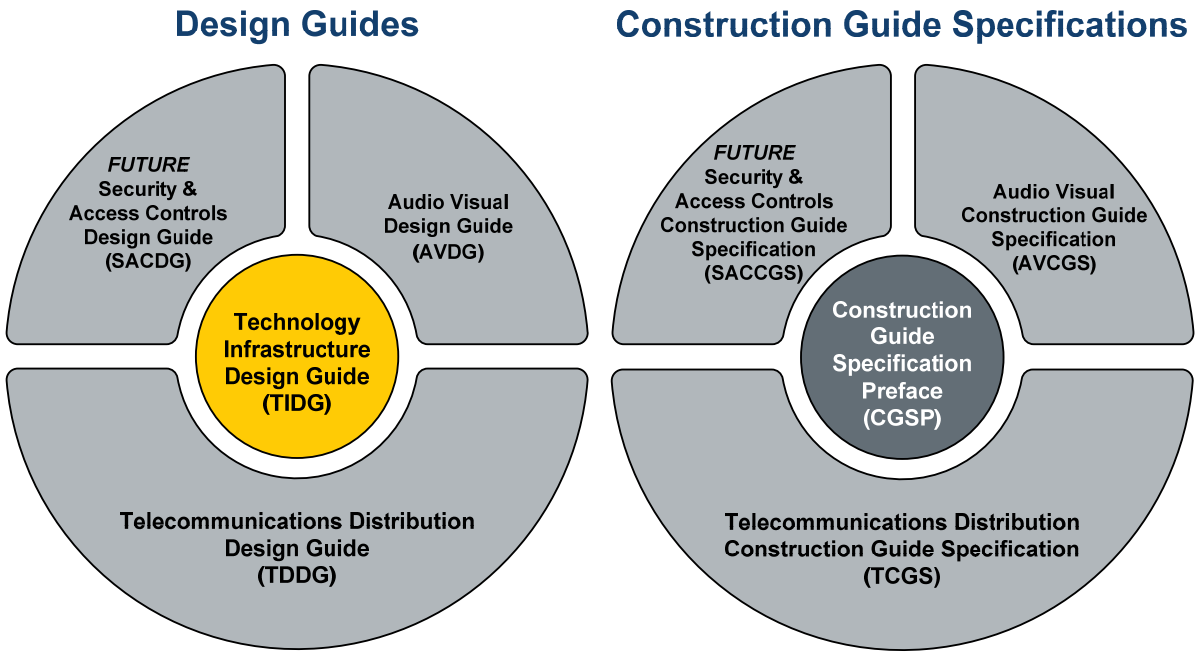
1.1 Introduction

A. The Technology Infrastructure Design Guide (TIDG) is written to communicate the requirements of the Pullman campus of Washington State University (WSUP) for the design and installation of technology infrastructure and systems at WSUP campus facilities.

- The TIDG is written for an audience of Architects, Engineers and Designers who are responsible for the design of new or remodeled facilities for WSUP where telecommunications distribution systems currently exist or will be installed.
- It is also intended for other low voltage telecommunications Contractors installing telecommunications distribution systems at WSUP facilities.
- This document also applies to infrastructure designed and installed by WSUP staff, when a formal design is not developed.

B. The TIDG belongs to a set of documents (depicted below) that comprise the standard design and installation practices for all facets of technology infrastructure and systems at the WSUP campus. This document forms the core of the Design Guides document set.

Technology Infrastructure Standards Document Set



C. The Technology Infrastructure Design Guide (TIDG) contains information common to all of the WSUP Design Guides.

D. The Construction Guide Specification Preface (CGSP) is a key companion to the TIDG.

- Designers shall adapt the various Construction Guide Specification sections "as written" for creating specifications for a particular project according to the instructions in the TIDG. In other words, Designers shall use the electronic specification section documents (provided by WSUP in MSWord format) and then shall make any project-specific edits to the specifications in those documents. Any changes to the specifications shall be done using the "Revision Tracking" features in MSWord.
- Rewriting sections in the Construction Guide Specification or modifying the format structure or requirements will not be accepted.

E. It is the responsibility of the Designer of technology infrastructure for WSUP to coordinate with the other designers on a project (architectural, electrical, mechanical, etc.) to determine that other systems are both compatible with and complementary to the technology infrastructure. It is critical to coordinate between disciplines during the design phase of a project, rather than making adjustments in the field during construction via change orders.

F. This document was prepared by Summit Engineering & Consulting, P.S. and by the Information Technology Services department at the Pullman campus of Washington State University. As technology and needs evolve, the document will be periodically updated.

- June 24, 2015 – Originally published

1.2 Low Voltage Systems

Wherever practical, telecommunications pathway and cabling systems designed for WSUP facilities are expected to support and integrate the complete set of building automation systems and other low voltage systems that convey information and operate facilities. Telecommunications infrastructure shall be designed in accordance with the requirements in ANSI/TIA/EIA 862 – Building Automation Systems Cabling Standard for Commercial Buildings, and the requirements in this document, to support the Ethernet telecommunications channels on low-voltage devices. Throughout this document, references to "low voltage systems" shall include those referenced in ANSI/TIA/EIA 862, and shall be subject to specific requirements in that standard and as discussed below.

1.2.1 SHARED OSP MEDIA AND PATHWAY

The common outside plant (OSP) telecommunications media (cabling) shall be singlemode fiber optic cable and 24 AWG unshielded twisted pair (UTP) copper

cable. The common OSP telecommunications media is intended for shared use by the following low-voltage systems, in addition to voice and data systems. The common OSP telecommunications ***pathway*** infrastructure and ***media*** are intended for shared use by all low-voltage systems (not just voice and data systems).

1.2.2 SHARED ISP MEDIA AND PATHWAY

A. The common inside plant (ISP) telecommunications ***pathway*** is intended for ***shared*** use by all low-voltage systems (not just voice and data systems).

B. The common inside plant telecommunications media shall be singlemode fiber optic cabling, 50/125 micron OM3 multimode fiber optic cable, and 24 AWG UTP copper cable (Category 6-rated). ***Backbone*** cabling is permitted to be ***shared*** by all low-voltage systems (not just voice and data systems). ***Horizontal*** cabling serving these systems shall be dedicated (***not shared***) to each system.

C. Where applications require 10GB communications, the common inside plant telecommunications media shall be singlemode fiber optic cable.

D. Inside plant telecommunications infrastructure intended to support Ethernet telecommunications (or other similar protocols for security, environmental, and fire alarm systems) shall be designed in accordance with the inside plant telecommunications infrastructure requirements in this document. However, due to the critical nature of these systems, inside plant pathway and cabling serving these systems shall typically homerun to a Mechanical Room or other Low Voltage Electronics Room rather than to a common shared telecommunications room.

E. Where low-voltage systems require different media (other than fiber optic cabling and 24 AWG UTP) the systems shall be designed to comply with the pathway and space requirements of this document wherever practical. WSUP anticipates the future convergence of most low voltage systems, and requires that new pathways and spaces be designed to support future telecommunications cabling needs.

F. The Designer shall design pathway and cabling to serve these systems, in cooperation with the other design disciplines on a project.

1.3 Standards and Guidelines

A. Generally speaking, WSUP adopts most industry standards for technology infrastructure. ANSI/TIA/EIA, BICSI, Infocomm and other organizations are primary producers of industry standards and best practices. Refer to each Design Guide for the specific standards and guidelines associated with each subject.

B. It is mandatory to adhere to and comply with the listed codes, standards, and industry practices, as well as the WSUP requirements contained in the Technology Infrastructure Standards Document Set. Refer to each Design Guide for the specific codes, standards, and guidelines associated with each subject.

C. The following requirements from the State of Washington apply:

- RCW 19.28.161
  - http://apps.leg.wa.gov/rcw/default.aspx?cite=19.28.161
- RCW 19.28.410
  - http://apps.leg.wa.gov/rcw/default.aspx?cite=19.28.410
- WAC 296-46B-010
  - http://app.leg.wa.gov/WAC/default.aspx?cite=296-46B-010
- WAC 296-46B-800
  - http://app.leg.wa.gov/WAC/default.aspx?cite=296-46B-800

D. Any request to deviate from the requirements of the National Electrical Code will not be accepted.

E. In some cases, the Designer is required to use products from specific manufacturers in the design (unless otherwise directed by WSUP) and to design systems that will be suitable for the use of products from these manufacturers. The construction documents shall require that the Contractor's installation workmanship fully comply with the current installation requirements from the manufacturers of these products.

F. The Designer shall seek approval for designs that are not consistent with the WSUP requirements. Requests to deviate from industry standards or WSUP design solutions will be considered on a case-by-case basis by the applicable WSUP Technology Services Project Manager (TPM) (the ITPM, AVPM, SACPM, etc.). Designers shall contact the applicable WSUP Technology Project Manager to discuss proposed alternatives before spending significant time pursuing the option.

G. The requirements contained in the WSUP Technology Infrastructure Standards Set are considered to be in addition to those listed in Instructions for Architects and Engineers Doing Business with Division of Engineering and Architectural Services and the State of Washington Conditions of the Agreement. Where the requirements differ, the issue shall be brought to the attention of the WSUP Facilities Services Project Manager (FSPM) and the applicable TPM – otherwise the more stringent requirement shall apply.

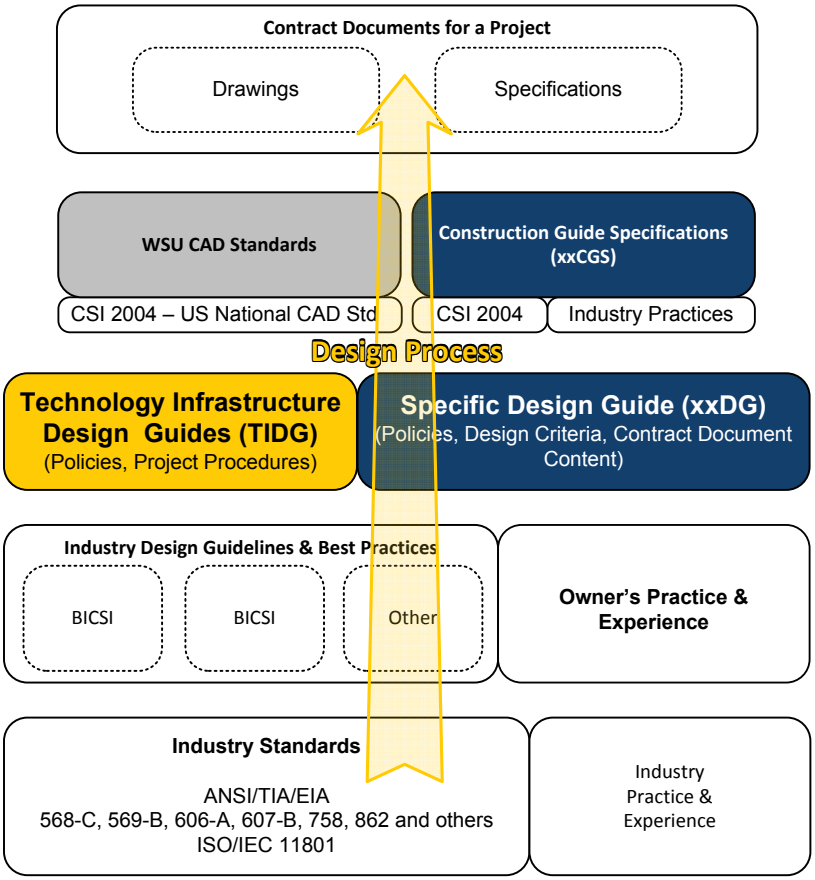
1.4 Document Intent

A. The Design Process diagram below depicts the relationships between industry standards, industry design guidelines/best practices, the WSUP Design Guide documents and the project-specific Construction Documents.

B. The WSUP Technology Infrastructure Standards provide directions for making standards-compliant design decisions that will, in due course, be reflected in Construction Documents for a project. The Construction Documents will be comprised of drawings and specifications that properly incorporate technology infrastructure and systems within a project. The Design Guides shall be used in conjunction with the Construction Guide Specifications. Drawings shall conform to the guidelines contained in the Design Guide documents for content and completeness, and the specifications shall be based upon the Construction Guide Specifications.

The Design Process

Based on Industry Standards and Guidelines and the WSUP Design Guide and Standard Specifications



1.5 Document Structure

The TIDG is organized in the following sections:

1. Preface
2. WSUP Technology Infrastructure Policies
3. Project Procedures
4. Appendices

A. The **Preface** (this section) describes this document, its intent, and its relationship to industry standards, practices, and the various audiences affected by the document. It also describes how to use this document.

B. The **WSUP Technology Infrastructure Policies** section applies specifically to WSUP personnel. It describes internal WSUP technology policies, requirements, standard practices, and processes for designing, installing, and operating technology infrastructure. WSUP personnel should also be aware of the instructions, requirements, and guidelines for Designers contained in the other sections of this document, with respect to their application on both large-scale technology projects and small-scale "moves, adds, and changes" (MAC) projects. In addition, these requirements apply to in-house operations and maintenance of existing technology systems.

C. The **Project Procedures** section describes the required qualifications for Designers, as well as the procedures that Designers must follow when working on technology infrastructure projects at WSUP facilities. It includes activities that are required throughout the project, as well as phase-specific requirements.

D. The **Appendices** section provides standard forms and diagrams along with example forms and diagrams that are required for WSUP technology infrastructure.

1.6 Types of Buildings and Spaces

Many WSUP buildings have multiple building-type spaces within the building. For example, an academic building will have academic spaces and office spaces, and may also have research spaces, vivarium spaces, public gathering spaces, etc.

Building/Space Type	Definition
• Academic buildings	Classrooms, lecture halls, auditoriums, teaching labs
• Research spaces	Research labs, freezer/refrigerated spaces, or other spaces containing specialized research equipment
• Vivarium spaces	Spaces for live animals used in research
• Controlled/Isolated Environment	Research spaces requiring atmospheric containment
• Office spaces	Offices and conference rooms
• Clinic spaces	Spaces where medical services are provided to live patients, both human and animal
• Public gathering spaces	Student lounges, lobbies for stand-up meetings or gatherings, outdoor meeting spaces
• Warehousing or industrial buildings	Storage buildings for materials or equipment; campus utility buildings
• Residential buildings	Student residential buildings

• Main Communication Facilities (MCF)	Spaces supporting critical network equipment and backbone cabling serving a sector of the campus
• Data Centers	Spaces for servers and data to support on-campus and off-campus computing needs.
• Nuclear Facility	Research facility containing a nuclear reactor and other related instrumentation and equipment

The Designer shall assume that adherence to BICSI guidelines, referenced industry standards, and WSUP standards (unless specifically indicated otherwise) is required for all facility types. Where exceptions are permitted, this document set will specifically highlight the construction type where WSUP requirements may differ from generally applicable practices and standards.

Adherence to applicable Code is always required.

1.7 Construction Types

For the purposes of this document set, construction projects are categorized by the extent of the construction work, as follows:

Construction Type	Definition
• New Construction	A new building.
• Full Remodel	An existing building undergoing extensive remodeling, frequently including reallocation of internal spaces.
• Minor Remodel (workspace remodel)	An existing building undergoing adjustments to office/work spaces. The project typically does not include changes to building systems (HVAC, electrical, etc.).
• Historical Building Remodel	Changes made to buildings that are designated as historical properties.
• Classroom Enhancement	An existing academic building undergoing updates to classrooms, including the technology features.
• Tenant Improvement	An existing building undergoing adjustments to suit the purposes of a non-WSUP tenant.
• Technology Upgrade	Projects primarily focused on upgrading technology infrastructure or systems. These projects may involve minor remodeling.
• Outside Plant	Projects involving the installation of or adjustment to cabling between buildings, including the in-building terminations.

Historical Building Remodel projects will typically qualify as multiple construction types, for example:

- Historical Building Remodel + Classroom Enhancement
- Historical Building Remodel + Minor Remodel
- Historical Building Remodel + Technology Upgrade

The Designer shall assume that adherence to BICSI guidelines, referenced industry standards, and the TIDG are required (unless specifically indicated otherwise) for all extents-of-construction. Where exceptions are permitted, this document will specifically highlight the construction type where WSUP requirements may differ from generally applicable practices and standards.

Adherence to applicable code is always required.

1.8 WSUP Personnel

A. There are several WSUP-specific personnel roles referenced in this document. The Designer shall interact with these individuals as direct points of contact:

- Facilities Services – Capital:
  - **Facilities Services Project Manager (FSPM)** – responsible for project management, project oversight, and project budget.
  - **Security Systems Project Manager (SSPM)** – responsible for oversight of all technology considerations related to security systems, access control systems, and surveillance video systems. This scope is under the stewardship of Facilities Services.
  - **Life Safety Project Manager (LSPM)** – responsible for oversight of all considerations related to life safety systems, such as the fire alarm system. This scope is under the stewardship of Facilities Services.
  - **Building Automation Systems Project Manager (BASPM)** – responsible for oversight of all considerations related to control of building systems including HVAC, lighting, and the environment. This scope is under the stewardship of Facilities Services.
- Technology Project Managers (TPM) – responsible for oversight of an assigned subset of WSUP technology considerations, including interpretation of the requirements of this document. There are two designated technology project managers:
  - **Information Technology Project Manager (ITPM)** – responsible for oversight of all technology considerations related to the telecommunications infrastructure – see the TDDG.
  - **Audio/Visual Project Manager (AVPM)** – responsible for oversight of all technology considerations related to the audio/visual infrastructure, television distribution infrastructure, and related systems – see the AVDG and the TVDDG.

B. The WSUP Technology Infrastructure Policy section of this document applies specifically to WSUP personnel. In addition to the WSUP Technology Infrastructure Policy section, WSUP personnel should be aware of the instructions, requirements, and guidelines for Designers contained in the other sections of this document. Also, the Construction Guide Specification contains additional requirements related to technology infrastructure materials and installation methods applicable at WSUP facilities.

C. WSUP personnel should be familiar with these requirements with respect to their application on both large-scale technology projects and small-scale “moves/adds/changes” projects. These requirements also apply to in-house operations and maintenance of existing systems.

1.9 Technology Infrastructure Designers

Technology infrastructure designers shall be responsible to apply the guidelines, instructions and requirements in this document, and adapt the Construction Guide Specification sections in the course of designing technology infrastructure and systems at WSUP facilities.

1.10 Contractors and Cabling Installers

Contractors and installers involved in projects without a formal engineering and design process shall be fluent with and adhere to the requirements of the Design Guide document set, and also the requirements contained in the Construction Guide Specification (xCGS) document set.

1.11 Copyright

Summit Engineering & Consulting retains the copyright for this document. Washington State University is authorized to edit and adapt the document.

Summit Engineering & Consulting has authored similar documents for many other organizations. The document is intended (in part) to describe best practices that are found in some segments of the industry. As a result, portions of this document are similar to comparable content in documents previously prepared by Summit Engineering & Consulting for other organizations. This document does not contain any information that is proprietary or confidential to other organizations.

2 WSUP Telecommunications Policies

This section describes internal WSUP telecommunications policies, requirements, standard practices and processes associated with designing, installing, maintaining, and operating technology infrastructure. It is intended for an internal audience of WSUP personnel, including:

- Information Technology Services (ITS)
- Academic Media Services (AMS)
- Information Technology Services Advisory Committee (ITSAC)
- IT Executive Board (ITEB)
- Facilities Services (FS)
- Building Stakeholder Design Committee (BSDC)
- Student Groups
- Associated Students of WSU (ASWSU)
- Anyone that may be involved in the design, installation, maintenance or use of telecommunications infrastructure, network equipment or telephone equipment at a WSUP facility.

Other Design Guides have additional Section 2 content that is specific to a particular technology.

2.1 Everyone

The following policies apply to anyone that may be involved in the design, installation, maintenance or use of telecommunications infrastructure at a WSUP facility.

2.1.1 GETTING HELP

ITS and AMS are most efficient in meeting your needs when you work through our normal channels. We are committed to applying our best efforts to address each request in a timely and professional manner.

When your request is received, it will be evaluated by ITS or AMS and assigned to the appropriate specialists to address your needs.

2.1.1.1 GETTING IT HELP

All requests for IT assistance should be submitted to Information Technology Services:

- Call CougTech at 509.335.4357
- Email its-nss-project@lists.wsu.edu
- See http://infotech.wsu.edu

2.1.1.2 GETTING AUDIO/VISUAL HELP

All requests for A/V assistance should be submitted to Academic Media Services:

- Call 509.335.7336
- Email ams@wsu.edu

2.1.2 DO NOT ALTER CABLING

Cabling supporting technology shall not be altered by anyone outside ITS. Doing so will cause interoperability problems with equipment and may void manufacturer warranties.

Please do not:

- Remove installed connectors
- Attempt to access locked panels
- Remove patch cables

Anyone needing help with cabling should contact ITS for assistance.

2.1.3 NEW PROJECTS

Please contact ITS as indicated above to discuss any new projects, new technologies needed, or other requests.

2.1.4 PROCUREMENT

ITS' procurement practices are designed to comply with the requirements established by the State of Washington.

Procurement of University-owned telecommunications cabling, network electronics, audio/visual equipment, and telephone equipment shall be handled through ITS.

Please do not purchase any equipment that attaches to the University network or telephone system without involving ITS, even while following otherwise normal procurement procedures.

WSUP's procurement policies are detailed here:

- http://purchasing.wsu.edu/

Unauthorized items (particularly wireless access points (WAP) and network switches) will interfere with the University network. ITS will confiscate unapproved devices that are discovered on the network. Please work with ITS for all technology procurement.

2.1.4.1 OFFER OF ASSISTANCE

Anyone purchasing technical equipment for research or other departmental purposes that will connect to the University network is invited to contact ITS to review your plans prior to purchase.

ITS will verify whether the network connection portion of your equipment is compatible with the University network. ITS' intention is to help you avoid purchasing equipment that will not communicate via the network, or that will otherwise negatively impact other systems on the network.

ITS will not endorse the suitability of the equipment for your intended purposes.

2.2 Event Coordinators

Technology needs can vary greatly due to the diverse nature of events, such as trade shows, banquets, conferences, entertainment, etc.

The WSUP wireless network is not designed to support these events without advance coordination with ITS. The following technology-related requirements shall be addressed as conditions of the contract for all Event customers:

- All network services shall be negotiated with ITS at the time of booking.
- Customer network services shall be wired connections.
- Customers shall not expect the campus wireless network to meet their needs.
- Secure transaction processing shall not be attempted via wireless networking. There shall be no expectation of privacy via wireless networks.
- Customers shall not install their own wireless networking without coordinating with ITS. Non-coordinated wireless networks will interfere with the existing wireless network.
- If Customers require wireless networking for an event, this service shall be negotiated with ITS at the time of booking.
- Please see the University's Wireless LAN Policy for further information:
    - http://www.wsu.edu/~forms/HTML/EPM/EP13_Wireless_LAN_Policy.htm

Event Coordinators shall not make any technology-related commitments to customers without written approval from ITS.

2.3 Information Technology Services Advisory Committee (ITSAC)

When plans are being laid for a new or remodeled building, please be aware of the following indirect commitments that are made:

- For every 50,000 square feet of building space that is added, one additional full-time technical support person is required to maintain and operate the building.
- For every 50,000 square feet of building space that is added, data center space requirements and other communications infrastructure requirements are increased by 5%.
- Audio/visual equipment requires maintenance labor, spare parts, and consumables (spare stand-by equipment to replace malfunctioning equipment, projector lamps, etc.).

- Every 8 to 10 years, the network equipment requires replacement due to obsolescence.
- Every 8 to 10 years, the audio/visual equipment requires replacement due to obsolescence.
- Every 15 to 18 years, the telecommunication (network) cabling requires replacement due to obsolescence.

The optimal design solution balances first cost and ongoing costs. Since the ongoing costs for the above requirements are typically not borne by capital funds, operating budgets must also increase in step with campus growth and technology improvements. ITS is committed to strategies that optimize stewardship of the University's resources.

Please invite ITS to participate early in the planning processes.

2.4 Building Stakeholder Design Committee (BSDC)

When opportunities are presented to remodel a building or construct a new building for your department, you will have an opportunity to influence the design and the technology that goes into the building.

ITS needs your constructive feedback and input to be sure that your needs are met.

As future technology needs for a new or remodeled building are being evaluated, please consider the following key points:

2.4.1 STANDARD FEATURES

Every new or remodeled building will be designed to include the following features:

- Complete wireless network coverage throughout the building.
- Every standard office will have two network outlets on opposite sides of the room, each with two cables. This is sufficient for a computer and phone on one cable and another device (computer, printer, etc.) connected to the other outlet.
- WSUP's telephone system is a Voice-Over-IP (VOIP) system, meaning that it operates using the computer network (as opposed to a separate cable). One network cable is sufficient to handle both your computer and your telephone.
- Analog telephone circuits will be provided for applications that require them, such as courtesy phones, fax machines, etc.
- Every meeting room will have cabled network services accessible at the conference table.
- Every classroom will have cabled network services accessible at the instructor's podium.

2.4.2 REQUESTED FEATURES

Please identify any needed features that are not included in the Standard Features list above. Some examples might include:

- Offices that require more network-connected equipment.
- Other surveillance cameras, especially program-driven applications that are not necessarily required for security.
- Digital signage locations.
- Study lounge requirements.
- Research and program requirements.
- Door access.
- Vending machines.

2.4.3 NEW TECHNOLOGIES FOR YOUR EXISTING SPACES

From time to time, needs may arise within your department or program for new technologies or equipment. If any new equipment will connect to the campus network, you are strongly encouraged to involve ITS prior to procurement.

- ITS will help evaluate the compatibility of the equipment with the campus network.
- ITS will also help evaluate whether the existing cabling and other infrastructure in your space will support the new technologies.

If new infrastructure is required, the costs for that work must be carried by your program budget.

2.5 Facilities Services

2.5.1 FACILITIES SERVICES - OPERATIONS

2.5.1.1 THIRD-PARTY TENANTS

Most third-party tenants occupying space in WSUP buildings require telephone and Internet services. While it might seem straightforward for WSUP to provide these services as a condition of the contract, there are several complications associated with providing these services, including:

- Handling of confidential information
- Quality of service expectations
- Loss of business due to service outages
- Support of commercial interests using State service resources

ITS discourages providing these services within the lease contract. Instead, the following practice is much preferred:

2.5.1.2 OBTAINING TELEPHONE AND INTERNET SERVICES

Non-WSUP tenants shall obtain telephone and Internet services as follows:

- Tenants shall contract directly with the telephone and Internet utility service providers for the services they require when possible.
- Tenant services shall typically demark in the MDF of the building in which the tenant resides. WSUP telecommunications infrastructure shall not be accessible from tenant demark facilities.
- ITS will then assign dedicated campus backbone fiber and/or copper pairs to route the tenant's services from the demark to their space on campus.

2.5.1.3 OTHER HIGHER EDUCATION INSTITUTIONS

Partnerships with other higher education institutions are treated differently than commercial interests. ITS will provide telephone and network services as agreed with these institutions.

2.5.1.4 CONSTRUCTION TRAILERS

Telephone and Internet services for construction trailers shall be provided as discussed above for non-WSUP tenants. The Contractor is required to provide cabling from the nearest telecommunications room to the jobsite trailer. Any underground or aerial routing to the trailer shall be coordinated in advance with ITS.

Any Contractor-owned wireless (WiFi) networking shall not interfere with the WSUP campus wireless network. When ITS notices interference, ITS will alert the Contractor that the signal strength on Contractor-owned wireless access points (WAP) needs to be reduced or the WAPs turned off.

2.5.1.5 SERVICE OUTAGES

Maintenance, upgrade, or construction activities sometimes result in service outages. It is usually possible to plan for these events in advance, but occasionally things do not go as planned.

2.5.1.5.1 PLANNED OUTAGES

Planned telecommunications outages shall be scheduled with ITS at least three days prior to the outage. This lead time is required in order to reschedule the appropriate IT staff to support the outage.

2.5.1.5.1.1 Call Before You Dig

Before digging on the WSUP campus for any reason, the project manager supervising such work shall contact the "Call Before You Dig" service (dial 8-1-1) to identify any existing underground infrastructure.

2.5.1.5.2 UNPLANNED OUTAGES AND DAMAGE TO EXISTING INFRASTRUCTURE

Construction, maintenance and other activities may result in damage to existing telecommunications infrastructure. In this event, regardless of the cause or party responsible, whoever observes a damage situation shall immediately contact the WSUP ITS at 509-335-0404.

The party responsible for the damage to the telecommunications infrastructure shall be responsible for the total cost of the temporary repairs and the full restoration/ replacement costs. WSUP ITS will also establish required deadlines for restoring service depending on the campus impact of the outage. Some outages could be sufficiently detrimental that immediate and continuous efforts would be required until the service has been restored.

All damaged infrastructure shall be restored to within the scope of the original design/installation parameters. This shall include, but not be limited to:

- All repair or replacement work performed by a certified cabling installation contractor of WSUP's choosing.
- All testing and recertification of the infrastructure for full compliance with the WSUP Telecommunications Infrastructure Standards and applicable fiber optic cabling warranty.

Please note that splicing will not constitute an acceptable repair for damaged fiber optic cabling. Damaged fiber must be replaced in its entirety.

ITS will have the sole discretion to determine the repair or replacement strategy and urgency for the damaged infrastructure.

2.5.1.5.3 POST-RESTORATION ASSESSMENT

After completing the restoration of damaged infrastructure, an assessment process is conducted. It is hoped that through these processes, institutional learning will occur that will lead to fewer unplanned outages and disruption.

If the event involved Facilities Services - Operations, representatives from that organization will be invited to participate in the process.

2.5.2 FACILITIES SERVICES - CAPITAL

2.5.2.1 COORDINATION

Facilities Services - Capital and ITS have a mutual interest in the success of projects on campus. Regular coordination is essential to the project success, and is key to reducing the life-cycle costs of University assets.

2.5.2.1.1 MEETING SCHEDULE

Coordination meetings between ITS, Facilities Services – Capital, and Housing & Dining ASIS occurs once a month. The purpose of the meeting is to discuss applicable technology issues related to Facilities Services - Capital and Housing & Dining ASIS activities, including:

- New projects
- Tracking and review of current project status
- Projects without technology components, but which may offer attractive opportunities for expanding technology infrastructure

- Planned excavation activities
- Planned service disruptions

2.5.2.2 INITIATING NEW PROJECTS

ITS' definition of a successful construction or renovation project involving technology includes the following facets:

- ITS involvement in the scope development, especially for Design-Build projects.
- Appropriate selection of technical features.
- Flexible solutions that are adaptable to support unknowable future requirements.
- Favorable first cost.
- Favorable long-term costs (life-cycle costs).

There are several points of coordination between ITS and Facilities Services - Capital that help achieve the above objectives:

2.5.2.2.1 ITS INVOLVEMENT FROM START OF PROJECT

All additions or modifications to telecommunications infrastructure, regardless of the size or scope of the project or quantity of cable involved, involve the appropriate WSUP ITS representative(s) from the beginning of the project.

All new construction projects require the involvement of the appropriate ITS representatives from the beginning of the project.

2.5.2.2.1.1 Design-Build Projects

ITS involvement from the beginning is crucial for Design-Build projects. ITS must be invited to influence the development of project scope before the request-for-proposal is published. Otherwise, the Contract will be established with a scope that will likely not meet WSU's standards or requirements without expensive change orders.

2.5.2.2.2 FURNITURE

When furniture is procured and installed in office spaces, the furniture frequently obstructs access to the power and data outlets. Two examples of common problems are:

- Modesty panels are often purchased unnecessarily for the side of the desk that is against the wall.
- Furniture is often placed so close to the wall that it is not possible to insert plugs (both power and data) into the outlets. A space of 3 inches is necessary in front of outlets (especially power outlets) in order to insert and remove plugs.

Any furniture containing built-in data jacks must have AMP/TE compatible jacks.

2.5.2.2.3 STANDARDS COMPLIANCE IS REQUIRED

All telecommunications infrastructure shall be installed in compliance with the requirements of this document.

2.5.2.2.4 BUDGETING

ITS stands ready to assist Facilities Services - Capital with the preparation of budgets for new projects. Please request ITS involvement before finalizing any budgets.

Upon request, ITS can provide a set of general guidelines for establishing project budgets, including both the Construction budget and the Furniture, Fixtures and Equipment (FF&E) budget.

2.5.2.2.5 SYSTEM INTEGRATION

Significant technical advances have been made in recent years resulting in numerous systems that now communicate via the campus network. The following are examples of systems or processes that now require secure networking:

- HVAC/environmental control systems
- Mechanical/DDC control systems
- Irrigation control systems
- Surveillance video systems
- Security and intrusion detection systems
- Access control systems
- Handling of personally identifiable information (PII)
- Financial transactions

Do not expect wireless networking to provide the capacity, reliability or security required to handle these systems.

It is therefore crucial to the success of these systems that Facilities Services - Capital coordinate with ITS during the planning and design phases to ensure that adequate network and infrastructure are included in the design.

2.5.2.3 DOCUMENTATION

2.5.2.3.1 AS-BUILT/RECORD DRAWINGS

When a construction project is completed, the as-built drawings or (preferably) record drawings need to be made available to ITS as follows:

- Full-size hardcopy printed drawings, CAD Drawing Files, and PDF files depicting the portion of the drawing set that is applicable to technology. The full set is not required, just the sheets that depict the technology features of the project.

- Facilities Services - Capital shall maintain a network-accessible archive of both CAD files and PDFs of the record drawings, organized by building. ITS shall have unrestricted access to review the information via the network.

2.5.2.3.2 CABLE TEST REPORTS

At the conclusion of each project, the telecommunications cabling subcontractor is required (in the project specifications) to provide their cable test reports. The subcontractor is also required to register the manufacturer's warranty for the cabling infrastructure.

- Other technology subcontractors may also have similar test report and warranty requirements for their specialties.

The CPD Project Manager should require the test results and warranty registrations at the time that record drawings are submitted, and prior to final payment. A copy of this information shall be provided to ITS.

3 Project Procedures

A. The Project Procedures section contains guidelines for architects, engineers and technology infrastructure designers regarding the procedures that WSUP requires for projects that include technology infrastructure and systems. This applies both to projects that entail primarily technology infrastructure work (such as telecommunications upgrade projects) as well as to architectural projects and other work (such as a new building) that involve technology as part of the building.

B. This section is not intended to supersede the requirements in the State of Washington Conditions of the Agreement or the Instructions for Architects and Engineers, but rather to complement them, providing additional requirements that apply specifically to technology design in projects at WSUP facilities.

C. It is intended that the requirements in this section be considered contractually binding for professional design firms providing technology design services.

3.1 Designer Qualifications

A. For the purposes of this document set, the term “Designer” shall be defined in each individual Design Guide. There are unique qualification requirements for the designer of each technology subject.

B. The services of a professional engineer (PE) shall be required to design the following aspects of a complete technology infrastructure:

- Grounding and bonding
- Firestopping
- Electrical power distribution in telecommunications spaces
- Standby generator and associated other backup power systems
- Telecommunications room cooling systems

C. The services of a licensed fire protection engineer shall be required to design fire protection and life safety systems.

3.2 Architect/Engineer Teams

It is imperative that the technology infrastructure design be incorporated during the preliminary architectural design phase. To accomplish this, the architects and engineers on the design team shall work closely with the Designer, the WSUP FSPM, and the applicable WSUP TPM beginning with the Pre-Design phase of the project.

3.2.1 CROSS-DISCIPLINE COORDINATION

Successful projects involving technology infrastructure require frequent, thorough design coordination between the disciplines involved in the project. The Designer shall be primarily responsible to coordinate the technology requirements and design features with the designs produced by the other Designers on the project.

At a minimum, the following aspects of the design shall be coordinated:

3.2.1.1 OUTSIDE PLANT INFRASTRUCTURE

- Ductbank routing around obstacles (trees, tunnels, buildings, existing ductbanks, etc.).
- Coordinate the locations of maintenance holes and hand holes to determine that they are not located in areas of water concentration. This includes site requirements, such as: drainage, traffic, joint usage, utility requirements, etc.
- Proximity of ductbanks to sources of EMI, including power distribution feeders.
- Proximity of ductbanks to steam piping.
- Routing of entrance conduits through buildings.
- Backbone cabling requirements of other disciplines (fire alarm, HVAC, security, CATV, etc.).

3.2.1.2 INDOOR UTILITIES AND FUNCTIONS

- HVAC cooling requirements for telecommunications rooms (TR) and A/V equipment rooms.
- HVAC ductwork routing (avoiding TR ceiling spaces and A/V equipment room spaces, and allocating space to access cable trays).
- Routing of wire basket cable trays through ceiling spaces in congested areas (HVAC ductwork, plumbing, electrical, etc.).
- Plumbing routing (avoiding TR spaces and A/V equipment room spaces).
- Lighting requirements for TRs, A/V equipment rooms, classrooms, and conference rooms.
- Projection Surfaces (whiteboards, screens) and the light switching scheme.
- Video Projectors conflicting with fire suppression sprinklers and pendant lighting
- Power requirements for TRs and A/V equipment rooms.
- Power requirements for work areas (receptacle locations near telecommunications outlet locations and other devices).
- Proximity of cabling to sources of EMI.
- Routing of conduits through and location of pullboxes in congested areas (HVAC ductwork, plumbing, electrical, etc.).
- Walls, paint, doors, and floors in TRs and A/V equipment rooms.
- Proximity of microphone and speaker wiring to sources of EMI.
- Acoustic treatments for Classrooms, Conference Rooms, and A/V Control Rooms.

More information regarding the above requirements is available in the Design Criteria section in each individual Design Guide.

3.3 Design Review Process

As noted in Section 3.5 titled “Procedures Related to Project Phases,” the project documents will pass through the design review process at the end of each design phase plus follow-up reviews when necessary. These requirements are in addition to those contained in the *State of Washington Conditions of the Agreement* and the *Instructions for Architects and Engineers*.

The following steps correspond to the numbered activities shown on the Design Review Process diagram below:

① Each time a review is required, the A/E shall provide printed copies and electronic copies of the complete project documents set (drawings and specifications for all disciplines involved in the project) for the following people:

- WSUP Capital Planning and Development Services Project Manager (FSPM) (one set)
- Each WSUP Technology Project Manager (ITPM – one set, AVPM – one set, etc.)

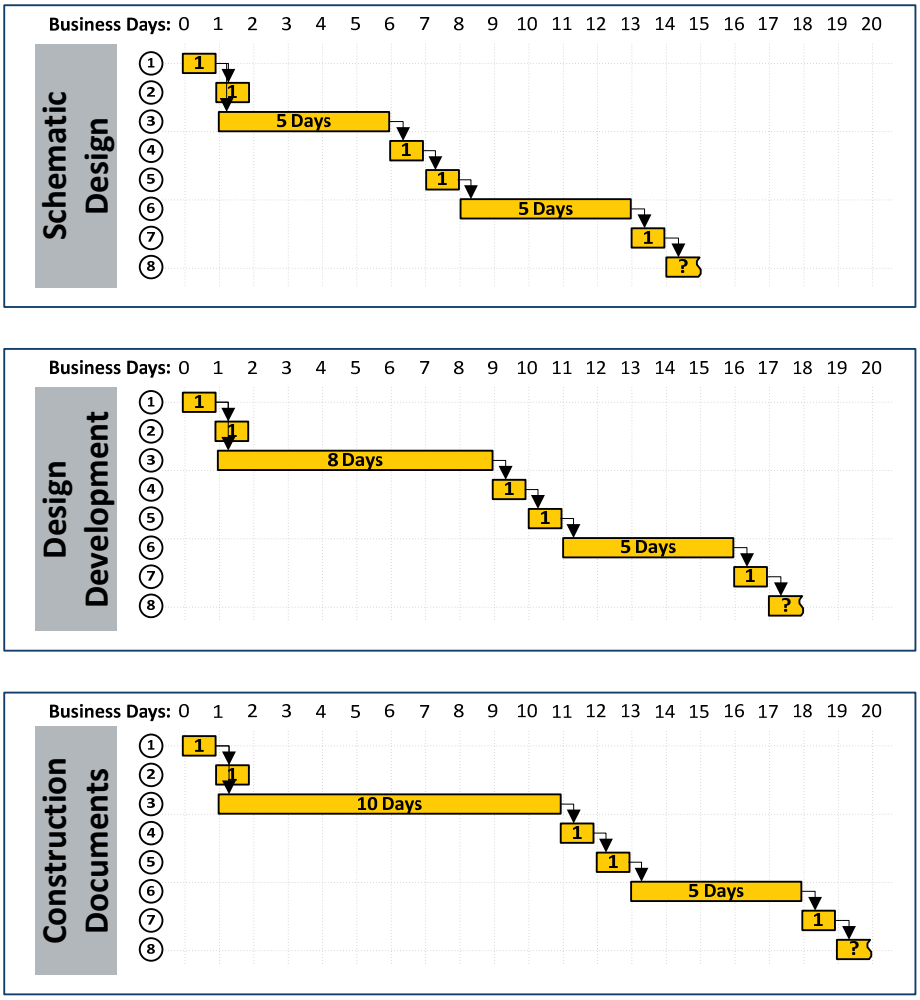
②③④ The WSUP FSPM and the WSUP TPM will have 5, 8, or 10 days (depending on the project phase) to review the design documents, after which the WSUP Technology Review Comments will be sent to the WSUP FSPM for review.

⑤⑥ The WSUP FSPM will submit the Technology Review Comments to the Designer. The Designer will then be given five days to review the comments and respond to them in writing. Negative responses to any comment shall include a discussion of the reasons for non-compliance.

⑦⑧ Finally, a meeting or teleconference will be held with the WSUP FSPM, the WSUP TPM, and the Designer to discuss the review comments and the Designer’s responses. Following the meeting, the Designer shall revise the design in accordance with the designated resolution for each comment.

The diagram below depicts a typical technology design review process. The number of days listed for #3 and #6 may need to be adjusted based on the scope or depth of the technology infrastructure and systems in a project.

Design Review Process



1. Designer sends hard copy printed Drawings and Specifications to WSUP Technology Project Manager and WSUP Facilities Services Project Manager.

2. WSUP FSPM reviews the drawings and specifications.

3. WSUP TPM reviews the drawings and specifications and then produces Review Comments.

4. WSUP FSPM and WSUP TPM meet to discuss and finalize the Review Comments.

5. WSUP FSPM issues the Technology Review Comments to the Designer for response.

6. Designer provides a written response for each Review Comment and returns the Review Comments to WSUP FSPM.

7. WSUP FSPM and WSUP TPM meet to discuss the Designer's responses to the Review Comments and determine a course of action for each item.

8. Designer shall revise the design per the direction given in Step 7 (above). Designer shall then submit a second written response indicating how each Review Comment was resolved.

3.4 General Procedures

3.4.1 PROCUREMENT AND INSTALLATION

A. The Designer shall inquire which procurement method will be used for a particular project. The construction documents prepared by the Designer shall be suited for the procurement method designated for the project. Some examples of procurement methods used at WSUP include:

- Design-Bid-Build
- Design-Build
- Job Order Contracting
- WA State Master Contract
- General Contractor/Construction Manager (GC/CM)
- Direct to Contractor (in emergency situations)
- Request for Quotation/Request for Proposal
- Blanket Purchase Agreement

B. WSUP Facilities Services Shops crews have first right of refusal to construct projects for which the budget is less than $90,000.

C. For Design-Build projects, it is crucial to involve ITS while the scope is being developed, prior to requesting proposals from interested contractors.

- ITS will define the scope of work for technology infrastructure for the project.
- ITS will ensure that the WSUP Technology Infrastructure Standards are incorporated by reference as a contract requirement.

D. For projects where primarily scope of work is a technology upgrade, such as telecommunications cabling replacement projects, WSUP may opt for one of the following:

- Washington State Dept. of Enterprise Services (DES) Master Contract[1]
- Western States Contracting Alliance (WSCA)[2]
- Washington Institutions of Public Higher Education (WIPHE)[3]
- or any other contracts that are approved by the WSU Purchasing office[4]

E. When the DES Master Contract, WSCA, WIPHE, or another contact is not being used, a competitive bid shall be sought using the WSUP-approved subset of the contractors listed on the websites for these contracts. The procurement and construction of the telecommunications systems will be a combined effort between the WSUP FSPM and the WSU ITPM.

3.4.2 CAD FILES

The Designer shall coordinate with the Prime Consultant (typically the architect) to determine that the electronic CAD files used for backgrounds for the technology

[1] As of this writing, more information about the Washington State DES Master Contract is available at http://www.des.wa.gov/services/cabling
[2] http://des.wa.gov/services/ContractingPurchasing/CurrentContracts/Pages/ContractsWSCA.aspx
[3] http://apps.sbctc.edu/WIPHE/
[4] http://purchasing.wsu.edu/

infrastructure and systems design are consistent with the CAD file backgrounds used by the other disciplines on the project.

3.4.3 STANDARDS VARIANCE REQUEST (SVR)

A. It is not the intent of WSUP to rigidly impose standards on every aspect of a design. Each design is unique and special requirements may lead to situations that warrant deviations from the standards.

B. The WSUP Technology Infrastructure Standards document set identifies specific design solutions that are intended to meet the technical requirements at most WSUP facilities. Design issues that are not consistent with the requirements in this document shall require prior approval through the WSUP Standards Variance Requests (SVR) process. Requests to deviate from industry standards or WSUP design solutions will be considered on a case-by-case basis. Any request to deviate from applicable code requirements, or from manufacturer's warranty requirements, will not be approved.

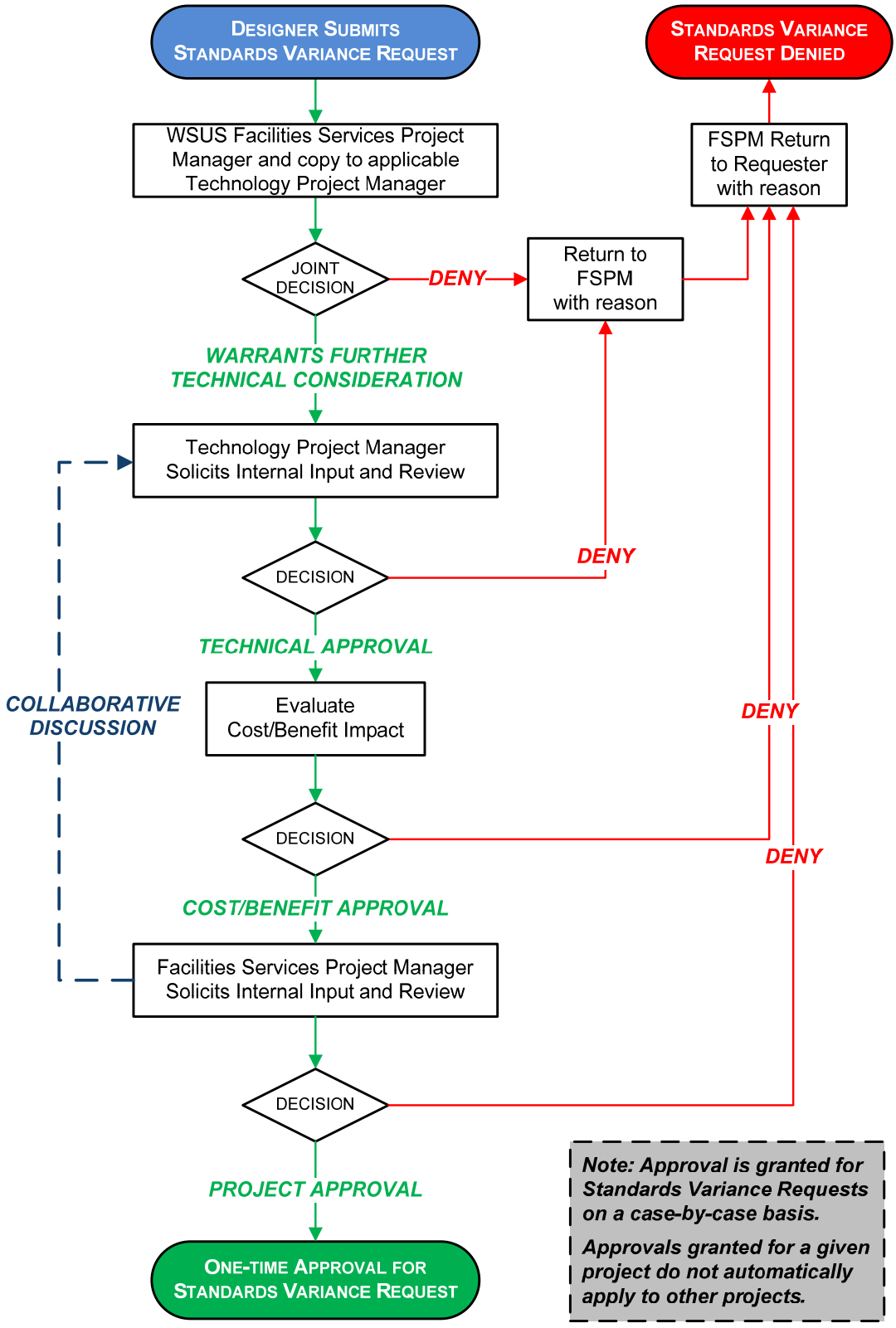
C. If the Designer feels that a solution is warranted that is different from a given standard, the Designer shall submit a written Standards Variance Request to WSUP. The Designer may, upon written approval from WSUP, incorporate the design deviation into the overall design. WSUP approval is required on a project-by-project basis, and only for the designated instance(s) within that project. The Designer shall not assume that an approval for one project or one instance means that the practice is approved for use throughout that project or that it will necessarily be approved for a subsequent project.

   The request shall include a complete description of the proposed alternative design identifying:

   1. The type of facility;
   2. The conditions at the facility;
   3. The approved design solution as described in this document or as described in the standards referenced in this document;
   4. The proposed alternative design;
   5. A list of the guidelines and standards referenced in this document with which the alternative design will not be in compliance, and the effect of non-compliance, both short and long term;
   6. The reason for wishing to use the alternative design;
   7. The Contractor or personnel performing the construction;
   8. A written statement indicating that the proposed alternative design will meet the applicable WSUP system performance requirements, and identifying any performance limitations, drawbacks and benefits from using the alternative design.

D. Both the Designer and the Prime Consultant on the project shall be jointly responsible to determine that the SVR process is properly conducted, and shall participate in the process (review, acknowledge and address issues) to determine that the University's requirements are met.

Approval Process for Standards Variance Requests (SVR)



3.5 Procedures Related to Project Phases

In addition to the requirements contained in the State of Washington *Conditions of the Agreement* and the *Instructions for Architects and Engineers*, Designers of technology infrastructure and systems for WSUP facilities have the following responsibilities during each project phase:

3.5.1 PRE-DESIGN

A. During Pre-Design, the architect shall involve the Designer to incorporate the following considerations:

- Location and capacity of existing technologies and infrastructure that might be used to support the project.
- Identify any existing underground infrastructure that might conflict with the footprint of new work.
- Telecommunications room sizes and centralized locations.
- Audio/visual equipment room sizes and desirable locations.

3.5.2 SCHEMATIC DESIGN AND FIELDWORK

A. Some projects at WSUP campuses may require the Designer to conduct preliminary fieldwork to document the existing equipment, cabling and applications into which new technology will integrate. WSUP believes that this information is vital to a successful project.

B. For projects that involve modifications to existing buildings, the Designer shall visit the project site during the Schematic Design phase to perform preliminary field investigation of the horizontal and intra-building backbone telecommunications infrastructure. The Designer shall create the following types of documentation based on information gathered while onsite:

- Take digital photographs of existing pathways, spaces, equipment, and cabling that affect or are affected by the new project work.
- Verify existing diagrams or create a new backbone schematic diagram, showing the existing outside plant cabling in the area associated with the new project and the existing equipment connection strategy.

C. The Designer shall also conduct a needs analysis (involving WSUP personnel) to identify and describe the required features and functionality of the new applications.

D. The information gathered during the fieldwork, combined with the results of the needs analysis, shall be the starting point for Schematic Design of the proposed new work.

E. The Designer shall discuss pathway type and size options with the WSUP TPM.

F. Schematic Design drawings shall show the following information:

- Building and OSP distribution
- Telecommunications Room sizes and locations
- Major distribution pathways inside the building, including cable trays
- Audio/Visual Equipment Room sizes and locations

G. Upon completion of the Schematic Design documents, the standard Design Review Process shall be conducted prior to progressing to the Design Development phase.

3.5.3 DESIGN DEVELOPMENT

A. The Designer shall modify the design documents to address the review comments received during the Schematic Design Phase.

B. In addition to the content shown on the Schematic Design documents, the Design Development documents shall show the following information:
- Schematic diagrams
- Outlet locations and port counts for each outlet
- Equipment/Device types and locations
- Draft of specifications based on the Construction Guide Specifications

C. Upon completion of the Design Development documents, the standard Design Review Process shall be conducted prior to progressing to the Construction Document phase.

3.5.4 CONSTRUCTION DOCUMENTS

A. The Designer shall modify the design documents to reflect the accepted review comments received during the Design Development Phase.

B. It is expected that the Designer will expend considerable effort coordinating details between different disciplines during the design process. Non-coordinated pathway/raceway is not acceptable to WSUP.

- In particular, accessible cable tray is crucial to the University's operations. The Designer shall work with the mechanical designers to coordinate ductwork such that it does not obstruct access to the cable tray.

C. During the Construction Documents phase, the Designer shall obtain the assistance of manufacturer product representatives to review the CGS-based project specifications to determine that the correct part numbers have been included for each product in the specification. The specifications shall be adapted by the Designer from the WSUP Construction Guide Specification.

D. Upon completion of the Construction Documents, the standard Design Review Process shall be conducted. The Designer shall then modify the documents to

reflect the accepted review comments associated with the Construction Documents prior to the Bidding Phase.

E. The Construction Documents are expected to contain the items discussed in the ***Construction Document Content*** of each Design Guide.

F. Upon completion of the Final Construction Documents, the standard Design Review Process shall be again conducted as described above. The Designer shall modify the documents to address the review comments associated with the Final Bid Documents prior to the bidding phase, rather than incorporating the changes "by addendum."

3.5.5 BIDDING

A. On projects where a pre-bid walkthrough is held, the Designer shall attend the walkthrough, and shall discuss any materials and practice requirements that the bidders might find peculiar, or which might affect the bids if such requirements were overlooked. Noteworthy items would typically be requirements that are more restrictive than practices considered acceptable for other commercial projects. The Designer shall consider the following items for inclusion on such a list, as well as any other items applicable to the project:

- The fact that most of the materials specified for use in WSUP technology applications are not designated as "or equal, according to the judgment of the contractor." Any material substitutions must be approved in advance by the Designer in counsel with the WSUP TPM.
- The requirement that the technology subcontractors must be pre-approved, prior to the bid, and that bids from subcontractors who have not been pre-approved will be considered non-responsive. The approval process and the list of pre-qualified subcontractors is located in Specification Section 27 05 00.
- The fact that WSUP technology infrastructure standards and specifications are more stringent than common electrical installation requirements or the specifications on many other projects.
- The use of metallic flex-conduit is almost always prohibited.
- The installation of conduit under-slab or in-slab is prohibited for on-grade slabs.
- The requirement for no more than two 90-degree bends in any conduit run.

B. The Designer shall be attentive to the addendums produced by other disciplines on the design team. Sometimes addendums can be submitted which conflict with technology infrastructure. The Designer shall promptly address any such conflicts and bring them to the attention of the applicable TPM in each case.

C. Approximately ten days prior to the date that bids are due, the Designer shall issue an addendum reiterating the requirement for technology subcontractors to have been pre-approved. The addendum shall also list the name and contact information for any subcontractors who have been pre-approved. The objective is for bidders to receive this finalized list of pre-approved subcontractors not less than one week before the bids are due.

D. On projects where a contractor will design and install the work, the Contractor shall submit the following documentation with the bid, depicting what will be installed by the Contractor:

- Material cut-sheets
- Plan drawings of new devices, outlets and cable routing
- Drawings of the grounding/bonding plan (as appropriate, when required)

All drawings shall be prepared using professional design software. Hand-drawn sketches, or drawings produced using bitmap graphics editors, shall not be accepted.

3.5.6 CONSTRUCTION OBSERVATION

A. The Designer shall review the Contractor's submittals that are required by the Construction Documents. When the Contractor's submittals include materials or methods that deviate from WSUP standards, the Designer shall either:
   - Reject the specific materials and methods that do not comply, when the Designer believes that they constitute undesirable solutions.
   - Pursue the SVR process to seek separate approval for each specific material and method that the Designer believes would constitute a better solution.

B. The Designer shall visit the construction site frequently to observe the construction quality and status. The Designer shall confer with the WSUP FSPM and applicable TPM prior to proposing services for the project to determine an appropriate site visit frequency for the project. The site visit frequency will likely fluctuate during the construction phase as the technology-related activity increases and decreases.

C. During the site visits, the Designer shall take digital photographs of existing and new pathways, spaces, and cabling (both intra-building and outside plant) that are related to the project. In particular, the Designer shall photograph infrastructure that will later be concealed during the course of construction.

D. It is the responsibility of the Designer to verify that the Contractor properly labels all cabling (both inside plant and outside plant) during construction. Inadequate or incomplete labeling is not acceptable.

E. Accurate as-built drawings are considered critical for the efficient long-term operation of WSUP facilities. During construction observation visits, the Designer shall observe and report on the up-to-date status of the as-built drawing notations.

F. After each construction observation visit, the Designer shall submit a written report describing the observed construction progress. Observations shall be documented in the report with annotated digital

photographs and a written description of any problems, a description of the requirements in the Construction Documents, and the resolution of the issues. For each item requiring corrective attention, the report shall describe the following:

- A description of the issue
- Applicable requirements in the Construction Documents
- Applicable WSUP standards, industry standards and codes
- Corrective options available to WSUP
- Designer's recommendation

G. The Designer shall submit the construction observation reports via email to the WSUP FSPM and the WSUP TPM as soon as possible following each site visit. The reports shall also be reviewed at the next construction meeting. A timely report submission will aid the Designer and WSUP in identifying potential problems early in the construction process.

H. The Designer shall alert the Contractor that cable testing shall be performed after electrical systems have been powered on and after building operational conditions become similar to normal operations. Also, any dust-producing construction activities shall be completed prior to any cable testing. The intent is that testing not be done until normal operating conditions exist (and the associated electromagnetic interference is being generated by electrical systems in the building).

3.5.7 POST-CONSTRUCTION

A. The Designer shall review the Operation and Maintenance information provided by the Contractor for the telecommunications distribution system. The Designer shall verify that information is included for each component in the system. Upon approval of the content in the Operation and Maintenance information, the Designer shall submit the information to the designated WSUP TPM with written documentation indicating that the Designer has reviewed the information and that it appears to meet the requirements in the Construction Documents.

B. The Designer shall provide record drawings and record documentation to WSUP (based on as-built documents that have been "red-lined" by the Contractor). Record documents shall be provided in electronic CAD format where applicable, in addition to any requirements contained in the Designer's contract with WSUP.

C. The Designer shall review the test reports produced by the Contractor during the project. The Designer shall verify that the test reports are complete, properly performed, and indicate passing results.

- If the test results are not satisfactory, the Designer shall require the Contractor to address all issues and resubmit acceptable test reports.

D. The Designer shall verify that the contractor provides the appropriate manufacturer warranty certification documentation to WSUP.

3.6 Designing For Demolition

Some projects may involve existing buildings that require the demolition of existing telecommunications cabling and components. In these situations, the following activities are required:

3.6.1 SITE-SPECIFIC CODE REQUIREMENTS

The Designer shall clearly understand the site-specific, Code-based requirements for demolishing cabling and components that are no longer in use, and shall communicate these requirements to WSUP. Such cabling shall be completely removed from the facility, from source to destination.

3.6.2 PRESERVATION OBJECTIVES

WSUP may wish to preserve some existing cables in operational condition. Such existing cables may not be used immediately following the completion of the work, but WSUP may have plans for future use of those cables. It may be required in the Code that such cables be physically tagged for future use, or otherwise be subject to demolition.

The Designer shall inquire with WSUP on a project-by-project basis about cabling, equipment, and other materials that should be preserved in an operational condition during the course of a project.

3.6.3 SALVAGE OBJECTIVES

The Designer shall inquire with WSUP on a project-by-project basis about cabling, equipment and other materials that should be removed and salvaged to the Owner, and also to determine how and where the salvaged materials will be delivered to the Owner.

4 Appendix

4.1 Sample Review Comment Report

The table below depicts an example Review Comment Report form that may be used. Review comments from WSUP would be entered on the left half of the page. Responses from the Design Team (including architects, engineers and Technology Infrastructure Designers) shall be provided on the right half of the page. Upon request, WSUP will provide an electronic document for this form to be used as a template.

DESIGN REVIEW COMMENTS

Date: 3/21/2013 | Returned to WSU: | Page: 1 of 1

Project Title: Washington State University Project Title | Contract No.: WSU # | Architect: Architect Name

DWG. NO./ PAR. NO.	ITEM NO.	Reviewer Initials	REVIEWER COMMENTS	Initials / Firm	DESIGN TEAM RESPONSE
Sheet #	1	AE	Drawing Comment		
Sheet #	2	SE	Drawing Comment		
Sheet #	3	KB	Drawing Comment		Design Team Responses (Architects, Engineers, Designers)
Section # Para. #	4	BR	Specification Comment		
Section # Para. #	5	LH	Specification Comment		