

# Salt River Project



Delivering water and power™

## Design Guidelines Manual for Design and Construction Projects

Facilities Services  
Design & Construction  
Vision: Best in Class

December 2021



Delivering water and power™

# Design Guidelines Manual

As a community-based not-for-profit water and energy company, SRP strives to act in the best interest of their employees and the people they serve. As good stewards of the SRP culture, Facilities Services strives to be the “**Best in Class**” to help build a better future for Arizona. Best in Class means that Facilities Services is constantly improving, working to deliver better quality projects and services. As a valued service provider, SRP needs your help to achieve this vision and to continue to improve in both process and results.

As part of this effort to improve, I’m proud to introduce the Design Guidelines Manual, a new tool that we have developed to bring **clarity** to expectations, process, and preferences. Written specifically around SRP’s requirements, these guidelines include both process recommendations that outline how to best achieve success, as well as technical recommendations that reflect SRP’s unique standards and project needs.

Our goal in development of this document is to set Design Consultants up for success and to drive **consistent results** from project to project. By sharing our thoughts up front, we hope to take out some of the guess work and free you up to be able to focus your time and energy on tasks that bring higher value to SRP.

As you use this manual, we welcome your input. We envision that this document will evolve over time, with updates occurring on a regular basis to reflect lessons learned and industry best practices. We encourage you to share your ideas for improving this tool, just as we trust that you will bring forward creative design solutions during a project. We value your opinion and your **partnership** as we work together to deliver **quality** project results.

Sincerely,

Brian Heath

Senior Director, Facilities and MCM Services

# Table of Contents

<b>Section 1 – Process Guidelines .....</b>	<b>10</b>
<b>1.01 Purpose.....</b>	<b>10</b>
1.01.01 Introduction to SRP .....	10
1.01.02 Strategic Initiatives.....	10
1.01.03 Philosophy .....	11
1.01.05 Goals .....	11
<b>1.02 Overview .....</b>	<b>12</b>
1.02.01 Intent of Document.....	12
1.02.02 Guiding Principles.....	12
1.02.03 Structure .....	13
1.02.04 Additional Resources .....	13
<b>1.03 Stakeholders.....</b>	<b>14</b>
1.03.01 SRP Organizational Chart.....	14
1.03.02 SRP Facilities Services Organizational Chart.....	15
1.03.03 SRP Resources .....	17
1.03.04 Role of the SRP Project Manager .....	21
1.03.05 Role of the Design Consultant .....	22
<b>1.04 Processes and Procedures.....</b>	<b>23</b>
1.04.01 Communication and Approvals .....	23
1.04.02 Codes & Jurisdictions .....	25
1.04.03 Document Control .....	26
1.04.04 Deviations from Design Guidelines .....	26
1.04.05 Updates .....	27
<b>Section 2 – Design Guidelines .....</b>	<b>29</b>
2.01 Site Maps .....	29
2.02.01 Introduction .....	30
2.02.02 Administrative .....	30
2.02.03 Service and Support .....	31
<b>2.03 Space Types .....</b>	<b>32</b>
2.03.01 Introduction .....	32
2.03.02 Office .....	32
2.03.03 Warehouse .....	33
2.03.04 Vehicle Service / GARAGE .....	34
2.03.05 Shops .....	35
<b>2.04 Design Principles .....</b>	<b>36</b>
2.04.00 Introduction .....	36
2.04.01 Comprehensive Approach.....	36
2.04.02 Balance Between Capital and Life Cycle Costs.....	36

2.04.03 Consideration of Maintenance and Operations .....	37
2.04.04 Flexibility and Growth.....	38
2.04.05 Universal Planning and Standardization.....	38
2.04.06 Sense of Place.....	39
2.04.07 Brand Integration .....	40
2.04.08 Color and Pattern as Wayfinding.....	41
2.04.09 Efficient Circulation .....	42
2.04.10 Shared Spaces as Destinations .....	43
2.04.11 Hierarchy of Space .....	44
2.04.12 Transparency and Visibility .....	45
2.04.13 Safety and Security.....	46
2.04.14 Sustainability and Wellness .....	47
<b>Section 3 – Technical Guidelines.....</b>	<b>49</b>
<b>3.01 Division 01 – General Requirements.....</b>	<b>49</b>
3.01.00 Introduction .....	49
<b>3.02 Division 02 – Existing Conditions .....</b>	<b>50</b>
3.02.00 General Requirements.....	50
<b>3.03 Division 03 – Concrete .....</b>	<b>51</b>
3.03.00 Introduction .....	51
3.03.01 Concrete Joints.....	51
3.03.02 Concrete Reinforcing .....	51
3.03.03 Cast-in-Place Concrete.....	51
3.03.04 Concrete Finishing.....	52
3.03.05 Architectural Concrete .....	52
3.03.06 Precast Concrete .....	52
3.03.07 Concrete Stairs .....	52
3.03.08 Concrete Cutting and Coring.....	53
<b>3.04 Division 04 – Masonry.....</b>	<b>54</b>
3.04.00 Introduction .....	54
3.04.01 Mortar .....	54
3.04.02 Masonry Accessories.....	54
3.04.03 Commissioning of Masonry.....	55
3.04.04 Unit Masonry.....	55
3.04.05 Brick Masonry .....	55
3.04.06 Concrete Masonry Unit .....	55
3.04.07 Glass Unit Masonry.....	56
3.04.08 Masonry Restoration and Cleaning .....	56
3.04.09 Cast Stone.....	56
<b>3.05 Division 05 – Metals .....</b>	<b>57</b>
3.05.00 Introduction .....	57



3.05.01 Metal Fabrications .....	57
3.05.02 Metal Stairs.....	57
3.05.03 Handrails and Railings .....	57
<b>3.06 Division 06 – Wood, Plastic and Composites.....</b>	<b>58</b>
3.06.00 Introduction .....	58
3.06.01 Rough Carpentry .....	58
3.06.02 Architectural Woodwork .....	58
3.06.03 Architectural Woodwork - Cabinets .....	59
3.06.04 Architectural Woodwork - Countertops.....	60
<b>3.07 Division 07 – Thermal and Moisture Protection .....</b>	<b>61</b>
3.07.00 Introduction .....	61
3.07.01 Site Drainage .....	61
3.07.02 Dampproofing and Waterproofing .....	61
3.07.03 Weather Barriers.....	62
3.07.04 Roofing .....	62
3.07.05 Metal Wall Panels .....	63
3.07.06 Flashing and Sheet Metal .....	64
3.07.07 Firestopping.....	64
3.07.08 Sealants and Caulking .....	64
<b>3.08 Division 08 – Doors and windows .....</b>	<b>65</b>
3.08.00 Introduction .....	65
3.08.01 Entrances and Storefronts .....	67
3.08.02 Hollow Metal Doors and Frames.....	67
3.08.03 Wood Doors.....	67
3.08.04 Aluminum Frames.....	68
3.08.05 Specialty Doors.....	68
3.08.06 Access Doors.....	68
3.08.07 Hardware .....	69
3.08.08 Keys and Keying.....	70
3.08.09 Glass and Glazing .....	71
<b>3.09 Division 09 – Finishes .....</b>	<b>72</b>
3.09.00 Introduction .....	72
3.09.01 Selection and Approval of Finishes .....	75
3.09.02 Non-Structural Metal Framing .....	75
3.09.03 Gypsum Board.....	76
3.09.04 Lath and Plaster.....	76
3.09.05 Tile.....	77
3.09.06 Acoustical Ceilings.....	77
3.09.07 Transitions .....	77
3.09.08 Concrete Flooring .....	78

3.09.09 Resilient Flooring .....	78
3.09.10 Carpeting .....	78
3.09.11 Wallcovering .....	78
3.09.12 Painting and Coating.....	79
3.09.13 RAISED ACCESS FLOORING.....	79
<b>3.10 Division 10 – Specialties .....</b>	<b>80</b>
3.10.00 Introduction .....	80
3.10.01 Interior Signage .....	80
3.10.02 Exterior Signage .....	80
3.10.03 Toilet Compartments.....	81
3.10.04 Wall Protection.....	82
3.10.05 Toilet Accessories.....	82
3.10.06 Fire Extinguishers & Automated External Defibrillators.....	83
3.10.07 Storage Specialties .....	83
3.10.08 Load Points and Fall Protection .....	84
<b>3.11 Division 11 – Equipment .....</b>	<b>85</b>
3.11.00 Introduction .....	85
3.11.01 Projection Screens .....	85
<b>3.12 Division 12 – Furnishings .....</b>	<b>86</b>
3.12.00 Introduction .....	86
3.12.01 Window Treatments .....	86
3.12.02 Furniture .....	86
<b>3.13 Division 13 – Special Construction .....</b>	<b>87</b>
3.13.00 Introduction .....	87
<b>3.14 Division 14 – Conveying Systems.....</b>	<b>88</b>
3.14.00 Introduction .....	88
3.14.01 Elevators.....	88
<b>3.21 Division 21 – Fire Suppression.....</b>	<b>89</b>
3.21.00 Introduction .....	89
3.21.01 Fire Suppression.....	89
3.21.02 Clean-Agent Fire Extinguishing Systems .....	91
<b>3.22 Division 22 – Plumbing .....</b>	<b>94</b>
3.22.00 General Plumbing Requirements .....	94
3.22.01 Fixtures.....	95
3.22.02 Equipment .....	97
3.22.03 Piping .....	98
<b>3.23 Division 23 – Heating, Ventilating and Air Conditioning.....</b>	<b>100</b>
3.23.00 General Mechanical Requirements .....	100
3.23.01 Air Side .....	102
3.23.02 Water Side .....	105

3.23.03 Direct Expansion Air Conditioning.....	107
<b>3.25 Division 25 – Integrated Automation.....</b>	<b>109</b>
3.25.00 General Requirements.....	109
<b>3.26 Division 26 – Electrical.....</b>	<b>110</b>
3.26.01 Power Distribution.....	110
3.26.02 Lighting.....	111
3.26.03 Basic Minimum Raceway Requirements:.....	112
3.26.04 Concealing New Circuits.....	112
3.26.05 Fire Stopping.....	112
3.26.06 Arc Flash Study.....	112
3.26.07 Cathodic Protection.....	112
3.26.09 Low-voltage Electrical Power Conductors and Cables.....	113
3.26.10 Prohibited Materials.....	113
3.26.11 Grounding and Bonding for Electrical Systems.....	113
3.26.12 Raceways and Boxes for Electrical Systems.....	114
3.26.13 Bus Duct and Busway.....	114
3.26.14 Conduit Drainage.....	114
3.26.15 General Box Requirements.....	115
3.26.16 Floor Penetration Details.....	115
3.26.17 Vibration and Seismic Controls for Electrical Systems.....	115
3.26.18 Identifications for electrical systems.....	115
3.26.19 Low-voltage Switchgear and Switchboards.....	116
3.26.20 Panelboards.....	117
3.26.21 Motor-Control Centers.....	118
3.26.22 Wiring Devices.....	118
3.26.23 Variable-Frequency Motor Controllers.....	119
3.26.24 Engine Generators.....	119
3.26.25 Emergency Power Systems and Emergency/Egress Lighting.....	119
3.26.26 Emergency and Egress Lighting Design Criteria.....	122
3.26.27 Emergency Generator.....	123
3.26.28 Lightning Protection for Structures.....	123
3.26.29 Interior Lighting.....	124
3.26.30 Light Fixture Switching and Control.....	125
3.26.31 Exterior Lighting.....	126
3.26.32 Communications.....	128
<b>3.27 Division 27 – Communications.....</b>	<b>130</b>
3.27.01 Requirements Outside Buildings.....	130
3.27.02 Requirements Inside Buildings.....	130
3.27.03 Specific Requirements Inside Buildings.....	131
<b>3.28 Division 28 – Electronic Safety and Security.....</b>	<b>133</b>

3.28.00 Introduction .....	133
3.28.01 Access Control.....	133
3.28.02 Video surveillance.....	134
3.28.03 Intrusion Detection.....	134
3.28.04 Fire Detection and Alarm .....	134
3.28.05 Mass Notification .....	136
<b>3.31 Division 31 – Earthwork .....</b>	<b>137</b>
3.31.00 Introduction .....	137
3.31.01 Demolition.....	137
3.31.02 Trench Excavation, Compaction and Backfill .....	138
3.31.03 Riprap.....	138
<b>3.32 Division 32 – Exterior Improvements .....</b>	<b>140</b>
3.32.01 Asphalt Concrete Pavement .....	140
3.32.02 Rigid Concrete Pavement .....	140
3.32.03 Concrete Curb, Gutter, Sidewalk and Driveway .....	140
3.32.04 Parking .....	141
<b>3.33 Division 33 – Utilities.....</b>	<b>142</b>
3.33.01 Water Systems .....	142
3.33.02 Sanitary Sewer Systems .....	143
3.33.03 Storm Drain Systems .....	144

# 1

## Section 1 Process Guidelines

# Section 1 – Process Guidelines

## 1.01 Purpose

### 1.01.01 INTRODUCTION TO SRP

SRP was founded in 1903 as a Federal Reclamation Project. It is a Political Subdivision of the State of Arizona whose purpose is to provide both water and power to commercial and residential customers. Since its inception, the Phoenix-Mesa Metropolitan Service Area has grown to a population exceeding 4.7 million. Over the last century, SRP has grown to the point that the Facilities Services group now oversees 17 campuses with over 100 buildings, consisting of over 2 million square feet. Most of the buildings were built in the 1980's or prior and consist of a mix of offices, vehicle repair facilities, warehousing, and shops.

### 1.01.02 STRATEGIC INITIATIVES

SRP is a forward-thinking organization that places high value on people and progress. The company is known for its commitment to customer service and support of the local community through education initiatives and community giving. As a fiscally responsible company, SRP takes great care to invest their capital dollars in the best interest of the company and its rate payers. By setting ambitious goals, including the 2035 Sustainability Goals, SRP is leading the industry in sustainability and innovation. SRP values thoughtful leadership and creative solutions.



### 1.01.03 PHILOSOPHY

As a community-based not-for-profit water and energy company, SRP acts in the best interest of their employees and the people they serve. Within SRP, Corporate Services is a customer service-oriented group, viewing the business units within SRP as their customers. Corporate Services provides a diverse range of services for the greater good of SRP and the customers they serve. They partner with SRP business units to develop and implement valued sustainable solutions, providing reliable and quality service without exception.

As part of the Corporate Services team and as good stewards of the SRP culture, Facilities Services strives to be the “Best in Class” to help build a better future for Arizona. Best in Class means that Facilities Services is constantly improving, working to deliver better quality projects and services. They value creativity, innovation and finding solutions that work, all while building trusted relationships with their customers across SRP.

### 1.01.05 GOALS

Facilities Services is responsible for being good stewards of SRP’s finances. Consistent execution and results are key, as well as application of appropriate, cost effective design solutions. The definition of a successful project is one that:

- Satisfies the spatial and functional needs of the users
- Is designed specifically for the actual climate and other physical parameters of the site
- Is designed for the minimum capital cost consistent with lowest life cycle costs
- Is environmentally and socially sustainable
- Meets SRP Facilities design guidelines, specifications, and project requirements.

SRP Corporate Goals should always be considered during project planning. Current Corporate or Facilities Goals can be obtained from the SRP project manager.

## 1.02 Overview

### 1.02.01 INTENT OF DOCUMENT

The purpose of the Design Guidelines Manual is to set expectations for Design Consultants, including Architects, Interior Designers and Engineers. They are intended to clarify SRP's needs and protocols to ensure consistent results from project to project. Design guidelines include both process recommendations that outline how to best achieve success, as well as technical recommendations that outline SRP's preferred design solutions.

They are not:

- Rules
- Codes
- Product specifications
- A substitution for critical thinking or problem solving during the design process

This document does not modify the contractual obligations between SRP and the Design Consultant, Contractor, or other party. Compliance with these guidelines does not constitute a waiver of the Design Consultant's liability. It is not intended to be fully inclusive of every scenario and is not intended to replace the need to exercise good judgment or appropriate standard of care.

The guidelines are not meant to replace code compliance or industry best practice. They are meant to provide guidance when SRP's preference deviates from or exceeds current codes. In cases where the guideline requirements exceed code requirements, the Design Guidelines Manual will take precedence.

### 1.02.02 GUIDING PRINCIPLES

- **Good design review is advisory:** It does not make the decisions but offers impartial advice for the decision makers. It offers constructive, impartial, peer advice that will help assess designs from a broader perspective and identify any fundamental weaknesses as opposed to providing alternative design solutions. It does not provide advice to redesign schemes, rather, it offers comments that will lead to their improvement.



- **Good design review is accessible:** Findings should be clearly expressed in language that decision makers and clients can understand and use. The design review process is as transparent as possible.
- **Good design is timely:** It takes place as early as possible in the life of a design, because this is when changes can be made with the least time and cost implications.
- **Good design review is focused on outcomes for people:** It evaluates how a building or place can better meet the needs of the people using it and of anyone who is affected by it.
- **Good design review aims to improve quality:** It constructively seeks to raise the quality of all buildings and places by providing advice that enables better quality design solutions.

### 1.02.03 STRUCTURE

This document is made up of the following three sections.

- 1) **Process Guidelines:** Provide information on the background of SRP, the intent of this document, the stakeholders and the processes and procedures of SRP
- 2) **Design Guidelines:** Define the space types and the design principles that are the overarching ideas that become the basis for decision making
- 3) **Technical Guidelines:** Provide additional information by technical division

### 1.02.04 ADDITIONAL RESOURCES

SRP Facilities has additional resources available for your reference. All content, including the Construction Specification, Standard Details, and CAD Standards can be found at [srpnet.com/facilitiesdc](http://srpnet.com/facilitiesdc).

## 1.03 Stakeholders

### 1.03.01 SRP ORGANIZATIONAL CHART

SRP consists of various departments with their own set of responsibilities. Up to date information on SRP's Officers and Executives can be found at <https://www.srpnet.com/about/officers.aspx>

Project Specific organizational information can be obtained from the SRP Project Manager.

## 1.03.02 SRP FACILITIES SERVICES ORGANIZATIONAL CHART

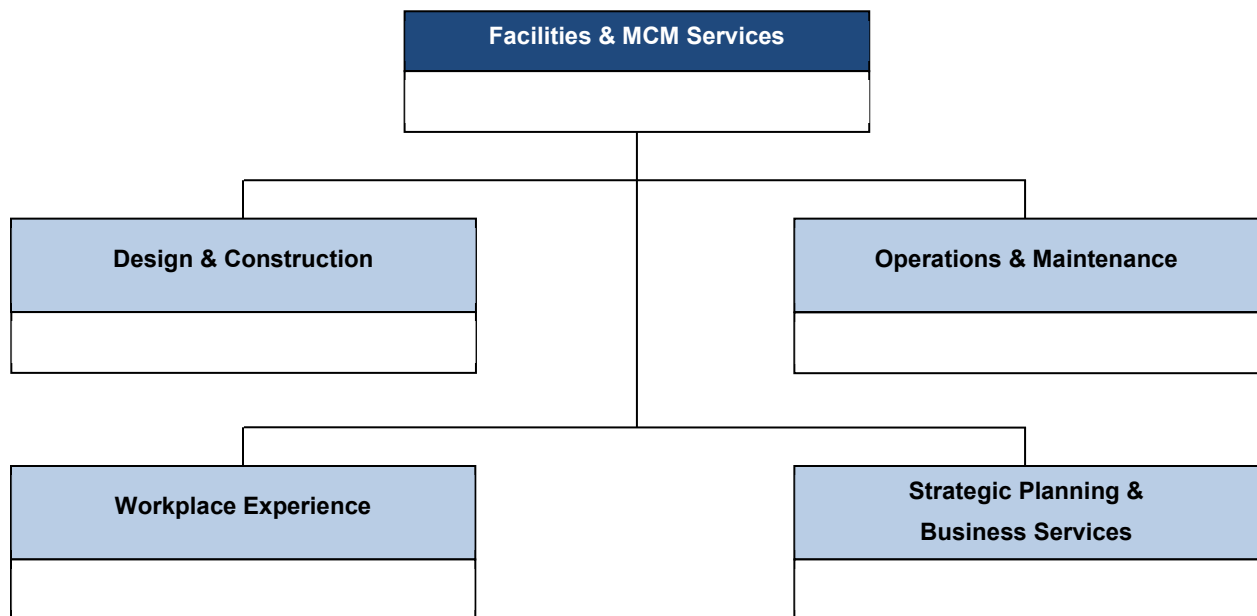
Facilities Services acts as the Owner's Representative for SRP design and construction projects.

Facilities Services has the authority to:

- Develop and maintain the Facilities Betterment Roadmap
- Establish the project Scope of Work (SOW), budget and schedule
- Publish and maintain the Design Guidelines Manual, Standard Specifications, Design Details Library and CAD Standards
- Determine the project delivery method
- Review and accept design drawings

Facilities Services consists of four teams.

- Design & Construction
- Operations & Maintenance
- Strategic Planning & Business Services
- Workplace Experience



## DESIGN & CONSTRUCTION (D&C)

D&C oversees the capital projects of a variety of scope and scale, from a chiller replacement to a multi-phased renovation. The D&C team consists of Designers, Engineers, Project Managers and Project Coordinators. D&C is responsible for the planning, design, construction, and commissioning of capital projects. They work with the project team and stakeholders and manage a vast array of activities that include developing Scope of Work documents, providing drawing reviews, technical and tribal knowledge, reviewing financial transactions, and supervising the closeout process. They play a key role in coordinating both internal and external resources.

## OPERATIONS & MAINTENANCE (O&M)

O&M is focused on maintaining the reliability of buildings and systems. They implement preventative maintenance programs and perform corrective maintenance to ensure consistent functionality. They act as the technical experts for the systems they operate and maintain. They also provide logistical services including workstations and office relocations, reconfigurations, and Facilities Services Call Center responsibilities.

O&M is D&C's largest customer, as O&M is a Project Stakeholder in most capital projects since they involve building systems. A productive working relationship with O&M is critical as they will be involved in the following aspects of project execution:

- Design and engineering drawing review
- Maintenance and equipment requirements
- Construction administration document review
- Spare parts and attic stock
- Asset management
- Building or partial-building shutdowns
- Owner review and functional acceptance at project turnover
- Asbestos Testing

## STRATEGIC PLANNING AND BUSINESS SERVICES (STRATEGIC PLANNING)

Strategic Planning is responsible for company-wide planning, analysis, and administration of owned and leased space. They serve as the liaison for space needs between departments and Facilities Services. Strategic Planning maintains awareness of department locations, space needs and keeps records regarding SRP's overall space inventory by conducting assessments regularly.

Strategic Planning works closely with D&C to implement space project requests, including planning, construction, maintenance, and where necessary, facility upgrades. Strategic Planning reviews space changes or relocation projects to determine if the request meets the intended need of the department. They are also responsible for long term strategy, forecasting and planning, including development of and updates to the Facilities Betterments Roadmap.

## WORKPLACE EXPERIENCE

The Workplace Experience team has recently been created to address the workplace of the future. This new team is focused on addressing the changing workplace needs of SRP's employees, brought about by the adoption of telework. They will develop strategies and guidelines to facilitate the shift to hybrid work, along with the implementation of a core consolidation plan and comprehensive change management strategy.

### 1.03.03 SRP RESOURCES

In addition to the Facilities Services teams identified in the previous section, SRP has internal resources that need to be included in the design process. Coordination with these resources will occur through the SRP Project Manager.

## INFORMATION TECHNOLOGY SERVICES (ITS)

Information Technology Services (ITS) is responsible for establishing, monitoring, and maintaining corporate information technology systems and services for SRP. They have a presence in every building throughout SRP. Several of the relevant divisions that are involved in Facilities projects are noted below.

## ITS - IT WORKPLACE SERVICES

IT Workplace Services includes the Digital Experience Team (DET), Voice Communications (VC), Workspace Technologies (WTS), and End User Computing Support (EUC). These teams work to improve experiences for SRP's workforce by delivering new service delivery channels, modernizing shared workspaces and identifying digital expectations and requirements. In addition, they provide consistent quality customer experiences to SRP's workforce for voice communications and conferencing technologies

The IT Workplace Services team may be involved in the following:

- Conference Room upgrades and technology standards (DET)
- Projectors and fixed and retractable projection screens (DET)
- Conference room control systems (Note: lighting control systems are typically determined by Facilities Services) (DET)
- Cable television network infrastructure (wired and wireless) (DET)
- Standards for power and data requirements for employee work areas (offices and cubicles) (WST)
- Employee equipment support (desktop computers, laptops, phones) (EUC, DET)
- Temporary removal or relocation of existing telecommunications infrastructure (VC)
- Multifunction Printers (WST)

## ITS – INFRASTRUCTURE AND OPERATIONS

Infrastructure and Operations includes Network Management, Telecommunication, and Data Center Operations. They are responsible for the design, standards and guidelines, operation, and maintenance of SRP's internal network. Network may be involved in the following:

- Main and intermediate distribution frames (MDF/IDF)
- Cabling specifications
- Telecommunications infrastructure
- Cable trays (Note: pathways are typically designated by Facilities Services)
- Addition, removal or relocation of telecommunications infrastructure or corporate networks
- Tower / antenna systems
- Land-mobile radio and paging systems

## CREATIVE SERVICES

Creative Services is part of the Community, Communications and Marketing group. They are responsible for communication standards and photo archives. Creative Services may be involved in the following:

- Integration of art and graphics
- Instructional podiums and instructional media equipment

## HAZARDOUS MATERIALS TESTING

SRP conducts materials testing internally. The testing is conducted by various departments or teams across SRP. The responsible group is designated below after the material being tested. Hazardous Materials Testing may be involved in testing the following:

- Soils (Civil)
- Adhesives and mastics
- Paints
- Indoor air quality (Safety)
- Outdoor air quality (Environmental Services)
- Water quality (Environmental Services)

## INSURANCE SERVICES (FIRE PROTECTION)

Fire Protection is a division within Insurance Services. Their mission is to protect employee and visitor lives and property by fostering a safe environment through preventative measures, ongoing maintenance, plan reviews, inspections, and education. The SRP Fire Marshall is involved with life safety systems. Fire Protection may be involved in the following:

- Review of life safety systems design and construction installation
- Fire impairment planning

## SAFETY SERVICES

The role of Safety Services is to provide and maintain a safe work environment. This includes health and industrial hygiene to address the various potential exposures to SRP employees and the general public. Safety Services may be involved in the following:

- Fall protection
- Site, egress, and entrance
- Pedestrian and vehicular traffic control inspections
- Indoor air quality
- Construction site safety

## SECURITY SERVICES

Security Services works towards reducing crime and providing a secure environment for employees and visitors. They oversee security personnel and equipment, such as metal detectors, card readers, cameras, etc. Security Services may be involved in the following:

- Coordination with security vendors
- Review and approval of security hardware
- Card reader locations
- Security camera locations
- Security gates
- Traffic barriers
- Guard house and security desk
- Perimeter fencing
- Site access
- Backgrounds checks and vendor badging

## INVESTMENT RECOVERY & SUSTAINABLE SOLUTIONS

Investment Recovery & Sustainable Solutions works to enhance SRP's economic and environmental impact by providing innovative and sustainable services within SRP and the community. They can be a resource for both assets and materials being removed. Investment Recovery may be involved in the following:

- Review of materials for salvage prior to demolition
- Trash / recycling management



## WATER QUALITY & WASTE MANAGEMENT SERVICES

Water Quality & Waste Management Services (WQ & WMS) provides compliance programmatic review for Spill Prevention Control & Countermeasures, Construction General Permitting, and notifications. WQ & WMS also provides support for facility regulatory reporting for Pollution Prevention and Tier II, both a requirement of Arizona Department of Environmental Quality. WQ & WMS may be involved in the following:

- Management of earthmoving and asbestos (aka: NESHAP) permits
- Drywell guidelines assistance
- Safety Data Sheet Review
- Provide environmental compliance
- Provide best practice training for SRP employees
- Assists in regulated waste disposal for asbestos, used petroleum products, and other spent chemicals

### 1.03.04 ROLE OF THE SRP PROJECT MANAGER

The SRP Project Manager (PM) is the direct link between the Design Consultant, SRP, and all project stakeholders. They act as the main point of contact and owner's representative. The SRP PM has the authority to authorize design services and approve project financials, as well as approve design and deliverables. The PM's responsibilities include:

- Act in SRP's best interest
- Coordinate with SRP Procurement
- Oversee internal and external consultants, including the Design Consultant
- Build project charter to establish scope of work, ROM budget, and goals
- Coordinate and consolidate stakeholder comments
- Maintain communications
- Seek out SRP resources and internal vendors
- Provide access to resources and standards as needed
- Work side by side with the Design Consultant in creating and maintaining the schedule
- Provide clarifications on deliverable requirements
- Scheduling job walks, Design Review meetings and inspections
- Obtain documentation at project closeout

### 1.03.05 ROLE OF THE DESIGN CONSULTANT

SRP values companies that share their ideals and beliefs. The Design Consultant is expected to act as a partner to SRP and conduct themselves with integrity and respect. Capital projects are complex endeavors and SRP relies on the Design Consultant to help navigate, build consensus, and bring forward design ideas and creative solutions. The Design Consultant manages the design process and acts as the main point of communication, coordinating and gathering information on behalf of the entire design team. The Design Consultant's responsibilities include:

- Act in SRP's best interest
- Design to the scope of work, ROM budget, and goals as outlined in the project charter
- Maintain communications
- Request information needed from SRP resources and internal vendors in advance
- Use resources provided by SRP including but not limited to Design Guidelines, Construction Specifications, Design Document Submission Requirements, Standard Details, CAD Standards and Furniture Standards ([srpnet.com/facilitiesdc](http://srpnet.com/facilitiesdc))
- Work side by side with the SRP Project Manager in creating and maintaining the schedule
- Meet deliverable requirements
- Attend job walks and Design Review meetings
- Coordination of Design Consultant's sub-consultants as well as SRP's vendors
- Obtain milestone approvals prior to moving forward to next phase of work
- Perform site verification to confirm accuracy of provided digital drawings

### SRP'S ADVICE TO DESIGN CONSULTANTS

Design Consultants are encouraged to:

- Track communications and approvals in writing
- Ask questions
- Be proactive
- Follow the rules for processes and procedures
- Be a good team player
- Provide honest and open feedback
- Use good judgement

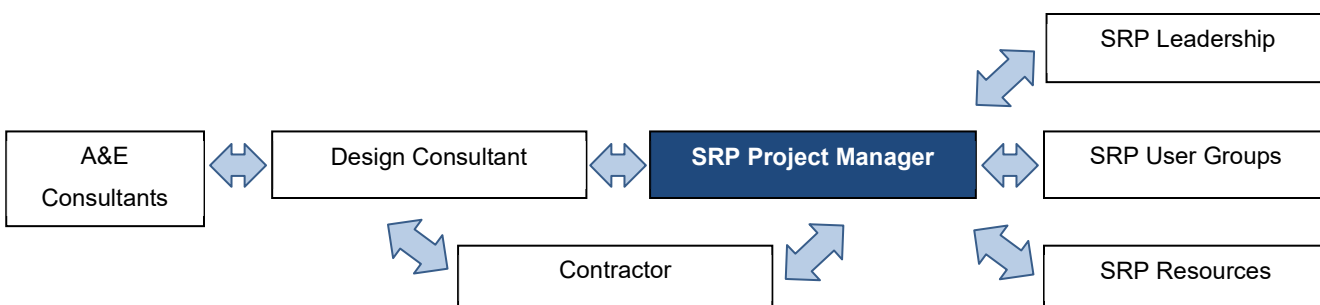
## 1.04 Processes and Procedures

### 1.04.01 COMMUNICATION AND APPROVALS

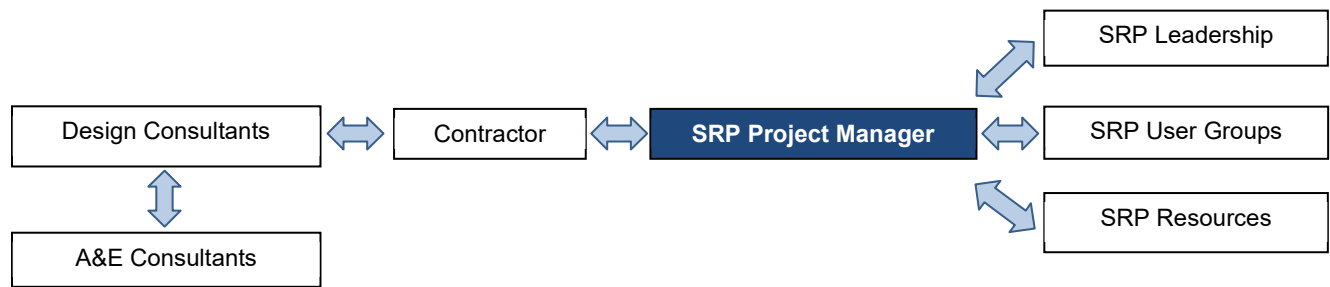
Communication is critical for SRP projects to meet objectives of the scope and budget. Types of communication include in-person meetings, conference calls and email correspondence. Due to the public nature of their work and their obligations to their ratepayers, SRP is sensitive to public communications. Requests for interviews, project statistics, or other public communications should be coordinated through the SRP Project Manager. Use of project information or photography for marketing purposes must be approved in writing.

The project delivery method will determine the communication path. With a traditional Design Bid Build, Construction Manager at Risk (CMAR) or Job Order Contracting (JOC) Project, the Design Consultant, the Contractor and the SRP Project Manager coordinate hand in hand. With a Design Build Project, the Design Consultant communicates through the Contractor, who then addresses with the SRP Project Manager. In both project delivery methods, the Design Consultant will be the main source of communication with the A&E consultants. If the project does not fit into one of these categories, it is important to determine the communication path at the start of a project.

#### PROJECT DELIVERY METHOD: DESIGN BID BUILD, CMAR AND JOC



## PROJECT DELIVERY METHOD: DESIGN BUILD



Capital projects are complex; therefore, it is important to keep written documentation of approvals, decisions, outcomes of meetings, questions, and responses. At the beginning of a project, consider the level of complexity and scale documentation efforts accordingly. This could include change logs, weekly status reports, deviation requests and open item tracking. As the main point of contact for communication, the Design Consultant is responsible for both internal and external communication. Within the design team, the Design Consultant coordinates deliverable dates, design deliverables, SRP's requirements and redlines. Outside the design team, the Design Consultant communicates through progress updates, agendas, and meeting notes to the SRP Project Manager.

## DESIGN REVIEW MEETINGS

The design review and approval procedures are in place to secure necessary client approvals, resolve conflicts, address comments, obtain clarifications, define non-standard projects, and confirm alignment with the scope of work and budget, prior to proceeding to the next phase. The SRP Project Manager is responsible for inviting the appropriate client representatives. The Design Review Meetings are held at scheduled milestone dates/phases to accomplish the following:

- Confirm scope
- Check schedule
- Validate the budget
- Consider value engineering
- Prepare for jurisdictional submission (if required)
- Review Drawing Submittal Requirements located in the Design Document Submission Requirements

## DESIGN DOCUMENT SUBMISSION REQUIREMENTS

The purpose of this document is to provide additional details regarding design submissions at each stage of the design process. This document also clarifies what is to be expected at each stage of the Design Review process, to ensure all proposals are compared equally. The SRP Project Manager is responsible for evaluating each submission in its entirety for completeness. Incomplete submissions will be returned to the A&E Consultants to complete and re-submit prior to technical review. The building design may consist of the following two to five stages:

- Schematic Alternatives Evaluation Phase
- Schematic Design Phase
- 30% Design Development Design Phase
- 50% Construction Document Design Phase
- 100% Construction Document Design Phase

Refer to this living document within the contractual agreement documentation or request a copy from your PM.

## APPROVALS

The only person who can provide approval is the designated SRP Project Manager. Approval must be obtained in writing and must be obtained before moving to the next phase of work. Items requiring approval include:

- Milestone deliverables
- Contract documents
- Changes in scope, budget, or schedule

### 1.04.02 CODES & JURISDICTIONS

Established by the National Reclamation Act, SRP operates on withdrawn federal land and acts as its own regulatory authority over those sites. SRP sites are not subject to local municipality regulation except for Right of Way (ROW). However, SRP typically designs to current building codes.

At the beginning of a project, it is important to agree to and document the codes used for the project and the path for plan review. SRP will either conduct a plan review internally or elect to have a 3<sup>rd</sup> party reviewer. The Design Consultant is to include a list of codes on their drawings used as the basis of design for the project.

A submittal to the local municipality is required for work outside of the site boundary, specifically within the ROW. For onsite work, submitting to the municipality is typically only required if a portion of the onsite utilities are proposed to be public.

### 1.04.03 DOCUMENT CONTROL

The production and transfer of correctly formatted digital information is important to SRP. Properly formatted digital information, in accordance with the SRP CAD Standards Manual allows SRP to store and manage facilities information efficiently, allowing for easy retrieval when needed. Building models that may be helpful to SRP in the future should be included as part of close-out.

Design Consultants are expected to plan, produce, and present information in a way that is useful to SRP. Contract documents, calculations, reports, etc. may be referenced by personnel with different backgrounds both now and in the future and should be user friendly.

### 1.04.04 DEVIATIONS FROM DESIGN GUIDELINES

The Design Guidelines are written with common issues and applications in mind. Non-standard projects or circumstances may require deviations from these Design Guidelines. A deviation could either be due to project limitations or a recommended change that may be of significant benefit to SRP. Two types of deviations are anticipated: exceptions and revisions.

**Exception:** a one-time departure from the Design Guidelines due to a specific instance or circumstance.

**Revision:** a change to the Design Guidelines which, after being approved by SRP, is incorporated, and applied to future projects.

The applicant must prepare a Deviation Request Form for the suggested exception or revision during the design process. The applicant is to send the Deviation Request Form to the SRP Project Manager who, in conjunction with the applicant, presents the request to SRP's Design Review Team.

Incorporate approved deviations into the project documents. A list of all deviation requests (accepted and rejected) is to be incorporated by including the scanned original deviation requests on a drawing sheet in the construction documents. The review and approval process for exceptions and revisions is time-consuming. Applicants submitting deviation requests to SRP are advised to be judicious in the use of the process.

#### 1.04.05 UPDATES

The Design Guidelines Manual is a living document and will be updated with revisions reflecting current industry standards and lessons learned. The process for requesting changes to the Design Guidelines can be done throughout the year and involves submitting a formal request for changes to the Document Review Committee following the process outlined above. The Document Review Committee will evaluate all requests received throughout the year. For those changes that are accepted, redline edits will be made in the Design Guidelines manual and circulated for final review and comments. Once all comments have been received, the Document Review Committee will evaluate and finalize accepted changes. The revised Design Guidelines Manual will be updated and redistributed by annually.

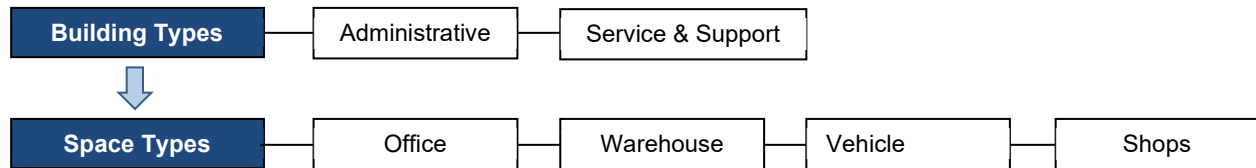
# 2

## Section 2 Design Guidelines

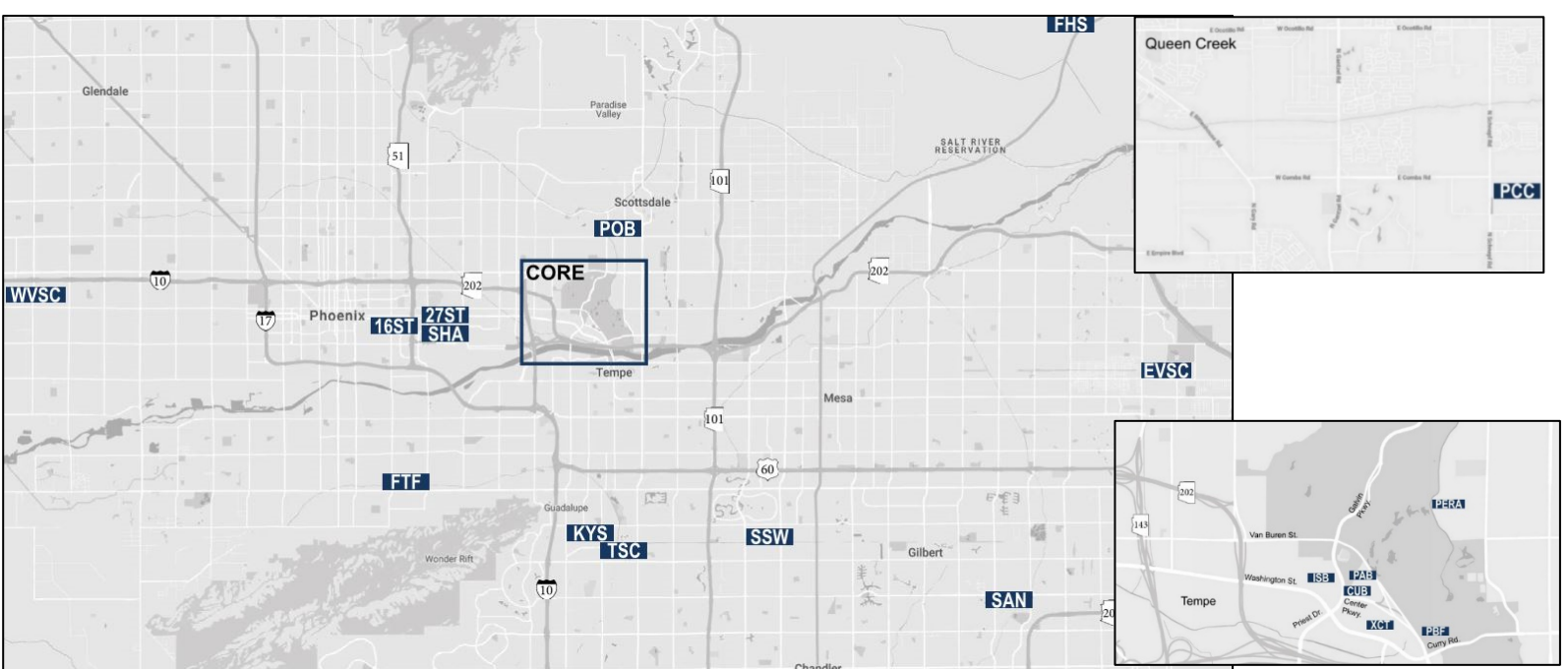


# Section 2 – Design Guidelines

Projects can be looked at in different levels, including site, building and space. The following is the description of those terms.



## 2.01 SITE MAPS



<b>16ST</b>	<b>16<sup>th</sup> Street Facility</b> 1616 E. Lincoln St. Phoenix, AZ 85034-3440	<b>FHS</b>	<b>Fountain Hills Facility</b> 16602 N. Saguaro Blvd. Fountain Hills, AZ 85268-6634	<b>PAB</b>	<b>Project Administration Bldg.</b> 1500 N. Mill Ave. Tempe, AZ 85281	<b>POB</b>	<b>Power Operations Building</b> 6504 E. Thomas Rd. Scottsdale, AZ 85251-6008	<b>TSC</b>	<b>Tempe Service Center</b> 110 W. Elliot Rd. Tempe, AZ 85284-1330
<b>27ST</b>	<b>27<sup>th</sup> Street Facility</b> 2727 E. Washington St. Phoenix, AZ 85281-1202	<b>FTF</b>	<b>Foothills Training Facility</b> 7211 S. 16 <sup>th</sup> St. Phoenix, AZ 85040-5605	<b>PBF</b>	<b>Papago Buttes Facility</b> 1010 W. Operations Dr. Tempe, AZ 85281-1298	<b>SAN</b>	<b>Santan Power Plant</b> 1005 S. Val Vista Dr. Gilbert, AZ 85296-3701	<b>WVSC</b>	<b>West Valley Service Center</b> 221 N. 79 <sup>th</sup> Ave Tolleson, AZ 85353-3127
<b>CUB</b>	<b>Credit Union Building</b> 1511 N. Project Dr. Tempe, AZ 85281-1206	<b>ISB</b>	<b>Information Services Bldg.</b> 1600 N. Priest Dr. Tempe, AZ 85281-8100	<b>PCC</b>	<b>Pinal Customer Center</b> 3735 E. Combs Rd. Queen Creek, AZ 85242	<b>SHA</b>	<b>SRP Flight Services</b> 2601 E. Airline Dr. Gate 101 Phoenix, AZ 85031-2626	<b>XCT</b>	<b>Crosscut Facility</b> 998 W. Washington St. Tempe, AZ 85281-1027
<b>EVSC</b>	<b>East Valley Service Center</b> 7050 E. University Dr. Mesa, AZ 85207-6406	<b>KYS</b>	<b>Kyrene Power Plant</b> 7005 S. Kyrene Rd. Tempe, AZ 85283-4531	<b>PERA</b>	<b>PERA Club - Valley</b> 1 E. Continental Dr. Tempe, AZ 85281-1053	<b>SSW</b>	<b>Southside Water</b> 3160 S. Alma School Rd. Mesa, AZ 85210-4043		

## 2.02 Design Guidelines

### 2.02.01 INTRODUCTION

Most SRP sites support multiple buildings and sometimes multiple building types. For the purpose of the Design Guidelines, buildings have been categorized as Administrative or Service and Support. Unique buildings such as Labs, Trailers, etc. are not addressed in the Design Guidelines and will need to be programmed for their specific use.

Many of the existing buildings have changed use and occupancy type over time. Changing the type of floor loading (for added file storage, etc.) adding new equipment, and removing load-bearing walls are common examples of renovation measures that may be required.

### 2.02.02 ADMINISTRATIVE

Administrative buildings house the majority of the SRP employees; therefore, their main function is to provide an effective workplace. The finishes need to promote a safe and healthy work environment. These buildings typically do not house fabrication work or maintenance functions.

Example: Crosscut Administrative Building



### 2.02.03 SERVICE AND SUPPORT

The design of the service and support buildings is practical and focused on durability and longevity. Planning considerations include floor loading and heavy-duty equipment use. Service and support buildings may house multiple functions. For example, a vehicle service garage typically has both service bays and office space.

Example: Southside Water Garage



## 2.03 Space Types

### 2.03.01 INTRODUCTION

The Administrative and Service and Support Buildings may be comprised of multiple space types. The space type describes the individual room or area and is defined by function.

### 2.03.02 OFFICE

Offices are typically air-conditioned with finished ceilings, walls, and doors. They are also used as a tool for attraction and retention; therefore, the design should focus on the employees and create a productive work environment. The lighting design will need to support computer usage.

Planning considerations include:

- Internal circulation
- Wayfinding
- Acoustics
- Collaboration and meeting space
- Technology Integration
- Systems Furniture

Example: Crosscut Administrative Building



## 2.03.03 WAREHOUSE

Warehouse spaces are typically large scale and used for storage racking and distribution of supplies and materials. They consist of high bays and are either air-conditioned or have evaporative cooling. The ceilings, walls and floors are typically exposed. Warehouse spaces may also include a mezzanine. Planning considerations include:

- Efficiency of racking
- Maneuverability of forklifts or other heavy-duty equipment
- Pickup / drop-off / loading of the service vehicles
- Laydown space
- Receiving / inventorying
- Cleanability and durability of surfaces

Example: Tempe Service Center Warehouse





## 2.03.04 VEHICLE SERVICE / GARAGE

Passenger and service vehicles are maintained and repaired in these spaces; therefore, they are typically high bay and will need to house and provide infrastructure to support the necessary equipment. These spaces are either air-conditioned or have evaporative cooling. Planning considerations include:

- Number of vehicles and bays required
- Single-sided or pull through bays
- Types of vehicles being serviced
- Services being performed and equipment needed
- Cleanability and durability of surfaces
- Waste containment, treatment, and disposal
- Air quality

Example: Tempe Service Center Garage



## 2.03.05 SHOPS

Shops are where parts are fabricated for SRP's use. The infrastructure should support the necessary equipment. If the shops are conditioned, they are either air-conditioned or have evaporative cooling. There may be specialty system requirements based on the sensitivity of the equipment. Planning considerations include:

- Services being performed and equipment needed
- Cleanability and durability of surfaces
- Material and tool storage and handling
- Waste containment, treatment, and disposal
- Air quality
- Climate control
- Workflow

Example: Crosscut Paint Booth



## 2.04 Design Principles

### 2.04.00 INTRODUCTION

Design principles are overarching concepts that apply to multiple project types. They represent SRP's priorities and provide insight into the organization's culture and decision making.

### 2.04.01 COMPREHENSIVE APPROACH

SRP Facilities Services is taking a more comprehensive approach to projects. Rather than addressing portions of a building or system, SRP is shifting toward viewing projects holistically for a better long-term outlook that minimizes the risk to SRP and maximizes the project value. SRP has begun prioritizing master planning efforts for their real estate portfolio, for sites, and for building systems. Impacts of a comprehensive approach include:

- Minimize risk of having to rework or renovate recently completed work
- Anticipate future needs of the organization and plan for flexibility and change in use
- Support business continuity through limiting the frequency of disturbance and improving the reliability of systems
- Ensure comprehensive and compatible systems and strategies are employed to maintain continuity and support long term maintenance and operations
- Decrease risks for Facilities Maintenance by addressing issues for entire buildings, sites, and areas rather than individual spaces
- Reduce costs to SRP by limiting design and construction team mobilization costs
- Schedule routine replacement and updates to systems, better anticipate future budget needs

### 2.04.02 BALANCE BETWEEN CAPITAL AND LIFE CYCLE COSTS

SRP owns and operates their facilities long term. With a responsibility to the ratepayers, SRP strives to make decisions that offer the best value to their customers. Therefore, design decisions should weigh the initial capital investment against the long-term operational costs. Priorities may change from project to project depending on the use of the space and competing priorities in the organization. Design Consultants are encouraged to bring forward ideas that may decrease initial capital costs, as well as ideas that may improve the long-term performance of a site, building, or system. If conflicts arise between the two opposing forces, the Design Consultant is expected to partner with the SRP Project Manager and bring forth information that allows SRP to make an informed decision.



## 2.04.03 CONSIDERATION OF MAINTENANCE AND OPERATIONS

As an organization that performs much of their own maintenance, SRP is committed to operating effectively and making investments into buildings and systems with a long-term outlook in mind. Planning for operations and maintenance over the lifetime of a building should be a major factor in the design process and decision making. Recommendations include:

- Selecting building materials for availability for future renovation or replacement
- Locating equipment for access and serviceability
- Planning for redundancy of systems for reliability and for potential expansion
- Considering future infrastructure needs, such as support for large equipment (air handling units, condensers, chillers, boilers, transformers, switchgear, etc.) and suspended utilities (ductwork, piping, light fixtures, conduits, cable trays, etc.)
- Planning service paths for access to rooftop equipment, with preference for equipment to be rolled (ramps) over carried (stairs)
- Designing a structural system (frame, bearing walls, etc.) for proposed current use, possible future use, and possible future expansion

Example: PAB Equipment



## 2.04.04 FLEXIBILITY AND GROWTH

Due to the length of time SRP owns and operates their facilities, paired with the changing nature of the organization, flexibility should be a key factor in design. Many of SRP's facilities have changed use, changed occupancy, or been repurposed over time. The more flexibility and adaptability that can be planned into a building or site, the more likely the building will continue to be viable and the less cost SRP will incur to modify its use. Project teams often flex in both function and size, so additional future capacity should be considered for both the infrastructure and the furniture solutions.

## 2.04.05 UNIVERSAL PLANNING AND STANDARDIZATION

The concept of universal planning and standardization supports SRP's culture of equality among staff and supports the long-term flexibility. By creating consistent size and fit-out of spaces with a limited kit of parts, SRP can change the use by different departments over time with little to no modification. Standardized tools, components, and configurations allow for quicker response time to customers and better support SRP's maintenance and operations. Considerations include:

- A uniform grid for column locations, facilitating repetitive member sizes, reducing the cost and increasing the speed of construction
- Optimizing bay dimensions to minimize material quantities while efficiently accommodating specific space requirements, such as parking garages and partition layouts
- Planning for not only the structure itself, but also raised floors, suspended ceilings, ductwork, piping, lights, and cable runs for power, communications, etc., which may affect the type of floor system that is selected
- Utilizing SRP's workstation, office and conference room standards for consistency and flexibility, which offers multiple configurations within the same footprint

Example: 6'x8' Workstation Configurations



## 2.04.06 SENSE OF PLACE

Although materials and finishes are not dictated and not required to be the same from one site to another, it is important that SRP facilities have a consistent sense of place and represent the company culture. Spaces should be conservative but still welcoming and family-oriented, supporting SRP's commitment to both the internal and external community. They should not be frivolous, trendy, flashy or opulent, but more reflective of SRP's modest and financially conservative culture. In addition to overall look and feel, SRP spaces often incorporate subject matter, such as photographs, related to SRP history. These offer an opportunity to represent the department or team's area of focus and reinforce a consistent visual identity.

The first impression is the most important design opportunity when creating a sense of place. The sense of arrival begins at the entry to the site and extends to site navigation, building entry, and reception area. Public sites are more open and welcoming, while secure sites are designed to discourage outside visitors with perimeter fencing and a prominent guard house.

Example: Credit Union Building Lobby



## 2.04.07 BRAND INTEGRATION

One strong aspect of creating a consistent sense of place is through brand integration. SRP's branding ties back to its roots in power and water, both of which are reflected in the rising sun logo. Avoid literal use of SRP blue as an accent finish unless it is being used as a logo.



Delivering water and power™

Instead, consider SRP's history and Arizona roots and convey SRP's identity through color, patterns and forms that are native to Arizona. It is common to see the SRP story told in a space through:

- Desert-inspired color
- Geometric pattern and textures
- Historic artifacts
- Photographic records as art
- Wall graphics
- Custom informative displays

Example: Credit Union Building





## 2.04.08 COLOR AND PATTERN AS WAYFINDING

With complex sites and buildings that can be difficult to navigate, wayfinding is a key component of moving people through space and supporting their work. SRP encourages the use of distinctive, saturated colors and geometric patterns to differentiate space. The chosen colors and patterns can perform double duty and help support SRP's branding and visual identity. Recommendations include:

- Provide architectural features at main building entrances
- Use identifying colors to differentiate, where applicable
- Utilize a different architectural element or identifying feature at each node or destination
- Include photos at main circulation to support department identity

Example: Project Administration Building

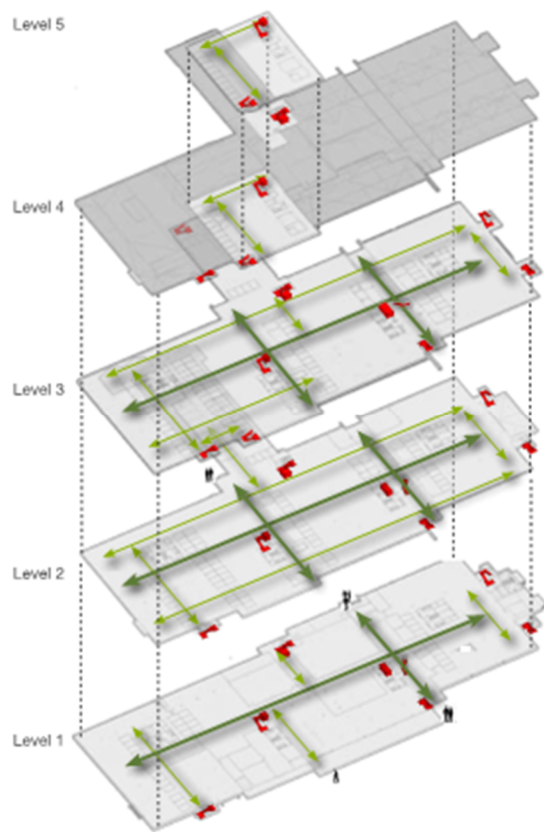


## 2.04.09 EFFICIENT CIRCULATION

Being an engineering-minded company, efficiency is important in SRP's culture. Efficient circulation is not only logical and practical, but also supports wayfinding. Many of the sites and buildings have grown and changed organically over time. Comprehensive projects are an opportunity to improve the effectiveness of circulation, making the spaces more efficient and more user friendly. This concept applies to both exterior space (parking and building entries) and interior space (corridors and hallways) equally. Efficient circulation supports:

- Site safety, reducing vehicle accidents
- Security, making common paths of travel highly visible
- Productivity, reducing time spent traveling and navigating
- Communications, increasing likelihood of chance meetings in common circulation paths
- Comprehensive approach, reviewing circulation in context with the overall site or building

Example: Circulation Stacking Diagram



## 2.04.10 SHARED SPACES AS DESTINATIONS

SRP encourages planning shared spaces, such as break rooms and conference rooms, along main circulation paths. When these spaces are highly visible, they become destinations for people traveling around a building or site. Prominent placement on a floor and impactful finishes emphasizes these shared spaces and make them easier to find, thus improving wayfinding while supporting a collaborative culture. Using these spaces as community hubs encourages interaction and communication among staff and can help bridge the gap between departments. Focusing activity on these destinations helps draw activity away from focused workspace, improving concentration and productivity.

Drawing attention to these shared destinations through more detailed construction often focuses the design efforts and capital costs on these shared spaces. This supports SRP's culture of equality, ensuring that the higher cost and quality spaces are available for all to share.

Example: Information Services Building



## 2.04.11 HIERARCHY OF SPACE

In the case of SRP, hierarchy of space refers to the different levels of both activity and cost. An efficient plan with clear circulation and orientation of space aids in wayfinding, safety, and security. Active spaces receive more vibrant finishes, encouraging their use, while quiet spaces should receive more subdued finishes. This hierarchy of space helps balance capital cost by focusing more elaborate finishes in the most prominently used spaces. The levels of hierarchy are typically:

- **First impression:** may include branding, graphics, more elaborate finishes, and construction
- **Primary circulation:** may include art or photographs, wayfinding through color, pattern, and signage
- **Destinations:** planned off primary circulation and may include nodes of activity such as break rooms, huddle spaces, and conference rooms, may include more elaborate finishes and more vibrant color
- **Secondary circulation:** planned off primary circulation, may be aisles through workspace, narrower and more utilitarian in nature
- **Private workspace:** planned off primary or secondary circulation, more consistent in nature to support quiet, heads down work

Example: Planning Diagram





## 2.04.12 TRANSPARENCY AND VISIBILITY

The use of transparency and visibility supports SRP's values and culture in several ways. Safety and security are improved when people have a direct visual connection to each other. Transparency also provides visual access to nature and natural light, which supports SRP's sustainability and wellness efforts. Consider the following:

- Planning sites to maximize exterior views
- Planning rooms or non-transparent spaces at the interior of a floor plate
- Planning offices on the interior, with open and shared spaces at the exterior windows
- Adding glazing at rooms on exterior windows for light transfer
- Adding glazing to interior rooms to improve visibility
- Planning collaborative and support areas that can remain open and do not require doors
- Limiting department separation to only where required by security protocols

Example: Crosscut Administrative Building



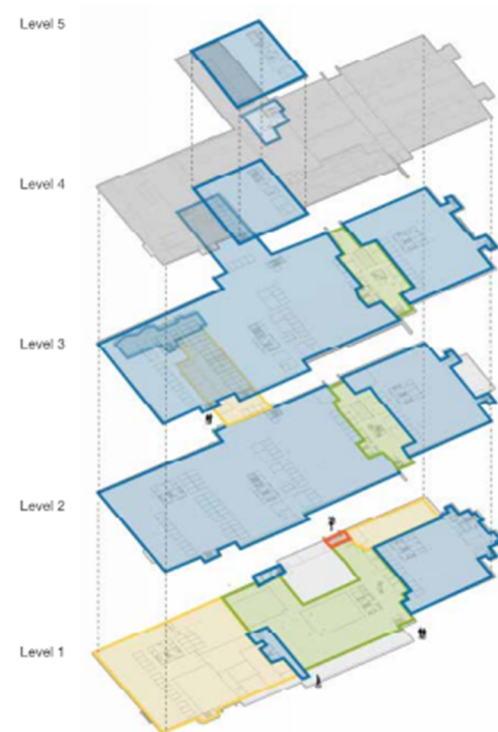
## 2.04.13 SAFETY AND SECURITY

As a company that genuinely cares about the wellbeing of its people, safety and security are pillars in the SRP organization. Although distinct groups within SRP, many design measures that improve security also improve safety and vice versa, so they have been grouped together for the purpose of this manual.

Security is visibly present on every site and is often the first impression upon arrival. SRP's security program protects the staff, the electrical infrastructure distribution, and helps reinforce strict compliance with governmental regulation. Plan for security zones in the following layers:

- Vehicle and pedestrian entry to site
- Public or secure entry to building
- Badged access to department work area
- Restricted badge access to high security area

Example: Security Stacking Diagram



Safety is such a priority that every meeting begins with a safety minute, where an attendee shares a personal experience or story to increase awareness and improve vigilance. The high volume of vehicular traffic on SRP's sites makes vehicular safety a major concern. Special considerations for parking include:

- Maximize the quantity of pull-through parking spaces
- Limit two-way traffic in high traffic areas, such as parking garages
- Clearly delineate pedestrian paths

To improve both safety and security, consider the following:

- Limit entrances and clearly define wayfinding
- Plan efficient, user friendly circulation
- Ensure visibility of spaces and traffic (avoid blind spots)
- Refer to Crime Prevention Through Environmental Design (CPTED) concepts for additional planning considerations

## 2.04.14 SUSTAINABILITY AND WELLNESS

As a public utility, SRP has been a steward of the environment long before sustainability became popular. It is a priority in the organization, so much that every meeting begins with a sustainability minute, much like the safety minute, where an attendee shares a personal experience or story to increase awareness. SRP's commitment to both the environment and its employees is made visible in the following:

- Specification of high-performance systems
- Building measurement and control systems to understand use
- Use of native materials and landscape
- Use of electric vehicles and charging stations
- Use and visibility of solar panels
- Recycling programs, with staff communication visibly displayed in common areas
- Discouraging printing and paper use
- Discouraging the use of disposable plastics
- Designing with LEED philosophies, even if the project is not pursuing certification
- Healthy environments and walking paths, encouraging activity
- [SRP's Corporate 2035 Sustainability Goals](#)

Example: PAB Visitor Parking



# 3

## Section 3 Technical Guidelines

# Section 3 – Technical Guidelines

## 3.01 Division 01 – General Requirements

### 3.01.00 INTRODUCTION

The Technical Guidelines contain more specific design criteria on topics such as existing conditions, concrete, etc. They are structured based on the Construction Specifications Institute (CSI) MasterFormat 2016. Unlike MasterFormat 2016, the divisions are not consistently broken into CSI 3-part format (general, products and execution). Information is grouped by division then further subdivided by concept to make the document easier to navigate. Cross references highlight important relationships to other sections. Specification requirements and references to standards have been omitted from this document. They can be found in the SRP Facility Services Construction Specifications.

## 3.02 Division 02 – Existing Conditions

### 3.02.00 GENERAL REQUIREMENTS

- A. SRP has internal resources to address hazardous materials if there is a concern on a project.
- B. SRP Asset Management is to be involved prior to demolition. General Contractor prepares a list of items being removed and returned to SRP for use or disposal. Design Consultant should include this requirement on construction documents for coordination.
- C. During Programming, Design Consultant should confirm extent of existing to remain versus area to be renovated with SRP Project Manager.
- D. SRP has a diverse portfolio of buildings that vary in function and age. Many have changed use over time. Design Consultant should evaluate building for intended use and occupancy during programming. It should not be assumed that the building and systems were designed for the current and proposed use.

## 3.03 Division 03 – Concrete

### 3.03.00 INTRODUCTION

This section outlines the requirements for the use of cast in-place concrete and cast-in-place architectural concrete. Concrete components include reinforcement, formwork, concrete materials, mixture design, and exposed concrete finishes.

### 3.03.01 CONCRETE JOINTS

- A. Plan control joints to be straight and continuous, not staggered. Place joint locations under walls or carpeted areas whenever possible. Plan the joint pattern to avoid re-entrant corners or triangular wedges of concrete which are highly prone to cracking.
- B. Sealant to be added to control joints to prevent the transmission of the joint through the floor finish.
- C. Show control joints on design drawings for exposed concrete finish.

### 3.03.02 CONCRETE REINFORCING

- A. Specify corrosion resistant materials for concrete reinforcing at areas of moisture concern.

### 3.03.03 CAST-IN-PLACE CONCRETE

- A. For concrete without plasticizer, design for maximum slump of 4-1/2" at point of placement.
- B. Avoid the embedment of conduits, pipes and sleeves within concrete structural elements or structural concrete toppings.
- C. Cast-in-place concrete colors are to be approved by the SRP Project Manager.
- D. Concrete testing is to be provided by an approved testing firm on the first truck load and each truck load containing the next additional 50th cubic yard.
- E. Vapor barriers are to be provided as required by the Design Consultant for the specific circumstances.

### 3.03.04 CONCRETE FINISHING

- A. Formwork snap tie cone holes should be filled and finished smooth with adjacent surfaces.
- B. Specify a slip-resistant finish at exposed concrete floors, ramps, steps, landings, and exterior walks.
- C. Exposed concrete used as an interior finish material is to be formed and finished to tolerances and finish requirements that are appropriate for the occupied space. Refer to Division 09 - Finishes for locations.
- D. Exposed concrete traffic surfaces are to have a slip resistant broom finish.

### 3.03.05 ARCHITECTURAL CONCRETE

- A. Exposed architectural concrete should have a rubbed smooth surface.
- B. Design for a minimum slump of 5" at point of placement.

### 3.03.06 PRECAST CONCRETE

- A. Indicate panel joint aesthetic and locations in the construction documents. Outside corner joints that are mitered need to be accompanied with a quirk joint to prevent the 45-degree cut from breaking or chipping.
- B. Architectural precast concrete colors are to be approved by the SRP Project Manager.
- C. Indicate and dimension joints and snap tie holes in the contract documents for exposed, poured-in-place concrete.
- D. Batch colored concrete may not be used on exterior slabs.
- E. Coat unpainted, precast concrete with a water repellent to reduce surface absorbency.

### 3.03.07 CONCRETE STAIRS

- A. Exposed concrete at stairs should have chamfered edges no greater than ½".
- B. Incorporate a contrasting nosing finish at stairs to clearly distinguish between steps in descent under all lighting conditions. Incorporate a nosing with an abrasive, non-slip surface at interior stair treads.



### 3.03.08 CONCRETE CUTTING AND CORING

- A. Indicate that General Contractor is required to use GPR or X-ray at areas required to receive saw cutting or core drilling of existing concrete. The method is to be approved by the SRP Project Manager.

## 3.04 Division 04 – Masonry

### 3.04.00 INTRODUCTION

This section contains the requirements for manufactured units of masonry and cast stone, including masonry cleaning.

Refer to Division 03 – Concrete and Division 07 – Thermal & Moisture Protection for additional information.

### 3.04.01 MORTAR

- A. For building additions, match existing color.
- B. Specify mortar color to match masonry color.

### 3.04.02 MASONRY ACCESSORIES

- A. Brick ties, plates, fasteners, lintel angles, relieving angles, and other metal accessories are to be galvanized steel (minimum G- 90) or stainless steel.
- B. Flashing shall extend beyond openings and have end dams at vertical terminations.
- C. At through-wall flashing for brick veneer, extend within the wythe a minimum of 12 inches above the weep location. Coordinate and detail the interface between below-grade waterproofing and through-wall flashing, as well as base flashing and weep vents.
- D. For brick masonry veneer above roof areas, through-wall flashing is to be fabricated from copper or stainless-steel sheet metal and have receivers for roof counterflashing.
- E. Specify brick ties with built-in drips to prevent water from bridging the cavity.
- F. Install weeps at all through-wall flashing locations.
- G. Open head and sill joints with honeycomb plastic weep inserts are required, rather than cords or tubes.
- H. Locate through-wall flashing and weeps a minimum of 12 inches above adjacent roofs, to allow reroofing without interfering with their operation.
- I. If water repellent systems are used, provide breathable systems rather than barrier systems.

### 3.04.03 COMMISSIONING OF MASONRY

- A. The Design Consultant is expected to participate in a building envelope preconstruction conference for all new construction and exterior wall renovation projects.

### 3.04.04 UNIT MASONRY

- A. Base design and layout of all masonry construction on the module of the unit selected, including brick, concrete masonry units (CMU), and cast stone. Dimension both horizontal and vertical directions, including masonry rough openings, to minimize cutting and material waste.
- B. Documents representing masonry in a graphic hatch without considering masonry modules and units are prohibited.

### 3.04.05 BRICK MASONRY

- A. Specify face brick that is a standard size and readily available.
- B. Running bond is the preferred pattern for brickwork.
- C. New brickwork is to match adjacent existing brickwork in appearance.
- D. Custom, special-shaped brick units for outside corners, windowsill, window heads (accommodating steel lintels), string courses, and various angle units are acceptable.
- E. Sealant joints are to have backer rods. Match the sealant color to the adjacent mortar joints to the greatest extent possible.
- F. For exposed joints that do not receive a coating, silicone-based sealant joint materials are required.
- G. The maximum sealant joint is 3/4".
- H. Submit brick samples to SRP Project Manager for approval prior to the completion of the construction documents.

### 3.04.06 CONCRETE MASONRY UNIT

- A. Reinforce and grout hollow cells per structural requirements.

### 3.04.07 GLASS UNIT MASONRY

- A. Glass unit masonry may only be used when matching existing construction.

### 3.04.08 MASONRY RESTORATION AND CLEANING

- A. Do not sand blast or acid wash brick surfaces without approval from Environmental Services.

### 3.04.09 CAST STONE

- A. Windowsills, headers, string courses, lintels, column caps, wall coping, and other accent details may be cast stone or architectural precast (Division 03 - Concrete).
- B. Cast stone may be dry cast with zero-slump concrete or wet cast.
- C. Provide full width through-wall flashing with end dams.
- D. Rake back joints and install backer rod and sealant.
- E. Coat cast stone with a water repellent to reduce surface absorbency.

## 3.05 Division 05 – Metals

### 3.05.00 INTRODUCTION

This section contains the requirements relating to structural, non-structural, and decorative metals.

### 3.05.01 METAL FABRICATIONS

- A. Exterior steel that will remain exposed to the elements must be galvanized.
- B. Use galvanized steel angles in exterior masonry, stone, or precast concrete walls, and in interior walls where used in conjunction with stone.

### 3.05.02 METAL STAIRS

- A. Stair treads are to have a nosing with an abrasive, non-slip surface.
- B. In applications where equipment or materials will be carried, standard stairs are required.
- C. Consider metal stairs at areas requiring infrequent access, such as Warehouses, Guard Houses, Vehicle Service and Fabrication Shops. Ship ladders or other similar fire escape-type stairs are only to be used with SRP Project Manager approval.

### 3.05.03 HANDRAILS AND RAILINGS

- A. Handrails and guardrails are to be stainless steel or painted steel pipe. Painted or galvanized exterior handrails may be approved by the SRP Project Manager.
- B. For rail posts set in concrete, specify matching sleeves or inserts not less than 5 inches long.
- C. Wood handrails and guardrails are not permitted.

## 3.06 Division 06 – Wood, Plastic and Composites

### 3.06.00 INTRODUCTION

This section contains the requirements relating to wood and plastics, including rough carpentry, and architectural woodwork.

#### 3.06.01 ROUGH CARPENTRY

- A. SRP's preference for in wall backing is fire rated wood.
- B. Where wood meets concrete, back paint before setting.
- C. The use of wood above ceilings is prohibited.
- D. Provide fire rated backboards for wall mounted equipment per SRP specifications in Server, MDF, IDF, electrical, voice, and data rooms.

#### 3.06.02 ARCHITECTURAL WOODWORK

Built in millwork should be planned for areas with fixed use, including breaks rooms with plumbing fixtures and high electrical needs. Consider furniture solutions for areas that are more adaptable in nature for future flexibility. For example, banquette seating and copy rooms are typically designed with furniture instead of millwork.

General guidelines by space type are as follows.

Administrative Buildings		
Space Type	Cabinets	Countertops
Reception/Guard Desk	Wood Grain or Solid Color Plastic Laminate	Quartz or Solid Surface Transaction Top Wood Grain or Solid Color Plastic Laminate or Solid Surface Worksurface
Break Room	Wood Grain or Solid Color Plastic Laminate	Quartz or Solid Surface with Backsplash and Sidesplash
Restroom	None or Removable Panels	Quartz or Solid Surface with Backsplash and Sidesplash
Mother's Room	Wood Grain or Solid Color Plastic Laminate	Quartz or Solid Surface with Backsplash and Sidesplash

Service and Support Buildings		
Space Type	Cabinets	Countertops
Reception/Guard Desk	Wood Grain or Solid Color Plastic Laminate	Solid Surface Transaction Top Wood Grain or Solid Color Plastic Laminate or Solid Surface Worksurface
Break Room	Wood Grain or Solid Color Plastic Laminate	Solid Surface with Backsplash and Sidesplash
Restroom	None or Removable Panels	Solid Surface with Backsplash and Sidesplash
Mother's Room	Wood Grain or Solid Color Plastic Laminate	Solid Surface with Backsplash and Sidesplash
Service Counter	Wood Grain or Solid Color Plastic Laminate (where occurs)	Stainless Steel

- A. The design and construction of millwork should typically be AWI Custom Grade, in accordance with the Architectural Woodwork Institute Architectural Woodwork Standards.
- B. Limited feature areas or fine woodwork in areas of high visibility, when approved by the SRP Project Manager, may be AWI Premium Grade.
- C. Do not specify endangered or protected species. Use sustainably harvested wood whenever possible.
- D. Do not specify soft species for face veneers or high impact areas.
- E. Consider planning gypsum board wing walls at millwork edges to avoid exposed corners that can become damaged.
- F. For materials with directional pattern, including wood grain, indicate direction of pattern on construction documents.
- G. The use of wall paneling is discouraged. If using as an accent material, limit panels sizes to the width and height or available material. Indicate reveal locations and attachment details in construction documents.
- H. Wood handrails are prohibited.

### 3.06.03 ARCHITECTURAL WOODWORK - CABINETS

- A. Refer to spec division 12 for additional cabinet requirements
- B. Cabinet finish is to be plastic laminate exterior, with black or white melamine interior. Plastic laminate to be selected for durability. Specify a scratch resistant coating, such as Nevamar Armored Protection.

- C. Cabinet doors to be 12" wide minimum, 21" wide maximum.
- D. Shelving to be adjustable unless programmed for a specific use.
- E. Toe kick to be plastic laminate finish, not rubber base.
- F. Provide undercabinet lighting when requested for specific programmed use.
- G. Break room sinks are to be planned as front approach for accessibility.
- H. At break rooms requiring multiple microwaves, stack microwaves in a tower to maximize counter space. Include plastic laminate stops behind microwave to keep microwave from sliding back into cabinet and damaging back surface of cabinet or wall beyond. In rooms requiring more than four microwaves, consider splitting and planning in multiple locations to avoid crowding.
- I. At break rooms and select conference rooms, provide for built-in and/or free-standing trash and recycling containers as confirmed by the SRP Project Manager. The types and quantities will vary by location, building type, and recycling programs in place at the time.
- J. Restroom sinks are to be planned with insulated plumbing. If recessed apron is required, specify water resistant material, and ensure panel is removable for maintenance.
- K. At cabinets designed for audio-visual or other heat producing equipment, coordinate ventilation requirements.
- L. At areas of power and data integration, such as reception desks, provide grommets in countertops and under-counter wire management.
- M. Include upper cabinets if required by programming for storage.

### 3.06.04 ARCHITECTURAL WOODWORK - COUNTERTOPS

- A. At wet areas, plastic laminate countertops are not recommended. Consider water resistant countertops, such as solid surface or quartz composite. Provide minimum 4" backsplash and sidesplash. Sidesplash is to be provided at vertical gypsum board and plastic laminate panels, such as side of microwave towers.
- B. Provide backsplash and sidesplash to protect the wall from damage.
- C. Solid surface and quartz countertops are to have eased edges and mitered corners.
- D. Plastic laminate countertops are to have square edges (not bullnose).
- E. If under-counter steel supports are required, coordinate countertop edge with size of support required to ensure steel support is concealed.



## 3.07 Division 07 – Thermal and Moisture Protection

### 3.07.00 INTRODUCTION

This section addresses technical requirements for thermal and moisture protection provided by low slope and steep slope roofing systems that include insulation, roof membranes, standing seam metal, membrane flashing, and sheet metal flashing. In addition, this section contains the requirements for waterproofing, damp proofing, air barriers, insulation, and exterior insulation and finish systems.

The Design Consultant is to coordinate the ground floor finish floor elevation with the site grading plan and flood plain level to mitigate building water intrusion and ensure that water flows away from the building.

### 3.07.01 SITE DRAINAGE

The entire site must be graded to provide positive drainage away from the building. Finish floor elevation must be set to prohibit flooding in a 100-year storm condition.

### 3.07.02 DAMPPROOFING AND WATERPROOFING

- A. Above-grade wall surfaces that are concealed by masonry wall panels or masonry veneer shall be dampproofed or waterproofed to resist water intrusion.
- B. Exterior wall assemblies shall be waterproofed to 48 inches above finish grade, not dampproofed.
- C. Walls with brick veneer constructed below-grade shall have the cavities grouted to a line approximately 12 inches above finish grade. Flashing and weep vents shall be installed directly above grouted elevation. Attention should be paid to termination of below-grade waterproofing and its incorporation into the building envelope.
- D. Bentonite panel waterproofing and accessory products should be used for positive side, below-grade applications, such as on the sides and bottom of elevator pits.
- E. Modified bituminous sheet waterproofing shall be used for above-grade applications.

### 3.07.03 WEATHER BARRIERS

- A. Air and vapor barriers shall be detailed, specified, and installed so that condensation will not occur within the wall or roof assembly.

### 3.07.04 ROOFING

Building Type	Roof Type
Administrative	Single Ply or Modified Bitumen
Service and Support	Standing Seam Metal, Single Ply or Modified Bitumen

- A. Roofing is not single sourced. If roofing is currently under warranty, it is SRP's desire to maintain warranty by utilizing the same or compatible products and providers.
- B. Include roofing specifications and design intent in 50% construction documents.
- C. Roof drainage should be tied into the storm water drainage system. Consider overall drainage strategy for the site in developing the design solution.
- D. Thermal insulation should be installed at the roof deck. Insulation laid on suspended ceilings is not recommended.
- E. Roofs should be designed to meet FM Approvals windstorm classifications rating of I-75 minimum.
- F. The use of portable ladders for primary roof access is not permitted. All levels of roofs are to be made accessible by permanent means.
- G. Access door thresholds to the roof are to be 7" above the adjacent roof surface, with a ramp provided for equipment maintenance. An acceptable walking surface is to be installed immediately outside the access door threshold on the roof system. The access door should be an outswing door or hatch.
- H. Roofs are to have 3' wide continuous walking pads from points of access to the maintenance side of equipment.
- I. For rooftop equipment, provide insulated steel roof curbs, minimum of 8 inches high from the adjacent roof surface.
- J. Utility supply lines (electrical, water, gas, etc.) to roof mounted equipment are preferred to be installed within the supporting curb of that equipment.
- K. Lightning air terminals, cables, and accessories should not be attached to or penetrate the base flashing or roofing membrane material.

- L. Interior gutter systems for roof drainage are prohibited.
- M. Pitch pockets are prohibited. Provide upturned curb solution instead.
- N. Roofs are to be protected by a 42-inch parapet around the perimeter of the roof wherever the roof exceeds 10 feet or have an owner-approved OSHA-compliant fall protection system. Low slope roofs should be designed with a minimum 42-inch parapet wall around the perimeter of the roof.
- O. Single ply membranes are preferred on roofs with minimal equipment and traffic.
- P. A single-ply system shall have a white, 60+ mil PVC membrane, that is either mechanically or adhesively applied.
- Q. At modified bitumen roofing, a minimum slope of 1/4" per foot is required on all areas of the roof system. Cant strips are to be installed where recommended by the manufacturer.
- R. A modified bitumen system shall have two inter-ply sheets and a granulated white cap sheet with a 3-year aged reflectivity of 0.55. Base sheet requirements shall be specified by the Design Consultant.
- S. Standing seam metal roofs, when approved, are to have true standing seams with concealed clips and fasteners and a Kynar finish.
- T. Locate roof expansion joints above the plane of the roof with a factory-finished aluminum or stainless-steel expansion cover. Detail the termination of the expansion joints.
- U. Cap parapet walls with factory-finished aluminum or stainless-steel coping. Slope the top of the coping so that water drains onto the roof and not the building facade.
- V. Roof drains are to be factory-painted, cast iron drain assemblies with painted cast iron strainers. Drains shall be installed with factory-furnished clamping rings.
- W. Exterior downspouts are to be piped to storm drains.
- X. Overflow drains or overflow scuppers must be provided. Overflow drains, when provided, must discharge a maximum of two feet above grade.

### 3.07.05 METAL WALL PANELS

- A. Metal wall panel systems are to be detailed and specified with continuous vapor barrier systems, flashing, and weeps so that water will not accumulate within the wall system.
- B. Details should indicate fastening systems and joint details where the metal panel systems are adjacent to other wall cladding systems, such as brick masonry, curtainwall, or storefront systems.

### 3.07.06 FLASHING AND SHEET METAL

- A. Stone coping caps are prohibited except at exterior screen wall applications. When stone caps are used, provide through-wall flashing.
- B. For cavity wall construction, such as masonry veneer, specify and detail through-wall flashing at drainage plane interruptions, including heads and sills.
- C. Exterior window assemblies must have stainless steel sill pans with welded end dams that drain to the exterior of the window assembly.

### 3.07.07 FIRESTOPPING

- A. Fire-resistant sealants must be used to seal rated walls.
- B. Fire-resistant sealants shall not be used at non-rated walls, to avoid confusion as to the classification of the wall.

### 3.07.08 SEALANTS AND CAULKING

- A. Silicone-based joint sealant shall be used for exterior joints that do not receive a coating, i.e., brick masonry, stone cladding, metal panel systems, curtainwall panel systems, etc.
- B. Urethane-based joint sealant shall be used for exterior applications that receive a coating material, such as Portland cement plaster with a painted surface.
- C. Sealants shall not be installed or adhered to curtainwall mullion caps.

## 3.08 Division 08 – Doors and Windows

### 3.08.00 INTRODUCTION

Building openings are a critical point of building construction. The openings section includes doors, frames, storefront, windows, specialty doors (overhead, coiling doors and grilles, and folding doors) access doors and panels and hardware. Openings are to be treated as an integrated system, whose function is to provide security, life safety, and accessibility.

Refer to Division 28 – Electronic Safety and Security for additional information.

Refer to Division 6 – Architectural Woodwork for cabinet hardware.

The table below provides guidelines for common door and frame type by location and function.

Location/Function	Opening Type
Public Entrance	Storefront
Main Employee Entrance (Admin)	Storefront or Revolving Door
Secondary Exterior Entrance	Hollow Metal Door and Frame with Vision Panel
Interior Department Entrance	Storefront or Wood <sup>3</sup> with Vision Panel, Hollow Metal Frame
Interior Rated	Hollow Metal Door and Frame w/Rated Vision Panels
Office	Wood <sup>3</sup> Door and Sidelight, Hollow Metal Frame <sup>1,2</sup>
Conference/Training	Wood <sup>3</sup> Door and Sidelight, Hollow Metal Frame <sup>1</sup>
Storage	Wood <sup>3</sup> Door, Hollow Metal Frame <sup>1</sup>
Building Support / Custodial	Hollow Metal Door and Frame
Restrooms	Wood <sup>3</sup> Door, Hollow Metal Frame <sup>1</sup>
Break	Wood <sup>3</sup> Door with Vision Panel or Sidelight, Hollow Metal Frame <sup>1</sup>
Oversized Equipment Entrance	Overhead Coiling Door

<sup>1</sup> Knock down aluminum frames may be used in administrative buildings with the approval of the SRP Project Manager.

<sup>2</sup> Aluminum and glass sliding doors (demountable) may be used in administrative buildings with the approval of the SRP Project Manager.

<sup>3</sup>Wood door implies plastic laminate faced wood door

The following guidelines are to be applied unless noted otherwise.

- A. In existing facilities, glazing and door finish and style are to match existing to greatest extent practical.
- B. Minimum width of single doors should be 36". Wider doors are to be used with owner approval only. Minimum door height to be 7'-0". Maximum door height is 8'10".
- C. Doors are to provide adequate clearance for moving large equipment. PM to request approval during design review for doors wider than 36".
- D. Where paired doors are required for wider exit width, they are to be designed with a removable mullion and exiting devices on each leaf.
- E. Coordination of doors and hardware is required. At doors requiring security devices, the General Contractor is to provide the doors, frames, non-electrified hardware, and electrified hardware, with holes drilled and prepared to receive electrified hardware.
- F. Doors in the major path of egress should provide visibility, either by using a storefront system, adjacent sidelight or adding a vision panel at the door.
- G. Recess doors opening out into corridors or other pathways of pedestrian traffic.
- H. Shared occupancy rooms, such as conference rooms and meeting rooms, are to have a sidelight or window in door for visibility.
- I. Vision panel sizes are to be based on manufacturer standards. Include the width and height of view panels in construction documents.
- J. Sidelights are to be integral to door frames. Sidelights are to be 18" minimum width, full height to align with top of door.
- K. Design exterior doorways to protect against water intrusion into the building. Design for adequate positive slope away from the doorway.
- L. Recess public entry doors or locate under an overhang at a minimum of four (4) feet to prevent water intrusion.
- M. Specify commercial, heavy-duty grade doors and hardware.
- N. Plan door clearances for future flexibility, assuming that a closer may be added in the future.
- O. Doors shall be installed so that the gap around the edges of doors and at meeting edges of pairs of doors does not exceed 1/8", except where code requires more stringent tolerances (such as for rated doors) or use of adjoining spaces dictates privacy.
- P. Specify a sealant, sealant and backer rod, or weather-stripping at exterior building openings.

- Q. Grade level mechanical rooms must have double doors that swing out to the exterior of the building. Mechanical rooms with equipment wider than 60 inches or higher than 72 inches must have an overhead coiling door.

### 3.08.01 ENTRANCES AND STOREFRONTS

- A. Storefront entrances may be used for public entries.
- B. Revolving doors may be used at employee entrances at major Administrative buildings. Considerations for use should be reviewed with owner Security. If used, provide a standard swing door in proximity for code compliance, accessibility, and convenience for carts and other equipment.
- C. Aluminum finish should be clear anodized for new construction. Existing finish should be matched in existing construction.
- D. Glass should be factory tinted to match existing where applicable. No film applied.
- E. Aluminum entrance doors shall have 6-inch stiles (minimum) to receive door-mounted closers.
- F. For hinge-type doors, only one power door operator in each pair is to be activated by the door opener, for ADA purposes.
- G. Threshold to match storefront system in material and finish and to be designed to withstand the anticipated use.

### 3.08.02 HOLLOW METAL DOORS AND FRAMES

- A. Exterior frames shall be zinc-coated (galvanized or galvanized) or back-sprayed with an undercoat primer (such as Z Guard 8000). Confirm that primer is compatible with factory applied surface.
- B. Interior doors and frames are to receive semi-gloss paint finish for durability.

### 3.08.03 WOOD DOORS

- A. Wood doors are not to be used at the exterior or interior spaces without minimal humidity control.
- B. Interior wood doors are to be flush type, solid core wood core, with high pressure laminate finish on visible surfaces, and with semi-gloss painted edges to match the laminate face.
- C. Trim at lite and louvered openings is to be hardwood if factory-provided or steel if modified

in the field.

- D. Internal solid wood blocking is required at closers and mortise locksets.
- E. Where cutouts for closers are required, the head rail shall be six (6) inches or greater. All edges are to be hardwood.

### 3.08.04 ALUMINUM FRAMES

- A. Aluminum finish should be clear anodized for new construction.
- B. Knock down type frames can be used as approved by SRP project manager in areas anticipating light duty use.
- C. Corners to be mitered.
- D. Insulate frames where acoustics are a concern.

### 3.08.05 SPECIALTY DOORS

- A. Specialty folding egress doors, or overhead drop-down type shutters for rated opening protection, shall not be used for general area separation, egress, or convenience paths. Specify regular, side-hinged type doors requiring minimal annual maintenance.
- R. Shutters may only be considered for service window openings and garage doors.
- S. Motorized overhead coiling doors are to be used when needed for equipment or service access. Preferred motor control voltage is 24V, with 120V being the next choice
- T. Open security grilles are prohibited.
- U. Provisions are to be made for movement and servicing of rooftop equipment. Roof hatches are to be electrified with guardrail.
- V. Depending on the size of rooftop equipment, roof hatches may not be adequate. Review service access to the roof with the SRP Project Manager.

### 3.08.06 ACCESS DOORS

- A. Access doors or panels are required at locations where access is required for maintenance of equipment, including plumbing, mechanical equipment, and crawl spaces.
- B. Openings at walls are to be 12" x 12" minimum.
- C. Openings at ceilings are to be 24" x 24" minimum.
- D. Access doors are to be metal, 14-gauge minimum, stainless steel or painted to match the adjacent finish surface.
- E. Specify screwdriver operated cam latches, not lock cylinders.



- F. SRP's preference is to locate access doors along walkways.

### 3.08.07 HARDWARE

- A. The finish hardware schedule will be provided to SRP by the Architect with the Design Development Phase submittal. This submittal shall include standard locking and keying system information and the appropriate lock functions.
- B. When preparing the hardware schedule, relate the door numbers to space and room numbers assigned by SRP.
- C. Hardware finish is to be 626 (26D).
- D. Exterior doors are to have electric mortise locksets and shall secure during a power failure.
- E. Exterior operable devices are to have an integral finish. Field-applied or factory-applied surface coatings are prohibited.
- F. Do not paint door hinges and hardware or fire door labels.
- G. Kickplates are required at doors in high traffic areas and at custodial closets.
- H. Plastic parts are prohibited, inside or out.
- I. Doors are to be installed with a minimum of four hinges with four screws in each hinge-leaf.
- J. Levers are to be specified with tactile warning at the entrance side of electrical, mechanical, communication, and elevator equipment doors.
- K. Locate Surface-mounted door closers on the room side of doors and not visible from corridors, lobbies, or other public spaces.
- L. Use of magnetic locks and electric strikes is prohibited.
- M. Specify continuous sound seal at offices, conference rooms and other locations requiring acoustical privacy.
- N. Specify automatic door bottom for appropriate applications with approval of SRP project Manager.

The table below indicates general hardware function by location.

Location	Hardware Function	Closer
Exterior Entry	Electrified Mortise Lockset with Card Reader and Exit Device	X
Exterior Exit Only	Exit Device	X
Department Entry	Electrified Mortise Lockset with Card Reader <sup>1</sup>	X

Restrooms, Single User	Privacy Lockset with Occupancy Indicator	X
Restrooms, Multiple User	Push/Pull	X
Break Room	Push/Pull	X
Server/MDF/IDF	Electrified Mortise Lockset with Card Reader	X
Office	Office Lockset <sup>1</sup>	
Conference Room	Passage Latchset	
Training Room	Electrified Mortise Lockset with Card Reader and Exit Device	X
Storage	Electrified Mortise Lockset with Card Reader	X
Copy	Passage Latchset	
Building Support / Custodial	Electrified Mortise Lockset with Card Reader	X

<sup>1</sup> If using demountable office fronts with sliding doors, SRP will coordinate hardware requirements with furniture vendor.

The table below indicates acceptable products for hardware.

Hardware	Acceptable Products	Notes
Hinges	Hager Stanley Ives	4 ½ x 4 ½ stainless ball bearing hinges, with non-removable pins
Offset Pivot	Ives	
Lever Set	Schlage ND Rhodes	
Mortise Lock	Schlage L Series, 06A	
Core	Schlage Large Format Interchangeable	Keyed to the GGM 290 master key system
Exit Device at Wood or Hollow Metal Door	Von Duprin 99 Series	Keyed dogging function with IC core with QEL
Exit Device at Storefront	Von Duprin 33 Series	Keyed dogging function with IC core with QEL
Closer	LCN Smoothie 4000 series LCN 4040 series LCN 2030 series (concealed)	Surface mounted, typical Concealed in door header at storefront
Keyed Mullion	Von Duprin KR1654 Von Duprin KR4954	

### 3.08.08 KEYS AND KEYING

- A. Lock cylinder housings are to be suitable for Schlage large format interchangeable cores.

- B. The SRP locksmith performs keying for each project.

### 3.08.09 GLASS AND GLAZING

- A. Exterior glazing is to be insulated dual pane.
- B. Exterior glazing is to have low-emissivity (low-e) coating.
- C. Consider light exposure and span when specifying glass thickness.
- D. Metal frames are preferred to wood.
- E. Glazing should not be operable unless requested and approved by the SRP Project Manager.
- F. Use standard sizing whenever possible for future replacement.
- G. Avoid using film at exterior surfaces.
- H. Exterior glazing samples are to be reviewed and approved by SRP Project Manager in Design Development.
- I. Avoid spandrel glass whenever possible. If spandrel glass is required, consider ventilation of space immediately behind the glass and use of vapor barrier.
- J. Use fire rated glass, instead of wired glass, at fire rated assemblies for safety.

## 3.09 Division 09 – Finishes

### 3.09.00 INTRODUCTION

This section contains the requirements relating to finishes, including walls, ceilings, transitions, tile, flooring, and paint.

Finishes are intended to be clean, contemporary, light and bright, neutral, timeless, and consistent with SRP's brand standards. Finishes that are opulent or extravagant in appearance are to be avoided. SRP's brand is inspired by the desert environment with the logo being inspired by the sun and water. Interior finishes should not be a literal representation of brand logo and colors but a representation of SRP's core businesses of power and water. Vinyl wall graphics are used in common areas for brand emphasis and visual interest.

The tables below provide guidelines for finishes by building type. Specialty spaces not listed below, such as labs, should be programmed as part of the project scope.

Administrative				
Space Type	Finish			
	Floors	Base	Walls	Ceilings
Reception/Lobby	Porcelain Tile	Porcelain Tile	Eggshell Paint	Gypsum Board or Acoustical Ceiling Tile
Office	Carpet Tile, Medium Color, Pattern Variation	Rubber	Eggshell Paint with One Accent Wall	Acoustical Ceiling Tile
Conference Room	Carpet Tile, Medium Color, Pattern Variation	Rubber	Eggshell Paint with One Accent Wall	Acoustical Ceiling Tile
Circulation	Resilient Tile or Carpet Tile, Medium Color, Pattern Variation	Rubber	Eggshell Paint	Acoustical Ceiling Tile
Copy / Workroom	Carpet Tile, Medium Color, Pattern Variation Resilient Tile	Rubber	Eggshell Paint	Acoustical Ceiling Tile
Storage	Resilient Tile	Rubber	Eggshell Paint	Acoustical Ceiling

				Tile
Restroom/Locker Room/Change Area	Porcelain Tile, Medium Color Grout	Porcelain Tile with Schluter Cove	Porcelain Tile with Semi-Gloss Paint Above	Gypsum Board
Shower	Porcelain Tile, Medium Grout Color	Porcelain Tile	Porcelain Tile	Gypsum Board
Mother's Room	Resilient Tile or Carpet Tile, Medium Color, Pattern Variation	Rubber	Eggshell Paint	Acoustical Ceiling Tile or Gypsum Board
Break Room	Resilient Tile	Rubber	Eggshell Paint with One Accent Wall, Vinyl Wall Graphics space permitting	Gypsum Board or Acoustical Ceiling Tile
Mechanical, Fire Riser, Electrical	Sealed Concrete or Epoxy	Rubber	Eggshell Paint	Acoustical Ceiling Tile or Open to Above
Custodial	Sealed Concrete or Epoxy	Rubber	Semi-Gloss Paint, Stainless Steel Panels at Sink	Acoustical Ceiling Tile or Open to Above
Server / MDF / IDF	Grounded Static Dissipative Tile, Sealed Concrete or Resilient	Rubber	Eggshell Paint, Fire-resistant Plywood	Acoustical Ceiling Tile or Open to Above

Service and Support – Garage, Shops, Warehouse				
Space Type	Finish			
	Floors	Base	Walls	Ceilings
Office	Carpet Tile or Resilient Tile	Rubber	Eggshell Paint with One Accent Wall	Acoustical Ceiling Tile
Conference Room	Carpet Tile, or Resilient Tile	Rubber	Eggshell Paint with One Accent Wall	Acoustical Ceiling Tile
Circulation	Sealed Concrete, Resilient or Carpet Tile	Rubber	Specialty Paint or Semi-Gloss Paint <sup>1</sup>	Acoustical Ceiling Tile
Copy / Workroom	Resilient Tile, Carpet Tile or Sealed Concrete	Rubber	Eggshell Paint	Acoustical Ceiling Tile
Storage	Resilient Tile, Sealed Concrete or Epoxy	Rubber	Eggshell Paint	Acoustical Ceiling Tile
Restroom Area	Porcelain Tile or Epoxy	Porcelain / Ceramic Tile with Schluter cove	Porcelain / Ceramic Tile with Semi-Gloss Paint Above	Gypsum Board
Locker Room/Changing Area	Porcelain Tile or Epoxy	Porcelain / Ceramic Tile with Schluter cove	Porcelain / Ceramic Tile or Semi-Gloss Paint	Gypsum Board
Shower	Porcelain Tile or Epoxy	Porcelain Tile	Porcelain / Ceramic Tile	Gypsum Board
Break Room	Resilient Tile, Sealed Concrete or Epoxy	Rubber	Eggshell Paint with One Accent Wall, Vinyl Wall Graphics space permitting	Gypsum Board or Acoustical Ceiling Tile
Mechanical, Fire Riser, Electrical	Sealed Concrete or Epoxy	Rubber	Eggshell Paint	Acoustical Ceiling Tile or Open to Above <sup>2</sup>
Custodial	Sealed Concrete or Epoxy	Rubber	Semi-Gloss Paint <sup>1</sup> , Stainless Steel Panels at Sink	Acoustical Ceiling Tile or Open to Above <sup>2</sup>
Server / MDF / IDF	Grounded Static Dissipative or Resilient Tile, Sealed Concrete or Epoxy	Rubber	Eggshell Paint, Fire-resistant Plywood	Acoustical Ceiling Tile

Warehouse	Sealed Concrete, Yellow Painted Safety Markers	Rubber	Semi-Gloss Paint, Chain-Link or Exposed <sup>1,2</sup>	Open to Above <sup>2</sup>
Service Garage	Sealed Concrete or Epoxy	Rubber	Semi-Gloss Paint or Exposed <sup>1,2</sup>	Open to Above <sup>2</sup>

<sup>1</sup> Consider wall protection at areas of high abuse

<sup>2</sup> Structural steel to have primed finish or epoxy paint

### 3.09.01 SELECTION AND APPROVAL OF FINISHES

- A. SRP should be consulted prior to development of finish selections as predetermined site palettes may already exist and should be utilized.
- B. The selection of materials should be assessed for long-range, life-cycle cost analysis.
- C. The Architect or Interior Designer is to provide non-returnable samples, digital and/or physical color boards, and renderings as applicable to communicate design intent. Present preliminary finish options prior to the 50% Design Review Meeting. The final color selections are to be submitted and approved prior to completion of the Construction Documents Phase.
- D. Indicate for General Contractor to provide submittals to Owner for approval prior to ordering.
- E. Final finish samples are to be submitted in a 3-ring binder format at close out of project.
- F. Vinyl graphics and artwork to be coordinated with the SRP Project Manager.

### 3.09.02 NON-STRUCTURAL METAL FRAMING

- A. Minimum framing shall be 25-gauge galvanized metal studs, spaced no greater than 16" on center.
- B. Where partitions terminate at or 6" above the acoustical ceiling, provide diagonal stud bracing to structure.
- C. Impact resistant gypsum board is required at partitions that are subject to severe impact loads.
- D. Backing or blocking is required where appurtenances are intended to be supported directly
- E. Interior walls are to be constructed with metal stud framing. The use of wood framing is not acceptable. Steel studs are to be 25-gauge minimum, spaced at a maximum of 16" on center.

- F. Specify galvanized, rust-resistant studs with a required rating per SRP specs.
- G. Load-bearing and exterior conditions are to be delegated designs.
- H. The use of structural, cold-formed, metal-framed exterior backup walls for brick veneer, when appropriate, is allowable.
- I. from partitions. Specify appropriate size and gauge of metal backing.
- J. Provide an adequate plumbing chase behind fixtures so cutting, drilling, and notching of metal studs is not necessary.

### 3.09.03 GYPSUM BOARD

- A. Provide water-resistant gypsum board within six feet of wet areas. Specify corrosion resistant screws in wet locations.
- B. Cement board to be used for shower walls and shower ceilings.
- C. Locate control joints and expansion joints on construction documents.
- D. Renovations affecting one wall or less in a space require matching the existing adjacent wall finishes (i.e., Orange peel finish). If 2 or more walls affected, all the walls in the space shall be refinished in accordance with the new criteria.
- E. Gypsum board should not be interrupted at fire resistant partitions for blocking, ceramic tile backer boards, or other construction.
- F. The following finish grade levels are required by space type, per Gypsum Association GA-214. Level 0 finish is prohibited.

Finish Grade	Space Type
Level 1	Plenum Areas above Ceilings and Attic Spaces
Level 2	Garages, Warehouse
Level 3	Storage, Mechanical Rooms, Electrical Rooms and Server / MDF / IDF Rooms
Level 4	Corridors, Offices, Conference Rooms, Break Rooms, Accent Walls
Level 5	Vinyl Wall Graphics, Specialty Wall Finishes

### 3.09.04 LATH AND PLASTER

- A. Lath and plaster can be used in existing facilities when matching existing. Gypsum board or masonry construction are preferred.
- B. Lath and plaster systems must use galvanized steel metal lath in conjunction with acoustic plaster to eliminate rust stains. All lathing accessories shall be made of zinc alloy.



### 3.09.05 TILE

- A. White or light-colored grouts should be avoided.
- B. Epoxy grout is to be used at showers.

### 3.09.06 ACOUSTICAL CEILINGS

- A. Suspended acoustical ceiling tiles to be 2'x2' or 2'x4' square edge lay-in panels. Tegular panels may be used with approval from the SRP Project Manager when matching existing field conditions.
- B. Office areas are to be designed with a 9'-0" ceiling height where possible.
- C. The minimum acceptable Noise Reduction Coefficient (NRC) for acoustical ceiling tiles is 0.70.
- D. Adhesive tiles are prohibited.
- E. Suspension systems are to be hung only from structural framing members or the structural deck above. Do not hang suspension systems from metal roof deck, sheet metal ductwork, pipes, or conduit.
- F. Where widths of ducts and other construction within ceiling plenum interfere with the location of hangers at required maximum spacing (4'-0" on-center) to support standard suspension system members, supplemental suspension members and hangers in the form of trapezes or equivalent devices shall be installed.
- G. Lighting, diffusers, and sprinklers are to be in the center of ceiling tiles and occur at regular intervals.
- H. Consider maintenance access requirements of above ceiling items when selecting and layout out ceilings.
- I. Size of acoustical ceiling tiles must be no smaller than 2" in any direction when planning the grid placement in the room.

### 3.09.07 TRANSITIONS

- A. Use brushed stainless steel or aluminum transitions throughout.
- B. At floor to wall tile transitions, provide stainless steel or aluminum cove-shaped transition strip.

### 3.09.08 CONCRETE FLOORING

- A. Seal concrete for maintenance and protection.
- B. At wet locations, concrete is to receive epoxy coating with a non-skid finish.

### 3.09.09 RESILIENT FLOORING

This section includes vinyl composition tile (VCT), luxury vinyl tile and plank (LVT), rubberized flooring tile and rubber base.

- A. LVT is preferred to VCT.
- B. If used, VCT should be standard tile size, bio-based, heavy duty commercial.
- C. Color should be easily maintainable.
- D. Stair treads and risers shall be installed as a single piece across the width of the stair.
- E. Nosings must incorporate an integral contrasting method to differentiate the edge of the step-in descent.
- F. A premium adhesive shall be used for installation when used on stair treads and risers.

### 3.09.10 CARPETING

- A. Carpet tile is preferred over broadloom for ease of replacement.
- B. A color and pattern should be specified that is easily maintainable.
- C. Carpet to have stain resistant qualities.
- D. All rolled carpet must be direct glue down.
- E. Carpet adhesives are to be of free of VOCs.
- F. Built-in walk off carpet tile (min 5') are to be specified on interior side of exterior doors to greatest extent possible
- G. Carpeting applied to vertical surfaces is prohibited.
- H. Rubber base should be 4"x1/8" rolled goods, coved profile.

### 3.09.11 WALLCOVERING

- A. Vinyl wall coverings are to be used for branding. Wallpapers are not preferred and will be reviewed per project.
- B. Provide full height corner guard or manufacturer's J-trim at exposed edges.
- C. Vinyl wallcoverings should not be used at exterior walls.

### 3.09.12 PAINTING AND COATING

- A. Documents are to note that no paint or other substances are allowed on low voltage data cabling.
- B. All exposed exterior metal components and trim to be provided with a finish, applied or inherent to prevent corrosion. Typical coatings are yellow paint on gas meters and components, yellow painted or sleeved bollards, blue and red backflow preventers, or matched painted finishes for exposed conveyance piping in stairwells and common areas.
- C. Exposed interior fire suppression piping is to be painted in finished areas and stairwells.
- D. All interior painting is to contain zero VOC's for health of occupants.

### 3.09.13 RAISED ACCESS FLOORING

- A. Weight load capacity for raised access flooring needs to account for weight of flooring and dead loads.
- B. The structural engineer needs to analyze the building load capacity and the raised access weight load when determining placement of RAF.

## 3.10 Division 10 – Specialties

### 3.10.00 INTRODUCTION

Specialties covered in this division include a variety of products and equipment, including items for instructional use, signage, storage, and toilet compartments.

#### 3.10.01 INTERIOR SIGNAGE

- A. Signage should follow the Facility Signage Manual document (available upon request). Sign Consultant may be responsible for coordination of or assistance in design.
- B. Rooms are to have SRP standard signage denoting the room name and grid number.
- C. SRP assigns grid numbers to all spaces during the review of the Design Development phase deliverable. These numbers must be documented on the Construction Documents.
- D. Each building shall be provided with the following interior signage:
  - In addition to the minimum code-required information, each stair floor-level landing shall be labeled with the grid number, stair naming convention, floor level and identify if roof access is available.
  - Systems and piping within stairwells shall have identification.
  - Fire extinguisher signs, as pictured below, shall be provided at all fire extinguisher locations. Fire extinguisher and AED locations to be indicated with a wall-mounted sign.
  - A nominal 11" x 17" evacuation map shall be posted in all Conference rooms and other locations to be determined by SRP with their signage vendor.
  - Evacuation maps will be generated by SRP and installed by the signage vendor.
  - Locations should be determined collaboratively by SRP and the Design Consultant during Design Development.
- E. Life safety systems may require additional signage for the clarification of remote or hidden controls. Design Consultant to notify SRP project manager of requirements for additional or specialty signage. For example, where a specialty suppression system is remotely located from the room of protection, both rooms will receive signage to indicate the specialty and control locations, such as at room 100 "Pre-action Suppression System Area – Controls in Room 200" and at room 200 "Pre-action Controls for Room 100 Within."

#### 3.10.02 EXTERIOR SIGNAGE

- A. Exterior building signage must follow the SRP Branding Guidelines and the Facilities Signage Manual.
- B. Include “No Parking Fire Lane” signage at all locations deemed necessary by the Building Code Office and the State Fire Marshal, such as but not limited to signage at the fire department routes/lanes, hydrants, back flow preventers, and post indicator valves.
- C. Include “No Parking Fire Lane, FDC” signage at all fire department connection (FDC) locations.
- D. The emergency disconnects to each building shall be labeled separately as “Main Shunt” or “Emergency Shunt.” The numerals 1 of 3, 2 of 3, etc., shall be included as appropriate for each situation. Where disconnects are within an enclosed room, signage listing, “Disconnecting Means Within,” in large letters, shall be provided adjacent to the room.
- E. Each fire department connection, backflow, or post indicator valve is to have a permanent hangtag denoting the building number (####) and building abbreviation.
- F. Permanent directional signs are to be planned and installed on the site to aid in site wayfinding for vehicular and pedestrian traffic and must meet existing signage standards. These signs include building identification signs, vehicular directional signs, etc. Quantities and locations of directional signage shall be coordinated with SRP Project Manager.
- G. Include pavement marking, and graphics in the construction documents.
- H. Design roadway signage in accordance with Arizona Department of Transportation (ADOT) and the Manual of Uniform Traffic Control Devices (MUTCD).
- I. Identify each building with an aluminum sign, denoting the building number, located so it can be seen from the main access path through the site. The size depends on the size of the building. More than one sign may be required on larger buildings. Buildings not within an enclosed campus style setting may also have a monument sign.

### 3.10.03 TOILET COMPARTMENTS

- A. Toilet partitions must be mounted to the overhead structure with independent overhead reinforcements and wall brackets. Floor mounted partitions are not preferred.
- B. Provide shower curtains at the shower stalls. Provide partition doors (if applicable) at the shower drying area entry. Add full privacy cover at all gaps at partitions.
- C. Toilet partitions and urinal screens are to have full height mounting brackets and hinges to eliminate gaps.
- D. Toilet partition panels and doors are to have rounded edges.

- E. Door hinges are to be continuous and adjustable self-closing. Door strikes/keepers, sliding latches and housings, and continuous wall brackets are to be made of 316 brushed stainless steel.

### 3.10.04 WALL PROTECTION

- A. Specify stainless steel corner guards in high-traffic areas and where mobile equipment may be used.
- B. FRP corner guards are acceptable in office areas.
- C. Corner guards should be adhered with construction adhesive and not with screws or double stick tape.
- D. Recessed corner guards are prohibited.
- E. Corner guard locations to be indicated on finish plans.
- F. Provide full stainless steel wall panels behind industrial sinks (hand sinks or mop sinks), see plumbing specifications for sizing.

### 3.10.05 TOILET ACCESSORIES

- A. See specifications for common toilet room accessory product information. General guidelines are as follows:

#### Restroom stalls

- Wall-mounted sanitary disposal – in female and unisex
- Surface mounted dual roll toilet tissue dispenser
- Coat Hook with rubber end shock absorber on door (specify extra wall bumper with backing if coat hook bumps into GWB wall)
- Fold down convenience shelf
- Wall-mounted toilet seat cover dispenser
- Grab bars as required by ADA code

#### Restrooms

- In-sink or counter Soap dispenser (dripless model used by custodial)
- Sanitary Product Vending – in female and unisex
- Mirrors, mechanically attached
- Recessed paper towel dispenser with waste receptacle

- Convenience shelf
- Electric hand dryer

#### Showers

- Vinyl shower curtain between shower and dressing area
  - Robe hook
  - ADA fold-down seat at ADA stalls
  - Recessed soap dish or niche
  - Liquid Soap Dispenser
- B. Accessories are also required at Mother's Rooms, Break Rooms, and handwashing areas.
- C. Locations and product information is to be included on contract documents.
- D. Consultants responsible for determining ADA required accessories.

### 3.10.06 FIRE EXTINGUISHERS & AUTOMATED EXTERNAL DEFRIBULATORS

- A. All fire extinguisher locations (existing and new) are to be shown on the construction documents.
- B. Locate fire extinguishers in common or corridor spaces per applicable life safety codes.
- C. Semi-recessed cabinets are required for finished office areas. Wall mounted rack is acceptable in industrial / service type spaces.
- D. Extinguishers are to have all metal head assemblies, not plastic.
- E. Extinguishers are to be placed and sized for preferred five-pound coverage spacing. Ten-pound-size or larger may be used where code requires larger for a specific hazard.
- F. Carbon dioxide (or approved equivalent) extinguishers are to be used where clean agent is needed. The use of Halon extinguishers is prohibited.
- G. AED's are to be semi-recessed and located on the construction documents. SRP Project Manager will coordinate quantities and locations with Health Services and the end users.

### 3.10.07 STORAGE SPECIALTIES

- A. Pallet racking systems are to consist of the following:

- Teardrop-style, 2" adjustable, 192" high by 42" deep uprights, with a minimum weight capacity of 18,000 pounds
  - 96" or 120" beams, with a minimum weight capacity of 5,400 pounds
  - Top beam with full-width, welded, open-wire decking
  - All remaining beams shall have front-to-back safety crossbars (4 per beam)
- B. Pallet racking systems are to include the following:
- Post protectors at the upright on both ends of each row, bolted securely to the floor
  - Be securely fastened to the floor, and back-to-back rows shall be tied together with steel row spacers for stability
  - Three pairs of beams per rack, with spacing determined based upon individual products to be stored.
  - Beams securely attached to uprights with a safety lock
  - labeling that clearly indicates the maximum rack load capacity, weight limits, RMI caution, and a RMI compliance statement
- C. Pallet rack systems are to include a comprehensive design for fire suppression and alarm annunciation detailing the additional devices needed, such as in rack heads, row mounted alarm devices, and protective guards for all equipment.

### 3.10.08 LOAD POINTS AND FALL PROTECTION

- A. All installed overhead, hoist, cranes, and blocks shall be load tested and permanently labeled with their approved load.
- B. Complete engineering shall be provided for all points designated as a load bearing or tie off.
- C. Integral fall protection means is required at openings adjacent to elevated equipment that pose a fall risk.

### 3.10.09 OPERABLE FOLDING PARTITION

- A. Operable walls are to be used sparingly. Where required, see SRP specifications.
- B. Coordinate structural requirements and include in construction documents, not as delegated design by the General Contractor.



## 3.11 Division 11 – Equipment

### 3.11.00 INTRODUCTION

This section includes the standard equipment required for Break Rooms, Copy Rooms and Conference Rooms.

Refer to Room Typical Sheets for data and electrical infrastructure requirements.

The table below provides the standard equipment by space type.

Space Type	Standard Equipment	Requirements
Break Room	(1) Commercial Refrigerator, (1) Commercial Freezer, Water/Ice Machine (per project approval required), Coffee Maker(s), Microwave(s), Toaster	Floor Sink, Dedicated Electrical Outlets at countertop for employee use, Garbage Disposal
Copy Room	Copy Machine	Dedicated Electrical Outlets, Two data ports per unit, Data/Network connectivity
Conference Room	Projector/Projection Screen or Television CPU Wireless Keyboard and Mouse Room Reservation Monitor	Electrical Outlets HDMI cord (length 15'-0" L min) with liberty ring, Data/Network connectivity

- A. Consider access to shut offs at water lines when planning. Refer to Facilities Design Details Library/Architectural Details for exact requirements.
- B. For Coffee Maker Requirements, Refer to Facilities Design Details Library for the Coffee Timer Valve Detail.
- C. For Ice Maker Requirements, Refer to Facilities Design Details Library for Ice Maker connection detail.

### 3.11.01 PROJECTION SCREENS

- A. Recessed ceiling mounted is preferred to wall mounted projection screens.
- B. Projection screens are to be electrically operated on dedicated electrical circuit.

## 3.12 Division 12 – Furnishings

### 3.12.00 INTRODUCTION

This section includes information regarding the furnishings required in the SRP Buildings. This includes window treatments, furniture, and fixed seating.

#### 3.12.01 WINDOW TREATMENTS

- A. Provide rolling shade coverings or treatments on exterior window openings other than lobbies or corridors. Mini-blinds are prohibited.
- B. Color of fascia and shade are to match window trim.
- C. Specify manually operated, double roller shades with 3% opacity at all exterior windows. Specify dual shades with blackout covers for all East, West, and South exposures.
- D. Coverings or treatments for windows in conference rooms and training rooms shall restrict daylight from visually obscuring projection screens at any time of the day during the year.
- E. No window coverings are to be provided on office or conference room door glass or sidelights. These windows are to have vinyl frosted film starting at 24" above finished floor and up to 72" above finished floor.

#### 3.12.02 FURNITURE

- A. Furniture (such as desks, chairs, filing cabinets, etc.) is to be specified and purchased by SRP from their furniture and equipment vendor.
- B. Infrastructure such as power and data for systems furniture is required to be noted and coordinated on the contract documents.

## **3.13 Division 13 – Special Construction**

### **3.13.00 INTRODUCTION**

See specifications division 13 for information on metal building systems and fabricated control booths.

## 3.14 Division 14 – Conveying Systems

### 3.14.00 INTRODUCTION

Conveying equipment is limited to elevators. No other conveying equipment is common at SRP facilities.

### 3.14.01 ELEVATORS

- A. Elevators are to be planned at buildings with more than one story. Elevators are not required at warehouse mezzanine spaces unless required by code.
- B. Consider planning for a dedicated freight elevator at administrative buildings.
- C. Elevator cab finishes are to be designed and specified as a package for cost savings and efficiency of installation.
- D. Elevator cab flooring is to be hard surface if possible. If carpet is used, select product with mid to dark color and pattern for durability.
- E. Elevator cab walls are to be panelized for future repairs or replacement. Consider level of abuse when selecting materials.
- F. Provide metal handrails at side and back walls.

## 3.21 Division 21 – Fire Suppression

### 3.21.00 INTRODUCTION

Fire suppression refers to sprinkler systems and other similar systems designed and installed with the intent of limiting the propagation of fire in a building or structure.

### 3.21.01 FIRE SUPPRESSION

- A. System design is to be performed by a licensed Fire Protection Engineer. At a minimum, the primary branch line distribution is to be indicated on the construction documents.
- B. In determining the adequacy of the existing water source to meet the required fire flow, it is the responsibility of the system designer to perform the necessary site flow tests, in coordination with the SRP Project Manager and witnessed by the SRP Fire Marshall. Timing is to be coordinated at peak demand to reflect typical conditions and include a suitable factor of safety using historic data.
- C. Each sprinkler or standpipe system is to be dedicated to the building it serves. Separate buildings only joined by a breezeway-type canopy are to have separate systems. Design shall allow the entire building to be operated as one system and monitored by one fire alarm. Where building additions are planned, provisions should be made to unify the system upon completion of all phases.
- D. Design standpipe, fire department connections and fire hydrants threads in accordance with local responding fire department specifications
- E. Locate the system main riser in a mechanical space, stairwell, or other maintenance-accessible area, preferably with a door to the building exterior. Control valves, drain valves, and components requiring access for routine testing, maintenance, and inspection shall be in dedicated closets or a location in common areas. Laboratories, office, storage, restrooms, and instructional or similar spaces used by building occupants shall not be used for equipment access. Provide an inspector's test valve, (with a sight glass where needed), and drain to the exterior of the building next to the riser. Locate a second drain valve at a remote point in each system to facilitate air bleed-off.
- F. Systems shall have control valves to accommodate individual isolation for each floor of

the building, with additional valves for isolation of special areas as determined by SRP. Fire alarm-monitored flow switches shall, at a minimum, identify flow by floor, with additional switches as needed for special area zones.

- G. All pre-action, dry, or similar special systems controls shall have a dedicated closet-type space located off the main corridor, with adequate access at all times, not in housekeeping rooms or user storage spaces. Wall surfaces adjacent to special system controls and drains shall be water-resistant.
- H. Fire pump rooms shall be located on an exterior wall with a door to the outside. The room shall be dedicated to fire protection equipment, without penetrations for non-related services. Ventilation and HVAC is required. The fire pump controller shall be located directly adjacent to the exterior room door for direct access to the emergency disconnect. They will be located in proximity to the fire alarm control panels, adjacent to a Fire Department-accessible exit, and in a common area of the building. Backup fire alarm systems monitoring the pump controller dry contacts shall be provided where possible. Monitoring may also be achieved utilizing the building fire alarm system where available. Trouble and supervisory conditions with the pump must be reflected remotely. The test header's finish should match the FDC or building wall as appropriate for the location.
- I. All new and renovated piping for fire protection systems shall be rigid metal pipe. Non-metallic tubing and "flex"- type connections must be approved by SRP Project Manager and SRP Fire Marshall.
- J. All lines two inches or larger shall have open stem and yolk (OS&Y) type valves, with tamper switches and flow switches.
- K. Any newly installed fire suppression system shall have dedicated, metered, backflow preventers with freeze protection.
- L. All system control valves, including backflow preventers on fire protection system supply mains and PIV, shall be monitored by the building fire alarm system. Valves (including backflow and PIV) located outside or in common building areas shall be chained and locked with a Master #2425, an approved break-away lock.
- M. Specify exposed fire suppression piping in finished areas with:
  - A finish consistent with the area, including painted risers in stairwells
  - Chrome finish on the full FDC and ring
  - Red paint on the backflow preventer and PIV
  - Concrete pads for yard equipment with bollards

- N. Gauges are to be new and permanently labeled with the date of installation.
- O. Automatic sprinkler heads shall be standard, automatic closed type. Sprinkler heads shall be specified and installed with a date of manufacture not more than one year prior to the date of installation. Specify semi-recessed pendent sprinkler heads at ceilings. Specify brass upright or sidewall sprinkler heads in other applications. Locate sprinkler heads in the center of the tile and the center of the area of coverage where possible. Renovated spaces shall adjust sprinkler head locations for optimal coverage protection.
- P. Provide sprinkler coverage behind ceiling-mounted projection screens where the distance off the adjacent wall exceeds eight (8) inches.
- Q. Using sprinkler system piping for electrical grounding is prohibited.
- R. System drains and test connections are to be hard piped to a termination point outside of the building at grade, away from public view or access ways, and arranged to avoid damaging landscaping. Size special system drains to allow for system testing and resetting without additional attachments or causing area flooding.
- S. All components shall be provided with labeling, including but not limited to riser room, control valve, inspectors test, and drains. Where controls are hidden, additional labeling shall be provided on the closest door, grid, access panel, etc. The FDC and exterior control valves shall be identified with the building number of the facility served. Coordinate colors with the SRP Project Manager.
- T. For areas that have special system coverage, such as pre-action or dry systems, identify entrances to special protected areas with SRP Standard style signage to indicate, "Room XXX: Pre-action Protected Area (Controls Are Located in Room YYY)." Provide signage at corresponding separate rooms housing controls for special systems, indicating "Room YYY: Contains Controls for Pre-action Protected Area, Room XXX."

### 3.21.02 CLEAN-AGENT FIRE EXTINGUISHING SYSTEMS

- A. In areas with clean agent fire extinguishing systems, specify doors with vision panels, which swing in the direction of egress and include panic hardware exiting clean agent-protected areas. Recess so they do not project out into adjacent pedestrian paths.
- B. The installation of a CA system does not substitute for building fire sprinkler systems, but pre-action sprinklers may be used in lieu of wet pipe.
- C. The system design shall outline the complete system specific to the agent (NOVEC1230) and manufacturer models to be installed, with defined agent concentrations for the entire

area to be protected.

- D. Design shall include a contingency plan for ventilation of the protected area and restarting of HVAC after discharge.
- E. Provide access, storage, operational sequence, and identification for all system equipment. Specify piping materials used in all applications.
- F. Address maintaining fixed barriers where lay-in type ceilings are installed, to minimize added debris from concealed spaces upon discharge. Where the space requires access, provide identifiable means of entry or operable restraints. Label ceiling grids where tiles are secured.
- G. Provide tank securing detail and assembly for each tank location.
- H. Additional requirements, spare parts, testing, and inspections, as outlined in other Divisions of this manual apply for all components of the system. All system components shall be in dedicated, identified raceways and cabinets with Class A wiring.
- I. Do not specify plastic piping exposed within plenum areas; plan aesthetics accordingly.
- J. Locate control panels by room exit doors and provide remote annunciation outside the protected area when possible.
- K. Appliances, detectors, and devices shall be dedicated to the system served. The building's main fire alarm panel shall monitor the systems for status as deemed appropriate by the Engineer of record, the SRP Fire Marshall, and the SRP Project Manager. Where the building system has the capability to indicate full descriptions, clean agent alarms shall be fully identified and shall be able to be transmitted to remote monitoring facilities. Specify interlocked and cross-zoned sequences, as appropriate, for the level of protection desired.
- L. Where areas are also provided with pre-action sprinklers, separate dedicated initiation devices shall be installed. Provide identification methods to differentiate system components.
- M. Provide photoelectric-type devices in subfloor areas where smoke detection is requested to prevent false alarms. Locate the smoke detector chamber at the top of the subfloor.
- N. Agent tanks shall be located and maintained accessible for routine access, semiannual weighing, and scheduled removal. The tank shall be located by an area access door or main pathway.
- O. Identify entrances to protected areas with SRP Standard-style signage to indicate, "Room #### CLEAN AGENT Protected Area Within Controls Located at Room ####." Indicate pre-action sprinklers where applicable. Identify separate rooms housing controls for systems



with signage “Room ### Controls for Clean Agent for Area ### Located Within.” (See example in Fire Suppression section 3.21.01.) The department shall post additional emergency contact information for all areas.

- P. Locate Miniature system locator maps shall be at each control panel and annunciator.

## 3.22 Division 22 – Plumbing

### 3.22.00 GENERAL PLUMBING REQUIREMENTS

- C. The quantity of plumbing fixtures provided shall comply with the minimum requirements of the applicable plumbing code. Additional fixtures may be required to meet the unique aspects of a particular facility. The plumbing fixtures should be grouped horizontally and stacked vertically to the extent practical to minimize the piping requirements.
- D. Design Consultants are to design a plumbing system which is appropriate for the facility type. This will range from a modern office style to an industrial style.
- E. Include in the construction drawings a lay description of the design, operating function, loads, capacities, tolerances, sequence(s) of operation, etc., of the plumbing systems designed for this project. Update this lay description at later stages of design and construction if the systems' operation changes and provide copies of updates to the building's commissioning agent, as well as to the design reviewers.
- F. Plumbing materials or systems should not be located on the outside of the building or outside of interior walls or chases. If that is necessary, they are to be designed to blend in with the building structure.
- G. Floor sleeves shall be provided at penetrations in upper floors, even those within plumbing chases, and shall extend above the finished floor a minimum of 1-1/2 inches and shall be sealed watertight.
- H. New penetrations in fire rated assemblies shall be fire-stopped.
- I. Concrete bases, 3-1/2-inch minimum height, shall be provided under all floor mounted plumbing equipment. Base size and location shall be coordinated with the equipment specified and shall be shown on the drawings.
- J. The Design Consultant is expected to field-verify existing conditions so that construction conflicts are minimized. For remodeling projects, the Designer will validate existing conditions and where concealment exists, they shall request SRP provide openings in walls and ceilings to permit verification of existing conditions. Include a statement in the contract document that the contractor is to be accountable for identifying and coordinating these items.
- K. Coordinate the plumbing system design with the manufacturer's installation instructions for the equipment, fixtures, and associated accessories.
- L. Coordinate the plumbing system design with the structural and non-structural framing to

ensure adequate chases are provided.

### 3.22.01 FIXTURES

#### WATER CLOSETS AND URINALS

- A. Water closets and urinals shall be vitreous china and wall mounted using a floor supported carrier. Carriers shall be heavy duty steel construction.
- B. Flush valves for water closets shall be a manual flush valve of chrome plated brass.
- C. Flush valves for urinals shall be a battery-powered, automatic flush valve of chrome plated brass.

#### HAND WASHING FIXTURES

- A. Lavatories in administrative areas shall be vitreous china with hands free, sensor-controlled faucets. The lavatory bowls will typically be under mounted in a millwork surface supported by a tube steel frame mounted at the floor. Single bowls in tops less than 3 feet wide may be laterally supported by adjacent walls. Each group of faucets will be connected to a thermostatic mixing valve closely located for prompt delivery of tempered water.
- B. Lavatories in industrial, low use areas shall be vitreous china with hands free, sensor-controlled faucets. The lavatory bowls will typically be wall mounted; supported by a steel carrier mounted at the floor. Each group of faucets will be connected to a thermostatic mixing valve closely located for prompt delivery of tempered water. Single lavatories located away from a centralized, domestic water heating system may have their own instantaneous, tankless water heater.
- C. Lavatories in industrial, high use areas shall be stainless steel, semi-circular wash fountains with hands free, sensor-controlled faucets. Each group of faucets in the wash fountain will be connected to a thermostatic mixing valve closely located for prompt delivery of tempered water.

#### SHOWER FIXTURES

- A. Shower fixtures shall include wall mounted heads and hand wand on a flexible, metal hose. The mixing valve with integral stops shall provide pressure-based temperature control. A separate dual outlet, diverter valve will be included.
- B. Each group of shower valves will be connected to a thermostatic mixing valve closely

located for prompt delivery of water at a suitable temperature less than 120°F.

## SINKS

- A. Mop sink basins of molded, solid surface material shall be floor mounted with a wall mounted faucet. The faucet shall be the dual lever type with quad turn valves. The faucet spout shall be supported by a steel rod and have a vacuum breaker with a hose threaded outlet.
- B. Breakroom sinks shall be the dual bowl type of stainless-steel construction. A chrome plated faucet with a single control lever shall be provided with a swing spout and low flow aerator. A  $\frac{3}{4}$  HP commercial grade garbage disposal shall be included.

## DRINKING FOUNTAINS

Electric water coolers with integral refrigeration shall be wall mounted and supported by steel carriers attached to the floor. The stainless-steel water coolers shall be the barrier free, bi-level configuration with a bottle filler. Water filtration shall be provided for drinking fountains.

## FLOOR DRAINS & FLOOR SINKS

- A. Provide an approved membrane flashing to extend 12-inches from the clamping ring on all floor drains located in slabs not on grade.
- B. The lowest floor in the building, whether basement or grade level, must have adequate floor drains to the sanitary sewer. There should be more than 1 floor drain on this lowest level.
- C. Every restroom must have at least 1 floor drain. Additional floor drains may be provided to minimize the extent of the floor slopes within the space.
- D. Floor drains in machine rooms must be accessible and must not be located under equipment.
- E. Floor sinks shall be provided where indirect waste receptors are required.
- F. Floor drains and floor sinks shall be provided with a dry type trap seal device instead of trap primers.

## FIXTURE VALVES

- A. All fixtures must be installed with isolation valves for shutoff service. Fixtures with integral

stops shall have additional isolation valves at the branch takeoffs serving them.

- B. Isolation valves shall be located above a lay-in ceiling, in a wall chase, or other easily accessible location.
- C. Smaller valves without flanges shall be provided with unions nearby to allow replacement without cutting pipe or major rework.

## 3.22.02 EQUIPMENT

### BACKFLOW PREVENTION

- A. Reduced pressure principle backflow preventers shall be piped to "dump" to the exterior or into a floor drain of adequate size to handle full flow.
- B. Backflow prevention assemblies shall have an isolation valves on each end with unions or flanges between them and the backflow assembly.
- C. Where backflow prevention assemblies are required for domestic water service to a building, two backflow preventions assemblies in parallel shall be provided.

### WATER HEATERS

- A. The preferred location for tank type water heaters is in a Mechanical Room. A hot water circulation system shall be provided to minimize the wait for hot water at any fixture.
- B. A thermostatic mixing valve shall be provided at restroom lavatories to provide a tempered water supply temperature between 85°F and 110°F. Electric instantaneous water heaters with automatic temperature limiting capability may be used for isolated lavatories and sinks.
- C. A thermostatic mixing valve shall be provided to limit the hot water supply temperature to a maximum of 120°F at the showers.

### AIR COMPRESSORS

Air compressors shall be reciprocating or rotary screw type, depending upon the application. Air treatment such as particulate filters, coalescing filters, after-coolers, and refrigerated air coolers shall be provided as the application requires. Air compressors shall be properly isolated, so vibration is not transmitted to adjacent building components.

## EQUIPMENT INSTRUMENTATION

Utility meters with BACnet communication connected for remote computer monitoring shall be supplied for makeup water lines. Closed circuit hydronic systems will be metered for leak detection. Open circuit hydronic systems will be metered for water usage.

## EQUIPMENT VALVES

All equipment must be installed with isolation valves for shutoff service. Equipment with integral stops shall have additional isolation valves at the branch takeoffs serving them. Remote isolation valves shall be located above a lay-in ceiling, in a wall chase, or other easily accessible location.

### 3.22.03 PIPING

#### DOMESTIC WATER PIPING

- A. The design of building supply and distribution systems shall provide a volume of water at the required flows, pressures, and temperatures to ensure safe, efficient and code compliant operation during periods of peak demand.
- B. The domestic hot water piping system can be either designed as a recirculating loop or with point of use water heaters. Ensure the system design complies with the temperature restrictions at the point of use and within the distribution system itself to satisfy the code and health considerations.
- C. All piping below and up through slab on grade shall be Type K soft copper without joints within a polyethylene sleeve.
- D. All piping above slab on grade shall be hard drawn copper, type L, with soldered joints.
- E. All piping shall be in concealed locations, with access panels at isolation valves, shock absorbers, and manifolds.
- F. Rooftop hose bibbs shall be provided within 40 feet of any rooftop equipment. Provide freeze-proof hydrants in freezing areas.
- G. Provide lockable wall hydrants at approximately 100-foot centers around the exterior of the building.
- H. Hose bibbs shall also be provided in mechanical equipment rooms and restrooms.
- I. Provide a laundry tub or service sink in each central plant and a combination emergency shower/eye wash.

## SANITARY WASTE & VENT PIPING

- A. Below Grade and beneath buildings & structures, specify solid core PVC Schedule 40 with DWV fittings below grade, through floor slab on grade, and up to 6 inches above floor slab on grade.
- B. 6 inches above floor slab on grade and higher, specify Hubless cast iron piping with heavy duty couplings.
- C. Additional cleanouts beyond code minimum may be necessary to accommodate the system configuration.
- D. Gravity drainage is desired throughout the building.

## STORM PIPING

- A. Below Grade and beneath buildings and structures, specify solid core PVC Schedule 40 with DWV fittings below grade, through floor slab on grade, and up to 6 inches above floor slab on grade.
- B. 6 inches above floor slab on grade and higher, specify Hubless cast iron piping with heavy duty couplings.
- C. Cleanouts may be necessary to accommodate the system configuration.
- D. Gravity drainage is desired throughout the building.

## COMPRESSED AIR PIPING

Compressed air piping shall be steel or copper; selected for the operating conditions.

## PIPING VALVES

- A. All systems such as potable water, non-potable water, RO water, compressed air, etc. must have a minimum of 1 isolation valve per function inside of a building.
- B. Each subsystem such as cold water, hot water, and hot water return shall have isolation valves in each restroom and each breakroom. Piping serving restrooms shall be designed to allow for each restroom in a restroom group to be individually isolated.
- C. Isolation valves shall be located above a lay-in ceiling, in a wall chase, or other easily accessible location.
- D. Smaller valves without flanges shall be provided with unions nearby to allow replacement without cutting pipe or major rework.

## 3.23 Division 23 – Heating, Ventilating and Air Conditioning

### 3.23.00 GENERAL MECHANICAL REQUIREMENTS

#### SPACE DESIGN CONSIDERATIONS

- A. Equipment and components shall be selected, and systems engineered, to provide reliable performance that is accurate and repeatable at full and part load conditions and under all operating modes.
- B. Each conference room and huddle room shall be provided with individual temperature control. Open office areas shall be designed with a maximum of 2,000 SF per temperature zone. Separate temperature zones shall be provided for each exterior wall with windows and for each exposure. Exterior zones shall be limited to approximately 12 feet from the exterior wall. Other rooms shall be grouped (3 minimum - 5 maximum) into similar exposures and temperature zones. The system shall be designed with future flexibility in mind.
- C. The indoor design temperatures used in calculating the heating and cooling loads shall be the following: Offices and similar occupied spaces, 75°F in cooling, 70°F in heating; Electrical Rooms, Mechanical Rooms, Storage Rooms, and similar unoccupied spaces, 80°F in cooling, 60°F in heating; IDF and Telco Rooms, 75°F in cooling, 65°F in heating.
- D. In mission critical facilities, a redundant chiller, cooling tower, chilled water pump, and condenser water pump shall be provided. The chilled water systems will typically be configured in a constant flow primary, variable flow secondary arrangement. Same service pumps shall be connected by manifold to allow any pump to serve any piece of equipment. A hydronic, flat plate heat exchanger sized for the output of an off-season chiller shall be provided and shall be piped in parallel with the chillers.
- E. System layouts shall be functional with necessary clearances to allow for ease of operation and maintenance. Space planning shall allow for the removal and replacement of equipment and components, including major equipment, without disturbing permanent walls or disrupting service to other system components.
- F. The location and size of equipment rooms shall allow for ease of maintenance, and removal and replacement of individual pieces of equipment and components. Equipment rooms that house major equipment should be directly connected to the outdoors and the outdoor path shall be accessible.
- G. Equipment rooms shall be air conditioned.



- H. The Design Consultant shall coordinate the mechanical system design with the structural and non-structural framing to ensure chases are provided where necessary.
- I. Design Consultants shall overlay final furniture plan with mechanical design to ensure there are no access conflicts with furniture, future furniture, or occupied spaces. It is best practice to locate access panels along hallways.

## HVAC INSTRUMENTATION AND CONTROLS

- A. The Design Consultant should be aware that SRP was previously committed to providing a BACnet compliant building automation system where appropriate utilizing the MS/TP protocol throughout all levels of the SRP Network. New projects may now be incorporating Internet Protocol (IP) communications into lower levels of the SRP Network and the consultant needs to coordinate closely with SRP personnel in this regard.
- B. The Design Consultant is responsible for development of an HVAC controls system design that meets the specific needs of the site and/or building location of the project
- C. The design shall coordinate the equipment labels on the construction documents with the SRP device naming convention in the specifications.
- D. In chilled water systems, PICV's or differential pressure control valves shall be provided to maintain proper control valve authority.
- E. Sequences of control, a controls points list, and control diagrams shall be provided on the drawings for all equipment. Most HVAC equipment shall be monitored by the BAS and controlled by Field Equipment Controllers connected to the BAS BACnet MS/TP Bus. This includes exhaust fans, packaged rooftop heat pumps, evaporative coolers, chillers, pumps, cooling towers, VAV boxes, rooftop air handlers, fan coils, etc. Power meters, lighting controls, hot water recirculation pumps may also be integrated into the BAS system.
- F. The building pressure relationship relative to ambient shall prevent infiltration through the building envelope year-round. Where room pressure differentials need to be sustained, the preferred method is using a fixed volumetric offset between the supply, return, and exhaust airflow rates.

## YEAR-ROUND COOLING

- A. IDF, Telcom, and similar rooms may require ductless split system units sized for the

anticipated load in the room. Ideally, each room would be provided with a redundant VAV air terminal unit.

- B. Special year-round 24/7 cooling and dehumidifying systems shall be stand-alone air conditioning units and shall be separated from the general comfort cooling system in the building.
- C. Examples of these special cooling systems are research spaces, telecommunication rooms, computer rooms, dry rooms, and instrumentation rooms.
- D. When required by application, condensing equipment shall be capable of starting and operating at 20-degree F ambient temperature.

## VENTILATION AND IAQ

- A. It is the responsibility of the Design Consultant to locate the outside air intake away from sources of exhaust fumes such as loading docks, parking areas, heavily trafficked areas, cooling towers, incinerator stacks, fume hood stacks, and other stacks exhausting toxic or radioactive materials, nuisance odors, plumbing vents, emergency generator exhausts, and engine driven fire pumps exhausts.
- B. It is the responsibility of the Design Consultant to locate building exhausts away from air intakes on adjacent existing buildings.
- C. Measurement, access, and balancing of outdoor air shall be addressed when locating the intakes.

### 3.23.01 AIR SIDE

## DUCTWORK

- A. At duct humidifiers, solder ductwork watertight 5 feet upstream and 25 feet downstream of the ductwork. Pitch ductwork to a drain located at the humidifier. No duct or terminal box liner in section with humidifier.
- B. The Design Consultant shall coordinate size and type of louvers, roof intake and relief hoods.
- C. No pipe, conduit, supports, or other type of obstruction shall pass through a duct.
- D. Contract documents shall indicate duct transitions. Duct transitions at fan discharges shall have a maximum slope of 1 in 7. Supply duct connections shall be made with a 30 degree to 45-degree take-offs in the direction of air flow. Tee connections shall be used only where

necessary.

- E. Flexible duct length shall not exceed 8 feet. Limit total sag to less than 1/2 inch per foot. Minimize bends in flexible duct, limit total bends on one branch to 135 degrees. The minimum turn radius of 1.5D applicable to metal duct elbows shall also apply to bends in flexible ducts. The construction documents shall depict the flexible duct in accordance with these requirements.
- F. The Design Consultant shall coordinate the design of floor and wall penetrations.
- G. All ducts and piping shall be independently supported from the building structure.
- H. All vertical ductwork shall be supported by structural members at each floor.

## DUCT INSULATION

- A. Thickness of supply air duct and plenum insulation shall be selected to prevent condensation on the surface of insulation. The Design Consultant is responsible for determining the lowest potential supply air temperature whether the ducting is associated with a new or existing air system.
- B. Fresh air intake ducts, supply ducts, and return air ducts shall be insulated with fiberglass board insulation or duct wrap two inches thick, mechanically fastened, and shall have finish suitable to the location and surrounding conditions. Fastenings shall not penetrate to the inside of ducts. Insulation pins shall be fastened to ductwork by welding.

## AIR DEVICES

Supply, return, and exhaust air devices selection shall be based upon effective air distribution and noise considerations. The air device materials shall be stainless steel, aluminum, or steel as appropriate for the application. The appearance and layout of the air devices must be coordinated with the architectural considerations.

## AIR TERMINAL UNITS

- A. The Design Consultant shall establish and depict on the construction documents the required maintenance access above and below the ceiling.
- B. Dedicated air terminal units serving relatively small spaces should typically be located outside the space served. If this is not possible, the air terminal units must be located above clear floor space and not be placed directly above equipment and furnishings.

- C. The Design Consultant shall provide an equipment schedule listing the minimum and maximum primary air flow rates for the cooling and heating modes, ensuring the delivery of the required ventilation air to each space served.
- D. Air terminal units serving unoccupied spaces that require cooling service only such as equipment rooms are to be the single duct, non-fan powered variable volume type.
- E. Air terminal units serving occupied spaces are to be the single duct, parallel fan powered, variable volume type. Control schematics and sequences of operation will be provided to the Design Consultant for applications of these air terminal units.
- F. Single duct, series fan powered, air terminal units will be considered for specialty applications only.

## FAN COIL UNITS

Fan coil units may be used for conditioning isolated spaces, but not for extensive areas of a building. The fan coil unit component materials shall be appropriate for the application. Direct drive fans are preferred, where possible.

## AIR-HANDLING UNITS

- A. The Design Consultant shall include plan views, section views, and elevation views to describe the intended configuration of the proposed air handling units in the construction documents.
- B. Specify double wall galvanized construction with a minimum two-inch wall thickness.
- C. All cooling coils shall be supported on stainless steel racks to allow individual removal of coils along with a stainless steel drain pan below each coil.
- D. The coil drain pans drainage system shall be designed to handle the maximum static pressure of the system. The water shall flow out of the pan at the specified maximum static pressure, without overflowing the pan.
- E. Air handling units shall have hinged doors for access to filters, coils, dampers, humidifiers, and fan. The Design Consultant may need to include additional modules or sections in the air handling units for maintenance access.
- F. Specify EWT and LWT to the cooling coil to provide minimum 12-degree F. delta T. Chilled water coils shall be a maximum of eight rows and shall be selected for maximum 400 FPM face velocity. If more than eight rows are required, a second coil module will be provided

with an access module in between the two coil modules.

- G. Provide piping connection detail showing valves, unions, control valves, flow metering devices and gauges.

## EXHAUST FANS

Provide rooftop or wall mounted exhaust fans for restrooms and other areas.

- A. Exhaust fans shall be configured to operate continuously.
- B. Specify exhaust fan component materials that are appropriate for the application.

## EVAPORATIVE COOLERS

Warehouse areas, repair garages, maintenance shops, and other buildings with doors that are typically open shall be provided with evaporative cooling instead of mechanical cooling.

- A. The evaporative cooler component materials consistently exposed to moisture shall be stainless steel.
- B. Ground-mounted equipment shall be used wherever possible to limit roof penetrations and facilitate maintenance activities.
- C. Provide electric radiant heaters or unit heaters as appropriate in the spaces where required.

### 3.23.02 WATER SIDE

## HYDRONIC PIPING

- A. Include pipe elevations, slope directions, and air vent locations in the construction documents to minimize the accumulation of air in the hydronic piping circuits.
- B. Chilled and condenser water piping NPS2 and smaller shall be standard weight black steel pipe with threaded connections or Type L hard copper with soldered or brazed connections.
- C. Chilled and condenser water piping NPS2-1/2 and larger shall be standard weight black steel pipe with welded or flanged connections or Type L hard copper with soldered or brazed connections.
- D. Groove-type mechanical connections may be used with written permission (above ground, exposed only).
- E. Isolation valves shall be provided for all equipment services.

- F. Provisions shall be included in the design documents for cleaning and treating new hydronic system components before combining flow with the existing system.

## HYDRONIC PUMPS

- A. Pumps shall be selected such that additional flow and head above design conditions will be available. Pump motors shall be selected so they cannot be overloaded with the specified pump impeller.
- B. End suction pumps with suction diffusers and flexible motor connection are typically used. Inline circulators may be used for fractional horsepower pumping applications.
- C. Variable frequency drives with electronic bypasses are typically provided for both variable flow and constant flow applications. However, the VFDs are not intended to be used for balancing flow rates.
- D. A manifold with a single pressure gage shall be provided for reading pump suction and discharge pressure. Two additional fittings with bronze ball valves shall be provided for connection of temporary instrumentation.

## WATER CHILLERS

- A. Specify machines built for operation with HFC-134A refrigerants, R-513A, or HCFC-410A.
- B. For chillers smaller than 500 tons, the recommended system is a packaged, air-cooled screw or scroll chiller. For chillers over 500 tons, specify the use of water cooled, centrifugal chillers. The 500-ton decision point is not a hard line, as equipment availability changes over time. If air cooled chillers become available in larger capacity machines, they are the preferred design alternative. A life cycle cost analysis should be conducted for replacement of existing chillers not meeting these stated criteria to aid in the determination of the replacement approach.
- C. Air cooled heat rejection equipment shall be rated at 115 degrees ambient.
- D. Chilled water systems shall be selected with a minimum 12-degree delta T.
- E. Consider magnetic bearings for centrifugal chillers.
- F. Specify that newly installed water chillers be capable of communicating with the Building Automated Controls System (BACS) network with integration.
- G. The capacities of chillers in a group shall be selected to meet both the maximum and the minimum load requirements of the system. Typically, one redundant chiller shall be

provided, and the capacity of this machine shall be based on discussions with the Owner.

## COOLING TOWERS

- A. If it is determined that a cooling tower is necessary for the air conditioning system and other heat rejection systems, careful consideration shall be given to its location in relationship to noise and appearance, prevention of fresh air intake contamination, disease spread, and similar aesthetic or environmental issues, as well as function. It is intended that landscape arrangements and appearance will be included in the discussions of other site considerations.
- B. All non-media surfaces of cooling towers and evaporative air condensers exposed to condenser water shall be stainless steel or other corrosion resistant material.
- C. Cooling towers shall not be located at lower elevation than chiller. Provide vibration shutoff switch.
- D. Maintenance access to cooling towers and evaporative air condensers in accordance with fall protection standards shall be provided.

## SPECIALTIES

- A. Include details showing valves, unions, and controls on all converter and expansion tank systems. Properly size relief valves for the system designed.
- B. Provide piping connection detail showing valves, unions, control valves, flow metering devices and gauges for all types of coils.
- C. Hydronic system makeup water lines shall have backflow prevention assemblies protecting the domestic water supply.
- D. All coils shall be provided with air vent and drain.
- E. Service Valves: Provide supply and return mains and risers with isolation valves for service, along with valved/capped drains at low points for complete drainage of the hydronic system.
- F. Provide air/dirt separator and a side stream filter in chilled water systems.
- G. Provide a basin cleaning and filtration system for each cooling tower.

### 3.23.03 DIRECT EXPANSION AIR CONDITIONING

## ROOFTOP AIR CONDITIONERS:

- A. When other viable options are not available or cost effective, rooftop direct expansion equipment may be considered.
- B. Fewer units with variable capacity are favored over numerous smaller capacity units.
- C. Where appropriate or practical, packaged heat pumps may be used. Provide supplemental electric heat as needed.
- D. Locate the unit to minimize the adverse effects to the building aesthetics.
- E. Select unit and location to minimize noise impact on occupied spaces.
- F. All rooftop equipment shall be specified with a minimum 14" curb. Provide a taller curb where required due to rooftop insulation thickness. The top of the curb shall be a minimum of 8" above the adjacent roofing material.

## SPLIT SYSTEM AIR CONDITIONING

- A. When other viable options are not available or cost effective, split direct expansion systems may be considered.
- B. Fewer units with variable capacity are favored over numerous smaller capacity units.
- C. Where appropriate or practical, heat pumps may be used. Provide supplemental electric heat as needed.
- D. Locate the unit to minimize the adverse effects to the building aesthetics.
- E. Select unit and location to minimize noise impact on occupied spaces.



## 3.25 Division 25 – Integrated Automation

### 3.25.00 GENERAL REQUIREMENTS

#### INTEGRATED AUTOMATION

- A. The Design Consultant should be aware that SRP was previously committed to providing a BACnet compliant building automation system where appropriate utilizing the MS/TP protocol throughout all levels of the SRP Network. New projects may now be incorporating Internet Protocol (IP) communications into lower levels of the SRP Network and the consultant needs to coordinate closely with SRP personnel in this regard.
- B. The Design Consultant is responsible for development of an Integrated Automation design that meets the specific needs of the site and/or building location of the project.
- C. SRP has standardized an open system architecture for complete integration of new and existing components of the building automation system. This open system standardization will ensure continued building automation system interoperability between all sub-systems.
- D. This system must have the ability to allow for stand-alone operation of any sub system in the event of communication failure.
- E. The Design Consultant is encouraged to read and become familiar with all the recently added specifications regarding instrumentation, controls, and integrated automation.

## 3.26 Division 26 – Electrical

### 3.26.01 POWER DISTRIBUTION

- A. In general, SRP prefers that medium voltage distribution remains the purview of the Transmission & Design group. All facilities should take delivery at low voltage - typically 480Y/277V, 3 Phase. If at all possible, avoid 120/240V either single or 3 phase.
- B. Electrical service entrance equipment and other switchgear, switchboards, panelboards, and transformers shall be located indoors in dedicated electrical rooms wherever possible. Allow space for the installation of future distribution equipment.
- C. Where requested, provide standby power from diesel engine generators in weatherproof enclosures. Provide sound attenuation and other means to comply with noise ordinances, where applicable. Fuel system and leak monitoring shall be integrated with the site Building Management System (BMS) for remote alarming. Where direct fueling is not practical, provide separate fill ports with local overfill alarming. Other alarm points to be discussed during construction documents phase.
- D. Electrical distribution systems shall be designed to achieve arc flash incident energy levels of 25 cal/cm<sup>2</sup> or less. Except where fully compartmentalized UL 1558 switchgear construction is used, service entrance switchboards should include a draw-out main circuit breaker with shutters and outgoing lugs. A remote racking device shall be provided to be permanently stored at the facility. When necessary to achieve good protective device coordination, it is acceptable to utilize protective devices with multiple settings (i.e., a normal setting to achieve good coordination and an alternate setting that achieves a lower incident energy potential used under maintenance circumstances.) Verify that transformers have tightly sized line side protective devices with adjustable short-time pickup and delay settings such that transformer inrush can be accommodated while still clearing the relatively low magnitude secondary bus arc faults.
- E. The distribution system at each facility shall be designed whenever possible so that the distribution branches are segregated for mechanical and lighting. The Mechanical distribution branch shall supply central utility plants, HVAC loads, and plumbing loads as well as their associated controls. The lighting distribution shall supply all lighting and lighting control loads. The General distribution branch shall supply all modular systems furniture, receptacles in private offices, huddle rooms, and conference rooms, and all associated peripheral loads (e.g., multi-function devices).

- F. Metering shall be installed to capture the facility mains as well as the discrete distribution branches. Plan for the necessary data required to connect any metering including utility meters. For facilities with central chilled water plants, such shall be metered separately from the remainder of the Mechanical distribution branch.

### 3.26.02 LIGHTING

- A. All new luminaires shall be LED based. Lighting designs shall incorporate SRP standard luminaires. Coordinate with the SRP Project Manager for the latest approved luminaire schedule. Photometric calculations are required for all lighting remodels and IESNA recommendations are to be met at a minimum.
- B. Except for support spaces such as Electrical Rooms, Mechanical Rooms, IDF Rooms, and similar, provide occupancy control and 0-10V dimming control. Provide daylight compensating sensors in zones where natural lighting is present. For common spaces such as open offices and corridors, the occupants shall have access to the dimming control only through preset scenes set by SRP Facilities Services. For private offices, huddle rooms and conference rooms, both scene control and direct dimming control shall be made available to the occupants. Exterior lighting shall be controlled via I/O interface to the BMS. Coordinate with the SRP Project Manager on each project for specific control system configuration and non-standard occupant control needs.
- C. Provide at least one emergency luminaire in each multi-occupant restroom. Provide emergency lighting in generator rooms, areas containing generator fuel storage and transfer equipment, and electrical rooms containing ATS's. Provide emergency lighting in open office areas of any size (i.e., even those with an occupant load less than 50). Coordinate with the SRP Project Manager on each project for other operational emergency lighting needs.
- D. In order of preference, emergency lighting should be supplied from an NEC 700 branch of an on-site generator, a Central Lighting Inverter, a local lighting inverter supplying multiple luminaires, or local Emergency LED drivers. Where luminaires are mounted at or above 12 ft. above the finished floor, a generator source or remote lighting inverter in an accessible location is required.
- E. Wherever the emergency source is external to the luminaire, switching and dimming control should be coordinated through either a Bodine GTD20 transfer device (where only

emergency luminaires are present in a space such as a stairwell) or a bypass relay with the ability to open the 0-10V circuit on loss of normal power (for all other conditions).

### 3.26.03 BASIC MINIMUM RACEWAY REQUIREMENTS:

- A. In order to facilitate long-term cable management, wiring systems (including but not limited to DDC, fire alarm, telecommunications, security, and power) shall be installed in raceways.
- B. Low-voltage systems such as DDC, HVAC, lighting, and telecommunications cabling may be installed above drop ceilings in open raceways such as cable tray or j-hooks separate from the electrical system.
- C. Conduit should be  $\frac{3}{4}$ " minimum and rigid when in warehouses, mechanical rooms, electrical rooms, outdoor, and other locations as required by the project.

### 3.26.04 CONCEALING NEW CIRCUITS

Electrical work in architecturally finished spaces shall be concealed. Obtain approval from the SRP Project Manager for design of new circuits that must be installed in surface raceway systems where concealment is not possible.

### 3.26.05 FIRE STOPPING

Identify and provide installation details for utilization of fire stopping materials associated with the particular construction materials that will be encountered. Include details of firestop systems in plans.

### 3.26.06 ARC FLASH STUDY

Perform arc flash coordination study when installing new switchgear, transformers, and related panelboards. The need for arc flash study shall be reviewed for each project. SRP is updating their modeling database to SKM and the preferred software.

### 3.26.07 CATHODIC PROTECTION

Cathodic protection is required for certain underground piping systems. The need for cathodic protection shall be reviewed with the SRP Project Manager and typically based upon soil report

recommendations.

### 3.26.09 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

- A. Feeder and branch circuit conductors shall be type THHN/TWHN. For 6 AWG or larger, use THW-2, rated for use at a continuous 90 degrees in wet or dry locations.
- B. All conductors, including grounds, shall be stranded.
- C. Circuits are to be provided with separate neutrals when possible to avoid multipole breakers and handle ties.

### 3.26.10 PROHIBITED MATERIALS

- A. Aluminum wire is prohibited.
- B. To facilitate future replacement of conductors and increase conductor life, direct-buried conductor systems for underground wiring are prohibited.
- C. Under Carpet Electrical Power Cables are prohibited.

### 3.26.11 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

- A. The building electrical ground shall be exothermically welded to the building steel in the grade beam, the piers, and the columns in at least two different sides of the building in addition to the water pipe ground and any driven rod/counterpoise systems. This applies to all new buildings and additions, and where possible, to renovated buildings. Renovated buildings are usually possible to make at least one steel connection in one location when planned in the design phase.
- B. Provide ground riser diagrams for power distribution and telecommunications systems in the contract documents.
- C. Provide a Main Ground Bar at the Main Electrical Room. Provide a supplemental ground bar at each of the other electrical rooms to serve as an accessible interface between the electrical system and the grounding electrode system and miscellaneous metal bonds. In both cases, the bar shall be copper, on insulative standoffs and with plexiglass covers. In general, only the ground bar in the primary electrical room will connect to the grounding

electrode system. Additional grounding may be required for new transformers and services. Verify with the SRP Project Manager during design if ground well and rod details are to be included.

### 3.26.12 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

- A. Nonmetallic raceways are prohibited for use inside of buildings, unless specifically permitted elsewhere in this standard.
- B. Thin-wall indenter, pressure cast, set screw fittings, or slip-on metallic fittings are prohibited.
- C. Conduits shall not be considered grounding systems. All conduits shall include a separate grounding conductor.
- D. Use of flexible conduit shall be limited to recessed lighting fixtures, motors, and equipment. These connections shall be of minimum length and a maximum of 6'-0". Specify  $\frac{3}{4}$ " or  $\frac{1}{2}$ " steel flex from equipment and lighting manufacturers if available.
- E. Rigid non-metallic raceways may be used below grade, embedded in concrete, and for special service applications such as corrosive locations.
- F. Elbows in buried PVC conduit runs shall be PVC covered steel.
- G. Lsteel flex from equipment and lighting manufacturers if available. Limit horizontal runs to upper or lower portions of walls; avoid horizontal routing in the center of walls when possible.

### 3.26.13 BUS DUCT AND BUSWAY

- A. Plug-in and feeder busses 225 amp and larger shall have built-in ground bus.
- B. Plug-in devices shall have an integral, built-in ground connection for attachment to bus ground.

### 3.26.14 CONDUIT DRAINAGE

Where probability exists of moisture entering buried conduits and junction boxes/hand holes, provide methods for drainage.

### 3.26.15 GENERAL BOX REQUIREMENTS

- A. Surface boxes used on or in exterior building surfaces, or on the site, shall be cast type.
- B. To reduce sound transmission, wall outlet boxes shall not be installed back-to-back in partitions.
- C. Where boxes are installed in concrete block walls, the box mounting height shall be at the block joint.
- D. Locate boxes for wall or ceiling-mounted devices so that they do not compromise the ability to install furnishings, marker/bulletin boards, artwork, and similar items at those locations in the future.
- E. Wherever possible, locate boxes along the perimeter of the surface. Do not install devices, such as fire alarm devices or thermostats, in the center of those surfaces if they can be located along the perimeter.
- F. Light switches and electric outlet devices to be gray. Face plates to be stainless steel.

### 3.26.16 FLOOR PENETRATION DETAILS

- A. Specify concrete curbs and fire barriers where conduit/duct runs pass through concrete floor slabs and fire-rated walls.
- B. All openings through floors for conduit shall be made watertight by detailing or specifying either a concrete housekeeping base or an embedded sleeve, each to be not less than 1-1/2" high above the finish floor, to prevent leaks from penetrating to the floor below.
- C. Duct seal or fire caulk all penetrations or conduit that travels between floors or between the exterior and interior.

### 3.26.17 VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

Lead, fiber, or wood anchors are prohibited for support of raceways or equipment.

### 3.26.18 IDENTIFICATIONS FOR ELECTRICAL SYSTEMS

- A. Refer to specification section 260553 to identify specific requirements for labeling and identifying electrical equipment and devices. All switching, protective devices, and

metering on main distribution switchboards shall be identified with engraved black-white-black laminated 1/8-inch-thick plastic plates. Plastic identification plates shall be attached to the equipment with screws or rivets. Identification plates are required for all electrical distribution equipment from the service through branch circuit panelboards, motor control centers, and branch circuits regardless of size. Labels shall identify both the equipment designation and the source supplying the equipment.

- B. The Designer shall specify both numbering and wording of identification plates.
- C. Motor and associated equipment numbers shall be the same.
- D. Raceways shall be labeled anywhere accessible.

### 3.26.19 LOW-VOLTAGE SWITCHGEAR AND SWITCHBOARDS

- A. When specifying overcurrent protective devices, conduct short circuit and coordination studies to determine protective device ratings and requirements, and shall not assign the responsibility for this to the contractor.
- B. When sizing secondary service and distribution (600 Volt and Below): specify new secondary service and distribution systems to be of adequate size to provide for load growth during the life of the building. The facility type and use shall be considered in determining capacity to be provided in excess of initial demand. Design criteria documents shall identify the reserve capacity provided in the design.
- C. When designing switchgear or panelboard upgrades that serve existing feeders, consider a coordinated system on the feeders rather than a main service entrance type ground fault system to permit incremental settings thus providing reasonable continuity of electric service.
  - Additional ground fault protection may be required at point-of-use receptacles to provide personnel protection. Exterior power outlets and interior uses at lavatories and service sinks shall be provided and shall be GFCI protected and corrosion resistant.
- D. Current pickup and time delay range shall be specified for all sensors. Construction documents shall state that ground fault sensors shall be set at "0" time delay and "minimum" ground current flow during construction period. When the project is turned over to SRP, the two settings shall be changed to values selected by the Design Consultant.
- E. Power Factor Correction: The Design Consultant shall review with the SRP Project Manager whether any secondary voltage power factor correction is required. It may not



be desired in most locations because medium voltage rated power factor correction is already in place at both main campus substations.

- F. When designing for available fault current, the Design Consultant is responsible for determining available fault current at the point of equipment installation and for specifying bracing to withstand the available short circuit current, asymmetrical, RMS at rated voltage. Values shall be specified.
- G. For distribution switchboards: include the following provisions in the construction documents:
  - Do not locate plumbing facilities above the vault and switchboard space.
  - The phase arrangement on three-phase busses shall be "A-B-C," from left to right as viewed from the front of the switchboard.
  - Specify provisions for future protective devices. Base these provisions on the need for possible future increases in electrical requirements. In order to increase flexibility, provide spaces in lieu of spare devices.
  - Include continuous ground bus, equipped with bolted pressure clamp type lugs, full length of switchboard.
  - Busses shall be copper. Design shall include provisions for future extension of main bus.

### 3.26.20 PANELBOARDS

Include the following provisions in the construction documents:

- A. In order to accommodate future additional wiring; provide spare conduit stubs from flush-mounted panels recessed within walls into adjacent suspended ceiling spaces or other accessible spaces. The spare circuits and spaces available in panel shall determine the quantity.
- B. Verify room numbers with the SRP Project Manager.
- C. Provide a number designation on each circuit protective device. Odd numbers shall be used in sequence down left side and even numbers in sequence down right side.
- D. Provide cross breaker connectors and bus for the spare circuit breakers indicated in

panelboard schedules. Provide a minimum of 25% spare spaces with single pole 20A circuit breakers.

### 3.26.21 MOTOR-CONTROL CENTERS

- A. Regarding motor control, variable speed drives should be used wherever feasible in lieu of motor starters.
- B. In areas where there are eight or more three-phase motors, a motor control center shall be provided. MCC bus work shall be braced to withstand the available short circuit current, asymmetrical, RMS at rated voltage. Values shall be specified.
- C. With the exception of portable maintenance equipment, motors over 1/3-h.p. shall be three-phase.
- D. Starters shall be full voltage with fusible disconnect except as follows: For 20 HP and larger motors on 208Y/120-volt systems, and for 40 HP and larger motors on 480Y/277-volt systems, starters shall be auto-transformer or part-winding type with fusible disconnect.
- E. Disconnects shall not to be shown mounted to the serving device, i.e. ductwork, AHU, VAV, etc. Provide keyed note and detail to call out specific unistrut mounting with support kicker when suspended vertically.
- F. Control circuit voltage shall be 120 Volt. Where transformers are needed, fuses shall be employed in both primary and secondary sides.
- G. Where two pumps are provided, with one intended as a standby, an alternator shall be incorporated which allows the stopping and automatic switching for restart through one BMS stop/start point.
- H. Starters shall incorporate a minimum of two auxiliary contacts and a hand-off-auto switch.
- I. A motor control center schedule shall be included on the electrical drawings.
- J. A schematic wiring diagram of circuits involved in an interlocked system shall be included in the construction drawings.
- K. Starters shall have fusible disconnects rather than circuit breakers or MCPs. Control circuit voltage shall be 120 Volt or less. Specify push button start/stop control in lieu of hand-off-automatic control for fan motors controlled through BMS.

### 3.26.22 WIRING DEVICES

- A. General use receptacles and light switches shall be heavy-duty, 20-amp, grounding type for general service applications.
- B. One receptacle per office may have surge protection and shall be equipped with both audible and light alarms. Review with SRP Project Manager.
- C. For corridors, large assembly areas, and other areas where floor maintenance equipment is used, locate receptacles so that a 45-foot cord will reach any part of the floor.
- D. Receptacles, switches, and plates in damp or corrosive areas shall be specifically designed for use in that environment. Exterior power receptacles and interior receptacles at lavatories and service sinks shall be GFCI protected with weatherproof, in-use metal covers, and corrosion resistant.

### 3.26.23 VARIABLE-FREQUENCY MOTOR CONTROLLERS

- A. Clearly state in construction documents whether controllers are to be provided by electrical subcontractor, mechanical subcontractor, or by building controls provider.
- B. Provide a note to verify fault settings of VFD during installation and commissioning.

### 3.26.24 ENGINE GENERATORS

- A. Provide as appropriate for each project. Review specific criteria with SRP Project Manager and when serving life safety systems with SRP Fire Marshall.
- B. Generators for new buildings shall provide emergency power to serve all exit elevators.
- C. New emergency power generators serving existing buildings shall be sized to include enough capacity to serve existing or future replacement elevators as emergency exit elevators, even if those elevators are not being improved as part of that project.

### 3.26.25 EMERGENCY POWER SYSTEMS AND EMERGENCY/EGRESS LIGHTING

- A. It is the Design Consultant's responsibility to prepare a code-compliant emergency lighting design and submit it to both the SRP Project Manager and the Fire Marshall for review before completion of the Contract Documents.
- B. Emergency and egress lighting shall exceed minimum levels prescribed by code (1 foot-

candle at the floor within a 40 to 1 brightness ratio). The range shall be an average of between 3 and 5 foot-candles, with a minimum level of 1 foot-candles and a maximum level of 20 foot-candles.

- C. A level of 20 foot-candles below any fixture would allow for a 1 foot-candle minimum between fixtures, which stays within the 40 to 1 ratio as required by code. At the conclusion of the project, egress and emergency lighting levels shall be verified during commissioning and testing. Systems MUST maintain full lighting levels for 90 minutes.
- D. Use the following criteria as guidelines in evaluating and selecting a system with the appropriate functional performance for the specific project circumstances. Systems utilizing emergency ballast type fixtures shall only be allowed with special permission from the SRP Project Manager.

## SYSTEM TYPES BY ORDER OF PREFERENCE

- A. **Always on (night light) system:** Emergency and egress lighting utilizing the general lighting system connected directly to the emergency power source through the emergency power transfer switch. Exit signs, fire alarm, egress elevators, fire pumps and all life safety associated equipment shall be connected. Circuits will be verified by the SRP at final inspection.
  - Egress lighting in normally off areas: Provide minimum lighting at egress paths within rooms or assembly area occupancies over 49 where normally off emergency lighting is used. Wall LED floor wash lighting or strip/rope lighting is recommended and circuited to the emergency lighting circuit.
  - Relay controlled lighting: For normally off areas label at each room for annual and 30-day testing. Provide 2" x 4 1/2" sign as noted below.
  - Exterior Emergency Lighting: Provide at all required exits up to 30 feet away from building or to the public way. Lighting should be connected to emergency power switched off during the day with photocell.
  - Stairwells: Recommend two level lighting.
- B. **Normally off emergency lighting:** Self-contained individual or tandem smart self-diagnostic battery packs connected to a local lighting circuit. This system is not to be used without permission by the SRP Project Manager.
  - Concealed 'pop out' fixtures shall not be used.
  - Integrated emergency ballast type fixtures shall not be used.

- Egress lighting in assembly occupancies: Wall LED floor wash lighting or strip/rope on normal power not switched.
- Egress lighting (night lights): Provide non-switched lighting throughout exit path including stairwells, restrooms, and exterior paths.
- Exterior Emergency Lighting: Smart, self-diagnostic battery packs.
- Stairwells: Provide smart, self-diagnostic battery packs.

**C. Existing lighting installation for always on (night light) system:**

- This system would re-circuit existing lights to a separate (always-on) circuit connected to an emergency generator. In this system, it is imperative that the lighting levels be at the minimum design criteria since they will be on 24 hours a day. This is generally the most economical system since existing lighting circuits are not easily re-grouped for control purposes.
- Conference and meeting rooms over 49 occupants: Smart, self-diagnostic battery packs. Review with the SRP Project Manager on normally off relay option. Provide egress lighting.
- Exterior Emergency Lighting: Provide at all required exits up to 30 feet away from building or to the public way. Lighting should be connected to emergency power switched off during the day with photocell.
- Stairwells: Recommend two level lighting. Try to capture the existing lighting circuit and change light fixtures as needed. Remove switches to existing circuits. Egress and Emergency lighting cannot be switched.

## EMERGENCY LIGHT FIXTURE LOCATIONS

- Interior egress paths:** Provide in corridors and stairwells at 3 to 5 fc.
- Exterior egress paths:** Provide to the public way or 30 foot away from building at 1 fc.
- Electrical and mechanical equipment rooms:** Provide at 1 fc. Small rooms can be switched since these areas are not required to have emergency lighting.
- Public restrooms:** Provide at minimum levels. (Not required by code but required by SRP) If existing circuits cannot be isolated to switch a single fixture to the emergency lights then a separate fluorescent fixture may be added.
- Private restrooms:** Not required.
- Conference rooms with occupancy of over 49:** Recommended normally OFF lighting. Provide smart, self-diagnostic battery packs or room lighting on relays connected to the

local hot leg of the lighting circuits is recommended. Fixtures must be labeled, and testing instructions must be provided at each room.

- G. **Generator and generator support equipment areas:** Provide smart self-diagnostic battery packs as prescribed by code for maintenance of generator equipment and circuits if system is down.
- H. **Normal Roof Areas:** Not required.

### 3.26.26 EMERGENCY AND EGRESS LIGHTING DESIGN CRITERIA

- A. Emergency light fixtures shall be located throughout the exit path at intervals that are designed to maintain a minimum light intensity of 1 foot-candle at floor. In a normal 8-foot wide corridor, it has been found that 35 to 45 foot spacing for a typical 2 light T-8 fluorescent fixture is acceptable. This yields approximately 1 to 3 fc.
- B. Stairwells shall be partially lit by non-switched emergency/egress lights. To save energy switched lighting also should be utilized. All night lighting should be minimum levels.
- C. Control relays shall be fused, accessible and labeled with the area serve.
- D. Control relays must have testing instructions within the room they serve indicating what breaker and panel serves the emergency lighting. Provide a sign; gray with red letters, 4 1/2 inches wide (the width of double gang wall switch) and 2 inches high; text 1/4" high, located just above the typical room lighting wall switch on the latch side of the primary entrance door to the room. Sign should be mounted just above the wall switch or at 60" above finished floor. Sign shall state the following:

**EMERGENCY LIGHTING PROVIDED  
TO TEST (REQUIRED MONTHLY)  
TRIP CIRCUIT \_\_\_\_\_ AT PANEL \_\_\_\_\_  
PANEL LOCATED IN ROOM \_\_\_\_\_**

- E. All emergency light fixtures shall be labeled with a 3/4" permanent red DOT.
- F. All conduits connecting the emergency lighting system shall be labeled with red and green electrical tape at all junction boxes and spans over 30 feet.
- G. New exit signs shall be LED type, without flashing function.
- H. Locations are to be submitted to the SRP Project Manager for approval before construction documents are completed.

### 3.26.27 EMERGENCY GENERATOR

- A. Diesel generators with #2 diesel fuel are preferred.
- B. Provide SRP with required data on the generator so that permit application can be submitted.
- C. Generator sets shall be located to disperse exhaust fumes and noise without affecting the normal functions of the building and surrounding site.
- D. Specify a method of damping vibrations to acceptable levels.
- E. The Design Consultant shall specify that the manufacturer provides contacts for remote indication of generator status, alarm and shutdown, and battery charger alarm to the BMS network. Provide auxiliary contacts for remote indication of transfer switch position.
- F. Size generator with a minimum or 25% additional capacity for future loads.
- G. The use of a centralized battery inverter is prohibited.
- H. In general, provide backup electrical power supply capability for the following loads:
  - Emergency egress and exit sign lighting
  - Building sprinkler system fire pumps
  - Security systems, fire alarm systems
  - Selected ADA-compliant egress passenger elevators
  - Communications systems equipment, computer workstations, or servers only if required to maintain operation of life safety equipment
- I. If a generator-based system is not affordable or desirable, self-diagnostic battery packs in dedicated emergency light fixtures shall be utilized. This requires approval from the SRP Project Manager. Do not use emergency ballasted type fixtures.
- J. Provide a static uninterruptible power supply as appropriate for each project. Review specific criteria with SRP Project Manager.

### 3.26.28 LIGHTNING PROTECTION FOR STRUCTURES

- A. All new projects will require a complete building lightning protection system.
- B. Down conductors should be hidden from view wherever possible.
- C. Down conductors shall be selected from copper, tin-copper or aluminum materials that are compatible with roofing or substrate materials.
- D. Where down conductors extend to grade level, they shall be placed in metallic conduit to protect them for the bottom 8' above finish grade, which shall be painted to closely match

color of substrate materials.

- E. Air terminals shall be mechanically fastened to substrates. Adhesive-only attachments are NOT acceptable. Mount above roof and flash or seal fastener penetrations to make watertight. On flat roofs, concrete masonry or precast concrete bases may also be used.
- F. Surge Suppression: Lightning surge arresters should be installed at all building primary power transformers and all other wire services where they enter the building, and they should have the lowest possible voltage breakdown for maximum protection.
- G. Where service is provided by the power company at the use voltage, the surge suppression should be located at the point the service enters the building.

### 3.26.29 INTERIOR LIGHTING

- A. Fixture Mounting Locations: Fixture locations requiring special equipment or scaffolding to aid in maintenance or re-lamping increase ongoing operating costs and should be eliminated when possible. If necessary, approval from the SRP Project Manager is required. Such special equipment and provisions for its storage and access must be provided as part of the project.
- B. Confirm during the Design Development phase, which room(s) may require a man-lift or other special equipment to be stored within and verify the path of travel can be negotiated by the man-lift/equipment, including by elevator, if required to reach the space to be serviced.
- C. Confirm that the weight limit of the man-lift does not exceed the floor or elevator weight limit rating of the path of travel.
- D. Coordinate with the SRP Project Manager to establish and document design criteria for lighting levels during schematic design.
- E. The number of foot-candles of illumination designed for particular functions of the building shall be in accordance with the latest edition of the Illuminating Engineering Society (IES) Handbook in accordance with local code standards.
- F. Furnish design calculations to the SRP Design Team during the design review process to help evaluate compliance with the IES standard and IECC energy requirements.
- G. It is presumed that LED lighting will be satisfactory throughout. Specialty lighting may be required for some applications and should be discussed with the SRP Project Manager whenever the situation dictates.



- H. LED drivers shall be readily accessible and special consideration must be given to replacing drivers. Consider remote location of banks of drivers if available per coordination with manufacturer.
- I. If necessary, fluorescent lighting shall be with highest-efficiency electronic ballasts available, with a proven two-year or more reliability record. Harmonics shall be less than 20% Total Harmonic Distortion. Although there may be concerns with the noise (audible & EMI) level created by such lighting. This can be reduced to a satisfactory minimum for most applications by proper electrical design.

### 3.26.30 LIGHT FIXTURE SWITCHING AND CONTROL

- A. Three-way and four-way light switching shall be provided in long corridors, large conference rooms and other large spaces.
- B. Provide inboard/outboard multi-level switching or dimming of fluorescent fixtures in private offices, classrooms, laboratories, and conference rooms.
- C. Occupancy sensors shall be integrated in the control schemes when possible. Occupancy or ambient light sensors shall be considered as a means of controlling lights and conserving energy in large rooms.
- D. Use sensors with combined ultrasonic/infrared technology, provided with an integral manual over-ride switch and ambient light level sensor.
- E. Do not specify occupancy sensors on any of the lighting in egress paths, stairwells, public restrooms, or on any other emergency lighting fixtures required to achieve 1 fc minimum illumination levels.
- F. Review the feasibility of automatic light level control areas with prominent daylighting.
- G. For general use, provide dimmable fixtures with wall controller/switches. Where specialty systems have been stipulated for a project, at a minimum a comprehensive design will be considered and must include the following:
  - Circuiting of fixtures to be dimmed
  - Location of controller modules
  - Location of programmable controllers
  - Locations of dimmer panels
  - Emergency lighting relay if required
  - A detailed written sequence of operation and control modes for the dimming system

- H. The use of LED lamps is encouraged. Regardless of type, general interior lighting fixture lamps shall have a correlated color temperature of 3500K for interiors and minimum 80 CRI depending on the tasks.
- Specify lamps that are readily available and economical to maintain. Special or unique lamps are discouraged unless specifically required to meet the program/functional needs of the building occupants.
- I. Provide direct/indirect lenses in ceiling fixtures in offices to prevent reflected glare and provide enhanced appearance.
- J. Fluorescent ballasts shall be efficient solid-state electronic ballasts. Electronic ballasts shall have a "true" power factor of .90 or greater with 20 percent or less total harmonic distortion. Fluorescent ballasts for outside applications or in areas where ambient temperature is lower than 50 degrees F shall have a minimum starting temperature of -20 degrees F.
- K. On remodeling projects, the Designer shall consult with the SRP Project Manager for proper handling and disposal of PCB ballasts. Removal and disposal of ballasts containing PCB material shall be accomplished per EPA requirements.
- L. Note in the construction documents that the Contractor shall examine existing ballasts that are to be removed from service.

### 3.26.31 EXTERIOR LIGHTING

- A. Use SRP requirements for lighting of walkways, parking lots, drives, building entrances and building egress paths as outlined below.
- B. **Building Illumination:** SRP policy is to NOT illuminate the exterior of buildings. Should the Design Consultant propose to do so, an exception request will need to be submitted to the SRP Project Manager, for consideration and direction.
- C. Site lighting systems shall be designed to provide the illumination levels indicated in the chart at the end of this section, using SRP-standard poles and luminaires.
- D. Maintain low max to min ratios via proper spacing and luminaire selection. 4000K color temperature is preferred.
- E. **Pedestrian Walkways/Plazas, Bicycle Paths & Bike Racks:** 20 ft. poles with LED luminaires.
- F. **Roadways & Parking Lots:** 30 ft. poles with LED luminaires.

- 20 ft. poles with closer spacing may be used along roadways or in parking areas when required to provide uniform lighting below the mature tree spread; locations to be approved by the SRP Project Manager.
  - Provide cast-in-place concrete light pole bases, per SRP standard details in Light Pole Base Detail. Design Consultants shall include these details in the construction documents for all projects that include site lighting.
- G. **Wall-Mounted Site Lighting:** Do not specify "wall packs" or wall-mounted luminaires for general site lighting, as they are a source of glare and uneven lighting.
- H. **Lighting Bollards:** Design Consultants are discouraged from using lighting bollards, which have proven to be more difficult to maintain, unless site conditions would make them more effective than pole lighting and their use is specifically approved by the SRP Project Manager.
- I. **Non-Standard Lighting Systems:** Non-standard luminaires, light fixtures or poles will not be approved in lieu of SRP's standard site lighting systems for roads, parking lots, sidewalks, and outdoor gathering spaces. If considered, they will only be approved as accent lighting, for aesthetic purposes only, and they must not compromise or alter the uniform lighting and color rendition of those areas by the SRP standard lighting systems.
- J. All exterior site lighting fixtures shall use Light Emitting Diodes (LED) as the lighting source, and the finish on light poles, support arms and luminaires shall be Dark Bronze.
- K. **Light Poles:** Round tapered aluminum poles with cast aluminum tenons
- Provide banner arms on light poles where directed by SRP. Each project including them shall provide not less than 10% of the total number of banner arms (not including the mounting brackets) as attic stock
- L. **LED Luminaires for Site Lighting:** "Galleon LED" series incorporating Light Squares, as manufactured by McGraw-Edison, a division of Cooper Lighting. Arm-mount, rectangular body luminaries with optional tenon adapter for 2-3/8" O.D. tenon.
- M. **Number of Light Squares:** The number of Light Squares and optical distributions shall be specified to meet the recommended illumination levels, light pole placement, and specific site characteristics.

Location	Minimum Foot-candles Level	Average Foot candle Level
Pedestrian Walkways	1.0	--
Bicycle Paths	1.0	--
Bike Racks	1.0	--
Roadways	0.25	1.0 to 1.5
Parking Lots	0.40	1.5 to 2.0
Building Entrances	5.0	1.5 times floodlighting design levels, if the building has floodlighting

- N. **Lamps and Accessories:** LED lamps shall be used. Fixtures for outside applications shall be weatherproof and rated for -20 degrees F. Full cutoff, with dark-sky compliant optics. Provide photocell or connection to photocell-controlled system.

### 3.26.32 COMMUNICATIONS

- A. The Design Consultant should include communications design as part of their project scope, but also be aware that the SRP organizational structure includes Information Technology (IT), which is responsible for maintenance of all telecommunications and computer networking systems on campus.
- B. Refer to Division 27 - Communications for detailed requirements for all SRP telephone/voice, data, video, and other telecommunication systems, as established by SRP IT.
- C. At the earliest possible stages of programming or design, the Design Consultant should review with the SRP Project Manager the options available for each project regarding the provision of network, telephone, audio visual, and other telecommunication systems and verify how that project's telecommunication systems shall be designed and constructed.
- D. For projects that involve the addition or relocation of telephone and/or computer communications outlets, review and verify outlet locations with the SRP Project Manager. This review shall identify outlets that are needed for immediate program needs, as well as future outlet locations.
- E. Include installation location of all cabling, conduit, boxes, and mounting devices in the project construction documents.

## MASTER ANTENNA TELEVISION SYSTEM

- A. Requirements for these systems will be determined on a project-by-project basis.
- B. Cable and/or satellite television systems require written approval from SRP Management prior to installation.

## PUBLIC ADDRESS SYSTEMS

- A. Requirements for this will be determined on a project-by-project basis.
- B. For Emergency Public Address System (EPAS) for Mass Notification, refer to fire alarm standards for additional information.

## SOUND-MASKING EQUIPMENT

- A. Requirements for this will be determined on a project-by-project basis.

## 3.27 Division 27 – Communications

### 3.27.01 REQUIREMENTS OUTSIDE BUILDINGS

#### A. Conduit Duct Banks:

- The Main Distribution Frame (MDF) telecom room shall be connected to the closest Maintenance Hole (MH) for interconnection with the telecommunications infrastructure via a minimum of two Schedule 40 PVC conduits four inches in diameter, encased in concrete.
- New duct banks interconnecting MHs shall contain an appropriate number of conduits. A minimum of four Schedule 40 PVC conduits four inches in diameter, encased in concrete, are required to accommodate future growth.
- Duct banks shall have a minimum of 36" ground cover with buried "cable tape" placed 12 inches above the encasement, and above non encased duct banks under slabs on grade.
- Where the 4-inch conduits turn up through the building slab, manufactured rigid metal conduit sweeps shall be provided.

#### B. Outside Plant Copper Telephone Cable Facilities:

- Appropriately sized outside plant copper telephone cable shall be installed from the closest existing copper distribution point having the cable pairs available to serve the project.
- Outside plant copper telephone cables entering building MDFs shall have building entrance protector units with balanced solid state lightning protection modules.

#### C. Outside Plant Fiber Optic Cable Facilities:

- Install the fiber optic cable as one continuous cable run, not containing any splices. Provide 10-foot service loops of the cable in MHs and on each end of the cable run.
- The outside plant fiber optic cabling installation shall also include standard telecom cable racking in MHs. The fiber distribution centers shall be installed into a floor mounted equipment rack.

### 3.27.02 REQUIREMENTS INSIDE BUILDINGS

- #### A.
- Conference rooms require a minimum of six network data outlets. Offices and workstations require a minimum of two network data outlets.

- B. The preferred method of transporting telephone/data/TV cabling between the telephone/data/TV outlet boxes and the telecom rooms is through home run conduits run in walls then above ceilings. For large quantities of outlets in parts of the new building, the 1-inch conduits may be run to cable trays. The cable trays shall then lead to the nearest telecom room.
- C. Connect the MDF to each individual IDF with minimum (unless otherwise noted) 24 strand single mode fiber optic cabling in home run fashion. No daisy chaining of cabling. Server Rooms can be fed from the MDF or closest IDF, unless otherwise noted.
- D. Each Telecom Room shall have a minimum of two dedicated electrical receptacles served by commercial power, and two dedicated electrical receptacles served by emergency generator power. Coordinate the exact locations of those receptacles in the Telecom Rooms. All electrical lights, electrical receptacles, card access systems, and HVAC units serving all Telecom Rooms, shall be supplied via emergency generator power during commercial power outages.
- E. The cabling system shall be able to handle 100 Base-T and 1000 Base-T+ Ethernet technology, for the transport of 1 Gbps Ethernet to the desktop. Where floor boxes are required to be installed in concrete, they shall be equipped with the appropriate brackets and access hatch. All floor boxes are to be flush with the finished floor.
- F. Coordinate with the SRP Project Manager regarding what brand and model of furniture will be provided.

### 3.27.03 SPECIFIC REQUIREMENTS INSIDE BUILDINGS

- A. **Fire Alarm Panels:** Provide one 4 pair 24 AWG Category 5E cable in a 1-inch conduit, between the closest telecom room and the fire alarm dialer panel.
- B. **Elevator Cab Phones:** Provide one permanently in cab, panel mounted emergency telephone in each Elevator. Those telephones will not utilize a conventional handset. They shall be push button activated to automatically call SRP Security Operations. Provide one 4 inch by 4 inch square outlet box in the Elevator Equipment Room. Provide one 1-inch conduit from that outlet box, to the closest telecom room or Telecom cable tray. Provide one 1-inch conduit from that outlet box, to the Elevator Equipment Control Panel.
- C. A telecommunications cable is required from the elevator car to the elevator equipment room and modify or add a control panel that can accept this device. A  $\frac{3}{4}$ " conduit is required from the main IT telecommunications panel to the elevator equipment room near

the elevator control panel. Pull boxes must be installed after every 180-degree change in direction. All bends must be sweeping bends. In the elevator equipment room, terminate conduit in a deep single gang box. At top of telecommunications panel, terminate conduit with bushing.

- D. SRP IT will provide the telephone number of the monitoring service to the Elevator Contractor, who shall program the elevator phone to automatically dial this number when activated.



## 3.28 Division 28 – Electronic Safety and Security

### 3.28.00 INTRODUCTION

Electronic Safety and Security ensures that the occupants of the building are protected. This section includes access control, video surveillance, intrusion detection, fire detection and alarm, and mass notification.

Refer to Division 08 – Openings for additional information.

### 3.28.01 ACCESS CONTROL

- A. The access control system should be considered during programming. Considerations include:
  - Separation of public and private spaces
  - Separation of areas requiring restricted access for regulatory compliance
  - Separation needed to control access to high value equipment
  - Hours of operation and hours of access
  - Potential conflicts between egress and access control
  - The need for emergency power
- B. Upon receipt of the Design Development drawings, the SRP Security Systems Engineering Department will review the drawings to locate and review the required card readers.
- C. Access control equipment is to be located in a secure room. Consider locating in the Server/MDF/IDF room to utilize fire-resistant plywood mounting boards.
- D. Construction Documents are to indicate locations of card readers. Coordinate infrastructure, conduit, and power and data requirements for access control equipment with SRP Security Services.
- E. Doors with access control hardware are to be tied into fire alarm system when required to allow free and clear egress in the event of an emergency or power failure.
- F. If Request to Exit (REX) devices are used, they are to be integrated and not controlled through a motion sensor.
- G. Electric hinges are to be used, not electric strikes.
- H. Consider adding turnstiles in areas where visitors from outside SRP are common for an

additional layer of security.

### 3.28.02 VIDEO SURVEILLANCE

- A. Upon receipt of the Design Development drawings, SRP Security Services will review the drawings to locate the required security cameras.
- B. Construction documents are to indicate locations of cameras. Coordinate infrastructure, conduit, and power and data requirements with SRP Security Services.
- C. Camera locations are planned for visibility to entrances/exits and areas requiring secure access.

### 3.28.03 INTRUSION DETECTION

- A. Upon receipt of the Design Development drawings, SRP Security Services will review the drawings to locate the required door contacts.
- B. Construction documents are to indicate door contacts. Coordinate with doors and hardware.
- C. Door contacts are planned for entry points from the exterior, including roof hatches and overhead coiling doors.

### 3.28.04 FIRE DETECTION AND ALARM

- A. All SRP occupied buildings shall have a fire alarm system.
- B. Specification of a fire alarm system shall not be proprietary. The installed system shall have replacement parts that are readily obtainable and can be serviced by a third-party, licensed vendor who is Owner selected by a separate bid process.
- C. Systems shall be designed and installed as one unified system per building. The comprehensive system shall be all new from a single manufacturer and be UL/FM listed and approved, to include all components for fire protective signaling. Each building shall operate independently.
- D. Where part of an existing building is being renovated or expanded, the existing fire alarm system shall be upgraded to accommodate the new addition, in a unified, single system method with full annunciation (including microphone speaker) and controls throughout. If the old panel is expanded beyond its capability or listed connecting parts are no longer

available, the entire system shall be replaced. If more than 50% of an existing fire alarm system is affected or it is more than ten years old, it shall be upgraded to the current standard.

- E. Each fire alarm system on the site shall be connected to the SRP Security Operation Center (SOC).
- F. Fire alarm system monitoring shall have a dedicated Ethernet connection, fed from a main switch, and shall not be subject to general building occupant access. Monitoring signal transmission devices shall be located with similar fire alarm equipment. The Ethernet line shall be identified at all ports as "Fire Alarm Service Only."
- G. The fire alarm control panel shall be located in a main lobby or common corridor near a Fire Department accessible exit. Additional remote annunciators may be required by the Owner.
- H. All system components requiring access for testing, maintenance, and inspection shall not be located in office, storage, or instructional spaces used by building occupants. Maintenance-intensive items such as batteries and sprinkler testing controls, shall be located at finished floor level for easy access.
- I. Atriums and similar spaces are to be avoided when possible due to the necessity for complicated smoke evacuation and control systems as provided by code. Where such systems are installed, the engineer of record shall provide a comprehensive system Operations and Maintenance manual for SRP Design Team review and approval prior to permitting. Such manual shall:
  - Identify sequences of operations and associated equipment and systems (HVAC, fire alarm, sprinkler, doors, dampers, fans, etc.) with drawings, cut sheets, and identification labels that will also be installed on each applicable component.
  - Include a walk-through and balance protocol, indicating the initial acceptance testing sequence for all components on all power sources, with a comprehensive report matrix. The matrix will be executed and filled out by the installer and approved by the Engineer of Record prior to Certificate of Occupancy.
  - Include a reoccurring service test and balance and maintenance protocol matrix to be used by the Owner for semiannual and annual services and comparison to the original acceptance testing.
- J. Shop drawings, battery calculations, voltage drop calculations, wiring diagrams, sequence of operations for all programmed conditions, listings, complete cut sheets and installation

program manuals shall be provided for permit and Owner approval prior to installation. The fire alarm system shall be inspected, demonstrated, and approved by the Fire Protection Engineer of Record prior to requesting inspection by the SRP Fire Marshall.

- K. The design shall include a UPS power backup system for operation of required equipment under emergency power transfer conditions.

### 3.28.05 MASS NOTIFICATION

- A. Mass notification is not a requirement for every project but should be a consideration during planning. Even if not installed, it may be SRP's desire to build in future capability.
- B. Consider integrating into an existing building system, such as fire alarm or sound masking system.

## 3.31 Division 31 – Earthwork

### 3.31.00 INTRODUCTION

This section includes general design requirements for earthwork including site preparation and grading.

- A. Specify fill material, aggregate base, and topsoil to match the geotechnical report for the project and local municipal requirements.
- B. Design datum and benchmark for the project to meet local municipal requirements and show on the cover sheet.
- C. Review the geotechnical report and notify SRP of specific items that may significantly impact earthwork activities.
- D. Verify location, size, elevation, and other pertinent information required to specify connections to existing utilities and drainage systems.
- E. Where feasible, comprehensive, campus wide drainage studies should be performed to understand existing on-site and off-site drainage throughout the project site. Retain this report as a record document and refer to or update as proposed drainage projects are completed.
- F. Building finished floors are to be set per applicable codes.
- G. Where appropriate, design onsite retention to satisfy local municipal requirements. At a minimum, onsite retention shall be sufficient to ensure that post-development runoff does not exceed pre-development runoff.
- H. Site flow and retention requirement calculations shall comply with the “Drainage Design Manual for Maricopa County” by the Flood Control District of Maricopa County (FCDMC).

### 3.31.01 DEMOLITION

- A. Demolition plans are to include the demolition of structures, pavement and utilities as needed prior to proceeding with site construction.
- B. Coordinate the proposed limits of demolition with SRP, including existing site items that are to be protected in place. Potential items include but are not limited to:
  - Existing structures
  - Site amenities

- Streetlights
  - Sidewalks
  - Planters
  - Trees
  - Other vegetation
- C. Utilize all available documentation to locate underground utilities and structures as accurately as possible.
- D. Potholing and utility location and inspection services may be recommended to locate underground utilities where existing documentation is insufficient.
- E. Items and materials deemed to have salvage value by SRP are to be removed and stored as directed by the SRP Project Manager.

### 3.31.02 TRENCH EXCAVATION, COMPACTION AND BACKFILL

This section covers operations in connection with the excavation, backfill and compaction of trenches for underground pipe installation.

- A. Where applicable, specify utility bedding and backfill per local municipal standards and codes.
- B. Where no municipal standards apply, specify utility bedding and backfill per the recommendations of the utility manufacturer.
- C. Specify backfill and bedding to account for minimum H-25 loading in all traffic areas.
- D. Locate proposed utilities with sufficient horizontal and vertical separation to protect adjacent existing utilities. This includes considering limits of trenching, bedding, and backfill.

### 3.31.03 RIPRAP

This section covers the design for placement of stone, with or without grout, for the purposes of erosion control.

- A. Determine riprap rock sizing based on flow calculations.
- B. Specify Erosion Control Geosynthetic Fabric under loose riprap sections.

- C. Riprap is to be in areas where concentrated drainage flows will occur, at outlet side of drainage pipe or culvert, or other location where potential for erosion is noted by the Design Consultant.
- D. Determine dimensions of riprap to sufficiently mitigate erosion in the designated design storm event.
- E. Determine the depth of loose riprap based on calculated design flows, but not less than 12".

Consider specifying grouted riprap in areas of high velocity flow or where future maintenance may be a concern.

## 3.32 Division 32 – Exterior Improvements

### 3.32.01 ASPHALT CONCRETE PAVEMENT

This section covers the design standards for aggregate materials, mineral admixture and asphalt binder to form a pavement course for placement on a previously prepared base or sub base.

- A. Reference the appropriate Maricopa Association of Governments (MAG) standard specifications for asphalt and asphalt base course installation on design plans.
- B. Specify the depth of asphalt and asphalt base course on the design plans per the recommendations in the site geotechnical report.
- C. Generally, onsite pavement sections should be specified for high traffic loads as recommended in the site geotechnical report. “Light duty” sections may be used in specific parking areas where SRP has confirmed that they will not be subject to heavy truck parking.

### 3.32.02 RIGID CONCRETE PAVEMENT

This section covers the design standards for the mixture of aggregate materials, mineral admixture and Portland cement to form a pavement course for placement on a previously prepared base or subbase.

- A. Reference the appropriate Maricopa Association of Governments (MAG) standard specifications for concrete pavement, base course, and subgrade preparation on the design plans as appropriate.
- B. Specify the depth of pavement, base course, and subgrade on the design plans per the recommendations in the site geotechnical report.
- C. Portland cement concrete pavement is to be used in lieu of asphalt concrete in areas subject to regular truck loading and turning. Examples include refuse collection areas and delivery truck loading areas. Coordinate with SRP Project Manager to confirm additional locations.

### 3.32.03 CONCRETE CURB, GUTTER, SIDEWALK AND DRIVEWAY

This section covers design in connection with the construction of concrete curb, gutter, sidewalk,



sidewalk ramps, driveways, and alley entrances according to the plans.

- A. Concrete sidewalk depth is to match local municipal requirements or MAG Standard Details.
- B. Concrete Curb and Gutter is to match local municipal requirements or MAG Standard Details.
- C. Plan driveway alignments at new entrances from adjacent Right of Way in accordance with local municipal requirements.
- D. Tactile warnings are to be installed on ramps that direct pedestrian traffic into a vehicular travel path.

### 3.32.04 PARKING

- A. Design pull-through parking spaces to the greatest extent possible. Back-in and pull through parking are an important part of SRP's safety program.
- B. Avoid barriers such as parking stops, light poles, and trees between parking spaces. If required, plan light poles and other barriers at striping intersections to allow small vehicles to still pull through the parking space.
- C. The minimum parking accommodations for employee and visitor parking should be designed in accordance with the local municipality.
- D. Parking spaces are to be 9' wide minimum.
- E. When covered parking is required by the project program, provide metal structure with under-canopy lighting.
- F. Parking spaces to receive white striping and be labeled with white paint according to use. Examples include "RESERVED" and "EV" at electric vehicle charging stations.
- G. SRP has a large quantity of fleet vehicles, including both service trucks and passenger vehicles. Determine the number of spaces required during programming and plan in a designated area separate from and in addition to employee and visitor parking.
- H. Electric vehicle (EV) charging stations are required at most SRP sites. The location of EV parking spaces are typically driven by the availability of power. Special charging stations may be required for Tesla vehicles. The quantity and type of spaces required will be determined with the assistance of the SRP Project Manager during programming.

## 3.33 Division 33 – Utilities

### 3.33.01 WATER SYSTEMS

This section covers the design of potable water lines and appurtenances outside of the building footprint including, but not limited to, backflow preventers, valves with valve boxes, fire hydrants, water meter and box, and taps.

- A. Pipe material is to be specified as required by the local municipality for public water mains. For private, onsite water mains:
  - Water lines 4" or larger in diameter are to be Pressure Class 350 ductile iron pipe (DIP) or AWWA C-900 polyvinyl chloride (PVC), unless otherwise directed by the SRP Project Manager.
  - Water services 3" and smaller are to be Type K, soft copper with brazed joints.
- B. Metal pipes are to be wrapped with high-density polyethylene per MAG Standard Specification 610.
- C. An electronic ball marker is to be installed per manufacturer specifications at changes in direction where a valve is not present.
- D. Design joint restraints per MAG Standard Detail 302 or MAG Standard Detail 380.
- E. Where PVC pipe is utilized, metal marking tape is to be installed 1-foot above the pipe.
- F. Avoid public waterlines and public utility easements within SRP property boundaries wherever possible. If necessary, public water lines may be allowed to be installed onsite with special permission from SRP.
- G. Public utilities will be required to be reviewed and approved by the local municipality. Coordinate plans as needed to meet the requirements of the local municipality.
- H. Water line installation may be subject to review by Maricopa County Environmental Services (MCESD). When applicable, submit plans to MCESD to obtain an "Approval to Construct" (ATC) for public water lines. Upon approval of the ATC, coordinate with SRP and the contractor as needed for the completion of the "Approval of Construction" (AOC). The AOC is required to be submitted upon completion of waterline installation.
- I. Where feasible, comprehensive, campus wide Water System Studies should be performed in order to analyze the current onsite system and determine any potential system deficiencies prior to beginning new work. Retain the report as a record document and refer to or update as future site improvement projects occur.

- J. Minimum cover for water pipes smaller than 12" shall be 36". For water pipes larger than 12", minimum cover shall be 48".
- K. Design separation between utilities in accordance with the Engineering Design Criteria of the Public Works Department of the City of Tempe.
- L. Onsite water lines serving more than one building or fire service should be looped via connection at two locations along the public water main.
- M. Space fire hydrants to provide sufficient coverage as determined by the SRP Fire Marshal.
- N. Provide valves at intersections of the water line to allow isolation in each direction.
- O. Determine water line sizing based on hydraulic modeling of the calculated site demands.
- P. Dead-end waterlines are not permitted unless they are terminated at a fire hydrant or if utilized as a service. Maximum length of a dead-end fire hydrant is 300 feet.
- Q. Separate domestic water distribution and fire protection distribution systems are preferred.

### 3.33.02 SANITARY SEWER SYSTEMS

This section covers the design of sanitary sewer lines and appurtenances outside of the building footprint including, but not limited to, manholes, cleanouts, stub outs, and caps as shown on the plans.

- A. Specify pipe material as required by the local municipality for public sewer mains. For private, onsite sewer mains:
  - Gravity sewer pipes shall be PVC SDR35 unless otherwise directed by the SRP Project Manager.
  - Force main pipes shall be PVC, with pressure class as noted in the MAG Standard Specifications per system design pressures.
- B. Design gravity sewer cleanouts per MAG Standard Detail 441.
- C. Design manholes per MAG Standard Details. Manholes less than 10' deep may be 4' diameter with a 24" grate and cover. Manholes greater than 10' deep shall be 5' diameter with a 30" grate and cover.
- D. Avoid public sewer lines and public utility easements within SRP property boundaries wherever possible. If necessary, public sewer lines may be allowed to be installed onsite with special permission from SRP.
- E. Public utilities will be required to be reviewed and approved by the local municipality.

Coordinate plans as needed to meet the requirements of the local municipality.

- F. Sewer line installation may be subject to review by Maricopa County Environmental Services (MCESD). When applicable, submit plans to MCESD to obtain an “Approval to Construct” (ATC) for public water lines. Upon approval of the ATC, coordinate with SRP and the contractor as needed for the completion of the “Approval of Construction” (AOC). The AOC is required to be submitted upon completion of waterline installation.
- G. Where feasible, comprehensive, campus wide Wastewater System Studies should be performed in order to analyze the current onsite system and determine any potential system deficiencies prior to beginning new work. Retain this report as a record document and refer to or update as future site improvement projects occur.
- H. Specify sewer pipe slopes and sizing to provide a minimum full flow velocity of 2 feet per second (fps).
- I. Design separation between utilities should be in accordance with the Engineering Design Criteria of the Public Works Department of the City of Tempe.
- J. For sewer lines 6” and smaller, design cleanouts at intersections and change in direction or slope.
- K. For sewer lines 8” and larger, design manholes at sewer intersections and change in direction or slope.
- L. Show sewer lines 8” and larger in plan and profile.

### 3.33.03 STORM DRAIN SYSTEMS

This section covers the design of storm drain lines and appurtenances outside of the building including, but not limited to, catch basins, air breaks, clean outs, flared ends, headwalls and wing walls, underground storage, culverts, manholes and dry wells as shown on the plans.

- A. Specify pipe material as required by the local municipality for storm drains within the Right-of-Way. For private, onsite water mains:
  - Storm Drain pipe material shall be High Density Polyethylene (HDPE) for pipes up to 60” in diameter, unless otherwise directed by the SRP Project Manager.
  - Pipes larger than 60” shall be Reinforced Concrete Pipe (RGRCP). RGRCP may also be required in specific areas subject to large structural loads.
- B. Design cleanouts per MAG Standard Details.

- C. Design manholes per MAG Standard Detail 420-1. Manholes shall be 5' diameter with a 30" grate and cover.
- D. Design minimum pipe cover per manufacturer specifications. See section 31.31.02 – Trench Excavation, Compaction and Backfill.
- E. Design cleanouts at pipe intersections or horizontal changes in direction not located at a manhole or catch basin.
- F. Major drainage improvements shall be accompanied by a Drainage Report. In the report, provide a summary of existing and proposed flows, on-site and offsite drainage design, and relevant hydraulic calculations and modeling results. Calculations and modeling shall be of sufficient detail to ensure proper sizing of storm drains and drainage system inlets and outlets. Calculations shall comply with the "Drainage Design Manual for Maricopa, County" by the Flood Control District of Maricopa County (FCDMC). Reference and conform to any applicable Master Drainage Reports for the site.
- G. Size storm drains to serve the 10-year storm event at a minimum. Where storm drains are not sized for the 100-year storm event, surface grading design should allow for a surface route to the site outfall with a maximum of 6-inches of ponding. System to be designed to ensure ponding dissipates in less than 36 hours per ADEQ requirements.