

Design Contract Requirements

Sacramento Area Sewer District

Version 4.0



March 2024

Table of Contents

1.0 Introduction	1
1.1 Purpose	1
1.2 Relationship with Other District Design Standards	1
1.3 Organization of Design Contract Requirements	1
1.4 Deviations to Design Contract Requirements	2
2.0 Interaction with the DISTRICT and General Design Topics	2
2.1 Project Team Concept	2
2.2 Design Responsibility	2
2.3 Construction Sequence	3
2.4 Commissioning Plan Preparation	3
2.5 Standardized Equipment	3
2.6 Designer Proposed Alternates	4
3.0 Documents	4
3.1 Technical Memoranda	4
3.2 Preliminary Design Report	5
3.3 Project Design Manual	6
3.4 Equipment Numbering and Location Identification System and Related Asset Management Databases	6
3.5 Reliability Centered Design (RCD) Documentation	8
4.0 Drawings	8
4.1 General	9
4.2 Common Contract Drawings	10
4.3 District Typical Details	10
4.4 District Example Diagrams	10
5.0 Specifications	10
5.1 General Conditions	11
5.2 Technical Specifications	11
5.3 Manufacturer’s Catalog Information	11
5.4 Electrical Specification Schedules	11
5.5 Process Control Specification Schedules	14
6.0 Calculations	15
6.1 Computer Output	16

APPENDIX A – STANDARDIZED EQUIPMENT

APPENDIX B – SACSEWER EQUIPMENT NUMBERING GUIDELINES AND PREFIX LIST

APPENDIX C – EXAMPLE OF DESIGN DRAWING SUBMITTAL CONTENT INVENTORY

1.0 Introduction

1.1 Purpose

The purpose of the **Design Contract Requirements** is to establish an understanding of content requirements for contract documents (plans and specifications) produced for Sacramento Area Sewer District (District) at the EchoWater Resource Recovery Facility (EchoWater Facility).

1.2 Relationship with Other District Design Standards

This document is one component in a suite of District Design Standards. The standards are created and maintained in order to provide consistency and efficiency among design projects within the District. The standards clearly document requirements, issues, decisions, products, procedures, etc. that have reached general consensus of District staff.

Each component of the standards is targeted for a specific purpose. The purpose of this document is as stated above. The additional major components of the District Design Standards include:

- **Design Guidelines** – Describes discipline-specific District design preferences above and beyond applicable codes and standards.
- **Guide Specifications** – A library of contract requirements and technical specifications available for project use.
- **CAD/BIM Standards** – Standards to be used on computer aided drafting (CAD) drawings and Building Information Model (BIM) requirements for data and file management.
- **Standard Drawings and Typical Details** – A library of CAD drawings common across all projects and typically used details available for use by the Designer.
- **Operations Manual Development Guide** – Presents the level of effort required, from the Design Consultant, to develop an Operations Manual for each project. In addition to providing details of the respective project, the Operations Manual must also include details of the interconnections to the existing EchoWater Facility or other projects. The Operations Manual will serve as a teaching and reference tool for SacSewer.

Other guidance documents that aid in the execution of the work are available for reference, as appropriate. Additional requirements related to design execution, deliverables, and designer coordination with District staff will be contained in the Request for Proposal (RFP) for the specific design project.

1.3 Organization of Design Contract Requirements

This Design Contract Requirements document is organized as follows:

- Chapter 1 provides an introduction to this document.

- Chapter 2 discusses interaction with District and general design topics.
- Chapter 3 presents general requirements for drawings and modeling.
- Chapter 4 presents general requirements for specifications.
- Chapter 5 presents general requirements for calculations.

1.4 Deviations to Design Contract Requirements

It is recognized that not all design contract requirements may be applicable or appropriate for each design project. When the Designer believes a project-specific deviation is warranted, the Designer shall identify the item to appropriate District staff during the negotiations of project scope and budget. The mutually agreed language, as incorporated into the final scope and budget, shall then supersede these Design Contract Requirements.

During the course of the design development, deviations to these Design Contract Requirements may be permitted or required if mutually agreed upon by the Designer and the PM; any deviations shall be presented to the PM for consideration. If warranted, project scope, budget and schedule will be revised. Upon completion of design and bid phases, the Designer and District staff may wish to conduct a project debrief to identify areas that worked well and/or need improvement.

2.0 Interaction with the DISTRICT and General Design Topics

2.1 Project Team Concept

For each District design project, a Project Team is assembled. The leader of the Project Team is a Project Manager (PM) from the District Engineering Section.

Members of the Project Team include staff who represent District Engineering, Operations and Maintenance (O&M), Operations Support, District Resident Engineer's office, the project Designers (in-house or consultant team) and others, as applicable. The Project Team is responsible for the successful completion of the project.

The PM serves as the principal point of contact for the Designer on all issues related to project execution. The PM and Designer shall work to identify specific project needs. The entire Project Team shall work on the timely resolution of issues.

2.2 Design Responsibility

The project Designer shall be responsible for the professional quality, technical accuracy, and coordination of all project documents. The engineering design and contract documents shall comply with all applicable codes, standards, and industry practices. District review or acceptance of the project design shall not relieve the Designer of design responsibility.

2.3 Construction Sequence

The project shall be designed so that it can be constructed with minimum adverse impacts on existing operations. This includes all connections to existing EchoWater Facility processes, utilities, auxiliary systems, instrumentation and controls, electrical and computer systems, and structures. The construction sequence shall ensure that there is a means for the Contractor to do the work without undue difficulty. If the work has challenges, the sequence shall identify those challenges and constraints.

The designers shall prepare a Construction/Operations Sequencing Plan for use in discussions with District staff. The plan shall include:

- Specific work items and any associated Contractor constraints.
- A narrative description of at least one method for making each connection to existing infrastructure.
- Identification of process and equipment shutdown constraints.

Upon discussions with District staff who may be impacted by items in the Construction/Operations Sequencing Plan, the work items and work constraints shall be incorporated into the contract documents, including the District Guide Specification Section 01 14 00 “Work Restrictions.”

2.4 Commissioning Plan Preparation

The development of the testing and startup plan is a combined effort between the Designers, Project Team, and the District to verify that the constructed system meets the design and operational requirements. Members of the Project Team and Designers shall meet during the Design Submittal #2 (DS-2) phase to establish pass/fail criteria, contractor test requirements, and to verify the testability of the design.

The Designer shall develop a new commissioning plan and/or confirm existing test procedures for all equipment and systems. Overall system test procedures shall ensure that the design intent is satisfied. These procedures, along with the Master Equipment List (MEL), will be used by the Designer to develop the Commissioning Plan. The Designer shall prepare the Commissioning Plan and modify the technical specifications for the Contractor to describe how to implement the testing plans; in addition, the Commissioning Plan shall be made available to the Contractor as an appendix to the project specifications.

2.5 Standardized Equipment

The EchoWater Facility has obtained District Board approval to standardize on certain equipment on previous projects. The rationale for accepting “sole source” items is based on several factors:

- The equipment is currently in use at the EchoWater Facility.

- Standardized equipment results in efficient use of personnel and training.
- Consolidation of spare parts.
- Interchangeability throughout the EchoWater Facility.
- Operational reliability.
- Significant consequences for not standardizing on equipment.

A list of current EchoWater Facility standardized equipment is provided in Appendix A. When warranted, the District will evaluate and modify the list of standardized equipment. Technical specifications for the standardized equipment have been prepared and are available as part of the District Guide Specifications library.

2.6 Designer Proposed Alternates

When materials and installation techniques previously adopted by the District are not appropriate for the proposed project or when the Designer believes that an alternate material or technique would be more efficient, reliable or cost effective, the Designer shall provide the following material for approval:

- Manufacturer's catalog and application data for both or all alternatives,
- Manufacturer's representatives name and telephone number,
- At least one location where the material or installation technique has been successfully employed for a minimum of 3 years, and
- An analysis comparing life cycle costs, both capital and O&M, for each alternative.

The Designer and PM should attempt to identify need or opportunities for designer proposed alternates before the completion of the pre-design phase.

3.0 Documents

During the course of a design, written documents shall be produced to document the project. The Designer shall coordinate with the PM and obtain templates for each document type.

Upon request, the electronic file of any report, letter, memo, drawing, or other document shall be delivered to the District. In general, the Designer shall prepare draft and final copies of each document. The Project Team shall review each draft version and provide comments. The PM will collate and resolve any conflicts in the comments before forwarding them to the Designer. The Designer shall address each comment and provide a written response.

3.1 Technical Memoranda

Technical memoranda (TM) shall be written to address project specific issues. The TMs shall include background information, discussion on available alternatives and options, tables listing pros and cons, life cycle cost analysis (if appropriate) and a recommendation.

TMs shall be prepared by the Designer and reviewed by the Project Team. A draft TM shall be initially released once the Designer has completed investigations, evaluations, and recommendations. The Project Team will review the draft TM for completeness, clarification or further investigation. Comments will be routed through the PM who will collate the comments before returning them to the Designer. The Designer shall respond to all written comments. A final draft TM, with the review comments addressed, shall be delivered to the PM. The PM will be responsible to review the final draft and coordinate with other Project Team members as necessary. All final comments will be returned to the Designer.

All completed technical memoranda shall be distributed to the Project Team. For TMs produced during the preliminary design phase, the final TMs shall be included in the preliminary design report. Any TM completed after the preliminary design phase shall be distributed under separate cover, or incorporated in the Project Design Manual.

The technical memoranda shall be prepared and submitted to the District for review as they are completed and subsequently discussed in detail through a series of review meetings and workshops. The District's intention is for all significant equipment decisions to be made before the start of Final Design. At the end of Preliminary Design, major design elements should be fixed and major equipment, building footprints, major structural elements and process pipelines should be well defined and established. The extent of the design and the number and type of drawings should also be established.

3.2 Preliminary Design Report

The preliminary design report (PDR) is the tool to identify key design features of the project. The purpose of the PDR is to present the project while it is still in its conceptual form. These concepts shall be aligned with the project objectives with regard to intent, budget, and schedule. Once the concepts are approved, the project can proceed into final design.

The PDR shall consist of a series of TMs that document the conceptual design of the proposed facilities and a separate package that includes all drawings associated with the PDR.

Documents that must accompany the PDR include the following:

- Decision Log (using the following minimum number of headings: item number, date, item action description, decision, action by and related discipline),
- Meeting and workshop notes, and
- Project Support Documentation including calculations, information research and other required materials and construction costs and backup data related to Risk Management Plan.

The Project Team will review the preliminary design report to confirm that the direction of the project is accurately documented and meets the criteria/goals established for the project. The draft PDR will also be reviewed for completeness, clarification or further investigation.

Comments on the draft PDR will be routed to the PM who will collate the comments before returning them to the Designer to produce a final PDR. Once the Project Team members review the responses to make sure comments are addressed, the PDR shall be finalized and provided to the PM.

3.3 Project Design Manual

A Project Design Manual (PDM) shall be prepared for each project and updated as the design progresses. The PDM shall be a reference document of key project information, and shall provide rationale for the design. The PDM shall contain all pertinent design criteria, schematic layout drawings, process schematic diagrams, narratives of the process elements, hydraulic profiles, utility system elements (narratives and schematics), and all provisions made to accommodate future expansions. Since much of this information is initially included in the PDR and associated TMs, the PDM may be initiated during Design Submittal #1 (DS-1) to document changes after finalization of the PDR.

Where appropriate to avoid redundancy, the PDM may reference calculations, specifications, and drawings. The PDM shall also contain information, decisions, and rationale on specific design discipline features.

The PDM shall be updated at each design submittal (DS-1, DS-2 and DS-3). The updates shall provide more detail as the project design progresses. The goal is to have an updated PDM that complements the completed project plans and specifications. The PDM is not a construction contract document.

3.4 Equipment Numbering and Location Identification System and Related Asset Management Databases

An equipment number and location identification auto-numbering system has been established for District facilities. All new equipment shall be numbered in accordance with that system. The system consists of a standardized list of equipment prefixes and a unique identifying number related to the location within the facility. Please refer to SacSewer's Equipment Numbering Guidelines and Prefix List included in Appendix B.

The Designer shall allocate time and resources to become familiar with the equipment-numbering system, in general, and to work with the Project Team and other District staff to develop an appropriate project-specific numbering scheme. A block of equipment numbers have been reserved for specific process areas and are shown on common contract drawing GI601. Designer shall use the block of equipment numbers and develop a numbering scheme. SacSewer Documentation staff will review and approve the numbering scheme prior to its detailed use throughout the project.

Asset data from process and piping schematics and process and instrumentation diagrams (P&IDs) shall be extracted to a project database, as outlined in the CAD/BIM Standards. This

shall be automated process using workflow and software selected by the Designer to maximize efficiency of data transfer and minimize discrepancies.

3.4.1 Master Equipment List

The District maintains a Master Equipment List (MEL) for the EchoWater Facility. This list is a compilation of equipment information from past projects, and is used for ongoing operation and maintenance needs.

The Designer shall prepare a project-specific MEL which records specific information for each piece of mechanical, electrical, and instrumentation equipment (including all accessories), as well as, each manual valve, slide gate, process manhole, electrical manhole and handhole, control unit, and utility station as listed in SacSewer's Equipment Prefix List (included in Appendix B). All existing equipment (pre-project) abandoned in place, demolished, replaced, relocated, renumbered, or modified by the project, as well as all future equipment, shall also be included. A designated person on the Designer staff shall work with the assigned District Documentation representative to assign equipment numbers and Location ID's (i.e. tag numbers) and add them to the project-specific MEL as they are assigned. Prior to DS-1, the designer shall define the numbering strategy with the District and use this to assign tag numbers.

The Designer shall work with the Project Team and other District staff to develop a project specific MEL that will record the appropriate information for future uses. Designers are provided an Asset Metadata Spreadsheet to generate the initial MEL for DS-1. Specific instructions on using the Asset Metadata spreadsheet are included with this file. Asset Metadata Spreadsheet generates individual tabs for each asset classification which contain all the required columns and asset class information required for importing data into the District Computerized Maintenance Management System (CMMS). The Asset Metadata spreadsheet can be populated by importing the Data directly from AutoCAD P&ID or manually. If MEL is developed manually, designer is to fill out Asset Classifications tabs first which auto-populates the MEL. Designer shall use "Miscellaneous" tab for unknown asset Classifications. District would classify these assets.

Designer shall review the data requirements associated with populating the Asset Metadata Spreadsheet to develop a scope for managing the data.

The incorporation of the project-specific MEL into the EchoWater Facility-wide MEL is the responsibility of the District.

3.4.2 MEL Review and Maintenance-Managed Items

After the initial submittal of the MEL and during the DS-2 phase, SacSewer will review MEL and verify the equipment numbering, classify unclassified equipment and identify Maintenance Managed Items. District will identify MMIs by including a "Y" the MMI column for each Asset Classification Tabs in the Asset Metadata Spreadsheet.

Designer shall re-submit MEL and Asset Metadata spreadsheet as part of the next design submittal (DS-2 and DS-3). Designer shall identify Assets that have been added or removed as the design progresses by highlighting/flagging the new and/or deleted asset using an exceptions list so the District can make the necessary revisions in their CMMS system.

3.4.3 Equipment Data Forms

Equipment data form templates have been developed for each asset classification as part of the guide specifications. The equipment data forms are used to obtain asset attribute data during construction from the Contractor that the Designer then transfers into an Asset Metadata Spreadsheet provided by the SacSewer after the initial project-specific MEL has been processed. Designer shall incorporate all relevant data forms in the contract specifications.

3.5 Reliability Centered Design (RCD) Documentation

Based on project scope, Designer may utilize the approach to RCD described in the Reliability Centered Design Implementation Guide, to document that the design process is based in RCD principles. The Designer will integrate O&M requirements into the design process; implement a systematic approach to maximize treatment process availability by increasing asset reliability, operability and maintainability; and establish criticality-based decision making on asset redundancy and spares inventory.

While the term may not be standard industry practice, this project will use an RCD-Lite process. Consultant will identify the process systems and the primary system functions that will require RCD analysis based on their professional experience after the PDR phase is complete. They will lead a single RCD Workshop after the P&IDs are developed to perform the failure modes and effects analysis (FMEA), then prepare a TM documenting the results for incorporation into the Design. The Consultant shall prioritize and strategize the workshop to limit the meeting time to 4-hours. If desired by the District (to be negotiated after the bid and award phase), the Consultant will lead an RCM workshop to assist with the development of the maintenance documents (Job Plans, Preventative Maintenance recommendations, etc.).

A typical RCD process (for reference) is as follows: During the planning phase (Basis of Design Report), the Designer will participate with District staff in a facilitated workshop for an initial screening of process systems and primary system functions that will require RCD analysis. Since draft P&IDs are usually initiated during the subsequent PDR phase (see below), this initial screening will be general in nature, with more detailed identification of systems and functions later, when P&IDs are available.

During the PDR, Designer will prepare the RCD-based information described in the Reliability Centered Design Implementation Guide, including preliminary P&IDs; participate in a facilitated workshop for failure mode analysis of major systems; and prepare a TM documenting how RCD principles will be incorporated into the design.

During DS-2 preparation, Designer will validate prior RCD conclusions and implementation steps; participate in a facilitated workshop; perform reliability centered maintenance (RCM) analysis; develop documents for implementation of RCM, as described in the District's Reliability Centered Design Implementation Guide, and document RCD and RCM principles of design in a TM.

4.0 Drawings

The District has developed CAD/BIM Standards that set the minimum requirements for CAD drawings and BIM data that are to be used in District construction contracts. In addition, the CAD/BIM Standards describe requirements for the organization and content of the contract drawing set. The purpose of these standards is to provide designers and construction contractors with the information required to ensure that the District will receive CAD documents and BIM data that will comply with the minimum acceptable standards in use at the District's facilities.

These standards shall be followed by all designers. Exceptions to the standards must be submitted in writing prior to implementation for specific approval by the PM. Once issued to the project, the impact of any later updates or revisions to the design scope, budget and schedule will be discussed between the Designer and PM, before proceeding with the changes.

4.1 General

Drawings shall be submitted with each design submittal as outlined in the District CAD/BIM Standards. In addition to the drawing submittals, designer is to submit both native and federated models for review at each submittal. Refer to the District CAD/BIM Standards for specific submittal requirements for federated models and associated review procedures.

The Designer may request the viewing of drawings from previous design projects in order to obtain, in general, the quality and level of detail expected. The Designer is cautioned that some details may be inappropriate for the current project due to technological advances, outdated standards, new preferences, etc. The Designer shall verify, with the PM, the level of detail to be provided on the drawings at each submittal stage, and shall develop and maintain a Design Drawing Submittal Content Inventory matrix similar to the example contained in Appendix C.

In general, the level of design development for the model files and associated drawings at each submittal stage shall meet the following minimum guidelines:

- PDR Drawing Set – Schematic design, including process flow diagrams, hydraulic profiles, process and piping schematics, P&IDs, and single line diagrams shall be developed to a level of detail to allow a thorough understanding of the design intent, operational flexibility, and provisions for future modifications. Physical layout drawings, including plans and sections for all disciplines, shall be developed to a level that allows for a determination of space requirements, clearances, access, provisions for future facilities, and sufficient detail for a construction cost estimate at the PDR level of accuracy.

- DS-1 – Schematic design shall be completed, including annotations and tagging, allowing reliable use of the schematic drawings for development of physical layout drawings (plans, sections and details) and design data development, such as equipment and instrument lists. Final dimensions, including slab and wall thicknesses, shall be indicated on all plan and section views, and information such as re-bar placement, allowing for a detailed quantity take-off shall be included.
- DS-2 – The entire drawing set shall be at approximately a 90 percent level of completion, with 100 percent of the planned contract drawing set included in the submittal; i.e., no missing drawings, and the majority of line work and call-outs completed. Remaining work on drawings after DS-2 shall generally be annotations that are not needed for a thorough understanding of the concepts, layouts, construction cost, and construction schedule.
- DS-3 – The entire drawing set shall be 100 percent complete, ready for final review and coordination checking.

4.2 Common Contract Drawings

The District maintains a set of drawings that are commonly included in the contract documents. These drawings present information that remains constant from project to project, or represent project-specific information relative to existing facilities. These drawings are available to the Designer with the intent that only minor work (such as updating the border information, showing the project site, adding project specific information, etc.) is required.

4.3 District Typical Details

The District maintains a library of typical details. The typical details represent construction details grouped by design discipline. These details are available in AutoCAD format and may be used on project drawings. The Designer may request a hardcopy catalog and/or electronic copy of the current details. Once the typical details have been issued to the Designer, it is the intent that the details are not to be modified by either the Designer or the Project Team unless there is compelling reason to do so. However, the Designer is responsible for reviewing all typical details for applicability to the specific project.

4.4 District Example Diagrams

The District maintains a set of example diagrams that are intended to show the construction contractor the level of detail to provide on certain contractor-furnished electrical, instrumentation and control drawings. The Designer shall incorporate these example diagrams without modification. The Designer may supplement these diagrams for particular project needs, such as sample PLC or workstation screen configurations.

Although intended as a reference for construction contractors, the Designer should review the District Example Diagrams when preparing project-specific drawings that depict details similar

to the example diagrams. Possible project-specific drawings may include, but are not limited to, typical discrete and analog loops, interconnection wiring diagrams, and control panel drawings.

5.0 Specifications

The District maintains a library of guide specifications, which follows the Construction Specifications Institute (CSI) Masterformat 50 Division Specification numbering.

The Designers shall prepare and assemble specifications relevant to the project. The Guide Specifications Library shall be the primary source for specifications. If a particular specification section does not exist, the Designer shall develop new specifications to match District standards. The specifications shall be coordinated with the Project Team, as described in the sections below.

For the bid set and conformed set, a limited number of copies of the specifications shall be printed and spiral bound for internal use by EchoWater Facility staff. Bid sets will be provided to prospective bidders online only, no hard copies will be produced for the bidders.

Specifications shall be prepared using the latest version of Microsoft Word in use by the District. When editing District Guide Specifications, the “track changes” feature for highlighting additions and deletions shall be turned on. Changes shall be highlighted in each design submittal. The “track changes” feature shall be turned off for the check set print between DS-3 and the bid set, and all “track changes” shall be accepted as modified for the bid set.

5.1 General Conditions

The contract general conditions (GCs) address bidding and contract administration functions. Given the nature of topics covered, the Project Team shall not modify the GCs unless specifically identified to do so. Examples of project-specific information that will be furnished by the Project Team include bid schedule, work constraints, and time of completion. If changes to the GCs are necessary, the PM shall be consulted.

5.2 Technical Specifications

The District Guide Specifications are in draft format, and address technical construction aspects of the specifications. The guide specifications are intended to serve as a starting point for the Designer and to assist in the development of the project specifications; however, the content shall not be significantly altered without the consent of the PM. The District does recognize the need to tailor or create specifications for specific projects, and will assist the Project Team in preparing technical specifications for the project. The Designer shall forward to the PM a list of all reference material, codes and/or standards which are referenced in new specification sections.

5.3 Manufacturer's Catalog Information

The Designers shall obtain manufacturer catalog information for all proposed products and equipment proposed in the Specifications. The information shall be of sufficient detail to allow the Project Team to decide whether or not to allow new items in the project specifications and to verify the District's Guide Specifications have current model numbers and manufacturer names. If the decision is to allow the item into the project specifications, the Designer shall forward an original copy of the manufacturer's catalog information to the PM.

5.4 Electrical Specification Schedules

Certain electrical specification sections will include schedules generated specifically for each project. Some sections contain lead-in information, such as an explanation or applicable definitions used in the schedule. Samples of these specification sections are part of the Guide Specifications library.

Presented below is a description of each schedule.

5.4.1 Raceway Schedule

The District Guide Specifications contain a schedule of existing raceways to be removed, abandoned in place, or reused. They also contain a schedule of new raceways to be provided and existing raceways to be reused. The raceway and cable (as discussed below) information shall be maintained in a single database format. Each raceway schedule shall depict the following information:

- Revision
- Raceway designation
- From/To – Equipment destinations including junction boxes, pull boxes, wireways, cable tray, duct banks, hand holes, manholes, etc.
- Size of raceway
- Contains -- Cable numbers
- Reference drawings
- Notes

5.4.2 Cable Schedule

The District Guide Specifications contain a schedule of existing cable to be removed, abandoned in place, or reused. They also contain a schedule of new cable to be provided and existing cable to be reused. The raceway (as discussed above) and cable information shall be maintained in a single database format. Each cable schedule shall depict the following information:

- Revision
- Cable designation
- From/To – Equipment destinations including junction boxes, pull boxes, wireways, cable tray, duct banks, hand holes, manholes, etc.
- Routing – All intermediate raceways, boxes, etc.
- Cable type
- Number of conductors
- Size of conductors
- Size of ground conductor
- Insulation voltage rating
- Notes

5.4.3 Panelboard Schedule

The District Guide Specifications list panelboards that are to be provided or modified. For each panelboard, the following information is depicted in tabular form:

- Panelboard nameplate designation
- Location – Physical location
- Voltage, frequency, and number of phases, withstand rating
- Phase and ground bus ampacity
- Main interruption device ampacity, and AIC rating
- Branch interrupting device ratings; ampacity and number of poles
- Load on each branch circuit
- Description of branch circuit load
- Total load per phase
- Total load
- Current per phase
- Notes – Drawing references

The District has a design standard for documenting panelboard schedules. A Microsoft Excel spreadsheet shall be obtained from the PM. The filename is “EchoWater Facility Panelboard Schedule Template.xls.” See the file for more specific instructions.

5.4.4 Motor Control Center Schedule

The District Guide Specifications list motor control centers (MCCs) to be provided or modified. For each MCC, the following information is depicted in tabular form on the drawings:

- MCC designation nameplate
- Nominal operating voltage, number of phases, and wires
- Horizontal and vertical bus ampacities
- Bus fault bracing
- Cubicle location or designation
- Equipment number
- Location I.D.
- Equipment title nameplate
- Hp or kVA rating
- Interrupter type, number of poles, and trip rating
- Starter type and size
- Control or wiring diagram (manufacturer's drawings)
- Notes
- Connected load calculation
- NEC load calculation

In addition, a front elevation drawing of the MCC shall be provided on the drawings. The drawing shall show MCC dimensions and cubicle layout with designations.

5.5 Process Control Specification Schedules

Presented below are certain process control specification sections that include schedules generated specifically for each project. Samples of these specification sections are part of the Guide Specifications library.

5.5.1 Instrument Schedule

The District Guide Specifications list instruments required by the control system. The list is ordered by instrument loop number. For each instrument loop, a functional title is provided. Within a given loop, each instrument is listed by tag number. For each instrument, the following information is depicted:

- Revision

- Tag number
- Description
- Location
- Electrical drawing reference
- Mechanical drawing reference
- Instrument specification reference – including paragraph number
- Process and Instrumentation Diagram reference
- Control and Logic Diagram reference
- Notes – set points, ranges, units, etc.

5.5.2 Computer Input/Output Schedule

The District Guide Specifications list each computer input and output (I/O) circuit which must be wired to the ACC computer I/O subsystems and tested. This schedule also defines the specific I/O module, module personality type, and terminal numbers. The following information is sorted by ACC number and alphanumeric tag number:

- Point identification
- Description
- Type
- ACC designation with cabinet and row
- Terminal point
- P&ID and C&LD reference
- Notes
- Revision

5.5.3 Programmable Controller Input/Output Schedule

The District Guide Specifications list the input and output (I/O) points for the programmable logic controller (PLC) systems.

5.5.4 PCCS Control Strategies

The District Guide Specifications contain written descriptions of analog and discrete control functions executed by the EchoWater Facility computer control system (PCCS), as well as functions implemented in the ACC control panels and field instruments. These control

strategies are intended as an aide to understand the overall objective of each subsystem of the control system. Control strategies shall include pertinent sequence of operation descriptions.

5.5.5 PLC Control Narratives

The District Guide Specification contains written descriptions of analog and discrete control functions executed by the PLCs contained in vendor control panels.

5.5.6 ACC Control Panel Demolition Schedule

The ACC Control Panel Demolition Schedule section of the project technical specifications lists instruments located in existing ACC control panels that are to be removed, relocated, or abandoned in-place. The schedule shall be similar to that in the District Guide Specifications.

6.0 Calculations

Design calculations shall be prepared, as necessary, for the development of the project. Calculations shall be submitted with DS-2 and with conformed documents. Calculations shall be submitted electronically clearly identified as to the project and design phase, and description of what is being calculated. Calculations shall be supplemented with copies of reference material pertinent to the design, such as manufacturer's data, design references, etc. If necessary, the District may request calculations to verify certain design conditions.

The calculations shall be organized by design discipline. Within each discipline, the calculations shall be broken down and identified by task. Each task shall be separated by index tabs.

The calculations submitted with conformed documents shall be stamped and signed by a California professional engineer in responsible charge for the applicable design discipline.

6.1 Computer Output

Computer output, if used, shall be included with the calculations. Information that shall be provided to adequately interpret the input and output parameters include:

- Information on computer program name, version, and producer.
- Separate calculations deriving the input variables.
- Drawings showing computer model geometry.
- Drawings/explanations to assist in interpreting the results.
- Separate calculations showing how the results are incorporated into the design.

APPENDIX A
STANDARDIZED EQUIPMENT

REGIONAL SAN STANDARDIZED EQUIPMENT

Equipment Description	Manufacturer	Type/Model/Series	Comments
INSTRUMENTATION AND CONTROL			
Chlorine Analyzers* (Free Chlorine)	Evoqua – Wallace and Tiernan	Micro2000	A 2020 Regional San pilot study identified the Evoqua-WT Micro2000 as the preferred analyzer for free chlorine applications based on accuracy and overall performance.
Chlorine Analyzers (Total Chlorine)	Evoqua – Wallace and Tiernan	Micro2000	Regional San staff field-tested analyzers in 2019 and identified a total chlorine analyzer replacement to an existing analyzer that was obsolete.
Chlorine Analyzer (Total Chlorine - Low level) Sulfite Dioxide Analyzer (Total Residual SO2)	Analytical	Model Q46S/66 Model Q46H/76S	Regional San Staff tested various types of direct read SO2 and C12 analyzers to improve monitoring plant effluent for permit compliance and process control. The Study recommended ATI's SO2 A15/66 and CL2 A15/79 direct read analyzers. ATI's latest analyzer models with the same sensor and technology are analyzers Q46S/66 and Q46H/76S, respectively.
Plant Computer Control System	Emerson	Ovation Distributed Control System (DCS)	Initially selected through a competitive procurement process back in the late 1990s. This system has been through multiple upgrades since its initial installation. This system is being expanded as a result of the Echo Water Project.
Human/Machine Interface (HMI)	Automation Direct	C-More Series HMI Panels	Initially selected through a competitive procurement process as part of the Echo Water Flow Equalization construction contract.
Public Address System	Barix	Exstreamer 100	A Standardized public address system to match the existing system supported by the County of Sacramento Department of Technology.
Security Card Access System	Software House	iStar Ultra SE Door Controller iStar Edge Door Controller	A Standardized security access system to match the existing system supported by the County General Services system.
Fiber Optic Cable System	Optic Cable Corporation	B-Series Cable (SM, MM, and Hybrid) G-Series Cable (SM,MM and Hybrid) Pre-Load FO Termination Panels	Initially selected through a competitive procurement process on the Echo Water Site Preparation project, and expanded on the subsequent Echo Water projects.

*New or revised standardized equipment item

REGIONAL SAN STANDARDIZED EQUIPMENT

Equipment Description	Manufacturer	Type/Model/Series	Comments
Profibus Network Components	Phoenix Contact Procentec	Profibus gateway, headstation, power module, DP surge protection device, DP repeater, DP Power supply, DP media converters, PA coupler, and PA Device coupler (also known as segment protector or field barrier).	Initially selected through a competitive procurement process on the Echo Water Flow Equalization construction contract. Procentec added as manufacturer of OEM Phoenix Contact Profibus devices.
FDT- Certified Frame Software	Endress+Hauser	FieldCare SFE500	Initially selected through competitive procurement process. Software to expand existing FieldCare ProdiBus network equipment monitoring.
Programmable Logic Controllers (PLC)	Rockwell Automation	ControlLogix Series/Compact Logix	PLC/5 was initially installed through a pre-qualification process and subsequently used as basis for the ACC design guide. The Logix5000 Series contains ControlLogix and CompactLogix, where ControlLogix Series is the manufacturer's replacement for the PLC/5. The Allen-Bradley (AB) product line is now manufactured by Rockwell Automation.
	Rockwell Automation	SLC-500 Series	Alternate to AB PLC/5 Series for medium applications.
	Rockwell Automation	RSLogix5, RSLogix 500, RSLogix 5000, Studio 5000	This is the recommended software to use for programming on the AB PLC/5 systems and the Logix 5000 series.
	Rockwell Automation	Graphical User Interface (GUI)	The recommended GUI due to unique programming and interfacing.
PLC Interface Card	ProSoft Technology	Profibus DP V1 Master MVI56-PDPMV1 Series	This is a recommended communication interface card to use with ABPLC due to the District's past use of ProSoft Technology interface cards with other network communication protocols in existing PLC5s and the fact that District staff has been trained on the ProSoft common software.
		Modbus TCP/IP Client/Server Enhanced Network Interface Module	Initially selected through competitive procurement process.
Backup Controllers	Micromod Automation	Series MC5000	Initially selected through competitive procurement process as part of the original SRWTP construction. Micromod Automation replaces Fisher Porter.
Baragraph Indicators	Micromod Automation	Series 53IT5100	Initially selected through competitive procurement process as part of the original SRWTP construction. Micromod Automation replaces Fisher Porter.

*New or revised standardized equipment item

REGIONAL SAN STANDARDIZED EQUIPMENT

Equipment Description	Manufacturer	Type/Model/Series	Comments
Fire Alarm System	Edwards Systems echnology	EST3 application system with Fireworks Software and associated detection and alarm components	Initially selected through competitive procurement process as part of the original SRWTP construction. Micromod Automation replaces Fisher Porter.
Pressure Transmitters	Rosemont	Series 3051 Alphline smart with HART Protocol	Series 3051 replaces the Series 1151 which was initially selected through competitive procurement process
Temperature Transmitters	Rosemont	Series 3144P Smart with HART Protocol	Series 3144P replaces the Series 3044 which was initially selected through competitive procurement process. Series 3044 is no longer manufactured.
Turbidimeter	Hach Company	Hach TU5300 sc	Selected based on a pilot study performed by staff where various types of turbidity meters were tested.
	Swan Analytical Instruments	Monitor AMI Turbiwell 7027; Auto-Drain	
Tank/Hopper Level Indicators	Siemens	MultiRanger HydroRanger	Initially selected by competitive procurement process. Electronics supports up to 6 Tanks, thus reducing number of units.
Mass Gas Flowmeters	FCI	ST-100 Series STP-100 Series	ST100 Series replaces the GF-90 Series which was initially selected by competitive procurement process. ST provide mass gas flow and STP provides mass gas flow and pressure measurements.
Transit/Doppler Time Flowmasters	Siemens	SITRANS FUS1010	Initially selected through competitive procurement process as part of the Grit Systems Modification Project. SITRANS FUS1010 replaces System 1010.
Vibration Protection	GE Bently Nevada	Series 3500	Meets stringent API standards. At time of initial installation, Plant knew of no equal product. Plant has several BN vibration monitoring systems installed, a stock of BN parts, and is trained in all aspects of programming, operating, and maintaining the BN equipment. System is very relieable and is essential to the Plant's predictive maintenance program.
	GE Bently Nevada	Prox Probes 3300 Series	Specialized probes for use with BN monitoring equipment
	GE Bently Nevada	Velometer Probes for Acceleartion	Specialized probes for use with BN monitoring equipment
Electrical			
Uninterruptible Power Supply	Liebert	EXM (modular)* N Power (large) NFinity (medium) GX(small)	Initially selected through competitive procurement process
Medium Voltage Substation Protection Relay	Schweitzer Engineering Laboratories(SEL)	SEL 500 Series SEL 700 Series	Initially selected through competitive procurement process as part of the EchoWater Main Electrical Substation Expansion Project

*New or revised standardized equipment item

REGIONAL SAN STANDARDIZED EQUIPMENT

Equipment Description	Manufacturer	Type/Model/Series	Comments
Contractors/Starters for medium voltage MCC	Eaton/Cutler-Hammer	Type SJ400	Initially selected by competitive procurement process. The manufacturer name has changed from Cutler-Hammer/Westinghouse to Eaton/Cutler-Hammer
Breakers for Switchgear Medium-Voltage Power Circuit	Eaton/Cutler-Hammer	Type VCP-W	Initially selected by competitive procurement process. The manufacturer name has changed from Cutler-Hammer/Westinghouse to Eaton/Cutler-Hammer
Medium Voltage Variable Frequency Drives	Rockwell Automation	Powerflex 7000	Initially selected through a competitive procurement process.
	Siemens/Robicon	Sinamics Perfect Harmony	
Motor Control Centers	Eaton/Cutler-Hammer	Freedom 2100	Initially selected through competitive procurement process as part of the original SRWTP construction. The manufacturer name has changed from Cutler-Hammer/Westinghouse to Eaton/Cutler-Hammer.
	General Electric	GE 9000	Model GE 9000 replaces GE 8000 which was initially selected through competitive procurement process.
Low Voltage Switchgear	Eaton/Cutler-Hammer	Magnum DS	Initially selected through competitive procurement process as part of the original SRWTP Construction. The manufacturer name has changed from Cutler-Hammer/Westinghouse to Eaton/Cutler-Hammer.
	General Electric	AKD-20	Model AKD-20 replaces AKD-8 which was initially selected through competitive procurement process.
Mechanical			
AWWA Butterfly Valves (for valves greater than 24")	Mosser	Series 830	Initially selected through competitive procurement process.
	Rodney Hunt	Streamseal	Initially selected through competitive procurement process.
	Valmatic	American-BFV	Initially selected through competitive procurement process.
Mechanically Cleaned Bar Screens	Headworks Inc.	MAHR Screen	Initially Selected through competitive procurement process on the Bar Screen Replacement Project.
Recessed Impeller Pumps	Wemco	Model C	Initially selected through competitive procurement process.
	Twin Pumps	Model C	Twin Pumps Model C parts are interchangeable with Wemco Model C parts.
Rotary Lobe Blowers	Kaeser	Omega Blowers	Initially selected through competitive procurement process.
Air Compressor	Kaeser	Lubricated Rotary Screw Compressor Series	Initially obtained through competitive procurement process.
Positive Displacement Rotary Lobe Pump	Swaby	Lobeline	Initially selected through competitive procurement process.
Forklift Boom Attachment	Lift Master Boom	Telescoping Economy Boom – LM-EBT-4-24	Manufacturer of this attachment has been approved for use with existing Regional San forklifts.

*New or revised standardized equipment item

REGIONAL SAN STANDARDIZED EQUIPMENT

Equipment Description	Manufacturer	Type/Model/Series	Comments
Electric Valve Actuators (Large)	Limitorgue	Series MX	Series MX replaces the Series T, Which was initially selected through competitive procurement process.
	EIM	Series TEC2000	Series TEC2000 replaces the Series 2000, which was initially selected through competitive procurement process.
	Rotork	Series IQ	Initially selected through competitive procurement process.
HVAC			
HVAC Direct Digital Controller	Johnson Controls	FX-PCG2621	Initially selected Johnson Controls model DX-9100 through competitive procurement process. Model DX-9100 has been phased out and replaced with model FX-PCG2621
GENERAL/PERSONNAL SAFETY			
Door Hardware	Best Access Systems	Cormax XD Series	A standardized door locking system to match existing and meet the District's security policy
Irrigation Controller	Rain Master	Evolution DX2	Initially selected through competitive procurement process.
Advanced Davit Arm System	DBI-SALA	3M DBI-SALA Advanced One Piece Adjustable Offset Davit	Staff are trained in the use of DBI-SALA safety equipment and the accessories that are compatible with the product.

*New or revised standardized equipment item

APPENDIX B

**SACSEWER EQUIPMENT NUMBERING GUIDELINES AND PREFIX LIST
(SMP 207)**

SMP 207 Appendix B

7/24/2023

SacSewer Equipment Prefix List (Prefix List for Auto-Numbering Equipment Location IDs)

The values shown in the DMI/MMI? column are general suggestions and may be modified based on equipment risk through RCM. See SMP 204

File: 10086677

Active Instrument Classification (ACTINST): Control equipment that is either powered or provides and/or receives a signal.

Passive Instrument Classification (PASSINST): Control equipment that is not powered and does not provide and/or receive a signal.

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
(none)	Manual Valve	61WRH11	6	VALVE	OPERATING	DMI	VALVES	Use syntax 6 for manual valves. There is no alpha prefix. See SMP 207C for list of Manual Valve Service Systems.
(none)	Motor Control Center Buckets/Cubicles	61A1-2I	10	MCC Bucket	OPERATING	MMI	POWERDIS	The description will be: ELECTRICAL CUBICLE, [EQUIPMENT FED BY ELECCUBE], [DESCRIPTION OF EQUIPMENT FED].
A	Analyzer	A610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ACC	Area Control Center	ACC11	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	
ACU	Air Conditioning (Cooling) Unit	ACU610951A	2	CONDENSER	OPERATING	MMI	HVACR	
AE	Analyzer Element	AE940501	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	Components within box are not tagged, but manual valves, rotometers, strainers, and other elements leading up to the box are tagged as separate elements.
AED	Automated External Defibrillator	AED1001	5	MISC	OPERATING	DMI	MISC	For Safety Office use only
AFD	Adjustable Frequency Drive	AFD610953	2	MOTOR DRIVE	OPERATING	MMI	MISC	Interceptor only. Do not use for EchoWater.
AFS	Air Flow Switch	AFS610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
AFT	Air Filter Timer	AFT610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
AHF	Active Harmonic Filter	AHF61A1	7	Active Harmonic Filter	OPERATING	DMI	POWERDIS	
AHU	Air Handling Unit	AHU610953	2	AIR HANDLER	OPERATING	MMI	HVACR	For packaged units, the motor, fan, and filter do not need separate tag numbers because the asset class AHU contains attributes for filter, motor and blower in Maximo.
AI	Indicator	AI610953	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
AIC	Indicator Controller	AIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
AIT	Indicator Transmitter	AIT940501	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
ANT	Antenna	ANT248001	2	ACTIVE INSTRUMENT	OPERATING	DMI	MISC	Radio Equipment
AR	Analyzer Recorder	AR610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ARST	Flame Arrestor	ARST610002	2	FITTINGS	OPERATING	MMI	MISC	
ARV	Air Relief Valve	ARV390008A	2	RELIEF DEVICE	OPERATING	MMI	VALVES	
AV	Audio Visual Signaling Device	AV610953	2	VIDEO EQUIPMENT	OPERATING	DMI	MISC	
AY	Analyzer Relay	AY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
B	Blower	B521001	2	COMPRESSOR	OPERATING	MMI	COMPRES	
BAT	Battery	BATS20313	2	BATTERY	OPERATING	DMI	POWERDIS	
BCH	Battery Charger	BCHS20314	2	BATTERY CHARGER	OPERATING	DMI	POWERDIS	
BE	Burner Element, Flame Element	BE610953	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
BET	Boiler Emergency Trip	BET610953	2	N/A	COMPONENT	DMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
BF	Blind Flange, Piping	N19-BF0005A	4	FITTINGS	OPERATING	DMI	MISC	For offsite pipelines only. Do not use for plant piping.
BFP	Belt Filter Press	BFP610953	2	Misc. Equipment	OPERATING	DMI	MISC	
BKR	Breaker	BKR61A1	8	BREAKER	OPERATING	MMI	POWERDIS	
BKRM	Manual 'Tie' Breaker	BKRM61AB	8	BREAKER	OPERATING	MMI	POWERDIS	
BLDG	Building	BLDG100203	5	STRUCTURE	OPERATING	MMI	MISC	Don't forget to issue a roof number which should be the same as the building number with a different prefix.
BLR	Boiler	BLR610953	2	BOILER	OPERATING	MMI	HVACR	
BNR	Biological Nutrient Removal Basin	BNR511100	2	TANK	OPERATING	MMI	MISC	(District Use Only)
BP	Backflow Preventer	BP610059	2	Backflow Preventer	OPERATING	MMI	VALVES	
BRN	Burner	BRN610953	2	FITTINGS	OPERATING	MMI	MISC	
BSN	Bar Screen	BSN610953	2	SCREEN	OPERATING	MMI	MISC	
BU	Blending Unit	BU610953	2	Misc. Equipment	OPERATING	DMI	MISC	
BUS	Electrical Bus	BUS50A	7	BUS	OPERATING	MMI	POWERDIS	
C	Crane	C521025	2	CRANE	OPERATING	MMI	MISC	
CAL	Calibration Chamber	CAL610701	2	Misc. Equipment	OPERATING	DMI	MISC	
CAV	Combination Air Valve	CAV610056	2	RELIEF DEVICE	OPERATING	MMI	VALVES	
CB	Catch Basins	CB6	5	Misc. Equipment	OPERATING	DMI	MISC	Do not issue numbers for EchoWater.
CC	Cooling Coil	CC510231	2	Misc. Equipment	OPERATING	DMI	HVACR	
CDC	Condensing Coil	CDC610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
CDU	Condensing Unit, Heat Pump	CDU610953	2	CONDENSER or SPOT COOLERS	OPERATING	MMI	HVACR	
CE	Conductivity Element	CE2894	5	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
CES	Monitor/Test Equipment	CES1001	5	Test EQ	OPERATING	DMI	MISC	Use for mobile testing equipment for Control Systems/Electrical Shop (CES). For mechanical mobile equipment, use ME.
CFR	Chemical Feeder	CFR610953	2	TANK	OPERATING	MMI	MISC	
CH	Conductivity High	CH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
CHR	Chiller	CHR610953	2	CHILLER	OPERATING	MMI	HVACR	
CI	Conductivity Indicator	CI610953	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
CIT	Conductivity Indicator Transmitter	CIT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
CJ	Computer ACC CPU	CJ610953	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	
CLO	Cleanout	CLO1054	5	FITTINGS	OPERATING	DMI	MISC	
CNR	Concentrators (Type 103)	CNR610953	2	Misc. Equipment	OPERATING	DMI	COMPUTER	
CON	Conveyor	CON593005	2	Misc. Equipment	OPERATING	MMI	MISC	
COT	Carbonaceous Oxidation Tank	COT610953	2	TANK	OPERATING	MMI	MISC	
CP	Compressor	CP512201	2	COMPRESSOR	OPERATING	MMI	COMPRES	
CPNL	Control Panel	CPNL420201	2	PANEL	OPERATING	MMI	POWERDIS	For control panels only. May contain such things as Operator Interface Terminals (OIT), Human Machine Interface (HMI), Cathodic Protection Rectifier Panels, etc. For power panels use PNL.
CPP	Category 5 Patch Panels	CPP510022	2	PANEL	OPERATING	DMI	COMPUTER	
CPR	Power Factor Correction Capacitor	CPR521001	2	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
CR	Control Relay	CR610953	2	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
CRSS	Cross (Pipe Fitting)	N19-CRSS0005A	4	FITTINGS	OPERATING	DMI	MISC	For offsite pipelines only. Do not use for plant piping. Only assign a Location ID if the flow is being split into multiple directions. The purpose of the Location ID is so that a node can be added at the split for GIS and the hydraulic model. If the fitting is only being used as an elbow and no piping connection can be added, a Location ID is not needed.
CS	Conductivity Switch	CS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
CSA	Control Station Alarm	CSA610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
CSP	Condensate Separator	CSP610953	2	Misc. Equipment	OPERATING	DMI	MISC	
CSTN	Control Station	CSTN510221	2	PANEL	OPERATING	MMI	MISC	
CTF	Centrifuge		2	Misc. Equipment	OPERATING	DMI	MISC	
CTS	Cathodic Protection Test Station	CTS1004	5	CATHODIC PROTECTION TEST STATION	OPERATING	DMI	MISC	
CU	Control Unit	CU89E	4		REPORTING	DMI	VALVES	Control Units will be considered a package unit, numbered, and designated on a PID using a single symbol. Its components will not have location ID's but be shown on a referenced detail drawing. On the detail drawing, components will have a noun description (such as valve, strainer, or flow indicator) and not be uniquely identified with a Location ID. In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose REPORTING as the LOCATION TYPE.
CV	Control Valve	CV510530	2	VALVE	OPERATING	DMI	ACTVALVE	A control valve is a valve used to control fluid flow by varying the size of the flow passage for control of process quantities such as flow, pressure, temperature, and liquid level. The opening or closing of actuated control valves is usually done by electrical, hydraulic or pneumatic operators (use 'MOP' or 'POP' prefix for the actuator). These can be set to any position, between fully open and fully closed. Use 'V' for actuated valves where flow can only be turned on or off 100% with no in between setting. Use syntax 6 for valves that are controlled manually.
DAS	Distributed Antenna System	DAS248001	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	MISC	Radio Equipment
DCP	DC Power Supply	DCP610953	2	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
DCU	Distributed Control Unit	DCU520901	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	
DD	Duct Detector	DD610953	2	N/A	COMPONENT	DMI	INSTRU	Use SD for smoke detector. In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
DE	Density Element (Meter)	DE610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
DI	Density Indicator	DI610953	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
DIF	Diffuser	S94-DIFF0001A	4	Misc. Equipment	OPERATING	DMI	MISC	Interceptor only. Do not use for EchoWater.
DIG	Digester	DIG610953	2	TANK	OPERATING	MMI	MISC	
DIT	Density Indicating Transmitter	DIT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
DM	Damper Motor	DM510231A	2	DAMPER/LOUVER	OPERATING	DMI	HVACR	
DOOR	Building Door	DOOR124	5	DOOR	OPERATING	DMI	MISC	Use for all doors including roll-up doors.
DPAD	Dumpster Pad	DPAD1001	5	Misc. Equipment	OPERATING	DMI	MISC	Dumpster assets are not owned by the District, so they will not receive location IDs. The pad locations receive the numbers.
DPIS	Differential Pressure Indicator Switch	DPIS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
DPR	Damper	DPR610953A	2	DAMPER/LOUVER	OPERATING	MMI	HVACR	Do not number balancing dampers or fixed dampers.
DS	Disconnect Switch	DS940101A	2	POWER SWITCH	OPERATING	MMI	MISC	

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
DT	Drip Trap	DT512202	2	FITTINGS	OPERATING	DMI	MISC	
DX	DX Coil	DX610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
DXC	Direct Expansion Coil	DXC610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
EA	ACC Instrument Voltage	EA	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
EC	Evaporative Cooler	EC510501	2	PACKAGE UNIT	OPERATING	MMI	HVACR	
EDM	Electrical Data Monitor	EDM61AB	8	Misc. Equipment	OPERATING	DMI	POWERDIS	Plant only.
EE	Voltage Sensor	EE610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
EH	Electric Heater	EH610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
ELC	Ethernet Link Controller	ELC529005A	2	N/A	COMPONENT	DMI	COMPUTER	Plant only. In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
EP	Electro-Pneumatic Switch	EP610953	2	POWER SWITCH	OPERATING	DMI	HVACR	
ESE	Emergency Shower/Eyewash	ESE770032	2	Misc. Equipment	OPERATING	DMI	MISC	
ESH	Voltage Switch High	ESH610953	2	POWER SWITCH	OPERATING	DMI	INSTRU	
ESL	Voltage Switch Low	ESL610953	2	POWER SWITCH	OPERATING	DMI	INSTRU	
ETH	Ethernet Switches	ETH610003A	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	Plant only.
EY	Voltage Isolator	EY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FB	Fire Bell/Strobe	FB970021A	2	Misc. Equipment	OPERATING	DMI	FIREPRO	Shares Core with FSS
FC	Flow Control	FC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FD	Fire Damper	FD610953	2	DAMPER/LOUVER	OPERATING	MMI	FIREPRO	
FDR	Feeder Cable from Breaker	FDR61AB	8	Misc. Equipment	OPERATING	MMI	POWERDIS	
FE	Flow Element (Meter)	FE610101	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
FEB	Fire Extinguisher Bracket (Hanger)	FE61636	5	Misc. Equipment	OPERATING	DMI	FIREPRO	
FFIC	Flow Ratio Indicating Controller	FFIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FFK	Flow Ratio Control Station	FFK610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FG	Flap Gate	FG610953	2	GATES	OPERATING	DMI	VALVES	
FH	Fire Hydrant	FH1025	5	VALVE	OPERATING	DMI	FIREPRO	Number wharf hydrants as syntax 6 (valves).
FHD	Fume Hood	FHD610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
FI	Flow Indicator	FIS10530	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	Includes rotameters.
FIC	Flow Indicator Controller	FIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FIR	Flow Indicator Recorder	FIR610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FIT	Flow Indicator Transmitter	FIT610101	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
FLP	Fluid Power Unit	FLP610953	2	GATES	OPERATING	MMI	PUMPS	
FLTA	Filter, Air	FLTA512201	2	FILTER	OPERATING	MMI	HVACR	For HVAC use only
FLTM	Filter, Not Air	FLTM512203A	2	FILTER	OPERATING	MMI	MISC	All other filter types (not HVAC)
FMC	Fiber Optic Media Converter	FMC515000A	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	Also see FOC (Fiber Optic Converter).
FMT	Force Main Transmission Line	FMT610953	2	PIPELINES	OPERATING	MMI	MISC	For offsite pipelines only. Do not use for plant piping.
FMX	Flash Mixer	FMX44910	2	MIXER	OPERATING	DMI	DRIVES	
FN	Fan	FN610957	2	FAN	OPERATING	DMI	HVACR	Add a separate equipment number for the motor using the same core number if the motor is over 5 horsepower.
FOP	Fiber Optic Panel	FOP610001	2	PANEL	OPERATING	DMI	COMPUTER	
FPR	Fault/Feeder Protection Relay	FPR52A	7	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FRS	Freezestat	FRS610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FRZ	Freeze Protection Switch	FRZ610953	2	POWER SWITCH	OPERATING	DMI	HVACR	
FS	Flow Switch	FS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FSD	Fire Smoke Damper	FSD24	5	DAMPER/LOUVER	OPERATING	MMI	FIREPRO	
FSH	Flow Switch High	FSH515009A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FSL	Flow Switch Low	FSL510019	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FSS	Fire Sprinkler System	FSS610953	2	Misc. Equipment	OPERATING	MMI	FIREPRO	Use for fire riser assemblies. Do not assign tag numbers to individual components.
FSV	Flow Straightening Vane	FSV595068	2	VALVE	OPERATING	DMI	HVACR	
FT	Flow Transmitter	FT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FTH	Flow Transmitter High	FTH610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FX	Flow Conditioner	FX610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
FY	Flow Solenoid/Relay/Accumulator	FY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
G	Gate (power actuated)	G510012	2	GATES or VALVE	OPERATING	MMI	ACTVALVE	
GBT	Gravity Belt Thickener	GBT610953	2	Misc. Equipment	OPERATING	DMI	MISC	

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
GDR	Grinder	GDR610953	2	GRINDER	OPERATING	MMI	MISC	
GEN	Generator	GEN610953	2	GENERATOR	OPERATING	DMI	POWERDIS	
GF	Grease Filter	GF610953	2	FILTER	OPERATING	DMI	MISC	Interceptor only. Do not use for EchoWater.
GO	Gate Operator	GO1003	5	VALVE OPERATOR	OPERATING	MMI	SECURITY	
GRT	Grit Tank / Gravity Transmission Line	N21-GRT0004A	5	PIPELINES or TANK	OPERATING	MMI	MISC	
HC	Heating Coil	HC610953	2	IMMERSION HEATER	OPERATING	DMI	HVACR	
HEX	Heat Exchanger	HEX521001	2	HEAT EXCHANGER	OPERATING	MMI	HVACR	
HH	Handhole (electrical)	HH100162	5	MANHOLE or Misc. Equipment	OPERATING	DMI	POWERDIS	Electrical boxes in the ground shall use 'HH'. Above ground electrical boxes shall use 'PB' Pullbox syntax 4. Larger electrical vaults which allow human entry would be considered 'MH' Manhole syntax 5.
HIC	Hand Indicator Controller	HIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
HIK	Hand Indicator Control Station (Switch)	HIK610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
HIT	Humidity Indicator Transmitter	HIT598013	2	N/A	COMPONENT	DMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
HK	Hand Control Station (switch)	HK610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
HLS	Hand Light Switch (DCSA)	HLS610953	2	N/A	OPERATING	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
HMD	Humidifier	HMD610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
HMS	Humidistat	HMS610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
HOP	Hydraulic Operator	HOP610953	2	VALVE OPERATOR	OPERATING	DMI	INSTRU	
HP	Heat Pump	HP520021	2	AIR HANDLER or PACKAGE UNIT	OPERATING	MMI	HVACR	
HS	Hand Switch	HS390101A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
HTR	Heater	HTRS97042	2	IMMERSION HEATER	OPERATING	DMI	HVACR	
HUB	Hub (type 103)	HUB610953	2	Misc. Equipment	OPERATING	DMI	COMPUTER	
HYD	Hydraulic Unit	HYD610953	2	Misc. Equipment	OPERATING	DMI	PUMPS	
IE	Current Sensor (Primary Element)	IE610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
IG	Ignitor	IG610953	2	Misc. Equipment	OPERATING	DMI	MISC	
II	Current Indicator	II610953	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
IR	Inlet Relief (Roof Hood)	IR610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
ISH	Absolute Signal Trip	ISH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ISY	Current Safety Isolator	ISY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
IT	Current Transmitter	IT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ITE	Current Transmitter Element	ITE610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
IV	Current Relay or Isolator	IV610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
JE	Power Primary Element	JE610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
JI	Power Indicator	JI610953	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
JIC	Power Indicating Controller	JIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
JNT	Joint, Pipe	N19-JNT0005C	5	FITTINGS	OPERATING	DMI	MISC	For offsite pipelines only. Do not use for plant piping.
JSL	Power Surge Monitor	JSL610953	2	Misc. Equipment	OPERATING	DMI	POWERDIS	
JT	Power Transmitter	JT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
JX	Power Supply	JX610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
KS	Timer Switch	KS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
KWH	Kilowatt Hour Meter (Plant Meter)	KWH610953	2	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
KY	Time Relay	KY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LA	Level Alarm (Light or Sound)	LA610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LB	Load Bank	LB610953	2	Misc. Equipment	OPERATING	DMI	POWERDIS	
LC	Level Controller	LC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LDIT	Level Differential Indicating Transmitter	LDIT593003	2	ACTIVE INSTRUMENT	OPERATING	DMI	MISC	

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
LDR	Ladder	LDR1194	5			MMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LDSH	Level Differential Switch High	LDSH593003	2	N/A	COMPONENT	DMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LE	Level Element	LE610201	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
LI	Level Indicator	LI515001	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
LIC	Level Indicator Controller	LIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LIT	Level Indicator Transmitter	LIT610201	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
LR	Level Recording	LR610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LS	Level Switch	LS595014	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
LSH	Level Switch High	LSH940401	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LSHH	Level Switch High High	LSHH610201	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LSL	Level Switch Low	LSL510210	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LSLL	Level Switch Low Low	LSLL940401	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LT	Level Transmitter	LT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LTG	Emergency Lights	LTG610953	2	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LV	Louver	LV610951	2	DAMPER/LOUVER	OPERATING	DMI	HVACR	Do not number fixed louvers.
LVBD	Low Voltage Bus Duct	LVBD59A	2	BUS	OPERATING	DMI	MISC	Interceptor only.
LY	Level Relay	LY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LYH	Level Relay High	LYH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LYHH	Level Relay High High	LYHH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LYL	Level Relay Low	LYL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
LYLL	Level Relay Low Low	LYLL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
M	Motor	M980058A	2	MOTOR	OPERATING	MMI	MOTORS	Not issued for Sump Pumps
MBKR	Main Breaker	MBKR61A	8	BREAKER	OPERATING	MMI	POWERDIS	
MC	Magnetic Clutch	MC610953	2	MOTOR DRIVE	OPERATING	MMI	DRIVES	
MCC	Motor Control Center	MCC61A1	8	MOTOR CONTROL CENTER	OPERATING	MMI	POWERDIS	
MD	Air Flow Measuring Station, Motorized Damper	MD610953	2	DAMPER/LOUVER	OPERATING	DMI	HVACR	
ME	Mobile Equipment	ME1003	5	Misc. Equipment	OPERATING	MMI	MOBILE	Use for mechanical mobile equipment. For mobile testing equipment for Control Systems/Electrical Shop (CES), use CES.
MEE	Miscellaneous Electrical Equipment	MEE940100	2	Misc. Equipment	OPERATING	DMI	POWERDIS	
MFU	Microfiltration Unit	MFU610953	2	FILTER	OPERATING	DMI	MISC	
MH	Electrical Manhole/ Interceptor Manhole	MH100	5	MANHOLE	OPERATING	DMI	MISC	For small electrical vaults which do not allow for human entry use 'HH' Handhole syntax 5.
MIT	Moisture Indicator Transmitter	MIT610953	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
MM	Micro-Meteorological Station	MM610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
MME	Miscellaneous Mechanical Equipment	MME44942	2	Misc. Equipment or VARIES	OPERATING	DMI	MISC	Includes: Drinking Fountains, Emergency Eyewash Shower assemblies (The eyewash shower has only a single location ID. Only a single isolation valve is numbered as this is needed for LTV description. There are additional valves and items within eyewash shower but they are not tagged).
MNTR	MONITOR VALVE	MNTR610953	2	VALVE	OPERATING	DMI	ACTVALVE	
MOP	Motor Operator	MOP390101	2	ACTUATOR	OPERATING	DMI	ACTVALVE	For motor operated, controlled, or actuated equipment which use an electric or hydraulic motor. Assign a 'MOP' number to the actuator portion of the valve assembly. If driving a valve, the valve being driven will get a separate 'V' or 'CV' number, depending on the use.
MPC	Mini Power Center	MPC595017	2	Misc. Equipment	OPERATING	DMI	POWERDIS	
MPR	Motor Protection Relay	MPS2A3	7	Misc. Equipment	OPERATING	DMI	POWERDIS	
MSE	Moisture Element	MSE51056	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
MSH	Moisture Switch High	MSH510019	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
MSL	Moisture Switch Low	MSL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
MT	Moisture Transmitter	MT510273	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
MVBD	Medium Voltage Bus Duct	MVBD610953	2	BUS	OPERATING	DMI	MISC	Interceptor only. Do not use for EchoWater.
MW	Monitoring Well	MW1002	5	Misc. Equipment	OPERATING	DMI	MISC	
MX	Mixer	MX440101	2	MIXER	OPERATING	MMI	MISC	
NST	Nitrifying Sidestream Treatment Basin	NST590027	2	Misc. Equipment	OPERATING	MMI	MISC	(District Use Only)
NGR	Neutral Ground Relay	NGRS2A	7	Misc. Equipment	OPERATING	DMI	POWERDIS	
OCC	Odor Control Canister	OCC610953	2	Misc. Equipment	OPERATING	DMI	MISC	
OCU	Odor Control Unit	OCU610953	2	TANK	OPERATING	MMI	MISC	
ORF	Orifice, Piping	N19-ORF0005A	4	FITTINGS	OPERATING	DMI	MISC	
ORT	Odor Reduction (Removal) Tower	ORT610953	2	Misc. Equipment	OPERATING	DMI	MISC	
P	Pump	P44920	2	PUMP	OPERATING	MMI	PUMPS	
PAS	Voice Paging Horn/Speaker	PAS510137	2	Misc. Equipment	OPERATING	DMI	PUBLADDR	
PB	Pullbox (Electrical)	PB51A	4	MANHOLE	OPERATING	DMI	MISC	For large electrical boxes which are above ground, use 'PB' Pullbox. Electrical boxes in the ground should use 'HH' Handhole syntax 5. Condulets or small boxes that are used for conduit connections and cable routing use 'JB' Junction Box and are not included in the MEL.
PBUS	Profibus	PBUS610057A	2	BUS	OPERATING	DMI	COMPUTER	Converter.
PC	Computer	PC610953	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	
PCV	Pressure Control Valve	PCV510016	2	VALVE	OPERATING	DMI	ACTVALVE	
PDI	Pressure Differential Indicator	PDIS21001A	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
PDIC	Pressure Differential Indicator Controller	PDIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PDIT	Pressure Differential Indicator Transmitter	PDITS21001A	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
PDM	Power Data Monitor	PDM610953	2	Misc. Equipment	OPERATING	DMI	POWERDIS	
PDS	Pressure Differential Switch	PDS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PDSH	Pressure Differential Switch High (High/Low)	PDSH510214	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PDSL	Pressure Differential Switch Low	PDSL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PE	Pressure Element	PE610953	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
PET	Plant Emergency Trip	PET610953	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	MISC	
PI	Pressure Indicator	PI610701B	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
PIC	Pressure Indicator Controller	PIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PIT	Pressure Indicator Transmitter	PITS10201	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
PIV	Post Indicator Valve	PIV610953	2	VALVE	OPERATING	DMI	FIREPRO	
PLC	Programmable Logic Controller (type 104)	PLC610009	2	PROGRAMMABLE LOGIC CONTROLLER	OPERATING	MMI	COMPUTER	
PLUG	Plug/Cap	N17-PLUG0026C	4	FITTINGS	OPERATING	DMI	MISC	For offsite pipelines only. Do not use for plant piping.
PMH	Process Manhole	PMH48A	4	MANHOLE	OPERATING	DMI	MISC	
PNL	Electrical Panel	PNL61A1B	8	PANEL	OPERATING	DMI	POWERDIS	
PNST	Pneumatic Signal Transmitter	PNST610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
POP	Pneumatic Operator	POP610001	2	ACTUATOR	OPERATING	MMI	ACTVALVE	For pneumatically operated, controlled, or actuated equipment. Air (or other gas) pressure is the power source for pneumatic operators. If driving a valve, the valve being driven will get a separate 'V' or 'CV' number, depending on the use.
PRT	Printer	PRT520926	2	Misc. Equipment	OPERATING	DMI	COMPUTER	
PRV	Pressure Relief Valve	PRV390101	2	RELIEF DEVICE	OPERATING	DMI	VALVES	
PS	Pressure Switch	PS610953	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
PSH	Pressure Switch High	PSH610228	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PSHH	Pressure Switch High High	PSHH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PSHL	Pressure Switch High Low	PSHL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PSL	Pressure Switch Low	PSL510202	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PSLL	Pressure Switch Low Low	PSLL512204	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
PST	Primary Sedimentation Tank	PST610953	2	TANK	OPERATING	MMI	MISC	
PT	Pressure Transmitter	PT610953	2	ACTIVE INSTRUMENT	OPERATING	DMI	INSTRU	
PTR	Printer (type 105)	PTR590005	2	Misc. Equipment	OPERATING	DMI	COMPUTER	
PVU	Panelview	PVU520014	2	VIDEO EQUIPMENT	OPERATING	DMI	COMPUTER	
PY	Pressure Converter (Relay)	PY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
RC	Pneumatic Receiver Controller	RC610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
RCK	Rack, Computer Equipment	RCK610017	2	Misc. Equipment	OPERATING	DMI	COMPUTER	
RECP	Receptacle (480V)	RECP610010A	2	Misc. Equipment	OPERATING	DMI	POWERDIS	
RED	Reducer, Piping	N18-RED0103A	4	FITTINGS	OPERATING	DMI	MISC	For offsite pipelines only. Do not use for plant piping.

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
RG	Roller Gate	RG510116	2	GATES	OPERATING	MMI	SLIDEGA	Typically very large gates with rollers added or removed by cranes. Gate is removed from its frame when open. Stop gates, stop plates and other types can also fall under this prefix if they have rollers. If there are no rollers, use SLG.
RLY	Current Relay	RLY610953	2	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ROAD	Road Service	ROAD1075	5	SRWTP ROAD	OPERATING	MMI	MISC	(SF of pavement)/(1000*pave width) = x units. Give 1 number per unit.
ROOF	Building Roof	ROOF100203	5	ROOF	OPERATING	MMI	MISC	Roof number should be the same as the building number.
ROOM	Building Room	ROOM1002	5	STRUCTURE	OPERATING	DMI	MISC	
ROU	Remote Optical Unit	ROU248001	2	ACTIVE INSTRUMENT	OPERATING	DMI	MISC	Radio Equipment
RR	Rail Yard Track	RR610953	2	Misc. Equipment	OPERATING	DMI	MISC	
RTR	Router	RTR590002A	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	Includes modems (type 103)
RTU	Remote Telemetry Unit	RTU610953	2	N/A	COMPONENT	DMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
RU	Relay Unit	RU610953	2	N/A	COMPONENT	DMI	FIREPRO	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
RVSS	Reduced Voltage Solid State (Soft Start)		7	RVSS	OPERATING	DMI	POWERDIS	
S	Silencer	S520230	2	Misc. Equipment	OPERATING	DMI	MISC	
SAR	Surface Aerator	SAR610953	2	AERATOR	OPERATING	MMI	MISC	
SBR	Scrubber	SBR610955	2	PRESSURE VESSEL	OPERATING	MMI	MISC	Use for positive pressurization units.
SC	Speed Controller	SC610953	2	MOTOR DRIVE	OPERATING	DMI	INSTRU	
SCR	Solid State Controller	SCR610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SCRN	Screen (Fixed or Rotary)	SCRN593003	2	SCREEN	OPERATING	DMI	MISC	
SCS	Signal Coupler/Splitter	SCS1001	5	ACTIVE INSTRUMENT	OPERATING	DMI	MISC	Radio Equipment
SD	Smoke Detector	SD610958A	2	ACTIVE INSTRUMENT	OPERATING	MMI	FIREPRO	Use DD for duct detector.
SDM	Switchgear Data Monitor	SDM61A	7	Misc. Equipment	OPERATING	DMI	POWERDIS	
SE	Speed Element	SE610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SEF	Stationary Engineer Facility Group Equipment		5	Misc. Equipment	OPERATING	DMI	MISC	
SEL	Selector Relay	SEL610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SEP	Separator or Dryer	SEP512201	2	Misc. Equipment	OPERATING	DMI	MISC	Can be used for desiccant dryers/filters.
SG	Sluice Gate (manual)	SG610953	2	GATES or VALVE	OPERATING	DMI	VALVES	Use 'G' for power actuated sluice gates. Large cast iron gates for high head (Heavy Duty Cast Iron AWWA C560). Used to be more common, but is rarely used in modern designs.
SI	Speed Indicator	SI610953	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
SIT	Speed Indicating Transmitter	SIT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SLG	Slide Gate	SLG61A	4	GATES or VALVE	OPERATING	MMI	SLIDEGA	Use 'G' for power actuated slide gates. Typically aluminum or stainless steel gates used to stop flow. Any type of gate can fall under this prefix if it uses a sliding mechanic, has no rollers (use 'RG'), and isn't a large cast iron sluice gate (use 'SG'). This may include what the industry refers to as stop plates, stop gates, stop logs, bulkhead gates, manual fabricated gates (that seal on 3 or 4 sides), and manual fabricated weir gates (that typically seal on 3 sides)
SMUD	SMUD Service Point	SMUD1002	5	Misc. Equipment	OPERATING	DMI	POWERDIS	
SOL	Smart Overload	SOL61A1C	7	Overload Protection	OPERATING	DMI	POWERDIS	
SPD	Surge Protection Device	SPD61A2		Misc. Equipment	OPERATING	DMI	POWERDIS	If mounted in the field use syntax 2. If located inside of a MCC Bucket use syntax 8.
SPH	Siphon Pipeline	N19-SPH0003A	5	PIPELINES	OPERATING	DMI	MISC	For offsite pipelines only. Do not use for plant piping.
SS	Speed Switch	SS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SSH	Speed Switch High	SSH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SSL	Speed Switch Low	SSL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SST	Secondary Sedimentation Tank	SST610953	2	TANK	OPERATING	MMI	MISC	
ST	Speed Transmitter	ST610953	2	N/A	COMPONENT	DMI	INSTRU	
STA	Starter	STA61A1D	8	Starter	OPERATING	DMI	POWERDIS	
STD	Steam Turbine Drive	STD610953	2	MOTOR DRIVE	OPERATING	MMI	HVACR	
STN	Strainer	STN610152A	2	STRAINER	OPERATING	DMI	MISC	Use for all sizes, even under 1". Includes motorized strainers, wye or Y strainers, basket strainers, or any other type of strainer. Please include the type of strainer in the description.
STP	Steam Trap	STP610953	2	STEAM TRAP	OPERATING	DMI	HVACR	
STR	Sound Trap	STR610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
SUMP	Sump	SUMPS1A	4	PUMP	OPERATING	DMI	MISC	

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
SV	Solenoid Valve or Actuator	SV940309	2	VALVE	OPERATING	DMI	ACTVALVE	Use 'SV' for solenoid package units which combine both a valve and solenoid as one unit. When a solenoid is being used to actuate a separate valve, use 'SV' for the solenoid portion. In this case, the valve it is operating will get a separate 'V' or 'CV' number, depending on the use. If a separate solenoid is being used to control the air flow to a pneumatic operator, assign a 'SV' number to the solenoid
SVR	Server (type 101)	SVR610953	2	Misc. Equipment	OPERATING	DMI	COMPUTER	
SW	Switch	SW61A	8	POWER SWITCH	OPERATING	MMI	POWERDIS	
SWR	Switchgear	SWR61A	7	SWITCHGEAR	OPERATING	MMI	POWERDIS	
SV	Speed Converter	SV610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
SYA	Security Device at Administration Building	SYA1001	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
SYB	Security Device at PMO/CMID Building	SYB1002	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
SYC	Security Device at Commons Building	SYC2001	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
SYE	Security Device at Engineering Building	SYE2001	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
SYH	Security Device at Heavy Equipment Building	SYH2001	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
SYL	Security Device at Laboratory Building	SYL2001	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
SYM	Security Device at Maintenance Building	SYM1001	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
SYP	Security Point	SYP1127	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	Use for security assets like card readers, electric strikes, cameras, c-cure gates, barrier arms, intercoms, and other security related devices.
SYT	Security Device at Tertiary Treatment Facility	SYT1127	5	PLANT COMPUTER CONTROL SYSTEM	OPERATING	MMI	SECURITY	
T	Tank	T610201	2	TANK or PRESSURE VESSEL	OPERATING	MMI	MISC	
TB	Terminal Box	TB2612	5	Misc. Equipment	OPERATING	DMI	MISC	Power or signal.
TBKR	Tie Breaker	TBKR61AB	7	BREAKER	OPERATING	MMI	POWERDIS	
TCP	Temperature Control Panel	TCP610953	2	PANEL	OPERATING	MMI	HVACR	
TCV	Temperature Control Valve	TCV521001	2	VALVE	OPERATING	MMI	VALVES	
TDE	Temperature Differential Element	TDE610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TDI	Temperature Differential Indicator	TDI610953	2	PASSIVE INSTRUMENT	OPERATING	MMI	INSTRU	
TDI	Temperature Differential Transmitter	TDI610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TE	Temperature Element	TE510201	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
TEE	Tee, Piping	N18-TEE0500A	4	FITTINGS	OPERATING	MMI	MISC	For offsite pipelines only. Do not use for plant piping. Only assign a Location ID if the flow is being split into multiple directions. The purpose of the Location ID is so that a node can be added at the split for GIS and the hydraulic model. If the fitting is only being used as an elbow and no piping connection can be added, a Location ID is not needed.
TFR	Transformer	TFR61A	8	POWER TRANSFORMER	OPERATING	MMI	POWERDIS	
TI	Temperature Indicator	TI610500	2	PASSIVE INSTRUMENT	OPERATING	MMI	INSTRU	
TIC	Temperature Indicator Controller	TIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TISH	Temperature Indicator Switch High (High/Low)	TISH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TIT	Temperature Indicator Transmitter	TIT510272	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
TM	Timer	TM610953	2	N/A	COMPONENT	DMI	HVACR	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TPC	Two Position Cumulator	TPC610953	2	Misc. Equipment	OPERATING	MMI	HVACR	
TPR	Transformer Fault Relay	TPR52A	7	N/A	COMPONENT	DMI	POWERDIS	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TS	Temperature Switch	TS610951A	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
TSH	Temperature Switch High	TSH610101	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TSHH	Temperature Switch High High	TSHH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TSL	Temperature Switch Low	TSL521019	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TSLL	Temperature Switch Low Low	TSLL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
TST	Thermostat	TST510231	2	ACTIVE INSTRUMENT	OPERATING	MMI	HVACR	
TT	Temperature Transmitter	TT610959	2	ACTIVE INSTRUMENT	OPERATING	MMI	INSTRU	
TU	Terminal Unit	TU610953	2	Misc. Equipment	OPERATING	MMI	HVACR	
TY	Temperature Converter	TY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
UIC	Multivariable Controller	UIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
UPS	Uninterruptible Power Supply	UPS61AB1		UNINTERRUPTIBLE POWER SUPPLY	OPERATING	MMI	POWERDIS	Use Syntax 2 when used for specific equipment. Use Syntax 8 for electrical Power use.

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
US	Utility Station	US61A	4	Misc. Equipment	OPERATING	DMI	VALVES	Valves at utility stations are not numbered individually. They are considered part of the utility station assembly.
UT	Multivariable Transmitter	UT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
UY	Multivariable Converter	UY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
V	Valve (Actuated)	V94314A	2	VALVE	OPERATING	DMI	ACTVALVE	Use for valves which are actuated, motor operated, pneumatically operated, or manually operated with a limit switch. Use 'V' for actuated valves when flow can only be turned on or off 100% with no in between setting. Use 'CV' when flow can be incremented or modulated (in other words, the valve can be set partially open to ramp flows up or down incrementally). Use syntax 6 for valves that are controlled manually.
VAV	Variable Air Volume Box	VAV610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
VE	Vibration Element (Accelerometer)	VE521001A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
VFC	Variable Frequency Controller	VFC610702		MOTOR DRIVE	OPERATING	MMI	DRIVES	If mounted in the field use syntax 2. If located inside of a MCC Bucket use syntax 8.
VFD	Variable Frequency Drive	VFD610701		MOTOR DRIVE	OPERATING	MMI	DRIVES	If mounted in the field use syntax 2. If located inside of a MCC Bucket use syntax 8.
VIS	Vibration Indicator Switch	VIS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
VIT	Vibration Indicating Transmitter	VIT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
VRV	Vacuum Relief Valve	VRV610953	2	RELIEF DEVICE	OPERATING	MMI	VALVES	
VS	Vibration Switch	VS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
VSD	Variable Speed Drive	VSD610953	2	MOTOR DRIVE	OPERATING	DMI	DRIVES	
VSH	Vibration Switch High	VSH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
VSHH	Vibration Switch High High	VSHH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
VT	Vibration Transmitter	VT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
VV	Variable Volume Box	VV610953	2	Misc. Equipment	OPERATING	DMI	HVACR	
VY	Vibration Relay	VY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
WAP	Wireless Access Point	WAS1002	5	N/A	COMPONENT	DMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
WEIR	Weir	N17-WEIR0059A	4	WEIRS	OPERATING	MMI	MISC	
WH	Water Heater	WH770031	2	Misc. Equipment	OPERATING	DMI	MISC	USE for all Water Heater Types
WKS	Workstation (type 101)	WKS610001	2	PLANT COMPUTER CONTROL SYSTEM	OPERATING	DMI	COMPUTER	
WQ	Weight Totalizer	WQ597501	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
WS	Torque Switch	WS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
WSH	Torque Switch High	WSH593003	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
WSHH	Torque Switch High High	WSHH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
WT	Weight Transmitter	WT597002	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
WYE	Wye, Piping	N18-WYE0002A	4	FITTINGS	OPERATING	DMI	MISC	For offsite pipelines only. Do not use for plant piping. Only assign a Location ID if the flow is being split into multiple directions. The purpose of the Location ID is so that a node can be added at the split for GIS and the hydraulic model. If the fitting is only being used as an elbow and no piping connection can be added, a Location ID is not needed.
XA	Unclassified Alarm Annunciator	XA610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
XE	Unclassified Element	XE597002A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
XS	Unclassified Switch	XS610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
XSHH	Unclassified Switch High High	XSHH610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.

Prefix	Description	Sample	Syntax	Classification	Location Type	DMI/MMI?	IDEA Type	Comments
XSW	Transfer Switch	XSW61A81	8	TRANSFER SWITCH	OPERATING	MMI	POWERDIS	
XT	Unclassified Transmitter	XT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZC	Position Controller	ZC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZE	Position Element	ZE521001A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZI	Position Indicator	ZI610953	2	PASSIVE INSTRUMENT	OPERATING	DMI	INSTRU	
ZIC	Position Indicating Controller	ZIC610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZIHL	Position Indicator High Low	ZIHL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZIT	Position Indicating Transmitter	ZIT521007A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZS	Position Switch	ZS610051A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSC	Position Switch Controller	ZSC597501	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSD	Position Switch Differential	ZSD610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSH	Position Switch High	ZSH420201A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSHH	Position Switch High High	ZSHH595014	2	N/A	COMPONENT	DMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSHL	Position Switch High Low	ZSHL610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSL	Position Switch Low	ZSL94316A	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSLL	Position Switch Low Low	ZSLL595014	2	N/A	COMPONENT	DMI	MISC	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZSR	Position Switch Recording	ZSR610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZT	Position Transmitter	ZT610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZY	Position (Compute, Converter, Relay, Transducer)	ZY610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.
ZZ	Position Actuator	ZZ610953	2	N/A	COMPONENT	DMI	INSTRU	In the MEL, enter into the "LOCATIONS and COMPONENTS" tab and choose COMPONENT as the LOCATION TYPE.

APPENDIX C

**EXAMPLE OF DESIGN DRAWING SUBMITTAL
CONTENT INVENTORY**

APPENDIX C
EXAMPLE OF DESIGN DRAWING SUBMITTAL
CONTENT INVENTORY

Sheet Content	PDR Content		Submittal#1 Content		Submittal #2 Content		Submittal #3 Content	
	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾
General								
Cover	■		■		■		■	
Index of Contract Documents and Signature Sheet	■		■		■		■	
Index of Drawings	■		■		■		■	
Location and Vicinity Maps	■		■		■		■	
Existing Site and Contractor Access Road	■		■		■		■	
Standard Abbreviations	■		■		■		■	
Standard Symbols	■		■		■		■	
Standard Designations, Document Annotation Symbols, and Schedules (ie: piping systems, piping and valve numbering, plan, section, and detail referencing, etc)	■		■		■		■	
Mechanical Equipment Numbering Systems and Schedules	■		■		■		■	
Design Data	■		■		■		■	
Hydraulic Profile	■		■		■		■	
Coordinate Layout	■		■		■		■	
Site Work Key Plan	■		■		■		■	
Plant Flow Schematics	■		■		■		■	
Cathodic Protection Plans				■		■		■
Cathodic Protection Sections				■		■		■
Cathodic Protection Details and Schedules					■		■	
Civil								
Standard Designations, Symbols, and Schedules	■		■		■		■	
Standard Civil Details	■		■		■		■	
Site Plan	■	■	■	■	■	■	■	■

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Sheet Content	PDR Content		Submittal#1 Content		Submittal #2 Content		Submittal #3 Content	
	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾
Grading and Paving Plans	■	■	■	■	■	■	■	■
Grading and Paving Sections and Details					■		■	
Outside Piping Plan			■	■	■	■	■	■
Piping Profiles			∩	■	∩	■	∩	■
Earthwork Sections			∩	■	∩	■	∩	■
Earthwork Details		∩	■	∩	■	∩	■	∩
Civil Sections, Details, Tables, and Schedules		∩		∩	■	∩	■	∩
Architectural								
General Notes	■	∩	■	∩	■	∩	■	∩
Standard Designations, Symbols and Schedules	■	∩	■	∩	■	∩	■	∩
Standard Details	■	∩	■	∩	■	∩	■	∩
Plans	■	■	■	■	■	■	■	■
Elevations	∩	■	∩	■	∩	■	∩	■
Interiors	∩		∩	■	∩	■	∩	■
Sections	∩		∩	■	∩	■	∩	■
Details		∩		∩	■	∩	■	∩
Schedules		∩		∩	■	∩	■	∩
Title 24 Compliance		∩	■	∩	■	∩	■	∩
Structural								
General Notes	■	∩	■	∩	■	∩	■	∩
Standard Designations, Symbols and Schedules	■	∩	■	∩	■	∩	■	∩
Standard Details	■	∩	■	∩	■	∩	■	∩
Plans	∩	∩	■	■	■	■	■	■

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	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾
Sections	☐	☐	☐	■	☐	■	☐	■
Details	└	└	└	└	■	└	■	└
Schedules	└	└	└	└	■	└	■	└
Process								
Standard Designations, Symbols and Schedules	■		■		■		■	
Process and Piping Schematics	■		■		■		■	
Mechanical								
General Notes	■		■		■		■	
Standard Designations, Symbols and Schedules	■		■		■		■	
Standard Details	■		■		■		■	
Plans	■	■	■	■	■	■	■	■
Sections	└	■	└	■	└	■	└	■
Details			■		■		■	
Schedules					■		■	
Plumbing Plans	■	■	■	■	■	■	■	■
Plumbing Sections	└	└	└	└	└	■	└	■
Plumbing Details	└	└	└	└	■	└	■	└
Fire Sprinkler Riser Plan	☐		■		■		■	
Fire Sprinkler Riser Sections and Details	└		└		■		■	
Heating, Ventilation and Air Conditioning								
Standard Designations, Symbols and Schedules	■		■		■		■	
HVAC Details	└		└		■		■	
Airflow Schematics	■		■		■		■	
Temperature Control Diagrams	└		└		■		■	

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	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾
HVAC Plans	☐	☐	■	■	■	■	■	■
HVAC Sections	┌	┌	└	■	┌	■	┌	■
HVAC Details	┌		■		■		■	
Electrical								
Standard Designations, Symbols and Schedules	■		■		■		■	
Electrical Details	■		■		■		■	
Elementary Diagrams	┌		■		■		■	
Single-Line Diagram – 12kV and 4160V Plant Distribution	■		■		■		■	
480V Switchgear Elevations	┌		└		■		■	
Electrical Site Location Plan	┌		■		■		■	
Site Plans – Power and Instrumentation	┌	┌	└	└	■	■	■	■
Manhole and Handhole Schedule	┌		└		■		■	
Ductbank Profiles	☐	☐	☐	■	☐	■	☐	■
Ductbank Sections	┌	┌		└	■	┌	■	┌
Plans – Power, Control, and Grounding	┌	┌	■	■	■	■	■	■
Plans – Instrumentation and Communications	┌	┌	■	■	■	■	■	■
Plans – Lighting and Receptacles	☐	☐	■	■	■	■	■	■
Large Scale Views	┌	┌	└	■	┌	■	┌	■
Schedules and Diagrams	┌				■		■	
Instrumentation and Control								
Standard Designations, Symbols and Schedules	■		■		■		■	
Block Diagram – SRWTP Control System	■		■		■		■	
ACC Functional Diagrams – Existing ACCs	■		■		■		■	

APPENDIX C
EXAMPLE OF DESIGN DRAWING SUBMITTAL
CONTENT INVENTORY

Sheet Content	PDR Content		Submittal#1 Content		Submittal #2 Content		Submittal #3 Content	
	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾	PDF	3D Model ⁽¹⁾
PLC System Block Diagram	☐		■		■		■	
PLC Module Block Diagram	┌		■		■		■	
Instrumentation Installation Details	┌		└		■		■	
Typical Wiring and Loop Diagrams	┌		└		■		■	
Typical Power Distribution Diagrams	☐		☐		■		■	
Control and Logic Diagrams	┌		└		■		■	
Process and Instrumentation Diagrams	■		■		■		■	
Cabinets and Panels	┌		└		■		■	
Control Room Layouts	☐	☐	☐	☐	■	☐	■	☐
Miscellaneous Hardware Details	┌		└		■		■	
Miscellaneous Systems	┌		└		■		■	

Note 1: 3D Models include native files (.RVT), Navisworks files (.MWD) and DWF(.dwf) files.