1.0 PURPOSE

The purpose of this procedure is to establish the preparation, review, approval, and control requirements for Pike Engineering and Design drawings.

2.0 SCOPE

This procedure applies to Engineering and Design drawings prepared manually and electronically to support Project activities.

3.0 REFERENCES

3.1 Pike Quality Assurance Manual
3.2 Project Procedure P-4-1, General Requirements for Engineering and Design
3.3 Project Procedure P-4-5, Engineering Document and Drawing Numbering
3.4 Project Procedure P-4-7, Drafting Standards
3.5 Project Procedure P-4-8, Professional Engineer’s Seal

4.0 DEFINITIONS

4.1 Approval: This signifies that the individual that has overall authority for release of the drawing is satisfied that the drawing has been reviewed adequately by the appropriate person(s) and that the requirements applicable to the preparation of the document have been met and are consistent with the purpose for releasing the document.

4.2 Drawings: Drawings are used in Engineering to convey technical data. Drawings may be developed from a number of sources, including tabulated data and detailed design calculations. The drawings are intended to be used for conceptual design, for approval of the Client, for construction, and for fabrication.

4.3 Figures: A figure is any graph, map, schematic, or illustration that is used in a report, proposal, work plan, sampling plan, etc. A figure can also be an informal drawing prepared to support another engineering document, such as a specification or calculation, which is prepared in accordance with the procedure for the base document.
4.4 **Review:** A review is a detailed examination of a drawing in accordance with established Project requirements and Pike procedures performed by a competent individual other than the Preparer to detect errors and omissions.

4.5 **Stand-alone Criterion:** This is a characteristic standard applied to each drawing or figure to ensure that the item contains sufficient identification, including drawing/figure number and title information, to uniquely identify the Project, report, proposal, plan, etc., to which the item belongs.

### 5.0 RESPONSIBILITIES

#### 5.1 GENERAL RESPONSIBILITIES

See the *General Requirements for Engineering and Design* (Reference 3.2) for the description of the general responsibilities of the Project Manager, Engineering Manager, and Project Engineer. See the procedure *Professional Engineer’s Seal* (Reference 3.5) for sealing/stamping requirements. The responsibilities listed in the following sections are specific to this procedure and do not release personnel from other assigned responsibilities.

#### 5.2 ENGINEERING MANAGER

The **Engineering Manager** is responsible for the following:

- Assigning qualified individuals to prepare drawings
- Assigning qualified Reviewers as required for checking purposes

#### 5.3 DISCIPLINE LEAD ENGINEER OR PROJECT ENGINEER

The **Discipline Lead Engineer** or **Project Engineer** is responsible for the following:

- Preparing and providing the specific design criteria to be utilized in the preparation of the drawings
- Reviewing all drawings within her/his discipline and ensuring that those drawings are technically sound and correct
- Numbering, reviewing, and initialing drawings as required by this procedure
- Retaining completed check prints, as required by this procedure
- Maintaining a discipline-specific Hold List (see Section 6.7)
5.4 PREPARER

The Preparer ensures that the drawing is prepared in accordance with all applicable Project and Client requirements.

5.5 DESIGNER/CAD OPERATOR

The Designer/CAD Operator completes the drawings/drafting in accordance with the Preparer’s instructions and the Drafting Standards (Reference 3.4).

5.6 REVIEWER

The assigned Reviewer examines drawings in accordance with the requirements of this procedure, then signs (or initials) and dates drawings that are satisfactory.

6.0 PROCEDURE

6.1 CREATING/CHECKING OF FIGURES

Figures are to be prepared in accordance with the Drafting Standards (Reference 3.4). The exception to this requirement shall be for specific Client requirements. Each figure shall meet the stand-alone criteria and shall have a unique number assigned by the Designer/CAD Operator. Each figure shall be logged and filed as required by the Drafting Standards.

The procedures for creating and checking figures are as follows:

a. The Preparer delivers the original concept to the Designer/CAD Operator. This may be in the form any of the following:
   - A hand sketch
   - A drawing/figure from another Project that is to be copied, changed, and/or given a new drawing number
   - A drawing/figure from another source (e.g., textbook, survey, or topographic map)

b. The Preparer provides direction either verbally or in writing, which conveys the Preparer’s instructions (such as size of drawing, date required, etc.), and submits the information to the Designer/CAD Operator.

c. The Designer/CAD Operator prepares the figure and delivers the “Check Print” stamped document, initialed by the Designer/CAD Operator, to the Preparer.
An example of typical checkprint stamp is shown in Attachment 7.1. Checkprints will be sequentially numbered and accompanied by the Preparer’s instructions.

d. The Preparer marks correct elements on the figure with a yellow highlighter and marks corrections using a red pen.

e. The Preparer checks the figure against applicable text to ensure the figure and text are in complete agreement. Any discrepancies are corrected using red pen.

f. The Preparer signs and dates the checkprint and returns it to the Designer/CAD Operator.

g. The Designer/CAD Operator makes changes and marks completions on the returned checkprint using a blue highlighter.

h. The Designer/CAD Operator provides a new checkprint and delivers it, initialed, numbered, and dated, along with all previous checkprints to the Preparer.

i. The process is repeated until the figure is in complete agreement with the Preparer’s intention.

j. The figure is signed before issuing or including it in an engineering document.

k. The final checkprints are retained in the permanent Project File.

6.2 CREATING/CHECKING OF DRAWINGS

The Preparer works with the Designer/CAD Operator to develop drawings as described above for figures, except as follows:

a. After the Preparer has checked the drawing and found it complete and correct, the Preparer shall submit the checkprint to a qualified Reviewer. In general, the Reviewer is selected at the beginning of the Project.

b. All items on an engineering drawing are to be checked for accuracy, thoroughness, and omissions. Items to be checked include, but are not limited to, dimensions, coordinates, drawing layout, title block, and symbology. Any discrepancies shall be corrected.

c. When the drawing is in complete agreement with the Preparer and the Reviewer’s intention, then the drawing shall be signed, dated, and issued.

d. As applicable, the Project equipment, material, calculations, and construction specifications shall be compared to the design drawings by the Project Engineer and/or the Discipline Lead Engineer to ensure that the drawings and specifications are in complete agreement. Any discrepancies shall be resolved and corrected.
6.3 VERIFICATION OF DRAWINGS/FIGURES

6.3.1 Figures

Figures are considered to be completely checked if the Preparer has reviewed such figure in detail and is satisfied with the contents.

6.3.2 Drawings

Drawings are to be checked by a qualified individual with equal or greater knowledge/experience than the Preparer.

6.4 INTERFACING ENGINEERING REVIEW

A drawing package prepared by multiple disciplines shall be reviewed by interfacing Engineering and Construction disciplines as determined by the Engineering Manager, Project Manager, Project Engineer, and/or Discipline Lead Engineer to ensure the Design is constructible with no interferences from each other.

6.5 ISSUE AND REVISION

Drawings shall be issued through Project Document Control in accordance with approved Project Quality Plan and/or Project Execution Plan. Drawing issue shall be documented through the use of drawing transmittals (see template in Attachment 7.3). The drawing transmittal has provisions for a “Receipt Acknowledgement”, if required. The Lead Discipline Engineer shall ensure that originals (whether manual or electronic) are provided to Project Document Control for issue and storage.

The issue and revision process shall be as follows:

- A drawing is assigned a revision in accordance with Section 6.3 of Procedure P-4-5, Engineering Document and Drawing Numbering (Reference 3.3) each time it is issued. A drawing is issued whenever it is transmitted to a Client (e.g., 30, 60, and 90 percent design). Checkprints are not considered drawing issues.

- Drawings certified for construction or fabrication, upon first being issued, are assigned Revision 0, and all alphabetical designations (A, B, C, etc.) are removed. Drawings being revised to include information contained on a design change shall include the design change number in the description of change block.

- General revision means the whole drawing needs to be reviewed/checked since the revision was extensive.

- Revised drawings shall be reviewed and approved using the same process as the original issue.
Each change shall be outlined with a cloud on the drawings/figures. A triangular revision symbol containing revision number shall be added at the perimeter of the cloud, and this symbol shall be removed for all previous revisions. As-built drawings shall not be clouded, and all previous revision clouds and revision symbols shall be removed.

When drawings are revised after being issued for construction (Revision 0), a brief description of the change shall be provided in the “description” block. Drawings being revised to include information contained on a design change shall include the design change number in the description of change block.

6.6 APPROVAL AND SIGN-OFF

The following are general guidelines for the signatures in the title block of the drawings:

- The “drawn by” block will be for the initials of the Designer/CAD Operator.
- The “designed by” block will be for the initials of the Preparer.
- The “checked by” block will be for the initials of the Reviewer for drawings and the Preparer or Reviewer for figures. Once the Reviewer initials a drawing, no additional change can be made without the Reviewer’s approval.
- The “approved by” block will be for the initials of the Discipline Lead Engineer or Engineering Manager.

Drawings shall be issued on the basis of approved design inputs. Vendor data shall be “Accepted as Certified” prior to issue of any drawing for fabrication or construction purposes. The Engineering Manager, Project Manager, and Project Engineer must approve, in writing, the release of any drawing for fabrication or construction purposes that does not have “Accepted as Certified” Vendor information prior to issue. Missing, incomplete, uncertified, or unapproved information shall be identified on the drawing as described in Section 6.7, Holds.

When a drawing/figure is initially issued, the handwritten initials shall be entered on the title block of the drawing, other than in the “drawn by” block, which may be electronically entered. For subsequent revisions, the original initials shall be converted to electronic initials and the handwritten initials shall be entered on the latest revision block, other than the “drawn by” block, which may be electronically entered by the Designer/CAD Operator.

Drawings may carry a disclaimer statement above the Title Block. When the disclaimer is applied it shall read: “This document is the property of Pike Electric Corporation. The original is retained on file by Pike Electric Corporation and is available for inspection upon reasonable request. Pike Electric Corporation is not responsible for any additions
or alterations made to this document without the written consent of Pike Electric Corporation.”

6.7 HOLDS

As a general rule, drawings shall not be issued with holds. However, if it is necessary to issue a drawing with holds, the following instructions apply:

- A Hold List shall be used to record, monitor, and expedite the resolution of each drawing issued with a hold (see Attachment 7.2, Typical Hold List Format).
- Each Discipline Lead Engineer shall maintain a discipline-specific Hold List.
- Holds shall be indicated by a cloud drawn around the area requiring further input with a note explaining the nature of the hold.
- Holds shall be removed by revising and re-issuing the drawing.

6.8 PROFESSIONAL SEAL REQUIREMENTS

For more details on sealing, see P-4-8, Professional Engineer’s Seal (Reference 3.5).

After a drawing/figure is finalized, a Professional Engineer seal for permit application or construction may be applied manually as required by the applicable state regulations (see Reference 3.5). The Professional Engineer shall sign and date next to the Professional Engineer seal on the hard copy of the drawings.

**Note:** Certain states require a firm’s Certificate of Authorization for the Engineering and Design firm. South Carolina requires proof of this certificate by sealing the drawings.

6.9 AS-BUILT DRAWINGS

During construction activities, the field personnel will maintain a record of all additions and deletions to the construction drawings that occurred during construction of the Project. These revised construction drawings are called “redline” drawings to depict installed conditions. If as-built drawings are required, these redline drawings will be used by the Designer/CAD Operator to develop as-built drawings. These redline drawings will be supplemented by field notes and survey information to produce accurate as-built drawings. The final version of the construction drawings shall be saved in accordance with the Drafting Standards (Reference 3.4), before changes are made to it. The procedure for preparation, review, and approval of as-built drawings shall be the same as the procedure described for drawings in Sections 6.2 through 6.6.
6.10 DISTRIBUTION AND RECORD MANAGEMENT

Copies of all drawings issued for a Project, whether in electronic or hard copy form, shall be maintained in the Project Files. This includes originals, drawings marked to indicate requested changes after original issue, and redlines prepared to record as-built conditions. If drawings are issued as “DRAFT” for Client review, copies shall also be maintained. Further, copies shall be maintained of all issued revisions.

Original drawings with handwritten approvals will be retained in Project Files through Project Closeout to demonstrate implementation of handwritten approvals only if dictated by the Contract or other legal requirements. Handwritten approvals shall normally be documented by means of creating a .pdf file (an electronic picture) of the original. For electronically-created drawings with handwritten approvals, the electronic file of subsequent drawing revisions should be updated with the initials of the previous approvers.

Drawings produced electronically shall comply with this procedure.

Checkprints should be maintained until a drawing is fully reviewed, approved, stamped (if required), and issued. Internal and/or external Quality Assurance auditing requires the checkprints as verification of the checking and approval process. If the checkprints are required for auditing, the Project staff shall be notified at the beginning of the Project work.

6.11 UPDATING CLIENT-SUPPLIED DRAWINGS

When a Client provides drawings for modification or update (e.g., on a revamp Project), the following will be the preferred means of control:

- Existing title blocks shall be removed and replaced with the Pike title block, and the drawing revision number shall be assigned (see Section 6.2, Creating/Checking of Drawings).
- The new drawing shall include reference to the drawing from which it is based, including the drawing number and revision.
- The new drawing shall clearly identify the scope of the change from the previous drawing to define the portion of that drawing for which Pike is responsible. Such markings shall remain on any subsequent revision of the drawing prepared by Pike.
- Review of the new drawing shall be in accordance with Section 6.4, Interfacing Engineering Review, but will only include the portions of the drawing modified by Pike.
6.12 VOIDING OR SUPERSEeding

Drawings shall be voided or superseded using the same review and approval cycle that applied to the original issue. Drawings may be voided without replacement or may be superseded by another drawing with a different number. When cancellations are required, a void issue of the drawing shall be issued as the next revision.

A void issue of a drawing shall be prepared by marking it “VOID – DO NOT USE” and by adding a note to the drawing describing the reason. If the drawing is superseded by another drawing, the superseding drawing shall be identified in the notation.

7.0 ATTACHMENTS

7.1 Attachment 7.1, Checkprint Stamp Sample
7.2 Attachment 7.2, Typical Hold List Format
7.3 Attachment 7.3, Drawing Transmittal Template

8.0 FORMS

None

9.0 REVISIONS AND APPROVALS

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<th>Revision Description</th>
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# CHECKPRINT STAMP SAMPLE

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☐ CHANGE AS NOTED

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### PROJECT TRANSMITTAL

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**Project No.:**

**Contract No.:**

**To:**

**Reference No.:**

**Date:**

**Attn:**

**Transmittal No.:**

**Documents transmitted are:**

- [ ] Preliminary
- [ ] Prints
- [ ] Reproducible
- [ ] Per Your Request
- [ ] Authorized To Proceed with Construction
- [ ] Reference Only
- [ ] Authorized as Noted
- [ ] Revised as Noted
- [ ] For Information

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**Regards,**

By: [Printed Name] [Signature] [Title] [Date]

By: [Printed Name] [Signature] [Title] [Date]

**Receipt Acknowledgement**

Please acknowledge receipt of the documents listed on this transmittal by signing in the space provided below and returning one copy of the signed transmittal form to the appropriate contact.

By: [Printed Name] [Signature] [Title] [Date]