MASTER SPECIFICATION USER GUIDE

PART 1 - ORGANIZATION AND INTENDED USE

1.1 SCOPE. The Master Specifications were developed by GLWA as a basis to support construction programs by facilitating design, increasing standardization and creating uniformity of plans and specifications. GLWA has established this set of master specifications to serve as a foundation for future design and construction of facilities, systems, pump stations and treatment projects. The Master Specifications may require the addition of some special provisional specifications by GLWA and design engineers on a project by project basis. This User Guide explains the process of how to use the Master Specifications and develop provisional specifications for various GLWA projects.

A complete project design will include the following documents:

- Contract
- FORMSPEC
- Master Specifications and Supplemental Specifications
- Provisional Specifications (Note: Issue as separate document with Master Specifications)
- Design Drawings (Plans, Details and Schedules)

1.2 MASTER SPECIFICATIONS AND PROVISIONAL SPECIFICATIONS. The GLWA Master Specifications are organized into 17 divisions following Construction Specification Institute (CSI) nomenclature and are structured across five volumes along with an additional volume containing the User Guide and Standard Details/Schedules.

The Master Specifications are to be used as written without modification and augmented as necessary by provisional specifications for each specific project. The Master Specifications are to be referenced in the project documents and should not be printed for every project. As part of the design effort, the design engineer will need to conduct macro and micro reviews of the Master Specifications to document for GLWA's approval general and specific areas where provisional information is required. This will allow the same Master Specifications to be issued for each project and will maximize consistency across all construction projects in the future. Provisional specifications shall be written by the design engineer to clarify, substitute or limit requirements of the Master Specifications.

1.3 DETAILS AND SCHEDULES. Both the details and schedules are issued separate from the five volumes of Master Specifications in an additional volume of 8.5" x 11" documents. These details and schedules are available in electronic format for the design of GLWA projects.

The details focus on typical design aspects that reoccur regularly in GLWA projects and are intended to set a standard for how these aspects of the projects should be constructed. The details are scaled to fit on 8.5" x 11" sheets of paper for utilization into full size project design drawings as needed.

Schedules are to be used as applicable by the design engineer to define and place project specific performance and design parameters in project drawings. Some schedules are included in the design drawings as 8.5" x 11" format and should be cut, pasted and modified as necessary into the applicable section of project drawings. The designer shall create additional schedules when necessary to provide specialized design parameters for applications where standard schedules do not exist.

1.4 APPLICATION GUIDES. The final tool available to design engineers is a set of application guides that are designed to identify GLWA preferred solutions in water and wastewater applications. The application guides are included in some Master Specifications. These application guides do not relieve the engineer of any responsibility for safe, code-compliant, efficient designs but the application guides help to keep design approaches consistent.

1.5 MASTER SPECIFICATION UPDATES. The Master Specifications will be updated periodically as conditions change during design and construction activities. Technical questions can be addressed to the Design Engineering Manager at WRRF.

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PART 2 – THE DESIGN PROCESS

2.1 OVERVIEW. The Master Specifications provide a solid foundation and greatly simplify the process but they may need to be supplemented by Provisional Specifications that are tailored to the specific projects.

The potential to overlook critical details creates the need for an organized approach to preparing the specifications. A macro evaluation should first be conducted to determine which specifications apply. Then, review each applicable Master Specification section at the micro level and prepare supporting Provisional
Specifications to make sure each section meets the requirements of the project.

It is suggested that the Design Engineer creates a design notebook or file of notes where any details or reminders of specific issues that need to be addressed in the design and specifications are collected during planning, research, and development of the design concept. These notes will be important in both the macro and micro reviews.

The Master Specifications are to be used by reference and all Master Specifications apply unless otherwise noted. A quick review of the scope at the beginning of each Master Specification section will indicate whether the section covers the necessary information for

the project considered. The Master Specification Worksheet in Attachment 1 of this User Guide shall be used by the Design Engineer to evaluate which Master Specifications will be utilized and determine if new Provisional Specifications are needed. The Worksheet shall be completed and submitted by the Design Engineer for GLWA approval prior to preparing provisional specifications.

2.2. MACRO REVIEW. As part of the design effort, the design engineer will need to conduct a macro overview of the Master Specifications as compared to the specific project considered. The design engineer will then document how these specifications can be used "as is", "modified" or "not applicable" (N/A) with comments why for the specific project. Additional specification sections to be created new are also to be identified on blank lines in each Division of the
Specifications. This process will be documented on Master Specification worksheet, Attachment 1, of this User Guide to prove to the Owner that the Master Specifications have been applied to project. The Owner will then review the worksheet with comments to provide approval of the approach.

2.3 MICRO REVIEW. The design engineer shall then conduct a micro level review to prepare provisional specifications that address specific changes and additions that the Owner will approve to be used with the Master Specifications. Provisional specifications shall follow the same GLWA Master Specification format as shown in Attachment 2 and discussed in Part 3 – Format and Document Conventions.

The diagram on the next page shows the macro and micro review process.

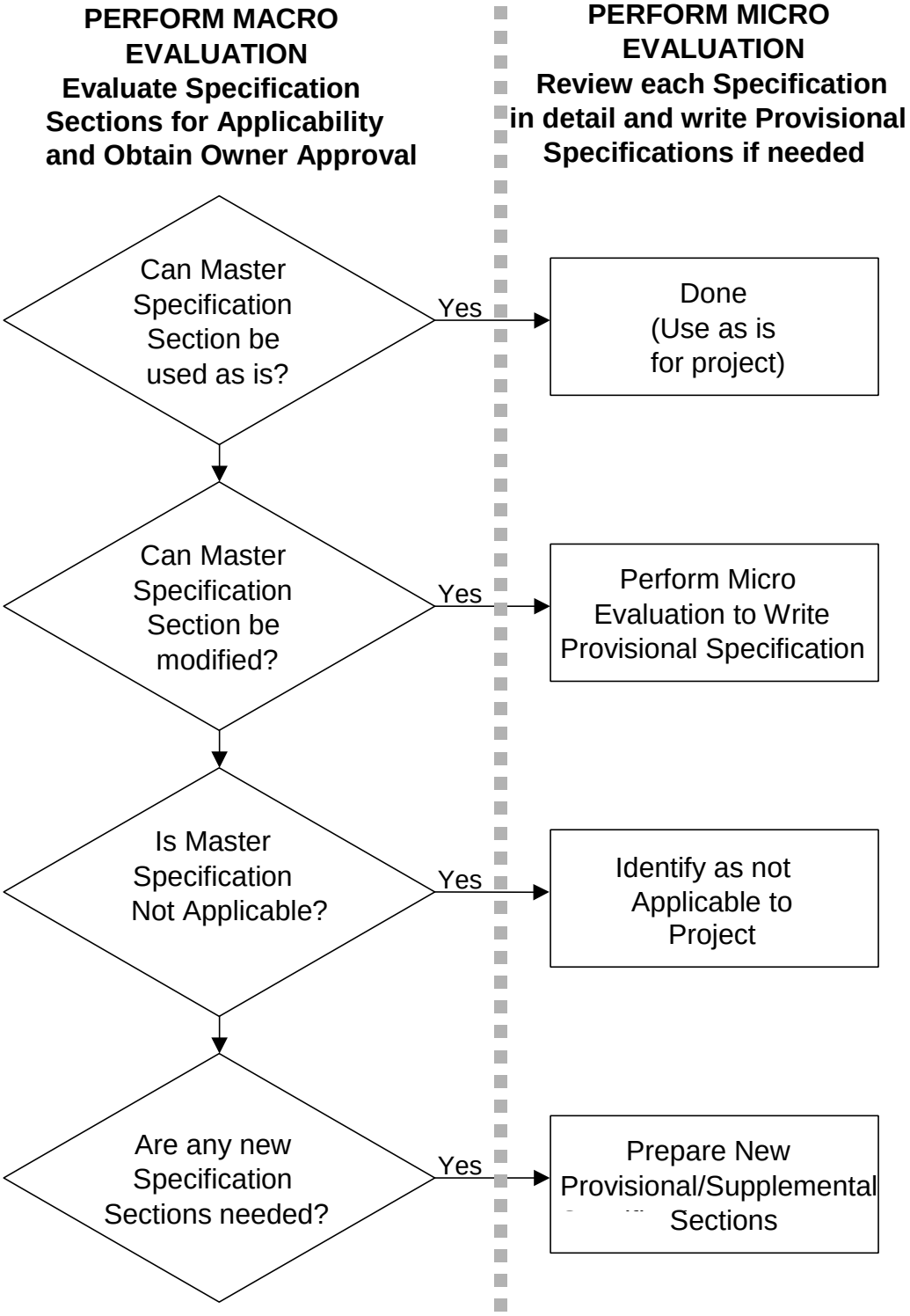

Diagram of Macro/Micro Level Evaluation

In most situations, a Master Specification section will generally define the construction process and tolerances, but the Design Engineer will desire minor alterations. In these cases, a Provisional Specification shall be developed by the Design Engineer that supplements the Master Specification section. Page Guide-7 of this User Guide shows an example of a typical Provisional Specification. Where Provisional Specification sections are required, they will take precedence over the Master Specification sections being supplemented.

In preparing the Provisional Specification, the Design Engineer will need to screen the Master Specification section closely and determine which paragraphs need to be revised to suit the specific project design. The items listed below are given as an example. The paragraphs below address typical examples, however, the Design Engineer may have others specification sections that need to be revised.

2.3.01 Manufacturer's Field Services. Manufacturers provide different levels of support for different products. Manufactured equipment will receive various levels of assistance and support from the manufacturer in terms of initial testing, oversight of installation, field testing after installation, and employee training. The Design Engineer should specify the level of Manufacturer Field Services required for different equipment and building systems.

2.3.02 Testing. Under Quality Assurance, the paragraph on Testing should be evaluated as well as the paragraph on Field Testing in Part 3. The actual equipment specified may change in size or type and that may drive the level of testing required. For example, with large specially manufactured pumps, it is common practice for the Design Engineer to visit the manufacturing plant and observe the pump being tested to ensure it meets specifications. For smaller, mass produced pumps, a standard certificate and pump curve for that model will be provided with the pump. The Design Engineer will need to make a conscious decision concerning the appropriate level of testing for different types of equipment.

2.3.03 Tolerances. Finish tolerances may be of varying importance depending on the structure or facility being constructed and should be evaluated. Tolerances for equipment or equipment pads may impact equipment alignment or have a direct effect on operational efficiencies and life expectancies.

One key issue will also be at what point the Engineer should be alerted that construction is exceeding desired tolerances. Identifying problems early before they become major issues will save the Owner time and money. In many cases, the Design Engineer may want to specify when the Engineer needs to be notified of a problem and what tolerances are needed to ensure the design can be successfully implemented in the field.

2.3.04 Submittals. Specifying different building systems or equipment will create different requirements for submittals. Discussions with the manufacturer and the Contractor can help identify what submittals are appropriate.

2.3.05 Warranties. While the typical warranty period runs 1 year from final acceptance by the Owner, warranties on equipment and building systems can run from 2 to 10 years or longer. The Design Engineer should specify all warranties that cover longer periods than the standard 1st year.

2.3.06 Acceptable Manufacturers. The single greatest source of changes to the Master Specification will be the specifying of different type or size equipment necessary for the specific project design. Changes to this paragraph may also drive changes to other portions of Part 2 - Products.

2.3 07 Installation. The type of equipment or building systems may require different installation techniques. Much of this information may vary depending upon the manufacturers and suppliers or intended utilization.

2.3.08 No Decision. The Design Engineer may decide not to make a decision concerning specific details of a project and let the Contractor identify a solution from a group of alternatives identified in the specification. This usually occurs when the Contractor is specialized and recognized to have specific expertise concerning a building or equipment system. The Design Engineer can review the proposed solution through the Shop Drawing review process.

2.4 PROVISIONAL SPECIFICATION FORMAT. The Provisional Specification sections shall follow the same format as the Master Specification section but will only include the changes. The Design Engineer will need to be very clear in the Provisional Specifications to identify which portions of Master Specification paragraphs apply and do not apply.

Modifications consist of one of four actions (*Replace*, *Update*, *Add*, or *Delete)* and should be indicated in a Provisional Specification Summary. The summary should appear at the beginning of the Provisional Specification in a box and using 11 point Arial font. "*Replace"* indicates that a subsection of the specification is to read, in its entirety, as shown in the Provisional specification. *"Update"* indicates that specific items in the text should be changed, but the remainder of the subsection should stay the same. "*Add*" and "*Delete"* denote that sections of text should be either inserted or completely removed from the specification. In order to minimize confusion and misunderstandings, it is recommended that the entire subsection (i.e., 1.3 or 2.2.03) should be written and indicated as "Replace".

The following text section should be included in the footer of all Provisional Specifications in 9-point Arial font, separated from the main text by a line:
"Provisional Specifications—which are issued separately from the Master Specifications on a per contract basis—shall supersede and govern over all other specifications or contract documents. All other wording in the Master Specifications that is not specifically stated to be modified in the Provisional Specifications shall remain in effect as is. The Provisional Specification Summary is included to clarify and/or highlight changes."

An example from Master Specification Section 11220, Axial Horizontal Split Pumps is shown on the next page of the User Guide.

SECTION 11220 – PROVISIONAL

AXIAL HORIZONTAL SPLIT PUMPS

Provisional Specification Summary:
2.2 – Replace with text as shown below. Manufacturer and pump type are now specified.
2.3.06 – Replace with text as shown below. Mechanical seals are to be used in place of packing.
3.3.01 – Update text as indicated below. List items not shown are to remain part of Specification.

(Update text as shown.)

2.2 ACCEPTABLE MANUFACTURERS. The pumps shall be Worthington type LN, or approved equal.

2.3.06 Stuffing Box. Mechanical seals shall be provided in place of packing.

Cartridge mechanical seals requiring no external flushing shall be furnished in the pump. The seal shall utilize a rotational sealing ring mounted in an elastomer cup with an o-ring mounted stationary ring loaded by a non-fouling, conical spring encapsulated in Viton. Installation of the seal shall require no measurements or scribe marks on the shaft.

3.3.01 Spare Parts. The contractor shall furnish the following spare parts.

1 Set of Mechanical Seals for each Pump – **Add to list**

2 Sets, Complete replacement all packing – **Delete from list**

1 Each, Stuffing Box Gland split with Bronze Bolts and Nuts **– Delete from list**

End of Provisional Section

Provisional Specifications—which are issued separately from the Master Specifications on a per contract basis—shall supersede and govern over all other specifications or contract documents. All other wording in the Master Specifications that is not specifically stated to be modified in the Provisional Specifications shall remain in effect as is. The Provisional Specification Summary is included to clarify and/or highlight changes.

PART 3 - FORMAT AND DOCUMENT CONVENTIONS

3.1 GENERAL. Consistency is very important for effective specification development. It helps a design engineer to know what to expect in each section because the information is always presented in the same place in each specification. The GLWA Master Specifications are based on a standard outline, consistent use of paragraph levels, and page format as well as a number of other conventions designed to standardize and simplify specifications.

Every project may need provisional specifications to some degree. These provisional specifications should follow the same format and convention as the Master Specifications.

3.2 GENERIC OUTLINE. Specifications are organized into 3 sections, General, Products, and Execution. A copy of the generic outline is shown in Attachment 2.

The main paragraph titles should be adhered to wherever possible. The subparagraph headings indicate possible subjects to be covered under that title and are intended to be more flexible. If a title is not needed for a paragraph, then move to the next title that is needed in the section, using the next available paragraph number.

Beneath the subparagraphs with titles, there may be several paragraphs of discussion before another subparagraph with a title occurs. Not all paragraphs should have a title.

3.3 USE OF PARAGRAPH LEVELS. The specifications have been designed to not go above 3 levels. This will require some forethought and planning on the part of the specification writer. Only use titles where needed for major topic changes. The typical format is as follows:

PART 1 – GENERAL	1st level – required
1.3 QUALITY ASSURANCE.	2nd level – required
1.3.05 Testing.	3rd level – titles can vary as needed

3.4 PAGE FORMAT. The format has been standardized to allow for easier transition to HTML format. The font throughout the main text is Arial 12 point. Do not use Microsoft Word's paragraph spacing before or after paragraphs. If additional spacing is required, use the <Enter> key. Refer to the generic outline shown at attachment 2 for the correct format. Text should be left justified.

3.4.01 Headers and Footers. Header and footer margins are both 0.7 from top and bottom of page. The font is Arial 12 point.

3.4.02 Margins. Margins for the body of the text are to be 1 inch (2.54 cm) from the edge of the top, bottom, and outer edge of the page. The right margin should be 1.25 inches (3.18 cm) from the edge of the page. Select mirror image on the Page Setup menu in Word to print Master Specification Sections.

3.5 ABBREVIATIONS. Abbreviations for all frequently used acronyms are listed in Master Specification Section 01010, Administrative Provisions. If an abbreviation is not listed there but will be used more than 2 times in a specification section, it should be spelled out the first time with the abbreviation enclosed in brackets () at the end of the word or title.

3.6 CAPITALIZATION OF SPECIFIC TERMS. The following terms will always be capitalized:

- Contractor
- Drawings
- Engineer
- Owner
- Work

3.7 REFERENCING OTHER SPECIFICATION SECTIONS. If other specification sections need to be referenced in a section, they should be referred to by their full title as “Master Specification Section XXXXX, Section Title” wherever mentioned.

3.8 TABLES. Anytime a list or table is needed, use the MS Word table function to create a table. Simple lists with two columns of information or less should created with a blank 0.5 inch wide column on the left side of the sheet to create an indent. The sum of all the table’s column widths should total to 5.75 inches. The gridlines should not be visible. Do not use the Tab function for indentions.

More complex tables comprised of multiple columns of information should be set up as more traditional tables complete with headings. These tables should be centered on the page and the gridlines should be visible with a weight of ½ point used through out the table.

3.9 NUMBERING OF SPECIFICATIONS. Master Specifications Sections will be numbered based on the CSI Divisions.

3.10 SIGNS, SYMBOLS, AND MEASUREMENTS. Symbols and signs are to be spelled out. For example, (º) should be degrees and (“) should be inches, etc. There is no hyphenation used in numbers. For example, 1-1/2 should be 1 1/2.