# PORTAGE COUNTY WATER RESOURCES DRAFTING STANDARDS

Date: April 1, 2023

**Portage County Water Resources Drafting Standards.**

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## PREFACE

The purpose of a set of plans is to delineate the intended work with sufficient details of design, supplemented with specifications, in such a manner that they are clearly and uniformly interpreted by engineers and contractors.

The drawing documents serve as a permanent record of the project and must provide sufficient data to enable the contractor to make an accurate bid and perform the work as intended. Clarity, completeness and conciseness are essential in avoiding misinterpretation. Unnecessary details should be avoided. Repetition of the specifications such as specifying capacities, etc., should also be avoided.

The plans become part of the contract and represent the detailed description of the work which the contractor agrees to do in consideration for an agreed sum. It is important the designer, engineer or technician understand that errors, contradictions or omissions in the plans may result in expensive change orders at the time of construction. The importance of minimizing this situation cannot be over-emphasized.

A general knowledge of drafting practices (as described in the American National Drafting Standards Manual – ANSI Y-14) is required by the Technician. It is assumed that the technician has prior exposure to ANSI Y14 from previous employment or educational background.

## Part 1 GENERAL PRACTICES

1.01 Scales

The following are recommended plotting scales. Drawing scales shall be discussed between the Engineer and Design Technician before final detail and layout are completed.

**For treatment plant structures**
Architectural Scales of:
1/8”=1’-0” for general views
1/4” or 3/8”=1’-0” for plan views
1/4” =1’-0” for whole or half sections through tanks and buildings
3/8”, 1/2” or 3/4 =1’-0” for enlarged sections and details

**For general plan drawings**
Engineer’s Scales of:
1”=100’ for general plan drawings
1”=200’ for general plan drawing with very little detail and long distances

**For plan and profile sheets**
Engineer’s Scale of:
1” = 20’ horizontal and 1” = 5’ for congested areas such as city streets
1” = 50’ horizontal and 1” = 5’ for open areas such as country roads

1.02 Text Styles

**For process drawings**

Existing "style" parameters:

Font = Romans
Height = 0.08"
Width Factor = 0.8
Oblique Angle = 22 degrees

Proposed "Style" parameters:

Font = Romans
Height = 0.1"
Width Factor = 1
Oblique Angle = 0 degrees

**For Plan and Profile Sheets**

Existing "Style" parameters:

Font = Romans
Height = 0.08"
Width Factor = 0.8
Oblique Angle = 22 degrees

Proposed "Style" parameters:

Font = Romans
Height = 0.1"
Width Factor = 1
Oblique Angle = 0 degrees

1.03 Piping Conversions

**For Process Drawings**

For plot scales of 1/4", 3/8" or 1/2", process piping of 3" and smaller will be shown with a single line. Process piping of 4" and larger will be shown with double lines. These standards may be modified for plot scales of 1/8" and smaller. Anything larger than a ¾" scale shall be drawn full scale.

**For Plan and Profile and/or Site Plan drawings**

For plot scales of 1"=20', 1"=30' or 1"=40' plan view utility piping smaller than 18-inch will be shown with a single line. Plan view utility piping 18-inch and larger with be shown with double lines. These standards may be modified for plot scales 1=50 and smaller.

1.04 Line Weights & Plot Styles

Line weights shall be set according to layers. Proposed object layers shall be set to 0.40mm thickness and existing object layers shall be set to the default thickness of 0.25mm. Hatch layers shall be set with a thickness of 0.05mm to fade into the background.

Drawings plotted at half scale shall have a separate plot style of half the regular style above. These plot styles can be saved and applied to each plot layout.

1.05 Drawing Naming

The lead technician initiating work on a project is responsible for creating and distributing the title block information to all other technicians who will be involved on the project. The lead technician shall create a drawing of the title block area from the standard title block drawing.

The drawing shall be named as indicated below:

**Applies to regular AutoCad drawings:**
U:\ACADDATA\STD\……..for Standard Drawings
U:\ACADDATA\MISC\……for Miscellaneous Drawings
U:\ACADDATA\SEWER\…for Sewer Projects created w/o Land Development
U:\ACADDATA\WATER\…for Water drawings created w/o Land Development

**For Land Development Desktop Project files:**
U:\ACADDATA\LANDPROJ ***PROJECT NAME***\DWG\…..

The above ***"PROJECT NAME"*** shall be described with the official project number and name, obtainable from the Official Project List maintained by the Customer Service Specialist, but not limited by a precise number of characters; be concise with the project name. Then the name of the drawing shall be descriptive of the drawing itself, (ie., beginning with the sheet number and a brief name of the drawing.) It is the discretion of the drafter to name the drawing with the best, short descriptive name for the drawing.

Land Development Desktop projects share a common database from within the current project folder. Thus, all the drawings that pertain to that project shall be saved under the same project folder in the "DWG" folder.

1.06 MARK-UPS

When marking up a print for corrections or additions the following colors should be used.

Red - for additions or corrections that are to be made.
Yellow – to indicate work that has been addressed.
Pencil – for drafting information only (i.e. sizes, dimensions or instructions not to be placed on the drawings).

1.07 LAYERING SYSTEM: **CURRENTLY BEING UPDATED….**

As a rule, use the following system for layering:

See Figure 1.07

1.08 HATCH PATTTERNS

AutoCAD's hatch patterns are to be used to show certain types of materials used in construction. Consistency is to be used between drawings. A number of standard hatch patterns are boxed with AutoCad. User defined hatch patterns are not transferred with the drawing unless packaged with the E-transmit command.

## Part II. Legends and Symbols

2.01 PIPE LEGEND

The following standard legends are to be used on all construction drawings. The legends, with the exception of plan and profile sheets, are intended so as to avoid notation of each item.

See Figure 2.01 (below)

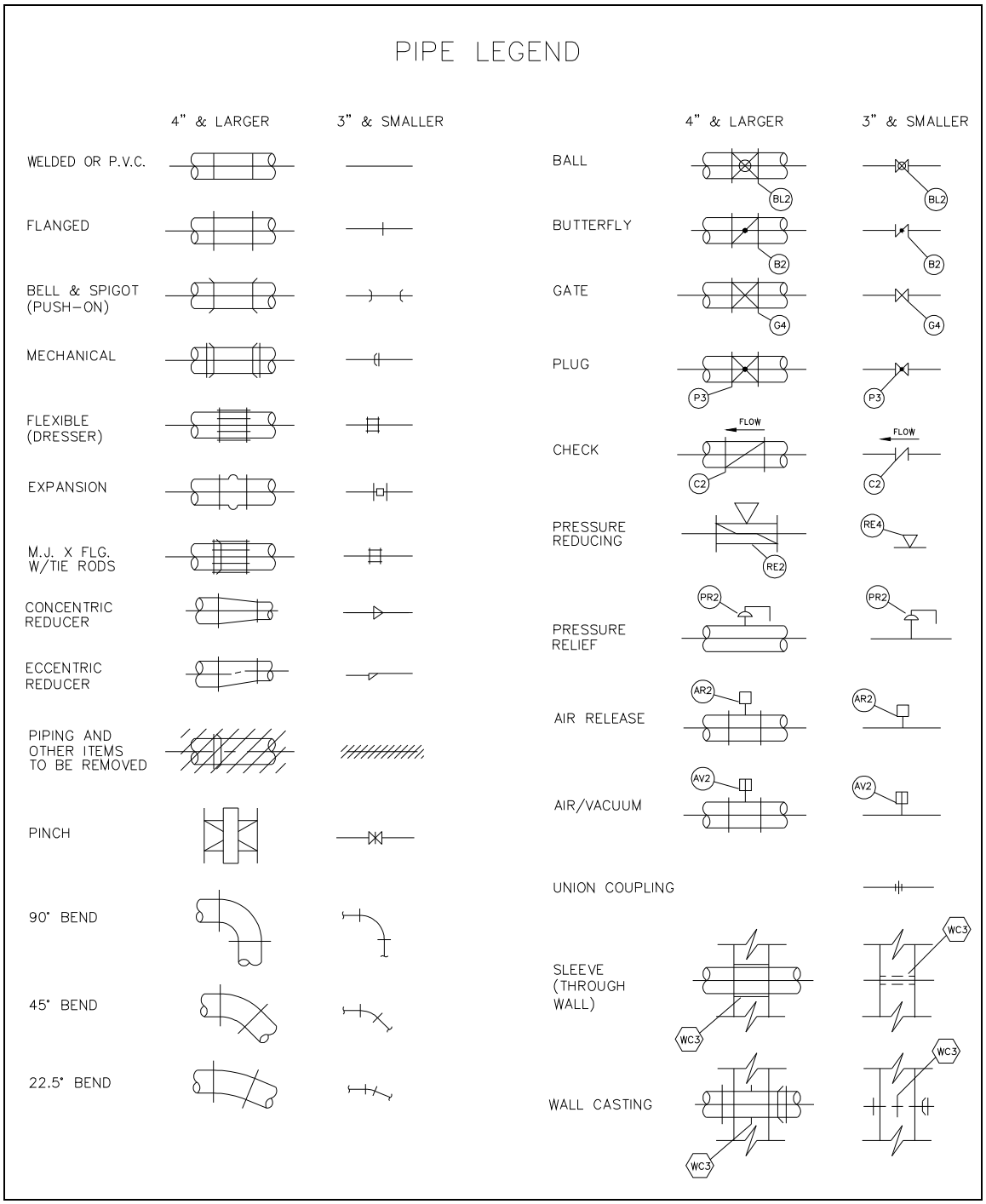

PIPE LEGEND
4" & LARGER
3" & SMALLER
WELDED OR P.V.C.
FLANGED
BELL & SPIGOT (PUSH-ON)
MECHANICAL
FLEXIBLE (DRESSER)
EXPANSION
M.J. X FLG. W/TIE RODS
CONCENTRIC REDUCER
ECCENTRIC REDUCER
PIPING AND OTHER ITEMS TO BE REMOVED
PINCH
90° BEND
45° BEND
22.5° BEND
4" & LARGER
3" & SMALLER
BALL
BL2
BUTTERFLY
B2
GATE
G4
PLUG
P3
CHECK
FLOW
C2
PRESSURE REDUCING
RE2
RE4
PRESSURE RELIEF
PR2
AIR RELEASE
AR2
AIR/VACUUM
AV2
UNION COUPLING
SLEEVE (THROUGH WALL)
WC3
WALL CASTING
WC3

Figure 2.01

## 2.02 PIPE FITTINGS

Pipe fittings may be inserted from the standard pipe fittings menu

## 2.03 GENERAL PLAN SYMBOLS

Plan and profile line legends shall adhere to the following figure.

Figure 2.03

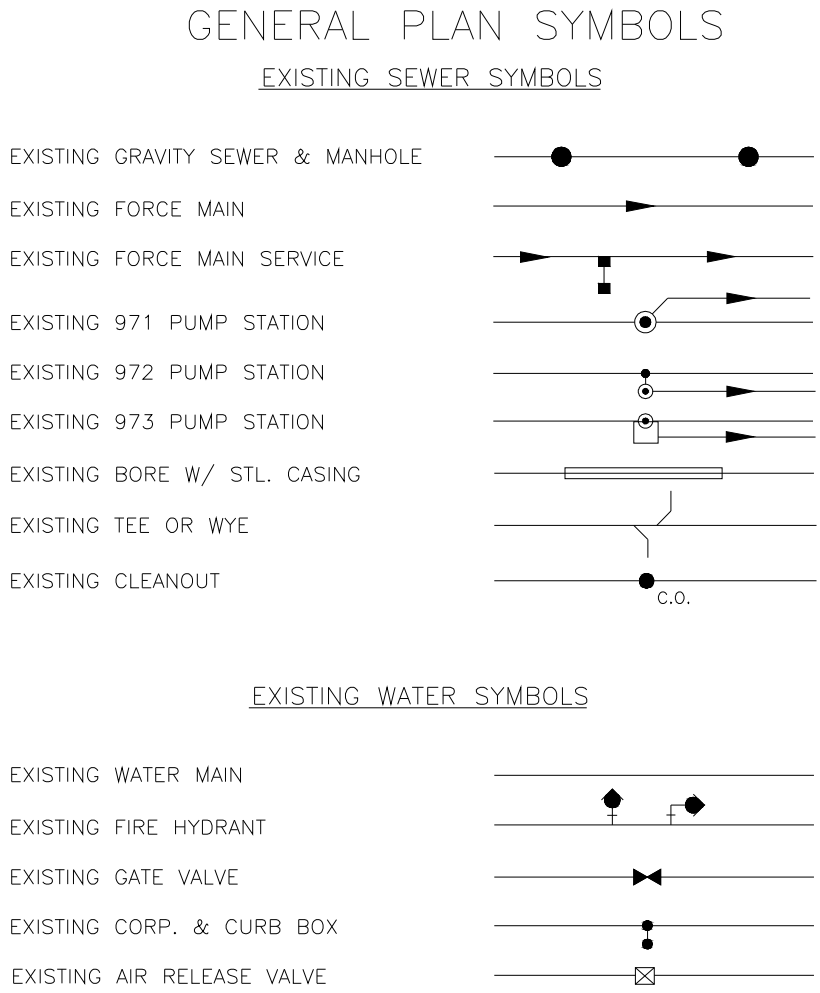


Figure 2.03 continued…

## FUTURE SEWER SYMBOLS

PROPOSED GRAVITY SEWER & MANHOLE

PROPERTY FORCE MAIN

PROPOSED FORCE MAIN SERVICE

PROPOSED 971 PUMP STATION

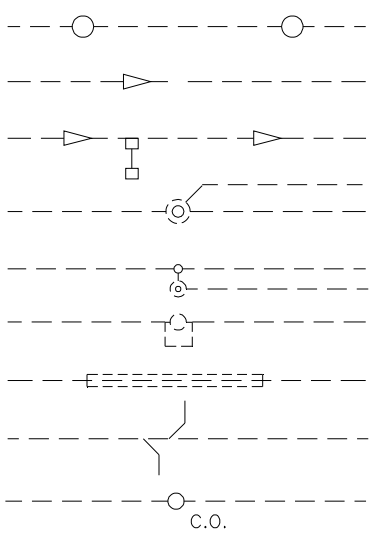
PROPOSED 972 PUMP STATION

PROPOSED 973 PUMP STATION

PROPOSED BORE W/ STL. CASING

PROPOSED TEE OR WYE

PROPOSED CLEANOUT




## FUTURE WATER SYMBOLS

PROPOSED WATER MAIN

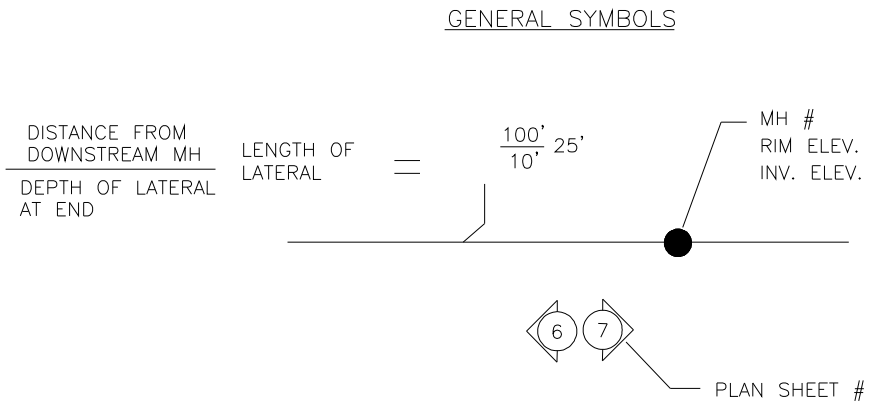
PROPOSED FIRE HYDRANT

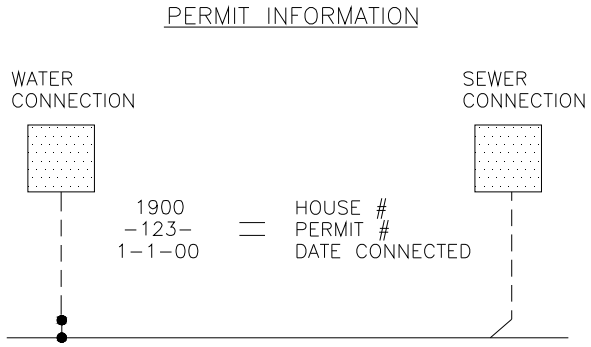
PROPOSED GATE VALVE

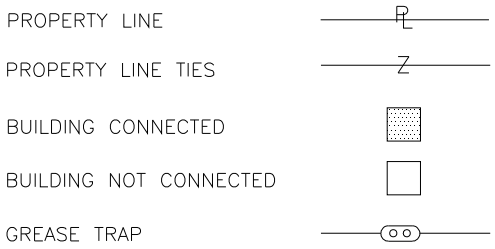
PROPOSED CORP. & CURB BOX

PROPOSED AIR RELEASE VALVE

Figure 2.03 continued…



## 2.04 PLAN AND PROFILE SYMBOLS

Figure 2.04

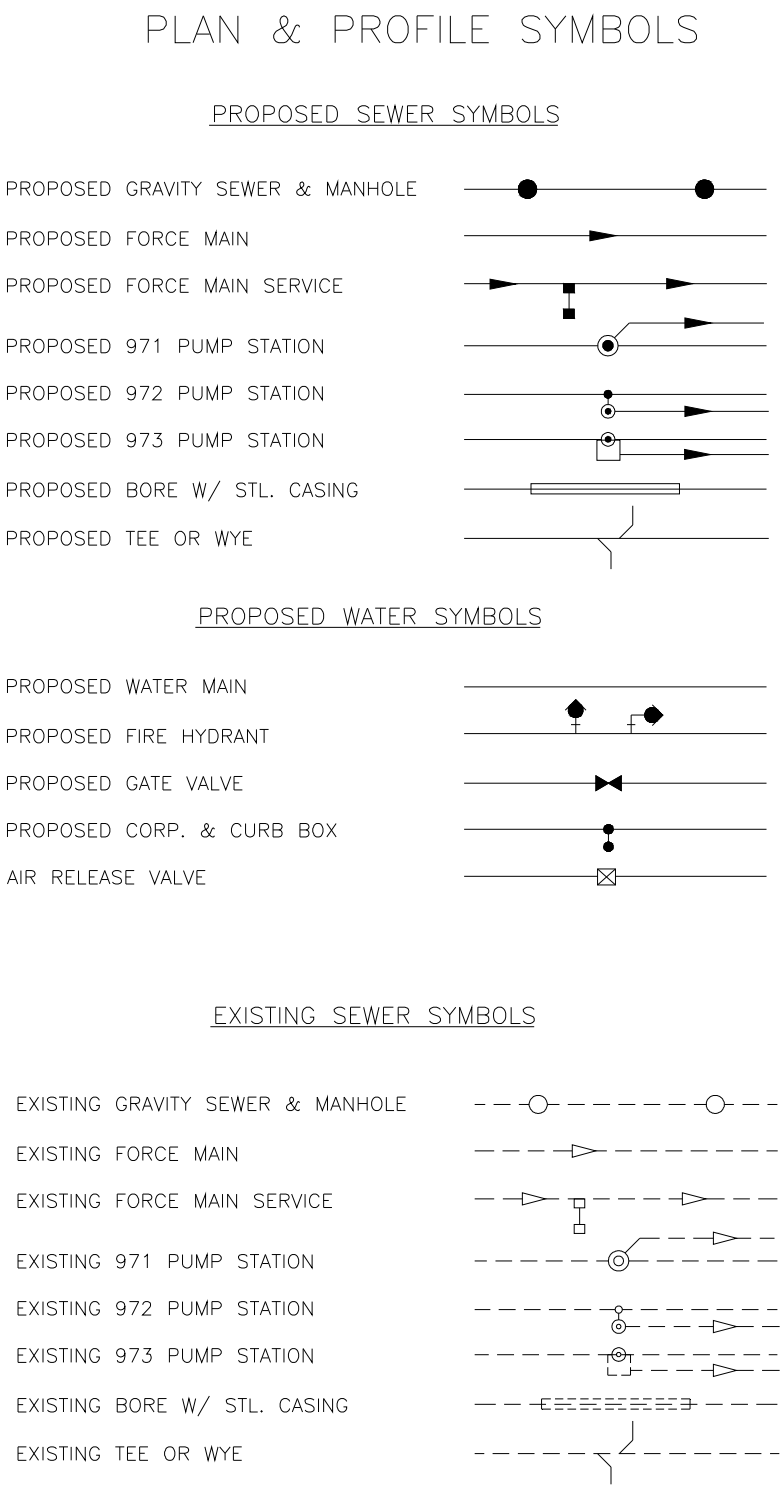
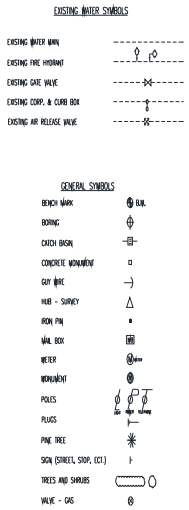
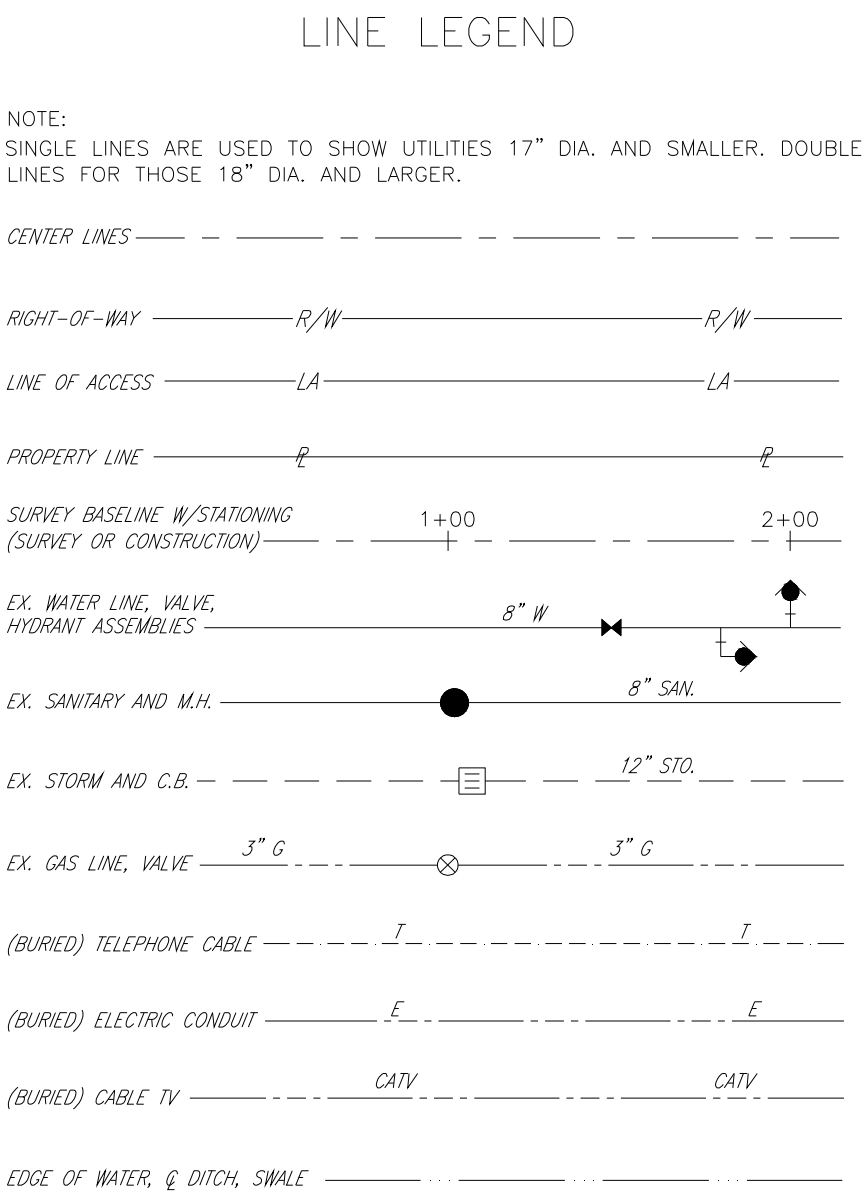


Figure 2.04 continued…



## MISCELLANEOUS LINE LEGEND

Figure 2.05



2.06 STANDARD TITLE SHEET

The standard prototype Portage County Water Resources Title sheet can be found on the server in the Standard folder and with the name of "STDTITLE.DWG". In some cases the text may need to be changed to accommodate more lines of text, drawing lists, quantities and approvals. Do not change the grouping of the information without consulting the Project Engineer. Any other modifications should be kept to a minimum. The project location map should be inserted at the specified scale.

See Figure 2.06

2.07 STANDARD BORDER FRAME

The standard border frame is drawn at 1=1 and saved in the Standard folder on U:\
When inserting into a drawing, use the intended scale of the drawing scale.

See Figure 2.07

## Part III Dimensioning and Labeling

3.01 BASIC PRACTICES

The following check list summarizes some common dimensioning conventions used to reduce mistakes.

- Use spell check
- Each dimension should be given clearly, so that it can be interpreted in only one way.
- Dimensions should not be duplicated or information given two different ways. No dimensions shall be given except those that are needed for construction or estimated quantities.
- Dimensions should be given between centerlines or wall surfaces that have a functional relation to each other or that control the location of openings or access ways.
- Dimensions should be given so that it will not be necessary for the contractor to calculate, scale or assume any dimensions.
- Dimensions should be attached to the view where the shape is best shown.
- Avoid dimensioning to hidden lines.
- Dimensions should not be placed upon a view unless shown with clarity and long extension lines are avoided.

- Dimensions applying to two adjacent views should be placed between views, unless clearness is promoted by placing some of them outside.

- The longer dimensions should be placed outside all intermediate dimensions so that dimension lines will not cross extension lines.

## 3.02 PLACEMENT OF DIMENSIONS AND EXTENSION LINES

The correct placement of dimension lines and extensions is crucial to the legibility of the drawing. Shorter dimensions should be closest to the object while longer dimensions shall be placed outside and beyond the shorter dimensions. The crossing of extension lines shall be avoided this way. Extension lines shall never form a continuation of any line of the drawing to avoid confusion. Hidden lines should never be dimensioned unless no other view is available to show that dimension.

## 3.03 NOTES

Some dimensions may need to be supplemented with notes. They should be brief and carefully worded to be capable of one interpretation. Notes should be lettered horizontally on the sheet and arranged in a systematic manner. They should not be lettered in crowded places. Avoid placement of notes between views where possible. The notes should be placed next to the correct view where application is needed so as to not confuse the reader. Leaders should not cross intersections, specific points or corners of objects in the drawing and cross as few lines as possible.

Notes are classified as “general notes” that apply to the entire drawing. “Local notes” are notes the apply to specific items.

General notes should be lettered in the lower right-hand corner of the drawings, above or to the left of the title block, or in a central position below the view to which they apply.

## 3.04 ADDITIONAL INFO

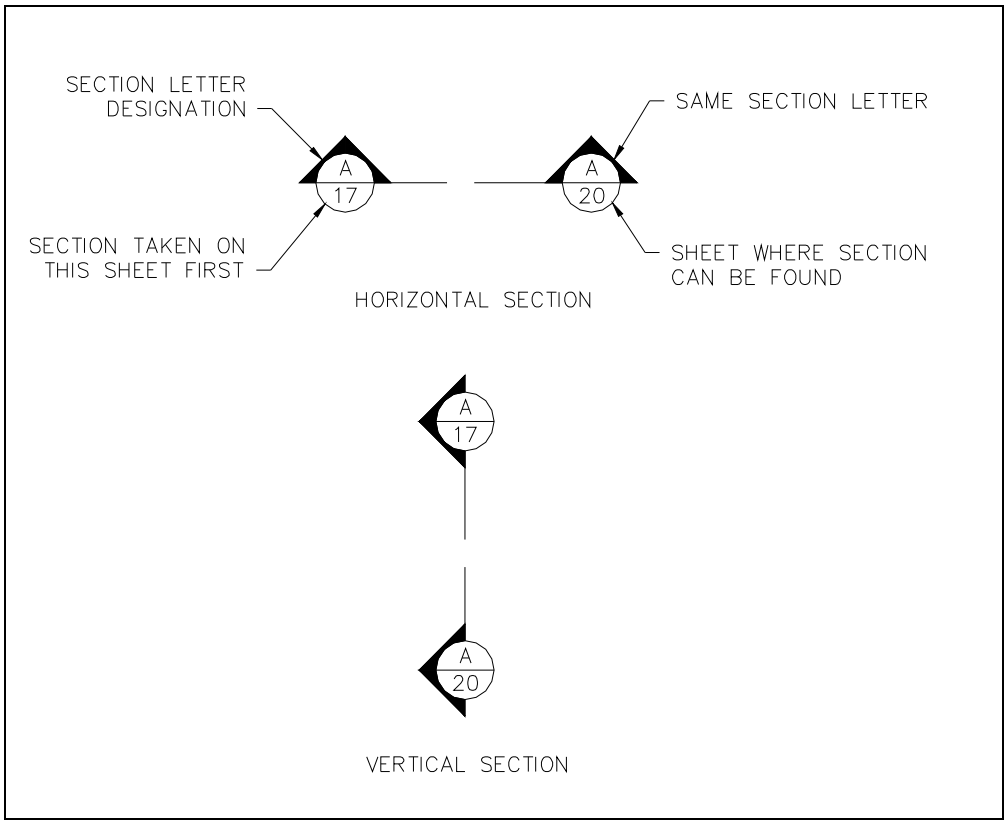
The main purpose of a plan view is to show equipment and piping relative to architectural space requirements.

Equipment and piping layout in plan view should be dimensioned from inside face of walls to important centerlines such as discharge and suction piping or centers of pump pads. In addition to pipe material, size and flow direction should also be indicated in both plan and section views. (ie., 6” DIP blower pump discharge).

Titles for plan views are to be labeled with reference to the elevation from which the plan is viewed and not the floor elevation. A plan “cut” five feet above a floor having an elevation of 985.00 would be labeled “PLAN @ EL. 990.00.

The cutting plane arrows used on architectural, process, structural, plumbing, HVAC and electrical plan views are shown here:

Figure 3.04




The corresponding sectional view is to be labeled as follows with the appropriate scale:

SECTION A17 – A20
SCALE: 1/4" = 1'-0"

Please note the left justification of the scale. Cutting plane arrows can be selected from the symbols library.

3.05 STANDARD ABBREVIATIONS

See the attached Figure 3.05 standard abbreviations for commonly used standard abbreviations that may be used on the drawings at any time.

## Part IV Drafting Administration

4.01 DRAWING FILES

Drawing files are stored on the Network server. The location is as follows:

**U:\ACADDATA\SEWER*Project Name**DWG Name*** (for sewer drawings done without Land Development Desktop). The drafter puts the project name and drawing name on the drawing.
**U:\ACADDATA\WATER*Project Name**DWG Name*** (for water drawings done without Land Development Desktop)

**U:\ACADDATA\LANDPROJ R2*Project Name*\DWG*DWG Name*** (for drawings done with Land Development Desktop)

Note: Any drawings not saved on Network Drive U:\ will **not** be backed up by the server tape backup.

When saving a drawing and choosing a drawing name, a folder shall be created with the project name and the drawing shall be saved with a descriptive name into the respective project folder.

Drawings received on disk by surveyors and or consultants are to be copied onto the server under their respective project folder and the disk(s) shall be logged in to the data received log book.

## 4.01 PLOTTING PROCEDURES

Drawings are plotted on paper and official title sheets for signatures are plotted on mylar. As-built drawings are plotted to mylar and stored in the hanging file.

## 4.02 STANDARD DETAIL MANAGEMENT

Water Resources Standard drawings are saved on the network drive on u:\acaddata\standard\ and are not to be altered or changed unless requested by the construction engineer or the engineering department itself. These drawings consist of standard water and sewer construction details, a title sheet, pump station drawings and miscellaneous drawings. Changes are submitted to the Engineering Division Manager for final approval.

Drawings are drawn at a scale of 1=1 and then plotted at the matching dimscale or the intended plot scale.

## 4.03 SPECIAL NOTES LIBRARY

Special notes are drawn at a scale of 1=1 and saved in the U:\Acaddata\Standard folder. They may be accessed and inserted into a drawing at the intended scale of the drawing.

## 4.04 GENERAL NOTES LIBRARY

General notes are drawn at a scale of 1=1 and saved in the U:\Acaddata\Standard foler. These may be accessed and inserted into a drawing at the intended scale of the drawing.